

March 2020

Taxonomy and Systematics of the New Zealand Pselaphini (Coleoptera: Staphylinidae: Pselaphinae)

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**TAXONOMY AND SYSTEMATICS OF THE NEW ZEALAND
PSELAPHINI (COLEOPTERA: STAPHYLINIDAE: PSELAPHINAE)**

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Entomology

by
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B.S., Tulane University, 2012
M.S., Louisiana State University, 2014
May 2020

ACKNOWLEDGEMENTS

I thank Crystal Maier, (FMNH), John T. Nunn (Dunedin, New Zealand), Richard Leschen (Landcare Research, Auckland, New Zealand), John Marris (Lincoln University, Lincoln, New Zealand), Beulah Garner (NHM), and Donald S. Chandler (Durham, New Hampshire, USA) for the loan of valuable specimens and their comments and valuable contributions to my work, and Roger G. Booth (NHM) for helping with type examinations. I also thank Margaret K. Thayer (FMNH), Alfred F. Newton (FMNH), Donald S. Chandler (Durham, New Hampshire, USA), and Richard Leschen (Landcare Research, Auckland, New Zealand) for continued insight and encouragement, during both this project and my career as a graduate student. Travel to museums was funded in part by the Ernst Mayr Travel Grant (Museum of Comparative Zoology, Harvard University) and the GSREA (Coleopterists' Society) to Brittany Owens.

I thank LSAM members (past and present), Igor Sokolov, Alexey Tishechkin, Michael Ferro, Jong-Seok Park, Forest Huval, Ilgoo Kang, and Able Chow for the many adventures and valuable lessons beyond the lab; my experience would not be complete without their place in my journey. I thank my committee members, David Dismukes, Michael Kaller, Rodrigo Diaz, and Michael Stout for their advice and support throughout my program and in my academic life. I especially thank Mike Stout and James Ottea for their support on my committee for my M.S. degree. I thank Dr. Brant Faircloth and his student, Jessie Saltzer, for their donation of lab space and expertise in aiding my first pass at a molecular resolution of the Pselaphinae. I thank Victoria Bayless (curator, LSAM) for her constant encouragement, insight, guidance, conversation, and friendship, and for her confidence in me as a researcher and a person during this strange and exciting journey. I thank Chris Carlton for his initial confidence in me as a M.S. student and for his continued support during my Ph.D. program. He always trusted my decisions and shared his appreciation of the wonders of the natural world, great and small. Most of all, he taught me much about being both a researcher and a human.

This research would not be the same without the support of my family. My father (Jace Owens) and mother (Amy Owens) trusted my dream to become an entomologist from the time I was in second grade. I could not have had better cheerleaders and guides along the way. My husband, Keith Credo, shared his life with me and believed in me as I pursued my dreams and goals. His encouragement and friendship along this crazy journey can not be overestimated. Many other family members and friends also supported my dream- their encouragement of this Ph.D. and this research is acknowledged and cherished.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	ii
LIST OF FIGURES.....	v
ABSTRACT.....	ix
CHAPTER 1. INTRODUCTION.....	1
1.1. INTRODUCTION TO THE PSELAPHINAE.....	1
1.2. INTRODUCTION TO THE NEW ZEALAND FAUNA.....	5
1.3. INTRODUCTION TO THE TRIBE PSELAPHINI.....	6
CHAPTER 2. MATERIALS AND METHODS.....	12
2.1. SPECIMENS.....	12
2.2. PERMANENT SLIDE PREPARATIONS.....	12
2.3. TERMINOLOGY AND MAPS.....	12
2.4. GENUS AND SPECIES BOUNDARIES.....	13
2.5. NOTES ON BROUN TYPES AND LECTOTYPE DESIGNATIONS.....	14
2.6. MORPHOLOGICAL PHYLOGENETIC ANALYSIS.....	14
2.7. MOLECULAR PHYLOGENETIC ANALYSIS.....	19
CHAPTER 3. REVISION OF THE NEW ZEALAND PSELAPHINI.....	21
3.1. REVISION OF THE GENUS <i>PSELAPHAULAX</i>	22
3.2. REVISION OF THE GENUS <i>PSELAPHOGENIUS</i>	48
3.3. <i>PSELAPHOPHUS</i> : REDESCRIPTION AND NOTES.....	87
3.4. <i>PSELAPHOTHESEUS</i> : CLARIFICATION OF TYPE STATUS AND NOTES....	91
3.5. DESCRIPTION OF THE GENUS <i>PSELAPHOTUMULUS</i>	93
3.6. PSELAPHINI OF THE NEW ZELAND OFFSHORE ISLANDS.....	111
3.7. MONOTYPIC GENERA OF THE NEW ZEALAND PSELAPHINI.....	129
CHAPTER 4. PHYLOGENETIC RESULTS.....	153
4.1. MORPHOLOGICAL RESULTS.....	153
4.2. MOLECULAR RESULTS.....	154
4.3. MORPHOLOGICAL CHARACTER ANALYSIS.....	154
CHAPTER 5. SUMMARY AND CONCLUSIONS.....	163
APPENDIX A. TAXA USED IN MORPHOLOGICAL PHYLOGENY.....	165
APPENDIX B. DATA MATRIX FOR MORPHOLOGICAL PHYLOGENY.....	172
APPENDIX C. TAXA USED IN MOLECULAR PHYLOGENY.....	173
APPENDIX D. WORLD CATALOGUE OF GENERA OF THE TRIBE PSELAPHINI.....	175

APPENDIX E. CATALOGUE OF THE TRIBE PSELAPHINI IN NEW ZEALAND.....	181
REFERENCES.....	188
VITA.....	200

LIST OF FIGURES

Figure 1. Morphological diversity of Pselaphinae.....	2
Figure 2. Inset image detailing example of pselaphine fovea.....	3
Figure 3. Phylogenetic tree of Pselaphinae supertribes (<i>sensu</i> Newton and Thayer, 1995).....	4
Figure 4. Phylogenetic tree of some higher-level relationships within the Pselaphinae (<i>sensu</i> Parker and Grimaldi, 2013)	8
Figure 5. Diagnostic characters of the New Zealand Pselaphini.....	13
Figure 6. <i>Pselaphaulax pauper</i> (Sharp) male, habitus photographs.....	25
Figure 7. <i>Pselaphaulax</i> species groups diagnostic characters.....	26
Figure 8. Map of localities where <i>Pselaphaulax</i> “ <i>intermedius</i> ” specimens have been collected and aedeagus illustrations.....	31
Figure 9. Map of localities where <i>Pselaphaulax</i> “ <i>hornabrooki</i> ” specimens have been collected and aedeagus illustrations.....	33
Figure 10. Map of localities where <i>Pselaphaulax meliusculus</i> (Broun) specimens have been collected and aedeagus illustrations.....	35
Figure 11. Map of localities where <i>Pselaphaulax</i> “ <i>pelorus</i> ” specimens have been collected and aedeagus illustrations.....	37
Figure 12. Map of localities where <i>Pselaphaulax pilifrons</i> (Broun) specimens have been collected and aedeagus illustrations.....	38
Figure 13. Map of localities where <i>Pselaphaulax</i> “ <i>ramsayi</i> ” specimens have been collected and aedeagus illustrations.....	41
Figure 14. Map of localities where <i>Pselaphaulax</i> “ <i>tararua</i> ” specimens have been collected and aedeagus illustrations.....	42
Figure 15. Map of localities where <i>Pselaphaulax</i> “ <i>nunni</i> ” specimens have been collected and aedeagus illustrations.....	46
Figure 16. Map of localities where <i>Pselaphaulax pauper</i> (Sharp) specimens have been collected and aedeagus illustrations.....	47
Figure 17. Dorsal and lateral habitus of <i>Pselaphogenius</i> species groups.....	50

Figure 18. Illustrations of <i>Pselaphogenius</i> species groups diagnostic characters.....	51
Figure 19. Illustrations of meso- and metaventrite of <i>Pselaphogenius</i> males.....	58
Figure 20. Map of localities where <i>Pselaphogenius caecus</i> (Broun) specimens have been collected and aedeagus illustrations.....	59
Figure 21. Map of localities where <i>Pselaphogenius “calantica”</i> specimens have been collected and aedeagus illustrations.....	60
Figure 22. Map of localities where <i>Pselaphogenius “chandleri”</i> specimens have been collected and aedeagus illustrations.....	61
Figure 23. Map of localities where <i>Pselaphogenius “cornus”</i> specimens have been collected and aedeagus illustrations.....	62
Figure 24. Map of localities where <i>Pselaphogenius delicatus</i> (Broun) specimens have been collected and aedeagus illustrations.....	63
Figure 25. Map of localities where <i>Pselaphogenius “elephantus”</i> specimens have been collected and aedeagus illustrations.....	66
Figure 26. Map of localities where <i>Pselaphogenius “fimbria”</i> specimens have been collected and aedeagus illustrations.....	67
Figure 27. Map of localities where <i>Pselaphogenius “jiawei”</i> specimens have been collected and aedeagus illustrations.....	68
Figure 28. Map of localities where <i>Pselaphogenius “kangi”</i> specimens have been collected and aedeagus illustrations.....	70
Figure 29. Map of localities where <i>Pselaphogenius “moerewae”</i> specimens have been collected and aedeagus illustrations.....	71
Figure 30. Map of localities where <i>Pselaphogenius “otteai”</i> specimens have been collected and aedeagus illustrations.....	73
Figure 31. Map of localities where <i>Pselaphogenius “parki”</i> specimens have been collected and aedeagus illustrations.....	74
Figure 32. Map of localities where <i>Pselaphogenius “stouti”</i> specimens have been collected and aedeagus illustrations.....	76
Figure 33. Map of localities where <i>Pselaphogenius ventralis</i> (Broun) specimens have been collected and aedeagus illustrations.....	77

Figure 34. Map of localities where <i>Pselaphogenius citimus</i> (Broun) specimens have been collected and aedeagus illustrations.....	82
Figure 35. Map of localities where <i>Pselaphogenius “dismukei”</i> specimens have been collected and aedeagus illustrations.....	84
Figure 36. Map of localities where <i>Pselaphogenius “gibbus”</i> specimens have been collected and aedeagus illustrations.....	85
Figure 37. Map of localities where <i>Pselaphogenius “kalleri”</i> specimens have been collected and aedeagus illustrations.....	86
Figure 38. Map of localities where <i>Pselaphogenius “lescheni”</i> specimens have been collected and aedeagus illustrations.....	87
Figure 39. Map of localities where <i>Pselaphophus atriventris</i> Westwood specimens have been collected in New Zealand, habitus photograph.....	91
Figure 40. <i>Pselaphotheseus ihupuku</i> Carlton and Leschen dorsal and lateral habitus Photograph.....	92
Figure 41. Dorsal habitus of <i>Pselaphotumulus</i> sp.....	95
Figure 42. Diagnostic characters of <i>Pselaphotumulus</i> species.....	97
Figure 43. Map of localities where <i>Pselaphotumulus aorerei</i> and <i>P. cavelli</i> specimens have been collected.....	100
Figure 44. Map of localities where <i>Pselaphotumulus dubius</i> and <i>P. oviceps</i> specimens have been collected.....	103
Figure 45. Map of localities where <i>Pselaphotumulus unus</i> and <i>P. urquharti</i> specimens have been collected.....	107
Figure 46. Illustrations of meso- and metaventrite characters of <i>Pselaphotumulus</i> species males.....	109
Figure 47. Illustrations of aedeagi of <i>Pselaphotumulus</i> species.....	110
Figure 48. Map of New Zealand highlighting offshore islands.....	114
Figure 49. Map of localities where <i>Pselaphaulax caeruleus</i> specimens have been collected; habitus photograph of <i>P. caeruleus</i> ; illustrations of <i>P. caeruleus</i> aedeagus.....	116
Figure 50. Map of localities where <i>Pselaphaulax dracophyllum</i> specimens have been collected; habitus photograph of <i>P. dracophyllum</i> ; illustrations of aedeagus.....	118

Figure 51. Map of localities where <i>Pselaphaulax flavus</i> specimens have been collected; habitus photograph of <i>P. flavus</i> ; illustrations of <i>P. flavus</i> aedeagus.....	120
Figure 52. Map of localities where <i>Pselaphaulax traversi</i> specimens have been collected; habitus photograph of <i>P. traversi</i> ; illustrations of <i>P. traversi</i> aedeagus.....	122
Figure 53. Map of localities where <i>Pselaphopluteum motumaha</i> specimens have been collected; habitus photographs of <i>P. motumaha</i> ; illustrations of <i>P. motumaha</i> aedeagus.....	125
Figure 54. “ <i>Pselaphazealus</i> ” <i>sulcicollis</i> (Broun) photographs, line drawings, and map of localities where specimens have been collected.....	136
Figure 55. “ <i>Pselaphoaotearoa rugosus</i> ” photographs, line drawings, and map of localities where specimens have been collected.....	139
Figure 56. “ <i>Pselapholateralis</i> ” <i>cavidorsis</i> (Broun) photographs, line drawings, and map of localities where specimens have been collected.....	142
Figure 57. “ <i>Pselapholobus</i> ” <i>dulcis</i> (Broun) photographs, line drawings, and map of localities where specimens have been collected.....	145
Figure 58. “ <i>Pselaphopegasus stewarti</i> ” photographs, line drawings, and map of localities where specimens have been collected.....	148
Figure 59. “ <i>Pselaphotuberculum chandleri</i> ” photographs, line drawings, and map of localities where specimens have been collected.....	151
Figure 60. Consensus tree of maximum parsimony analysis of morphological data.....	155
Figure 61. Consensus tree with character states for character 16 (gular process) mapped; a) Group A, b) Group B, and c) Group C.....	156
Figure 62. Consensus tree with character states for character 24 (maxillary palpomere) mapped; a) Group A, b) Group B, and c) Group C.....	158
Figure 63. Consensus tree with character states for character 41 (antebasal sulcus) mapped; a) Group A, b) Group B, and c) Group C.....	159
Figure 64. Consensus tree with character states for character 50 (setose fovea on mesoventral shield) mapped; a) Group A, b) Group B, and c) Group C.....	160

ABSTRACT

The New Zealand (NZ) Pselaphini was revised at the species level, a phylogenetic analysis was performed using morphological data, and first steps were taken towards the construction of a molecular analysis of the tribe. Eight new genera and 33 new species were discovered from specimens collected from the NZ mainland, offshore islands, Chatham Islands and the Subantarctic Islands. Of the 13 species originally described in the genus *Pselaphus* by Thomas Broun during the late 19th and early 20th centuries, all were either reassigned to the genera *Pselaphaulax* and *Pselaphogenius*, or were placed into new genera. Three names were synonymized in the genus *Pselaphaulax*. Four new genera, “*Pselaphoaotearoa*”, “*Pselaphopegasus*”, “*Pselaphopluteum*”, and “*Pselaphotuberculum*” were described from new species. The new genera “*Pselaphazealus*”, “*Pselapholateralis*”, “*Pselapholobus*”, and “*Pselaphotumulus*” were designated based on species originally described in the genus *Pselaphus*. The two genera *Pselaphaulax* and *Pselaphogenius* were revised at the species level. The single NZ exemplar of the genus *Pselaphophus*, *Pselaphophus atriventris* Westwood, was redescribed. The status of the type specimen for *Pselaphotheseus ihupuku* Carlton and Leschen was clarified. These revisional studies bring the numbers of New Zealand Pselaphini from 19 species in four genera to 52 species within 12 genera. Of these 12 genera, 8 are apparently endemic to NZ. A morphological tree was reconstructed based on 65 taxa and 111 morphological characters. The consensus tree supported the cohesion of NZ exemplars in the two genera *Pselaphaulax* and *Pselaphogenius*, and did not support the division of these genera according to the “species groups” instituted as aids to identification in the generic revisions. Additionally, the tree also supports the removal of all NZ exemplars previously placed in *Pselaphus* by Broun in the revisionary work. A close alliance between NZ, Asian, Australian, and New Caledonian taxa is supported by this tree. A first attempt at a molecular phylogenetic analysis was pursued for 48 taxa utilizing protocols for ultraconserved elements. This project was halted prior to sequencing due to poor quality of PCR products post-amplification, highlighting issues for future projects aimed at resolving phylogenies of disparate pselaphine genus-group taxa.

CHAPTER 1. INTRODUCTION

1.1. INTRODUCTION TO THE PSELAPHINAE

Staphylinidae is the largest family of beetles and the most diverse family of multicellular animal life on earth, containing about 60,000 named species and an even greater number of undescribed species. The Pselaphinae Latreille is the second most diverse subfamily in this taxon, including approximately 10,000 named species and 1200 genera worldwide (Thayer 2005). Treatments of staphylinid taxonomy have consistently placed the Pselaphinae as a monophyletic taxon within the omaliine group of staphylinid subfamilies (Newton and Thayer 1995; Newton *et al.* 2001; Thayer 2005).

Despite the wealth of morphological diversity present within this subfamily (Figure 1), pselaphines are strikingly morphologically distinct from other staphylinids and all other beetles. They are generally small, with an average body length of 1.5mm (approximately 0.8-7.0 mm range), and possess a robust body plan of limited flexibility, antennae with a distinct club (except Supertribe Faronitae), distinctive foveae on prosternum and elytra, tarsal formula 3-3-3 or apparently 2-2-2, and larvae with a pair of eversible organs on their frons that function as prey capture organs (except Faronitae) (Chandler 2001b; Newton and Thayer 1995).

This body plan is in contrast to the typically more elongate, flexible bodies characteristic of most other staphylinids. The robust body morphology is due to a heavily sclerotized body wall of consolidated sclerites and the proliferation of foveae: sclerotized, concentrically ringed invaginations of the exoskeleton that extend into the body cavity (Figure 2). Pselaphine foveae are hypothesized to derive from consolidation and invagination of sclerite sutural boundaries. Studies suggest they are both sensory and structural in function, although true function of all foveae remains a mystery (Chandler 2001b). The unique and remarkably consistent structure and arrangement of pselaphine foveae provide the most important set of characters defining the group's monophyly, with other less obvious characters contributing (Newton and Thayer 1995). The positional conservation of foveae in body-wall sclerites extends to many genus-group taxa, making them taxonomically and phylogenetically informative at the level of genus and higher. However, it should be noted that further examination of some groups (i.e. this study) has highlighted the unreliability of this system in some taxa, cautioning over-reliance upon this single morphological character system.

Due to this abundance of distinct characters and overall appearance, the Pselaphinae has been historically treated as the independent family, Pselaphidae. This taxonomic rank was questioned by a number of specialists throughout the 20th century, such as Raffray (1908), Park (1942), Jeannel (1950), Naomi (1985), and Thayer (1987). It was recognized that many of the diagnostic characters of the taxon, such as shortened elytra, are shared with a number of other subfamilies within the Staphylinidae (Newton and Chandler 1989). Additionally, the foveal system, an important character for the taxon, was recognized as autoapomorphic. Eventually, a morphological phylogenetic analysis of the Omaliine Group of staphylinid families (Newton and Thayer 1995) formally reduced the Pselaphidae to the rank of subfamily within the Staphylinidae (Pselaphinae), and downgraded the six former subfamilies of pselaphines to supertribes: Faronitae, Euplectitae, Batrisitae, Pselaphitae, and Clavigeritae (Figure 3). With the exception of the division of the former Faroninae into the Faronitae and Bythinoplectitae (Newton and Thayer 1995) and the subsequent transfer of the Bythinoplectitae into the Euplectitae (Chandler 2001b), this supertribe system has remained stable and forms the basis of current classifications.



Figure 1. Morphological diversity of Pselaphinae. a) Faronitae, *Sonoma* sp.; b) Euplectitae, *Eutyphlus similis*; c) Goniaceritae, *Pselaptrichus rainierensis*; d) Batrisitae, *Batrisodes* sp.; e) Pselaphitae, *Pselaphaulax* sp.; f) Clavigeritae, *Adranes lecontei*.

In a global, ecological context, the Pselaphinae are widespread, abundant members of the forest litter fauna and are known to be micro-predators of organisms such as mites, worms, and springtails (DeMarzo and Vit 1982; Park 1947; Schomann *et al.* 2008). They may also be found in non-forest habitats, including grasslands and deserts, where they are typically associated with riparian areas or live as inquilines of social insects. Pselaphines exhibiting myrmecophilous life styles often exhibit extreme morphological and behavioral modifications that have generated interest in understanding the spectrum of adaptations associated with this lifestyle (Parker and Maruyama 2013; Lapeva-Gjonova 2013). Ecological studies have also highlighted the sensitivity

of these beetles to ecological changes and disturbances, especially those affecting forest floral compositions and age structure (Chandler 1987; Chandler 2001b). For ecosystem studies that consider the essential role of the forest-floor community in nutrient turnover, as well as overall system productivity and structure, pselaphines are ideal candidates as indicators of biodiversity, forest health, and trophic webs (Sakchoowong *et al.* 2008).



Figure 2. Inset image detailing example of pselaphine fovea.

Across the subfamily's global range, species richness of pselaphines is highest in the tropics, with single site diversity in tropical forests exceeding 200 species in some areas (Carlton *et al.* 2004). However, diversity of this subfamily has also been found to be impressively high in many temperate regions (Chandler 2001a, Jeannel 1962). Global diversity patterns differ significantly among the six supertribes of pselaphines. The Batrisitae and Clavigeritae exhibit highest

diversity in the tropics, while the Faronitae and the two largest tribes of the Euplectitae exhibit the highest levels of diversity in temperate regions. The Goniaceritae and Pselaphitae are represented in both tropical and temperate regions, making these groups especially relevant for biogeographic studies comparing these two faunal realms.

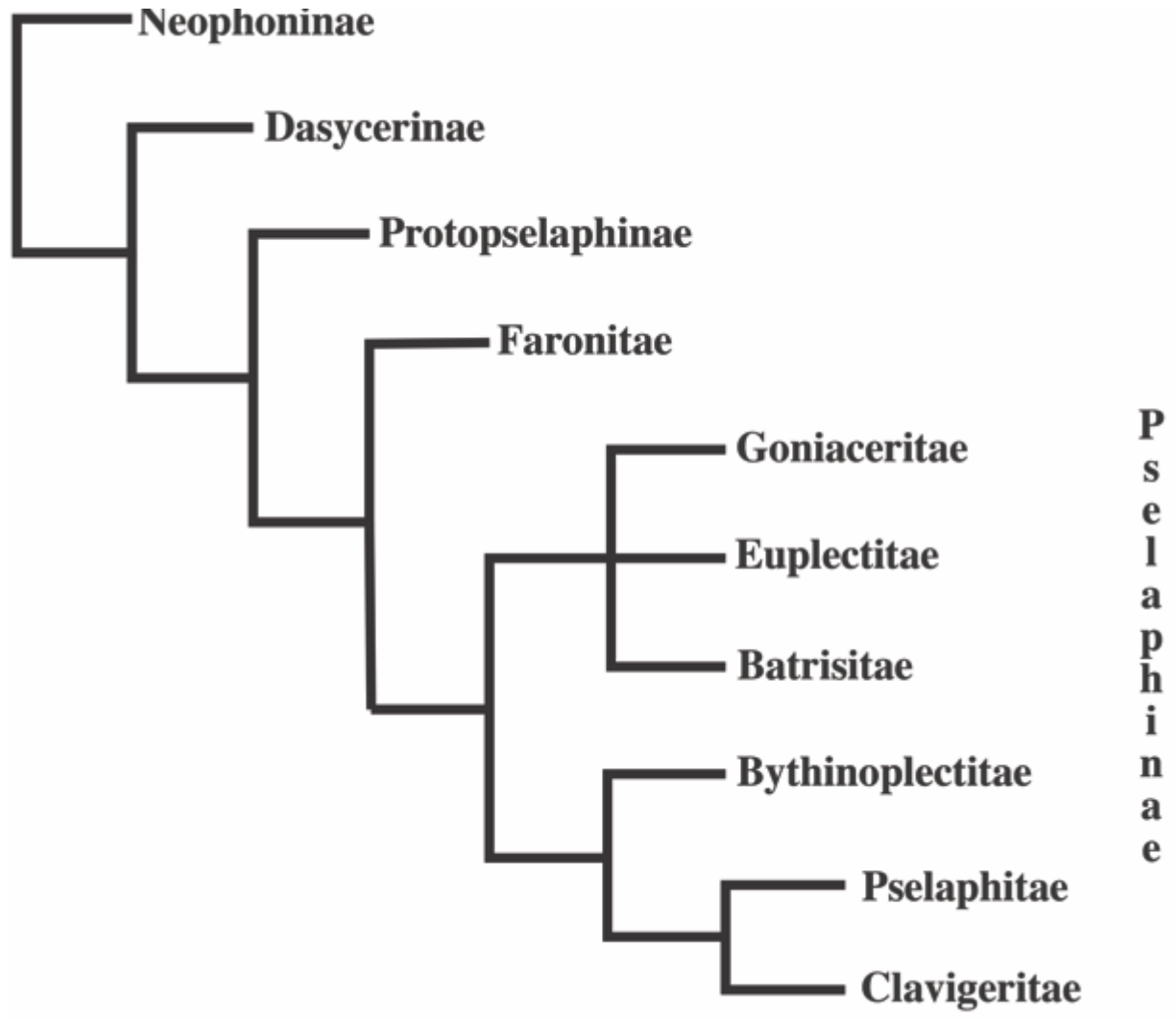


Figure 3. Phylogenetic tree of Pselaphinae supertribes (*sensu* Newton and Thayer, 1995).

Despite this impressive diversity and ecological importance, only a small number of pselaphine genus-group taxa have been treated phylogenetically (ex. Chandler 1988; Kurbatov and Lobl 2001; Kurbatov and Sabella 2008; Park 2015; Parker and Grimaldi 2014; Sabella 1998), highlighting the need for future phylogenetic studies of higher taxa, particularly at tribal and subtribal levels, which are promising levels for developing phylogenies across the subfamily. In addition, low dispersal abilities and microhabitat specificity of many species result in limited geographic ranges at the species level in many taxa. Species within some large genera (e.g., *Arianops* and *Sonoma*) are known only from single localities and even unique holotypes (Carlton 2008; Ferro and Carlton 2010). The global ubiquity and low vagility of many species make pselaphines a model group for addressing deep-time biogeographic questions, and for assessing

more recent processes of community restructuring and refugia formation influenced by mountain building, volcanism, and glaciation in a variety of regions.

1.2. INTRODUCTION TO THE NEW ZEALAND FAUNA

Modern-day New Zealand represents a small, ocean-bound region with an incredible diversity of habitats, a unique (and contentious) geologic history, and an incredibly diverse and highly endemic fauna, making it an area of special biological interest. New Zealand biogeography is complex and fraught with conflicting hypotheses (Heads 2017). Historically, the region has been viewed by most biogeographers as part of a Gondwanan complex of intermingled ancient and more recent lineages, the oldest of which date to the Gondwanan breakup during early Jurassic (Coope 2000; McLoughlin 2001; Laird and Bradshaw 2004; Stevens 1971). This places the dissolution of Gondwana at a critical evolutionary point in the diversification of insect fauna (Grimaldi and Engel 2005). Alternatively, some researchers have argued for post-Gondwanan faunal origins and complete submergence of New Zealand landmasses (Trewick *et al.* 2007). Hypotheses of chance dispersal from Australia (Sanmartin *et al.* 2006) is supported by the dating of faunal connections with Australia, Chile, and New Caledonia via land connections through arc systems or transarctic linkages (Liebherr *et al.* 2011).

On a more recent geologic time scale, studies of the post-Pliocene New Zealand fauna may be of interest to biogeographic studies aimed at investigating newer dispersals, divergences, and resulting diversity (e.g., the “beech gap” mystery; Leschen *et al.* 2008). Additionally, New Zealand has experienced a large amount of recent volcanism and glaciation (King 2000; Pulford and Stern 2004), undoubtedly allowing for subsequent diversification and radiation *in situ*. Studies targeting such relatively recent biogeographic histories have resulted in exploration of new methods and biogeographic theory (Marske *et al.* 2012). Functionally, New Zealand is small and geographically isolated from other landmasses by large stretches of ocean, concentrating the entire fauna in a small area with little transient drift from other regions. Modern infrastructure provides access to high altitude habitats, offshore islands, and deep forests, allowing researchers to conduct fieldwork with minimal time expenditure.

New Zealand’s long period of isolation from other Gondwanan landmasses (ca. 60-80 million years), has resulted in a unique faunal assemblage present nowhere else on earth. Phylogenetically important basal taxa exhibit diverse radiations or are present as relictual representatives and, in some cases, are conspicuously absent (Goldberg *et al.* 2008). The presence of an extant species of the archaic reptile family Sphenodontidae (tuatara) (Jones *et al.* 2009), basal taxa of passerine birds (Ericson *et al.* 2002), a notable radiation of basal ratite birds (moas) (Cooper *et al.* 2001), and the absence of native terrestrial mammals and snakes all point towards this long period of isolation and resulting independent evolution of New Zealand faunal elements. Similar patterns of endemism are evident in invertebrates, notably among a unique assemblage of small beetles represented in New Zealand by four endemic families (Leschen *et al.* 2003; Leschen *et al.* 2010). Not surprisingly, pselaphines also exhibit interesting patterns of diversity and absences. The large diversity of members of the supertribe Faronitae fits into the basal taxon profile. Faronites are hypothesized as the sister taxon to all other pselaphine lineages and are remarkably diverse in New Zealand, comprising approximately one-third of the New Zealand pselaphine fauna (e.g. Park and Carlton 2013, 2014, 2015). By contrast, the globally diverse supertribe Batrisitae and the exclusively inquilinous supertribe Clavigeritae are both absent from New Zealand, although they are found in nearby Australia.

The Pselaphinae is a major component of the litter arthropod community in south temperate regions (Australia, New Zealand, south Chile and Argentina, and South Africa and Madagascar). The pselaphine fauna of this region comprise 510 genera or 40% of the world fauna. Despite the high diversity of taxa in New Zealand, studies of the subfamily in this region have been relatively scarce, historically. The most comprehensive treatment of the New Zealand fauna (Nomura and Leschen 2006) included 385 species in 42 genera in a regional checklist. Of this total, 334 species (almost 87%) were described by Thomas Broun between 1883 and 1922, and 30 species were concurrently described by David Sharp. Thus until the revision of the New Zealand Faronitae (Park and Carlton 2015), 95% of currently recognized New Zealand species were described by these two individuals in the late 19th and early 20th centuries. Fortunately, the majority of Broun and Sharp's primary types and syntypes are housed in the NHM (Natural History Museum, London, UK), allowing researchers to review most described species in a visit to a single museum. Some Broun syntypes are held in the NZAC (New Zealand Arthropod Collection, Landcare Research, Auckland NZ), but label data are problematic as some have been replaced by subsequent workers, so these specimens must be carefully reviewed.

Resolution of the New Zealand fauna is important on a phylogenetic level due to the high species diversity in genera that are likely informative at very deep nodes. Critically, these genera are essential to understanding the initial split between pselaphines and sister taxa in other staphylinid subfamilies. Notably, *Sagola* of the tribe Faronini, sister taxon to all other Pselaphinae based on morphological characters (Newton and Thayer 1995) and molecular data, was recently revised (Park and Carlton 2015). *Sagola* is the largest genus of New Zealand Pselaphines (131 species) and also present but much less diverse in Australia. The geographical proximity and close association, taxonomically, of the New Zealand and Australian faunas provides a good framework for studying New Zealand taxa. Interestingly, while the Australian pselaphine fauna is one of the best understood at the generic level (Chandler 2001a), that of New Zealand is one of the most poorly known, with only the Faronitae benefiting from modern monography. Comparison of these two regional species assemblages and utilization of the Australian generic monograph (Chandler 2001a) as a model for dealing with New Zealand taxa, provides a framework and context to expedite taxonomic work in the region.

1.3. INTRODUCTION TO THE TRIBE PSELAPHINI

Over the past fifty years, the majority of systematic studies dealing with pselaphines have comprised generic revisions, typically including new species descriptions, but lacking phylogenetic analyses or robust revisionary work. An exception is the treatment of the Australian Pselaphinae (Chandler 2001a), a continent-wide revision of the subfamily which effectively doubled generic diversity of the region via description of 81 new genera. Park and Carlton's various papers on the supertribe Faronitae also included numerous descriptions of newly recognized genera in the limited context of the New Zealand fauna (Park and Carlton 2013, 2014, 2015). Kurbatov and Lobl's revision (2001) of the tribe Batrisini of Sri Lanka and Sabella's (1998) revision of the fauna of Sicily also stand as notable exceptions. Conversely, some recent molecular studies have shed light on particular supertribal or tribal elements of the global fauna, but are limited in their taxonomic scope (Parker and Maruyama 2013; Parker and Grimaldi 2014). A revision of the tribe Pselaphini constitutes one of the few studies aimed at resolving a taxon of pselaphines above the level of genus. Such studies are essential to resolution of the subfamily and paving the way for biogeographic studies on a continental and global scale.

Generally, higher-level taxa within the Pselaphinae vary greatly in degree of support for monophyly. At the level of supertribe, some taxa such as the basal Faronitae are considered to be monophyletic. Others groups, such as the variable and diverse Goniaceritae, have traditionally varied in their phylogenetic placement and generic composition, casting doubts on monophyly. The limited selection of available studies based on both morphology and molecular analyses continue to cast doubt on the structure of many higher-level taxa (Parker and Grimaldi 2014), particularly the placement of the crown-group Clavigeritae as nested within the supertribe Pselaphitae (Figure 4). On the other end of the taxonomic scale, many generic and species boundaries are relatively poorly defined, even for some common taxa. Generally, the taxonomic unit of tribe is considered to be the most monophyletically sound higher-level taxon within the subfamily and, therefore, critical for understanding phylogenetic and biogeographic relationships. Thus, a species-level revision of the tribe Pselaphini constitutes examination of genera and species within the context of well-defined morphological and, eventually, molecular boundaries. The presumed monophyly of the Pselaphini supports use of this group to explore questions of endemism, dispersal, and the origin of the New Zealand fauna.

The Pselaphini is a taxon with a combination of high diversity in temperate regions and a need for revision at both the genus and species-level. Currently, the Pselaphini constitutes 321 species in twenty-two genera, worldwide (Table). In New Zealand, this tribe is represented by four genera containing a total of 19 species. Current assessment of the New Zealand pselaphine fauna is derived from a handful of major works: Newton and Chandler's (1989) catalog of the global genera, Klimaszewski et al.'s (1996) review of the Staphylinidae of New Zealand, Nomura and Leschen's (2006) faunistic review of the New Zealand pselaphine taxa, and Chandler's (2001a) Australian checklist, which provides useful comments on select elements of the New Zealand fauna.

According to Newton and Chandler's (1989) global checklist, four genera of the tribe Pselaphini are found in New Zealand: *Dicentrius* Reitter (now *Pselaphogenius*) (Palearctic, Afrotropical, China, New Zealand; 38 spp. worldwide), *Pselaphophus* Raffray (Australia, New Guinea, New Zealand; 5 spp. worldwide), *Pselaphotheseus* Park (New Zealand, Campbell Island; 2 spp. worldwide), and *Pselaphus* Herbst (worldwide, except Neotropical, South Africa, and Australia; 59 spp. worldwide). The first effort to specifically catalog the constituents of the Pselaphinae of New Zealand was presented in a checklist of the country's rove beetle fauna (Klimaszewski et al. 1996), which documented three species of *Dicentrius* (now *Pselaphogenius*), a single species of *Pselaphophus* and *Pselaphotheseus*, and thirteen species of *Pselaphus* as New Zealand members of the Pselaphini. The most recent checklist of the subfamily of the country includes notes on the distributions and taxonomy of existing genera and species (Nomura and Leschen 2006). Two species of *Pselaphotheseus*, thirteen species of *Pselaphus*, a single species of *Pselaphophus*, and three species of *Pselaphogenius* Reitter (previously a synonym under *Dicentrius*) were recorded for Pselaphini. Although Chandler's (2001) monograph on the Pselaphinae of Australia dealt with that fauna, he included narratives on the generic boundaries of many Pselaphini and some notes on the fauna of New Zealand. In particular, this work addressed the complex issue of distinguishing the genera *Pselaphus*, *Pselaphogenius*, and *Pselaphostomus* Reitter, and the non-monophyly of *Pselaphus* as it is currently defined in New Zealand. Despite apparent low generic diversity of the New Zealand fauna, many generic boundaries are poorly defined, in particular the obviously non-monophyletic *Pselaphus*, highlighting the necessity of determining generic and species boundaries for the resolution of the New Zealand fauna and work at this taxonomic level on a global scale.

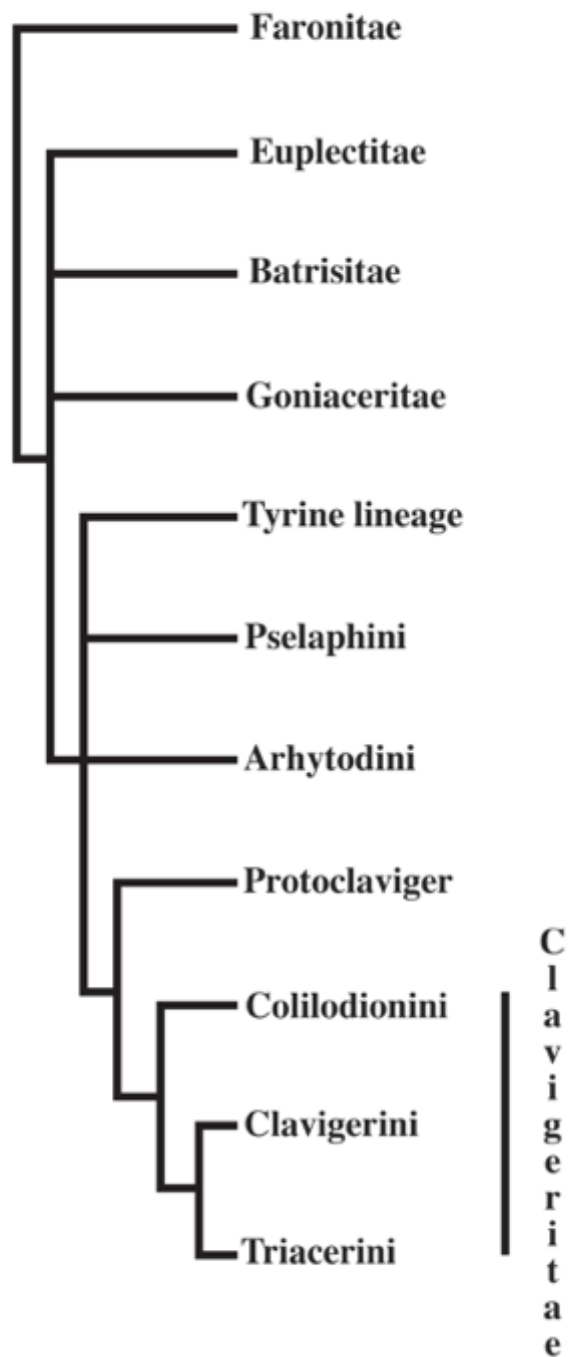


Figure 4. Phylogenetic tree of some higher-level relationships within the Pselaphinae (*sensu* Parker and Grimaldi 2013).

In conclusion, revisionary work focused on the NZ pselaphines is quickly approaching completion. Active research in the region includes ongoing revisions of the Euplectitae (Don

Pselaphini taxa by region

Genera of Pselaphini	Number of Species	Nearctic	Neotropical	Chilean/ Argentinian	W. Palearctic	E. Palearctic	Oriental	Pacific	Australian	New Zealand	Afrotropical	S. African	Malagasy
<i>Afropselaphus</i> Jeannel	23				X	X							
<i>Bellenden</i> Chandler	6						X		X				
<i>Curculionellus</i> Westwood	12					X	X	X	X				
<i>Dicentrius</i> Reitter	10				X								
<i>Geopselaphus</i> Jeannel	24				X								
<i>Hirashimanymus</i> Nomura	2					X	X						
<i>Kakadu</i> Chandler	1								X				
<i>Mareeba</i> Chandler	1								X				
<i>Margaris</i> Schaufuss	1								X				
<i>Maydena</i> Chandler	4								X				
<i>Mentrophus</i> Sharp	7				X		X				X		
<i>Nabapselaphus</i> Nomura	6						X						
<i>Neopselaphus</i> Jeannel	10	X	X										
<i>Peckieella</i> Chandler	1								X				
<i>Pselaphaulax</i> Reitter	61				X	X	X		X	X	X	X	X
<i>Pselaphellus</i> Raffray	7		X										
<i>Pselaphischnus</i> Raffray	1											X	
<i>Pselaphogenius</i> Reitter	56				X	X	X		X	X	X		
<i>Pselaphophus</i> Raffray	6						X		X	X			
<i>Pselapharites</i> Jeannel	19										X		
<i>Pselaphostomus</i> Reitter	23				X								
<i>Pselaphotheseus</i> Park	2									X			
<i>Pselaphotrichus</i> Besuchet	6						X				X		
<i>Pselaphus</i> Herbst	88	X	X		X	X	X			X	X	X	X
<i>Tyrophus</i> Sharp	19					X	X		X				

Chandler), the Tribe Tyrini (Peter Hlavac, John Nunn, and Rich Leschen), and the Goniaceritae (Jiawei Shen). The supertribe Faronitae in NZ underwent a complete revision in 2015 (Park 2015), and the current work on the Pselaphini, herein, completes the coverage of the subfamily. The resulting resolution of the subfamily will represent a total catalogue and coverage of this taxon in NZ. Looking to the future of research in the region, the Pselaphinae will be poised to serve as a model taxon with which researchers will be equipped to further explore some of the long-standing biogeographic and evolutionary questions in the region, including controversies surrounding the supposed Gondwanan origin of the New Zealand fauna (Coope 2000; McLoughlin 2001; Lard and Bradshaw 2004), the possibility of complete submergence of the New Zealand landmasses (Trewick *et al.* 2007), the evolutionary hypotheses involving dispersal of the fauna from Australia (Sanmartin *et al.* 2006), and the existence and subsequent dating of faunal connections with Australia, New Caledonia, and Chile (Liebherr *et al.* 2001). Additionally, knowledge of a resolved NZ Pselaphinae will be a tool to aid in the exploration of more recent (post-Pliocene) questions such as the explanation of the “beech gap” (Leschen *et al.* 2008), explanations of patterns of vicariance and dispersal surrounding the Southern Alps, and deeper investigations into radiations and diversifications due to the recent tumultuous history of glaciation and volcanism (Pulford and Stern 2004). Beyond the exploration of preexisting hypotheses and controversies, previous research involving other diverse Coleoptera taxa in the region have resulted in the development of new biogeographic theory (Marske *et al.* 2012). Contributions to the revisionary work on the subfamily in NZ build the foundation from which these larger questions may be explored in the near future.

1.4 Objectives

This dissertation research includes two components: a traditional taxonomic revision of the tribe Pselaphini from New Zealand, and a phylogenetic project utilizing the application of a morphological matrix and next-gen sequencing (ultraconserved elements, UCEs) to the global pselaphine fauna.

1. The taxonomic revision of the New Zealand representatives of the tribe Pselaphini will review the current status of all described species from the region. These will be redescribed, and undescribed taxa will be described based on modern morphological and phylogenetic criteria. Generic boundaries will be evaluated for current genera in the tribe, new genera will be described if necessary, and species will be appropriately assigned among them. Specimens will be obtained and reviewed from appropriate museum collections including the British Museum of Natural History (BMNH, London, U.K.), the New Zealand Arthropod Collection (NZAC, University of Auckland, Auckland, New Zealand), the Field Museum of Natural History (FMNH, Chicago, Illinois) and the Louisiana State Arthropod Museum (LSAM, Louisiana State University, Baton Rouge, Louisiana). Additional specimens will be obtained from personal collections of relevant individuals, and during collecting trips in New Zealand.
2. Phylogenetic analyses involving a molecular characters and a next-gen sequencing method (UCEs) will be applied to a subset of pselaphine genera. Results will represent the first attempts to utilize morphological or molecular data to both explore relationships of the Pselaphini in NZ and to resolve the tree of the Pselaphinae. My goal is to complete a phylogenetic analysis of the global Pselaphinae fauna with sufficient taxon sampling to develop a comprehensive hypothesis of relationships at tribal and subtribal levels, and to

explore the results of my revisionary efforts within the tribe Pselaphini in New Zealand and the surrounding regions.

CHAPTER 2. MATERIALS AND METHODS

2.1. SPECIMENS

Approximately 3000 dried specimens, including types, and 1000+ alcohol-preserved specimens were examined from the following institutional and private collections: Auckland Museum (AMNZ), Auckland, New Zealand; personal collection of Donald S. Chandler (DSC), Durham, NH, USA; Field Museum of Natural History (FMNH), Chicago, IL, USA; personal collection of John T. Nunn (JTN), Dunedin, New Zealand; Louisiana State Arthropod Museum (LSAM), Baton Rouge, LA, USA; Natural History Museum (NHM), London, United Kingdom; New Zealand Arthropod Collection (NZAC), Auckland, New Zealand. Holotypes of species described will be deposited in the New Zealand Arthropod Collection (NZAC), Auckland. Paratype depositions are indicated parenthetically.

2.2. PERMANENT SLIDE PREPARATIONS

To facilitate observation of internal and external characters using a compound microscope, fifty-one male specimens were mounted in Euparal (permanent mounting medium, Schmid GMBH & Co., Stuttgart-Untertürkheim, Germany) on glass slides. All permanent slide mounts were prepared based on the standardized techniques for the disarticulation and microscopic slide preparation of Staphylinidae described by Hanley and Ashe (2003). Prior to disarticulation, specimens were relaxed in a hot (~90°C) water bath for five to fifteen minutes. After relaxation, specimens were washed in a 75% ethanol (EtOH) solution and then cleared in a solution of 10% potassium hydroxide (KOH) for ~45 minutes. After clearing, specimens were examined and, as needed, were additionally bleached via placement in a solution of 3% hydrogen peroxide (H₂O₂) and subsequent washing and dehydrating in 95% EtOH. Cleared, dehydrated specimens were then transferred into a droplet of Euparal on the surface of a glass slide. Once suspended in the medium, an insect pin was used to disarticulate specimens and remove the aedeagus. Disarticulated segments were positioned using an insect pin. Slides were allowed to air-dry for one week. Additional mounting medium was then added to cover the specimen and a cover slip was positioned over the medium and the specimen. Completed slides were allowed to air-dry for two to three weeks before they were examined using a compound microscope.

2.3. TERMINOLOGY AND MAPS

Morphological terminology follows the standardized conventions for pselaphine staphylinids presented in Chandler (2001a). Particularly, this dissertation adopts the details of the foveal system and enumeration of abdominal sclerites presented therein. Of note is the replacement of the meso-meta sternites and abdominal sternites with ventrites (Figure 5). Tergite IV, the second apparent tergite is greatly expanded in most Pselaphini. The first apparent tergite resulting from the fusion of true tergites I-III is visible only as a narrow band and is partially concealed by the elytra in most specimens. These two structures are referred to as the “first” and “second” tergites, throughout.

Maps of species' distributions and collection localities were produced using QGIS (qgis.osgeo.org). The area codes of the New Zealand subregion follow the system of Crosby *et*

al. (1998). Generally, these Crosby Codes serve as the basic unit of locality information for specimens. Multiple specimens from the same locality are indicated on maps by a single symbol.

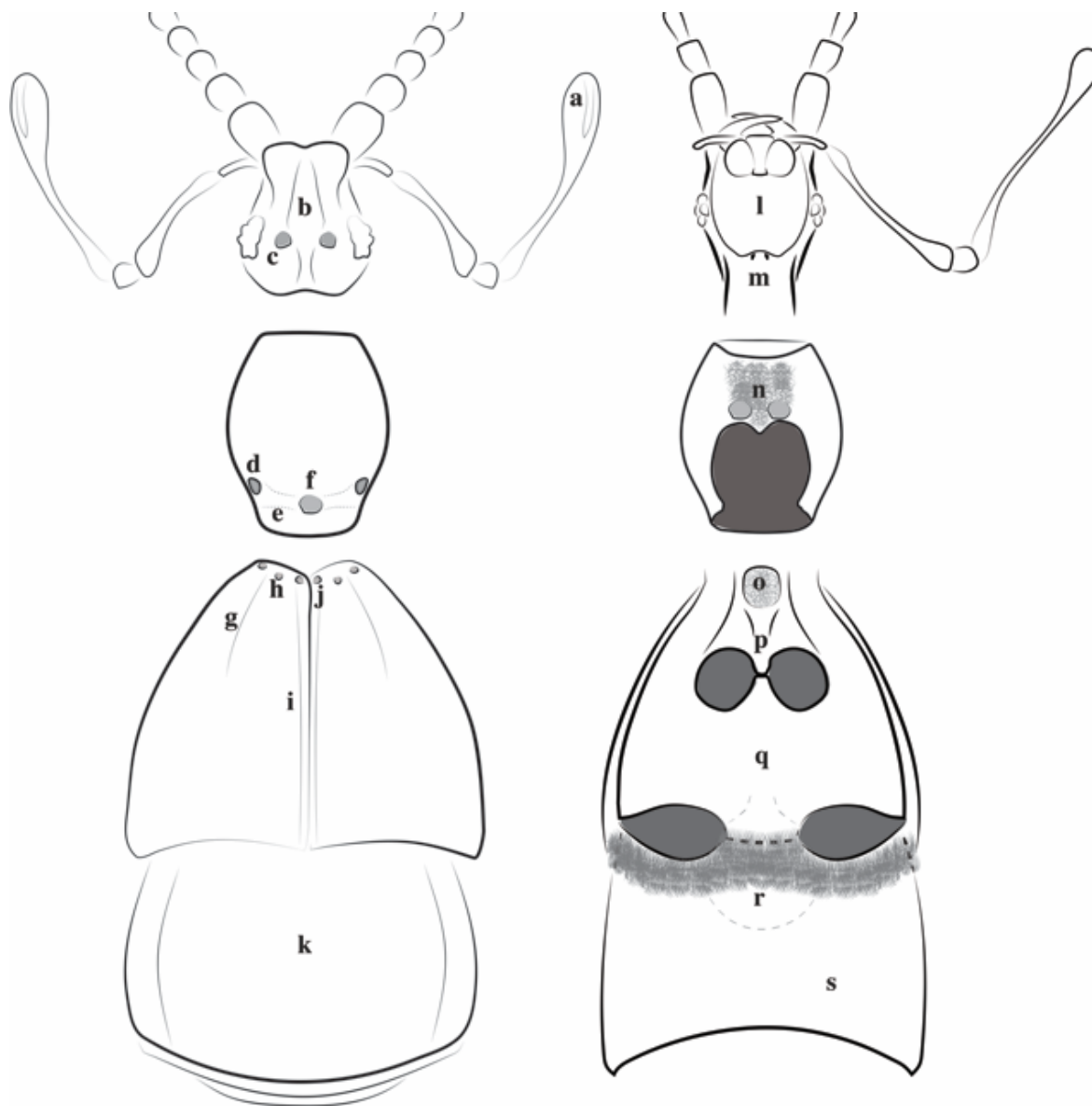


Figure 5. Diagnostic characters of the New Zealand Pselaphini. *Dorsal*: a) sensory patch on maxillary palpomere 4; b) rostral sulcus; c) vertexal foveae; d) lateral antebasal fovea; e) antebasal sulcus; f) median antebasal fovea; g) elytra discal stria; h) elytra basal fovea; i) elytra sutural stria; j) elytra sutural fovea; k) second tergite. *Ventral*: l) gular mound/swelling; m) gular foveae; n) procoxal foveae (obscured beneath modified setae); o) mesoventral shield setose pit; p) mesoventral shield; q) metaventrite; r) ovate depression on second ventrite; s) second ventrite.

2.4. GENUS AND SPECIES BOUNDARIES

During the process of selecting taxa and characters for inclusion in analyses, specimens were sorted, grouped, and placed into diagnosis-based (i.e., morphological) hierarchies. This was

essential for the large number of undescribed species in the particularly problematic genera *Pselaphaulax* and *Pselaphogenius*, and those previously placed into the paraphyletic genus *Pselaphus*. Due to this necessary initial treatment, the placement and revision of species and genera were based on the concepts outlined below. These newly defined hypotheses were then tested using phylogenetic analyses.

The foveal system nomenclature for pselaphines (Figure 5) was proposed by Grigarick and Schuster (1980) for characterizing genera and higher taxa within the subfamily. This nomenclature was further developed and applied to the Australian fauna by Chandler (2001a). While this system has proven useful for determining generic boundaries for other pselaphine groups on New Zealand (Park and Carlton 2015), the highly conserved foveal pattern of the Pselaphini necessitated the development of newly defined generic boundaries based on other morphological systems. Examination of characters governing generic boundaries for the Australian fauna informed decisions for the characterization of genera in New Zealand, and were largely based on characters on the head (e.g., form of the gular mound, terminal maxillary palpomere, rostral apex), and the pronotum (e.g., presence or absence of lateral and/ or basal sulci, and median basal fovea) (Figure 5). Species boundaries were primarily based on the structure of the male genitalia, particularly the configuration of parameres and terminal components of the median lobe. Secondary sexual characters, such as spines on the coxae or the elaborations of femora and tibiae, were rarely available to aid in species identification and the remarkably conserved morphology of most species groups ultimately required dissection for confirmation.

Taxonomic acts (e.g., new genera, new species, new synonyms and lectotypes) designated herein are not intended to satisfy rules of zoological nomenclature. The newly designated generic names and specific epithets of new species are indicated in double quotation marks except for previously published names to prevent confusion when this dissertation is quoted in public. Because all results are either published, or submitted to refereed scientific journals, manuscript names or published names are retained for all taxa, herein.

2.5. NOTES ON BROUN TYPES AND LECTOTYPE DESIGNATIONS

Syntype series of most of the Coleoptera species described by Thomas Broun are deposited in the Natural History Museum, London as a result of New Zealand's status as part of the British Empire during the late 1800s-early 1900s when Broun was active. Many of these are represented by short series labeled with numerical codes that correspond to numbers in his descriptions. Although many bear type labels, these do not constitute primary types under the ICZN because they were not specifically designated in his descriptions. In fact, evidence suggests that these type labels were added later, and not by Broun himself (Lord and Leschen 2014). Some of these series include mixed species, so designating lectotypes is necessary to fix the species to appropriate type specimens. When appropriate, published material designates the lectotype and paralectotype status for relevant specimens.

2.6. MORPHOLOGICAL PHYLOGENETIC ANALYSIS

Choice of taxa. Sixty-five taxa were included in this study (Appendix A). With respect to the New Zealand taxa, representatives are included from the NZ subantarctic islands, the NZ mainland (the North Island and the South Island), Three Kings Islands, and Chatham Islands.

This includes representatives of all “species groups” of *Pselaphogenius* and *Pselaphaulax* (Chapters 3.1. and 3.2.), which varied consistently but still fall within generic boundaries. Additionally, representatives of all new genera discovered from New Zealand were included in the matrix. Names follow results from revisional studies (Chapters 3.1. –3.7.). Outgroup taxa are derived from congeners of the NZ genera (*Pselaphophus*, *Pselaphaulax*, *Pselaphogenius*) and representatives of the global fauna. When genera were present across multiple geographic regions, exemplars from across the global distribution were included, when possible. All genera within the tribe Pselaphini are represented in the analysis with the exception of *Geopselaphus* Jeannel, *Pselaphischmus* Raffray, *Pselaphorites* Jeannel, and *Pselaphotrichus* Besuchet.

Selection of characters. One hundred and eleven morphological characters were included in the analysis. Larval characters were excluded, as the majority of Pselaphini species are unknown as larvae (Carlton and Leschen 2008). The following characters were scored:

1. *Head width.* (0) wide, width between eyes >1/2 length of head; (1) narrow, width between eyes <1/2 length of head.
2. *Number of eye facets.* (0) greater than 15; (1) less than 15.
3. *Frontal rostrum.* (0) present; (1) absent.
4. *Vertexal sulcus.* (0) present; (1) absent.
5. *Vertexal foveae.* (0) present, well-developed; (1) absent, reduced to pits.
6. *Position of vertexal foveae openings.* (0) opening dorsally; (1) opening more laterally, set in margin of sulcus.
7. *Vertexal foveae modifications.* (0) normal, unmodified; (1) obscured by dense patches of modified, spongeose setae.
8. *Vertexal foveae internal structure.* (0) straight, normal; (1) excavate as large internal cavities (often visible through cuticle).
9. *Median sulcus on rostrum.* (0) present; (1) absent.
10. *Antennal tubercle ridges.* (0) absent, evenly rounded; (1) present.
11. *Antennal tubercle ridge shape.* (0) flattened ridges; (1) sharp, carinate or subcarinate ridges.
12. *Postantennal notches at lateral margins of vertex.* (0) absent; (1) present.
13. *Lateral postantennal pits.* (0) absent; (1) present.
14. *Lateral postantennal pit location.* (0) lateral; (1) dorsal.
15. *Shape of rostral apex in dorsal view.* (0) straight; (1) rounded; (2) rounded/straight with small median emargination (<1/2 width of frontal margin); (3) broadly emarginated (>1/2 width of frontal margin); (4) pointed; (5) declivous.
16. *Patch of spongeose setae on rostral apex.* (0) absent; (1) present, apical; (2) present, subapical.
17. *Gular-mandibular carinae.* (0) present; (1) absent.
18. *Form of gular process.* (0) hemispherical/rounded (wider than long or about as long as wide); (1) swollen, broad mound; (2) extended posteriorly as shelf-like process; (3) gular process absent, gular area flattened; (4) ovate mound (2x as long as wide).
19. *Gular process anterior margin.* (0) absent; (1) broad; (2) narrowed.
20. *Gular process posterior margin.* (0) absent; (1) broad mound; (2) shelf-like; (3) rounded, broad; (4) rounded, narrowed.
21. *Gular spines.* (0) absent; (1) present.

22. *Scales on head posterior to gular process.* (0) absent; (1) present, covered in flattened, modified scales.
23. *Maxillary palpomere II length.* (0) $< 1/2$ length of head; (1) $1/2 < > 1$ length of head; (2) $>$ length of head.
24. *Maxillary palpomere II shape.* (0) elongate-pedunculate; (1) other.
25. *Maxillary palpomere III shape.* (0) quadrate rounded; (1) elongate.
26. *Maxillary palpomere IV shape.* (0) pedunculate (narrowed with swollen apical portion); (1) “normal”, aciculate; (2) “antler-shaped” (dorso-ventrally flattened w/ seta at midline and 2 setae apically, *Mentraphus*); (3) globular and excavate on dorsal surface (*Tyraphus*); (4) broadly expanded throughout length (*Bellenden*); (5) flattened and “machete-shaped” (*Taomica*); (6) with ventral lobe and external spine creating bidentate appearance (*Hirashimanymus*); (7) gradually widened towards apex (*Mareeba*, *Margaris*).
27. *Maxillary palpomere IV width.* (0) normal/rounded; (1) dorso-ventrally flattened; (2) laterally compressed; (3) excavate on one surface; (4) normal/rounded with narrowed apical portion.
28. *Maxillary palpomere IV apical swelling.* (0) swollen throughout length (non-pedunculate); (1) apical swelling before $1/2$ palpomere length; (2) apical swelling just beyond $1/2$ - $1/3$ palpomere length; (3) apical swelling about $1/4$ palpomere length; (4) apical swelling very small ($1/5$ palpomere length or less).
29. *Maxillary palpomere IV total length.* (0) $< 1/2$ length of head; (1) $1/2 < > 1$ length of head; (2) $>$ length of head.
30. *Maxillary palpomere IV surface texture.* (0) smooth, shining; (1) tuberculate, granulate, or rugose in part; (2) densely setose/pilose in part.
31. *Maxillary palpomere IV apical sensory patch.* (0) absent; (1) present, not set off by carinae; (2) present, set off by carinae.
32. *Cervical rough of setae.* (0) absent; (1) present.
33. *Antennal segments.* (0) equal in length; (1) irregularly segmented.
34. *Antennal segment 1.* (0) normal (as long as segments 2-3); (1) elongate (longer than segments 2-3); (2) short (not as long as segments 2-3).
35. *Antennal club.* (0) comprised of last 3 segments; (1) comprised of last 4 segments; (2) club comprised of > 4 segments; (3) club absent.
36. *Pronotum width.* (0) wider than long; (1) longer than wide; (2) width and length equal.
37. *Pronotum shape.* (0) hind margin wider than anterior margin; (1) anterior margin wider than hind margin; (2) hind margin and anterior margin equal.
38. *Pronotum with posterior margin obscured by rough of setae.* (0) absent; (1) present; (2) reduced to lateral margins.
39. *Pronotum with defined lateral lobes.* (0) absent; (1) present.
40. *Pronotum longitudinal, discal carinae.* (0) absent; (1) single lateral pair (*Mareeba*, *Margaris*).
41. *Pronotum longitudinal, discal sulci.* (0) absent; (1) single lateral pair (*Margaris*); (2) faint, poorly-developed.
42. *Pronotal disc.* (0) evenly rounded/flattened; (1) median depression (*Peckiella*); (2) raised into median ridge.
43. *Lateral antebasal sulcus on pronotum.* (0) absent; (1) present.
44. *Lateral antebasal sulcus delimited by lateral antebasal foveae.* (0) absent; (1) no; (2) yes.
45. *Lateral antebasal foveae on pronotum.* (0) present; (1) absent; (2) reduced to small pits.

46. *Lateral antebasal foveae on pronotum set into large, setose, lateral pits.* (0) no; (1) yes; (2) absent.
47. *Median antebasal fovea on pronotum.* (0) absent; (1) present; (2) reduced to small pit.
48. *Lateral procoxal foveae.* (0) absent; (1) present.
49. *Vestiture of prosternum anterior to procoxae.* (0) nude or setae sparse; (1) modified, densely appressed shining setae in part.
50. *Lateral margins of pronotum.* (0) evenly rounded; (1) margined, at least in part.
51. *Mesoventrite shape.* (0) forming median shield; (1) flat.
52. *Single setose fovea on median shield.* (0) absent; (1) anterior; (2) posterior.
53. *Mesoventral base completely covered in flattened, modified setae.* (0) absent; (1) present.
54. *Base of mesoventrite.* (0) nude; (1) bearing modified, densely appressed setae.
55. *Lateral mesoventral foveae.* (0) present; (1) absent.
56. *Lateral mesoventral foveae arrangement.* (0) present, simple, separate internally; (1) present, simple, meeting internally; (2) present, forked; (3) absent.
57. *Anterolateral mesoventral foveae.* (0) present; (1) absent.
58. *Lateral mesocoxal foveae.* (0) absent; (1) present.
59. *Median mesoventral fovea.* (0) absent; (1) present.
60. *Mesocoxal separation.* (0) narrowly separated by intercoxal process; (1) confluent, not fully separated by intercoxal process.
61. *Metaventricle foveal pattern.* (0) afoveate; (1) some foveae present.
62. *Metaventricle shape.* (0) unmodified, evenly rounded; (1) median depression; (2) raised into median tumosity; (3) produced into sharp, thorn-like projection.
63. *Metacoxal separation.* (0) separated by extension of ventrite 1 internally; (1) separated by extension of metaventricle.
64. *Protrochanter modifications.* (0) unmodified; (1) spinose or tuberculate; (2) small triangular indentations.
65. *Profemur shape.* (0) normal, rounded; (1) broad, flattened.
66. *Profemur modifications.* (0) unmodified; (1) spinose.
67. *Protibia shape.* (0) normal, rounded; (1) greatly narrowed.
68. *Protibia modifications.* (0) unmodified; (1) spinose.
69. *Mesotrochanter modifications.* (0) unmodified; (1) spinose; (2) small, triangular indentations.
70. *Mesofemur shape.* (0) normal, rounded; (1) broad, flattened.
71. *Mesofemur modifications.* (0) unmodified; (1) spinose.
72. *Mesotibia shape.* (0) normal, rounded; (1) greatly narrowed.
73. *Mesotibia modifications.* (0) unmodified; (1) spinose.
74. *Metatrochanter modifications.* (0) unmodified; (1) spinose/angulate.
75. *Metafemur shape.* (0) normal, rounded; (1) broad, flattened.
76. *Metafemur modifications.* (1) unmodified; (1) spinose.
77. *Metatibia shape.* (0) normal, rounded; (1) greatly narrowed.
78. *Metatibia modifications.* (0) unmodified; (1) spinose.
79. *Tarsal shape.* (0) unmodified; normal form; (1) lobate.
80. *Tarsomere length.* (0) second and third tarsomeres subequal in length; (1) third tarsomere longer than second tarsomere.
81. *Tarsomere width.* (0) second and third tarsomeres same width; cylindrical; (1) second tarsomere thicker than third; (2) tarsomeres both thickened; (3) third tarsomere lobed and thicker than second (*Hirashimanyus*).

82. *Tarsi length*. (0) normal, shorter than $\frac{1}{2}$ tibiae; (1) elongate, longer than $\frac{1}{2}$ length of tibiae (*Mareeba*, *Margaris*).
83. *Number of basal foveae per elytron (total, including sutural foveae)*. (0) zero; (1) one; (2) two; (3) three; (4) four.
84. *Elytral sutural striae*. (0) absent; (1) present.
85. *Discal striae per elytron*. (0) absent; (1) single; (2) two.
86. *Apical cleft on elytra*. (0) absent; (1) present.
87. *Subhumeral fovea on elytra*. (0) absent; (1) present.
88. *Wings*. (0) present; (1) absent.
89. *Apical fringe of setae on elytra*. (0) absent; (1) present, dense; (2) present, sparse.
90. *Posterolateral angles of elytra*. (0) normal, parallel/subparallel to interior angles; (1) strongly protruding (*Mareeba*).
91. *Abdominal ventrite I vestiture*. (0) nude; (1) modified, dense setae.
92. *Abdominal ventrite II modifications*. (0) evenly rounded; (1) median impression extending $>1/2$ ventrite length; (2) median impression extending $<1/2$ ventrite length; (3) medially spinose on apical margin; (4) flattened medially; (5) median ovate depression with shelf extending apically; (6) apically with two small impressions on hind margin; (7) with 2 lateral tubercles.
93. *Abdominal ventrite II basal area*. (0) deep basal sulcus with squamous setae; (1) deep basal sulcus without squamous setae; (2) smooth; (3) basal ridge/carina.
94. *Ventrite II basolateral foveae*. (0) present; (1) absent.
95. *Ventrite II basolateral foveae modifications*. (0) simple, normal development; (1) developed as large cuticular pockets; (2) absent.
96. *Ventrite II mediobasal foveae*. (0) absent; (1) present.
97. *Tergite II shape*. (0) wider than long; (1) as wide as long; (2) longer than wide.
98. *Tergite II basal area*. (0) deep basal sulcus with squamous setae; (1) deep basal sulcus without squamous setae; (2) smooth; (3) basal ridge/carina.
99. *Tergite II median basolateral carinae*. (0) absent; (1) present, paired (*Mareeba*).
100. *Tergite II mediobasal foveae*. (0) present; (1) absent.
101. *Tergite II basolateral foveae*. (0) present; (1) absent.
102. *Tergite II apical modifications*. (0) none, evenly rounded; (1) acutely protruding (*Margaris*).
103. *Aedeagus symmetry*. (0) symmetrical; (1) asymmetrical; (2) variable within genus.
104. *Parameres*. (0) paired, present; (1) absent.
105. *Dorsal diaphragm*. (0) present; (1) absent.
106. *Dorsal diaphragm opening*. (0) circular; (1) ovate; (2) absent.
107. *Internal sac*. (0) present; (1) absent.
108. *Internal sac spine*. (0) absent; (1) present.
109. *Ventral process of aedeagus*. (0) present; (1) absent.
110. *Integument*. (0) shining, smooth; (1) microreticulate, at least in part (*Curculionellus*, *Mentraphus*, *Mareeba*, *Peckiella*); (2) coarsely punctate (*Hirashimanymus*).
111. *Vestiture*. (0) normal, some sparse, suberect setae; (1) stiff, elongate setae; dense, (2) appressed, spatulate setae or scales (*Neopselaphus*, *Pselaphellus*); (3) fine, elongate setae.

Phylogenetic analysis. The matrix of morphological data (Appendix B) was created using Mesquite (Maddison and Maddison 2018). Characters were unweighted and unordered. A maximum parsimony analysis was performed using PAUP* (Swofford 2003). Heuristic searches

were performed via multiple TBR + TBR (hold: 10000; mult*N: 1000; hold/: 100). Bootstrap support values (Felsenstein 1985) were calculated to estimate support (replications: 1000; mult*N: 10; hold/: 10). Trees were rooted using *Maydena bryophilus* (Lea).

2.7. MOLECULAR PHYLOGENETIC ANALYSIS

Choice of Taxa. Two of the central obstacles to the application of molecular techniques to pselaphines are 1) the paucity of available molecular-grade material, and 2) the small amount of molecular material available per specimen due to small body size. For this reason, extractions were attempted on as many specimens as were available in appropriate conditions. Preliminarily, extractions were attempted from specimens preserved by a variety of methods, including dry, point-mounted specimens, specimens preserved in varying concentrations of EtOH (70-95%), and specimens preserved in EtOH for varying ages (15 ya to within a few weeks of capture). The resulting extraction products varied greatly, resulting in the inclusion and exclusion of different taxa from pools for enrichment and amplification. In total, 48 specimens were included in this study (Appendix C); names follow results from revisional studies (Chapters 3.2. –3.8.).

Extraction, enrichment, and amplification. Specimens were washed in 100% EtOH. Abdomina were removed to prevent possible contamination of samples via the introduction of material from prey items contained in the gut. Extraction was performed using the Qiagen Blood & Tissue Kit (Qiagen, Hilden, Germany) based on the manufacturer's instructions with modifications aimed at improving extraction product: 1) warming of buffer, 2) maceration of specimens. A rough determination of extraction product concentration and fragment length was determined via gel electrophoresis techniques and quantification via analysis in NanoDrop Spectrophotometer (ThermoFisher Scientific Inc., Waltham, MA, USA).

Samples containing fragments longer than 650 bp were sheared using Diagenode Bioruptor sonicator system (Diagenode Inc., Denville, NJ, USA). Sheared products were input into a modified genomic DNA library preparation protocol using HyperPrep Kit (Kapa Biosystems, Indianapolis, USA), incorporating “with-bead” cleanup steps (Fisher *et al.* 2011) using generic SPRI substitute (Rohland & Reich 2012); this version of cleanup includes end-repair, adenylation, and T/A ligation steps, but does not remove and replace SPRI beads between steps. Prepped libraries were then enriched using modified MYcroarray (now Arbor Biosciences, Ann Arbor, MA, USA) protocol (Faircloth 2013) with custom Coleoptera baits set; all pools were bound to streptavidin beads and washed according to standard target enrichment protocols. Post-hybridization, a limited cycle polymerase chain reaction (PCR) recovery process (Faircloth 2014) was performed using AccuPower PCR Premix (Bioneer, Daejeon, Korea).

For PCR, a master mix was created of 25 uL 2X Kapa HiFi Taq (KAPA Biosystems, Indianapolis, USA), 5 uL Primer Mix (5 uM each of TruSeq Forward and Reverse Primers, Illumina Inc., San Diego, CA, USA), 14 uL adapter-ligated DNA, and 5 uL ddH₂O for a total volume of 50 uL. PCR reactions were set up in separate 0.2 mL strip tubes and amplification procedure was 45 seconds at 98 °C followed by 12 to 16 cycles of: 15 seconds at 98 °C, 30 seconds at 60 °C, 60 seconds at 72 °C, 5 minutes 72 °C and 4 °C store. PCR products were taken through a AMPure XP bead cleanup (Beckman Coulter Life Sciences, Indianapolis, IN, USA). 1 uL aliquots of enriched, cleaned libraries were quantified using spectrophotometer and gel electrophoresis. Successfully amplified products were placed into -80 °C freezer for storage. Poor quality of PCR products for over 50% of samples resulted in pools that were too low in the

concentration of amplified target DNA for sequencing, so sequencing was not pursued at this point.

CHAPTER 3. REVISION OF THE NEW ZEALAND PSELAPHINI

Members of the Pselaphini are generally easy to recognize, visually, due to a suite of morphological characters that define the group: *Head* with frontal rostrum well-developed; gular region typically formed into prominent mound; maxillary palp segment I typically elongate, $\frac{1}{2}$ as long as segment II, maxillary palp segments II and IV typically pedunculate and elongate (longer than $\frac{1}{2}$ length of head to longer than head); *Pronotum* evenly rounded, lacking paranotal carinae; *Mesoventrite* formed into mesoventral shield; *Legs* with single tarsal claw; *Metaventrite* broadly truncate posteriorly; *Abdomen* with tergite I longest (usually longer than other tergites, combined); ventrite II with setose basal sulci.

Unlike other pselaphine taxa where the foveal system is particularly useful for genus-level discrimination (such as in euplectites), in the Pselaphini of NZ the foveal system is, for the most part, remarkably conserved across genera. The most useful characters for separating genera are those on the head, particularly the gular region and the maxillary palpi, as well as some characters on the pronotum and mesoventrite (Figure 5). *Pselaphaulax* and *Pselaphogenius* possess the greatest degree of morphological variability between species, complicating identification of these two genera. Revisions of these genera, in both cases, indicated that this variability can be encompassed by the designation of two different “species groups” (Chapters 3.1. and 3.2.). These groups are useful for aiding in the identification of *Pselaphaulax* or *Pselaphogenius* species, but do not appear to warrant subgeneric status and, therefore, are not included in this key. Many times observing a combination of characters is most useful to distinguish genera of Pselaphini in NZ, although in some cases a single, discrete character can be used to determine identification.

1	Pronotum evenly rounded, lacking discal or lateral sulci or carinae.....	3
1'	Pronotum with either discal or lateral sulci or carinae.....	2
2(1')	Pronotum with median ridge and deep lateral sulci, giving lateral margins the appearance of being formed into two lobes; eyes normally developed.....	
 “ <i>Pselapholobus</i> ” Owens & Carlton, gen. nov.	
2'	Pronotum with median depression and lateral margins evenly rounded, not lobe-like; eyes greatly reduced (absent).....	
 “ <i>Pselaphazealus</i> ” Owens & Carlton, gen. nov.	
3(1)	Gular area variously shaped; glabrous and smooth, not covered in tubercles.....	5
3'	Gular area flattened or formed into rounded mound; surface covered in tubercles.....	4
4(3)	Gular region tuberculate, completely flat, not raised into mound or circular area; maxillary palpomere II with row of tubercles along ventral face.....	
 “ <i>Pselaphoaotearoa</i> ” Owens and Carlton, gen. nov.	
4'	Gular region tuberculate, raised into circular, flattened mound; maxillary palpomere IV with apical swollen region pilose.....	
 “ <i>Pselaphotuberculum</i> ” Owen and Carlton, gen. nov.	
5(2)	Vertex evenly rounded or with small sulcus between eyes extending into rostral sulcus, distributed on the North or South Islands.....	7
5'	Vertex with broad excavation between eyes extending into rostral sulcus; found only on Subantarctic Islands.....	6
6(5')	Gular region modified into large shelf-like process; femora modified, broadened and flattened.....	<i>Pselaphopluteum</i> Owens <i>et al.</i> 2019

6'	Gular region flattened, not modified into large shelf-like process; femora unmodified, normally rounded.....	<i>Pselaphotheseus</i> Park 1964
7(5)	Maxillary palpomere IV rounded in cross-section; gular mound variously modified.....	8
7'	Maxillary palpomere IV dorsoventrally flattened; gular mound broad, covering anterior portion of gular region.....	<i>"Pselapholateralis"</i> Owens and Carlton, gen. nov.
8(7)	Gular mound rounded ovate or broadened anteriorly and posteriorly, not formed into broad mound covering underside of head; rostrum rounded or pointed, not bearing setose pit, apically.....	9
8'	Gular mound broad, covering underside of head; rostrum pointed, bearing setose pit, apically.....	<i>Pselaphotumulus</i> Owens and Carlton 2020
9(8)	Maxillary palpomere IV of normal length (3/4 length of head to longer than head), not 1/2 length of head or less, pedunculate at least in part.....	10
9'	Maxillary palpomere IV 1/2 length of head, base broadly joined to maxillary palpomere III, not pedunculate.....	<i>Pselaphophus</i> Raffray 1890
10(9)	Pronotum with antebasal sulcus present, often delimited by lateral antebasal foveae.....	11
10'	Pronotum lacking antebasal sulcus, lateral antebasal foveae absent or reduced to minute pits.....	<i>Pselaphogenius</i> Reitter 1910
11(10)	Maxillary palpomere IV as long as head, smooth or rugose, bearing apical sensory patches (usually bounded by carinae); median antebasal fovea on pronotum absent or reduced to pit; mesocoxae separated by extension of meso- and metaventrites.....	<i>Pselaphaulax</i> Reitter 1909
11'	Maxillary palpomere IV shorter than head, tuberculate, apical sensory patch absent; median antebasal fovea on pronotum present; mesocoxae confluent.....	<i>"Pselaphopegasus"</i> Owens and Carlton, gen. nov.

3.1. REVISION OF THE GENUS *PSELAPHAULAX*

Introduction. In New Zealand, the genus *Pselaphaulax* Reitter is represented by thirteen species. Six new species are described: *Pselaphaulax hornabrooki* Owens and Carlton, sp. nov.; *Pselaphaulax intermedius* Owens and Carlton, sp. nov., *Pselaphaulax nunni* Owens and Carlton, sp. nov.; *Pselaphaulax pelorus* Owens and Carlton, sp. nov.; *Pselaphaulax ramsayi* Owens and Carlton, sp. nov.; and *Pselaphaulax tararua* Owens and Carlton, sp. nov. *Pselaphus trifoveatus* Broun, 1914 is synonymized under *Pselaphus pilifrons* Broun, 1914 syn. nov. and is transferred to *Pselaphaulax* comb. nov. Two species, *Pselaphus pilistriatus* Broun, 1880 and *Pselaphus fuscopilus* Broun, 1886 are synonymized under *Pselaphus pauper* Sharp syn. nov., which is also transferred to *Pselaphaulax* comb. nov. *Pselaphus meliusculus* Broun, 1893 is also transferred to *Pselaphaulax* comb. nov. Lectotypes and paralectotypes are designated for the Broun and Sharp species. Distributional maps and line drawings of diagnostic characters for each species are provided. A regional checklist and key are provided to species of the genus that occur in New Zealand.

Globally, the subfamily Pselaphinae represents a widespread, diverse taxon known primarily as an abundant component of forest litter communities, functioning as a micro-predatory group feeding on other arthropods, and as an indicator of ecological disturbances (Chandler 1997, 2001; DeMarzo and Vit 1982; Park 1947; Schomann *et al.* 2008). However, a number of taxa have also been found to inhabit non-forest habitats such as deserts and

grasslands, or to exhibit extreme morphological variations associated with myrmecophilous lifestyles (Parker and Maruyama 2013). Despite ongoing taxonomic work, comprehensive global treatments of the diversity, life history, phylogeny, and ecology of most groups within the subfamily are virtually nonexistent (Newton and Chandler 1989).

Among the six supertribes included within the Pselaphinae, the Pselaphitae has consistently been placed as sister-taxon to the mainly myrmecophilous Clavigeritae (Newton and Thayer 1992, 1995; Parker and Grimaldi 2014). These two are easily separated from other taxa by the combination of elongate mesotrochanters (dorsal margin of the trochanteral/femoral joint distant from the mesocoxae), elongate third tarsomere (as long or longer than the first and second tarsomeres, combined), distinctly separate mesocoxae, and presence of visible paratergites on the abdominal margins. The Pselaphitae may be distinguished from the Clavigeritae by the presence of free abdominal tergites instead of a fused tergal plate found in clavigerites, the second and third tarsomere much longer than the first (second tarsal segment shortened in clavigerites), and the presence of two tarsal claws (single claw in clavigerites). A robust internal phylogenetic analysis of the Pselaphitae has not yet been presented, although efforts to resolve elements of the New Zealand and Australian fauna are underway by the authors.

Among the eleven tribes of Pselaphitae, the Pselaphini Latreille, 1802 is of particular interest due to its relatively high diversity in temperate regions, well-supported monophyly, and easily-recognizable habitus, in combination with its poorly-defined generic boundaries (Chandler 2001; Nomura and Leschen 2006; Parker and Grimaldi 2014). The most recent regional revision of the Pselaphini of Australia by Chandler (2001) resulted in the description of five new genera, four of which were monotypic and endemic to Australia. One of these was the result of the transfer of species previously placed into the problematic and paraphyletic genus *Pselaphus* Herbst. This study brought the number of genera in Australia from six to eleven, essentially doubling the generic diversity of the region. Although Chandler's monograph focused on the Australian fauna, the work included narratives on the generic boundaries of many Pselaphini and some notes on the fauna of NZ. In particular, it addressed the complex issue of distinguishing the genera *Pselaphus* and *Pselaphogenius* and the non-monophyly of *Pselaphus*, as currently defined in NZ. Thus, a logical next step towards the resolution of the tribe on a global level is a revision of the Pselaphini of New Zealand.

The NZ fauna of Pselaphini includes the following genera: *Pselaphaulax* Reitter, *Pselaphogenius* Reitter, *Pselaphophus* Raffray, *Pselaphopluteum* Owens, Leschen, and Carlton, *Pselaphotheseus* Park, *Pselaphotumulus* Owens and Carlton, and *Pselaphus* Herbst). Descriptions of several additional species are underway by the authors, along with preparation of a key to the NZ genera of Pselaphini. Among these, *Pselaphus* contains the greatest number of species, 13. As Chandler (2001) noted, the constituents of this genus in NZ require re-examination, with the majority of species to be transferred into the genera *Pselaphogenius* and *Pselaphaulax*. This assertion was supported by detailed examination of type material, as well as additional pinned and point-mounted material for this study.

The genus *Pselaphaulax* Reitter, 1909 is distributed broadly across the Afrotropical, Oriental, and Palearctic regions, as well as in South Africa and Madagascar, and now has been identified as a major constituent of the tribe Pselaphini in NZ. Prior to work on the NZ fauna, 61 species were described from the genus, with 29 of these from Australia (Chandler 2001). A recent review of the Pselaphini of the Subantarctic and Chatham Islands (Owens *et al.* 2019) resulted in the first description of species from this genus in New Zealand: *P. dracophyllum* (Auckland Island), *P. caeruleus* (Chatham Island), *P. flavus* (Chatham Island), and *P. traversi*

(Chatham Island). The additional description of ten new species, the subsequent synonymy of *Pselaphus trifoveatus* Broun under *Pselaphus pilifrons* Broun, the synonymy of *Pselaphus pilistriatus* Broun and *Pselaphus fuscopilus* Broun under *Pselaphus pauper* Sharp, and subsequent transfer of these along with *Pselaphus meliusculus* Broun to the genus *Pselaphaulax* in this manuscript is an important step to the resolution of a major component of the NZ fauna.

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

All specimens were obtained from the following institutions:

FMNH	Field Museum of Natural History, Chicago, IL, USA.
JN	John Nunn, personal collection, Dunedin, New Zealand.
NZAC	New Zealand Arthropod Collection, Landcare Research, Auckland, NZ.
LSAM	Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.
NHM	Natural History Museum, London, United Kingdom.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by two-letter Crosby Codes (Crosby *et al.* 1998). Two slashes (“//”) are used to indicate label breaks. The number and sex of specimens are indicated preceding label data (i.e. “(2 males, 1 female)”), and the lending institution is indicated following label data (i.e. “(NZAC)”). For type specimens, deposition in either the LSAM, NHM, or NZAC is indicated following label data.

Redescription of *Pselaphaulax*.

Pselaphaulax Reitter 1909

Pselaphaulax Reitter (1909: 218)

Type species: *Pselaphus dresdensis* Herbst, 1792 (monot.)

(Figure 6)

Redescription (based on Owens *et al.* 2019): MALES. Head: eyes rounded, composed of 15–20 facets. Vertex convex; shallow sulcus beginning at base of vertex, extending to level of vertexal foveae; vertexal foveae large, set into margins of vertexal depression parallel to middle of eyes; vertexal depression widest between eyes, confluent with sulcus extending to apex of rostrum. Rostral sulcus bounded by lateral, flattened ridges extending to antennal acetabula. Frontal margin of rostrum in dorsal view typically straight to slightly emarginate, with sparse, suberect setae. Antennal segment one as long as antennomeres 2–4, antennae otherwise unmodified. Gular mound modified, hemispherical, about as long as wide or narrowed and longer than wide, glabrous; area of head posterior to gular mound flattened, slightly concave, sometimes bearing flattened modified scales; gular foveae present, paired. Maxillary palpomere I elongate, 1/2 as long as palpomere II; palpomere II narrow, enlarged distally, shorter than head; maxillary palpomere III quadrate; maxillary palpomere IV as long as head, widened in distal 1/3–1/2, apical area smooth to roughened, v-shaped sensory patch present, margined by carina. Thorax: Pronotum widest at 1/2 length, narrowed anteriorly and posteriorly; basal sulcus present, delimited by lateral antebasal foveae, median antebasal fovea reduced to depression, margined by two short carinae. Prosternum in front of coxae slightly convex, anteriorly with modified flattened setae; lateral procoxal foveae present. Mesoventrite with median shield; lateral mesoventral foveae present in large cavities filled with dense setae, meeting internally; lateral

mesocoxal foveae absent; median mesoventral foveae present, paired, meeting internally; mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, variously modified; metacoxae separated by extension of ventrite I. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present; apical fringe of setae present. Abdomen: Tergites of usual form for tribe, unmodified; tergite 2 without obvious basal foveae, lateral basal sulcus extending along width of ventrite, obscured by dense band of setae along posterior edge. Ventrite I covered in dense, shining setae; ventrite II variously modified with median depressions, sulci, or projections; ventrites otherwise unmodified.



Figure 6. *Pselaphaulax pauper* male, habitus photographs.

Females: similar to males except eyes may be smaller, composed of fewer facets; secondary sexual modifications of the legs and second visible ventrite absent.

Comments. NZ species in this genus are primarily united by the presence of an antebasal sulcus on the pronotum margined by lateral antebasal foveae, the median antebasal foveae present and sometimes delimited by two small carinae (may be reduced to a median pit), maxillary palpi IV widened in the distal 1/3 to 1/2 with a v-shaped sensory patch margined by a

carina, and the gular swelling prominent, about as long as wide or narrower and slightly longer than wide. While several groups in NZ likely representing undescribed genera may superficially

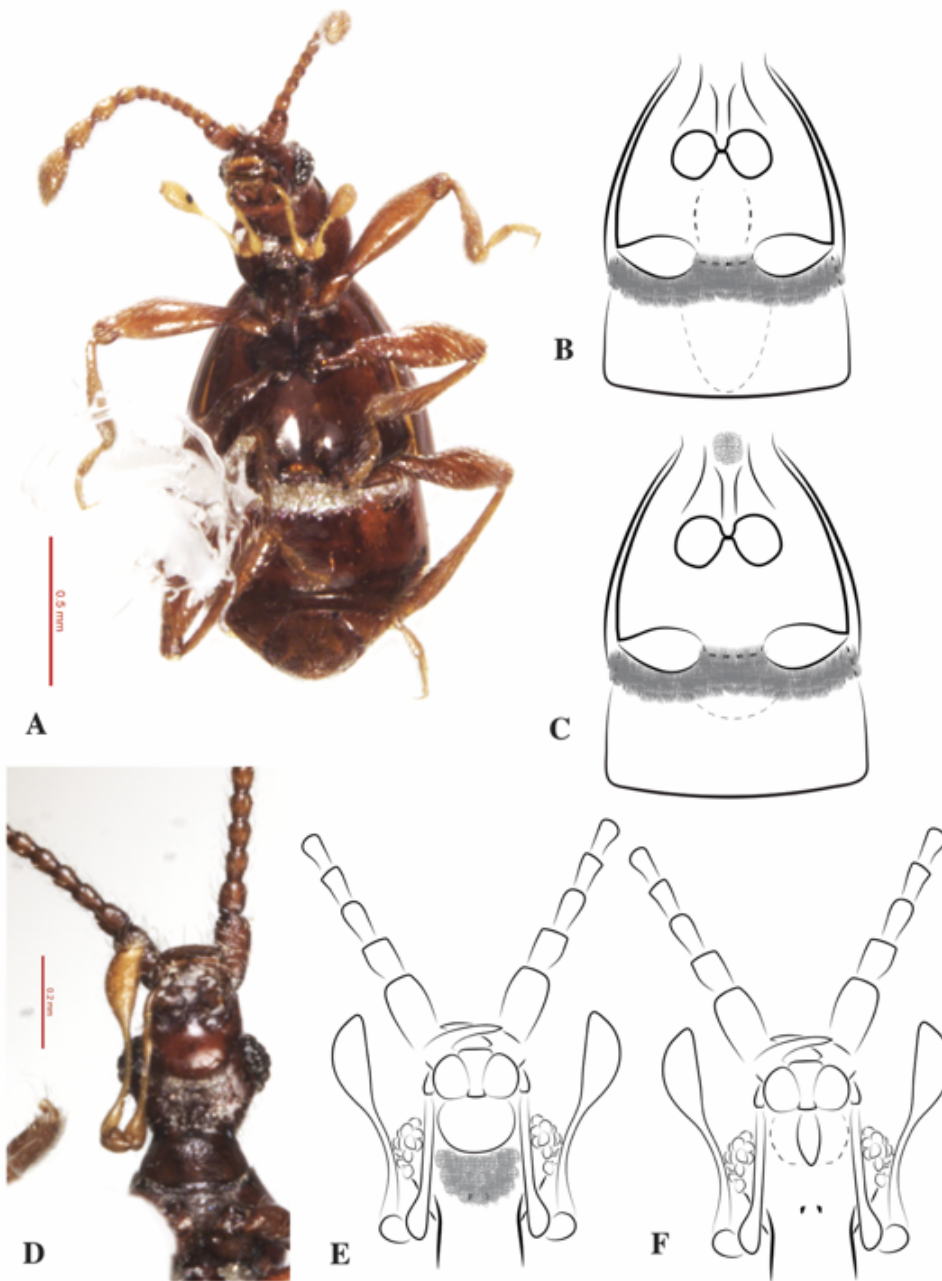


Figure 7. *Pselaphaulax* species groups diagnostic characters. A) *Pselaphaulax* meso- and metaventrals and ventrite II photo; B) meso- and metaventrals and ventrite II, species group one; C) meso- and metaventrals and ventrite II, species group two; D) *Pselaphaulax* head, ventral photo; E) head, ventral, species group one; F) head, ventral, species group two.

resemble *Pselaphaulax*, no other groups possess a combination of these character states. *Pselaphaulax* is most similar to *Pselaphotumulus* and *Pselaphogenius*, but can quickly be

distinguished, most noticeably, by the rounded to slightly emarginate apical margin of the rostrum (pointed in *Pselaphotumulus* and some *Pselaphogenius*), the gular process rounded or ovate-rounded (greatly expanded to cover the entire gular area of the head in *Pselaphotumulus*), and the presence of an antebasal sulcus on the pronotum (absent in *Pselaphogenius*).

Superficially, NZ specimens in the genus can be divided into two “species groups” which can consistently be distinguished by several characters (Figure 7), including: shape of gular mound (ovate, narrowed apically and posteriorly in group 1, rounded, widened apically and rounded or narrowed posteriorly in group 2), modifications of the area behind gular mound (nude in group 1, covered in flattened modified scales in group 2), the degree of reduction of the median antebasal fovea (present and margined by carinae in group 1; reduced and pit-like in group 2), and modifications of the mesoventral shield (bearing a single, setose fovea in group 1; lacking setose fovea in group 2). All species described in the previous Chatham Islands manuscript (Owens *et al.* 2019) can be placed in species group 2. *Pselaphogenius intermedius* possesses a mixture of characters (gular mound rounded posteriorly as in group 2, area behind gular mound nude as in group 1, median antebasal fovea present as in group 1, and mesoventral shield bearing a setose fovea as in group 2). Further investigation and comparison with Asian fauna may eventually warrant the designation of subgeneric status to these species groups within NZ *Pselaphaulax*, but under the current system they should be considered informal designations for encompassing possible morphological variations within the genus.

Checklist of the New Zealand species of *Pselaphaulax* Reitter.

Pselaphaulax caeruleus Owens, Leschen, and Carlton 2019

Pselaphus caeruleus Owens, Leschen, and Carlton (2019: 4)

Type depository. NZAC.

Distribution. NZ: Chatham Islands.

Pselaphaulax dracophyllum Owens, Leschen, and Carlton 2019

Pselaphus dracophyllum Owens, Leschen, and Carlton (2019: 5)

Type depository. NZAC.

Distribution. NZ: Auckland Island.

Pselaphaulax flavus Owens, Leschen, and Carlton 2019

Pselaphaulax flavus Owens, Leschen, and Carlton (2019: 6)

Type depository. NZAC.

Distribution. NZ, Chatham Islands.

Pselaphaulax “*hornabrooki*”, new species

Type depository. NZAC.

Distribution. NZ: Wellington (WN).

Pselaphaulax “*intermedius*”, new species

Type depository. LSAM.

Distribution. NZ: Central Otago (CO).

Pselaphaulax meliusculus (Broun), 1893, new combination

Pselaphus meliusculus Broun (1893a: 1044)

Type depository. NHM.

Distribution. NZ: Central Otago (CO); Dunedin (DN); Fiordland (FD); Southland (SL).

Pselaphaulax “*nunni*”, new species

Type depository. NZAC.

Distribution. NZ: Marlborough (MB).

- Pselaphaulax pauper* (Sharp), 1874, new combination
Pselaphus pauper Sharp (1874: 492)
 Type depository. NHM.
Pselaphus pilistriatus Broun (1880: 123), syn.
 Type depository. NHM.
Pselaphus fuscopilus Broun (1886: 944), syn.
 Type depository. NHM.
 Distribution. NZ: Auckland (AK); Fiordland (FD); MidCanterbury (MC); Northland (ND); Westland (WD); Wellington (WN).
- Pselaphaulax "pelorus"*, new species
 Type depository. NZAC.
 Distribution. NZ: Marlborough (MB); Nelson (NN).
- Pselaphaulax pilifrons* (Broun), 1914, new combination
Pselaphus pilifrons Broun (1914a: 93)
 Type depository. NHM.
Pselaphus trifoveatus Broun (1914b: 172), syn.
 Type depository. NHM.
 Distribution. NZ: Mid Canterbury (MC).
- Pselaphaulax "ramsayi"*, new species
 Type depository. NZAC.
 Distribution. NZ: Nelson (NN).
- Pselaphaulax "tararua"*, new species
 Type depository. NZAC.
 Distribution. Nelson (NN), Taranaki (TK), Taupo (TO), Wellington (WN).
- Pselaphaulax traversi* Owens, Leschen, and Carlton 2019
Pselaphaulax traversi Owens, Leschen, and Carlton (2019: 7)
 Type depository. NZAC.
 Distribution. NZ: Chatham Islands.

Key to the New Zealand species of *Pselaphaulax* (males). Extensive examination of NZ *Pselaphaulax* specimens has yielded very few external morphological characters useful for species-level identification. As a result, this key relies heavily on characters of the male genitalia. In most cases, identification of females is only possible via association with male specimens.

- | | |
|------|--|
| 1 | Gular mound ovate, narrowed posteriorly and anteriorly (except <i>P. meliusculus</i>); pronotum with median antebasal fovea well-developed with lateral carinate ridges; mesoventral shield with setose fovea present.....2 (species group 1) |
| 1' | Gular mound rounded, wider anteriorly, narrowed posteriorly; Pronotum with median antebasal fovea reduced or pit-like; mesoventral shield unmodified, setose fovea absent (except <i>P. dracophyllum</i>)7 (species group 2) |
| 1" | Possessing a combination of characters of both species groups: gular mound rounded posteriorly (group 2); pronotum with median antebasal foveae well-developed, mesoventral shield with setose foveae (group 1) <i>P. "intermedius"</i> |
| 2(1) | Gular mound broad anteriorly and narrowed posteriorly, not ovate.....
<i>P. meliusculus</i> (Broun), 1893 |
| 2' | Gular mound narrowed anteriorly and posteriorly, ovate.....3 |

- 3(2') Ventral process of aedeagus not distally curved downwards; reduced or blunt at apex....4
 3' Ventral process of aedeagus curved downwards, distally; apex pointed, narrow.....5
 4(3) Ventral process of aedeagus reduced, shortened, apically blunt; fleshy process associated with narrow median lobe.....*P. pilifrons* (Broun), 1914
 4' Ventral process of aedeagus reduced, apparently absent; median lobe broad.....*P. "ramsayi"*
 5(3') Ventral process of aedeagus serrate; dorsal processes associated with median lobe elongate, narrow, not noticeably curved.....*P. "pelorus"*
 5' Ventral process of aedeagus smooth; median lobe distinctly curved.....6
 6(5') Median lobe of aedeagus and associated left lateral process both curved towards the right.....*P. "hornabrooki"*
 6' Median lobe of aedeagus lacking associated left lateral process curved towards the right.....*P. "tararua"*
 7(1') Mesoventral shield modified, setose fovea present posterior to procoxae.....*P. dracophyllum* Owens *et al.* 2019
 7' Mesoventral shield unmodified, setose fovea absent.....8
 8(7') Males with visible ventrite II with large, deep, oval depression extending length of ventrite.....*P. "nunni"*
 8' Males with visible ventrite II not with large, deep, oval depression, median area slightly flattened or otherwise modified....9
 9(8') Visible ventrite II with two patches of setae on apex, distribution restricted to Chatham Is.....*P. caeruleus* Owens *et al.* 2019
 9' Visible ventrite II nude, not with two patches of setae on apex.....10
 10(9') Parameres of genitalia reduced and shortened, no more than ½ length of median lobe, distribution restricted to Chatham Is.....*P. traversi* Owens *et al.* 2019
 10' Parameres of genitalia not visibly shortened, longer than ½ length of median lobe.....11
 10(9') Ventral process of aedeagus associated with accessory serrate process, at least in part.....*P. pauper* (Sharp), 1874
 11' Ventral process of aedeagus not associated with accessory serrate process.....12
 12 Aedeagus with distal end of median lobe not curved to right, dorsal process poorly developed; distribution restricted to Chatham Is.....*P. flavus* Owens *et al.* 2019
 12' Aedeagus with distal end of median lobe curved to right, dorsal process well-developed and extended over median lobe before projecting ventrally.....*P. meliusculus* (Broun), 1893

Pselaphaulax "intermedius", new species
(See Figure 8)

Type Material. Holotype: (male) New Zealand: CO: Rock and Pillar Ra., 1158 m Swards, 13 Nov 1969 J McBurney, 69/208 (LSAM). Paratypes: (1 female) type locality (LSAM); (1 male, 1 female) New Zealand: CO: Old Man Ra., 1432 m, Litter and debris, 24 Feb 1974 JC Watt, 74/11 (LSAM).

Etymology. The specific epithet refers to the species' intermediate status between species groups 1 and 2.

Diagnosis. Externally, *Pselaphaulax "intermedius"* can be distinguished from all others in the genus by possessing a combination of characters of species groups 1 and 2: gular mound

rounded posteriorly (group 2); pronotum with median antebasal foveae well-developed, mesoventral shield with setose foveae (group 1). The form of the genitalia is also unique, with the median lobe large and complex, lateral processes absent, and ventral process simple and short.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 16 facets. Frontal margin of rostrum in dorsal view straight with sparse suberect setae. Gular mound narrowed apically and rounded posteriorly, swelling as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal $\frac{1}{3}$, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventricle afoveate; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with one basal fovea and single sutural fovea; discal stria absent, sutural striae present; apical fringe of setae present, sparse. Abdomen: Tergites of usual form for tribe. Ventrite II with median area slightly flattened at base, apically margined by short, sparse setae. Genitalia: aedeagus asymmetrical. Median lobe distally large and complex. Ventral process short, downward curved, distally, much shorter than median lobe. Lateral processes absent. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller.

Distribution. *Pselaphaulax intermedius* is known only from the type localities in Central Otago (CO).

***Pselaphaulax* Species Group 1**

Pselaphaulax “*hornabrooki*”, new species
(See Figure 9)

Type Material. Holotype: (male) Wellington 10-28 1946 R.Hornabrook (NZAC). Paratypes: (3 females) holotype locality (NZAC).

Etymology. This species is named after the collector of the type series, R. Hornabrook.

Diagnosis. *Pselaphaulax* “*hornabrooki*” can be distinguished from other species in the genus by the combination of a median lobe curved to the right and an associated left lateral process that is narrow and elongate, extending beyond the median lobe.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets. Frontal margin of rostrum in dorsal view slightly rounded with sparse suberect setae. Gular mound narrowed apically and posteriorly, swelling distinctly longer than wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal $\frac{1}{3}$, apical swelling roughened, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity

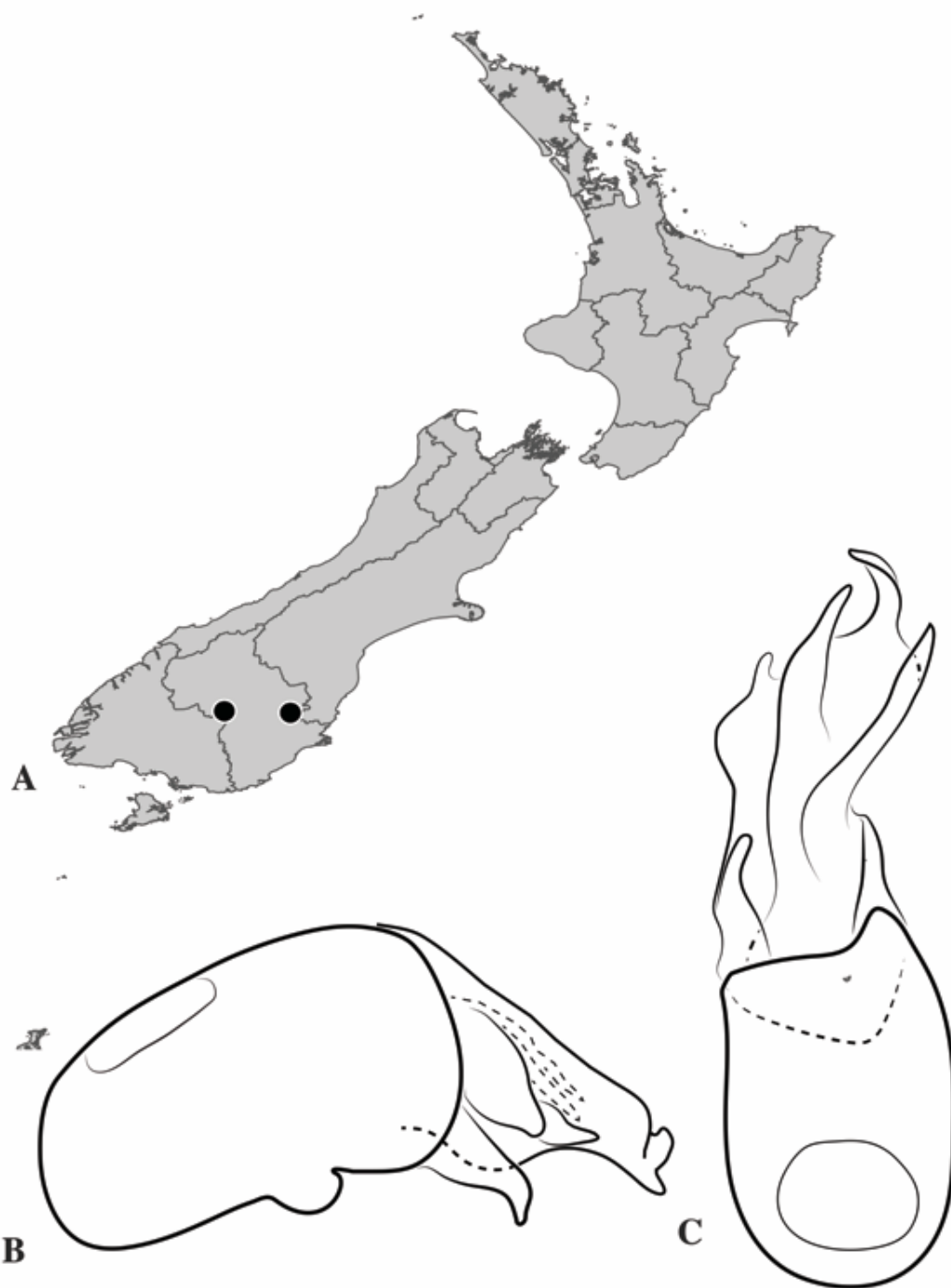


Figure 8. A) Map of localities where *Pselaphaulax* “*intermedius*” specimens have been collected; B) *Pselaphaulax* “*intermedius*” aedeagus, lateral; C) *Pselaphaulax* “*intermedius*”, dorsal.

behind margin of procoxae. Metaventricle afoveate; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and single sutural fovea; single discal stria,

sutural striae present; apical fringe of setae absent. Abdomen: Tergites of usual form for tribe. Ventrite II with median area slightly flattened at base, apically margined by short, sparse setae. Genitalia: aedeagus asymmetrical. Median lobe distally curved to the right. Ventral process downward curved, distally, shorter than median lobe. Left lateral process elongate narrow, extending beyond median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

Distribution. *Pselaphaulax "hornabrooki"* is known only from four collecting events in Wellington (WN).

Material examined. Wellington Region: (1 male, 3 females) New Zealand: WN: Otaki Forks, Hector Trig Moss, 6 Sep 1965 JI Townsend, 65/480 (LSAM); (8 males, 6 females) New Zealand: WN: Hutt Valley, Taita Litter, 1958-1961 K Lee, 61/16 (LSAM); (1 male, 1 female) Masterton 1410 10/2/1952 R. Hornabrook// Entomology Division D.S.I.R. New Zealand (NZAC).

Pselaphaulax meliusculus (Broun), 1893, comb. nov.

Pselaphus meliusculus (Broun 1893a: 1044)

(See Figure 10)

Type Material Examined. The following specimen from the NHM is the holotype of *Pselaphus meliusculus*: (male) TYPE (red/orange label)// 1868.// Dunedin// New Zealand Broun coll. Brit. Mus. 1922-482. The manuscript number (1868.) matches the number included in Broun's description (Broun, 1983a). Likewise, the locality of the specimen, Dunedin, is near the locality, Mount Maungatua, Otago, mentioned in Broun's original description.

Diagnosis. *Pselaphaulax meliusculus* can be distinguished from other species in the genus by the curvature of the median lobe to the right and the projection of a dorsal process over the median lobe.

Redescription. MALE Lectotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 22 facets. Frontal margin of rostrum in dorsal view straight with tuft of sparse suberect setae. Gular mound modified, broadened anteriorly, as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/2 to 1/3, distal swollen area smooth, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventrite afoveate, lateral margins of depression with short erect setae; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with single basal fovea present, single sutural fovea; single discal stria and sutural striae present; apical fringe of setae present. **Abdomen:** Tergites of usual form for tribe. Ventrite II flattened in narrow band along length of ventrite, flattened area margined by fine, short setae in some specimens. Genitalia: aedeagus asymmetrical. Dorsal process extended over median lobe, projected ventrally. Median lobe distally curved to the right. Ventral process downward curved, distally, about as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

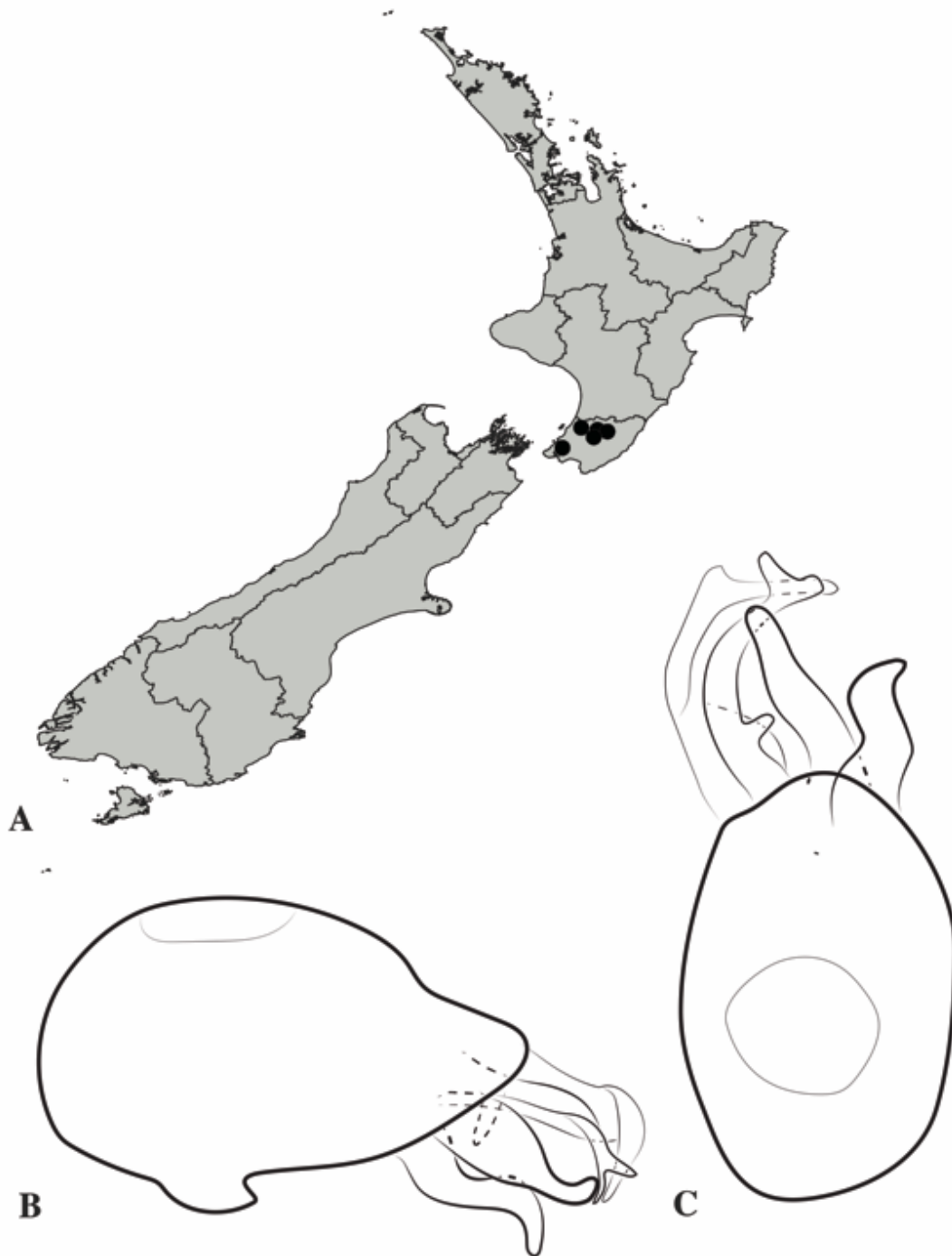


Figure 9. A) Map of localities where *Pselaphaulax 'hornabrooki'* specimens have been collected; B) *Pselaphaulax 'hornabrooki'* aedeagus, lateral; C) *Pselaphaulax 'hornabrooki'*, dorsal.

Distribution. *Pselaphaulax meliusculus* is known from Central Otago (CO), Dunedin (DN), Fiordland (FD), and Southland (SL) regions on South Island.

Material examined. Central Otago region: (1 male) New Zealand CO Leaning Lodge Rock & Pillar Rng 25-Jan-02 (JN); (1 male, 1 female) New Zealand CO Ailsa Craig Lammermoor Rng 7-Dec-08// Sifted moss and tussock litter// J T Nunn collection (JN); (1 male, 1 female) New Zealand CO Carrick Ra Watts Rock 8 ii 2015// Sifted moss and tussock litter J. Nunn (JN). Dunedin region: (1 male) New Zealand DN Flagstaff Hill 8-Oct-03// in tussock litter (JN); (1 male) NEW ZEALAND DN Flagstaff Hill Dunedin 23-IV-2011// in tussock litter (JN); (2 males, 1 female) NEW ZEALAND: DN: Mt. Cargill Scen. Res., Organ Pipes Track, nr. Mt. Cargill summit, 600m, 45°48.505'S, 170°33.999'E, 5.xii.2005, podocarp-broadleaf forest; FMHD#2005-076, berl., leaf litter (wet), A. Solodovnikov & D. Clarke; ANMT site 1165 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male) Dunedin 1408/15/1952 R.Hornabrook (NZAC). Fiordland region: (1 male) New Zealand FD Borland Saddle 24-Jan-08 (JN); New Zealand FD Thicket Burn L Hauroko 04-Jan-96// *Nothofagus* litter (JN); (1 male) New Zealand FD Mount Burns 18-Feb-07// Tussock litter (JN); (1 male) New Zealand FD First Bay L Hauroko 25 Sep 09// Washed soil sample, beech forest// J T Nunn collection (JN); (1 male) NEW ZEALAND FD Hump Ridge 914m 8 Feb 1968 J. I. Townsend Litter 68/9// New Zealand Arthropod Collection, NZAC Private Bat 92170 AUCKALND New Zealand (NZAC). Southland region: (3 males, 1 female) New Zealand SL Manuka Ridge Rd Blue mountains 9-Aug-03// in ground litter and litter from tussock zone// J T Nunn collection (JN); (1 male) New Zealand SL MW relat stn Blue Mountains 19-Mar-06// J T Nunn collection (JN); (1 male) New Zealand SL Round Hill Orepuki 6-Jul-02// In forest floor litter// J T Nunn collection (JN); (1 male) New Zealand SL Spence Basin Takitimu Rng 16-Jan-00// c. 1,150 m// J T Nunn (JN); (1 male) New Zealand SL Mores SR Riverton 6-Jul-02// In ground litter from kamahi forest// J T Nunn (JN); (1 male, 1 female) New Zealand SL Kaka Point SR 5-Jun-99// In kamahi forest floor litter (JN); (1 male) NEW ZEALAND SL Longwood Range 8 Feb 1976 G.W. Ramsay litter 76/36// Entomology Division D.S.I.R. New Zealand (NZAC).

Pselaphaulax “*pelorus*”, new species
(See Figure 11)

Type Material. Holotype: (male) New Zealand: MB: Pelorus Reserve Litter, 15 Sep 1964 JI Townsend, 64/93 (LSAM). Paratypes: (1 male, 2 females) holotype locality (LSAM).

Etymology. This species is named after the type locality in Pelorus Reserve.

Diagnosis. Of the species in group 1, only *P. “pelorus”* possesses a ventral process with serrations on the dorsal surface. Additionally, the elongate, curved processes associated with the elongate median lobe (4/5 length of basal bulb) are unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets. Frontal margin of rostrum in dorsal view straight with sparse suberect setae. Gular mound modified, ovate, narrowed posteriorly and anteriorly, longer than wide; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/3, apical swelling roughened, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus distinct, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventricle with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventricle afoveate; metacoxae separated by extension

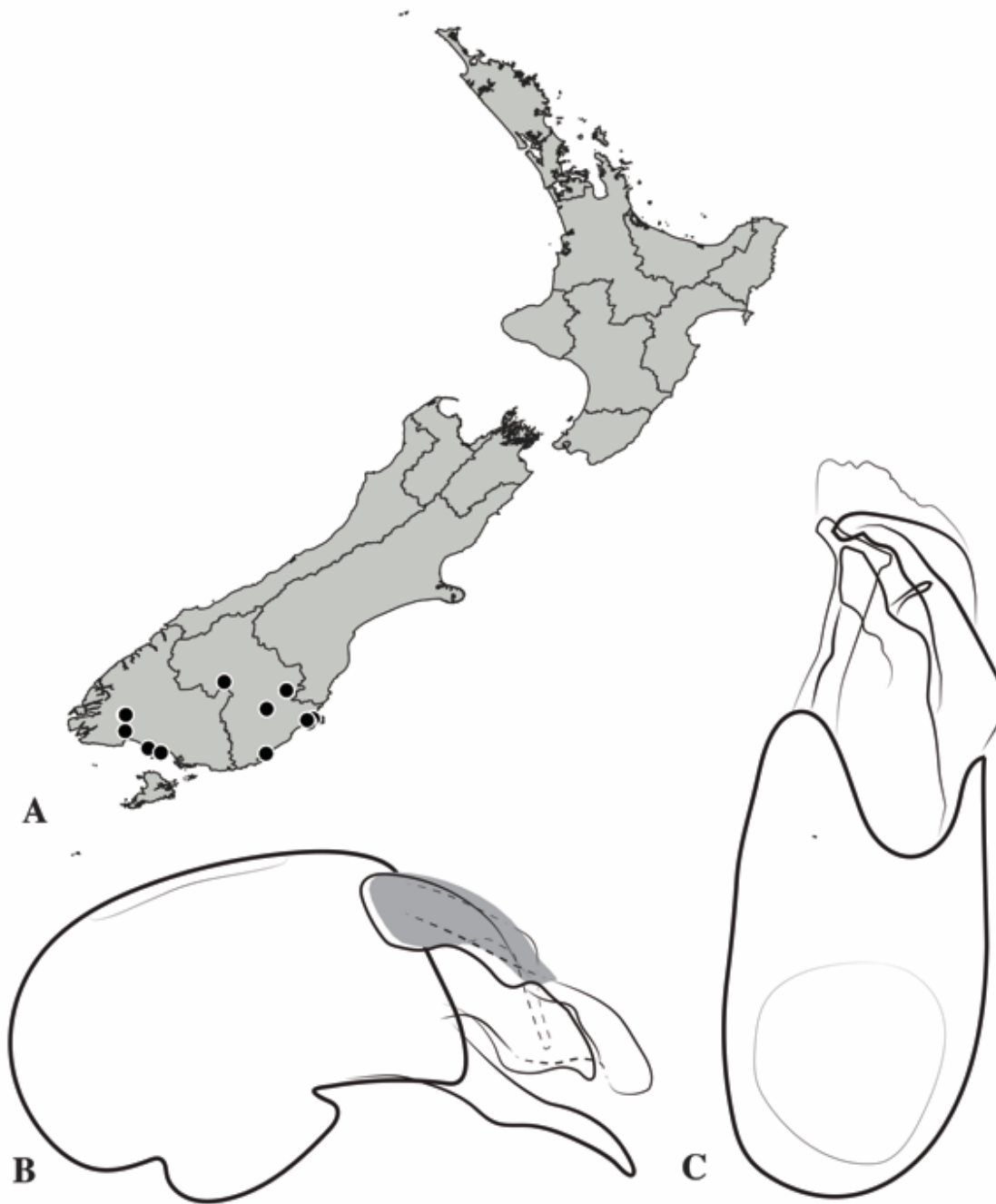


Figure 10. A) Map of localities where *Pselaphaulax meliusculus* (Broun) specimens have been collected; B) *Pselaphaulax meliusculus* (Broun) aedeagus, lateral; C) *Pselaphaulax meliusculus* (Broun), dorsal.

of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea; single discal stria, sutural striae present; sparse apical fringe of setae present. Abdomen: Tergites of usual

form for tribe. Ventrite II with median area slightly flattened throughout length of ventrite, apically with row of small tubercles. Genitalia: aedeagus asymmetrical. Median lobe broad, about 4/5 length of basal bulb; associated processes narrow, elongate, curved. Ventral process serrate on dorsal surface, as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

Distribution. This species is known from the Pelorus and Wakamarina Valleys in Marlborough (MB) and Cobb Reservoir and Dun Mt. in Nelson (NN).

Material examined. Marlborough region: (2 males) New Zealand: MB: Pelorus Bridge Litter, 15 Sep 1964 JI Townsend, 64/95 (LSAM); (1 male) New Zealand: MB: Pelorus Valley, 214 m Moss, 13 Jul 1965 JI Townsend, 65/388 (LSAM); (1 male) New Zealand: MB: Wakamarina Valley Litter, 12 Aug 1966 AK Walker, 66/237 (LSAM); (1 male) New Zealand: MB Ronga Saddle Moss, 13 Jul 1965 LPMarchant, 65/391 (LSAM). Nelson region: (1 female) New Zealand: NN: Cobb Reservoir, 1037 m Moss, 18 Sep 1964 TG Wood, 64/100 (LSAM); (1 male) New Zealand: NN: Dun Mt., Third House 560 m, moss, 66/121 29 Mar 1966, JI Townsend (LSAM); (1 male) NEW ZEALAND: So. Island, 70 km NE Nelson, Tennyson Inlet 480m, 27-v-1982, FMHD #82-604, Beech forest litter, S. Peck (FMNH, EtOH).

Pselaphaulax pilifrons (Broun), 1914, comb. nov.

Pselaphus pilifrons (Broun 1914a: 93)

Pselaphus trifoveatus (Broun 1914b: 172), synonym. nov
(See Figure 12)

Type Material Examined. After observing the type series of *Pselaphus pilifrons* and *P. trifoveatus* in the NHM and reviewing the original species descriptions of Broun, the two species were determined to be identical, and were synonymized and transferred to the genus *Pselaphaulax*. Lectotype designations are necessary to fix the taxon to a name bearing type. Broun did not specifically identify type specimens, and many of his syntype series include multiple species. Type information was included and the following specimens from the NHM were designated as lectotypes and paralectotypes:

Pselaphus trifoveatus: (male) 3538.// New Zealand Broun Coll. Brit. Mus. 1922–482// Mc Clennans 25-3-1912 (designated lectotype). The following four specimens are included in the syntype series in the NHM and have been determined to represent additional specimens of *P. trifoveatus*, and are designated as paralectotypes: (1 male) TYPE (red/orange label)// 3538.♂// New Zealand Broun Coll. Brit. Mus. 1922–482// Mc Clennans 25-3-1912; (2 females) 3538.♀// New Zealand Broun Coll. Brit. Mus. 1922–482// Rakaia 9-8-1912; (1 female) New Zealand Broun Coll. Brit. Mus. 1922–482// Mc Clennans 25-3-1912. These specimens match the manuscript number, “3583”, locality “McClennans Bush and Raikaia Gorge”, and collecting date, 1912, mentioned in Broun’s original description of the syntype series (1914b).

Pselaphus pilifrons: (1 female) 3402// Tisbury 9/10/10// *Pselaphus pilifrons*// TYPE (red/orange label) (Holotype). This specimen matches the manuscript number, “3402”, as well as the locality, “Tisbury, Invercargill” mentioned by Broun in the original description (1914b), so this specimen was determined to represent the holotype of *P. pilifrons*.

Diagnosis. *Pselaphaulax pilifrons* may primarily be separated from the other species in group 1 by the reduction of the ventral process with a short, blunt apex. The well-developed fleshy process associated with the median lobe is also unique among species in the group.

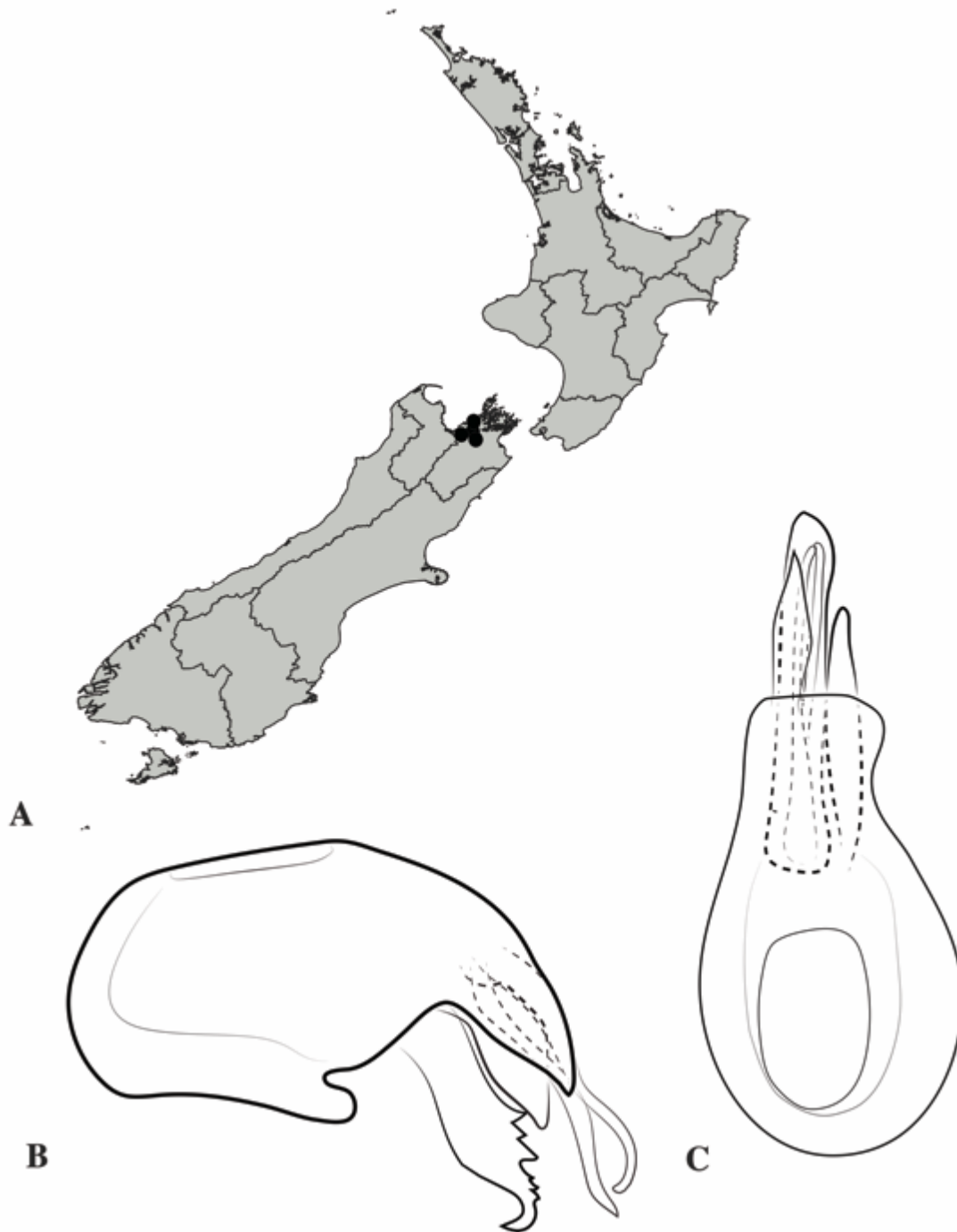


Figure 11. A) Map of localities where *Pselaphaulax "pelorus"* specimens have been collected; B) *Pselaphaulax "pelorus"* aedeagus, lateral; C) *Pselaphaulax "pelorus"*, dorsal.

Redescription. MALE lectotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than $\frac{1}{2}$

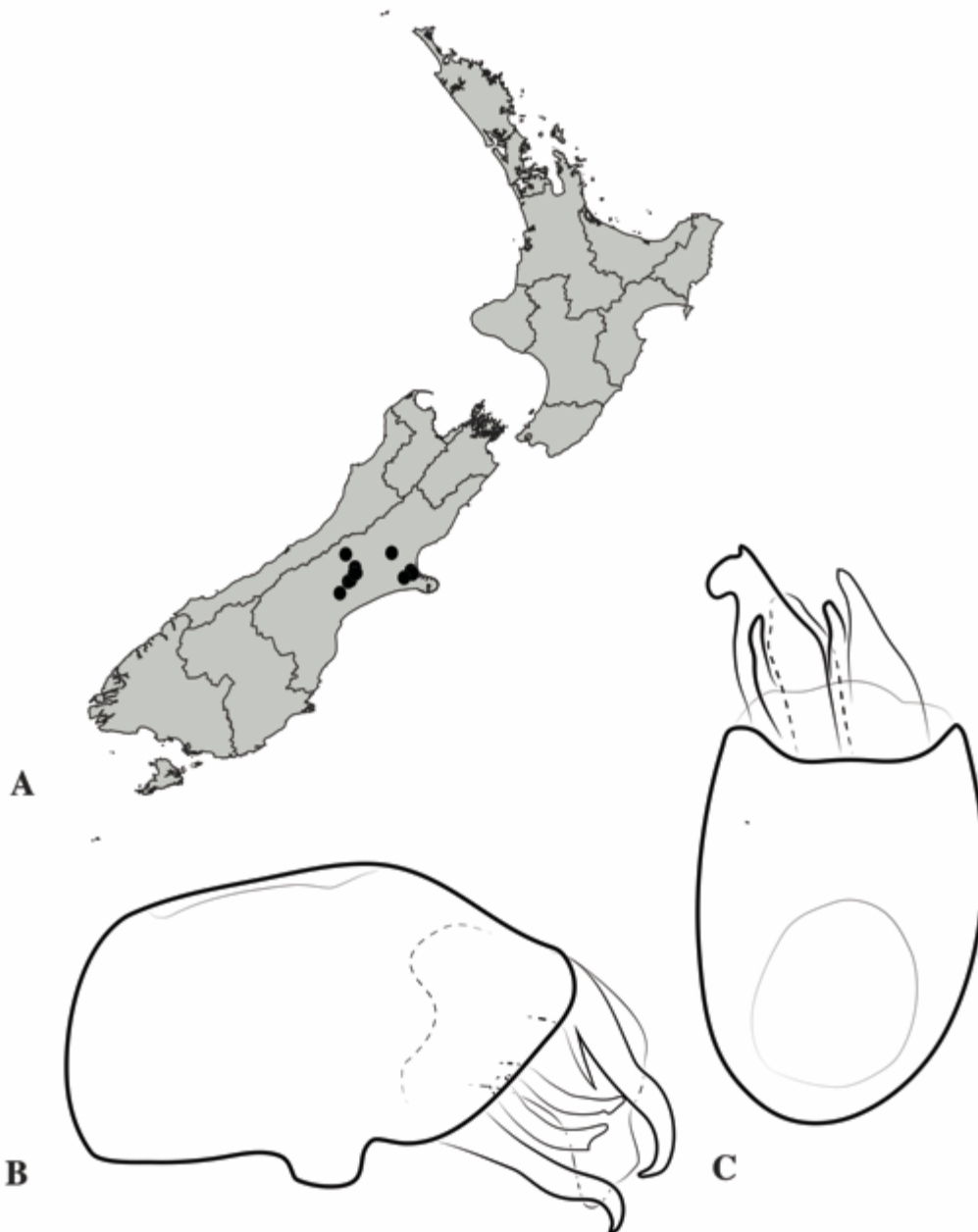


Figure 12. A) Map of localities where *Pselaphaulax pilifrons* (Broun) specimens have been collected; B) *Pselaphaulax pilifrons* (Broun) aedeagus, lateral; C) *Pselaphaulax pilifrons* (Broun), dorsal.

length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets. Frontal margin of rostrum in dorsal view weakly emarginate with sparse suberect setae. Gular mound modified, slightly longer than wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/3, distal swollen area smooth, v-shaped sensory patches present, margined by carinae.

Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventrite afoveate; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea; discal stria and sutural striae present; sparse apical fringe of setae present. Abdomen: Tergites of usual form for tribe. Ventrite II with median area slightly flattened throughout length of ventrite, apically margined by short, sparse setae. Genitalia: aedeagus asymmetrical. Median lobe distally curved downwards, protruding from fleshy dorsal extension. Ventral process blunt, shortened, barely extending beyond basal bulb. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

Distribution. *Pselaphaulax pilifrons* is known from a number of collecting events in Mid Canterbury (MC).

Material examined. Middle Canterbury region: (3 males, 1 female) New Zealand: MC: Foot of Mt. Somers Moss, 28 Jul 1966 AD Lowe, 66/220 (LSAM, one m slide-mounted); (1 female) New Zealand: MC: Foot of Mt. Somers Moss, 28 Jul 1966 AD Lowe, 66/219 (LSAM); (1 male) New Zealand: MC: McClennan's Bush Moss, 28 Jul 1966 AD Lowe, 66/221 (LSAM); (1 female) New Zealand: MC: Mt. Hutt, McClennan's Bush Moss, 11 Dec 1973 G Kuschel, 73/142 (LSAM); (2 males, 1 female) NEW ZEALAND MC Mt Alford 1067m NW of Methven 2 Feb 1976 G.W. Ramsay// Litter 76/16 (NZAC); (1 female) NEW ZEALAND MC Peel Forest Park Blandswood 7 Nov 1979 J.C.Watt// Litter 79/148 (NZAC); (1 female) NEW ZEALAND MC Sharplin Falls Bowyers stream 610m Mt Somers 2 Feb 1976// G.W. Ramsay Litter and moss 76/18 (NZAC); (2 males) Pudding Hill, nr. Methven, Canterbury// Coll. T. Hall 13.4.1915// 3538// T.Broun (NZAC); (5 females) Pudding Hill, nr. Methven Canterbury//3538 *Pselaphus trifoveatus* Broun (NZAC); (6 specimens) 21.i.52, moss, Riccarton Bush, Christchurch, S.I. (NZAC); (3 specimens) 13.x.51 moss Riccarton Bush, Christchurch, S.I. (NZAC); (2 specimens) 9.x.51 moss, 7 miles Christchurch (Bell-Bush) S.I. (NZAC); (2 specimens) 31.i.52 moss K. Valley, Cant., S.I. (NZAC); (3 specimens) 17.i.52, moss n. Ashley Gorge Cant. S.I. (NZAC); (1 male) Ex Lucerne Lincoln College, N.Z. ex: (turf) 10 pm 3 10. 1967 Coll. R. Macfarlane (NZAC); (1 male) Oakden 23-9-13// 3538// T.Broun Collector (NZAC); (2 males, 1 female) Mt. Algidus 9.10.1913// T.Broun Collection (NZAC); (1 female) Algidus 25-9-13// 3538// T.Broun Collection (NZAC).

Pselaphaulax "ramsayi", new species
(See Figure 13)

Type Material. Holotype (male) New Zealand: NN: Farewell Spit Lighthouse Litter, 28 Jan 1967 AK Walker, 67/47 (LSAM).

Etymology. This species is named in honor of GW Ramsay, collector of the holotype.

Diagnosis. This species is the only species in the genus with a completely reduced (absent) ventral process of the aedeagus. The median lobe is broad, also uncharacteristic for the genus.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets.

Frontal margin of rostrum in dorsal view straight with sparse suberect setae. Gular mound modified, ovate, narrowed posteriorly and anteriorly, longer than wide; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/3, apical swelling roughened, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus distinct, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventrite afoveate, raised into median tumosity; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea; single discal stria, sutural striae present; sparse apical fringe of setae present. Abdomen: Tergites of usual form for tribe. Ventrite II with median area slightly flattened throughout length of ventrite, apically margined by short, sparse setae. Genitalia: aedeagus asymmetrical. Median lobe distally curved downwards, broad. Ventral process reduced, apparently absent. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median flattened area.

Distribution. This species is only known from the holotype in Nelson.

Pselaphaulax "tararua", new species
(See Figure 14)

Type Material. Holotype: (male) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 990m 13 Feb 1985// C.F. Butcher Litter 85/16 (NZAC). Paratypes: (2 males, 3 females) holotype locality (NZAC).

Etymology. This species is named after the type locality in the Tararua Range.

Diagnosis. This species can be readily distinguished from all others in the genus by the curvature of the median lobe to the right and the posterior direction of the terminal end.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets. Frontal margin of rostrum in dorsal view straight, weakly emarginate with sparse suberect setae. Gular mound swollen, ovate, longer than wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/3, apical swelling roughened, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with median shield bearing patch of spongeose setae in small concavity behind margin of procoxae. Metaventrite afoveate, raised into median tumosity; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea present; single discal stria and sutural striae present; apical fringe of setae absent. Abdomen: Tergites of usual form for tribe. Ventrite II with narrow, flattened median depression, extending length of ventrite. Genitalia: aedeagus asymmetrical. Median lobe distally curved far to the right, elongate, terminal end directed posteriorly. Right lateral process well-developed, narrowed distally. Ventral process downward curved, distally, shorter than median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

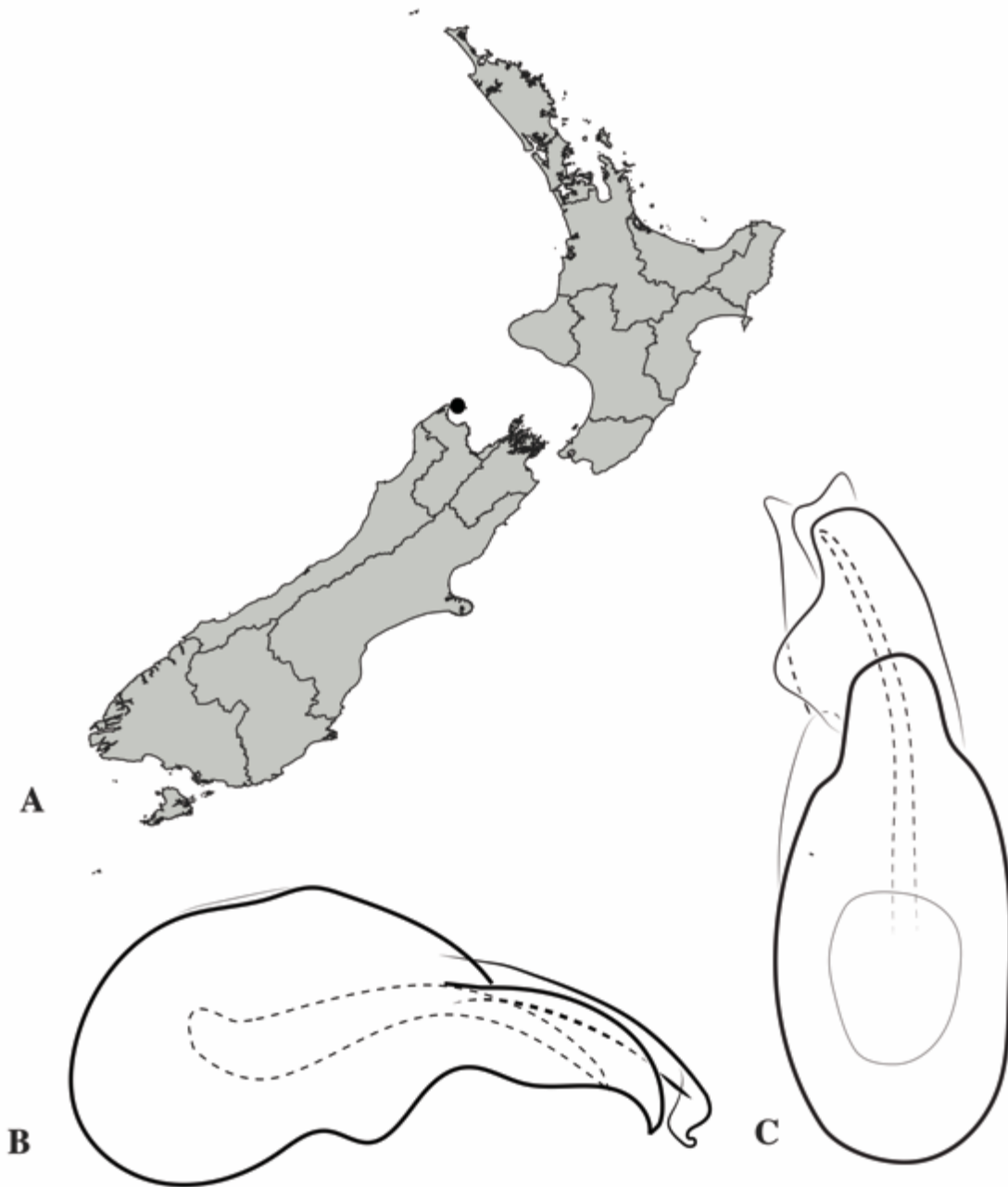


Figure 13. A) Map of localities where *Pselaphaulax "ramsayi"* specimens have been collected; B) *Pselaphaulax "ramsayi"* aedeagus, lateral; C) *Pselaphaulax "ramsayi"* aedeagus, dorsal.

Distribution. This species is known from collecting events in Nelson (NN), Taranaki (TK), Taupo (TO), and Wellington (WN). Its distribution is split across the North and South

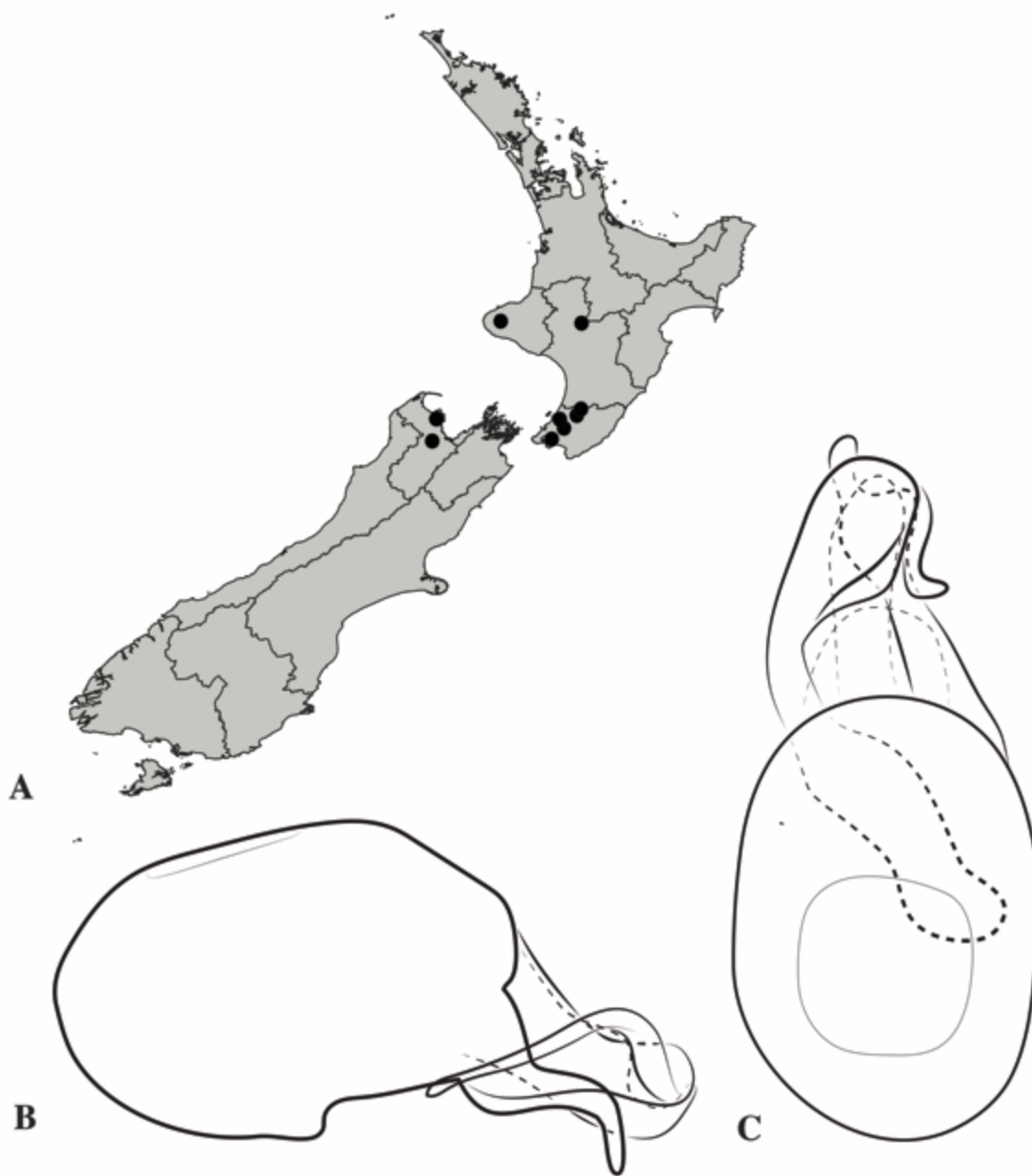


Figure 14. A) Map of localities where *Pselaphaulax* “tararua” specimens have been collected; B) *Pselaphaulax* “tararua” aedeagus, lateral; C) *Pselaphaulax* “tararua” aedeagus, dorsal.

islands of NZ, but it has not been collected farther south than the extreme northern tip of the South Island.

Material examined. (2 males, 1 female) New Zealand: NN: Stanley Brook, Sunday Creek Litter, 11 Oct 1963 JI Townsend, 63/27 (LSAM); (2 males) NEW ZEALAND: So. Island, 20 km

NE Takaka, Tasman Nat. Pk., 21-v-1982, FMHD #82-591, Mixed forest litter, S. Peck (FMNH); (1male) New Zealand: TK: Mt. Egmont Nat. Park 29 Nov 1970 AW Don (LSAM); (1 male) NEW ZEALAND TO Chakune Mtn Rd Waitonga Falls 4 Nov 2004 A C Eyles ground moss (NZAC); (3 males, 3 females) NEW ZEALAND: WN: Tararua Forest Park, above Akatarawa Saddle, 455m, 40°56.936'S, 175°06.529'E, 26.ix.2005, broadleaf-podocarp forest on slope; FMHD#2005-033, berl., leaf & log litter, A. Newton & M. Thayer, ANMT site 1151 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH); (3 males, 2 females) NEW ZEALAND: WN: Tararua Forest Park, Judd Ridge, Field's Track, Field Hut vic., 855m, 40°54.474'S, 175°15.371'E, 24.xi-26.xi.2005, broadleaf (*Noth. Menziesii-Weinmannia racemosa*) -podocarp forest; FMHD#2005-039, berl., forest leaf litter (mostly *Nothofagus*), A. Solodovnikov & D. Clarke; ANMT site 1153 95% EtOH FIELD MUSEUM NAT. HIST. (FMNH); (1 female) NEW ZEALAND, WN, Kaitoke Regional Park, Pakuratahi Forks, 15 Apr 2005, R. Leschen, C. McGuiness, // leaf litter, RL975, 41.03'S, 175.11'E (NZAC); (1 male) NEW ZEALAND WN Tararua Ra Logan East Basin 12 Feb 1985 C.F. Butcher // Mixed swards 85/27 (FMNH). NEW ZEALAND, WN Tararua Forest Park off Waiotauru Rd 25 Aug 1998 E. Spur // found on bait (NZAC); (1 male, 1 female) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 950m 3 Dec 1984 // R.C. Craw Sifted litter 84/88 (NZAC); (1 male) NEW ZEALAND WN Tararua Ra Ridge to Dundas Hut 1275m 6 Dec 1984 // R.C. Craw Moss and plants 84/98 (NZAC); (1 male, 2 females) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 800m 13 Feb 1985 // G.W. Ramsay Litter 85/18 (NZAC); (1 female) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 990m 3 Dec 1984 // B. G. Bennett & T. K. Crosby Sifted litter 84/83 (NZAC); (1 male) NEW ZEALAND WN Tararua Ra Dundas Hut 1250m 6 Dec 1984 J.S. Dugdale // Moss, plants 84/93 (NZAC); (1 male) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge, River Forks 900m 11 Feb 1985 // G.W. Ramsay Litter 85/12 (NZAC); (1 male, 3 females) NEW ZEALAND WN Wainuiomata Whakanui Tk 10 Jan 1993 J R Grehan // Beech/kamahai (NZAC).

***Pselaphaulax* Species Group 2**
Pselaphaulax “*nunni*”, new species
 (See Figure 15)

Type Material. Holotype: (male) New Zealand: MB Black Birch Ra summit 7 Feb-07 // JTN collection (JN). Paratype: (1 female) holotype locality.

Etymology. This species is named in honor of John T. Nunn, an avid supporter of Pselaphinae research in New Zealand, who collected the type series.

Diagnosis. This species can be distinguished from all other in the genus by the form of the deep ovate depression on the male ventrite II. Additionally, the absence of a setose pit on the mesoventral shield places this species in “species group 2”, although the absence of setae on the gular area behind the hemispherical swelling sets it apart from others in this division. The aedeagus, with a reduced median lobe and asymmetrical production of the right lateral process and absence of a left lateral process is also unique among the genus.

Description. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19 facets. Frontal margin of rostrum in dorsal view weakly emarginate with sparse suberect setae. Gular mound modified, hemispherical, as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, widened at base and distal 1/3,

distal swollen area smooth, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal foveae margined by small longitudinal carinae, present in groove alongside basolateral pits. Mesoventrite with mesoventral shield unmodified. Metaventrite afoveate, flattened and bearing vestiture of sparse short setae; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea; discal stria and sutural striae present; sparse apical fringe of setae present. Abdomen: Tergites of usual form for tribe. Ventrite II with deep ovate depression occupying length of ventrite. Genitalia: aedeagus asymmetrical. Median lobe reduced. Right lateral process developed, compressed laterally. Ventral process absent. Parameres present, well-developed (longer than length of basal bulb).

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

Distribution. *Pselaphaulax "nunni"* is only known from the type locality.

Pselaphaulax pauper (Sharp), 1874, comb. nov.

Pselaphus pauper Sharp (1874: 492)

Pselaphus pilistriatus Broun (1880: 123), syn. nov.

Pselaphus fuscopilus Broun (1886: 944), syn. nov.

(See Figure 16)

Type Material Examined. After observing the type series of *Pselaphus pauper*, *P. pilistriatus*, and *P. fuscopilus* in the NHM and reviewing the original species descriptions of Broun and Sharp, the three species were determined to be identical and were synonymized and transferred to the genus *Pselaphaulax*. When appropriate, information for type specimens was included, and the following specimens from the NHM were designated as lectotypes and paralectotypes for the original type series:

Pselaphus fuscopilus: The following specimen from the NHM is the holotype: (female) 1698.// Paparoa// New Zealand Broun Coll. Brit. Mus. 1922–482.// TYPE (red/orange paper). Broun's original description of this species (1886) indicated "near Howick" as the collecting locality, and did not indicate that more than one specimen was represented. The single specimen listed here is the only specimen in the NHM bearing the manuscript number matching the one given in Broun's original description, "1698", but the label indicates "Paparoa" as the collecting locality. That locality is approximately 144 km NW of Howick in a completely different part of North Island. No other specimens of Pselaphini in the NHM Broun collection bear the combination of a manuscript number, 1698, and "near Howick" as the locality. This specimen, therefore, was considered to be the holotype and Paparoa to be the type locality, not "near Howick". Neither a mistake by Broun nor a subsequent labeling mix-up at the NHM can be ruled out in this case and other cases of discrepancies between published localities and specimen label data (Lord and Leschen 2014). A default to the data indicated on the type specimens took precedence in these cases.

Pselaphus pilistriatus: (1 female) 227// Manaia// New Zealand. Broun Coll. Brit. Mus. 1922–482.// TYPE (red/orange paper) (designated neotype). Broun's original description of this species (1880) referenced a single specimen, "one mutilated individual near Whangarei Harbour". No specimens matching this combination of physical description, locality, or the manuscript number referenced in the original description, "227", were found in the NHM Broun collection. Due to the apparent absence of this specimen in the collection and its physical

damage as mentioned by Broun, it is believed likely that this specimen was lost or destroyed at some point. The specimen mentioned here was designated as the neotype, as it bears the manuscript number and physical description of the species mentioned in Broun's original description (1880).

Pselaphus pauper: (1 female) "Type H.T."// n. 3. Hokitika// *Pselaphus pauper* Type. D.S. (designated lectotype). The following specimen included in the type series is determined to be an additional specimen of this species and is designated a paralectotype: (1 female) "n. 3. Hokitika"// *Pselaphus pauper* Ind. Type. D.S. (designated paralectotype). These specimens match the locality information and description provided by Sharp regarding the syntype series in the original species description (1874).

Diagnosis. *Pselaphaulax pauper* can be distinguished from all other species in the genus by the bifurcate median lobe with the ventral process further divided at apex.

Redescription. MALE lectotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 22 facets. Frontal margin of rostrum in dorsal view slightly rounded with tuft of sparse suberect setae. Gular mound modified, hemispherical, as long as wide, glabrous; area of head posterior to gular mound flattened, covered in scale-like setae. Maxillary palpomere IV as long as head, widened at base and distal $\frac{1}{3}$, distal swollen area smooth, v-shaped sensory patches present, margined by carinae. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae; median antebasal fovea reduced to depression, present in groove alongside basolateral pits. Mesoventrite with median shield, lacking setose pit. Metaventrite afoveate, medially depressed; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea; single discal stria, sutural striae present; apex with dense fringe of setae. Abdomen: Tergites of usual form for tribe. Ventrite II with shallow oval median depression along length of ventrite. Genitalia: aedeagus asymmetrical. Median lobe protruding from fleshy dorsal extension, apparently bifurcate with ventral process distally divided. Ventral process downward curved, distally, about as long as median lobe, associated with accessory process dorsally serrate. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression and thickened area at apex.

Distribution. This species is known from Auckland (AK), Northland (ND), and Wellington (WN) on the North Island, as well as Wellington (WN) and Fiordland (FD) regions on South Island.

Material examined. Auckland region: (1 female) New Zealand: AK: Auckland, Lynfield ground plants 20 Dec 1975, G Kuschel (LSAM); (1 male) New Zealand: AK: Auckland, Lynfield ground plants 28 Aug 1976, G Kuschel (LSAM); (1 female) New Zealand: AK: Auckland, Lynfield litter, 27 Jun 1976 G Kuschel (LSAM); (1 male, slide-mounted) New Zealand: AK: Auckland, Lynfield liter, 31 Jul 1976 G Kuschel (LSAM); (1 female) New Zealand: AK: Lynfield stream bed 20 Dec 1975 G Kuschel (LSAM); (1male) New Zealand: AK: Auckland, Tropicana Dr. *Schoenus* 20 Dec 1975, G Kuschel (LSAM); (2 females) NEW ZEALAND AK Auckland Pollen I 7 Oct 1980 J.C.Watt// Litter 80/88 (NZAC); (2 males) NEW ZEALAND AK Auckland Domain podocarp litter 31.x.2005 SE Thorpe (NZAC); (1 female) NEW ZEALAND AK Auckland Domain podocarp litter 11.xi.2005 SE Thorpe (NZAC); (1 female) NEW ZEALAND AK Auckland Domain litter under rimu 15.iv.2006 SE Thorpe (NZAC); (1 female) NEW ZEALAND AK Auckland Domain podocarp litter 22.iv.2006 SE

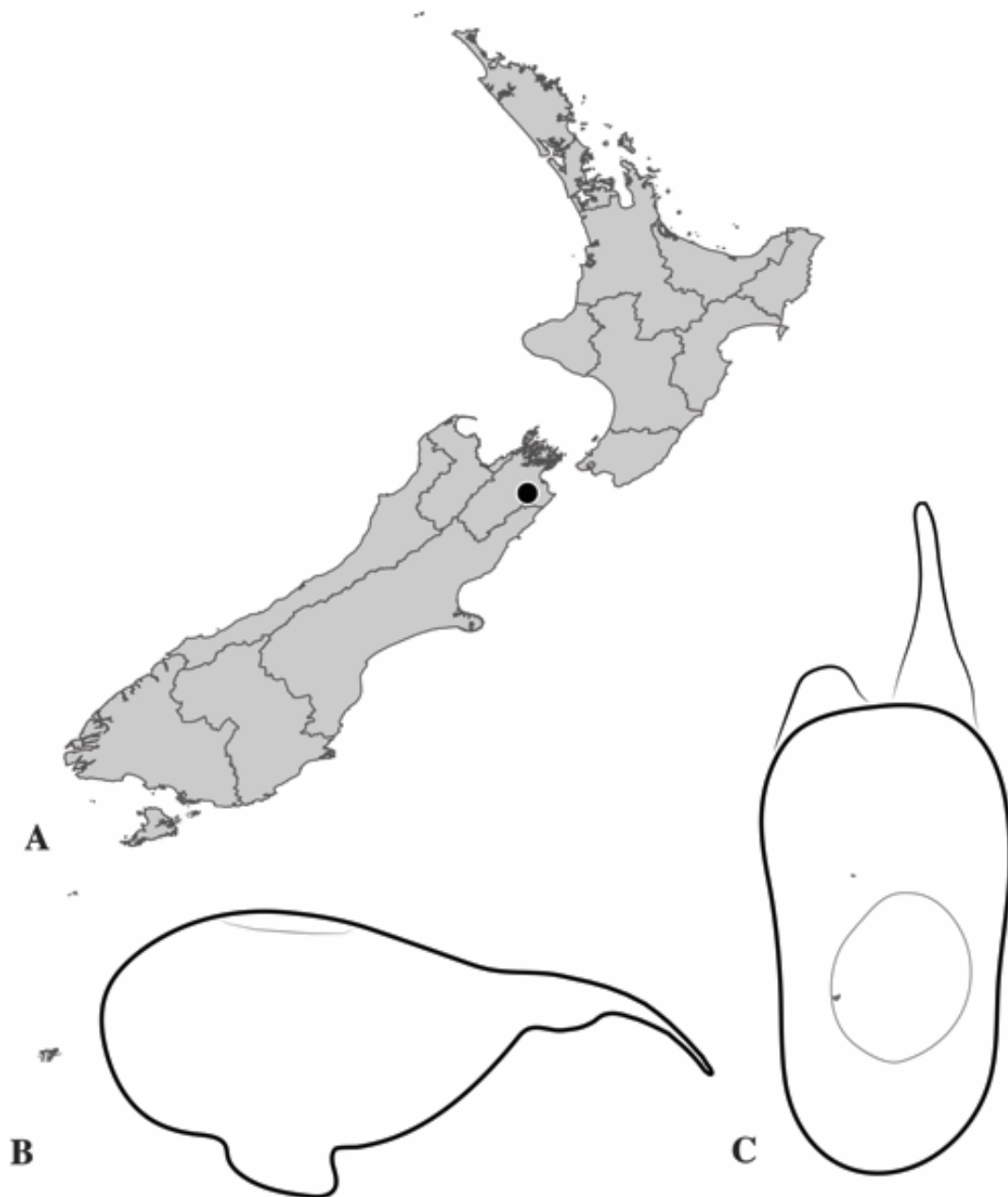


Figure 15. A) Map of localities where *Pselaphaulax "nunni"* specimens have been collected; B) *Pselaphaulax "nunni"* aedeagus, lateral; C) *Pselaphaulax "nunni"* aedeagus, dorsal.

Thorpe (NZAC); (1 male) NEW ZEALAND AK Auckland City bush under Grafton bridge, litter 14.x.2005, SE Thorpe (NZAC); (1 female) NEW ZEALAND AK Devonport North Head long grass 2.iv.2006, SE Thorpe (NZAC); (1 male) X Pasture Ihumateo Mangere 9.Mar 1960 8.M.May (NZAC); (1 female) NEW ZEALAND AK Mangatani Hunua range 5Apr-5May 1977 I. Barton// ARA Kauri Seed Project pit trap 14 (NZAC); (2 males) NEW ZEALAND AK

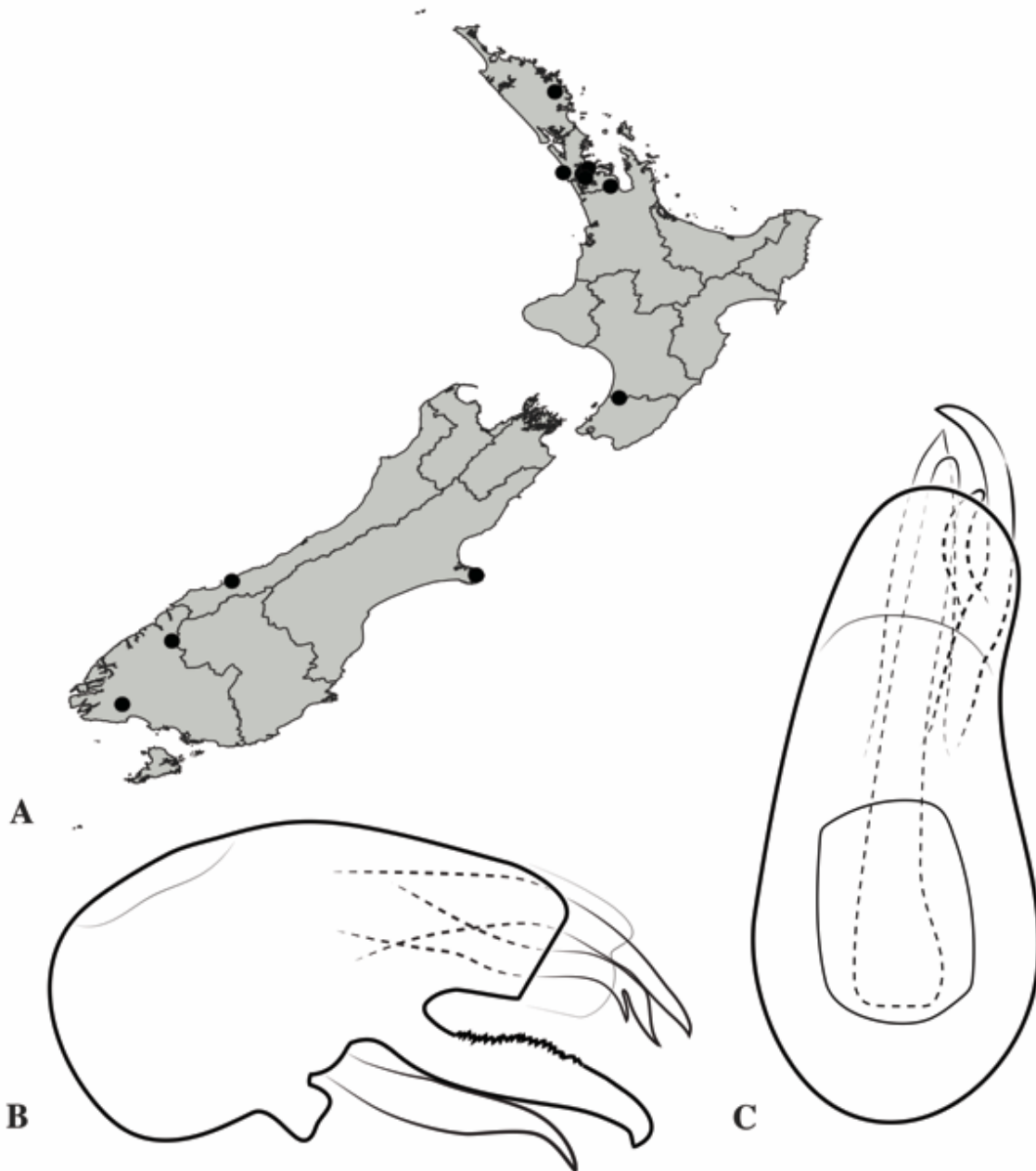


Figure 16. A) Map of localities where *Pselaphaulax pauper* (Sharp) specimens have been collected; B) *Pselaphaulax pauper* (Sharp) aedeagus, lateral; C) *Pselaphaulax pauper* (Sharp) aedeagus, dorsal.

Woodhill 8-15 Oct.1976 C.F.Butcher// Pit trap under *Pannisetum clandestinum* and *Lupinus* nr. *Pinus* and *Eucalyptus* (NZAC). Fiordland region: (3 males, 3 females) New Zealand: FD: Eglinton V., L. Gunn Litter, 30 Oct 1966 JI Townsend, 66/357 (LSAM); (3 males, 2 females) New Zealand: FD: L. Hauroko Litter 2, Nov 1966 JI Townsend, 66/364 (LSAM). Middle

Canterbury region: (1 male) New Zealand: MC: Banks Peninsula, Kaituna, litter 28 Aug 1964 G Kuschel, 64/81 (LSAM). Northland region: (1 male) New Zealand: ND: Whakapara, moss 3 Nov 1967 JI Townsend, 67/257 (LSAM). Wellington region: (1 male, 1 female) New Zealand WN Karori Reservoir 28-Mar-97// J T Nunn collection (JN); (1 male, 1 female) New Zealand WN Smt Akatarawa Rd, 15 Oct 89 Leaf Litter (JN); (2 males, 1 female) New Zealand WN Island Say 5.3.87 J. Nun (JN); (2 males, 2 females) New Zealand WN Waikawa Beach 18 Mch 1990 (JN); (1 male) New Zealand: WD 3.2 km NE Haast, 14m Haast River Walk 43°52S 169°03E, #072 (LSAM).

3.2. REVISION OF THE GENUS *PSELAPHOGENIUS*

Introduction. Species within the genus *Pselaphogenius* Reitter occurring in New Zealand are revised. Twenty-three species are known from the region and can be divided into two distinct species groups. Fifteen new species are described: *Pselaphogenius “calantica”*, *“Pselaphogenius chandleri”*, *Pselaphogenius “cornus”*, *Pselaphogenius “dismukesi”*, *Pselaphogenius “elephantus”*, *Pselaphogenius “fimbria”*, *Pselaphogenius “gibbus”*, *Pselaphogenius “jiawei”*, *Pselaphogenius “kalleri”*, *Pselaphogenius “kangi”*, *Pselaphogenius “lescheni”*, *Pselaphogenius “moerewae”*, *Pselaphogenius “otteai”*, *Pselaphogenius “parki”*, and *Pselaphogenius “stouti”*. *Pselaphogenius citimus* (Broun), 1893, *Pselaphogenius delicatus* (Broun), 1886, and *Pselaphogenius ventralis* (Broun), 1895 were transferred from the genus *Pselaphus* Herbst in the online database of Newton and Thayer (2003) and are herein redescribed. Additionally, the species *Pselaphus caecus* Broun, 1886 is transferred to the genus *Pselaphogenius*. Habitus photographs, distributional maps, and line drawings of diagnostic characters for each species are provided. A regional checklist and key to are provided to species of the genus in New Zealand.

The genus *Pselaphogenius* Reitter, 1910 is distributed across Europe, East Asia (including Japan), Australia, and New Zealand. Prior to this study, seven species were known from New Zealand (NZ), including four species from Three Kings Islands (Théry and Leschen 2013): *Pselaphogenius butcheriae* Théry and Leschen 2013, *Pselaphogenius carltoni* Théry and Leschen 2013, *Pselaphogenius holdberti* Théry and Leschen 2013, and *Pselaphogenius turbotti* Théry and Leschen 2013, and three species transferred from the genus *Pselaphus* Herbst in the online database of Newton and Thayer (2003): *Pselaphogenius citimus* (Broun), 1893, *Pselaphogenius delicatus* (Broun), 1886, and *Pselaphogenius ventralis* (Broun), 1895. The additional description of fifteen new species and transfer of *Pselaphus caecus* Broun, 1886, brings the total number of *Pselaphogenius* in New Zealand to 23, making it the most speciose genus in the tribe Pselaphini known from the region.

Members of *Pselaphogenius* are found in leaf litter, decayed wood habitats, and in the root balls of tussock grasses (Kuschel 1990). *Pselaphogenius* is a member of the supertribe Pselaphitae, which exhibits high diversity in temperate regions (Newton and Thayer 1995), in contrast to the majority of pselaphine taxa, which are more diverse in the tropics. Studies of this taxon may prove useful for future biogeographic, ecological, and phylogenetic research (Chandler 1997). This work, in combination with the recent revision of New Zealand *Pselaphaulax* (Owens and Carlton 2020, in press), addresses the complex issue of discriminating these two genera and the non-monophyly of *Pselaphus*, as currently defined, in New Zealand. Resolving these issues is an important step towards a revision of the Pselaphini of New Zealand and the resolution of the tribe in the Austral-Asian region.

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

All specimens were obtained from the following institutions:

NZAC New Zealand Arthropod Collection, Landcare Research, Auckland, NZ.
LSAM Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.
NHM Natural History Museum, London, United Kingdom.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by two-letter Crosby Codes (Crosby *et al.* 1998). Two slashes (“//”) are used to indicate label breaks. The number and sex of specimens are indicated preceding label data (i.e. “(2 males, 1 female)”), and the lending institution is indicated following label data (i.e. “(NZAC)”). For type specimens, deposition in either the LSAM, NHM, or NZAC is indicated following label data.

Redescription of *Pselaphogenius* Reitter.

Pselaphogenius Reitter (1910: 155, as genus).

Type species: *Pselaphus quadricostatus* Reitter (design. Jeannel 1950: 389).

Pselaphodinus Jeannel 1950: 389 (as genus)

Type species: *Pselaphus longipalpis* Kiesenwetter (design. orig. descr.).

Dicentrius Reitter (1882, synon. Besuchet 1968: 295).

(Figures 17, 18)

Redescription. MALES. Head: Eyes of variable size, may be reduced. Vertex convex, shallow sulcus beginning at base of vertex, extending to level of vertexal foveae; vertexal foveae large, set into margins of vertexal depression parallel to middle of eyes; vertexal depression widest between eyes, confluent with sulcus extending to apex of rostrum. Rostral sulcus bounded by lateral, flattened ridges extending to antennal acetabula. Frontal margin of rostrum acute to gently curved in dorsal view, apex often with notch bearing squamous setae. Antennal segment one as long as antennomeres 2-4, antennae otherwise unmodified. Gular mound modified, usually as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, usually without flattened modified scales; gular foveae present, paired. Maxillary palpomere I elongate, 1/2 as long as palpomere II; palpomere II narrow, enlarged distally, as long as or longer than head; maxillary palpomere III quadrate; maxillary palpomere IV as long as or longer than head, narrow, widened in distal 1/3-1/4, apical area smooth to weakly tuberculate, v-shaped sensory patches present but not delimited by sharp carinae. Thorax: basal sulcus absent, lateral antebasal foveae minute or absent; median antebasal fovea present, often reduced to depression. Prosternum in front of coxae slightly convex, anteriorly with modified flattened setae absent or present; lateral procoxal foveae present. Mesoventrite with median shield; lateral mesoventral foveae present in large cavities filled with dense setae, meeting internally; lateral mesocoxal foveae absent; median mesoventral foveae present, paired, meeting internally; mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, variously modified; metacoxae separated by extension of ventrite I. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified; T2 without obvious basal foveae, lateral basal sulcus extending along width of ventrite, obscured by dense band of setae along posterior edge. Ventrite I covered in

dense, shining setae; ventrite II variously modified with median depressions, sulci, or projections; ventrites otherwise unmodified.

Females: similar to males except eyes usually smaller, composed of fewer facets; secondary sexual modifications of the legs and visible ventrite two absent.

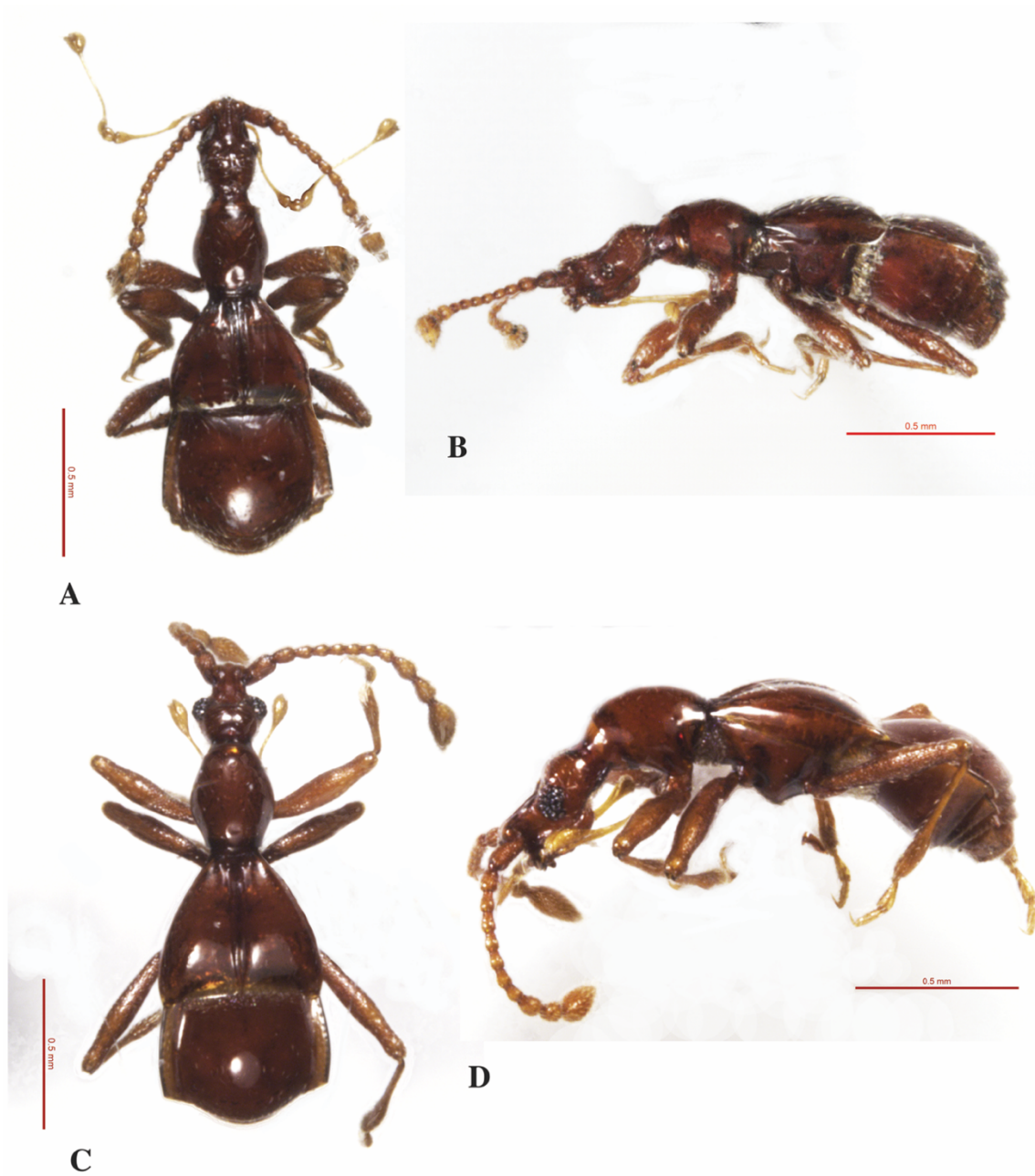


Figure 17. Dorsal and lateral habitus of *Pselaphogenius* species groups. A) *Pselaphogenius* species group 1, dorsal; B) *Pselaphogenius* species group 1, lateral; C) *Pselaphogenius* species group 2, dorsal; D) *Pselaphogenius* species group 2, lateral.

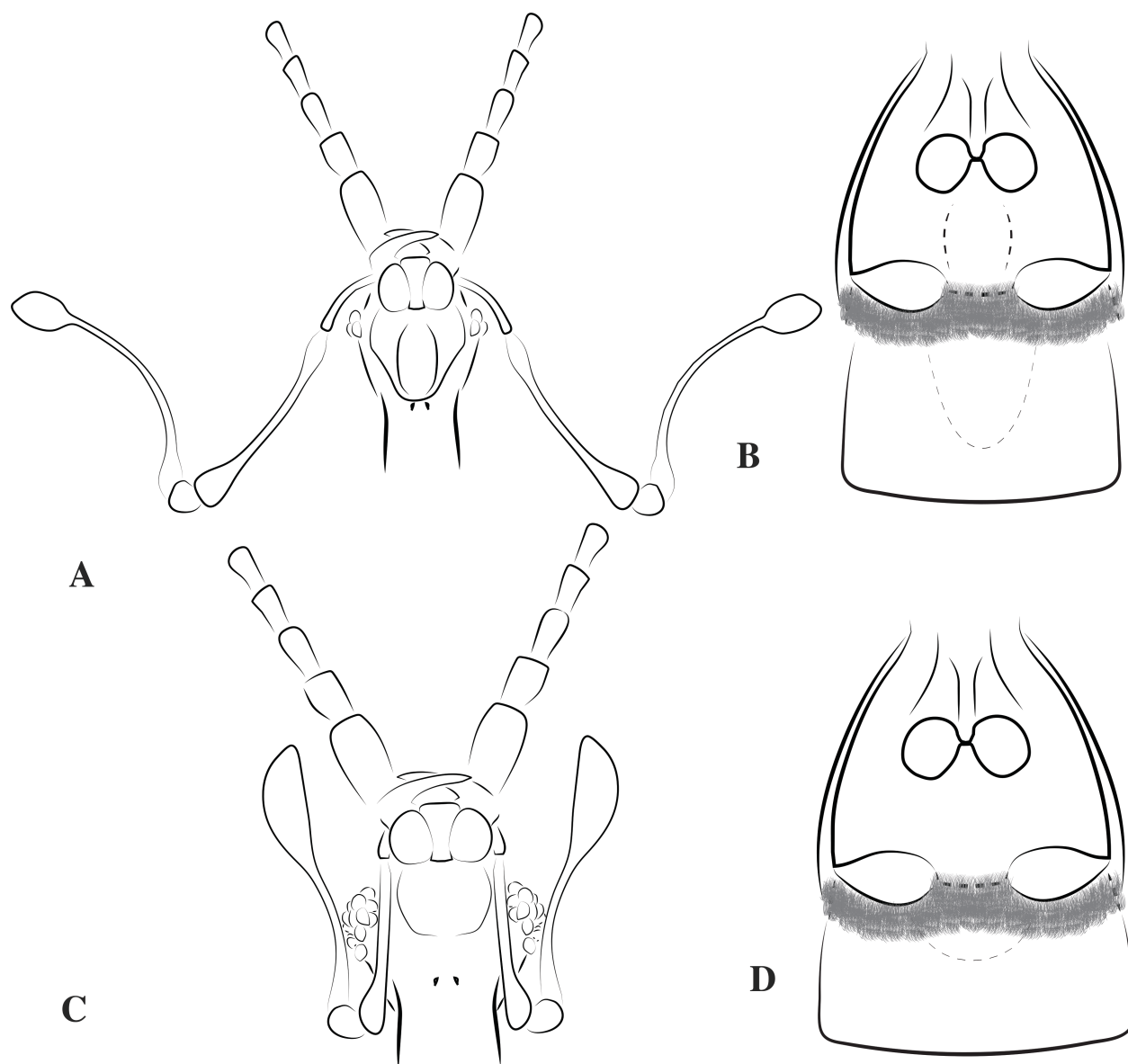


Figure 18. Illustrations of *Pselaphogenius* species groups diagnostic characters. A) Gular area, *Pselaphogenius* species group 1; B) meso- metaventricle and abdominal ventrite II, species group 1; C) Gular area, *Pselaphogenius* species group 2; D) meso- metaventricle and abdominal ventrite II, species group 2.

Comments. In NZ, *Pselaphogenius* is one of two genera (along with *Pselaphaulax*) that have been found to comprise the majority of species previously described as *Pselaphus* on the mainland (Chandler 2001). Since Chandler's observations, three species have been transferred from *Pselaphus* to *Pselaphogenius* in the online database of Newton and Thayer (2003). Four new species have been described from the fauna of Three Kings Islands (Théry and Leschen 2013). In NZ, species in the genus may be distinguished by the absence of an antebasal sulcus on the pronotum, the lateral antebasal foveae present or reduced, maxillary palpi IV elongate and widened in the distal 1/3-1/4 and with or without a v-shaped sensory patch not delimited by a carina, and the gular swelling hemispherical, typically as long as wide and not longer than wide.

In this genus, the elytron typically possesses two basal foveae separated by a longitudinal carina, although some NZ species possess only one basal fovea and the carina may be reduced or absent. The postgenal area of this genus is typically nude, although some individuals have been found to bear flattened scale-like setae in this area. This variation in characters and divergence from some of the forms known from other faunas highlights the necessity of a revision of this genus in NZ and a revision of the global *Pselaphini*. Nevertheless, while other undescribed genera in the NZ fauna may superficially resemble *Pselaphogenius*, this combination of character states is unique and may be used to distinguish this genus from all others in the region.

Based on external characters, NZ species in the genus can be readily divided into two “species groups” which can consistently be distinguished by several characters (Figs. 1–4), including: number of eye facets (few, about three in group 1, many, about fifteen in group 2); shape of gular mound (longer than wide, narrowed or rounded posteriorly and anteriorly in group 1, wider than long, broad anteriorly and posteriorly in group 2); form of maxillary palp IV (longer than head, swollen in distal ¼-1/5 in group 1, about equal to head length, swollen in distal ½ to 1/3 in group 2); and the shape of the metaventrite (depressed or flattened in group 1, flattened or produced into a tumosity in group 2). Future work on the Asian fauna may shed further light on these species group divisions, which may eventually warrant designation of subgeneric status. In the absence of these data, these should be considered designations to encompass morphological variation within this genus in New Zealand to aid identification.

Checklist of the New Zealand species of *Pselaphogenius*.

Pselaphogenius Reitter, 1910

Pselaphogenius Reitter (1910: 155, as genus).

TYPE SPECIES: *Pselaphus quadricostatus* Reitter (design. Jeannel 1950: 389).

Pselaphodinus Jeannel 1950: 389 (as genus).

TYPE SPECIES: *Pselaphus longipalpis* Kiesenwetter (design. orig. descr.).

Dicentrius Reitter (1882, synonym. Besuchet 1968: 295).

Pselaphogenius butcherae Thèry and Leschen, 2013

Pselaphogenius butcherae Thèry and Leschen (2013: 57).

Type depository. NZAC.

Distribution. NZ: Three Kings Islands.

Pselaphogenius caecus (Broun), 1886

Pselaphus caecus Broun (1886: 943).

Type depository. NHM.

Distribution. NZ: Auckland (AK).

Pselaphogenius “calantica”, new species

Type depository. NZAC.

Distribution. NZ: Northland (ND).

Pselaphogenius carltoni Thèry and Leschen, 2013

Pselaphogenius carltoni Thèry and Leschen (2013: 58).

Type depository. NZAC.

Distribution. NZ: Three Kings Islands.

Pselaphogenius “chandleri”, new species

Type depository. NZAC.

Distribution. NZ: Bay of Plenty (BP), Gisborne (GB).

Pselaphogenius citimus (Broun), 1893

- Pselaphus citimus* Broun (1893: 1043); syn. (Newton and Thayer 2003).
Type depository. NHM.
Distribution. NZ: Auckland (AK), Bay of Plenty (BP), Gisborne (GB), Hawke's Bay (HB), Northland (ND), Nelson (NN), Taranaki (TK), Taupo (TO), Waikato (WO).
- Pselaphogenius "cornus"*, new species
Type depository. NZAC.
Distribution. NZ: Auckland (AK).
- Pselaphogenius delicatus* (Broun), 1886
Pselaphus delicatus Broun (1886: 943); syn. (Newton and Thayer 2003).
Type depository. NHM.
Distribution. NZ: Auckland (AK), Northland (ND).
- Pselaphogenius "dismukesii"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius "elephantus"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius "fimbria"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius "gibbus"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius hodeberti* Thèry and Leschen, 2013
Pselaphogenius hodeberti Thèry and Leschen (2013: 59).
Type depository. NZAC.
Distribution. NZ: Three Kings Islands.
- Pselaphogenius "jiawei"*, new species
Type depository. NZAC.
Distribution. NZ: Bay of Plenty (BP), Gisborne (GB).
- Pselaphogenius "kalleri"*, new species
Type depository. NZAC.
Distribution. NZ: Nelson (NN).
- Pselaphogenius "kangi"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius "lescheni"*, new species
Type depository. NZAC.
Distribution. NZ: Buller (BR), Marlborough (MB).
- Pselaphogenius "moerewae"*, new species
Type depository. NZAC.
Distribution. NZ: Northland (ND).
- Pselaphogenius "otteai"*, new species
Type depository. FMNH.
Distribution. NZ: Northland (ND).
- Pselaphogenius "parki"*, new species

Type depository. NZAC.
 Distribution. NZ: Coromandel (CL).
Pselaphogenius "stouti", new species
 Type depository. FMNH?
 Distribution. NZ: Northland (ND).
Pselaphogenius turbotti Thèry and Leschen, 2013
Pselaphogenius turbotti Thèry and Leschen (2013: 60).
 Type depository. NZAC.
 Distribution. NZ: Three Kings Islands.
Pselaphogenius ventralis (Broun), 1895
Pselaphus ventralis Broun (1895: 72); syn. (Newton and Thayer 2003).
 Type depository. NHM.
 Distribution. NZ: WO.

Key to the New Zealand mainland species of *Pselaphogenius* (males). Examination of NZ *Pselaphogenius* specimens has yielded few external morphological characters useful for species-level identification. When available, these were primarily limited to secondary sexual characters of males. As a result, this key relies heavily on characters of the male genitalia. In most cases, identification of females is only possible via association with male specimens. The only species of *Pselaphogenius* in New Zealand known from offshore islands are those described from Three Kings Islands (Thèry and Leschen 2013). The Three King's *Pselaphogenius* are endemic to these isolated islands, and no main island species occur on them. They are treated in Thèry and Leschen (2013) and a concise key for their identification may be found in that manuscript. For purposes of utility and clarity, we limit the following key to the species of *Pselaphogenius* that may be found on North and South Islands.

- 1 Number of eye facets fewer (three to six); gular mound longer than wide; maxillary palp IV longer than head, swollen in distal 1/4-1/5, metaventrite depressed or flattened.....2 (species group 1)
- 1' Number of eye facets greater (about fifteen); gular mound wider than long; maxillary palp IV subequal to head, swollen in distal 1/3-1/2; metaventrite flattened or produced into tumosity.....15 (species group 2)
- 2(1) Gular mound narrowed anteriorly and posteriorly, ovate.....3
- 2' Gular mound broadened anteriorly, narrowed posteriorly.....7
- 3(2) Ventrite II ovate depression modified, bearing thickened lateral ridges or apical flange.....4
- 3' Ventrite II ovate depression simple, unmodified.....6
- 4(3) Ventrite II ovate depression with lateral margins thickened at apex; metaventrite depressed.....5
- 4' Ventrite II ovate depression with apex bearing thickened flange; metaventrite raised into slight tumosity.....*P. "parki"*
- 5(4) Aedeagus with entire apex modified into beak-like, downturned process....*P. "calantica"*
- 5' Aedeagus with apex truncate, simple.....*P. ventralis* (Broun)
- 6(3') Metaventrite produced into tumosity bearing golden setae; ventral process of aedeagus smooth, not carinate.....*P. "jiawei"*
- 6' Metaventrite depressed; ventral process of aedeagus carinate.....*P. caecus* (Broun)
- 7(2') Metaventrite depressed.....8

7'	Metaventricle flattened.....	9
8(7)	Aedeagus with right lateral process bifurcate.....	<i>P. otteai</i>
8'	Aedeagus with lateral process simple, curved.....	<i>P. delicatus</i> (Broun)
9(7')	Aedeagus with either ventral and/or lateral processes present.....	10
9'	Aedeagus with ventral and lateral processes absent.....	<i>P. "chandleri"</i>
10(9)	Aedeagus with ventral process of normal length, not exceeding length of basal bulb....	11
10'	Aedeagus with ventral process greatly elongate, longer than basal bulb.....	<i>P. "elephantus"</i>
11(10)	Aedeagus with lateral processes simple, not elaborate in form.....	12
11'	Aedeagus with lateral processes bearing elaborations along sides, wing-like in form.....	<i>P. "cornus"</i>
12(11)	Aedeagus with ventral process simple, straight or curved.....	13
12'	Aedeagus with ventral process laterally compressed and distally broadened... <i>P. "kangi"</i>	
13(12)	Aedeagus asymmetrical, right and left lateral process present.....	14
13'	Aedeagus asymmetrical, left lateral process absent.....	<i>P. "stouti"</i>
14(13)	Aedeagus with median lobe associated with fimbriate process.....	<i>P. "fimbria"</i>
14'	Aedeagus with median lobe simple, not associated with fimbriate process.....	<i>P. "moerewae"</i>
15(1')	Median portion of ventrite II with ovate depression.....	16
15'	Median portion of ventrite II with flattened area.....	<i>P. citimus</i> (Broun)
16(15)	Apex of median depression on ventrite II modified, bearing tubercle or small projection.....	17
16'	Apex of median depression on ventrite II unmodified, normal.....	<i>P. "dismukesi"</i>
17(16)	Apex of median depression on ventrite II bearing small, thickened tubercle.....	18
17'	Apex of median depression on ventrite II bearing small median projection angled anteriorly.....	<i>P. "gibbus"</i>
18(17)	Aedeagus with parameres deeply scoop-shaped, encasing much of aedeagus in lateral view.....	<i>P. "lescheni"</i>
18'	Aedeagus with parameres not deeply scoop-shaped, not obscuring much of aedeagus in lateral view.....	<i>P. "kalleri"</i>

***Pselaphogenius* Species Group 1**

Pselaphogenius caecus (Broun), 1886, comb. nov.

Pselaphus caecus Broun (1886: 943), synonym.

(See Figure 20)

Type Material Examined. After observing the type series of *Pselaphus caecus* in the NHM and reviewing Broun's original description, the following specimen from the NHM is recognized as the lectotype: (1 male) TYPE (red/orange label)// 1696.// Howick// New Zealand Broun Coll. Brit. Mus. 1922-482 (designated lectotype). The two additional specimens in the type series at the NHM were considered to be additional specimens of this species, and are designated as paralectotypes: (1 female) 1696.// ♀// Hunua Maketu// New Zealand Broun Coll. Brit. Mus. 1922-482; (1 male) 1696.// ♂// Hunua Maketu// New Zealand Broun Coll. Brit. Mus. 1922-482. In the original description (1886) Broun indicates "near Howick" as the collecting locality, but does not indicate a single type specimen in his description. Hunua Maketu is approximately 25km SE of Howick in the same region of North Island, and the specimens with this locality also

bear the same manuscript number, “1696” indicated in the original description (Broun 1886). These, therefore, are part of the syntype series and, thus, designated paralectotypes.

Diagnosis. Externally, this species is difficult to distinguish from others in species group 1. The form of the curled inner lateral processes and the ventral process with the ventral surface carinate is unique to the aedeagus of this species.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of three facets. Frontal margin of rostrum in dorsal view rounded with sparse suberect setae. Gular mound modified, longer than wide, narrowed anteriorly and posteriorly, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, apical area lightly rugose, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced, absent. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially depressed; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with one basal fovea, sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, large ovate median depression reaching apex. Genitalia: aedeagus symmetrical. Median lobe short, simple. Dorsal processes simple, narrow, curved towards midline. Inner lateral processes curled, distally; outer lateral processes simple, elongate (subequal to median process). Ventral process curved downwards, distally, ventral surface carinate. Parameres present, as long as ventral process.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and ventrite II lacking median ovate depression.

Distribution. This species is known from the locality of the type series in AK.

Pselaphogenius “calantica”, new species
(See Figure 21)

Type Material. Holotype: (1 male) NEW ZEALAND ND Te Pahi Coastal Reserve Wirihi Swamp 19 Oct 1982// C.F. Butcher Litter 82/98 (NZAC). Paratype: (1 male) NEW ZEALAND, ND Unuwaho, 270m 25 Nov 1982 G. Kuschel// sifted litter and decayed wood 82/125 (NZAC).

Etymology. This specific epithet of this species refers to the membranous “curtain” which occupies the apical margin of the aedeagus.

Diagnosis. Externally, the production of the lateral margins of the ovate depression on ventrite II into thickened ridges towards the apex is most similar to the thickened ridge present at the apex of the ovate depression in *P. ventralis*. The form of the aedeagus, with the entire apical portion modified into a beak-like, downturned process is also unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Dorsal surface with scattered stiffened, elongate setae. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of three facets. Frontal margin of rostrum rounded with sparse suberect setae in dorsal view. Gular mound ovate, longer than wide, narrowed anteriorly and posteriorly; area of head posterior to gular mound flattened, slightly concave, bearing shining setae. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae

and median antebasal fovea absent. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially depressed, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, ovate median depression deep, occupying length of ventrite, towards apex margin produced into greatly thickened ridges. Genitalia: aedeagus symmetrical. Median lobe straight, very short. Lateral processes fused with apical portion of aedeagus, entire distal end curved downwards, appearing beak-like; entire distal end fused with membranous curtain. Ventral process absent. Parameres absent.

Females. Females of this species are unknown.

Distribution. This species is known from only the type and paratype localities in ND.

Pselaphogenius "chandleri", new species
(See Figure 22)

Type Material. Holotype: (1 male) New Zealand, BP Orete Forest Te Puia Hut 26 Apr 1993 G. Hall// Sifted litter 93/96 (NZAC). Paratypes: (2 males, 3 females) holotype locality (NZAC).

Etymology. This species is named after Donald. S. Chandler, fellow pselaphine worker, whose years of support to the author has been much appreciated.

Diagnosis. Externally, *P. "chandleri"* is difficult to distinguish from other species of *Pselaphogenius* in New Zealand. The form of the aedeagus, with the simple, straight, median lobe and the absence of lateral and ventral processes, is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to ½ length of head from base of vertex to apex of rostrum. Eyes small, composed of three facets. Frontal margin of rostrum in dorsal view pointed-rounded with sparse suberect setae. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal 1/5 to 1/6, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea absent. Mesoventrite with median shield unmodified. Metaventrite afoveate, posterior margin with elongate hairs extending to base of ventrite II, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, single sutural fovea present; discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, shallow oval median depression small, restricted to basal portion of ventrite. Genitalia: aedeagus asymmetrical. Median lobe straight, simple, slightly down-curved. Lateral processes absent. Ventral process absent. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except visible ventrite II lacking median ovate depression.

Distribution. This species is known from several localities in BP.

Material examined. BP: (1 female) NEW ZEALAND, BP Hicks Bay 25 Oct 1992 J.S. Dugdale Litter 92/79 (NZAC); (1 female) NEW ZEALAND BP Lake Okataina 9 Oct 1995 M-C Lariviere & A Larochelle// Litter 95/12 (NZAC); (2 females) NEW ZEALAND, BP Orete Forest Te Puia Hut Bush 19 Oct 1992 J.S. Dugdale (NZAC); (1 male, 2 females) NEW ZEALAND, BP

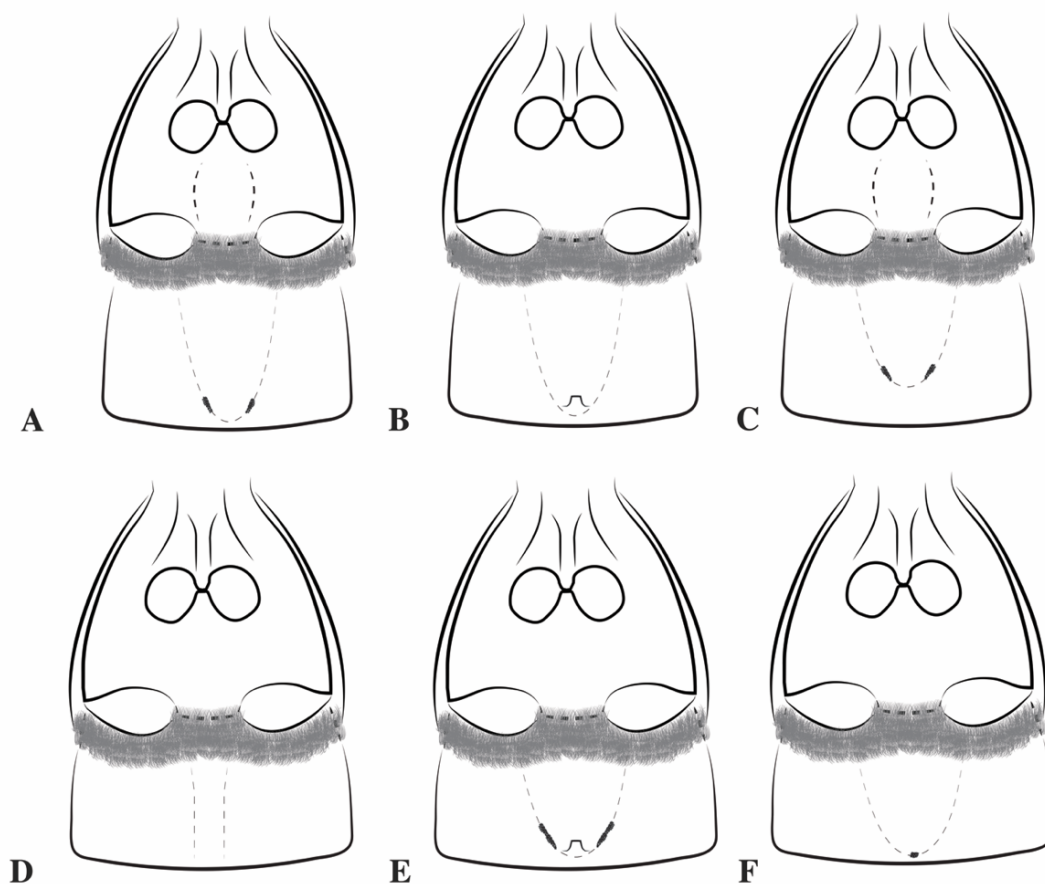


Figure 19. Illustrations of *Pselaphogenius* sp. meso-, meta-ventrite and ventrite 2 modifications. a) *P. calantica*, sp. nov.; b) *P. parki*, sp. nov.; c) *P. ventralis* (Broun), comb. nov.; d) *P. citimus* (Broun), comb. nov.; e) *P. gibbus*, sp. nov.; f) *P. kalleri*, sp. nov.

Orete Forest Te Puia Hut 13 Apr 1992 G. Hall// Litter 92/34 (NZAC); (1 female) NEW ZEALAND, BP Papatea 5 Nov 1993 R.C. Henderson Litter 93/115 (NZAC); (1 female) NEW ZEALAND, BP Rereauira 26 Apr 1993 J.S. Dugdale Litter 93/97 (NZAC); (1 female) NEW ZEALAND, BP Te Koau, Hovells Watching Dog 240m 24 Oct 1992 J.S. Dugdale// Litter 92/78 (NZAC); (1 female) NEW ZEALAND, BP Te Koau, 243m 15 Mar 1993 J.S. Dugdale Litter 93/43 (NZAC); (2 females) NEW ZEALAND, BP Te Koau, Hovells Watching Dog Track 360m 31 Jan 1993 (NZAC); (1 male, 2 females) NEW ZEALAND, BP Te Koau, 120m 29 Apr 1993 J.S. Dugdale Litter 93/101 (NZAC); (3 males, 1 female) NEW ZEALAND, BP Te Koau, 125m 2 May 1993 R.C. Henderson Litter 93/107 (NZAC); (1 male) NEW ZEALAND, BP Te Koau 140m Twin Puriri's 31 Jan 1993 J.S. Dugdale// Litter 93/10 (NZAC); (1 female) NEW ZEALAND, BP Te Koau Main Ridge, 220m 23 Sep 1992 J.S. Dugdale// Litter 92/83 (NZAC); (1 male) NEW ZEALAND, BP Lottin Pt Rd Waenga Bush 15 Mar 1984 G. Hall&// R.C. Henderson Litter 54/5 (NZAC); (1 male, 3 females) NEW ZEALAND, BP Waiaroho 10 Mar 1993 J.S. Dugdale Litter 93/36 (NZAC); (1 female) NEW ZEALAND, BP Waiaroho 2 Nov

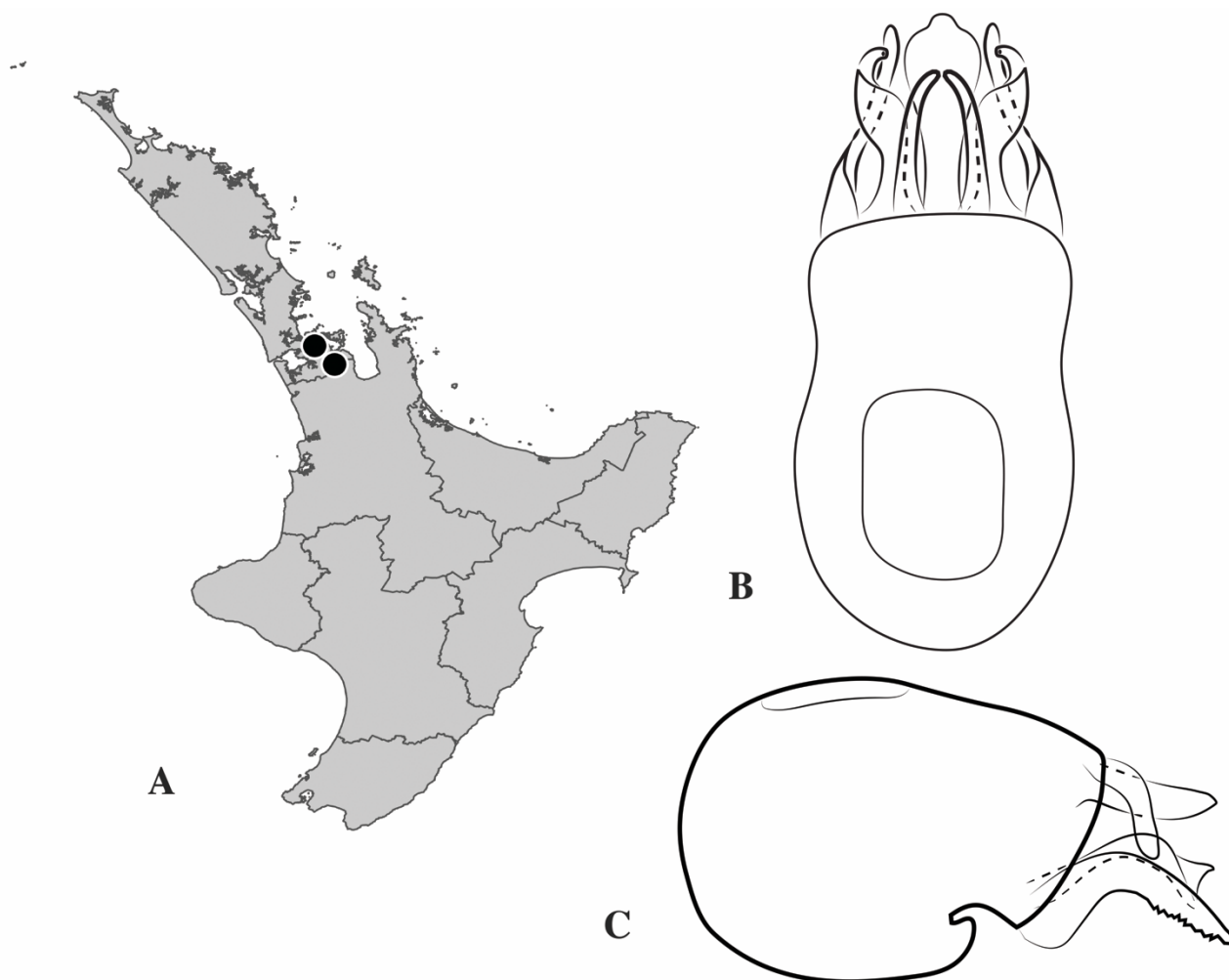


Figure 20. A) Map of localities where *Pselaphogenius caecus* (Broun) specimens have been collected; B) *Pselaphogenius caecus* (Broun) aedeagus, dorsal; C) *Pselaphogenius caecus* (Broun) aedeagus, lateral.

1995 G. Hall Litter 95/13 (NZAC); (1 female) NEW ZEALAND, BP Waiotuma Stm 85m 28 Jan 1993 J.S. Dugdale Litter 93/9 (NZAC).

Pselaphogenius "cornus", new species
(See Figure 23)

Type Material. Holotype: (1 male) New Zealand: AK: Mt. Dome, litter 15 Mar 1978 SB Peck (LSAM). Paratypes: (1 male, 1 female) holotype locality (LSAM).

Etymology. This specific epithet of this species refers to the horn-shaped, upturned median lobe of the aedeagus in males of this species.

Diagnosis. Externally, this species is difficult to distinguish from many other species of *Pselaphogenius* in New Zealand. The form of the aedeagus, particularly the wing-shaped lateral processes, is unique.

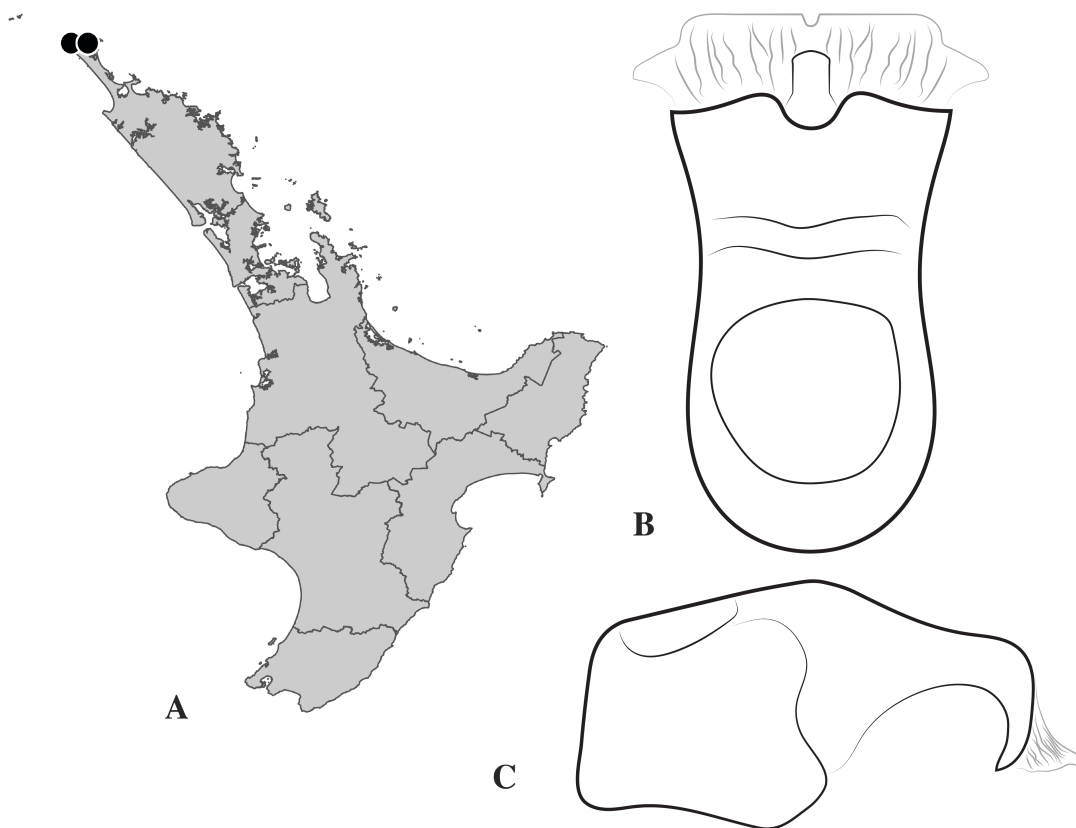


Figure 21. A) Map of localities where *Pselaphogenius 'calantica'* specimens have been collected; B) *Pselaphogenius 'calantica'* aedeagus, dorsal; C) *Pselaphogenius 'calantica'* aedeagus, lateral.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum in dorsal view pointed with sparse suberect setae. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced to minute pits. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially flattened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; single discal stria, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, shallow oval median depression reaching apex. Genitalia: aedeagus symmetrical. Median lobe compressed laterally, apical end upturned. Lateral processes almost as long as median lobe, bearing row of feather-like ventral extensions giving wing-like appearance. Ventral process narrow, straight, slight ventral curve, distally, about as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except visible ventrite II lacking median ovate depression.

Distribution. This species is known from several localities in Auckland AK.

Material Examined. AK: (1 female) New Zealand: AK: Auckland, Lynfield Ground plants 6 Dec 1975, G Kuschel (LSAM); (1 female) New Zealand: AK: Auckland, Lynfield Ground plants 13 Dec 1975, G Kuschel (LSAM); (2 males, 1 slide-mounted) New Zealand: AK: Auckland, Lynfield Litter, 17 Oct 1975 G Kuschel, 75/155 (LSAM); (3 females). New Zealand: AK: Mt. Dome, litter 15 Mar 1978 SB Peck (LSAM); (6 males, 1 female) New Zealand: AK: Ponga Bush, Drury, nr. Pukekohe Litter, 4 Jan 1973 BM May, 73/1 (LSAM); (1male) New Zealand AK (illegible) Gully 5 Nov 1985 R.C. Craw// Sifted litter (NZAC).

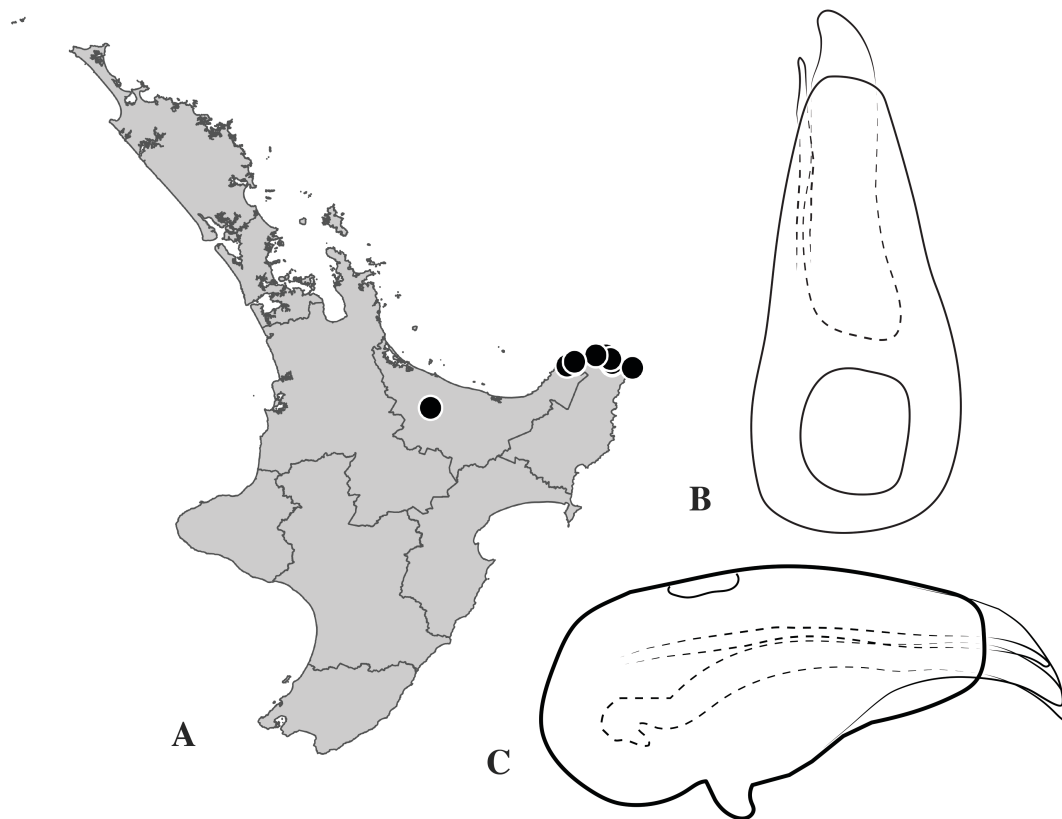


Figure 22. A) Map of localities where *Pselaphogenius "chandleri"* specimens have been collected; B) *Pselaphogenius "chandleri"* aedeagus, dorsal; C) *Pselaphogenius "chandleri"* aedeagus, lateral.

Pselaphogenius delicatus (Broun), 1886

Pselaphus delicatus Broun (1886: 943), transferred (Newton and Thayer 2003)
(Figure 24)

Type Material Examined. After observing the type series of *Pselaphus delicatus* in the NHM and reviewing Broun's original description, the following specimen from the NHM was designated as the lectotype: (1 male) 1697.// ♂// Hunua Maketu// New Zealand Broun Coll. Brit. Mus.

1922–482 (designated lectotype). The six additional specimens in the syntype series at the NHM are considered to be additional specimens of this species, and are designated as paralectotypes: (1 male) holotype label data; (1 female) TYPE (red/orange label)// Paparoa// New Zealand Broun Coll. Brit. Mus. 1922–482; (1 female) 1697.// ♀// Hunua// New Zealand Broun Coll. Brit. Mus. 1922–482; (2 females) 1697.// ♀// Hunua Maketu// // New Zealand Broun Coll. Brit. Mus. 1922–482; (1 male) 1697.// ♂// Hunua Clevedon// // New Zealand Broun Coll. Brit. Mus. 1922–482. In Broun’s original description (1886) he mentions “near Howick” as the locality. The localities of specimens within the series, “Paparoa”, “Hunua Maketu” and “Clevedon”, are all within 25 km of Howick, and the manuscript number of all of these specimens, “1697” matches that of the original species description for *P. delicatus*. Thus, these are part of the syntype series and are paralectotypes.

Diagnosis. Externally, *P. delicatus* is difficult to distinguish from other *Pselaphogenius* in New Zealand. The form of the aedeagus, with the two pairs of short, curved lateral processes and the spatula-like ventral process, is unique.

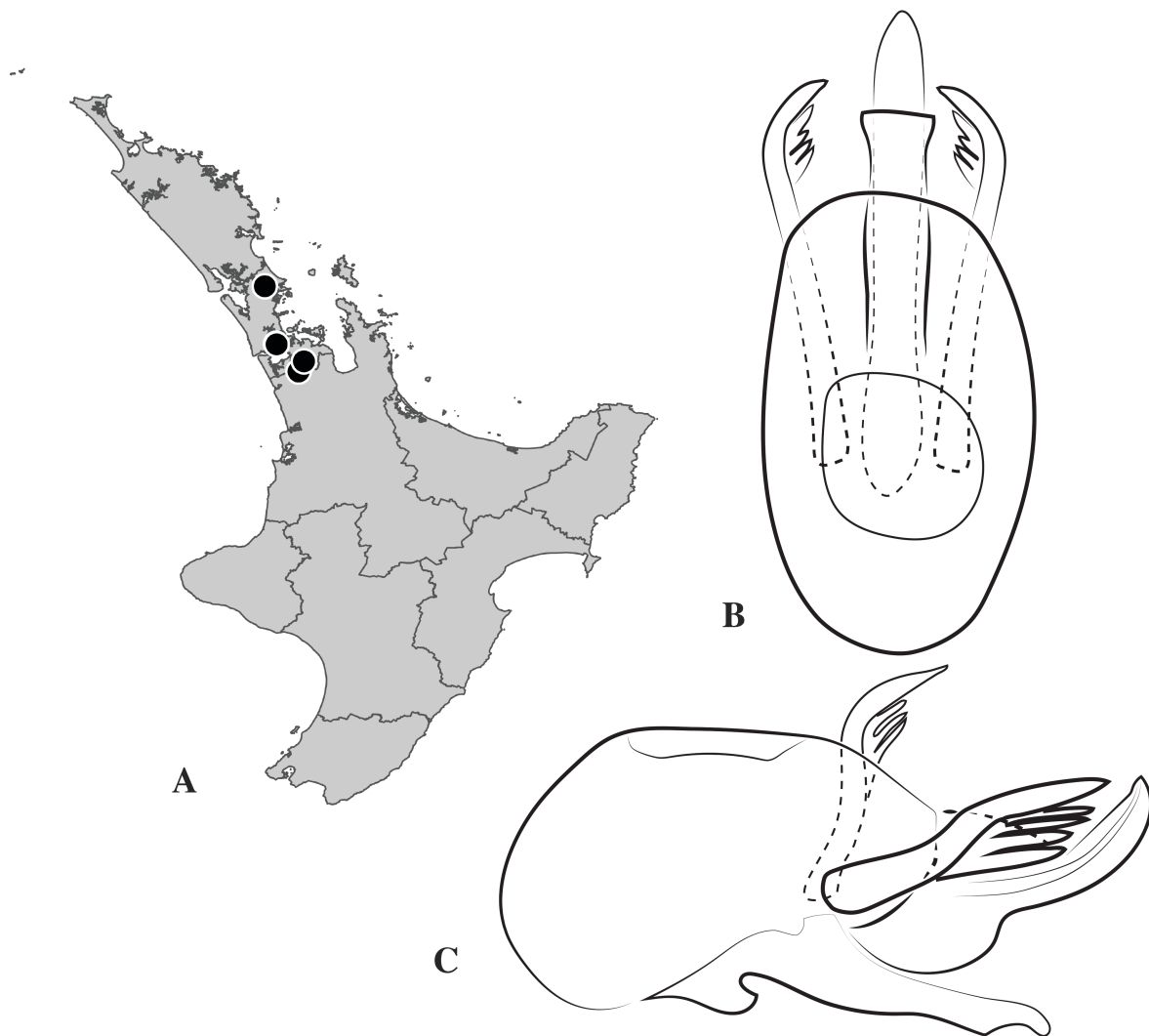


Figure 23. A) Map of localities where *Pselaphogenius* “*cornus*” specimens have been collected; B) *Pselaphogenius* “*cornus*” aedeagus, dorsal; C) *Pselaphogenius* “*cornus*” aedeagus, lateral.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum in dorsal view pointed with sparse suberect setae. Gular mound modified, longer than wide, narrowly rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae present, median antebasal fovea reduced, pit like. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially depressed, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, sutural fovea present; discal stria and sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae;

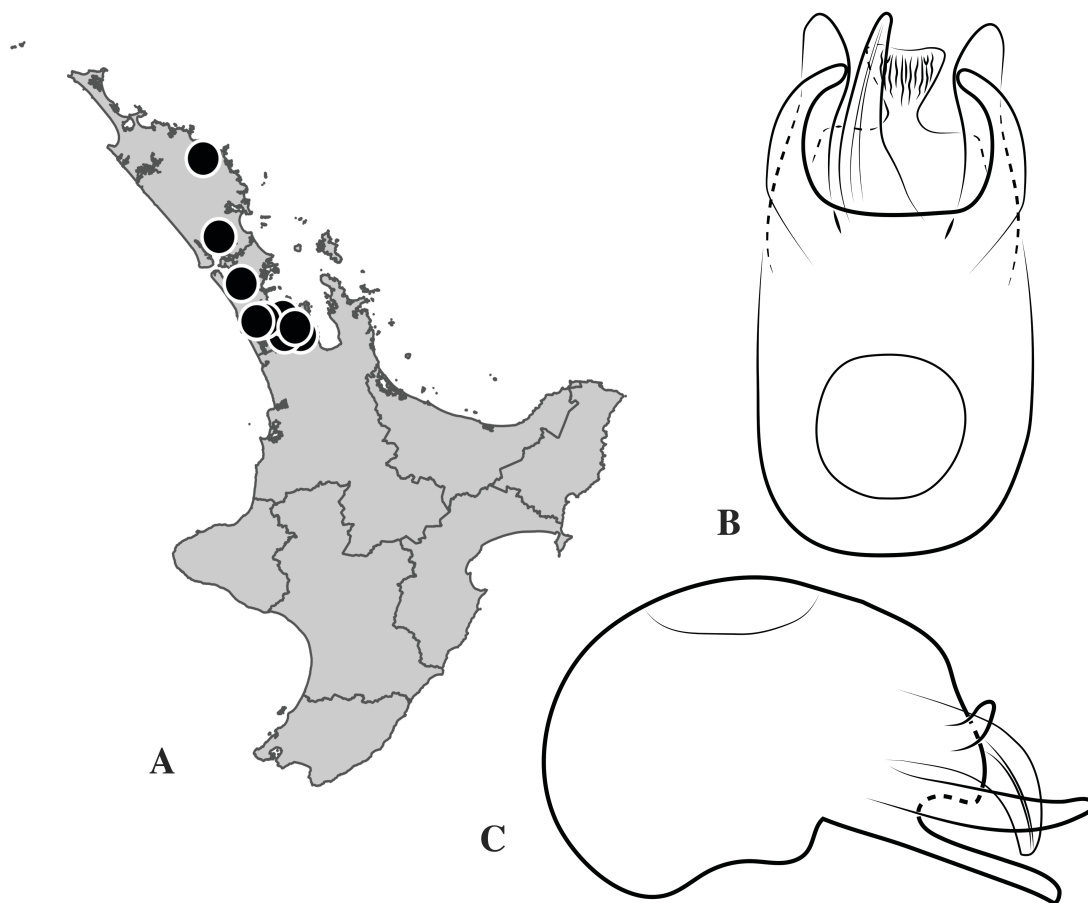


Figure 24. A) Map of localities where *Pselaphogenius delicatus* (Broun) specimens have been collected; B) *Pselaphogenius delicatus* (Broun) aedeagus, dorsal; C) *Pselaphogenius delicatus* (Broun) aedeagus, lateral.

ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, large shallow oval median depression not reaching apex. Genitalia: aedeagus asymmetrical. Median lobe distally displaced towards left, curved ventrad and slightly towards midline. Two pairs of lateral processes, more dorsal pair horn-like and curved inward, more ventral pair slightly expanded

distally, also curved inwards, slightly. Ventral process straight and flattened, longer than median lobe, constricted distally to small, spatula-shaped extension. Parameres present, slightly longer than median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except ventrite II lacking median ovate depression.

Distribution. This species is known from several localities in AK.

Material examined. AK: (1 male, 1 female) New Zealand AK Kirks Bush Papakura 26.5.92// JT Nunn Collection (JN); (1 male) NEW ZEALAND ND Waitangi SF 2 Nov 1981 G. Kuschel// Litter and decayed wood 81/117 (NZAC); (1 male) Titirangi Wairakere Rg. Auckland// 1694// coll. A.E. Brookes 26.2-1915// *Pselaphus delicatus* Broun (NZAC); (2 males, 2 females) Hunua Ra. Cleveden Auckland// Ex. Broun Collection// 1697// *Pselaphus delicatus* Broun (NZAC); (1 male) Lynfield, AK Tropicana Dr. 9.6.74 G. Kuschel// *Pselaphus delicatus* Broun, 1886 (NZAC); (1 male) Near Howick, Auckland// 1697// *Pselaphus delicatus*, Broun, 1886 (NZAC); (5 males) New Zealand AK Lynfield WB 2 May 1981 G. Kuschel// *Pselaphus delicatus* Broun, 1886 (NZAC); (1 male) New Zealand AK Lynfield 4 Sep 1976// ground plants// *Pselaphus delicatus* Broun, 1886 (NZAC); (1 male) New Zealand AK Lynfield Wattle Bay 29 Jun 1980 G. Kuschel// Litter at hollow *Metrosideros excelsa*// *Pselaphus delicatus* Broun, 1886 (NZAC); (1 male) New Zealand AK Omeru SR 15-22 Dec 1998 #162 P.Paquin & N.Duperre Pit traps (NZAC); (2 males) Titirangi, Waitakere Rg Auckland// 1697// Coll. A.E. Brookes 26.2.1915// *Pselaphus delicatus* Broun (NZAC); (1 male, 1 female) Ex. Broun Collection// Hunua Rg. Cleveden, Auckland// 1697// *Pselaphus delicatus* Broun, 1886// A.E. Brookes Collection (NZAC).

Pselaphogenius "elephantus", new species
(See Figure 25)

Type Material. Holotype: (1 male) NEW ZEALAND ND Waipoua SF Wairau Smt, 390m 14 Apr 1980 J.C.Watt// Sifted litter 80/51 (NZAC).

Etymology. The specific epithet refers to the elongate processes on the aedeagus, which resemble the trunk of an elephant.

Diagnosis. Externally, this species is difficult to distinguish from other species of *Pselaphogenius* in New Zealand. The form of the aedeagus, with the greatly elongate ventral process, is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum acute with sparse suberect setae in dorsal view. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude, maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae absent, antebasal fovea reduced to minute pit. Mesoventrite with median shield unmodified. Metaventrte afoveate, flattened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, shallow oval median depression not reaching apex, hind margin of depression with median

tubercle. Genitalia: aedeagus asymmetrical. Median lobe straight, short. Lateral processes present, narrow, elongate, right process curved inwards towards left, left process gradually curving inwards towards right. Ventral process greatly elongate, longer than phallobase, distally flattened and bifurcate. Parameres present, as long as ventral process.

Females. Integument, Head, Thorax, Abdomen: females of this species are unknown.

Distribution. This species is known from the holotype locality in AK.

Pselaphogenius "fimbria", new species
(See Figure 26)

Type Material. Holotype: (1 male) NEW ZEALAND ND Parahaki Park 5 Nov 1981 G. Kuschel// litter and decayed wood 81/126 (NZAC). Paratypes: (1 male, 2 females) holotype locality (NZAC).

Etymology. The specific epithet refers to the fimbriate process present on the male aedeagus.

Diagnosis. Externally, *P. "fimbria"* is difficult to distinguish from the other species of *Pselaphogenius* in New Zealand. The form of the aedeagus, with the median lobe associated with a fimbriate process and the right lateral process curled, is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to ½ length of head from base of vertex to apex of rostrum. Eyes small, composed of four facets. Frontal margin of rostrum rounded, with sparse suberect setae in dorsal view. Gular mound modified, as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV as long as head, narrow, widened at base and distal 1/5 apical area lightly rugose, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea minute, pit-like. Mesoventrite with median shield unmodified. Metaventrite afoveate; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with single basal fovea, sutural fovea present; discal stria and sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, shallow oval median depression not reaching apex. Genitalia: aedeagus asymmetrical. Median lobe short, blunt, associated with fimbriate process. Left lateral process curved ventrad, right lateral process curled over one rotation, then curved laterally to the right. Ventral process straight, short. Parameres present, as long as lateral processes. *Females.* Integument, Head, Thorax, Abdomen: similar to male except ventrite II lacking median ovate depression.

Distribution. This species is known only from the type locality in AK.

Pselaphogenius "jiawei", new species
(See Figure 27)

Type Material. Holotype: (1 male) New Zealand: BP: Mamaku Ra. Litter, 18 Jan 1972 GW Ramsay, 72/28. (NZAC). Paratypes. (1 male, 1 female) holotype locality (LSAM). (1 female) New Zealand: BP: Mt. Te Aroha, 763 m Litter, 21 Oct 1967 JC Watt, 67/254 (LSAM). (1 male) New Zealand: BP: Waimangu Scenic Res. Rotorua, litter, 71/86 21 Nov 1974, AK Walker (LSAM).

Diagnosis. Externally, *Pselaphogenius* “*jiawei*” is similar to other species in the genus, *Pselaphogenius*, in NZ. The form of the genitalia, with the laterally compressed and distally expanded ventral process and elongate and laterally compressed median lobe is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of six facets. Frontal margin of rostrum in dorsal view emarginate with sparse suberect setae. Gular mound modified, longer than wide, narrowed anteriorly and posteriorly, glabrous; area of head posterior to gular mound

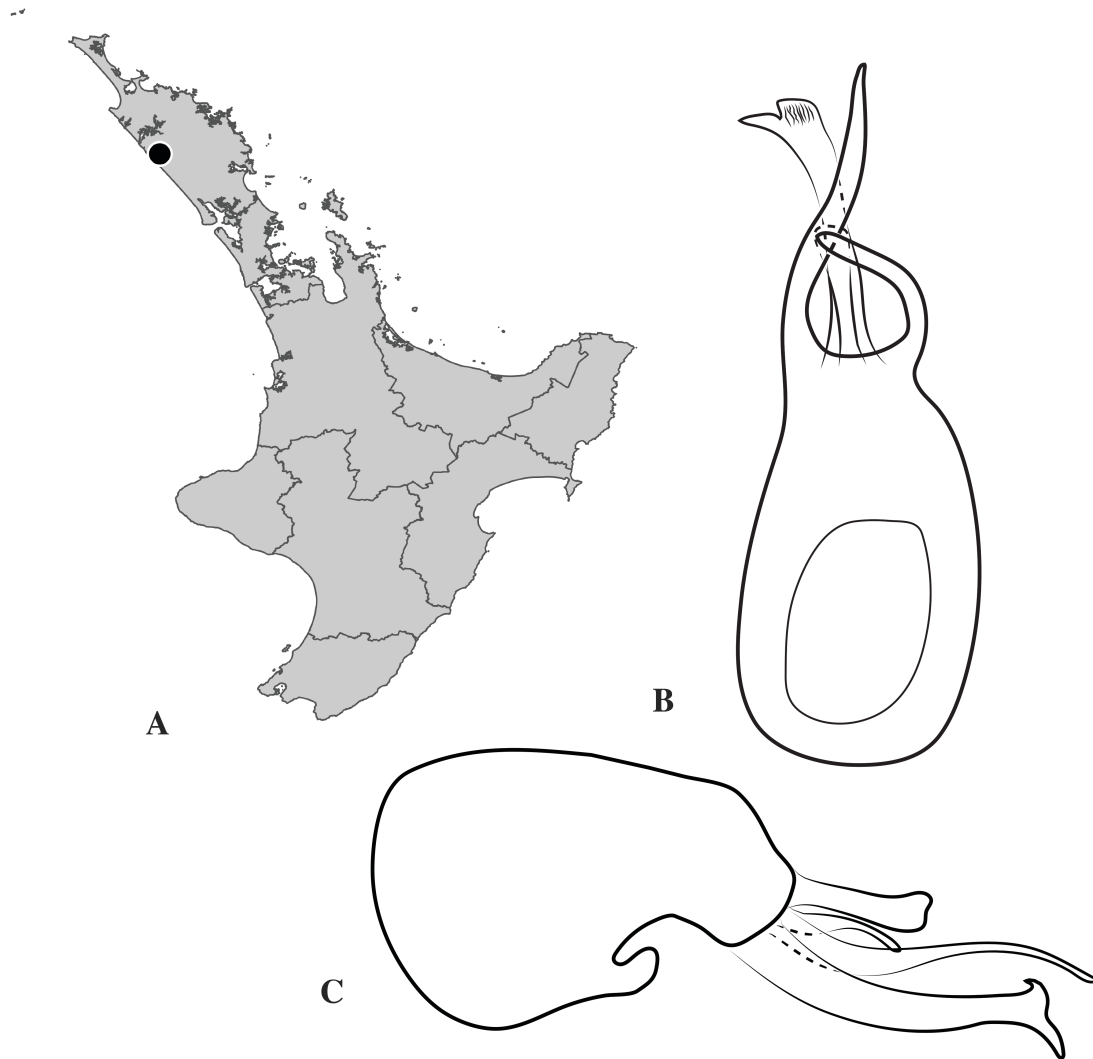


Figure 25. A) Map of localities where *Pselaphogenius* “*elephantus*” specimens have been collected; B) *Pselaphogenius* “*elephantus*” aedeagus, dorsal; C) *Pselaphogenius* “*elephantus*” aedeagus, lateral.

flattened, slightly concave, bearing sparse setae. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, apical area smooth, v-shaped sensory patches present,

row of ventral tubercles along length. Thorax: pronotum basal sulcus absent, lateral antebasal foveae absent, median antebasal fovea minute, pit-like. Mesoventrite with median shield unmodified. Metaventrte afoveate, produced into tumosity with patch of golden setae; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with one basal fovea, sutural fovea present; discal stria present, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying width of ventrite, sulcus densely setose, ovate median shallow, narrow, not reaching apex of ventrite. Genitalia: aedeagus symmetrical. Median lobe laterally compressed, slightly expanded and

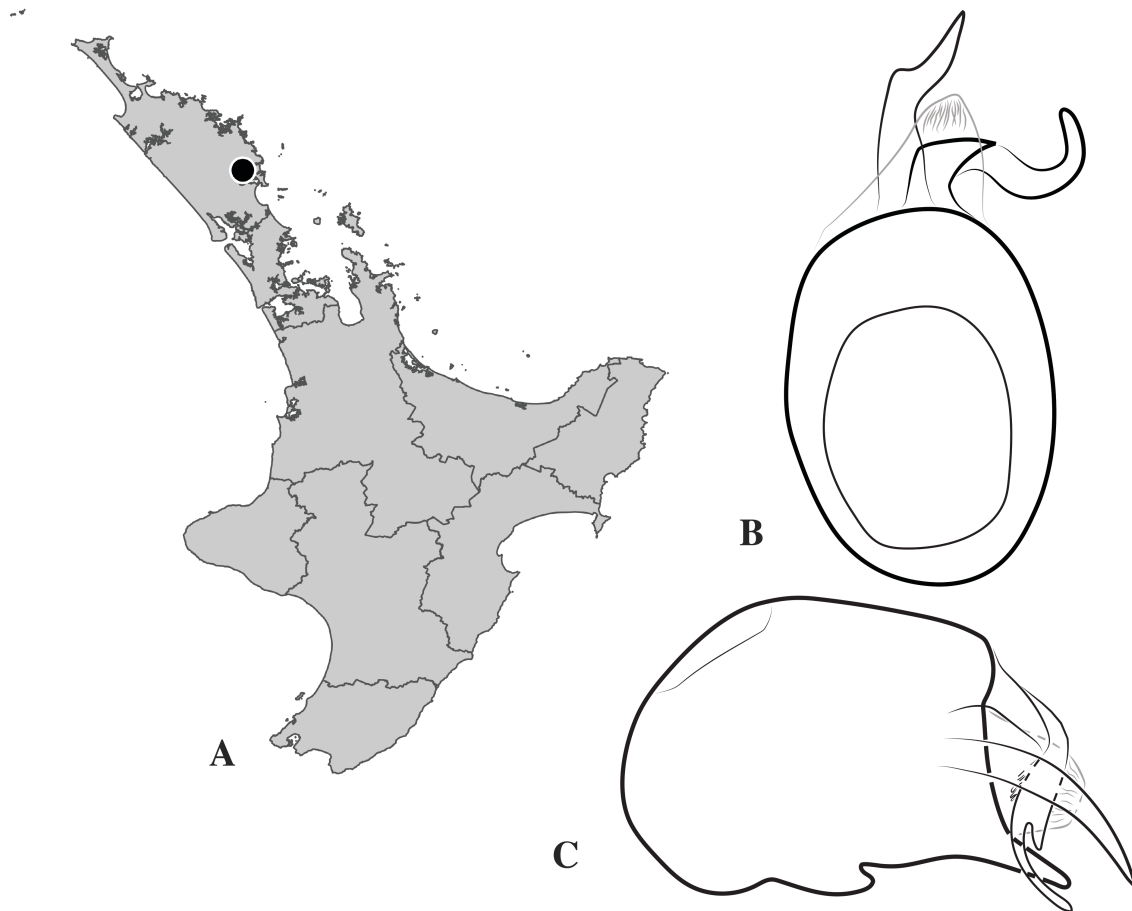


Figure 26. A) Map of localities where *Pselaphogenius 'fimbria'* specimens have been collected; B) *Pselaphogenius 'fimbria'* aedeagus, dorsal; C) *Pselaphogenius 'fimbria'* aedeagus, lateral.

curved dorsad, distally. Inner and outer lateral processes short, straight, simple. Ventral process laterally compressed, ventrally curved and distally expanded. Parameres present, as long as median lobe and ventral process.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression.

Distribution. This species is known from several localities in BP. Additionally, *P. jiawei* is known from two localities in GB.

Material Examined. BP: (2 males, 2 females) New Zealand: GB: Urewera N.P., Tawa Tr. Loop near Lake Waikaremoana, leaf litter, berlese, 18 Mar 2000 C Carlton, A Weir, #050 (LSAM); (1 male, 1 female) New Zealand: BP/GB: Mt. Maungapohatu, 762 m Litter, 3 Mar 1971 JI Townsend, 71/33 (LSAM); (2 males) Maraenui Bay of Plenty// Coll. A.E.Brookes May 1928// A.E.Brookes Collection (NZAC); (1 male, 1 female) Motu River April 1928// A.E. Brookes Collection (NZAC); (2 males, 1 female) Motu River// 20-10-28// A.E.Brookes Collection (NZAC); (1 male) Motu R. 0-5-29// A.E.Brookes Collection (NZAC); (2 males, 1

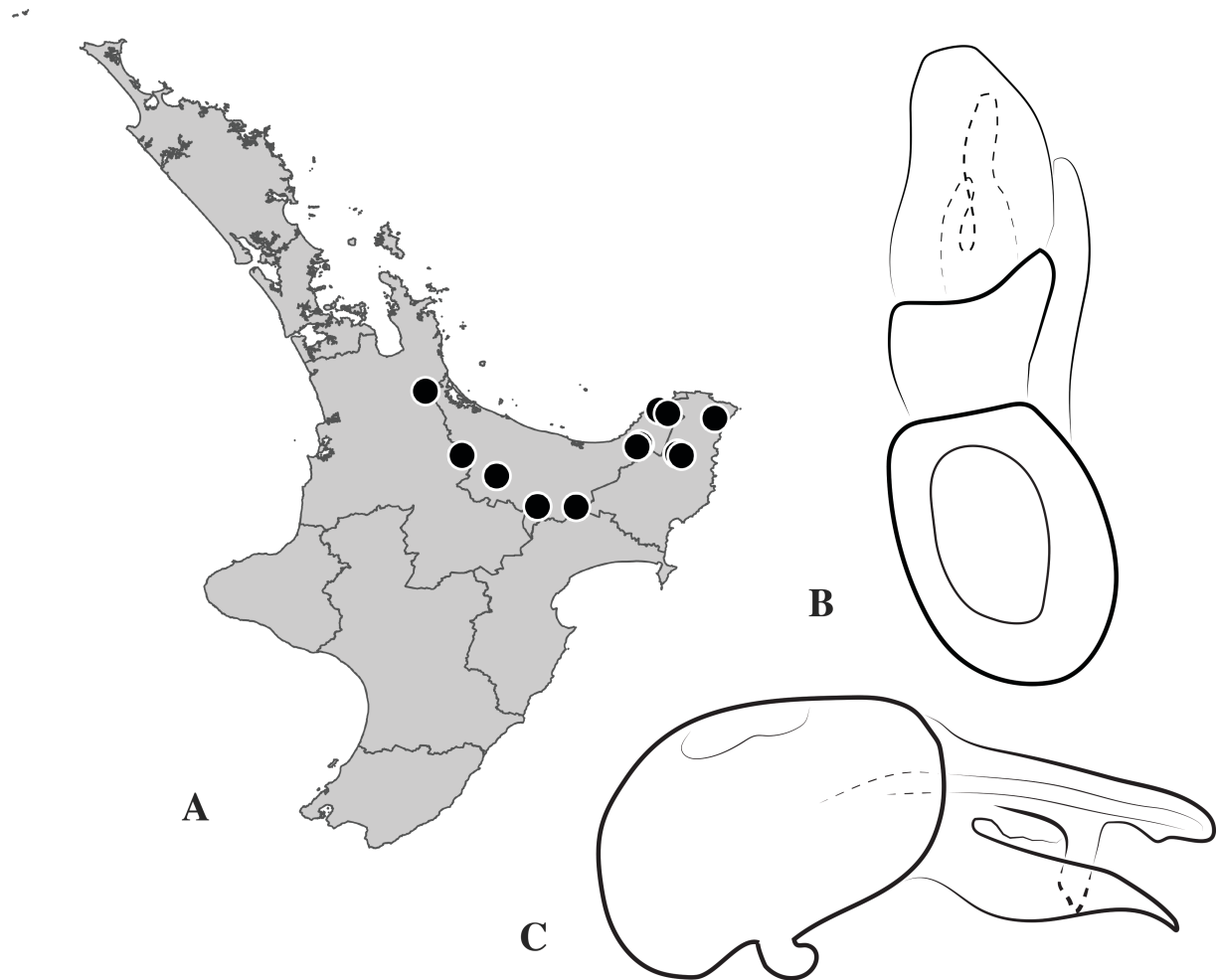


Figure 27. A) Map of localities where *Pselaphogenius 'jiawei'* specimens have been collected; B) *Pselaphogenius 'jiawei'* aedeagus, dorsal; C) *Pselaphogenius 'jiawei'* aedeagus, lateral.

female) Motu River Bay of Plenty// Coll. A.E.Brookes 28-10-38 (NZAC); (1 male) New Zealand BP 8km from Opotiki 20 August 1976 A.R. Ferguson// Litter 76/63 (NZAC); (1 male) NEW ZEALAND, BP Papatea 13 Oct - 23 Nov 1992 G. Hall// Pit traps (NZAC); (1 male) NEW ZEALAND, BP Papatea 26 Apr 1993 J.S. Dugdale Litter 93/94 (NZAC); (1 male, 2 females) NEW ZEALAND, BP Papatea 4 Dec 1992 G. Hall Litter 92/90 (NZAC); (2 males, 2 females) NEW ZEALAND, BP Papatea 8 Mar 1993 J.S. Dugdale Litter 93/32 (NZAC); (1 male) NEW

ZEALAND, BP Papatea 25 Jan 1993 J.S. Dugdale Litter 93/1 (NZAC); (1 female) NEW ZEALAND BP Papatea Roukokore V 19 Oct 1992 JS Dugdale Mosses (NZAC); (1 male) NEW ZEALAND BP, Papatea 5 Nov 1993 R.C. Henderson Litter 93/117 (NZAC); (2 females) NEW ZEALAND, BP Te Koau, Hovells Watching Dog Track 360m 31 Jan 1993 (NZAC); (2 males) NEW ZEALAND, BP Te Koau, 125m 2 May 1993 R.C. Henderson Litter 93/107 (NZAC); (1 male, 1 female) NEW ZEALAND, BP Te Koau Bush Track 23 Sep 1992 J.S. Dugdale// Sifted litter 92/62 (NZAC); (2 males, 3 females) NEW ZEALAND BP Tikitiki Stream Horohoro SF Mamaku Plateau 24 Jul 1976// J.S. Dugdale litter 76/50 (NZAC).

Pselaphogenius "kangi", new species
(See Figure 28)

Type Material. Holotype: (1 male) NEW ZEALAND ND Ngaiotonga Reserve 3 Nov 1981 G. Kuschel (NZAC).

Etymology. This species is named after Ilgoo Kang, a Ph.D. student at Louisiana State University, whose presence in the lab provided many hours of support and entertainment during the writing of this manuscript.

Diagnosis. Externally, this species is difficult to distinguish from all others in the genus on New Zealand. The form of the aedeagus, with the laterally compressed and distally broadened ventral process, is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum in dorsal view pointed with sparse suberect setae. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced to minute pits. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially flattened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, oval median depression deep, reaching apex. Genitalia: aedeagus asymmetrical. Median lobe short, narrow. Right lateral process elongate, compressed laterally. Ventral process elongate, compressed laterally, broadened towards apex. Parameres present, as long as ventral and lateral processes.

Females. Integument, Head, Thorax, Abdomen: females of this species are unknown.

Distribution. This species is known only from the holotype locality.

Pselaphogenius "moerewae", new species
(See Figure 29)

Type Material. Holotype: (1 male) New Zealand: ND: Moerewa Litter, 20 Jan 1972 GW Ramsay, 72/47 (LSAM). Paratypes: (3 males 2 females) holotype locality (LSAM).

Etymology. This species is named after the collection locality of the type series in Moerewa, Northland (ND).

Diagnosis. Externally, this species is similar to other species of *Pselaphogenius*. The form of the aedeagus, with the narrow and elongate left and right lateral processes, elongate and simple median lobe, and the straight, flattened ventral process is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of four facets. Frontal margin of rostrum in dorsal view pointed with sparse suberect setae. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow,

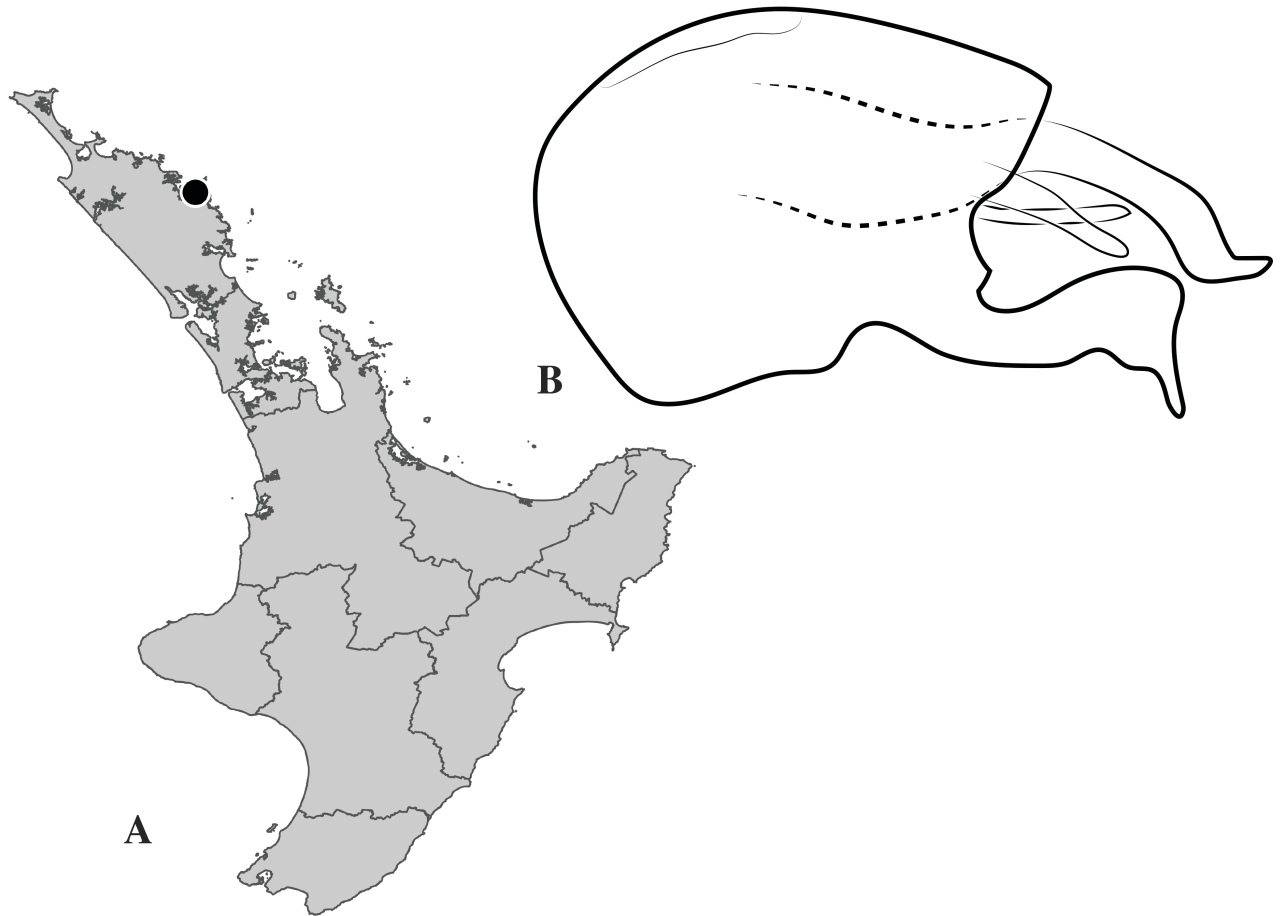


Figure 28. A) Map of localities where *Pselaphogenius 'kangi'* specimens have been collected; B) *Pselaphogenius 'kangi'* aedeagus, lateral.

widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae reduced to pits, median antebasal fovea absent. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially flattened with sparse fringe of small setae on margins, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with one basal fovea and sutural fovea present; discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, oval median depression

deep, reaching apex. Genitalia: aedeagus asymmetrical. Median lobe simple, narrow. Right lateral process longer than median lobe, simple. Left lateral process longer than median lobe, simple, narrow. Ventral process straight, flattened. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: females of this species are unknown.

Distribution. This species is known from the locality of the type series and two additional specimens from AK.

Material examined. (1 male, 1 female) New Zealand: ND: North Cape, Te Paki Coastal Park, litter, 7 Feb 1975 JC Watt, 75/81 (LSAM).

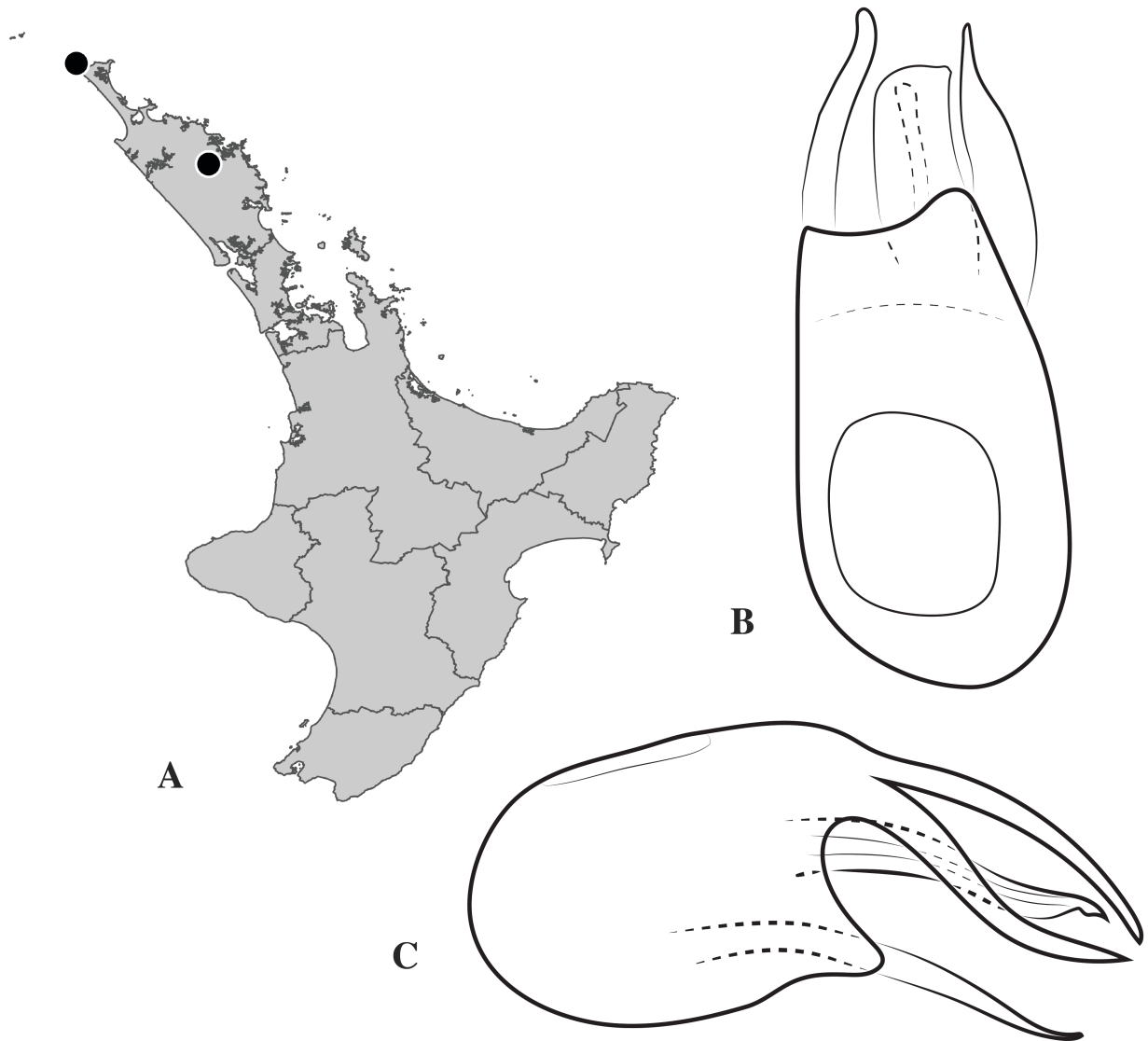


Figure 29. A) Map of localities where *Pselaphogenius* “*moerewae*” specimens have been collected; B) *Pselaphogenius* “*moerewae*” aedeagus, dorsal; C) *Pselaphogenius* “*moerewae*”.

Pselaphogenius "otteai", new species
(See Figure 30)

Type Material. Holotype: (1 male) NEW ZEALAND: ND Waipoua State Forest, 0.8km nw Wairau Summit 350m, 27.xi.1984 hdwd.-podocarp forest A. Newton/ M. Thayer 689// berl., leaf & log litter, forest floor (FMNH). Paratypes: (5 males, 2 females) holotype locality (FMNH).

Etymology. This species is named in honor of Dr. James Ottea, for his support of this project throughout and his service as a member of the author's advisory committee during her Master's program.

Diagnosis. Externally, *P. otteai* is similar to other species in the genus. The form of the aedeagus, with the bifurcate lateral process on the right side is unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Dorsal surface with scattered, stiff, elongate setae. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of three facets. Frontal margin of rostrum in dorsal view pointed with sparse suberect setae. Gular mound ovate, longer than wide, narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{5}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea absent. Mesoventrite with median shield unmodified. Metaventricle afoveate, medially depressed, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, shallow ovate median depression occupying length of ventrite. Genitalia: aedeagus asymmetrical. Median lobe simple. Dorsal processes short, curved downwards. Lateral process on right side bifurcate, as long as ventral process; left lateral process straight, simple, as long as ventral process. Ventral process downward curved, distally, as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression.

Distribution. This species is known from only the type locality in AK.

Pselaphogenius "parki", new species
(See Figure 31)

Type Material. Holotype: (1 male) NEW ZEALAND, CL Kauaeranga V Rd. 6 Dec 1992 M.C. Lariviere A. Larochelle// Litter 93/132. (NZAC). Paratypes. (3 males) holotype locality (NZAC). (1 male) NEW ZEALAND, CL Coromandel FP Maumaupaki TK 23 Oct 1993 M.C. Lariviere// Litter 93/112 (NZAC). (1 male) NEW ZEALAND CL S. Coromandel Ra Headwaters of Grace Darling Stm 1 Dec 1988// G. W. Ramsay Litter 88/1 (NZAC).

Etymology. This species is named in honor of Dr. Jong-Seok Park, an expert on New Zealand pselaphines and supporter of this research.

Diagnosis. Externally, *P. "parki"* can be distinguished from all others in the genus by the presence of the apical flange on the apex of the median depression on ventrite II. The form of the aedeagus, with two ventral processes is also unique.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of three facets. Frontal margin of rostrum in dorsal view rounded with sparse suberect setae. Gular mound modified, longer than wide, narrowed anteriorly and posteriorly, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal $\frac{1}{6}$, apical area smooth, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea minute, pit-like. Mesoventrite with median shield unmodified. Metaventrite afoveate, raised into tumosity; metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying

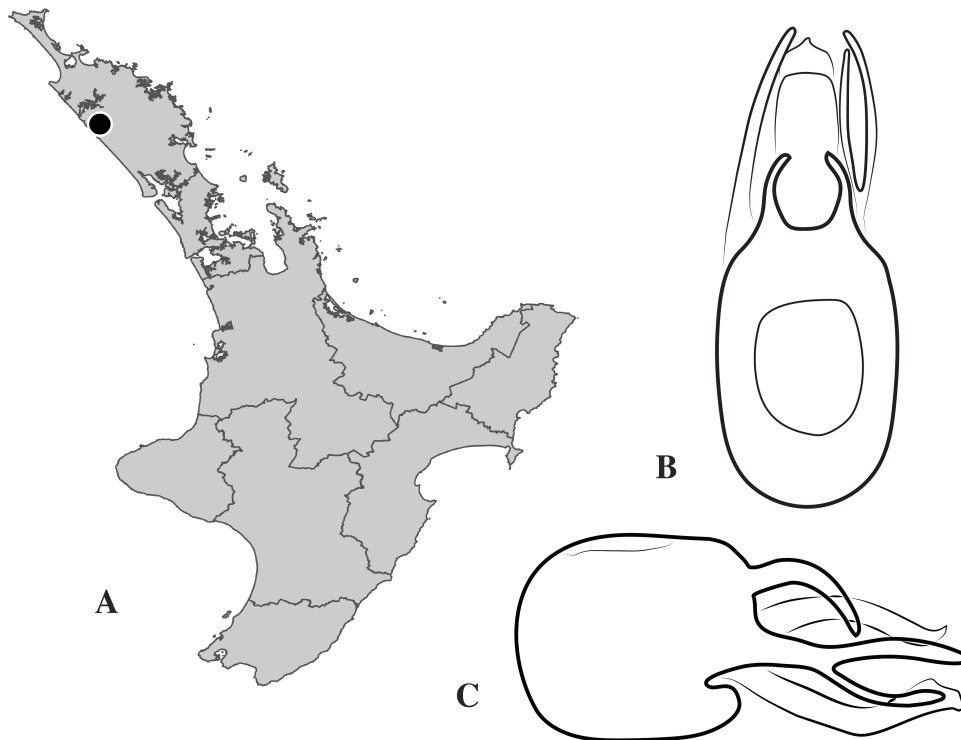


Figure 30. A) Map of localities where *Pselaphogenius* “otteai” specimens have been collected; B) *Pselaphogenius* “otteai” aedeagus, dorsal; C) *Pselaphogenius* “otteai” aedeagus, lateral.

length of ventrite, sulcus densely setose, deep ovate median depression reaching apex, sub-apically with small flange projecting anteriorly back over depression. Genitalia: aedeagus asymmetrical. Median lobe simple. Dorsal processes short, curved inwards. Lateral processes absent. Two ventral processes present, as long as median lobe. Parameres absent.

Females. Integument, Head, Thorax, Abdomen: females of this species are unknown.

Distribution. This species is known from the locality of the type series in Coromandel (CL).

Pselaphogenius "stouti", new species
(See Figure 32)

Type Material. Holotype: (1 male) N. Zeal.: ND: Waipoua SF, Toronui Tr. C150m 13.iv.1980 kauri-podocarp-broadlf.-nikau palm forest A. Newton, M. Thayer// berl., leaf & log litter, forest floor (FMNH). Paratypes: (2 males, 2 females) holotype locality (FMNH).

Etymology. This species is named in honor of Dr. Mike Stout for his support of this project as member of the author's advisory committee.

Diagnosis. Externally, this species is difficult to distinguish from others in the genus. The form of the aedeagus, with the enlarged and asymmetrical outer lateral process, simple inner lateral process, and simple ventral process is unique.

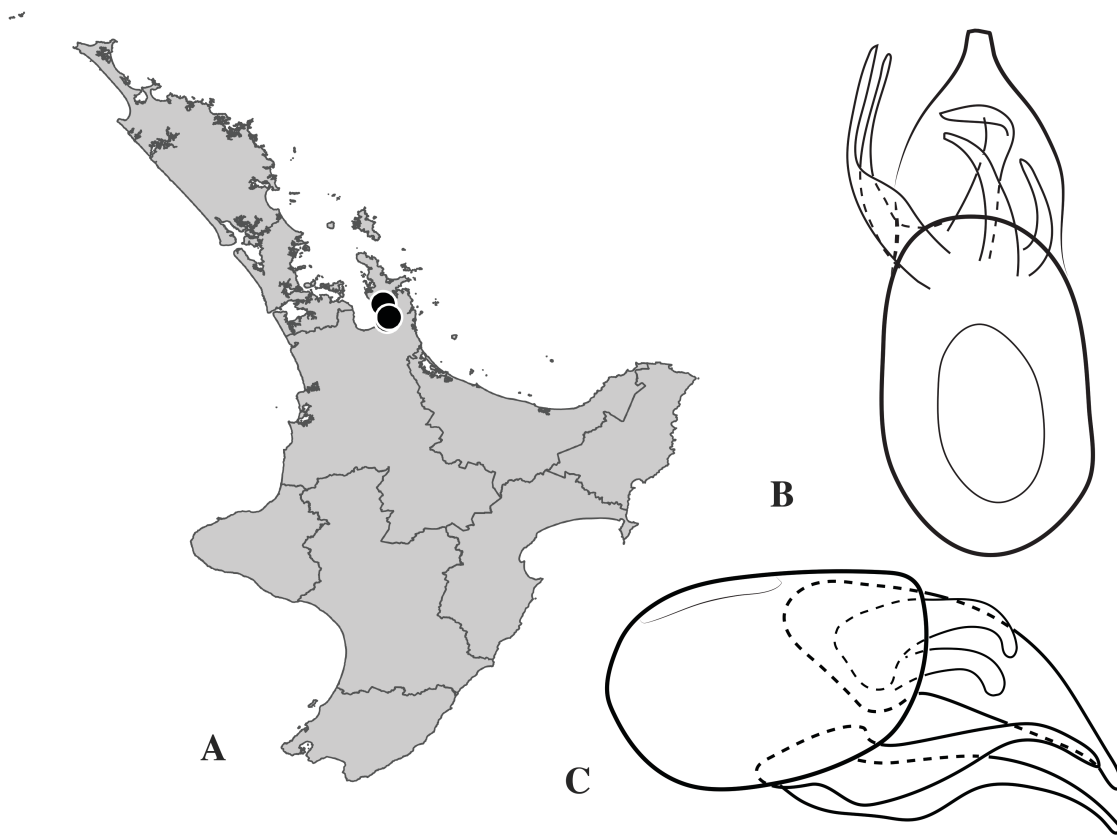


Figure 31. A) Map of localities where *Pselaphogenius "parki"* specimens have been collected; B) *Pselaphogenius "parki"* aedeagus, dorsal; C) *Pselaphogenius "parki"* aedeagus, lateral.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum in dorsal view pointed-rounded with sparse suberect setae. Gular mound modified, longer than wide, broad anteriorly and narrowed posteriorly; area of head posterior to gular mound flattened, slightly concave, nude Maxillary palpomere IV longer than head, narrow,

widened at base and distal 1/5, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced to minute pits. Mesoventrite with median shield unmodified. Metaventrite afoveate, medially flattened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, deep oval median depression reaching apex. Genitalia: aedeagus asymmetrical. Median lobe simple, apically curved upwards. Outer lateral process asymmetrical, present only on right side, as long as ventral lobe, curved outwards, distally. Inner lateral process simple, narrow. Ventral process downward curved, distally, about as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except visible ventrite II lacking median ovate depression.

Distribution. This species is only known from localities in AK.

Material Examined. (2 males) New Zealand: ND: Waipoua Stm., 100 m Litter 19 May 1978, SB Peck (LSAM); (1 male) NEW ZEALAND ND Headquarters Rd beside river Waipoua Forest 16 Dec 1976// V.A. May litter 76/110 (NZAC).

Pselaphogenius ventralis (Broun 1895)

Pselaphus ventralis Broun (1895: 72), transferred (Newton and Thayer 2003)

(See Figure 33)

Type Material Examined. After observing the type series of *Pselaphus ventralis* in the NHM and reviewing Broun's original description, the following specimen from the NHM was designated as the lectotype: (1 male) TYPE (red/orange label)// 2742// Mount Pirongia// New Zealand Broun coll. Brit. Mus. 1922-482 (designated lectotype). The additional specimen in the syntype series is also a member of the species *P. ventralis*: (1 male) 2742// ♂// Mount Pirongia// New Zealand Broun coll. Brit. Mus. 1922-482 and is designated a paralectotype.

Diagnosis. Externally, this species is most similar to *P. "calantica"*, which also bears a thickened region at the apex of ventrite II. The greatly reduced form of the aedeagus, with the median lobe truncate and the absence of lateral and ventral processes, is unique.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to ½ length of head from base of vertex to apex of rostrum. Eyes small, composed of five facets. Frontal margin of rostrum in dorsal view emarginate. Gular mound swollen, ovate, longer than wide, narrowed anteriorly and posteriorly, glabrous; area of head posterior to gular mound flattened, slightly concave, nude. Maxillary palpomere IV longer than head, narrow, widened at base and distal 1/4, apical area lightly tuberculate, v-shaped sensory patches reduced. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced, pit like. Mesoventrite with median shield unmodified. Metaventrite afoveate, with median depression, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae, sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying width of ventrite, sulcus densely setose, large deep oval median depression not reaching ventrite apex, apical portion of depression thickened into small, lateral ridge. Genitalia: aedeagus symmetrical. Median lobe

shortened, truncate. Lateral processes absent. Ventral process absent. Parameres present, slightly exceeding length of median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except ventrite II lacking median ovate depression.

Distribution. This species is known from localities in: Auckland (AK), Hunua Range, Waipipi Scenic Reserve, and the Waitakere Range; Bay of Plenty (BP), Kaimai-Mamaku Range; Nelson (NN), Kahurangi N.P.; Waikato (WO), Pirongia Forest Park and Te Mata.

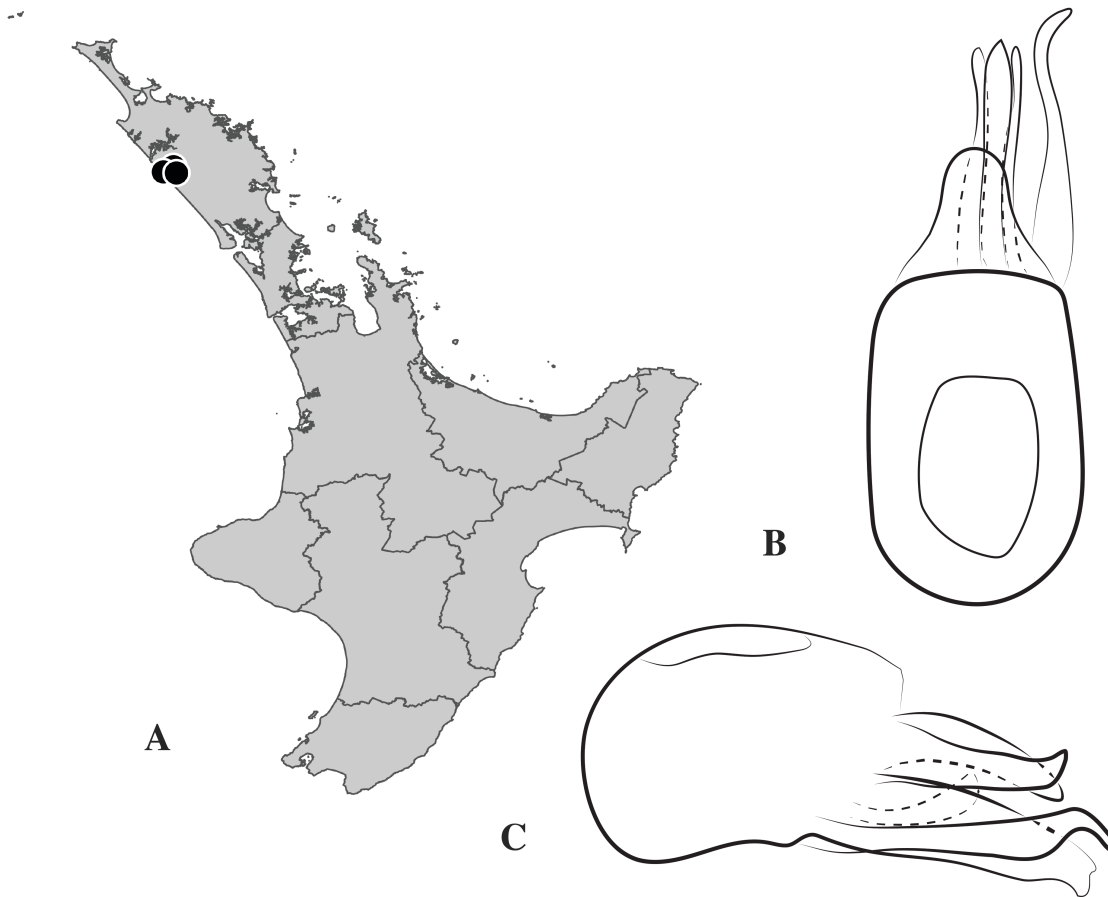


Figure 32. A) Map of localities where *Pselaphogenius* “*stouti*” specimens have been collected; B) *Pselaphogenius* “*stouti*” aedeagus, dorsal; C) *Pselaphogenius* “*stouti*” aedeagus, lateral.

Material examined. (2 males) NEW ZEALAND: AK: Hunua Ranges, Vining Reserve, Mangatangi Track, 240m, 37°0.7.747/S, 175°13.13.024/E, 17.xi.2005, *Nothofagus-Agathis-Phyllocladus trichomanoides*, etc.; FMHD#2005-008, berl. Leaf & log litter, A. Newton, A. Solodovnikov, et al.; ANMT site 1141 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (3 males, 2 females) NEW ZEALAND: AK: Waipipi Scen. Res., 2km. Wsw Waipipi 40m 37.14S 174.40E 22.ii.1987 native hardwood forest in gully A.Newton & M.Thayer 835 FMHD #87-269 berl., leaf & log litter, forest floor (FMNH, EtOH); (4 males, 3 females) NEW ZEALAND: AK: Waitakere Ra., Nohoanga Scen. Res., 260m 36.57S 174.35E 23.ii.1987

hardwood-podocarp forest A. Newton & M. Thayer 836 FMHD #87-271 berl., frond litter at base of tree ferns. (FMNH, EtOH); (4 males, 2 females) NEW ZEALAND: BP: Kaimai-Mamaku Forest Park, Mt. Te Aroha, upper end Tul Mine Track, nr. Summit road, 775m, 37°31.658'S, 175°44.684'E, 19.xi.2005, low *Nothofagus menziesii* forest w/ *Astelia* ground layer; FMHD#2005-021, berl., forest litter, A. Newton & M. Thayer; ANMT site 1145 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (3 males, 4 females) NEW ZEALAND: NN: Kahurangi N.P., Cobb Dam Rd., Asbestos Track 450m, 41°06.333'S, 172°43.174'E, 18.xii.2005, mixed broadleaf (incl. *Nothofagus fusca*)- podocarp forest; FMHD#2005-111, berl., leaf & log litter. Al Solodovnikov, D. Clarke, et al.; ANMT site 1160 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male, 1 female) NEW ZEALAND: NN: Kahurangi N.P., Arthur Range, above Flora Saddle, 1000m, 41°11.351'S, 172°44.456'E, 28.xi-19.xii.2005, *Nothofagus*-dominant forest; FMHD#2005-044, flight intercept trap, A. Newton & M. Thayer, ANMT site

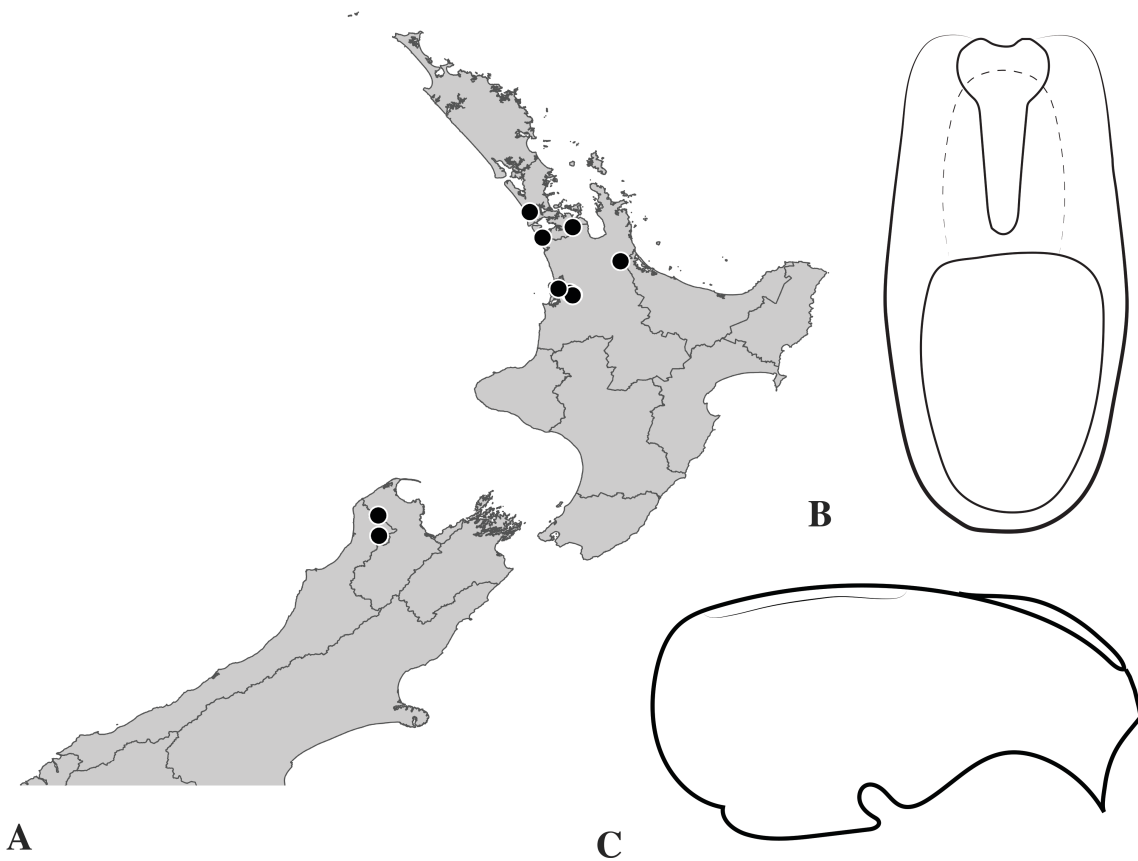


Figure 33. A) Map of localities where *Pselaphogenius ventralis* (Broun) specimens have been collected; B) *Pselaphogenius ventralis* (Broun) aedeagus, dorsal; C) *Pselaphogenius ventralis* (Broun) aedeagus, lateral.

1156 propylene glycol to 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (2 males, 2 females) NEW ZEALAND: WO: Pirongia Forest Park, Tirohanga Track (above end Corcoran Rd.), 500m, 37°58.409'S, 175°07.173'E, 20.xi.2005, broadleaf forest; FMHD#2005-015, berl., forest litter, D. Clarke & A. Solodovnikov; ANMT site 1146 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (3 males, 5 females) NEW ZEALAND: WO: Pirongia Forest Park, Mahaukura Track (above end Grey Rd.), 270m, 37°58.218'S, 175°06.523'E, 18.xi.2005, mixed broadleaf forest; FMHD#2005-011, berl., leaf & log litter, M. Thayer & A. Newton; ANMT site 1142 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male, 1 female) NEW ZEALAND WO Te Mata Bridal Veil Falls 19 Sep 1981 C.F. Butcher// Litter 81/88 (NZAC)

***Pselaphogenius* Species Group 2**

Pselaphogenius citimus (Broun), 1893

Pselaphus citimus Broun (1893: 1043), transferred (Newton & Thayer 2003)
(See Figure 34)

Type Material Examined. After observing the type series of *Pselaphus citimus* in the NHM and reviewing Broun's original description, the following specimen was determined to be the holotype: (1 male) TYPE (red/orange label)// 1867.// Howick// New Zealand Broun coll. Brit. Mus. 1922-482 (holotype). This matches the manuscript number, physical description, and locality information provided in the original description (Broun 1893).

Diagnosis. Externally, males of this species can be distinguished from other NZ species by the modification of ventrite II bearing a flattened median area instead of an ovate depression. The aedeagus is also distinct, with a large, shortened median lobe bearing distal complexities, a short straight ventral process and the absence of lateral processes.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15 facets. Frontal margin of rostrum in dorsal view pointed-rounded. Gular mound modified, wider than long, broad anteriorly and rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, bearing flattened scale-like setae. Maxillary palpomere IV as long as head, narrow, widened at base and distal ½ to 1/3, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae reduced to pits, median antebasal fovea absent. Mesoventrite with median shield unmodified. Metaventricle afoveate, raised into tumosity bearing small patches of short setae, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with one basal fovea and single sutural fovea present; discal stria present, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, median flattened area along length of ventrite. Genitalia: aedeagus symmetrical. Median lobe protruding from fleshy extension of basal bulb, produced into distal complexities. Ventral process simple, straight, shorter than median lobe. Lateral processes absent. Parameres broad and extending beyond median lobe.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and visible ventrite II lacking median flattened area.

Distribution. *Pselaphogenius citimus* is known from a large number of localities in the north island, including sites in Auckland (AK), Bay of Plenty (BP), Coromandel (CL) Gisborne

(GB), Hawkes Bay (HB), Northland (ND), Taranaki (TK), Taupo (TO), and Waikato (WO). This species is also known from Nelson (NN) on the South Island.

Material examined. (1 male) New Zealand TO Waituhi Sdl 1.9.93// In leaf litter// JT Nunn Collection (JN); (1 male, 4 females) New Zealand: AK: Hunua Ra., 150 m Litter 4 Jan 1973 BM May, 73/2 (LSAM); (2 males, 1 female) New Zealand: AK: Hunua Ra., Kohukohunui, 550 m Litter, 30 Mar 1974 G Kuschel, 74/19 (LSAM); (4 males, 2 females) New Zealand: AK: Hunua Ra., Kohukohunui, 600 m Litter, 30 Mar 1974 G Kuschel, 74/20 (LSAM); (3 males, 1 female) New Zealand: AK: Mt. Dome, litter 15 Mar 1978 SB Peck (LSAM); (3 males, 1 female) New Zealand: AK: Ponga Bush, Drury, nr. Pukekohe Litter, 4 Jan 1973 BM May, 73/1 (LSAM); (1 female) New Zealand: AK: Ponga Bush, Drury, nr. Pukekohe Ground plants 13 Dec 1975, G Kuschel (LSAM); (1 female) New Zealand: GB: Urewera, Orangihikoia Stm., litter, 6 Feb 1970 AW Don, 68/37 (LSAM); (1 male) New Zealand: GB: Urewera N.P., near Aniwanui Visitor Center, Sifting toetoe litter, 21 Mar 2000 C Carlton, A Weir, #074 (LSAM); (3 males, 4 females) New Zealand: GB: Urewera N.P., Lake Waikareiti 38°47'S 176°10'E/ *Dracophyllum/Nothofagus* litter berlese 19 Mar 2000 C Carlton, A Weir, #058 (LSAM); (1 male, 1 female) New Zealand: HB: Kaweka Ra., Makahu Hut 976 m, litter, 24 Feb 1971 JI Townsend, AC Eyles 71/21 (LSAM); (4 females) New Zealand: HB: Kaweka Ra., Makahu Spur 1036m, moss, 24 Feb 1971 JI Townsend, 71/23 (LSAM); (4 males, 1 female) New Zealand: ND: Waipoua Stm., 100 m Litter 19 May 1978, SB Peck (LSAM); (1 male) New Zealand: TK: Awakino Gorge, Kuriwera Stm, litter, 23 Jan 1972 GW Ramsay, 72/65 (LSAM); (1 female) New Zealand: TK: Dawson Falls, 975 m Mt. Egmont, litter, 65/387 16 Jun 1965, JI Townsend (LSAM); (3 females) New Zealand: TK: Mt Egmont, Dawson Falls 946 m, litter, 62/1 14 Jan 1962, G Kuschel (LSAM); (1 male, 1 female) New Zealand: TO: Whirinaki Forest Park End of Okahu Rd. FIT, 23 Mar 2000 C Carlton, A Weir, #083 (LSAM); (3 males, 3 females) NEW ZEALAND: AK: Hunua Ranges, Vining Reserve, Mangatangi Track, 240m, 37°0.7.747/S, 175°13.13.024/E, 17.xi.2005, *Nothofagus-Agathis-Phyllocladus trichomanoides*, etc.; FMHD#2005-008, berl. Leaf & log litter, A. Newton, A. Solodovnikov, et al.; ANMT site 1141 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male) NEW ZEALAND: AK: Hunua Ranges Reg. Park, Kohukohunui Track nr. Mine Rd., 475m, 37°02.396'S, 175°11.251'E, 17.xi.2005, broadleaf-podocarp forest, numerous tree ferns; FMHD#2005-004, berl., leaf & log litter, A. Newton, A. Solodovnikov, et al.; ANMT site 1140 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male) NEW ZEALAND: AK: Waipipi Scen. Res., 2km. Wsw Waipipi 40m 37.14S 174.40E 22.ii.1987 native hardwood forest in gully A. Newton & M. Thayer 835 FMHD #87-269 berl., leaf & log litter, forest floor (FMNH, EtOH); (5 males, 3 females) NEW ZEALAND: AK: Waitakere Ra., Nohoanga Scen. Res., 260m 36.57S 174.35E 23.ii.1987 hardwood-podocarp forest A. Newton & M. Thayer 836 FMHD #87-271 berl., frond litter at base of tree ferns. (FMNH EtOH); (1 male) NEW ZEALAND: BP: Kaimai-Mamaku Forest Park, Mt. Te Aroha summit road, 450m, 37°31.429'S, 175°44.005'E, 19.xi.2005, mixed broadleaf forest w/many tree ferns, nikau palms; FMHD#2005-018, berl., leaf & log litter, A. Newton & M. Thayer; ANMT site 1144 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (5 males) NEW ZEALAND: BP: Kaimai-Mamaku Forest Park, Mt. Te Aroha, upper end Tul Mine Track, nr. Summit road, 775m, 37°31.658'S, 175°44.684'E, 19.xi.2005, low *Nothofagus menziesii* forest w/ *Astelia* ground layer; FMHD#2005-021, berl., forest litter, A. Newton & M. Thayer; ANMT site 1145 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (21 males, 7 females) NEW ZEALAND: GB: Urewera N.P., Waikaremoana Rd., S end Matanunui Ridge, 720m, 38°44.404'S, 177°05.806'E, 22.xii.2005, mixed broadleaf (incl. *Nothofagus fusca*)- podocarp;

FMHD#2005-118, berl., leaf & log litter, A. Newton, M. Thayer, & A. Solodovnikov; ANMT site 1149 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (2 males, 3 females) NEW ZEALAND: GB: Urewera N.P., Maungapohatu Rd., 3.2 km E Taupeupe Saddle, 1110m, 38°36.975'N, 177°02.753'E, 22.xi.2005, mossy *Nothofagus menzeisii* forest; FMHD#2005-027, berl., leaf & log litter, A. Newton, M. Thayer, et al.; ANMT site 1148 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (3 males, 1 female) NEW ZEALAND: NN: Kahurangi N.P., Arthur Range, above Flora Saddle, 1000m, 41°11.351'S, 172°44.456'E, 28.xi-19.xii.2005, *Nothofagus*-dominant forest; FMHD#2005-044, flight intercept trap, A. Newton & M. Thayer, ANMT site 1156 propylene glycol to 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (12 males, 13 females) NEW ZEALAND: WO: Pirongia Forest Park, Tirohanga Track (above end Corcoran Rd.), 500m, 37°58.409'S, 175°07.173'E, 20.xi.2005, broadleaf forest; FMHD#2005-015, berl., forest litter, D. Clarke & A. Solodovnikov; ANMT site 1146 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (2 males) NEW ZEALAND: WO: Pirongia Forest Park, Mahaukura Track (above end Grey Rd.), 270m, 37°58.218'S, 175°06.523'E, 18.xi.2005, mixed broadleaf forest; FMHD#2005-011, berl., leaf & log litter, M. Thayer & A. Newton; ANMT site 1142 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH); (1 male) NEW ZEALAND AK Birkenhead Kauri Park 4 Oct 1978 B.M. May (NZAC); (1 male) Waitakere Drive 15.10.42// A.E. Brookes Collection (NZAC); (6 specimens) Waimarino, Main Trunk Line. N.Is.// 1867// Coll. T. Broun (NZAC); (1 male, 1 female) NEW ZEALAND BP Tikitiki Stream Horohoro SF Mamaku Plateau 24 Jul 1076// J.S. Dugdale litter 76/57 (NZAC); (1 male) NEW ZEALAND BP Horohoro SF Mamaku Plat 550m 24 Jul 1976 J.S. Dugdale// Litter 76/44 (NZAC); (2 males, 1 female) NEW ZEALAND BP Kaimai Ra 427m Leyland Tramline 22 Sep 1981 B.M. May// litter 81/92 (NZAC); (1 female) Kaimai Ra. Matamara, Waikare M.Is.// 1600 feet// A.E. Brookes Coll. (NZAC); (1 female) Kaimai 1520 1-1-31. AEB// A.E. Brookes Collection (NZAC); (1 female) NEW ZEALAND, BP 9km from Opotiki 20 Aug 1976 A.R. Ferguson// Litter 76/63 (NZAC); (2 males) NEW ZEALAND: BP Orete Forest Te Puia Hut Bush 15 Sep 1992 G. Hall & R.C. Henderson Sifted litter 92/50 (NZAC); (2 males, 2 females) NEW ZEALAND, BP Waiaroho 21 Oct 1992 J.S. Dugdale// litter & mosses 92/70 (NZAC); (1 male) Leafmould Fitzgeralds Rotorua // R.M. Bull Collection (NZAC); (2 males, 1 female) NEW ZEALAND, BP Te Koau, Hovelis Watching Dog 240m 24 Oct 1992 J.S. Dugdale// Litter 92/78 (NZAC); (2 males, 3 females) NEW ZEALAND, BP Te Koau, 243m 15 Mar 1993 J.S. Dugdale Litter 93/43 (NZAC); (1 male, 1 female) NEW ZEALAND, BP Waiaroho 10 Mar 1993 J.S. Dugdale Litter 93/36 (NZAC); (1 male) NEW ZEALAND CL Gt Barrier I Mt Hobson Upper Kauri Dam 11 Apr 1982// moss and litter (NZAC); (3 males, 1 female) NEW ZEALAND ND Kauri Reserve Omahutu SF 10 Oct 1974 J.C. Watt// Litter 74/81 (NZAC); (1 male) NEW ZEALAND, ND Kohuronaki, 270m 24 Nov 1982 G. Kuschel// Litter and decayed wood 82/123 (NZAC); (4 males) NEW ZEALAND ND Parahaki Park 5 Nov 1981 G. Kuschel// litter and decayed wood 81/127 (NZAC); (3 males, 1 female) NEW ZEALAND ND Parahaki Park 5 Nov 1981 G. Kuschel// litter and decayed wood 81/126 (NZAC); (2 males, 1 female) NEW ZEALAND ND Waipoua SF Toatoa Grove 25 Nov 1980 G. Kuschel// Sifted litter 80/121 (NZAC); (2 males, 1 female) NEW ZEALAND TK Mt Egmont NP Stratford Mtn House, 846m 23 May 1986// C.L. Lyal Leaf litter CL 474 (NZAC); (1 male) NEW ZEALAND, WO Mt Pirongia SF Rangitukia Stream 13 June 2001 R. Leschen// berlesate of tree holes leaf litter RL664 (NZAC); (1 male) NEW ZEALAND WO Mt Pirongia 962m 16 Jan 1977 A.K. Walker litter 77/2 (NZAC); (4 males, 3 females) NEW ZEALAND WO Mt Pirongia 962m 16 Jan 1977 A.K. Walker litter 77/2 (NZAC).

Pselaphogenius "dismukesi", new species
(See Figure 35)

Type Material. Holotype: (1 male) New Zealand: ND: Waipoua SF Te Matua Ngahere, litter, 4 Feb 1975 JC Watt, 75/94 (LSAM). Paratypes: (1 male, 3 females) holotype locality (LSAM).

Etymology. This species is named in honor of Dr. David Dismukes, for his support of this project as member of the author's advisory committee.

Diagnosis. Externally, *P. "dismukesi"* is difficult to distinguish from other species in the genus. The form of the aedeagus, with a median lobe enlarged, ventral process simple and two lateral processes simple and curved upwards is unique.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15 facets. Frontal margin of rostrum in dorsal view straight. Gular mound modified, as wide as long, broad anteriorly and rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, nude, maxillary palpomere IV as long as head, narrow, widened at base and distal $\frac{1}{2}$ to $\frac{1}{3}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae present, median antebasal fovea reduced. Mesoventrite with median shield unmodified. Metaventricle afoveate, medially flattened, bearing short, fine setae, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and single sutural fovea present; discal stria absent, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, oval median depression shallow, reaching apex. Genitalia: aedeagus symmetrical. Median lobe enlarged, produced in thickened extension from basal bulb. Lateral processes curved upwards, narrowed and simple. Ventral process downward curved, distally, longer than median lobe. Parameres present, as long ventral process.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression.

Distribution. This species is only known from collection events in Marlborough (MB) near Black Birch Range and a single collection event from Buller (BR) near Mt. Robert.

Material examined. (18 males, 25 females) New Zealand: ND: Waipoua Stm, 100m Litter 19 May 1978, SB Peck (LSAM); (3 males, 5 females) New Zealand: ND: Omahutu S.F. Litter, 18 Mar 1978 SB Peck (LSAM); (5 males, 7 females) New Zealand: ND: Waipoua S.F. Litter, 4 Feb 1975 SE Nichols, 75/84; (1 male, 1 female) New Zealand: ND: Waipoua S.F., Te Matua Ngahere, litter, 75/19 4 Feb 1975, JC Watt (LSAM); (10 males, 5 females) New Zealand: WD: Hokitika Gorge 19 Jan 1978 SB Peck (LSAM); (6 males, 6 females) New Zealand: WD: Okuku Scenic reserve 46.7 km W Oтира, 75 m 42'43S 171'14E, #050// zelandiae leaf litter Berlese, 12 Jan 1998 C. Carlton, R. Leschen (LSAM).

Pselaphogenius "gibbus", new species
(See Figure 36)

Type Material. Holotype: (1 male) NEW ZEALAND, ND Unuwhao, 270m 25 Nov 1982 G. Kuschel// sifted litter and decayed wood 82/125 (NZAC). Paratypes: (3 females) holotype locality (NZAC); (1 male, 1 female) New Zealand, ND Kohuronaki, 270m 24 Nov 1982 G. Kuschel// Litter and decayed wood 82/123 (NZAC).

Etymology. The specific epithet refers to the humped form of the median lobe on the aedeagus of males of this species.

Diagnosis. Externally, the median depression on ventrite II margined by carinae and the presence of a small median projection angled anteriorly at the hind margin of ventrite II distinguishes this species from all others in the genus in NZ. The form of the aedeagus with a large dorsal hump at the base of the median lobe is also unique.



Figure 34. A) Map of localities where *Pselaphogenius citimus* (Broun) specimens have been collected; B) *Pselaphogenius citimus* (Broun) aedeagus, dorsal; C) *Pselaphogenius citimus* (Broun) aedeagus, lateral.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15 facets. Frontal margin of rostrum in dorsal view rounded. Gular mound modified, as wide as long, broad anteriorly and rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, bearing dense setae. Maxillary palpomere IV shorter than head, narrow, widened at base and distal $\frac{1}{3}$, v-

shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced. Mesoventrite with median shield unmodified. Metaventrite afoveate, median flattened area declined posteriorly, margins thickened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with single basal foveae and single sutural fovea present; discal stria present, short, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, circular median depression reaching apex, margined by carinae, apex of ventrite bearing small median projection angled anteriorly. Genitalia: aedeagus symmetrical. Median lobe simple, slightly curved upwards at distal end with large dorsal hump-like process at base. Lateral processes absent. Ventral process simple, gently curved. Parameres short, extending about half the length of the median lobe, bearing elongate distal setae reaching margin of median lobe.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and ventrite II lacking median ovate depression.

Distribution. This species is only known from the type series.

Pselaphogenius "kalleri", new species
(See Figure 37)

Type Material. Holotype: (1 male) New Zealand: NN: Mt. Starveall, 1066 m, moss 29 Dec 1964, G Kuschel, JI Townsend, 65/165 (LSAM). Paratypes: (5 males) holotype locality (LSAM); (1 male, 1 female) New Zealand: NN: Lake Roititi, moss 27 Jul 1965 AK Walker, 65/402 (LSAM).

Etymology. This species is named in honor of Dr. Mike Kaller, for his support of this project as member of the author's advisory committee.

Diagnosis. Externally, *P. "kalleri"* is most similar to *P. "lescheni"* in possessing a median tubercle on the apex of the median ovate depression on ventrite II. The form of the aedeagus, with the median lobe elongate and simple, a ventral fleshy process and the absence of a ventral process is unique.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15 facets. Frontal margin of rostrum in dorsal view rounded. Gular mound modified, as wide as long, broad anteriorly and rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, bearing dense setae. Maxillary palpomere IV shorter than head, narrow, widened at base and distal $\frac{1}{3}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae and median antebasal fovea reduced. Mesoventrite with median shield unmodified. Metaventrite afoveate, median flattened area declined posteriorly, margins thickened, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with single basal foveae and single sutural fovea present; discal stria present, short, sutural striae present. Abdomen: Tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, deep longitudinal median sulcus reaching apex of ventrite, apex of ventrite with small median projection. Genitalia: aedeagus symmetrical. Ventral fleshy lobe extending beyond basal bulb. Median lobe simple and narrow. Two thin lateral processes also extending from fleshy lobe. Ventral process absent. Parameres as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and visible ventrite II lacking median ovate depression.

Distribution. This species is known from several localities in Nelson (NN): Maungatapu Saddle, Mt. Starveall, Dun Mt. Mt. Arthur, Lake Sylvester, and St. Arnaud Range.

Material Examined. (1 male, 3 females) New Zealand: NN: Maungatapu Sdle, 732 m Litter, 15 Nov 1967 JI Townsend, 67/83 (LSAM); (1 male) New Zealand: NN: Dun Mt. Wooded Peak E. Summit, litter, 71/116 14 Sep 1971, GW Ramsay (LSAM); (1 male, 1 female) New Zealand: NN: Mt. Arthur, 1158 m Moss, 3 Nov 1969 JI Townsend, 69/215 (LSAM); (1 male, 1 female) New Zealand: NN: L. Sylvester, 1402 m Mats, 29 Oct 1969 JS dugdale, 69/182 (LSAM); (1 male, 1 female) New Zealand: NN: Lake Roititi, moss 27 Jul 1965 AK Walker, 65/402 (LSAM); (1 male, 1 female) New Zealand: NN: St. Arnaud Ra. Moss, 23 Dec 1964 G Kuschel, 64/182 (LSAM).

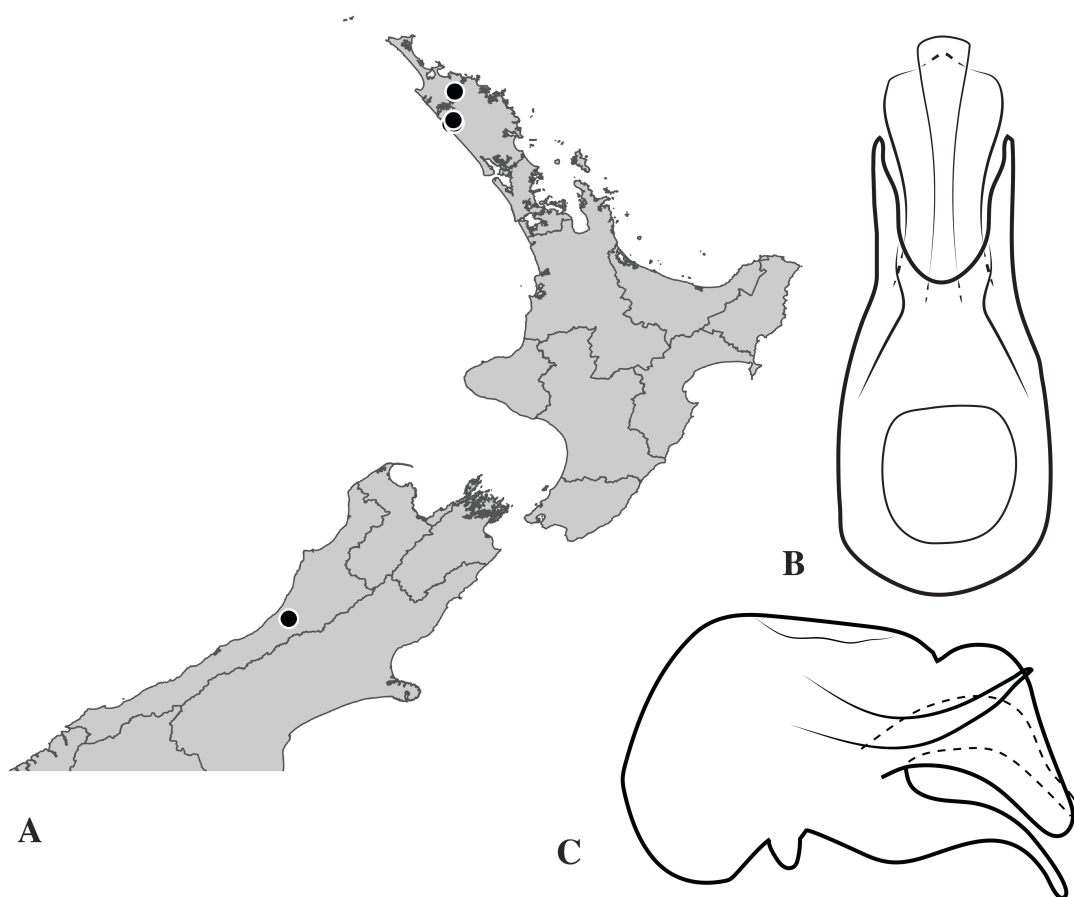


Figure 35. A) Map of localities where *Pselaphogenius "dismukesi"* specimens have been collected; B) *Pselaphogenius "dismukesi"* aedeagus, dorsal; C) *Pselaphogenius "dismukesi"* aedeagus, lateral.

Pselaphogenius "lescheni", new species
(See Figure 38)

Type Material. Holotype: (1 male) New Zealand: MB: Black Birch, 1800 m Litter, 16 Feb 1970 AC Eyles, 70/139 (LSAM). Paratypes: (1 male, 1 female) holotype locality (LSAM); (2 males, 1

female) New Zealand: MB: Black Birch Ra., Mt. Altmarloch 1700 m, litter, 16 Feb 1970 G Kuschel, 70/119 (LSAM).

Etymology. This species is named after Dr. Richard Leschen, an expert on New Zealand Coleoptera, supporter of this project, and friend of the author.

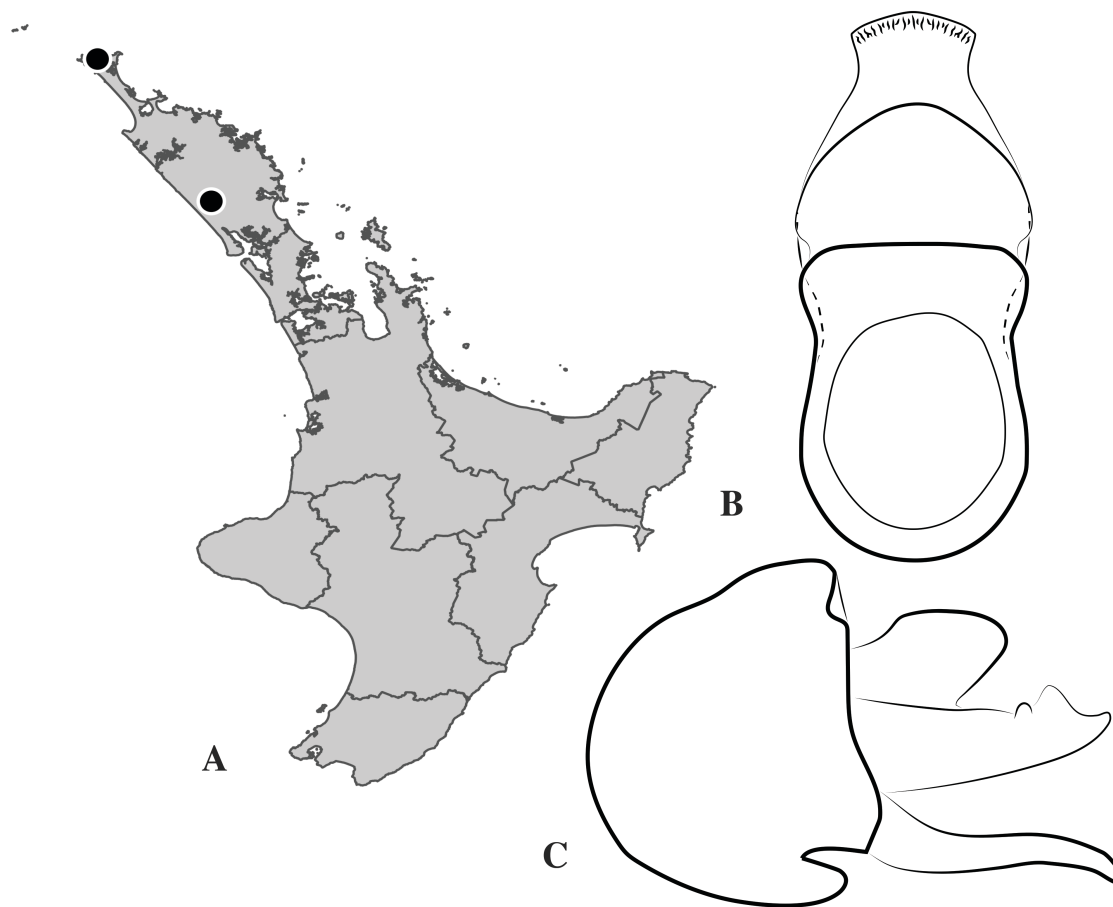


Figure 36. A) Map of localities where *Pselaphogenius* “*gibbus*” specimens have been collected; B) *Pselaphogenius* “*gibbus*” aedeagus, dorsal; C) *Pselaphogenius* “*gibbus*” aedeagus, lateral.

Diagnosis. Externally, *P. “lescheni”* is most similar to *P. “kalleri”* in possessing a tubercle at the apex of the medial oval depression on ventrite II. However, the form of the aedeagus, with the deeply scoop-shaped parameres and the presence of only a right lateral process is unique.

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15 facets. Frontal margin of rostrum straight in dorsal view. Gular mound modified, as wide as long, broad anteriorly and rounded posteriorly; area of head posterior to gular mound flattened, slightly concave, nude, maxillary palpomere IV as long as head, narrow, widened at base and distal $\frac{1}{2}$ to $\frac{1}{3}$, v-shaped sensory patches present. Thorax: pronotum basal sulcus absent, lateral antebasal foveae present, median antebasal fovea reduced. Mesoventrite with median shield unmodified. Metaventrite afoveate,

median area broadly flattened, bearing short, fine setae, metacoxae separated by extension of ventrite I. Legs unmodified. Elytra with two basal foveae and single sutural fovea present; discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe. Ventrite I covered in dense, shining setae; ventrite II with basal sulcus occupying length of ventrite, sulcus densely

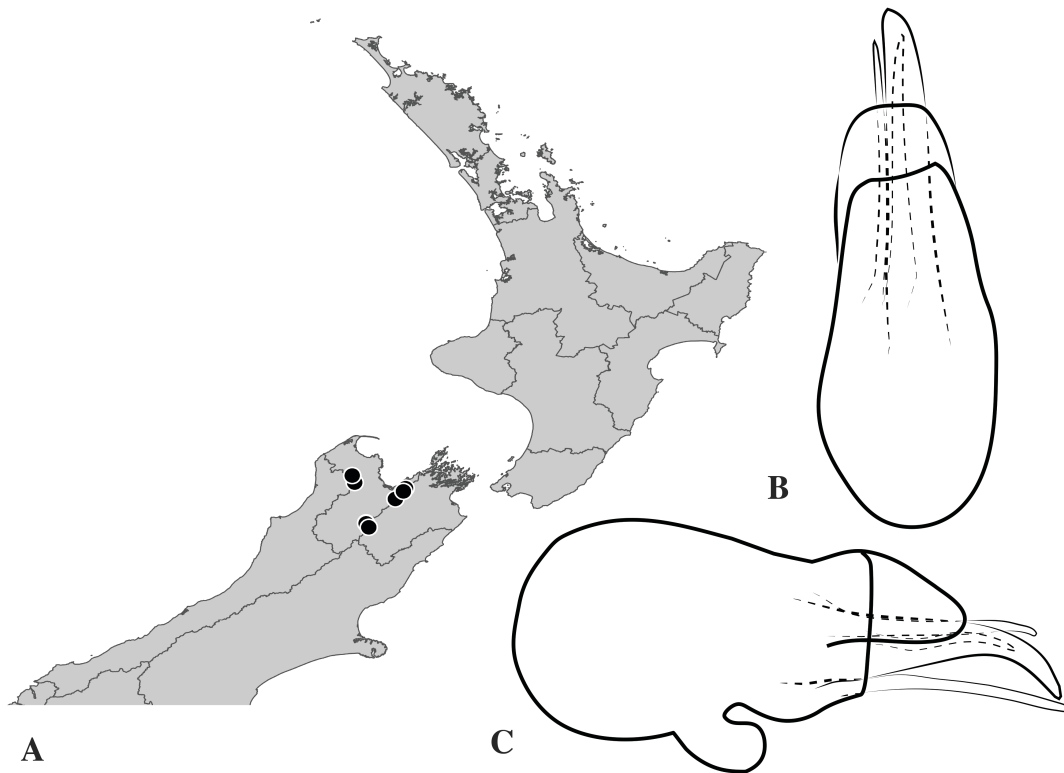


Figure 37. A) Map of localities where *Pselaphogenius* “*kalleri*” specimens have been collected; B) *Pselaphogenius* “*kalleri*” aedeagus, dorsal; C) *Pselaphogenius* “*kalleri*” aedeagus, lateral.

setose, deep oval median depression reaching apex, apex thickened into a tubercle bearing patch of fine, short setae. Genitalia: aedeagus asymmetrical. Median lobe short, simple. Lateral process only produced on right side of aedeagus, inner and outer process simple. Ventral process absent. Parameres large, deep and scoop shaped, almost completely encasing the terminal portion of the aedeagus in lateral view.

Females. Integument, Head, Thorax, Abdomen: Females are similar to male except eyes slightly smaller and ventrite II lacking median ovate depression.

Distribution. This species is only known from collection events in Marlborough (MB) near Black Birch Range and a single collection event from Buller (BR) near Mt. Robert.

Material examined. (4 males, 2 females) New Zealand: MB: Black Birch Ra., Mt. Altimarlock 1700 m, litter, 16 Feb 1970 G Kuschel, 70/121 (LSAM); (3 males, 7 females) New Zealand: MB: Black Birch Ra., Mt. Altimarlock 1700 m, litter, 16 Feb 1970 G Kuschel, 70/123;

(2 males) New Zealand: MB: Black Birch Ra., Mt. Altimarlock 1700 m, mats, 16 Feb 1970 G Kuschel, 70/125 (LSAM); (7 males, 5 females) New Zealand: MB: Black Birch Ra., Mt. Altimarlock 5550 m, mats, 16 Feb 1970 G Kuschel, 70/126 (LSAM). (1 male) NEW ZEALAND: BR: Nelson Lakes N.P., Mt. Robert, Relax Shelter 1420m, 41°50.2'S, 172°48.6'E, 1.xii.2005, alpine tussock herbfields; FMHD#2005-062, berl., debris at bases of tussocks, D. Clarke 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH, EtOH).



Figure 38. A) Map of localities where *Pselaphogenius 'lescheni'* specimens have been collected; B) *Pselaphogenius 'lescheni'* aedeagus, dorsal; C) *Pselaphogenius 'lescheni'* aedeagus, lateral.

3.3. *PSELAPHOPHUS*: REDECSRIPTION AND NOTES

Introduction. *Pselaphophus* Raffray, 1890 is represented in New Zealand by a single species, *Pselaphophus atriventris* (Westwood). This species is considered to be introduced to New Zealand (Klimazewski *et al.* 1996) from Australia. Notably, this is the only species of Pselaphini known to be shared between New Zealand and Australia, and the only species of Pselaphini in

New Zealand that is not a New Zealand endemic. Additionally, along with *Pselaphogenius* and *Pselaphaulax*, *Pselaphophus* is one of only three genera in the tribe that are shared between New Zealand and Australia. Globally, *Pselaphophus* is represented by a single species from New Guinea, as well four species from New Zealand and Australia in addition to *P. atriventris*: *Pselaphophus anopunctatus* (Schaufuss) *Pselaphophus bicolor* (Schaufuss), *Pselaphophus binodosus* Lea, and *Pselaphophus unicolor* Raffray.

In New Zealand, *Pselaphophus* is known on the North Island from Northland to Bay of Plenty, and on the South Island from Nelson. *Pselaphophus atriventris* is also listed in Emberson's study of the Coleoptera fauna of the Chatham Islands (1995). While adults have predominantly been collected in pasture habitats, additional specimens seen in the NZAC have been collected in a Malaise Trap, by splashing a stream bank, and from swampy habitats.

Interestingly, *P. atriventris* is one of only 18 species of Pselaphinae for which the larvae have been described (Carlton and Leschen 2008). Description of larvae was facilitated, in large part, by the high number of individuals collected during a three-year survey of pasture invertebrates conducted by Martin (1983) at a single site in Nelson. This study additionally yielded important information regarding seasonality (peak abundances in October–December for adults), and suggested that this species has a single generation per year, with larvae only being collected in late September through November.

While a detailed description of the larvae of *P. atriventris* is provided in Carlton and Leschen's work (2008), adults of this species have not been the focus of modern redescriptive efforts. A line drawing of the habitus and aedeagus of a male *P. atriventris* specimen are provided in Chandler's (2001) work on Australian Pselaphinae and are accompanied by a redescription of the genus based on a cleared male specimen. Here, I provide a redescription of the genus based on the type species (*P. atriventris*) and a redescription of the type species (and only species known from New Zealand), *Pselaphophus atriventris* (Westwood).

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

Specimens were obtained from the following institutions:

LSAM Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.

NZAC New Zealand Arthropod Collection, Landcare Research, Auckland, New Zealand.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by two-letter Crosby Codes (Crosby *et al.* 1998). Two slashes (“//”) are used to indicate label breaks. The number of sex and specimens is indicated preceding label data (i.e. “(2 males, 1 female)”), and lending institution is indicated following label data (i.e. “(NZAC)”).

Redescription of *Pselaphophus* Raffray, 1890.

Pselaphophus Raffray (1890: 139)

Type species: *Bryaxis atriventris* Westwood, 1870

Redescription. Males. Head: eyes rounded, composed of about 25 facets. Vertex convex; shallow sulcus beginning at base of vertex, extending to level of vertexal foveae; vertexal foveae large, set into margins of vertexal depression parallel to middle of eyes; vertexal depression widest between eyes, confluent with sulcus extending to apex of rostrum. Rostral sulcus bounded by lateral, flattened ridges extending to antennal acetabula. Frontal margin of rostrum in dorsal view slightly emarginate, with sparse, suberect setae. Antennal segment one as long as

antennomeres 2-3, antennae otherwise unmodified. Gular mound modified, rounded, broad anteriorly and posteriorly, wider than long, glabrous; area of head posterior to gular mound flattened, slightly concave, sometimes bearing flattened modified scales; gular foveae present, paired. Maxillary palpomere I elongate, 1/2 as long as palpomere II; palpomere II narrow, enlarged distally, shorter than head; maxillary palpomere III quadrate; maxillary palpomere IV shorter than head, barely pedunculate, widened along majority of length, v-shaped sensory patch present, margined by carina. Thorax: Pronotum widest at 1/2 length, narrowed anteriorly and posteriorly; basal sulcus present, delimited by lateral antebasal foveae, median antebasal fovea large. Prosternum in front of coxae slightly convex, anteriorly with modified flattened setae; lateral procoxal foveae present. Mesoventrite with median shield; lateral mesoventral foveae present in large cavities filled with dense setae, meeting internally; lateral mesocoxal foveae absent; median mesoventral foveae present, paired, meeting internally; mesocoxae narrowly separated by extension of meso- and metaventrite. Metaventrite afoveate, variously modified; metacoxae separated by extension of visible ventrite I. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present; apical fringe of setae present, dense. Abdomen: Tergites of usual form for tribe, otherwise unmodified; T2 without obvious basal foveae, lateral basal sulcus extending along width of ventrite, obscured by dense band of setae along posterior edge. Visible ventrite I covered in dense, shining setae; visible ventrite II variously modified with median depression; ventrites otherwise unmodified.

Females: similar to males except eyes may be smaller, composed of fewer facets; secondary sexual modifications of the second visible ventrite absent.

Comments. In New Zealand, *Pselaphophus* most closely resembles *Pselaphaulax* in the presence of an antebasal sulcus on the pronotum, and the well-developed median and lateral antebasal foveae. However, the form of the maxillary palpomere IV (basally broad in *Pselaphophus* and noticeably pedunculate in *Pselaphaulax*) can be used to easily distinguish the two. The form of the maxillary palpomere IV of *Pselaphophus* is most similar to *Pselaphotheseus* and *Pselaphopluteum*, although these genera are otherwise very different, morphologically.

Redescription of *Pselaphophus atriventris* (Westwood), 1870.

Bryaxis atriventris Westwood (1870: 125)
(See Figure 39)

Redescription. MALE. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: width between eyes equal to 1/2 length of head from base of vertex to apex of rostrum. Eyes large, composed of 25 facets. Frontal margin of rostrum in dorsal view slightly emarginate with sparse suberect setae. Gular mound modified, wider than long, broad anteriorly and posteriorly; area of head posterior to gular mound bearing dense flattened setae. Maxillary palpomere IV shorter than head, broad throughout length, v-shaped sensory patches present. Thorax: pronotum basal sulcus present, lateral antebasal foveae present, median antebasal fovea large. Mesoventrite with median shield unmodified. Metaventrite afoveate, slightly medially depressed, metacoxae narrowly separated by extension of visible ventrite I. Legs unmodified. Elytra with three basal foveae, sutural fovea present; discal stria and sutural striae present. Abdomen: Tergites of usual form for tribe. Visible ventrite I covered in dense, shining setae; visible ventrite II with basal sulcus occupying length of ventrite, sulcus densely setose, large shallow oval median depression extending length of ventrite. Genitalia:

aedeagus asymmetrical. Median lobe distally displaced towards left. Lateral processes absent. Ventral process straight and flattened, longer than median lobe, constricted distally to small, spatula-shaped extension. Parameres present, straight.

Females. Integument, Head, Thorax, Abdomen: similar to male except visible ventrite II lacking median ovate depression.

Distribution. In New Zealand, this species is known on the North Island from ND to BP, and on the South Island from NN and FD, as well as from the Chatham Islands. Australian representatives are mainly restricted to the southeastern portion of the continent.

Comments. Large series of *P. atriventris* are available in museum collections (NZAC and LSAM). This is atypical for many species of pselaphines and for many Pselaphini, in particular, which are often known from short series or singletons. Other genera of Pselaphini in NZ (i.e. *Pselaphaulax* and *Pselaphogenius*) possess species that are sympatric in distribution, and single collection events may contain multiple species. However, dissections of numerous individuals and careful examination of external characters of individuals within and across series of specimens have not yielded additional species of *Pselaphophus* in New Zealand.

Material examined. (10 males, 12 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture (10) 15 Dec 1965, G Hitchings (LSAM); (2 males, 4 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture (10) 2 Feb 1966, G Hitchings (LSAM); (3 males, 2 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture 28 Sep 1966, G Hitchings (LSAM); (2 males, 4 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture 11 Nov 1965, G Hitchings (LSAM); (5 males, 6 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture (10) 17 Nov 1965, G Hitchings (LSAM); (13 males, 11 females) New Zealand: NN: Pretty Bridge valley pit trap I pasture (10) 8 Dec 1965, G Hitchings (LSAM); (15 males, 14 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (10) 1965/66, G Hitchings (LSAM); (2 males) New Zealand: NN: Buller outlet, L. Rotoiti, 6069 m Moss, 30 Jun 1965 JI Townsend, 65/372 (LSAM); (21 males, 28 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 29 Dec 1965, G Hitchings; (4 males, 6 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 11 Nov 1965, G Hitchings (LSAM); (12 males, 7 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (10) 22 Dec 1965, G Hitchings (LSAM); (1 female) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 15 Dec 1965, G Hitchings (LSAM); (5 males, 1 female) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (10) 5 Jan 1966, G Hitchings (LSAM); (1 male) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 26 Oct 1965 (LSAM); (2 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 16 Jun 1966, G Hitchings (LSAM); (2 males, 3 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 2 Mar 1966, G Hitchings (LSAM); (1 male) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 21 Sep 1966 G Hitchings (LSAM); (3 males, 5 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (3) 16 Nov 1966, G Hitchings (LSAM); (1 male, 2 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 22 Dec 1965, G Hitchings (LSAM); (2 males, 7 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (10) 19 Jan 1966; G Hitchings (LSAM); (15 males, 10 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 24 Nov 1965, G Hitchings (LSAM); (3 males, 5 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 2 Feb 1966, G Hitchings (LSAM); (2 males 6 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 3 Nov 1965, G Hitchings (LSAM); (14 males, 16 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture (10) 26 Jan 1966, G Hitchings (LSAM); (5 males, 7 females) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 1965/66, G Hitchings (LSAM); (2 males, 2 females) New

Zealand: NN: Pretty Bridge Valley pit trap in pasture 27 July 1966, G Hitchings (LSAM); (1 male) New Zealand: NN: Pretty Bridge Valley pit trap in pasture 3 Aug 1966, G Hitchings (LSAM); (2 males, 3 females) New Zealand: Lake Tikapatu, Blue Lake, SE Rotorua, shoreline debris Berlese 5 Mar 2000 C Carlton, A Weir, #015 (LSAM); (1 female) New Zealand: NN: Cable Bay Rd 1st farm on left ex pasture, 30 Nov 1971 PG Fenemore (NZAC); (1 male) New Zealand: FD: Wilmot Pass, 630 m Litter, 23 Jan 1970 JI Townsend (NZAC).

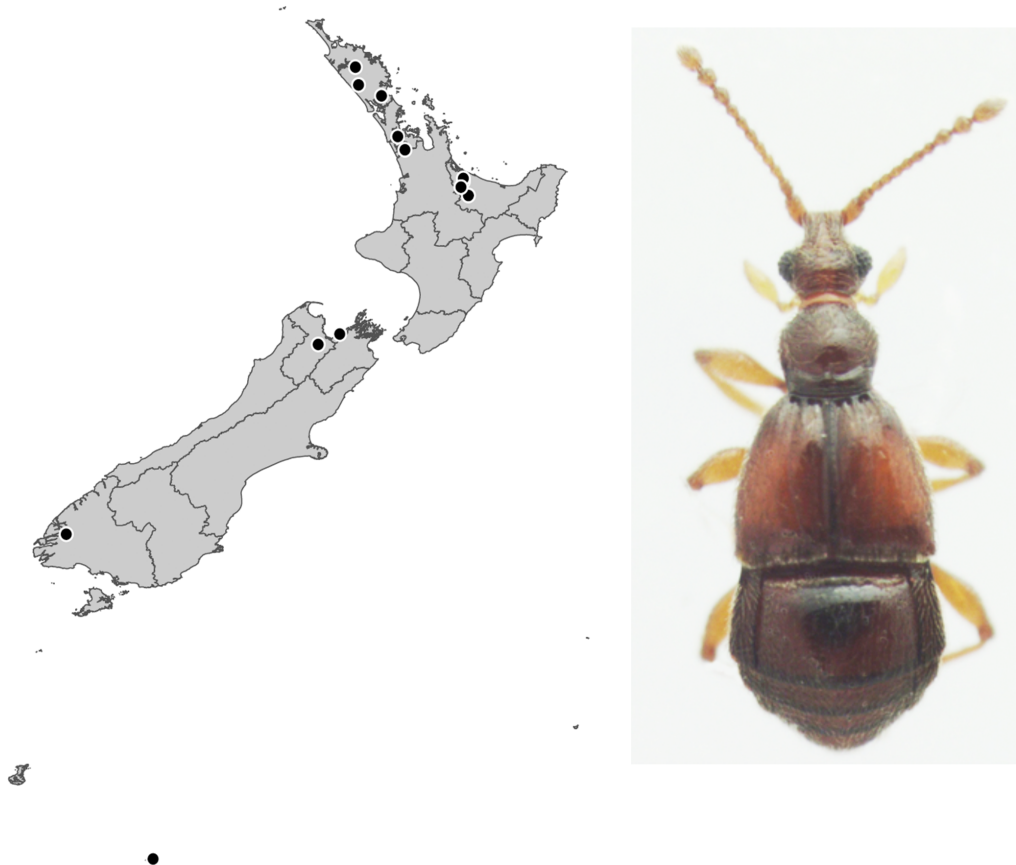


Figure 39. Map of localities where *Pselaphophus atriventris* Westwood specimens have been collected in New Zealand; habitus photograph.

3.4. ***PSELAPHOTHESEUS*: CLARIFICATION OF TYPE STATUS AND NOTES**

Pselaphotheseus Park is a genus of pselaphine staphylinid beetle endemic to Campbell Island, the southernmost of the Subantarctic Islands of New Zealand (Figure 40). The genus was originally monotypic, based on *Pselaphotheseus hippolytae* Park, 1964. Carlton and Leschen (2001) described a second species, *Pselaphotheseus ihupuku* Carlton and Leschen. The published version of that manuscript included holotype designations of two different specimens. As part of

an ongoing study to revise the tribe Pselaphini, in which *Pselaphotheseus* is placed, for the New Zealand region, the holotype status of *Pselaphotheseus ihupuku* is here clarified.

The Subantarctic Islands of New Zealand represent unique high latitude habitats comprising five island groups (Antipodes, Auckland, Bounty, Campbell, and Snares) located on the Campbell Plateau. Of these, Campbell Island is the most southerly (insert 52°33'S 169°08'E). The description of the genus *Pselaphotheseus* Park, 1964 within the Tribe Pselaphini (Pselaphinae: Pselaphitae) from Campbell Island, represented one of the most southerly records for the subfamily Pselaphinae (Carlton and Leschen 2001).



Figure 40. *Pselaphotheseus ihupuku* Carlton and Leschen.

The genus *Pselaphotheseus* was initially described based on a single species: *Pselaphotheseus hippolytae* Park (Park 1964). This was the first genus described in the tribe Pselaphini from New Zealand since Thomas Broun's work during the late 19th/early 20th centuries, and the first New Zealand endemic genus described in the tribe. More recently, a second species, *Pselaphotheseus ihupuku* Carlton and Leschen, was described, and its occurrence in sympatry with *P. ihupuku* on Campbell Island was discussed (Carlton and Leschen 2001). Since that paper, no further genera in the tribe have been described from Campbell Island, although current efforts by the author to revise the Pselaphini of the New Zealand region have revealed additional taxa on nearby Auckland Island (unpub. data).

Carlton and Leschen's publication in the New Zealand Journal of Zoology included erroneous designations of two different specimens as holotypes of *P. ihupuku*. Both specimens

were examined during the study, and the first mentioned specimen (p. 387), a point-mounted male with verbatim label data, “NEW ZEALAND, CA, Campbell Is., Beeman Hill, 20 m, 7 Mar 2000, M. Bullians, E. Edwards, R. Leschen, *Dracophyllum* leaf litter, SUB 013, 52°32’S, 169°08’E”, was determined to be the holotype. The second specimen (p. 388) is relegated to paratype status. It is a point-mounted male with verbatim label data, “Campbell I., Beeman Cove, 26 Feb 1981, G. W. Ramsay and T. K. Crosby, tidal debris, 81/36, Paratype (Owens and Carlton 2019), erroneously designated as holotype (Carlton and Leschen 2001)”. Both specimens are morphologically identical and originated at the type locality, so no uncertainty exists about their taxonomic identities. Both specimens are deposited in the New Zealand Arthropod Collection (NZAC, Auckland, New Zealand).

3.5. DESCRIPTION OF THE GENUS *PSELAPHOTUMULUS*

Introduction. *Pselaphotumulus* Owens and Carlton, gen. nov., is described as the sixth genus in the tribe Pselaphini known from New Zealand. Three new species are described: *Pselaphotumulus aorerei*, sp. nov.; *Pselaphotumulus dubius*, sp. nov.; and *Pselaphotumulus unus*, sp. nov. Three species, *Pselaphus cavelli* (Broun) 1893, *Pselaphus oviceps* (Broun) 1917 and *Pselaphus urquharti* (Broun) 1917 are transferred to *Pselaphotumulus*, nov. combs. Lectotypes from type series in the New Zealand Broun Collection (Natural History Museum, London) are designated for these three species. Habitus photographs, distributional maps, and line drawings of diagnostic characters are provided for each species. A key to species is provided. Searches of museum collections have not yielded representatives outside of New Zealand, suggesting that is the first endemic genus in the tribe Pselaphini described from the New Zealand’s main islands, specifically, South Island. *Pselaphotumulus* species exhibit restricted distribution patterns that approximately coincide with the Pacific/Indo Australian Plate boundary.

The supertribe Pselaphitae is well represented in both tropical and temperate regions (Newton and Chandler 1989). Within this group, the tribe Pselaphini exhibits high levels of generic and species diversity in the Australian, Oriental, and Western and Eastern Palearctic regions, while the Neotropical fauna is notably depauperate. A generic revision of the tribe in Australia (Chandler 2001) resulted in the description of five new genera from the region, including four monotypic to Australia as a result of the transfer of several species previously placed in the paraphyletic genus *Pselaphus* Herbst. Currently, five genera of Pselaphini are described from New Zealand (NZ) (Nomura and Leschen 2006). About one-third of the NZ species described in the genus *Pselaphus* will be transferred to *Pselaphaulax*, and the remainder will be reassigned among several newly described genera and the genus *Pselaphogenius* (first author, unpublished data). As a part of the current efforts towards a resolution of the tribe in NZ we describe a new genus, *Pselaphotumulus*, bringing the total number of genera of Pselaphini in NZ to six.

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

Specimens were obtained from the following institutions:

JN	John Nunn, personal collection, Dunedin, New Zealand.
LSAM	Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.

NHM Natural History Museum, London, United Kingdom.

NZAC New Zealand Arthropod Collection, Landcare Research, Auckland, New Zealand.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by two-letter Crosby Codes (Crosby *et al.* 1998). Two slashes (“//”) are used to indicate label breaks. The number of sex and specimens is indicated preceding label data (i.e. “(2 males, 1 female)”), and lending institution is indicated following label data (i.e. “(NZAC)”). All type specimens are deposited in the NHM or NZAC as indicated.

Description of *Pselaphotumulus* Owens & Carlton, gen. nov.

Type species. *Pselaphotumulus cavelli* (Broun), 1893
(Figures 41, 42)

Etymology. The genus name is derived from the combination of the prefix “pselaph-” which is commonly used for genera within the tribe Pselaphini, and “tumulus”, the Latin word for mound, referring to the broad, mound-like form of the gular process found in all species of this genus.

Diagnosis. MALES. Head: eyes rounded, composed of 10–20 facets. Vertex convex; shallow sulcus beginning at base of vertex, extending to level of vertexal foveae; vertexal foveae large, set into margins of vertexal depression parallel to middle of eyes; vertexal depression widest between eyes, confluent with sulcus extending to apex of rostrum. Rostral sulcus bounded by lateral, flattened ridges extending to antennal acetabula. Frontal margin of rostrum in dorsal view typically pointed, bearing patch of modified, flattened setae. Antennal scape as long as antennomeres 2–3, antennae otherwise unmodified. Gular mound modified, slightly rounded, glabrous, expanded to occupy most of underside of head; area of head posterior to gular mound flattened, nude, gular foveae present, paired. Maxillary palpomere I elongate, 1/2 as long as palpomere II; palpomere II narrow, enlarged distally, shorter than head; maxillary palpomere III quadrate; maxillary palpomere IV typically longer than head, widened in distal 1/3–1/4, apical area smooth to slightly roughened, v-shaped sensory patch present. Thorax: pronotum widest at midpoint, narrowed anteriorly and posteriorly; basal sulcus present, delimited by lateral antebasal foveae, median antebasal fovea present, variable in size, basolateral foveae absent or reduced to small depressions. Prosternum in front of coxae slightly convex, anteriorly with modified flattened setae; lateral procoxal foveae present. Mesoventrite with median shield bearing patch of spongy setae posteriorly towards margin of mesocoxae; lateral mesoventral foveae present in large cavities filled with dense setae, meeting internally; lateral mesocoxal foveae absent; median mesoventral foveae present, paired, meeting internally; mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, produced medially into bulge with median depression, parallel lateral sulci bearing modified setae; metacoxae separated by metacoxal process of ventrite I. Elytra with two basal foveae, single sutural fovea; discal striae absent, sutural striae present; sparse apical fringe of setae present. Abdomen: tergites of usual form for tribe, unmodified; T2 without obvious basal foveae, lateral basal sulcus extending along width of ventrite, obscured by dense band of setae along posterior edge. Ventrite I covered in dense, shining setae; ventrite II with flattened area medially, apically with small median tubercle; ventrites otherwise unmodified.

Females: similar to males except eyes may be smaller, composed of fewer facets; secondary sexual modifications of the second visible ventrite reduced.

Comments. Prior to this study, the most recent new genus of Pselaphini described from NZ was *Pselaphotheseus* Park 1964 from Campbell Island. Aside from the recognition of

Pselaphaulax Reitter from the North and South Islands, *Pselaphotumulus* is the first new genus record noted and the first new genus described from the NZ mainland (Figure 41). This genus is



Figure 41. Dorsal habitus, *Pselaphotumulus* sp.

apparently endemic to NZ. Species in *Pselaphotumulus* are united primarily by the following characters: 1) the frontal margin of the rostrum pointed with a patch of spongy setae, 2) modification of a gular process into a glabrous, “mound-like” form that occupies almost the entire gular area (Figure 42), 3) the presence of an antebasal sulcus on the pronotum margined by laterobasal foveae, 4) the median antebasal fovea present with basolateral foveae present as small depressions, 5) the mesoventrite with a median shield bearing a posterior patch of setae (Figure 42), 6) the metaventrite produced medially into bulge with median ovate sulcus, lateral margins

of sulcus sometimes with spongy setae, and 7) the absence of discal striae on the elytra. In NZ, this genus most closely resembles *Pselaphaulax*, however the latter lacks the spongy patch on the apex of the rostrum, the broadly expanded gular mound, and the setose sulci on the metaventre. Visually, these two genera may be easily separated by the previously mentioned characters, although they occur in similar habitats and both overlap in distribution on the South Island. Undescribed species likely exist and may be discovered with additional sampling.

Currently, species of *Pselaphotumulus* are known only from the South Island. No specimens have been observed from collection localities on the North Island or on offshore island groups with distinct faunas, such as the Chathams or the subantarctic islands. This exclusively South Island distribution is not typical of other mainland genera of NZ Pselaphini (*Pselaphaulax*, *Pselaphogenius*, *Pselaphophus*), which may be found on both the North and South Islands.

Checklist of *Pselaphotumulus* species.

Pselaphotumulus Owens & Carlton, gen. nov.

Type species. *Pselaphotumulus cavelli* (Broun), 1893

Distribution. South Island NZ: BR, FD, MC, MK, NC, NN, WD.

Number of species. Six.

Pselaphotumulus aorerei Owens & Carlton, sp. nov.

Type depository. NZAC.

Distribution. NZ: NN.

Pselaphotumulus cavelli Broun (1893)

Pselaphus cavelli (Broun 1893: 1414)

Type depository. NHM.

Distribution. NZ: BR, NN.

Pselaphotumulus dubius Owens & Carlton, sp. nov.

Type depository. NZAC.

Distribution. NZ: FD.

Pselaphotumulus oviceps (Broun 1917), comb. nov.

Pselaphus oviceps Broun (1917: 380).

Type depository. NHM.

Distribution. NZ: BR, FD, NN, WD.

Pselaphotumulus unus Owens & Carlton, sp. nov.

Type depository. NZAC.

Distribution. NZ: NC, WD.

Pselaphotumulus urquharti (Broun 1917), comb. nov.

Pselaphus urquharti Broun (1917: 379)

Type depository. NHM.

Distribution. NZ: BR, FD, MC, MK, NC, WD.

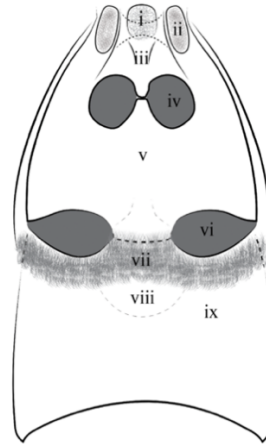
Key to the species of *Pselaphotumulus* (males). Unlike many genera of Pselaphini, *Pselaphotumulus* males exhibit external morphological characters useful for species-level identification. While the form of the male genitalia may be used exclusively for identification, reliance upon secondary sexual characters in males can aid identification without dissection. Due to the absence of observable external or genitalic characters, identification of females is only possible via association with male specimens.

- | | | |
|------|---|---|
| 1 | Metaventricle tumosity with two lateral patches of spongy setae..... | 2 |
| 1' | Metaventricle otherwise modified, not with two lateral patches of spongy setae..... | 3 |
| 2(1) | Ventricle II flattened medially, apical margin produced into small tubercle..... | |
| | <i>P. oviceps</i> (Broun 1917), comb. nov. | |
| 2' | Ventricle II with two lateral carinae along median depression..... | |
| | <i>P. urquharti</i> (Broun 1917), comb. nov. | |

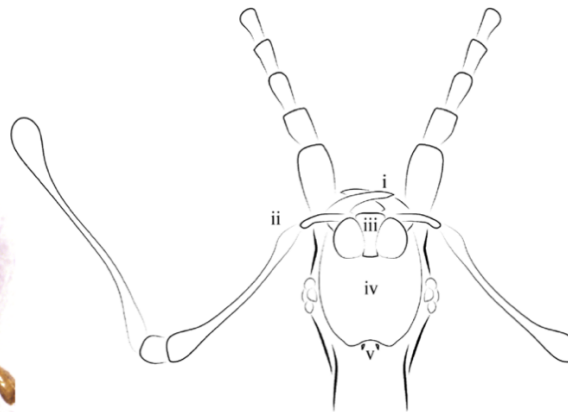
42.



b)



c)



d)

Figure 42. *Pselaphotumulus* sp. key characters. a) *Pselaphotumulus* male meso- and metaventricle and first and second ventrites; b) *Pselaphotumulus* male meso- and metaventricle and first and second ventrites, i) anterior setose patch on mesoventral shield, ii) lateral mesocoxal foveae, iii) mesoventral shield, iv) mesocoxal cavities, v) mesoventricle, vi) mesocoxal cavities, vii) dense setae covering first ventricle and base of second ventricle, viii) median ovate depression on second ventricle, ix) second ventricle; c) *Pselaphotumulus* gular region; d) *Pselaphotumulus* gular region i) mandibles, ii) maxillary palpi, iii) labrum, iv) gular mound, v) paired gular foveae.

- 3(1') Metaventricle tumosity with single median patch of spongy setae.....
.....*P. unus* Owens & Carlton, sp. nov.
- 3' Metaventricle tumosity otherwise modified, not with single median patch of spongy setae.....4
- 4(3) Metaventricle flattened medially, forming shining ovate depression margined posteriorly by short setae.....*P. dubius* Owens & Carlton, sp. nov.
- 4' Metaventricle formed as a rounded tumosity.....5
- 5(4') Metaventricle with two patches of shortened setae posteriorly.....
.....*P. cavelli* (Broun) 1893
- 5' Metaventricle with two low lateral tubercles, posteriorly.....
.....*P. aorerei* Owens & Carlton, sp. nov.

Pselaphotumulus aorerei Owens and Carlton, sp. nov.
(Figures 43a, 46a, 47a–b)

Type Material. Holotype: (1 male) Aorere Valley, Collingwood, Nelson 18.iv.63 J.I.Townsend (NZAC). The holotype specimen is deposited in the NZAC.

Etymology. This species is named after the collection locality of the type series in the Aorere Valley.

Diagnosis. Externally, the combination of the metaventricle tumosity bearing two low lateral tubercles and ventricle II bearing two small lateral rows of punctures distinguishes this species from all others in the genus. The absence of basolateral foveae in combination with the smaller enlarged distal area of maxillary palpomere IV (enlarged in distal ¼ versus distal 1/3) are also unique. Additionally, the form of the aedeagus is diagnostic, particularly the form of the hook-shaped median lobe.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 14 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, widened at base and distal 1/4, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present. Mesoventricle with median shield bearing patch of spongy setae in small concavity posteriorly. Metaventricle tumosity with two low, lateral tubercles posteriorly. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Ventricle II bulging in distal 1/3, with two lateral rows of fine punctures. Genitalia: aedeagus asymmetrical. Median lobe hook-shaped. Ventral process curved to the right. Dorsal process well-developed. Lateral parameres present, paired, as long as median lobe.

Females. Unknown.

Distribution. *Pselaphotumulus aorerei* is known only from the type locality and a second collection event, both in NN.

Material Examined. (2 males) New Zealand NN Scotts Hill Lookout Kohaihai// Sifted forest litter 2 Jan 2011 (JN).

Pselaphotumulus cavelli (Broun), 1893
(See Figs. 43b, 46b, 47c–d)

Type Material Examined. After observing the type series of *Pselaphus cavelli* in the NHM and reviewing Broun's original description, we designate the following specimen from the NHM as the lectotype: (1 male) TYPE (red/orange label)// 2642.// Charleston Westland// New Zealand Broun Coll. Brit. Mus. 1922–482 (designated lectotype). The additional specimen in the type series is a female specimen that is also a member of the species *P. cavelli*, collected from the same locality as the lectotype and is hereby designated as a paralectotype. Lectotype designations are necessary to fix the taxon to a name bearing type. Broun did not specifically identify type specimens, and many of his syntype series include multiple species. All lectotype and paralectotype specimens are deposited in the NHM.

Diagnosis. *Pselaphotumulus cavelli* may be distinguished from other species in the genus via the combination of a bilobed dorsal and median process of the aedeagus.

Description. MALE lectotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 14 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, widened at base and distal 1/4, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present, basolateral foveae present as small depressions. Mesoventrite with median shield bearing patch of spongy setae in small concavity posteriorly. Metaventricle tumosity bearing two small tufts of setae posteriorly. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Visible ventrite II slightly flattened medially throughout length. Genitalia: aedeagus symmetrical. Median lobe short, blunt. Ventral process broadly bilobed, with small striae apically. Ventral process associated with median lobe short, bilobed. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and metaventricle and visible ventrite II evenly rounded, lacking secondary sexual characters.

Distribution. This species is known from localities in BR and NN.

Material Examined. BR: (1 male, 1 female) New Zealand: BR: 0.8kmN Bullock Ck nr. Punakaiki 50m 23.iii.80 broadl-f-nikau palm-podocp. A. Newton, M. Thayer// berl., leaf & log litter, forest floor (FMNH); (2 specimens) New Zealand BR Mt Robert nr car park 12-ii-2014// Sifted ground litter, Nothofagus forest (JN); (1 male, 2 females) New Zealand: WD 1.8km n Punakaiki, 50m 19.xii.1984-20.i.1985 hdwd.-podo.-nikau for A. Newton/ M. Thayer 719// berl., leaf & log litter, forest floor (FMNH). NN: (1 male) New Zealand: NN: Nelson Lakes NP, N slope Mt. Robert 860m 23-26.iii.80 Nothofagus spp. A. Newton, M. Thayer// berl., leaf & log litter, forest floor (FMNH); (3 specimens) New Zealand NN Taffytown Hill smt nr Little Wanganui 29-Jan-96// In forest litter (JN); (4 specimens) New Zealand NN Fenian Tck Oparara 26-iii-2011// Ground litter, red beech forest (JN); (1 male) L. Rotoiti 2800' leaf litter 21-3-65 N.A.Walker (NZAC); (4 males, 2 females) New Zealand, NN, Denniston Saddle 10 Feb 1999, R. Leschen R. Hoare// Berlesate *Nothofagus* forest RL288 41°44'S, 171°48'E (NZAC); (2 males) Rotoiti// A.E. Brookes Collection (NZAC).

43.

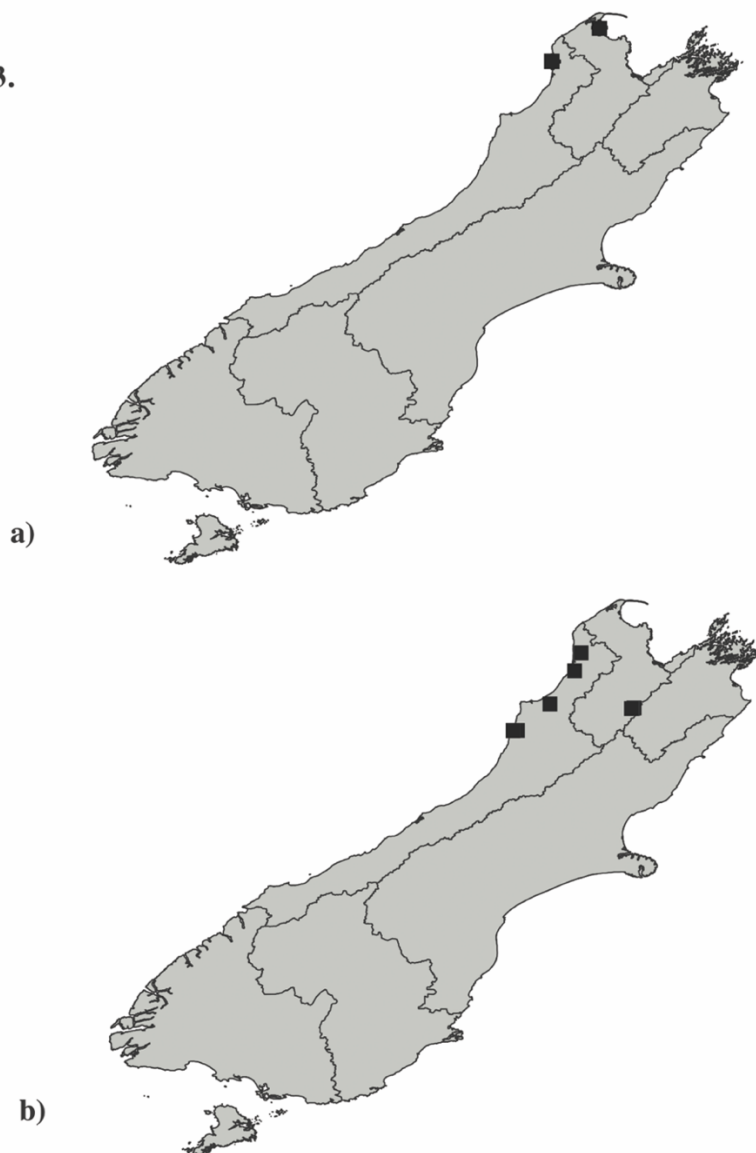


Figure 43. Localities where a) *Pselaphotumulus aorerei* and b) *Pselaphotumulus cavelli* have been collected.

Pselaphotumulus dubius Owens and Carlton, sp. nov.
(See Figures 44a, 46c, 47e–f)

Type Material. Holotype: (1 male) Doubtful Sound 1578A 5/4 1953 R. Hornabrook (NZAC).
Paratypes: (2 males, 4 females) holotype locality and collection data (NZAC). The holotype and paratype specimens are deposited in the NZAC.

Etymology. The specific epithet is Latin for “doubtful”, referring to Doubtful Sound, the collection locality of the type series.

Diagnosis. Externally, the combination of the metaventrite depressed medially into a glabrous ovate depression and visible ventrite II medially flattened, bearing a small apical tubercle distinguishes this species from all others in the genus. Additionally, the larger enlarged distal area of maxillary palpomere IV (enlarged in distal 1/3 versus 1/4), distinguishes this species from all other *Pselaphotumulus* except for *P. oviceps*. The form of the symmetrical aedeagus with paired, symmetrical, branched dorsal processes is also diagnostic.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 13 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, wider at base and distal 1/3, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present, basolateral foveae present as small depressions. Mesoventrite with median shield bearing patch of spongy setae in small posterior concavity. Metaventrite depressed medially into glabrous ovate depression, posteriorly with fringe of short, suberect setae. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Ventrite II slightly flattened medially, apically with small median tubercle. Genitalia: aedeagus symmetrical. Median lobe short, blunt, barely exceeding length of basal bulb. Ventral process slightly ventrally curved, about as long as median lobe. Paired dorsal processes symmetrical, branching into three small distal processes. Parameres present, longer than median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and metaventrite and ventrite II evenly rounded, lacking secondary sexual characters.

Distribution. This species is only known from the type locality in FD.

Pselaphotumulus oviceps (Broun 1917), comb. nov.

Pselaphus oviceps Broun (1917: 380)

(See Figures 44b, 46d, 47g–h)

Type Material Examined. After observing the type series of *Pselaphus oviceps* in the NHM and reviewing Broun’s original description, we designate the following specimen from the NHM as the lectotype: (1 male) TYPE (red/orange paper)// 3832.♂// New Zealand Broun Coll. Brit. Mus. 1922–482// Routeburn 16-2-1914 (NHM) (designated lectotype). The following three specimens are included in the type series in the NHM and have been determined to represent additional specimens of *P. oviceps*. We designate these as the paralectotypes: (1 male) New Zealand Broun Coll. Brit. Mus. 1922–482// 3832.♂// Routeburn 16-2-1912// Nov. Gen. oviceps Br. Cl. Besuchet det v 1968 (NHM) (designated paralectotype); (1 male) 3832.// New Zealand Broun Coll. Brit. Mus. 1922–482// Hollyford 19-2-1914 (NHM) (designated paralectotype); (1 female) 3832// Hollyford 19-2-1914// New Zealand Broun Coll. Brit. Mus. 1922–482 (NHM) (designated paralectotype). Lectotype designations are necessary to fix the taxon to a name bearing type. Broun did not specifically identify type specimens, and many of his syntype series include multiple species. The lectotype and paralectotype specimens are deposited in the NHM.

Diagnosis. Externally, the two lateral patches of spongy setae of the metaventrite distinguishes this species from all other *Pselaphotumulus* except for *P. urquharti*. The combination of the secondary sexual characters on the metaventrite in combination with the form of medially flattened ventrite II and apical tubercle of ventrite II are unique. The form of the aedeagus, with paired dorsal processes, each of which possess three branches, in combination with a flattened ventral process that is distally bilobed, is also diagnostic.

Redescription. MALE lectotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 13 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, widened at base and distal $\frac{1}{3}$, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present, basolateral foveae present as small depressions. Mesoventrite with median shield bearing patch of spongy setae in small concavity posteriorly. Metaventrite tumosity with two lateral patches of spongy setae. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Ventrite II flattened medially, apically with small median tubercle. Genitalia: aedeagus symmetrical. Median lobe short, distally narrowed. Dorsal processes paired, symmetrical, with three branches. Ventral process flattened, broadly bilobed at apex. Parameres present, paired, slightly longer than dorsal and ventral processes.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and metaventrite and visible ventrite II evenly rounded, lacking secondary sexual characters.

Distribution. This species is known only from collection localities in the South Island: BR, FD, NN, and WD.

Material examined. BR: (1 male, 2 females) NEW ZEALAND: NN: Nelson Lakes N.P., Mt. Robert, Speargrass Track, 875m, 41°49.469'S, 172°48.311'E, 17.xii.2005-110, berl., leaf & log litter, A Solodovnikov, D. Clarke, et al.; ANMT site 1161 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH). FD: (1 male) New Zealand: FD: Hidden Falls, Lower Hollyford R. Litter, 6 Jan 1967 AK Walker, 67/3 (LSAM); (3 males, 3 females) New Zealand: FD: Hollyford Tr, #109 44°42'S 168°08' E/ Nothofagus coastal forest flood debris 22 Jan 1998 C. Carlton, R. Leschen (LSAM); (1 male slide-mounted, 1 female) New Zealand: FD: Hollyford Tr, #110 44°42'S 168°08'E/ Nothofagus coastal forest leaf litter berlese, 22 Jan 1998 C. Carlton, R. Leschen (LSAM); (2 males) New Zealand: FD: L. Howden fork Key Summit, 720 m, litter 14 Dec 1966, 66/522 AK Walker, KZ Wilson (LSAM); (1 male) New Zealand: FD: Milford Rd Tutoko River, #112 44°41'S 167°56'E/ Coastal forest leaf litter berlese, 22 Jan 1998 C. Carlton, R. Leschen (LSAM); (1 male) New Zealand: FD: Milford Sound Litter, 1 Nov 1966 JI Townsend, 66/359 (LSAM); (1 male) New Zealand: FD: Murchison Mts., Point Burn, litter, 11 Dec 1972 AC Eyles, 72/272 (LSAM); (1 female) New Zealand: FD: Wilmot Pass, 400 m Litter, 23 Jan 1970 JI Townsend, 70/145 (LSAM); (3 males, 2 females) New Zealand: FD: Wilmot Pass, 450 m Litter, 23 Jan 1970 JI Townsend, 70/73 (LSAM); (1 male) New Zealand: FD: Wilmot Pass, 900 m, litter, 23 Jan 1970 GW Ramsay, 70/75 (LSAM); (1 male, 1 female) New Zealand: South Is. Fiordland, Hollyford Tr. Nothofagus/coastal forest flood debris, 20 Jan 1998 C Carlton, R Leschen, #109 (LSAM); (2 males) New Zealand FD Bauza Is. Doubtful Sd March 1986// Pitfall trap G M Bremner (JN). (2 males) New Zealand FD 400 m S of Borland Sdl 28 Jan 2011//

44.

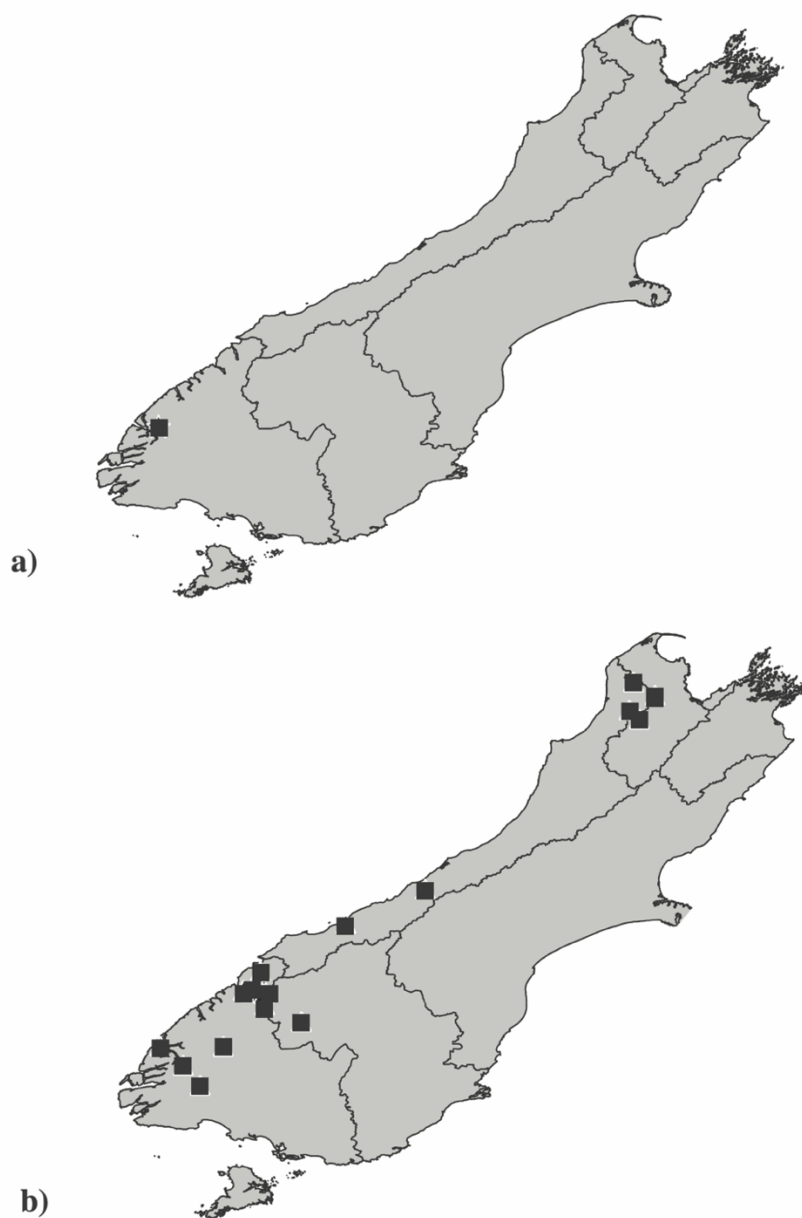


Figure 44. Localities where a) *Pselaphotumulus dubius* and b) *Pselaphotumulus oviceps* have been collected.

Washed soil sample beach forest (JN); (2 males) Hollyford Valley, N. of L. Wakikarou Southland// T.Hall 19.2.1914 (NZAC). NN: (5 males, 2 females) NEW ZEALAND: NN: Kahurangi N.P., Mt. Arthur Track, below Mt. Arthur Hut, 1200m, 28.xi.2005, *Nothofagus* forest;

FMHD#2005-048, berl., dead wood, D. Clarke; ANTM site 1157 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); (3 males, 1 female) NEW ZEALAND: NN: Kahurangi N.P., Cobb Ridge, above Cobb Reservoir, 1050m, 41°06.351'S, 172°41.658'E, 29.xi.2005, *Nothofagus menzeisii* & *N. solandri cliffortioides* forest; FMHD#2005-055, berl., sifted dryish moss on ground & rocks, A. Newton; ANMT site 1159 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH). WD: (2 males, 1 female) New Zealand: WD 3.2 km NE Haast, 14m Haast River Walk 43°52'S 169°03'E, #072// *Nothofagus/Podocarp* forest leaf litter berlese, 17 Jan 1998 (LSAM); (2 males, 1 female) New Zealand: WD 2 km SE Fox Glacier 225 m, #066 43°29'S 170°01'E// *Weinmannia/Metrosideros* leaf litter berlese, 16 Jan 1998 (LSAM); (1 male) New Zealand WD Taipo River Rd Taramakau Vly// sifted ground moss berlesate (JN).

Pselaphotumulus unus Owens and Carlton, sp. nov.
(See Figures 45a, 46e, 47i–j)

Type Material Examined. Holotype: (1 male) New Zealand: NC, 3km N Arthur's Pass, 900m 42°55'S 171°33'E, #042// *Nothofagus/Dracophyllum* leaf litter Berlese, 11 Jan 1998 C. Carlton, R. Leschen (NZAC). The holotype is deposited in the NZAC.

Etymology. The specific epithet “unus” is derived from the Latin word for “one”, referring to the presence of a single median longitudinal patch of spongy setae on the metaventrite of males of this species.

Diagnosis. Externally, the combination of the metaventrite with a single median, longitudinal patch of spongy setae and ventrite II medially impressed with two short carinae in distal 1/3 distinguishes this species from all others in the genus. Additionally, the aedeagus of *P. unus* is unique among species in the genus in the combination of a median lobe with the distal end narrowed and curved upwards, and a ventral process sharply narrowed and curved downwards, distally.

Description. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 13 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, wider at base and distal 1/4, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present, basolateral foveae present as small depressions. Mesoventrite with median shield bearing patch of spongy setae in small concavity posteriorly. Metaventrite bearing single median patch of spongy setae. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Visible ventrite II shallowly impressed medially, with two short carinae in distal 1/3. Genitalia: aedeagus asymmetrical. Median lobe with distal end narrowed and curved upwards. Ventral process sharply narrowed and curved downwards, distally, about as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller, metaventrite and visible ventrite II evenly rounded, and lacking secondary sexual characters.

Distribution. *Pselaphotumulus unus* is known from the type locality in NC, and several localities in WD.

Material Examined. NC: (1 male, 1 female) New Zealand: NC: Arthur's Pass NP, Bealey Vy. Tr. 840m 18-21.iii.80 sub-alpine Nothofagus A. Newton, M. Thayer// berl., leaf & log litter, forest floor (FMNH). WD: (2 males, 2 females) New Zealand: WD: L. Mahinapua Scen. Res. 30m 16-22.iii.1980 podocarp-mixed broadleaf A. Newton, M. Thayer// berl., leaf & log litter (FMNH). (2 males, 1 female) New Zealand: WD: Hokitika R. Gorge, S Kowhitirangi 100m 17.iii.1980 podocarp-broadlf. A. Newton, M. Thayer// berl., leaf & log litter, forest floor (FMNH). (2 males, 3 females) New Zealand: WD Okuku Scenic Reserve, 9.2km sse Kumara, 120m, 8-19.i.1985 podocarp-hdwd. Forest A. Newton/ M. Thayer 731;// berl., leaf & log litter, forest floor (FMNH).

Pselaphotumulus urquharti (Broun 1917), comb. nov.

Pselaphus urquharti Broun (1917: 379)

(See Figures 45b, 46f, 47k-l)

Type Material Examined. After observing the type series of *Pselaphus urquharti* in the NHM and reviewing Broun's original description, we designate the following specimen from the NHM as the lectotype: (1 male) TYPE (red/orange paper)// 3831.♂// Oakden 23-9-1913// New Zealand Broun Coll. Brit. Mus. 1922-482 (NHM) (designated lectotype). The following three specimens are included in the type series in the NHM and have been determined to represent additional specimens of *P. urquharti*. We therefore designate these as paralectotypes: (1 male) 3831.♂// New Zealand Broun Coll. Brit. Mus. 1922-482// Oakden 23-9-1913 (NHM) (designate paralectotype); (1 male) 3831// New Zealand Broun Coll. Brit. Mus. 1922-482// Algidus 25-9-1913 (NHM) (designate paralectotype); (1 female) 3831// New Zealand Broun Coll. Brit. Mus. 1922-482// Oakden 23-9-1913 (NHM) (designate paralectotype). Lectotype designations are necessary to fix the taxon to a name bearing type. Broun did not specifically identify type specimens, and many of his syntype series include multiple species. Lectotype and paralectotype specimens are deposited in the NHM.

Diagnosis. This species may be distinguished from all others in the genus except *P. oviceps* by the presence of two lateral patches of spongy setae on the metaventricle. This secondary sexual character, in combination with the presence of two, median lateral carinae on visible ventrite II, is unique among *Pselaphotumulus* species. This species may also be identified by the form of the aedeagus with both the ventral process and the median lobe simple, straight.

Redescription. MALE holotype. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in colour. Head: wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 13 facets. Frontal margin of rostrum in dorsal view pointed, with apical patch of modified, flattened setae. Gular area glabrous and mound-like, occupying most of gular area, gular foveae present. Maxillary palpomere IV longer than head, widened at base and distal 1/4, v-shaped sensory patches present. Thorax: pronotum with basal sulcus present, delimited by lateral antebasal foveae; median antebasal fovea present, basolateral foveae present as small depressions. Mesoventrite with median shield bearing patch of spongy setae in small concavity posteriorly. Metaventricle tumosity with modified spongy setae set into parallel sulci. Legs unmodified. Elytra with two basal foveae present, single sutural fovea; sutural striae present; apical fringe of setae sparse. Abdomen: tergites of usual form for tribe. Visible ventrite II slightly flattened medially, bearing two lateral carinae along margin of medial area. Genitalia: aedeagus symmetrical. Median lobe short, internal elements extending above sclerotized shelf. Ventral

process simple, about as long as median lobe. Parameres present, paired, about as long as median lobe and ventral process.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and metaventricle and visible ventrite II evenly rounded, lacking secondary sexual characters.

Distribution. This species has been collected from localities in BR, FD, MC, MK, NC, and WD.

Material Examined. BR: (1 male) New Zealand: BR: Paparoa Ra., 929 m, L. nr Mt. Priestly, litter, 69/241 10 Dec 1969, J McBurney (LSAM); (1 male) Pororari R. Westland 17-3-49// A.E. Brookes Collection (NZAC); (1 male, 1 female) Hokitika R. Gorge, S Kowhitirangi 100m 17.iii.1980 podocarp-broadlf. A. Newton, M. Thayer/ berl. Leaf & log litter, forest floor (FMNH). FD: NEW ZEALAND: FD: Fiordland N.P., Borland Rd., Borland Saddle vic., 980m, 45°44.81'S, 167°22.88'E, 10.xii.2005, *Nothofagus menziesii* forest in ravine; FMHD#2005-090, berl., leaf & log litter, A. Newton; ANMT site 1171 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); (5 males, 3 females) NEW ZEALAND: FD: Fiordland N.P., Milford Sound Rd., Tutoko Track, 70m, 44°40.517'S, 167°57.895'E, 9.xii.2005, very mossy *Nothofagus* spp. Forest, emergent podocarps; FMHD#2005-086, berl., leaf & log litter, A. Newton & M. Thayer; ANMT site 1168 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); (6 males, 3 females) NEW ZEALAND: FD: Fiordland N.P., Milford Sound Rd., Gertrude Saddle car park area, 800m, 44°46.13'S, 168°00.16'E, 9.xii.2005, very mossy *Nothofagus menziesii* forest; FMHD#2005-087, berl., leaf litter, A. Newton & M. Thayer; ANMT site 1169 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); NEW ZEALAND: FD: Fiordland N.P., Borland Rd., Borland Saddle vic., 980m, 45°44.81'S, 167°22.88'E, 10.xii.2005, *Nothofagus menziesii* forest in ravine; FMHD#2005-091, berl., sifted ?*Sphagnum* moss on ground, A. Newton; ANMT site 1171 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); (3 females) NEW ZEALAND: FD: Fiordland N.P., Borland Rd., Mt. Burns Tops Track, above Borland Saddle, 1075m, 45°44.883'S, 167°22.938'E, 10.xii.2005, subalpine tussockland; FMHD#2005-097, berl., unsifted litter at bases of shrubs (*Dracophyllum*, possibly *filifolium*), M. Thayer; ANMT site 1173 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH); (1 male, 1 female) NEW ZEALAND: FD: Fiordland N.P., Borland Rd., Mt. Burns Tops Track, above Borland Saddle, 1035m, 45°44.82'S, 167°22.87'E, 10.xii.2005, short ridgetop *Nothofagus menziesii* forest, near timberline; FMHD#2005-098, berl., twiggy & rooty leaf & log litter, M. Thayer, ANMT site 1174 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH). (3 males, 6 females) NEW ZEALAND: FD: Fiordland N.P., Kepler Track, above Broad Bay, 600m, 45°24.37'S, 167°39.105'E, 11.xii.2005, *Nothofagus* forest; FMHD#2005-102, berl., leaf & log litter, A. Solodovnikov & D. Clarke; ANMT site 1177 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH). (1 male) Hollyford leafmould (NZAC); (1 male) Key Summit 4/2/54 (NZAC). MC: (1 male) Oakden nr. Mt. Algidus Canterbury// 3831// Coll. T. Hall 23.9.1914 (NZAC). (1 male) Algidus 3-12-13// 3831// Broun (NZAC). MK: (1 male) Hooker Valley, Mt. Cook Southern Alps// Leaf mould// Collector Jan. 1943. A.E. Brookes (NZAC). NC: (1 female) New Zealand: NC: Arthur's Pass Devil's Punch Bowl Litter, 16 Nov 1966 AK Walker, 66/412 (LSAM). (1 female) New Zealand: NC: Arthur's Pass, McGrath Ck Moss, 12 May 1965 JI Townsend, 65/314 (LSAM). (2 females) New Zealand: NC: 2.9km N Arthur's Pass, 840 m Bealey Valley Trailhead 42°55'S 171°33'E, #036/ *Nothofagus solandri* leaf litter berlese 11 Jan 1998 C. Carlton, R. Leschen (LSAM). (1 male) New Zealand: NC: 3km N Arthur's Pass, 900m 42°55'S 171°33'E, #042/ *Nothofagus/Draco-phyllum* leaf litter berlese, 11 Jan 1998 C. Carlton, R. Leschen

45.

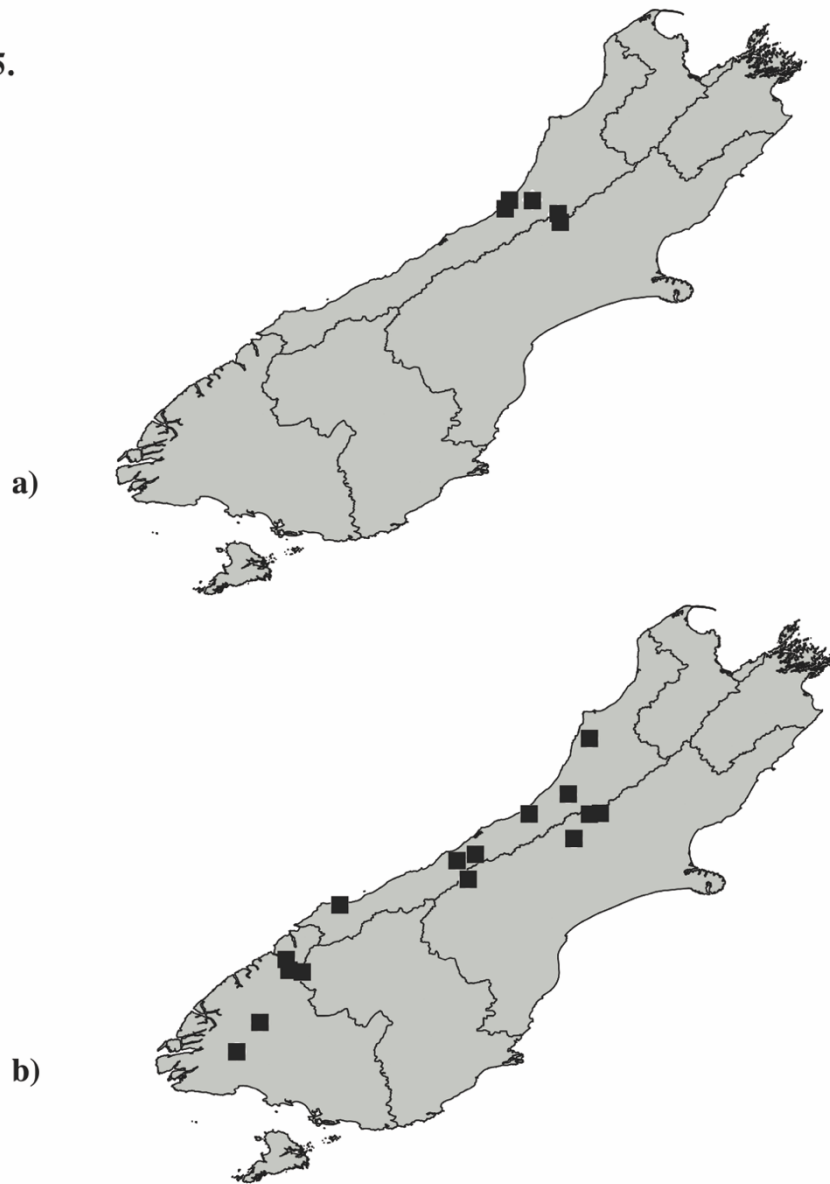


Figure 45. Map of locations where a) *Pselaphotumulus unus* and b) *Pselaphotumulus urquharti* have been collected.

(LSAM). (1 male, 2 females) New Zealand: NC, 4.5 km SE Arthur's Pass 725 m, #046 42'55S 171'33E/ *Nothofagus solandri* leaf litter/flood debris 11 Jan 1998 C.Carlton, R.Leschen (LSAM); (1 male, 1 female) Arthur's Pass NP, Bealey Vy. Tr. 840m 10-21.iii.80 sub-alpine *Nothofagus* A.

Newton, M. Thayer/ berl. Leaf & log litter, forest floor (FMNH); (1 male, 1 female) Okuku Ck., 11.3km SSE Kumara 60m 18-22.iii.1980 podocarp-broadlf. A. Newton, M. Thayer/ berl., leaf & log litter, forest floor (FMNH). WD: (2 males, 3 females) Okuku Scenic Reserve, 9.2km sse Kumara, 120m, 8-19.i.1985 podocarp-hdwd. Forest A. Newton/ M. Thayer 731/ berl., leaf & log litter, forest floor (FMNH); (3 males, 1 female) New Zealand: WD 2 km SE Fox Glacier 225 m, #066 43'29S 170'01E (LSAM). (2 males, 1 female) New Zealand: WD, 2.7 km S Franz Josef Glacier, #063 Trailhead of Alex Knob 43'25S 173'10E, 150 m (LSAM); (1 male) NEW ZEALAND WD Ross Mikonui Tk 9 Nov 2005 R Leschen S Nomura// ants in wood RL1015 (NZAC).; (2 males, 2 females) L. Mahinapua Scen. Res. 30m 16-22.iii.1980 podocarp-mixed broadleaf A. Newton, M. Thayer/ berl. Leaf & log litter, forest floor (FMNH).

Discussion.

Biogeographic considerations

The limited information available concerning distributional relationships and patterns of *Pselaphotumulus* species suggest presumptive endemism along the main northeastern and southwestern slopes of the Southern Alps. With the addition of molecular data and increased geographic coverage, we believe *Pselaphotumulus* may be an interesting candidate for further exploration of the application of hypothesis regarding the factors influencing distributions of taxa with shared biogeographic histories in the South Island region of New Zealand. Similar distributions are exemplified by many other plant and animal species, such as other Coleoptera taxa, including genera of Carabidae (Johns 2005), Zopheridae (Marske *et al.* 2011), and euasthetine Staphylinidae (Clarke 2011). These distributions are hypothesized to be either the result of strike slip displacements on either side of the Alpine fault (Heads 1998; Heads and Craw 2004) or due to habitat restrictions resulting from complex local interactions influenced by climate and geological substrates, most notably Pleistocene glacial cycles (Wardle 1998). The former, tectonic vicariance model, is suggested by sister group relationships that pair taxa displaced from each other to the northeast on the western side of the Alpine Fault and to the southwest on the eastern side. Such disjunctions along the Alpine Fault are found in over 200 plant and animal taxa (Heads 2017), including several members of the supertribe Faronitae (Staphylinidae: Pselaphinae): the genus *Leschenea* Park and Carlton (2015), and *Sagola turrentensis* Park and Carlton (2014). While many taxa exhibit disjunct distributions, a number of others exhibit either continuous distributions from north to south, or distributions that are localized in the less diverse central region of South Island. A notable feature of this central area is the “beech gap”, a region of forest in Westland that is devoid of most species of *Nothofagus*, which are common in other areas of South Island native forests (Leschen *et al.* 2008). These central distributions are typically hypothesized to be the result of range expansions and contractions via either several large (Willet 1951) or numerous smaller microrefugia (Mee and More 2013) during Pleistocene glacial cycles. In any case, such climatically and geologically influenced allopatry would reflect fine scale, mainly habitat-based allopatry, and should not show obvious concordance with the large-scale geological history of the region. Shared patterns resulting from alpine climatic fluctuations and the disruptive effects of sea level rise at lower elevations might be revealed through character based and deeper node molecular analyses and population level genetic divergence data.

Typical for many South Island taxa, *Pselaphotumulus* species appear to be mainly distributed along the northwestern and southwestern portions of the South Island, with concentrations in the forested regions of Nelson and Fiordland. *Pselaphotumulus aorerei*, *P.*

cavelli, *P. dubius*, and *P. oviceps* exhibit this distributional displacement and are absent in the drier, central regions of South Island. Of the two remaining species, *P. urquharti* has a more or less continuous distribution across western South Island, with a conspicuous absence in Nelson. *P. unus* appears to be present in the beech gap, with additional specimens in the Alpine region of

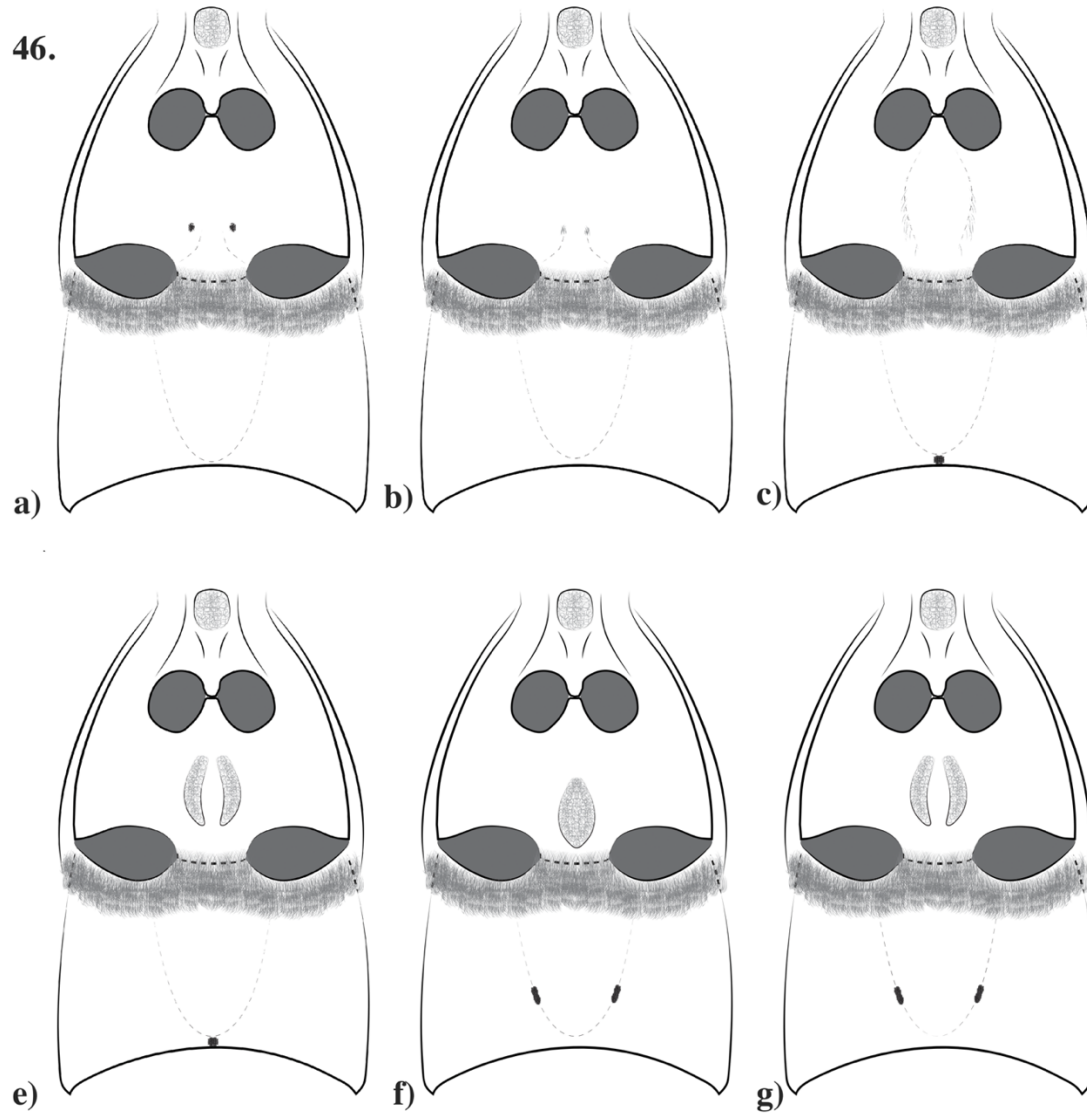


Figure 46. *Pselaphotumulus* species male meso- and metaventrite and second and first ventrites. a) *Pselaphotumulus aorerei*, b) *Pselaphotumulus caecus*, c) *Pselaphotumulus cavelli*, d) *Pselaphotumulus oviceps*, e) *Pselaphotumulus unus*, f) *Pselaphotumulus urquharti*.

Arthur's Pass. Generally, distributions consistent with classic alpine fault endemism with populations that extend into Fiordland are thought to either 1) predate the Miocene orogeny of

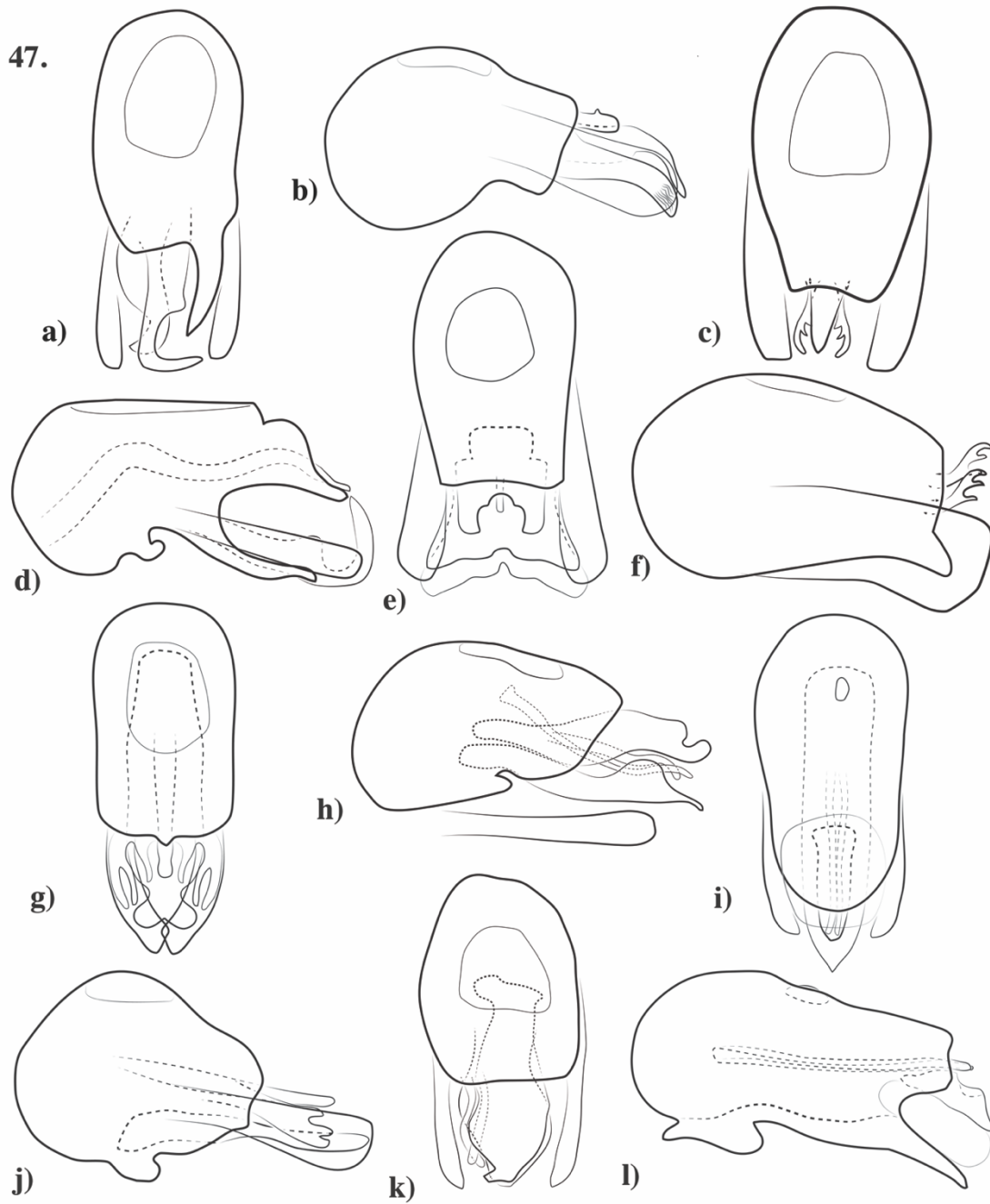


Figure 47. *Pselaphotumulus* aedeagi. a, b) *P. aorerei*; c, d) *P. cavelli*; e, f) *P. dubius*; g, h) *P. oviceps*; i, j) *P. unus*; k, l) *P. urquharti*.

the Southern Alps (Winkworth *et al.* 2005), persisting during mountain building, or 2) have diversified relatively late during alpine mountain building and subsequent strike slip

displacements (Trewick and Wallis 2001; Heads and Craw 2004). Additionally, the presence of a South Island gap in some groups is thought to be consistent with the phenomenon of the restriction of previously widespread populations due to glaciation or alpine uplift, constrained to several large refugia on the north and south ends of the South Island (Willett 1951). Conversely, the existence of species within the beech gap may be consistent with the theory of the existence of multiple microrefugia with metapopulations persisting through glaciations in small ecological islands (Heads 1994, Mee and Moore 2013, Buckley *et al.* 2015). Such distributions could also be indicative of the subsequent dispersal of populations back into previously glaciated areas following glacial retreats. Despite examination of pselaphine specimens from major museum collections representing a number of collection localities across New Zealand, *Pselaphotumulus* specimens are still known only from a relatively small number of localities. As with many litter-associated organisms, this taxon holds promise for further investigation of larger-scale questions, but more extensive sampling across the South Island is necessary. Additionally, it is important to note that many South Island species share congeners on the North Island, providing additional reference points for understanding species diversification and dispersal, and discovery of *Pselaphotumulus* species on the North Island would not be unexpected. It remains to be seen whether further sampling provides additional specimens and increases geographic coverage. The collection of DNA quality material across the genus' range is necessary for further exploration of broader questions.

Notes on symmetry of genitalia

Pselaphotumulus, as a genus, is unconventional among most other Pselaphinae in the inclusion of species that possess both asymmetrical and symmetrical genitalia. Within the subfamily, symmetry patterns of genitalia are generally considered to be characters conserved among genera and have been used to distinguish genera that are otherwise superficially similar (Kurbatov and Sabella 2008). While this phenomenon of varying symmetry among species is known to occur among some other genera (Chandler 1991), the vast majority of genera in the subfamily do not display this level of genitalic polymorphism. Conventional ideas about the evolution of the aedeagus presume symmetrical forms to be plesiotypic. This implies that asymmetrical forms arise from either single or independent origins within the genus. Within *Pselaphotumulus*, only two species, *P. aorerei* and *P. unus*, possess asymmetrical genitalia. Determination of origins of this asymmetry requires detailed homology of aedeagal structures, which is complicated by the highly derived and complex form of the morphology of male genital structures in Pselaphinae. Such analysis is beyond the scope of this paper, but may prove an interesting case study in future explorations of the evolution of variations within these complex sexual organs.

3.6. PSELAPHINI OF THE NEW ZEALAND OFFSHORE ISLANDS

Introduction. The staphylinid subfamily Pselaphinae is generally depauperate at high latitudes. We examine one exception, the tribe Pselaphini, at the southern extreme of its global distribution, the New Zealand subantarctic islands and the Chatham islands, an archipelago farther north. Currently only two species are known from remote Campbell Island (*Pselaphotheseus hippolytae* Park and *P. ihupuku* Carlton and Leschen). A new genus, *Pselaphopluteum* **gen. nov.** (type species, *Pselaphopluteum motumaha* **sp. nov.**) and two new species, *Pselaphopluteum motumaha* **sp. nov.** and *Pselaphaulax dracophyllum* **sp. nov.**, from the Auckland Islands are added to the subantarctic fauna. *Pselaphophus atriventris* Westwood,

introduced from Australia, is currently the only species known from the Chatham islands, although several unidentified species were noted by Emberson (2002). Three new species are described from the Chatham islands: *Pselaphaulax caeruleus* **sp. nov.**, *Pselaphaulax flavus* **sp. nov.**, and *Pselaphaulax traversi* **sp. nov.**. Potential biogeographic implications of these new taxa are discussed within the context of the overall New Zealand fauna of Pselaphini, which is the subject of ongoing study.

The tribe Pselaphini is a diverse, monophyletic taxon of pselaphine staphylinid beetles (Staphylinidae: Pselaphinae: Pselaphini) (Parker and Grimaldi 2014; Newton and Thayer 1995). While most genus-group taxa within the subfamily are more diverse in tropical, forested areas, the Pselaphini exhibits high species diversity at higher latitudes (Chandler 2001). Notably, it is the only pselaphine taxon represented in the harsh habitats of remote Campbell Island and other subantarctic islands of New Zealand. Currently, 21 species within six genera of Pselaphini are recorded from the North and South Islands of mainland New Zealand and adjacent islands (Nomura and Leschen 2006; Théry and Leschen 2013). New taxa revealed as part of a broader study of the Pselaphini of New Zealand are here described, including a new genus and two new species known only from the Auckland Islands on the Campbell Plateau (*Pselaphopluteum motumaha* gen. et sp. nov., and *Pselaphaulax dracophyllum* sp. nov.), and three new species in currently recognized genera from the Chatham Islands (“Chathams”) on the Chatham Rise, all of which are endemic to the Chathams (*Pselaphaulax caeruleus* sp. nov., *P. flavus* sp. nov., and *P. traversi* sp. nov.) (Figure 48).

With respect to many taxa, New Zealand exhibits a disharmonic fauna (Buckley *et al.* 2015), and pselaphines are no different. Only three of the subfamily’s six supertribes are represented on the New Zealand mainland and surrounding islands (Nomura and Leschen 2006). Notably, the New Zealand pselaphine fauna comprises a large component of Faronitae (Park and Carlton 2013, 2014, 2015), and an unusually small fauna of social insect inquilines (Nomura and Leschen 2015). The entire supertribe Batrisitae is completely absent from New Zealand, in contrast to its diversity in almost every other major faunal region (also poorly represented in temperate South America) (Newton and Chandler 1989). The Goniaceritae and Pselaphitae, taxa known to be especially diverse in temperate areas, are poorly studied in New Zealand, and are the focus of ongoing research by the authors and their collaborators.

Twenty-one described species in six genera of Pselaphini occur in New Zealand (Nomura and Leschen 2006; Théry and Leschen 2013). Prior to the present study, two endemic, sympatric species of pselaphines were known from Campbell Island: *Pselaphotheseus ihupuku* Carlton and Leschen and *P. hippolytae* Park (Carlton and Leschen 2008). These are the only known representatives of the genus *Pselaphotheseus* Park, which is thought to be most closely related to the Australian genus *Pselaphophus* Raffray (Park 1964). The latter is represented in New Zealand by one widespread, introduced species (Carlton and Leschen 2008). *Pselaphophus atriventris* Westwood also represents the only known species from the Chathams. Emberson’s (2002) survey of the Chathams’ Coleoptera fauna noted two additional undescribed species of *Pselaphaulax* and one specimen of an undetermined genus. The remaining New Zealand fauna consists of species currently placed into *Pselaphogenius* Reitter and *Pselaphus* Herbst (Nomura and Leschen 2006; Théry and Leschen 2013), although these genera are particularly problematic and generally considered to be non-monophyletic (Chandler 2001; Nomura and Leschen 2006). To date, no global phylogeny is published for the subfamily and the classification of New Zealand Pselaphinae has yet to be studied thoroughly other than a series of papers dealing with the supertribe Faronitae (Park and Carlton 2013, 2014, 2015).

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

Specimens were provided by the following institutions and curators:

FMNH	Field Museum of Natural History, Chicago, Illinois, USA.
LSAM	Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.
LUNZ	Entomology Research Museum, Lincoln University, New Zealand
NZAC	New Zealand Arthropod Collection, Auckland, NZ.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by locality. Two slashes (“//”) are used to indicate label breaks. The number and sex of specimens are indicated preceding label data (i.e. “(2 males, 1 female)”), and the lending institution is indicated following label data (i.e. “(NZAC)”). For type specimens, deposition in either the LSAM or NZAC is indicated following label data.

Redescription of *Pselaphaulax* Reitter.

Type species. *Pselaphus dresdensis* Herbst, 1792 (by monotypy).

Redescription. Males. *Head:* eyes rounded, composed of 15–20 facets. Vertex convex; shallow sulcus beginning at base of vertex, extending to level of vertexal foveae; vertexal foveae large, set into margins of vertexal depression parallel to middle of eyes; vertexal depression widest between eyes, confluent with sulcus extending to apex of rostrum. Rostral sulcus bounded by lateral, flattened ridges extending to antennal acetabula. Frontal margin of rostrum in dorsal view typically straight to slightly emarginate, with sparse, suberect setae. Antennomere 1 as long as antennomeres 2–4, antennae otherwise unmodified. Gular mound modified, hemispherical, about as long as wide or narrowed and longer than wide, glabrous; area of head posterior to gular mound flattened, slightly concave, bearing flattened modified scales; gular foveae present, paired. Maxillary palpomere 1 elongate, 1/2 as long as palpomere 2; palpomere 2 narrow, enlarged distally, shorter than head; maxillary palpomere 3 quadrate; maxillary palpomere 4 typically subequal to head, widened in distal 1/3–1/2, apical area smooth to weakly tuberculate, v-shaped sensory patch present, margined by carina. *Thorax:* Pronotum widest at 1/2 length, narrowed anteriorly and posteriorly; basal sulcus present, delimited by lateral antebasal foveae, median antebasal fovea reduced to depression, margined by two short carinae. Prosternum in front of coxae slightly convex, anteriorly with modified flattened setae; lateral procoxal foveae present. Mesoventrite with median shield; lateral mesoventral foveae present in large cavities filled with dense setae, meeting internally; lateral mesocoxal foveae absent; median mesoventral foveae present, paired, meeting internally; mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, variously modified; metacoxae separated by extension of first ventrite. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present; apical fringe of setae present. *Abdomen:* Tergites of usual form for tribe, otherwise unmodified; second tergite without obvious basal foveae, lateral basal sulcus extending along width of tergite, obscured by dense band of setae along posterior edge. First ventrite covered in dense, shining setae; second ventrite variously modified with median depressions, sulci, or projections; ventrites otherwise unmodified.

Females. Similar to males except eyes may be smaller, composed of fewer facets; secondary sexual modifications of the legs or second ventrite absent.

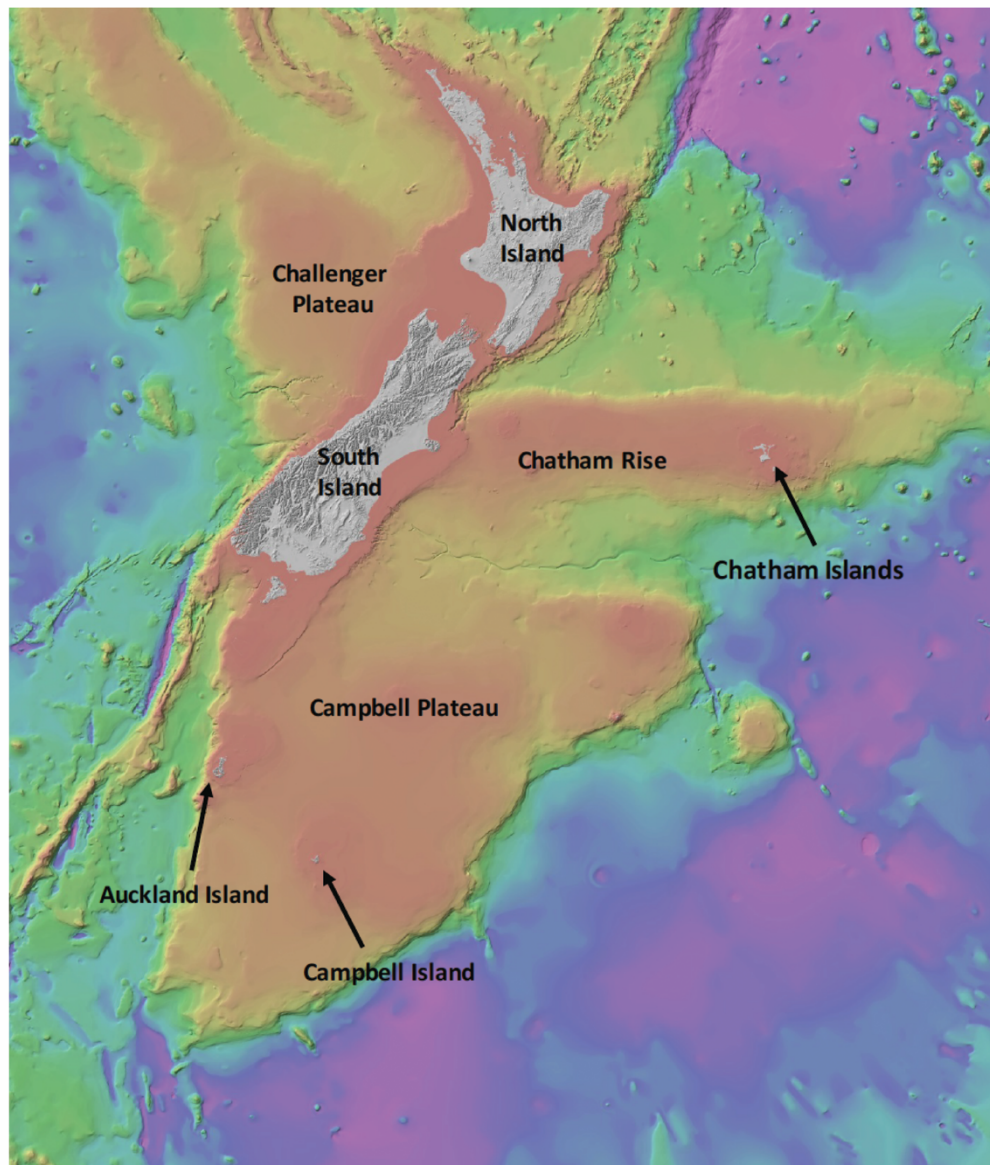


Figure 48. Map of New Zealand highlighting offshore islands.

Discussion. Currently, no species in New Zealand have been placed in the genus *Pselaphaulax*. However, in a review of the Australian fauna, Chandler (2001) commented that about one-half of the species currently in the genus *Pselaphus* in New Zealand should be transferred to *Pselaphaulax*, while the other half likely belong to the genus *Pselaphogenius*. An extensive review of the tribe currently underway by the author has yielded approximately 13 additional undescribed *Pselaphaulax* species in material from the FMNH, LSAM, and NZAC.

New Zealand species in this genus are primarily united by the presence of an antebasal sulcus on the pronotum margined by lateral antebasal foveae, the median antebasal foveae present and delimited by two small carinae, maxillary palpomere 4 widened in the distal 1/3-1/2 with a v-shaped sensory patch margined by a carina, and the gular swelling hemispherical, about as long as wide or more narrow and longer than wide. While several groups in New Zealand likely representing undescribed genera may superficially resemble *Pselaphaulax*, no other groups possess a combination of these character states. All three species from the Chathams and the single subantarctic species possess characters consistent with species of *Pselaphaulax* observed from the mainland.

Pselaphaulax caeruleus Owens, Leschen, and Carlton, sp. nov.
(See Figure 49, a–d)

HOLOTYPE: (male) CHATHAM IS NZ Chatham I Awatotara 180m// 12 Feb 1967 G.W.Ramsay litter 67/139 (NZAC). **PARATYPES:** (4 males, 3 females) same locality as holotype (NZAC). (1 male, 1 female) CHATHAM.I. N.Z. Awatotara Table land bus.183m 21.feb.1967// G.W.Ramsay Litter 67/139 (NZAC). All types of this species are deposited in the NZAC.

Etymology. The specific epithet is the Latin word for “blue”, commemorating Old Blue, the only remaining adult female Chatham Island robin in 1980. All Chatham Island robins today are descended from this single individual. She lived to be 14 years old, the longest-lived individual known for her species (Butler and Merton 1992).

Diagnosis. Head with sulcus on rostrum; frontal margin of rounded with small patch of sparse setae; gular mound rounded, glabrous, and sub-hemispherical; maxillary palpomeres elongate, maxillary palpomere 4 subequal to length of head, narrow through 1/2 length, widest just beyond 1/2 length, apical sensory patches present and delineated by faint carina. Pronotum with antebasal sulcus, lateral antebasal fovea, and median basal fovea reduced to pit. Mesoventrite with small patch of setae in concavity towards hind margin of procoxae. Metaventrite with broad depression extending from hind margin of mesocoxae to apex of ventrite between metacoxae. Second ventrite with large shallow oval median depression occupying length of ventrite. Externally, the presence of two patches of fine setae on the thickened apex of the second ventrite distinguishes this species of *Pselaphaulax* from the other two known from the Chathams. The form of the aedeagus, with the median lobe curved to the right is also unique.

Description. MALE. Body length: 2.6–2.8 mm. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than 1/2 length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 15–22 facets. Frontal margin of rostrum in dorsal view rounded with sparse suberect setae. Gular mound modified, hemispherical, as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, bearing flattened modified scales. Maxillary palpomere 4 as long as head, widened at base and distal 1/2, apical area smooth, shining, v-shaped sensory patches present, margined by carinae. Thorax: pronotum basal sulcus broad, well-defined, delimited by lateral antebasal foveae; median fovea reduced to pit. Mesoventrite with median shield bearing patch of spongeose setae in small concavity towards hind margin of procoxae. Metaventrite afoveate, medially depressed; metacoxae separated by extension of first ventrite. Legs unmodified. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae

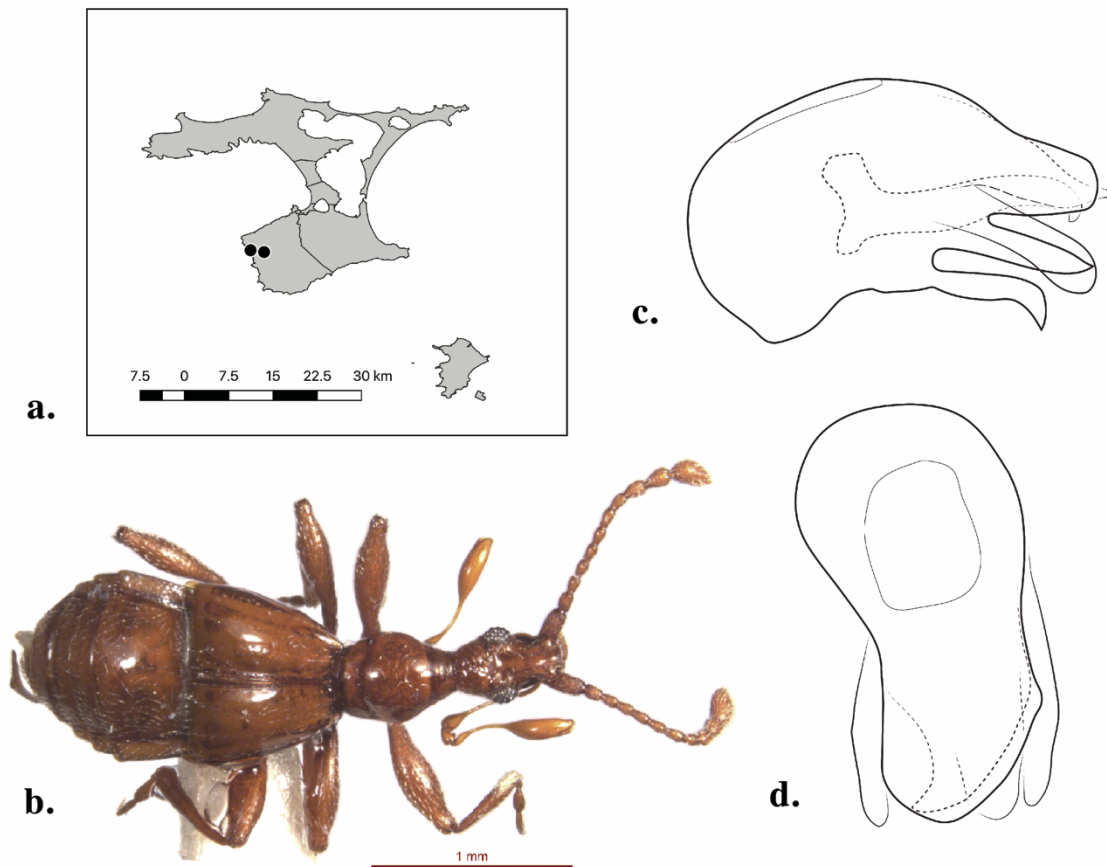


Figure 49. a) map of localities where *Pselaphaulax caeruleus* specimens have been collected; b) habitus photograph of *P. caeruleus*; illustrations of *P. caeruleus* aedeagus c) latera, d) dorsal.

present; apical fringe of setae present. Abdomen: Tergites of usual form for tribe. First ventrite covered in dense, shining setae; second ventrite with basal sulcus extending width of entire ventrite, sulcus densely setose, large shallow oval median depression occupying length of ventrite, apex of ventrite with small thickened area at middle bearing two patches of fine setae on distal margin. Genitalia: aedeagus asymmetrical. Median lobe distally curved to the right, protruding from fleshy dorsal extension. Ventral process downward curved, distally, about as long as median lobe. Parameres present, as long as median lobe.

Females. Integument, Head, Thorax, Abdomen: similar to male except eyes slightly smaller and second ventrite lacking median ovate depression and thickened area at apex.

Distribution. This species is only known from two collection events in the Awatotara Valley on Chatham Island. Extensive searches of museum collections have not yielded any specimens from additional localities, suggesting *P. caeruleus* is endemic to the Chathams.

Pselaphaulax dracophyllum Owens, Leschen, and Carlton, sp. nov.
(See Figure 50, a–d)

HOLOTYPE: (male) New Zealand: AU: Adams I., Magnetic Cove Berlese *Dracophyllum* bases and litter 20 Jan 1966 KAJ Wise (NZAC). **PARATYPES:** (1 male, 2 females) NEW ZEALAND AU Adams I, 50°52'5.6"S, 166°1'15.1"E 22 Jan-5 Feb 2011 G. Elliott, K. Walker// pitfall trap W2, *S. rata/Dracophyllum* forest, white-headed petrel colony// (green label) AMNZ85284// AMNZ85285// AMNZ85288 (AMNZ). (1 female) NEW ZEALAND AU Adams I, 50°52'5.8"S, 166°1'15.3"E 22 Jan-5 Feb 2011 G. Elliott, K. Walker// pitfall trap W5, *S. rata/ Dracophyllum* forest, white-headed petrel colony// (green label) AMNZ85283 AUCKLAND MUSEUM NEW ZEALAND (AMNZ). (1 female) NEW ZEALAND Adams I, 50°51'54"S, 166°02'27"E 19 Jan-3 Feb 2011 G. Elliott, K. Walker// pitfall trap S3, *S. rata* and *Dracophyllum longifolium* coastal forest (sooty shearwater colony)// (green label) AMNZ85291 AUCKLAND MUSEUM NEW ZEALAND (AMNZ). (1 male) New Zealand: AU: Adams I., Magnetic Cover Berlese *Dracophyllum* bases and litter 20 Jan 1966 KAJ Wise (LSAM). (1 male) New Zealand: AU: Adams I., Magnetic Cove Litter, 18 Jan 1966 G Kuschel 66/72 (LSAM). (1 male) New Zealand: AU: Adams I., Magnetic Cove Litter, 30 Jan 1966 G Kuschel, 66/92 (LSAM). (1 male, 1 female) New Zealand: AU: Adams I., Magnetic Cove Litter, 28 Jan 1966 G Kuschel, 66/84 (LSAM). (1 female) New Zealand: AU: Adams I., Magnetic Cove Stn., litter, 28 Jan 1966 G Kuschel, 66/84 (LSAM). (1 female) New Zealand: AU: Auckland I., Camp Cove 15 m, 5 Jan 1973 J Farrell, 73/16 (LSAM). (1 male) New Zealand: AU: Auckland I., Camp Cove, Carnley Harbor, litter 17 Feb 1973, JS Dugdale 73/94 (LSAM). (1 male, 1 female) New Zealand: AU: Auckland I., Fleming Plateau, 487 m, mats 12 Feb 1973, JS Dugdale 73/35 (LSAM). (3 males) New Zealand: AU: Auckland I., lookout, Ranui Cove, 54 m, moss 27 Feb 1973, JS Dugdale 73/93 (LSAM). (1 male) New Zealand: AU: Auckland I., lookout, Ranui Cove, 54 m, litter 27 Feb 1973, JS Dugdale 73/72 (LSAM). (1 male) New Zealand: AU: Auckland I., Ranui Cove, 15 m, litter, 27 Feb 1973 JS Dugdale, 73/71 (LSAM). (1 female) New Zealand: Auckland I., Ranui Cove, 304 m, moss and ferns 27 Feb 1973, JS Dugdale 73/82 (LSAM). (1 male) New Zealand: AU: Auckland I., Ranui Cove, Carnley Harbor, 30 m, litter, 1 Mar 1973 JS Dugdale, 73/84 (LSAM). (1 male) New Zealand: AU: Auckland I., Tagua Bay, Carnley Harbor, litter 11 Feb 1973, JS Dugdale 73/91 (LSAM). (1 male) New Zealand: AU: Auckland I., Tagua Bay, Carnley Harbor, moss 11 Feb 1973, JS Dugdale 73/92 (LSAM). (1 male) New Zealand AU: Ewing I., litter from West edge of *Metrosideros umbellata* *Olearia lyallii* forest 9 Feb 1973, DS Horning (LSAM). Type specimens are deposited in the LSAM or NZAC, as indicated following label data.

Etymology. The specific epithet for this species refers to the plant genus *Dracophyllum*, (Ericaceae) found in Australia, New Caledonia, and New Zealand. Many members of the type series were collected in leaf litter of these plants.

Diagnosis. Head with sulcus on rostrum; frontal margin of rostrum straight with small patch of sparse setae; gular mound rounded, glabrous, and sub-hemispherical; maxillary palpomeres elongate, maxillary palpomere 4 subequal to length of head, narrow through 1/3 length, widest just beyond 1/2 length, apical sensory patches present and delineated by faint carina. Pronotum with antebasal sulcus, lateral antebasal fovea, and median basal fovea. Metaventricle with broad depression extending from hind margin of mesocoxae to apex of ventrite between metacoxae, sparse short setae along lateral margins. Second ventrite with narrow median longitudinal depression. *Pselaphaulax dracophyllum* is the only species of *Pselaphaulax* known from the Subantarctic Islands of New Zealand. The form of the aedeagus,

with the median lobe narrow and associated with two lateral processes, and the heavily sclerotized, complex dorsal process is unique.

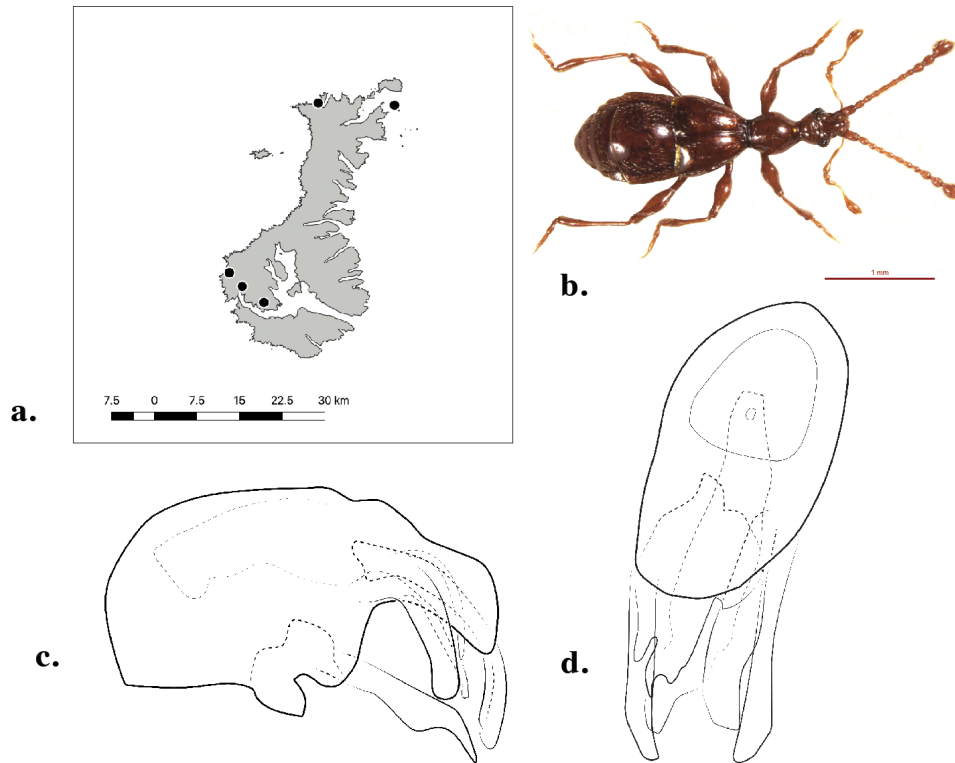


Figure 50. a) map of localities where *Pselaphaulax dracophyllum* specimens have been collected; b) habitus photograph of *P. dracophyllum*; illustrations of *P. dracophyllum* aedeagus c) lateral, d) dorsal.

Description. MALE. Body length: 2.3–2.5 mm. Integument: Body and appendages uniformly light reddish-brown to yellowish-brown, impunctate, pubescence on elytra and abdomen sparse. Head: Width between eyes equal to $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 20–22 facets. Occiput with median sulcus beginning at base and extending anteriorly, confluent with vertexal depression. Vertexal foveae large, setose, set obliquely into margins of vertexal depression parallel to middle of eyes. Vertexal depression slightly wider between eyes, confluent with narrower sulcus extending to apex of rostrum. Rostral sulcus bounded by flattened lateral ridges extending to antennal acetabula. Frontal margin of rostrum straight with a small tuft of short, erect setae in dorsal view. When viewed laterally, gular mound modified, glabrous and sub-hemispherical. Area of head posterior to gular mound bearing paired gular foveae obscured by small patch of modified flattened setae. Labrum narrower basally and slightly widened at apex. Mandible slightly falcate, bearing two small teeth. Maxillary palpomere 1 narrow, elongate, $\frac{1}{2}$ as long as palpomere 2; palpomere 2 narrow, widened distally, less than $\frac{1}{2}$ length of head; maxillary palpomere 3 short,

triangular-rounded; maxillary palpomere 4 subequal to length of head, narrow through $\frac{1}{3}$ length, widest just beyond $\frac{1}{2}$ length, apical sensory patches present and delineated by faint carina. Thorax: Pronotum widest at $\frac{1}{2}$ length, narrowed anteriorly and posteriorly. Lateral basal sulcus present, delimited by lateral antebasal foveae, single median antebasal fovea present. Prosternum in front of coxae slightly convex, sparsely covered in flattened modified setae, lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present in large lateral pits filled with dense spongeose setae, lateral mesocoxal foveae absent, median mesoventral foveae present, paired. Mesocoxae externally separated by extension of meso- or metaventrite. Metaventrite afoveate, median face with a broad depression extending from hind margin of mesocoxae to apex of ventrite between metacoxae, lateral margins of depression sharp, bearing sparse short setae. Metacoxae separated by extension of first ventrite. Elytra with three basal foveae, discal striae absent, sutural stria present. Abdomen: Tergites unmodified. First ventrite covered with dense, shining setae. Second ventrite with basal band of shining modified setae, narrow longitudinal depression extending from base to apex of ventrite. Genitalia: Asymmetrical. Basal bulb distinct, dorsal diaphragm present. Parameres paired, lateral. Median lobe narrow, associated with two lightly sclerotized, narrow processes. Ventral process associated with ventral strut, well-developed, downturned at apex. Dorsal process complex, heavily sclerotized.

Females. Difficult to distinguish from males, differing, in addition to genitalia, by eyes comprising fewer facets and absence of the longitudinal depression on second ventrite.

Distribution. This species is known only from the Auckland Archipelago: Adams Island, Auckland Island, and Ewing Island.

Pselaphaulax flavus Owens, Leschen, and Carlton, sp. nov.
(See Figure 51, a–d)

HOLOTYPE: (male) CHATHAM IS NZ Sth East I nr 600' 4 Nov 1970// J.I. Townsend litter 70/165 (NZAC). *PARATYPE:* (1 female) same locality as holotype (NZAC). Type specimens are both deposited in the NZAC, as indicated.

Etymology. The specific epithet is the Latin word for “yellow”, in reference to Old Yellow, the male half of the last breeding pair of Chatham Island robins in existence in 1980. Together Old Blue (female) and Old Yellow (male) played an integral role in bringing the only known population of their species back from the brink of extinction (Butler and Merton 1992).

Diagnosis. Head with sulcus on rostrum; frontal margin of rounded with small patch of sparse setae; gular mound rounded, glabrous, and sub-hemispherical; maxillary palpomeres elongate, maxillary palpomere 4 as long as head, narrow through $\frac{1}{3}$ – $\frac{1}{2}$ length, widest just beyond $\frac{1}{2}$ length, apical sensory patches present and delineated by faint carina. Pronotum with antebasal sulcus, lateral antebasal fovea, and median basal fovea reduced to pit. Mesoventrite with small patch of setae in concavity towards hind margin of procoxae. Metaventrite with broad depression extending from hind margin of mesocoxae to apex of ventrite between metacoxae. Second ventrite with large shallow oval median depression occupying length of ventrite, apex thickened. Externally, *P. flavus* is difficult to distinguish from *P. traversi*. The form of the genitalia, with the median lobe curved downwards and extending from an elongate fleshy dorsal process is unique.

Description. MALE. Body length: 2.6 mm. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes

greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 20–22 facets. Frontal margin of rostrum in dorsal view rounded with sparse suberect setae. Gular mound modified, hemispherical, about as long as wide, glabrous; area of head posterior to gular mound flattened, slightly concave, bearing flattened modified scales. Maxillary palpomere 4 as long as head, widened at distal $\frac{1}{3}$ – $\frac{1}{2}$, apical area slightly rugose, v-shaped sensory patches present, margined by carina. Thorax: pronotum basal sulcus broad, well-defined, delimited by lateral antebasal foveae; median fovea reduced to pit. Mesoventrite with median shield bearing patch of spongeose setae in small concavity towards hind margin of procoxae. Metaventrite afoveate, medially depressed; metacoxae separated by extension of first ventrite. Legs unmodified. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present; apical fringe of setae present. Abdomen: First ventrite covered with dense, shining setae; second ventrite with basal sulcus extending width of entire ventrite, sulcus densely setose, large shallow oval median occupying length of ventrite, apex of ventrite with small thickened area at middle. Genitalia: aedeagus asymmetrical. Median lobe elongate, curved downwards, protruding from elongate fleshy dorsal extension. Ventral process downward curved, distally, about as long as median lobe. Parameres present, as long as median lobe.

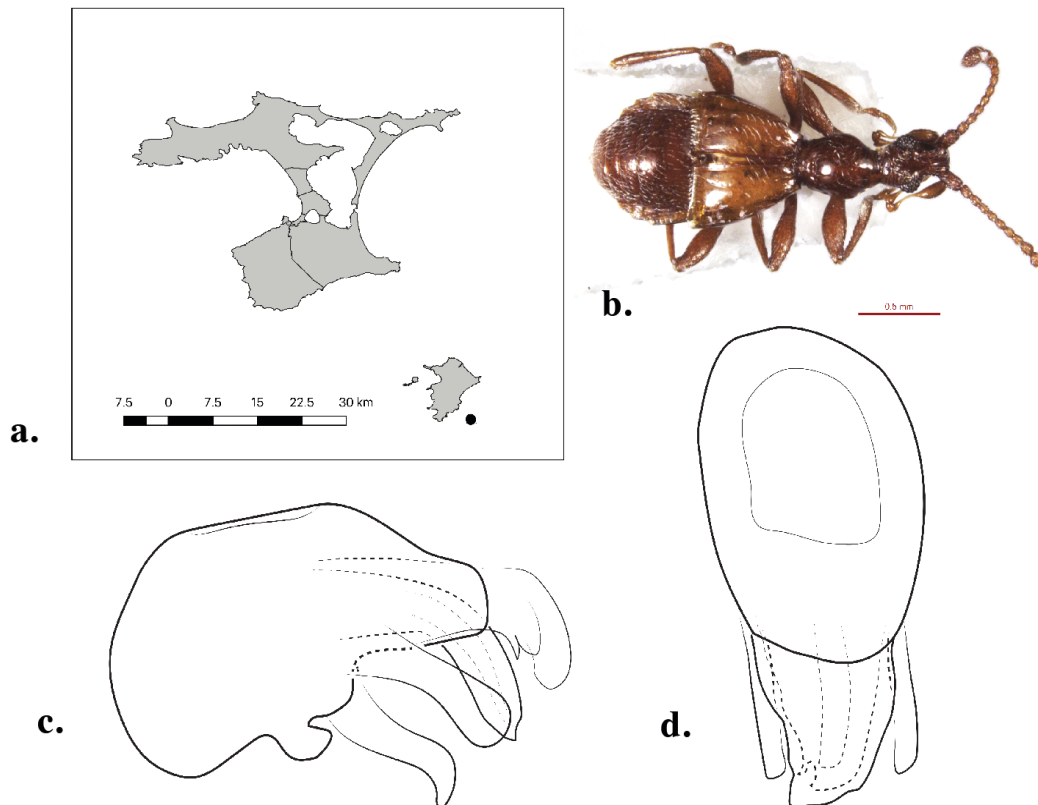


Figure 51. a) map of localities where *Pselaphaulax flavus* specimens have been collected; b) habitus photograph of *P. flavus*; illustrations of *P. flavus* aedeagus c) latera, d) dorsal.

Females. Similar to male except eyes slightly smaller and second ventrite lacking median ovate depression and thickened area at apex.

Distribution. *Pselaphaulax flavus* is known from a single collection event on South East Island, the third largest island in the Chatham Islands archipelago. No specimens from additional localities have been found in searches of museum collections, suggesting this species is a Chathams endemic.

Pselaphaulax traversi Owens, Leschen, and Carlton, sp. nov.
(See Figure 52, a–d)

HOLOTYPE: (male) CHATHAM IS, NZ Hapupu Res 14 Nov 1991 J.S. Dugdale Litter 91/62 (NZAC). *PARATYPES:* (3 males, 2 females) same locality (NZAC). (3 males, 3 females) NEW ZEALAND, CI Chatham I, Hapupu National Historical Reserve 4.xii.1992 R.M. Emberson P. Syrett// litter ex. *Corynocarpus laevigatus*/*Melicytus chathamicus* forest LCNZ 92/9 (LUNZ). (1 male, 1 female) CHATHAM IS, NZ Taiko Camp 5 Mar 1941 R.P. MacFarlane// Litter 91/8 (NZAC). (1 male) CHATHAM IS NZ Little Mangere I 30 Mar 1972// K. Horgan litter 72/279 (NZAC). (1 male) New Zealand, CH Little Mangere I 23–26.i.1998 M. & D. Bell, I. Atkinson (LUNZ). (5 males) CHATHAM IS, NZ Te Awatea 10 Mar 1991 R.C. Craw// litter 91/9 (NZAC). All type specimens are deposited in the NZAC, as indicated.

Etymology. This species is named after the Chatham Island robin or black robin, *Petroica traversi* (Buller) 1872. This endangered, endemic songbird was brought back from the brink of extinction in the 1980s by the extensive conservation efforts and creativity of the New Zealand Wildlife Service. From a total population of five individuals, the species has currently recovered to a stable population of about 250 individuals. This species is now a success story of conservation and is used as a model for fostering programs now used to stabilize other endangered bird species (Butler and Merton 1992).

Diagnosis. Head with sulcus on rostrum; frontal margin of rounded with small patch of sparse setae; gular mound rounded, glabrous, and sub-hemispherical; maxillary palpomeres elongate, maxillary palpomere 4 as long as head, narrow through 1/3–1/2 length, widest just beyond 1/2 length, apical sensory patches present and delineated by faint carina. Pronotum with antebasal sulcus, lateral antebasal fovea, and median basal fovea reduced to pit. Mesoventrite with small patch of setae in concavity towards hind margin of procoxae. Metaventrite with broad depression extending from hind margin of mesocoxae to apex of ventrite between metacoxae. Second ventrite with large shallow oval median depression occupying length of ventrite, apex thickened. This species is difficult to distinguish from *P. flavus* externally. The form of the genitalia, with the median lobe divided, and the parameres short (less than 1/2 length of the basal bulb) is unique among species known from the Chathams.

Description. MALE. Body length: 2.3–2.5 mm. Integument: head, pronotum, elytra, abdomen, and appendages light brown, palpi lighter in color. Head: wide, width between eyes greater than 1/2 length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 19–20 facets. Frontal margin of rostrum in dorsal view straight with sparse suberect setae. Gular mound rounded, hemispherical, about as long a wide, glabrous; area of head posterior to gular mound flattened, slightly concave, bearing flattened modified scales. Maxillary palpomere 4 as long as head, widened in distal 1/2, apical area weakly tuberculate, v-shaped sensory patch present, margined by carina. Thorax: pronotum with basal sulcus faint, delimited by lateral antebasal foveae. Mesoventrite with median shield bearing patch of spongeose setae in small

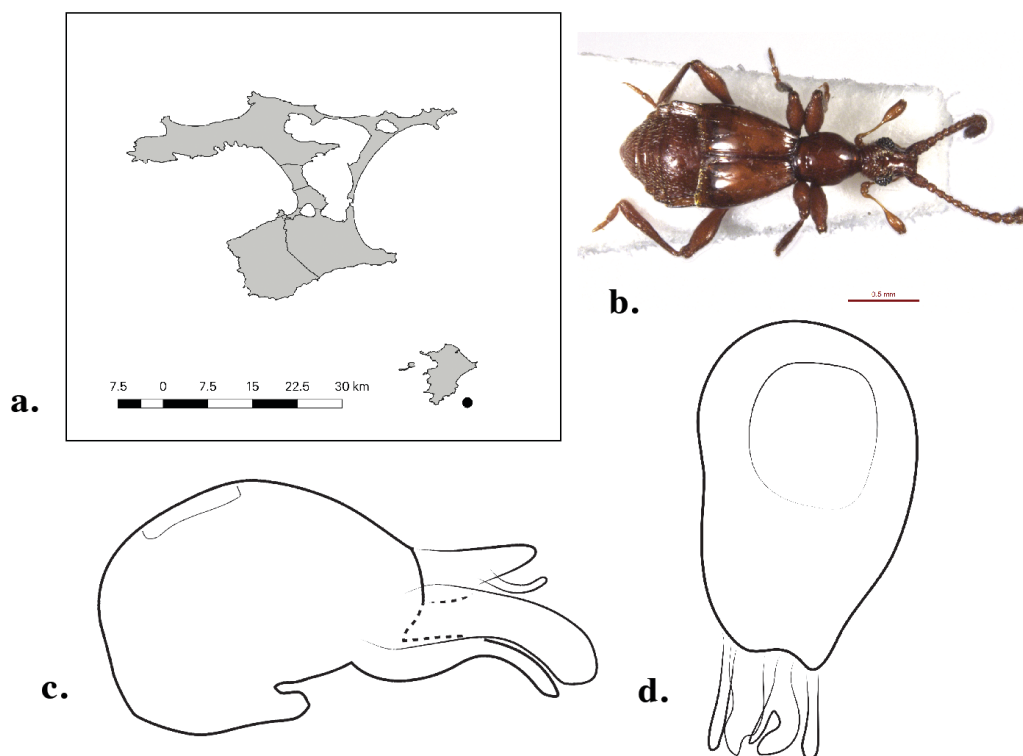


Figure 52. a) map of localities where *Pselaphaulax traversi* specimens have been collected; b) habitus photograph of *P. traversi*; illustrations of *P. traversi* aedeagus c) lateral, d) dorsal.

concavity towards hind margin of procoxae. Metaventricle afoveate, medially depressed; metacoxae separated by extension of first ventrite. Legs unmodified. Elytra with three basal foveae, single sutural fovea; single discal stria, sutural striae present; apical fringe of setae present. Abdomen: Tergites of usual form for tribe. First ventrite covered in dense, shining setae; second ventrite with basal sulcus extending width of entire ventrite, sulcus densely setose, large shallow oval median depression occupying length of ventrite, apex unmodified. Genitalia: aedeagus asymmetrical. Median lobe divided distally, protruding from reduced, fleshy dorsal extension. Ventral process downward curved, distally, about as long as median lobe. Parameres present, short (less than $\frac{1}{2}$ length of basal bulb).

Females. Similar to male except eyes slightly smaller and second ventrite lacking median ovate depression and projections at apex.

Distribution. This species is known from four localities on the Chathams. Three known localities are on the main island, Chatham Island: Hapupu Reserve, Taiko Camp (near present-day Tuku Nature Reserve), and Te Awatea reserve. An additional record of this species is from Little Mangere Island, a small island about 45 km off of the southeastern coast of Chatham Island. Extensive searches of museum collections have not yielded specimens from additional localities, suggesting *P. traversi* is endemic to the Chathams.

Pselaphopluteum Owens, Leschen, and Carlton, gen. nov.

Type species. *Pselaphopluteum motumaha* Owens, Leschen, and Carlton, sp. nov.

Etymology. The genus name is a combination of the prefix “pselaph-” which is common among other genera in the tribe Pselaphini and “pluteum”, the Latin word for “shelf”, which refers to the shelf-like form of the gular modifications in members of the genus. Gender neutral.

Diagnosis. Head with large vertexal depression between eyes; frontal margin of rostrum rounded; gular mound greatly expanded and shelf-like; maxillary palpomeres short, maxillary palpomere 4 weakly pedunculate, apical sensory patch absent. Pronotum with antebasal sulcus, lateral antebasal fovea, median basal fovea, and inner basolateral fovea present. The form of the shelf-like gular mound in combination with the shortened, pedunculate maxillary palpomere 4 easily distinguish *Pselaphopluteum* from all other genera of Pselaphini in New Zealand.

Description. MALE. Based on male holotype and male specimens of the paratype series of *Pselaphopluteum motumaha*. Body length: 2.5–2.7 mm. Integument: Body and appendages light brown, shining. Head: Occiput with median sulcus beginning at base and extending anteriorly, confluent with vertexal depression. Vertexal foveae large, setose, set obliquely into margins of broad vertexal depression parallel to middle of eyes. Vertexal depression occupying expanse of vertex between eyes, confluent with narrower sulcus extending to apex of rostrum. Rostral sulcus bounded by carinate lateral ridges extending to anterior margin of rostrum. Frontal margin of rostrum slightly rounded, with small median notch and patch of erect setae in dorsal view. When viewed laterally, gular mound greatly expanded, flattened and shelf-like. Area of head posterior to gular mound smooth, shining, gular foveae present, paired. Labrum narrowed basally and widened at apex. Mandible slightly falcate. Maxillary palpomere 1 narrow, elongate; palpomere 2 narrow, widened distally; maxillary palpomere 3 short, triangular-rounded; maxillary palpomere 4 shorter than length of head, weakly pedunculate, visible sensory patches absent. Thorax: Pronotum widest at anterior 1/3, narrowed anteriorly and posteriorly. Lateral basal sulcus present, delimited by lateral antebasal foveae, single median antebasal fovea present, inner basolateral fovea present. Prosternum in front of coxae flattened, nude, lateral procoxal foveae present. Profemur modified, flattened ventrally; protibia narrow and curved along length. Mesoventrite with median shield, lateral mesoventral foveae present in large lateral pits filled with dense spongeose setae, lateral mesocoxal foveae absent, median mesoventral foveae present, paired. Mesocoxae approximate, not separated by extension of meso- or metaventrite; mesofemur modified, flattened ventrally; mesotibia narrow and curved along length. Metaventrite afoveate. Metacoxae separated by extension of first ventrite. Elytron with three basal foveae present, discal striae absent, sutural striae present. Abdomen: Tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Second ventrite with basal band of shining modified setae, narrow median depression extending from base to apex of ventrite, depression bounded laterally by short setae from ½ length of ventrite to apex. Genitalia: Asymmetrical. Basal bulb distinct, dorsal diaphragm present. Parameres paired, lateral. Median lobe expanded and complex distally. Ventral and accessory processes present.

Distribution. This genus is known only from specimens collected from Adams Island, Auckland Island, and nearby Enderby Island.

Discussion. This genus is most similar to another genus known from the subantarctic islands of New Zealand, *Pselaphotheseus*. Both genera share a number of characters: Head. Occiput with deep sulcus running from base to vertex, the vertexal depression broad and occupying much of the area between the eyes with vertexal fovea opening obliquely in the

margins of the depression, maxillary palpomeres 2 and 4 relatively short, with segment 4 lacking apical sensory areas. Thorax. Pronotum with basal sulcus, lateral antebasal foveae and a median antebasal fovea on the pronotum; mesoventral shield unmodified; each elytron bearing single discal stria and three basal foveae. However, *Pselaphopluteum* is unique among other described genera of Pselaphini in the combination of the following characters, 1) modified gular area in the form of a broad, shelf-like process, 2) maxillary palpal segment 4 short and weakly elongate-pedunculate, 3) the strangely modified form of the broadened femora with a flattened ventral face, and 4) the narrow, laterally-flattened and curved tibiae. This genus is currently recorded only from Auckland, Adams, and Enderby Island suggesting it is endemic to the subantarctic islands of New Zealand.

Pselaphopluteum motumaha Owens, Leschen, and Carlton, sp. nov.
(See Figure 53, a–f)

HOLOTYPE: (male) New Zealand: AU: Auckland I., Camp Cove, Carnley Harbor, litter 18 Feb. 1973, JS Dugdale 73/90// LSAM 0215919 (NZAC). **PARATYPES:** (6 males) New Zealand: AU: Auckland I., Camp Cove, Carnley Harbor, litter 18 Feb 1973, JS Dugdale 73/90 (LSAM). (1 male) New Zealand: AU: Auckland I., Camp Cove Carnley Harbor, litter 20 Feb 1973, JS Dugdale 73/35 (LSAM). (1 male) New Zealand: AU: Auckland I., Skua Gull Flat, 243 m, Carnley Harbor, plant, 5 Feb 1973 JS Dugdale, 73/73 (LSAM). (1 male) New Zealand: AU: Auckland I., Ranui Cove, 304 m, moss and ferns 27 Feb 1973, JS Dugdale 73/82 (LSAM). (2 males) NEW ZEALAND AU Auckland Is Enderby I Stella Hut 21 Mar 2000 M Bullans E Edwards R. Leschen leaf litter SUB 087 50°30'S 166°16'E (NZAC). (1 female) NEW ZEALAND AU Adams Is. Fairchild's Garden 22 Mar 2006 *Dracophyllum*, *Metrosideros* *Poa* and Megaherb leaf litter R Leschen E Edwards AU 007 S50 50.248 E 165 55.342 (NZAC). (1 male) NEW ZEALAND AU Adams Is Fairchild's Garden 22 Mar 2006 megaherb leaf litter R Leschen E Edwards AU 006 S50 50.248 E165 55.342 (NZAC). Type specimens are deposited in the LSAM or NZAC, as indicated.

Etymology. The specific epithet is a noun in apposition and refers to the Maori name for Auckland Island, Motu Maha (O'Connor 1999), the literal translation of “maha” is “many”.

Diagnosis. Head with large vertexal depression between eyes; frontal margin of rostrum rounded; gular mound greatly expanded and shelf-like; maxillary palpomeres short, maxillary palpomere 4 weakly pedunculate, apical sensory patch absent. Pronotum with antebasal sulcus, lateral antebasal fovea, median basal fovea, and inner basolateral fovea present. Legs for this species are highly modified, all femora broadened with a flattened ventral face and tibiae narrowed and curved along length. The combination of these characters, particularly the form of the shelf-like gular mound in combination with the shortened, pedunculate maxillary palpomere 4 distinguish *Pselaphopluteum motumaha* from all other species of Pselaphini in New Zealand.

Description. MALE. Body length: 2.5–2.7 mm. **Integument:** Body and appendages uniformly light brown to yellowish-brown, glabrous, impunctate, pubescence sparse. **Head:** Wide, width between eyes greater than ½ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 13–15 facets. Antennomere 1 lightly granulate, as long as antennomeres 2–4, antennae otherwise unmodified. Labrum narrowed basally and widened at apex. Mandible slightly falcate, bearing two small teeth. Maxillary palpomere 1 narrow, elongate, ½ as wide as palpomere 2; palpomere 2 narrow, widened distally, less than ½ length of head; maxillary palpomere 3 short, triangular-rounded; maxillary palpomere 4 shorter than

length of head, narrow through $\frac{1}{3}$ length, widest just beyond $\frac{1}{2}$ length, visible sensory patches absent. *Thorax*: Procoxae with frontal rounded process; protrochanter angulate medially; profemur dorsoventrally flattened; protibia laterally compressed and curved along length. Mesocoxae approximate, not separated by extension of meso- or metaventrite; mesofemur broad, flattened on ventral face; mesotibia narrow and curved along length. Median face of metaventrite with longitudinal depression, lateral margins of depression bearing sparse short setae. Metacoxae separated by extension of second ventrite. *Genitalia*: Median lobe expanded and complex distally. Ventral process hooked and bearing flange at apex. Single accessory process on left falcate, incurved. Two accessory processes on right, lower process with broad base, incurved distally, dorsal-most process extending slightly beyond median lobe, incurved distally.

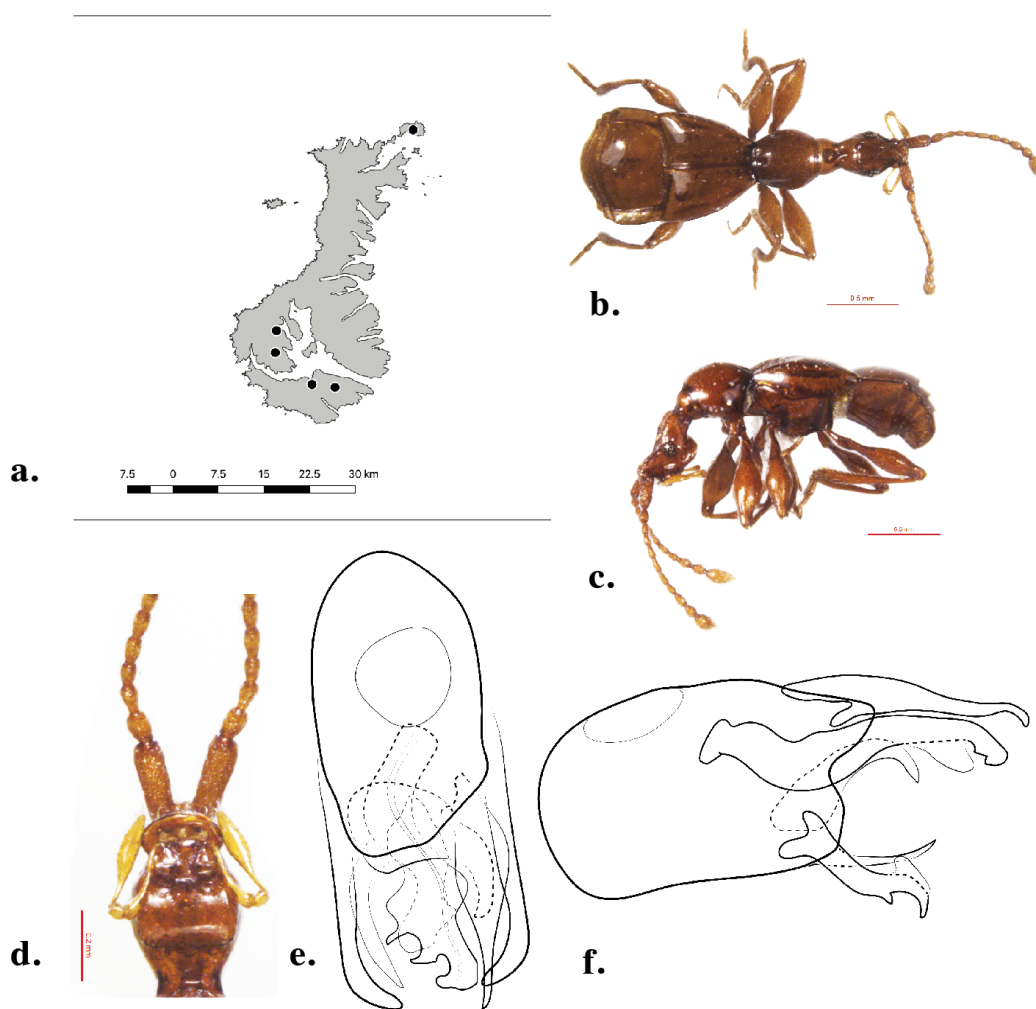


Figure 53. *Pselaphopluteum motumaha* a) map of localities where specimens have been collected; b) habitus photograph, dorsal; c) habitus photograph, lateral; d) gular area, ventral head; e) aedeagus, dorsal; f) aedeagus, lateral.

Females. Difficult to distinguish from males, differing, in addition to genitalia, by the absence of the narrow median depression on second ventrite. Unlike other pselaphines with elaborate gular modifications (*Pselaphotrichus* spp.), both males and females possess the unique gular shelf.

Distribution. This species is known from Adams Island, Auckland Island, and Enderby Island.

Discussion. This species represents the single representative of the monotypic genus, *Pselaphophuteum*. Five male specimens of the type series were dissected, and no variation in the form of the genitalia among individuals was noted.

Discussion. The Campbell Plateau and Chatham Rise underlie the principle oceanic archipelagos south and east of the South Island of New Zealand (Figure 48). Five island groups are included on the Campbell Plateau and one, The Chatham Islands, on the Chatham Rise. The two are separated by the Bounty Trough, with the Chathams to the north, and the Campbell Island groups to the south. These physiographic provinces split from Gondwana with the rest of ancient New Zealand terrains about 80 mya but may possess a separate and distinct history, having perhaps reconnected and combined with the southern portion of New Zealand some 20 mya (Michaux and Leschen 2005).

High levels of biological diversity and endemism characterize the flora and fauna of the Chathams across a variety of taxa, while those of the subantarctic islands are less diverse, but also highly endemic (e.g., Aikman and Miskelly 2004; Gressitt 1964). Both oceanic island groups have been the focus of studies aimed at elucidating biogeographic patterns and sources of flora and fauna of particular islands and of mainland New Zealand (Trewick 2000; Michaux and Leschen 2005; Buckley *et al.* 2013). One broad explanation for the origins of these faunas is that most of the insular biotas are derived from the northern mainland while a smaller portion may be relictual and therefore more broadly related to older, Gondwanan elements (Godley 1965; Kuschel 1964). However, robust biogeographic studies, particularly those that address the evolution of the Campbell Plateau biota, are limited and research on insects, in particular, is generally lacking. Current knowledge of subantarctic insects is based on written descriptions, such as Kuschel and Chown's (1995) study on weevils and phylogenetic studies of aleocharine staphylinids (Ahn *et al.* 2010; Ashe 2002; Leschen *et al.* 2002; Yamamoto & Maruyama 2017; Orlov *et al.* 2019), as well as a single meta-analysis (Michaux and Leschen 2005). Otherwise, faunistic and biogeographic work on the Campbell's biota is scarce (Buckley *et al.* 2015) and genetic studies are few, apart from the single-island study by Leschen *et al.* (2011).

Taxonomic considerations

Prior to this publication, the genera *Pselaphotheseus* (endemic to Campbell Islands), *Pselaphophus* (represented by the single introduced species *Pselaphophus atriventris*), *Pselaphogenius*, and *Pselaphus* were the only pselaphine genera recorded from New Zealand (Nomura and Leschen 2006). Of these, *Pselaphus* is highly variable across its global distribution and likely is polyphyletic, especially in New Zealand (Chandler 2001; Nomura and Leschen 2006). In his work on the Australian pselaphine fauna, Chandler (2001) asserted that representatives of the genus *Pselaphus* in New Zealand either belong in *Pselaphogenius* or *Pselaphaulax*, with no true *Pselaphus* occurring in New Zealand. Further observations of specimens by the first author suggest that a number of the New Zealand taxa currently placed into the genus *Pselaphus*, as well as a number of undescribed species, do not fall within the

boundaries of *Pselaphogenius* or *Pselaphaulax*, and likely represent new genera. However, working within the current framework of genera known from New Zealand, the new species described from the subantarctic islands and the Chathams (with the exception of *Pselaphopluteum motumaha*) share many characters with the genus *Pselaphaulax* known from Australia (see sections on generic diagnoses and species' comments). For this reason, we place these new species into the genus *Pselaphaulax* as currently recognized in New Zealand.

Conversely, while *Pselaphopluteum* appears most similar to *Pselaphotheseus*, also endemic to the subantarctic islands, these genera differ in several morphological characters, most obviously in drastic modifications of the gular region into a shelf-like projection and the extensively flattened and broad femora in the former. Delimiting generic boundaries within the Pselaphini is particularly troublesome because many groups are externally similar and characters traditionally used to distinguish genera in other pselaphine tribes (i.e., the arrangement of foveae on the prosternum and meso- and metaventrites) cannot be consistently used to distinguish genera within this tribe. This breakdown of the reliability of the foveal system is found in other groups, notably the New Zealand Trichonychini (Pselaphinae: Euplectitae) (D. S. Chandler, pers. comm.) and other Australian euplectites (Nomura and Leschen 2015). In the Pselaphini the characters of the head, particularly the modifications of the gular area, the maxillary palpi, the vertexal foveae, and the rostrum, as well as modifications of the shape, sulci, and foveae on the pronotum are more commonly used in combination as distinguishing characters. In the absence of a robust molecular or morphological phylogenetic analyses, the consistent differences seen between *Pselaphopluteum* and *Pselaphotheseus* warrant recognition of the former as a new genus. However, overall similarities in the morphology of the vertexal area of the head, maxillary palpi, pronotum, the meso- and metaventrites suggest these two genera are closely related.

Notes on head morphology in *Pselaphopluteum*

Among pselaphines, modifications of the gular region and the maxillary palpi are common in certain lineages and such morphological features are sometimes greatly exaggerated, including spectacular excavations, processes, and setae present on the gular region in most species of *Pselaptrichus* Brendel and the incredibly elongate and variously setose, tuberculate, or sulcate palpomeres of many genera of Bythinini and Pselaphini. While these characters are sometimes restricted to males, and therefore presumed to be sexual secondary characters associated with mating, (such as in *Pselaptrichus*), they are sometimes exhibited by both sexes.

In New Zealand Pselaphini, both sexes of most species possess an elongate, pedunculate maxillary palpomere 4 and some form of rounded or rounded-ovate process on the gular area. Of species observed to date, only *Pselaphophus atriventris*, the two species of *Pselaphotheseus*, and *Pselaphopluteum motumaha* possess a shortened maxillary palpomere 4 in both sexes.

Pselaphopluteum is even more unique in the modification of the gular region into a posteriorly directed shelf-like process and the presence of greatly enlarged flattened femora. In one of the few behavioral studies on pselaphines, Schomann *et al.* (2008) demonstrated that maxillary palpi play an important role in prey capture and manipulation. Two of the three examples of Pselaphini with a shortened maxillary palpomere 4 in New Zealand occur in the two genera of Auckland Island endemics, suggesting this palpal form may be adapted to feeding in harsh subantarctic island climates. Additionally, the unique form of the shelf-like gular region in *Pselaphopluteum* and the strangely enlarged femora may likewise play a role in prey capture. This combination of unusual features and exaggerated morphology in *Pselaphopluteum* suggests specialization on

predatory feeding behaviors in an extreme environment, similar to bizarre adaptations in *Stylogymnusa* Hammond (Staphylinidae: Aleocharinae), an Auckland Island endemic.

Adults of *Stylogymnusa* are the only known extant staphylinids with piercing sucking mouthparts (Hammond 1975, Ashe 2000). To date we have no knowledge about the exact feeding behaviors of these beetles. Its extinct relative *Electrogymnusa* Wolf-Schwenninger from Baltic amber (Wolf-Schwenninger 2004) bears some similarities of the head capsule to *Stylogymnusa* and understanding the feeding behavior may provide insight into the early evolution of basal staphylinids, in particular the large subfamily Aleocharinae. The presence of unique head characters of another endemic staphylinid to the New Zealand subantarctic region, *Pselaphopluteum*, may be oddly coincidental, or its presence may provide another snapshot of ancient communities that may have been once widespread.

Biogeographic implications

Beetles are the most speciose insect taxon in the Campbell Plateau region. The beetle fauna is a mixture of species that are mostly shared with and/or derived from the New Zealand mainland, with fewer taxa shared with other subantarctic regions (especially Patagonia), and a few “isolated monotypic genera” (Michaux and Leschen 2005; Orlov *et al* 2019). While the basement rocks of the Campbell Plateau are Paleozoic, the Auckland Islands are the oldest emergent landforms (12-25 my) and the Antipodes the youngest (0.2-0.5). The Bounty (135 ha) and Auckland Islands (61,120 ha), are the smallest and largest, respectively (see Michaux and Leschen 2005; Scott *et al.* 2013).

Globally, taxa within the Pselaphini are much more diverse in temperate than in tropical areas, with the Australian, Oriental, and Western and Eastern Palearctic regions containing the majority of the tribe’s genera and species (Table I), while the Neotropical fauna is notably depauperate for this group. Traditionally, diversity within the Pselaphini has exhibited a strong Gondwanan bias, and this has been viewed as the likely biogeographic origin of this fauna (Jeannel 1950; Hlavác and Chandler 2005). However, on a broad scale, the scattered presence of Pselaphini taxa in the Indian, Afrotropical, Malagasy, South African, New Caledonian, Tasmanian, and Australian regions presents a confounding mix of Gondwanan and Laurasian faunal elements. Additionally, the conspicuous absence of the tribe from temperate South America (Chile and southern Argentina) leaves a distributional gap that is inconsistent with a Gondwanan explanation of current diversity patterns.

Allopatry on islands, such as the Campbell Island/Auckland Islands split between *Pselaphopluteum* and *Pselaphotheseus*, is common for many groups on the Campbell Plateau (Michaux and Leschen 2005) indicating widespread ancestors endemic to the Plateau itself with regional vicariance resulting in insular allopatric distributions, possibly involving previously exposed island terrains (Leschen *et al.* 2011). A less common pattern is the presence of sympatric species, such as the two species of *Pselaphotheseus* on Campbell Island (Carlton and Leschen 2001). This also occurs in Carabidae (*Loxomerus* Chaudoir and *Oopterus* Guérin-Méneville; Laroche and Larivière 2001), aleocharine staphylinids (*Leptusa* Kraatz; Orlov *et al.* 2019) and Tenebrionidae (*Pseudhelops* Guérin-Méneville Tenebrionidae; Leschen *et al.* 2011) on Campbell and Auckland Islands. *Pselaphotheseus* and other taxa that are sympatric likely evolved in allopatry (e.g., Leschen *et al.* 2011). Their natural history requires detailed study to determine if resource partitioning or other local ecological factors are involved with their co-existence (Carlton and Leschen 2001) or if these species are functionally redundant (Scheffer *et al.* 2015).

On the Campbell Plateau pselaphines are apparently completely absent from Snares Islands and the Bounty Platform to the east (Bounty and Antipodes Islands). Absence on the Snares Islands and presence on the Auckland Islands is indicative of some “isolated monotypic genera” such as *Stylogymnusa*, found only on Auckland Islands and sister to the basal group Gymnusini (Ahn and Ashe 2004; Cai *et al.* 2015; Yamamoto & Maruyama 2017). The small islands of the Bounty Platform lack forest litter habitats, and the absence of trees or shrubs may explain the depauperate fauna of groups such as pselaphines and other litter-dwelling Coleoptera such as weevils (only one species of weevil is present in the Antipodes) (Kuschel 1964, 1971; Marris 2000). Conversely, oceanic barriers to dispersal could also explain the lack of pselaphines on the Bounty Platform, and possibly the Snares.

Seven species of the subfamily Pselaphinae have been recorded from the Chathams including two species of Faronitae (Park and Carlton 2014) and four species belonging to the tribe Pselaphini. Of the latter, two are recorded in Emberson’s checklist (2002) as being “unknown species” of the genus *Pselaphaulax*, with another recorded as an unknown genus. *Pselaphophus atriventris*, a widespread invasive species from Australia introduced to New Zealand (Carlton and Leschen 2008), is the only described species in the tribe currently known from the islands. The three species described herein appear to be endemics to the Chathams, with congeners on the North and South Islands of New Zealand. Evidence of a land bridge between the Chathams and main island exists (Lee *et al.* 2003), and this may explain patterns suggesting a recent origin with differential extinctions of the Chathams fauna. Some volcanic islands among the Chathams are estimated to be between seven and four million years old, while most island components are generally considered to be only between one and three million years old (Campbell & Hutching 2007). Emberson (1998) argued for a South Island source for much of the Chatham’s Island beetle fauna, while Craw (1988) showed widespread taxa shared with mainland New Zealand.

Pselaphini lineages on the New Zealand mainland and surrounding islands may represent ancient, relictual lineages of a once continuous distribution across Gondwana, or may be part of a much larger widespread dispersal of the tribe. A recent examination of the origin and diversification of the higher Pselaphinae has suggested an earlier origin (Jurassic) for many of these groups, predating a Laurasian-Gondwanan breakup (Parker 2016). Ultimately, closer examination of the world fauna especially for nearby Tasmanian, Australian and New Caledonian faunas may help shed light on this question.

3.7. MONOTYPIC GENERA OF THE NEW ZEALAND PSELAPHINI

Introduction. Revision of the tribe Pselaphini in NZ is complete with the description herein of six monotypic genera, bringing the total number of NZ genera in the tribe to twelve. Three new species are described: “*Pselaphoaotearoa rugosus*”, gen. et sp. nov.; “*Pselaphopegasus stewarti*”, gen. et sp. nov.; and “*Pselaphotuberculum chandleri*”, gen. et sp. nov. Three species previously in *Pselaphus* Herbst are transferred to new genera and redescribed: “*Pselapholobus*” *dulcis* (Broun), gen. et comb. nov.; “*Pselapholateralis*” *cavidorsis* (Broun), gen. et comb. nov.; and “*Pselaphazealus*” *sulcicollis* (Broun), gen. et comb. nov. Revisionary and descriptive work in the region on this taxon is summarized (Owens *et al.* 2019; Owens & Carlton 2020), a checklist and key to the genera of the tribe Pselaphini on New Zealand are provided, along with habitus photographs, distributional maps, and line drawings of diagnostic characters.

The Pselaphinae constitutes a major component of the litter arthropod community in south temperate regions (Australia, New Zealand, southern Chile and Argentina, and South Africa and Madagascar). Notably, the pselaphine fauna of these areas comprises 510 genera or 40% of the genera within the subfamily globally. The Australian and New Zealand fauna have been recognized as centers of pselaphine diversity (Nomura and Leschen 2006, Chandler 2001) and endemism. However, despite the high diversity of taxa on New Zealand, studies of the subfamily in this region have been relatively scarce historically. To date, the most complete catalogue of the New Zealand fauna (Nomura and Leschen 2006) included 385 species in 42 genera. Of this total, 334 species (almost 87%) were described by Thomas Broun between 1883 and 1922, and 30 species were concurrently described by David Sharp. Thus, until the revision of the supertribe Faronitae (Park and Carlton 2015 and references therein), 95% of currently recognized New Zealand species were described by these two individuals in the late 19th and early 20th centuries in descriptions that were typical of the period but are considered woefully inadequate by modern standards.

The geographical proximity and close association, taxonomically, of the New Zealand and Australian faunas provides a useful context for studying New Zealand taxa. Interestingly, while the Australian pselaphine fauna is one of the best understood at the generic level (Chandler 2001), the fauna of New Zealand is one of the poorest known, with only the Faronitae benefiting from modern monography. Comparison of these two regional species assemblages and utilization of the Australian monograph (Chandler 2001) as a model for dealing with New Zealand taxa provides a framework to expedite taxonomic work in the region.

Globally, the tribe Pselaphini constitutes 321 species in twenty-two genera based on Newton and Chandler (1989) and a few subsequent descriptions. This taxon exhibits high diversity in temperate regions, with the most recent major revisionary work at the tribal level having been done on the Australian fauna (Chandler 2001). On New Zealand, the Pselaphini is represented by four genera containing a total of 19 species. Current assessment of the New Zealand pselaphine fauna is derived from a handful of major works: Newton and Chandler's (1989) catalog of the global genera, Klimaszewski et al.'s (1996) review of the Staphylinidae of New Zealand, Nomura and Leschen's (2006) faunistic review of the New Zealand pselaphine taxa, and Chandler's (2001) Australian checklist, which provided useful comments on select elements of the New Zealand fauna. The most recent checklist to the subfamily of the country (Nomura and Leschen 2006) records two species of *Pselaphotheseus*, thirteen species of *Pselaphus*, a single species of *Pselaphophus*, and three species of *Pselaphogenius* Reitter (previously a synonym under *Dicentrius*) in the Pselaphini. Although Chandler's (2001) monograph primarily dealt with the Australian fauna, he included narratives on the generic boundaries of many Pselaphini and some notes on the fauna of New Zealand. In particular, this work addressed the complex issue of distinguishing the genera *Pselaphus*, *Pselaphogenius*, and *Pselaphostomus* Reitter, and the non-monophyly of *Pselaphus* as it is currently defined on New Zealand.

Previous manuscripts by the authors dealing with the New Zealand Pselaphini (Owens et al. 2019; Owens and Carlton 2020) have resulted in the revision of the two largest genera on New Zealand, *Pselaphaulax* and *Pselaphogenius*, as well as the description of a new genus on South Island, *Pselaphotumulus*, and the description of several new elements of the Subantarctic Island and Chatham Island fauna. The current work describes six new genera, three of which include new species as type species, and three of which result from the transfer of three species of *Pselaphus* into respective new genera. This completes the redescription and reassignment of

all of Broun's species of *Pselaphus* into other genera, and is the last step towards completing a revision of the tribe on New Zealand.

Materials and Methods. Materials and methods follow those pertaining to revisionary work in Chapters 2.1., 2.2., 2.3., 2.4., and 2.5.

All specimens were obtained from the following institutions:

FMNH Field Museum of Natural History, Chicago, IL, USA.

LSAM Louisiana State Arthropod Museum, Louisiana State University, Baton Rouge, LA, USA.

NHM Natural History Museum, London, United Kingdom.

NZAC New Zealand Arthropod Collection, Landcare Research, Auckland, NZ.

Verbatim label data are provided for all specimens examined and they are organized alphabetically by two-letter Crosby Codes (Crosby *et al.* 1998). Two slashes (“//”) are used to indicate label breaks. The number and sex of specimens are indicated preceding label data (i.e. “(2 males, 1 female)”), and the lending institution is indicated following label data (i.e. “(NZAC)”). For type specimens, deposition in either the LSAM, NHM, or NZAC is indicated following label data.

Checklist of the New Zealand genera of Pselaphini.

Pselaphaulax Reitter, 1909

Pselaphaulax Reitter (1909: 218).

Type species. *Pselaphus dresdensis* Herbst, 1792 (monot.).

Comments. *Pselaphaulax* is distributed broadly across the Afrotropical, Oriental, and Palearctic regions, as well as in South Africa and Madagascar, and now has been identified as a major constituent of the tribe Pselaphini in NZ. The first species described from NZ were described from a survey of the NZ Subantarctic (one species) and Chatham Islands (three species) (Owens *et al.* 2019). The revision of the genus on the NZ mainland (Chapter 3.1.) resulted in the description of six new species and several taxonomic changes: *Pselaphus trifoveatus* Broun 1914 synonym. under *Pselaphus pilifrons* Broun 1914 and transferred to the genus *Pselaphaulax*; *Pselaphus pilistriatus* Broun 1880 and *Pselaphus fuscopilus* Broun 1886 synonym. under *Pselaphus pauper* Sharp, transferred to *Pselaphaulax*; *Pselaphus meliusculus* Broun 1893 transferred to *Pselaphaulax*. In all, 13 species in the genus are described from New Zealand; no additional species from NZ have been observed in museum collections by the authors.

“*Pselaphazealus*” Owens and Carlton, gen. nov.

Type species. “*Pselaphazealus*” *sulcicollis* (Broun, 1893), comb. nov.

Pselaphus sulcicollis (Broun, 1893: 1415), preoccupied not Reichenbach, 1816.

Comments. This genus is only known from the type species, which was originally described by Broun as a species of *Pselaphus* collected on North Island (WO, Pirongia). The single specimen of this species in the NHM is the only specimen of this genus that has been observed by the authors from any collection localities or among any museum specimens. This monotypic genus is easily recognizable median depression on the pronotum and the absence of eyes.

“*Pselaphoaotearoa*” Owens and Carlton, gen. nov.

Type species. “*Pselaphoaotearoa rugosus*” Owens and Carlton, sp. nov.

Comments. “*Pselaphoaotearoa*” is a monotypic genus described from the Tararua Range on New Zealand. It is one of several genera in NZ that exhibit bizarre modifications to the head region, in this case with a flattened gular area covered in tubercles and elongate maxillary palpi with maxillary palpomere II bearing a row of tubercles along the ventral face.

Pselaphogenius Reitter, 1910

Pselaphogenius Reitter (1910: 155, as genus).

Type species. *Pselaphus quadricostatus* Reitter (design. Jeannel 1950: 389).

Pselaphodinus Jeannel 1950: 389 (as genus)

Type species: *Pselaphus longipalpis* Kiesenwetter (design. orig. descr.).

Dicentrius Reitter (1882, synonym. Besuchet 1968: 295).

Comments. *Pselaphogenius* is known from East Asia, Europe, Australia, and New Zealand. The first members of the genus described from New Zealand included four species in a survey of the fauna of the Three Kings Islands just off the northern tip of North Island (Théry and Leschen 2013). An additional three species were transferred from the genus *Pselaphus* Herbst in the online database of Newton and Thayer (2003): *Pselaphogenius citimus* (Broun), 1893, *Pselaphogenius delicatus* (Broun), 1886, and *Pselaphogenius ventralis* (Broun), 1895. A revision of the genus on the NZ mainland (Chapter 3.2.) resulted in the description of fifteen new species and the transfer of *Pselaphus caecus* Broun 1886 to *Pselaphogenius*. Twenty-three species are known from NZ, making this genus the largest known in the region.

“*Pselapholateralis*” Owens and Carlton, gen. nov.

Type species. “*Pselapholateralis*” *cavidorsis* (Broun, 1923), comb. nov.

Pselaphus cavidorsis (Broun, 1923: 681).

Comments. This genus is only known from the type species, which was originally described by Broun as a species of *Pselaphus*. A number of specimens have been observed by the authors from NZ in addition to the lectotype specimen in the NHM. Among monotypic genera exhibiting striking modifications to the head region, “*Pselapholateralis*” can be easily recognized by the elongate, conspicuously flattened maxillary palpi.

“*Pselapholobus*” Owens and Carlton, gen. nov.

Type species. “*Pselapholobus*” *dulcis* (Broun, 1881), comb. nov.

Pselaphus dulcis (Broun, 1881: 660).

Comments. “*Pselapholobus*” is known from only the type species, which was originally described by Broun in the genus *Pselaphus*. This genus appears to be restricted to North Island. It can be distinguished from others in the tribe by the lateral sulci on the pronotum, which create the appearance of lateral lobes.

“*Pselaphopegasus*” Owens and Carlton, gen. nov.

Type species. “*Pselaphopegasus*” *stewarti* Owens and Carlton, sp. nov.

Comments. This genus is only known from the type species. All specimens seen by the authors were taken from localities on Stewart Island or Codfish Island. It is the most cryptic of the monotypic genera, and is similar to *Pselaphaulax*. It can be distinguished by several key characters: the shortened and tuberculate maxillary palpomere IV (as long as head and rugose or

very lightly tuberculate in *Pselaphaulax*), the absence of a v-shaped sensory patch on maxillary palpomere IV (present and often bounded by carinate ridges in *Pselaphaulax*), median antebasal fovea on pronotum present (absent or reduced to a pit in *Pselaphaulax*), and confluent mesocoxae (separated by meso- and metaventrite in *Pselaphaulax*).

Pselaphophus Raffray, 1890

Pselaphophus Raffray (1890: 139, as genus).

Type species. *Bryaxis atriventris* Westwood (design. Lucas 1920: 544).

Comments. *Pselaphophus* is known from Australia. A single species, *Pselaphophus atriventris* Westwood, 1856, is known from New Zealand where it is presumed to be an introduced species, sometimes reaching high population densities in pasture grasses and other disturbed habitats (Martin 1983). It has the distinction of being the only species of pselaphine worldwide that is considered invasive. *Pselaphophus atriventris* is also one of the few members of the subfamily for which the larvae are described in detail (Carlton and Leschen 2008) and their phenology documented in NZ sheep pastures (Martin 1983).

Pselaphopluteum Owens, Leschen, and Carlton, 2019

Pselaphopluteum Owens, Leschen, and Carlton (2019: 8)

Type species. *Pselaphopluteum motumaha* Owens, Leschen, and Carlton, 2019

Comments. *Pselaphopluteum* is one of two genera of Pselaphini known to be restricted to the Subantarctic Islands. Both *Pselaphopluteum* and *Pselaphotheseus* Park bear modified mouthparts (shortened maxillary palpi). Additionally, *Pselaphopluteum* possesses a bizarrely modified gular region that is produced into a shelf-like process and legs with flattened femora. Modifications to the legs are not seen in other NZ genera of Pselaphini, perhaps an adaptation to restriction to a harsh island habitat.

Pselaphotheseus Park, 1964

Pselaphotheseus Park (1964: 391, as genus).

Type species. *Pselaphotheseus hippolytae* Park (orig. design.).

Comments. This genus is known only from Subantarctic Campbell Island. This genus was only known from the single species, *Pselaphotheseus hippolytae* Park, 1964, until a new species was recovered and described by Carlton and Leschen (2001), *Pselaphotheseus ihupuku*.

Pselaphotheseus shares modified mouthparts (distinctly shortened maxillary palpi) with the other endemic Subantarctic genus of Pselaphini, *Pselaphopluteum* Owens *et al.*, 2019.

“*Pselaphotuberculum*” Owens and Carlton, gen. nov.

Type species. “*Pselaphotuberculum chandleri*” Owens and Carlton, sp. nov.

Comments. This monotypic genus is only known from localities on North Island. Like many of the monotypic genera of Pselaphini in NZ, “*Pselaphotuberculum*” possesses modifications on the head region, in this case in the form of the gular mound as a circular flattened mound covered in tubercles and the pilose maxillary palpomere 4.

Pselaphotumulus Owens and Carlton, 2020

Pselaphotumulus Owens and Carlton (2020: 4)

Type species. *Pselaphotumulus cavelli* (Broun, 1893)

Comments. *Pselaphotumulus* is only known from South Island of New Zealand. Three species were described in the genus: *Pselaphotumulus aorerei* Owens and Carlton; *Pselaphotumulus dubius* Owens and Carlton; and *Pselaphotumulus unus* Owens and Carlton. An additional three species described by Broun in the genus *Pselaphus* were transferred to the genus: *Pselaphotumulus cavelli* (Broun 1893), *Pselaphotumulus oviceps* (Broun 1917) and *Pselaphotumulus urquharti* (Broun 1917).

Descriptions of New Genera.

“*Pselaphazealus*” Owens and Carlton, gen. nov.

Type species. “*Pselaphazealus*” *sulcicollis* (Broun), 1893, comb. nov.

Etymology. This species is a combination of the prefix used for many genera in the Pselaphini (Pselaph-) and “-zealus” to indicate the presence of this genus on New Zealand.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum acute; gular mound glabrous, ovate, longer than wide; maxillary palpomeres elongate, maxillary palpomere IV longer than head, apical swelling covered in tubercles, apical sensory patch absent. Pronotum with median depression, antebasal sulcus absent, lateral antebasal fovea and median basal fovea absent. Mesoventrite with median shield, setose pit absent. The form of the pronotum with a median depression and the absence of eyes distinguish *Pselaphazealus* from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male lectotype. Integument: body and appendages light brown. Head: occiput with median sulcus beginning at base. Vertexal foveae large, opening dorsally. Frontal margin of rostrum acute. Antennal segment one elongate, as long as antennomeres 2–5. When viewed laterally, gular mound glabrous, ovate, longer than wide. Area of head posterior to gular area nude, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, widened distally; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV longer than head, enlarged at base and from 1/3 length to apex, dorsal surface of swollen apical area densely covered in tubercles, visible sensory patch absent. Thorax: pronotum with median depression; widest at 1/2 length, narrowed anteriorly and posteriorly. Lateral basal sulcus absent, lateral antebasal and median antebasal foveae absent. Prosternum in front of coxae flattened, nude, lateral procoxal foveae present. Legs unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongeose setae, lateral mesocoxal foveae absent. Mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, depressed medially. Metacoxae separated by extension of ventrite I. Elytra with single basal foveae present, single discal stria present as large raised ridge, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with shining modified setae, basally, median ovate depression occupying length of ventrite.

Distribution. This genus is known only from the lectotype locality in Pirongia (WO) on North Island.

Discussion. This is the only genus known from NZ that possesses a median depression on the pronotum. Additionally, the absence of eyes also appears to be unique for genera of the region.

“Pselaphazealus” sulcicollis (Broun), 1893, comb. nov.
Pselaphus sulcicollis Broun (1893: 1415), synon.
(See Figure 54)

Type Material Examined. After observing the type series of *Pselaphus sulcicollis* in the NHM and reviewing Broun’s original description, we determined the following specimen from the NHM to be the holotype: (1 male) TYPE (red/orange label)// 2263.// Pirongia // New Zealand Broun Coll. Brit. Mus. 1922-482 (HOLOTYPE). This specimen matches the single individual with manuscript number “2263” from the locality information provided, “Mount Pirongia”, in the original description (Broun 1893).

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum acute; gular mound ovate, glabrous; maxillary palpomeres elongate, maxillary palpomere IV longer than head, apical area tuberculate, apical sensory patch absent. Pronotum with median depression; antebasal sulcus absent, lateral antebasal and median basal fovea absent. Mesoventrite with median shield, setose pit absent. Ventrite II with median ovate depression occupying length of ventrite. The pronotum with a median depression and the absence of eyes easily distinguish this species from all others on New Zealand. This species is only known from the single lectotype in the NHM and no other species of this genus are known. In the absence of the discovery of additional species in the genus, I elected to not dissect this lectotype, so the genitalia remain undescribed.

Redescription. MALE. Integument: body and appendages light brown. Head: Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes reduced, apparently absent. Antennomere 1 elongate, as long as antennomeres 2-5, antennae otherwise unmodified. Gular mound nude, ovate, longer than wide, gular foveae present, paired. Maxillary palpomere I elongate, $\frac{1}{2}$ as long as palpomere II, palpomere II narrow, slightly enlarged at base and distally, as long as length of head, maxillary palpomere III quadrate, maxillary palpomere IV longer than, slightly enlarged at base, widened gradually from $\frac{1}{3}$ length to apex, dorsal surface of swollen area densely covered tubercles, v-shaped sensory patches absent. Thorax: pronotum with median depression, antebasal sulcus absent, lateral antebasal and median antebasal foveae absent. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, depressed medially. Legs unmodified. Elytra with single basal foveae present, single discal stria present as large raised ridge, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. Ventrite I covered in dense, shining setae, ventrite II with shining modified setae, basally, median ovate depression occupying length of ventrite.

Females. Females of this species are unknown.

Comments. As this genus is known only from a single species represented by a single specimen (the lectotype), the specimen was not dissected. If additional species of this genus become known, dissections may be necessary to delineate species boundaries within the genus.

Distribution. This species is known from only the lectotype from WO.

“Pselaphoaotearoa” Owens and Carlton, gen. nov.

Type species. “*Pselaphoaotearoa rugosus*” Owens and Carlton, sp. nov.

Etymology. The genus name is a combination of the prefix used for many genera in the Pselaphini (*Pselaph-*) and “-aotearoa”, a suffix form of the Maori name for NZ, Aotearoa.

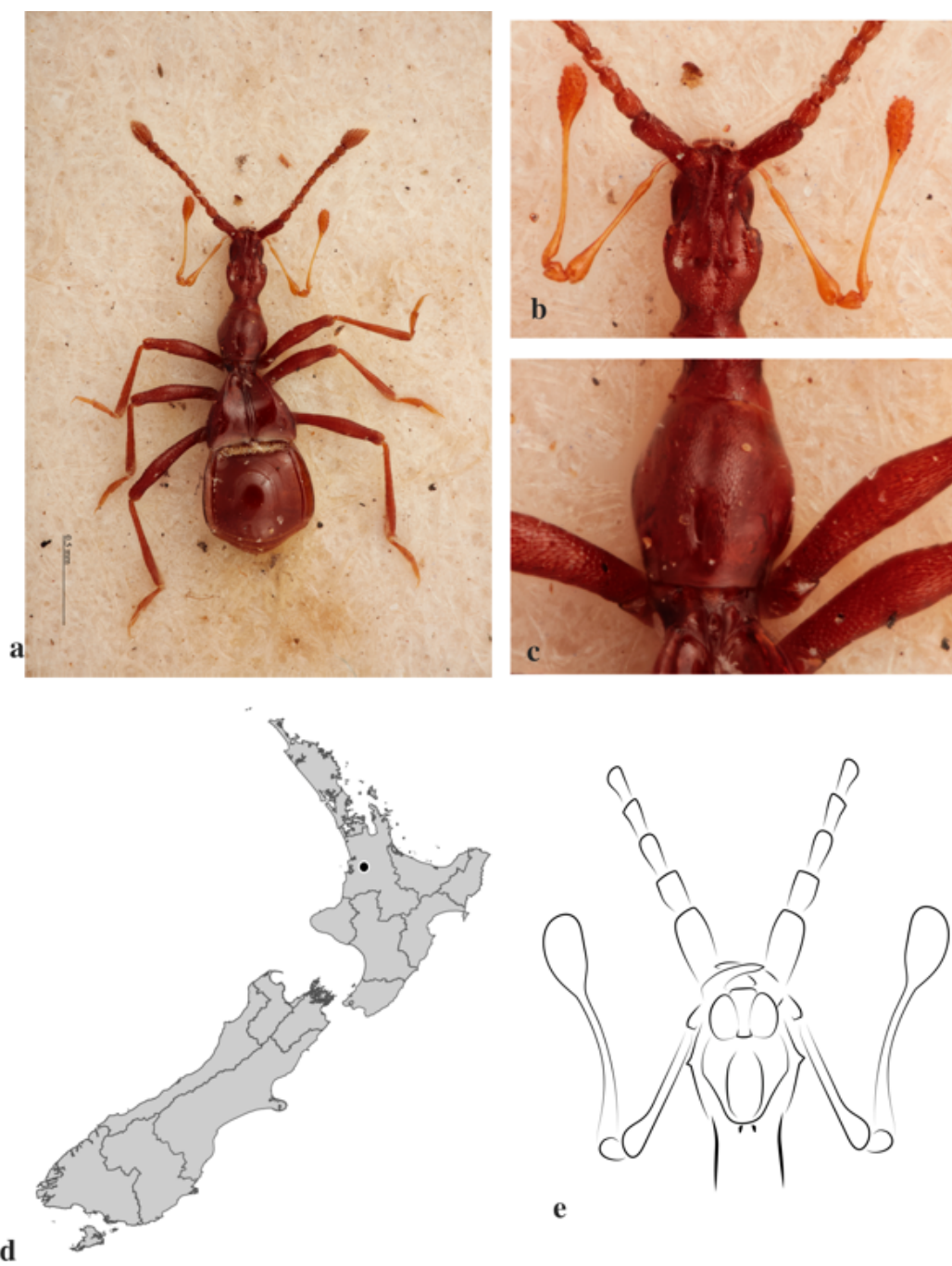


Figure 54. “*Pselaphazealus*” *sulcicollis* (Broun), comb. nov. a) dorsal habitus; b) head, dorsal; c) pronotum; d) collecting localities; e) head, ventral.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum declivous; gular area flattened, covered in tubercles; maxillary palpomeres elongate, maxillary palpomere IV as long as head, apical sensory patch absent. Pronotum with antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Mesoventrite

with median shield, setose pit absent. The form of the flattened and tuberculate gular region in combination with the declivous frontal margin of the rostrum and the maxillary palpomere II with row of tubercles along ventral face easily distinguish "*Pselaphoaotearoa*" from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male holotype. Integument: body and appendages light brown. Head: occiput with median sulcus beginning at base and extending anteriorly to apex of rostrum. Vertexal foveae large, setose, opening dorsally. Frontal margin of rostrum declivous to labrum. Antennomere 1 as long as antennomeres 2–3. When viewed laterally, gular region flattened, densely covered in tubercles. Area of head posterior to tuberculate gular area nude, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, widened distally, bearing ventral row of small tubercles along length; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV as long as head, enlarged at base and from ½ length to apex, visible sensory patch absent. Thorax: pronotum widest at anterior 1/3 length, narrowed anteriorly and posteriorly. Lateral basal sulcus absent, lateral antebasal foveae present, median antebasal foveae absent. Prosternum in front of coxae flattened, covered in flattened setae, lateral procoxal foveae present. Legs unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongeose setae, lateral mesocoxal foveae absent. Mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, produced medially into large tumosity. Metacoxae separated by extension of ventrite I. Elytra with single basal foveae present, discal striae absent, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with shining modified setae, basally, shallow median ovate depression occupying length of ventrite.

Distribution. This genus is known only from specimens of the type species collected around the Tararua Range in WN.

Discussion. This genus is one of several monotypic genera in NZ that possess modifications to the head region that are diagnostic. However, no other genus possesses the combination of the flattened and tuberculate gular region and declivous frontal margin of the rostrum.

"Pselaphoaotearoa rugosus" Owens and Carlton, sp. nov.
(See Figure 55)

Holotype. (male) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 990m 13 Feb 1985// C.F. Butcher Litter 85/16 (NZAC). Paratypes. (2 females) holotype locality (deposition?).

Etymology. The specific epithet refers to the roughened appearance of the underside of the head of this species due to the proliferation of tubercles in this region.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum declivous; gular area flattened, covered in tubercles; maxillary palpomeres elongate, maxillary palpomere II with row of tubercles along ventral face, maxillary palpomere IV as long as head, apical sensory patch absent. Pronotum with antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Mesoventrite with median shield, setose pit absent. Ventrite II with shallow median ovate depression occupying length of ventrite. Aedeagus with medial lobe curved downward, right lateral process bifurcate, distally, ventral process absent. The form of the flattened and tuberculate gular region in combination with the declivous frontal margin of the rostrum, the maxillary palpomere II with row of tubercles along ventral

face, and the aedeagus with bifurcate lateral process and ventral process absent easily distinguish this species from all others on New Zealand.

Description. Male. HOLOTYPE. Integument: body and appendages light brown. Head: Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 8 facets. Antennomere 1 as long as antennomeres 2-3, antennae otherwise unmodified. Gula flattened, covered in tubercles, gular foveae present, paired. Maxillary palpomere I elongate, $\frac{1}{2}$ as long as palpomere II, palpomere II narrow, slightly enlarged at base and distally, shorter than length of head, row of small tubercles along length on ventral side, maxillary palpomere III quadrate, maxillary palpomere IV as long as head, slightly enlarged at base, widened gradually from just before $\frac{1}{2}$ length to apex, v-shaped sensory patches absent. Thorax: pronotum with antebasal sulcus absent, lateral antebasal foveae present, median antebasal foveae absent. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, produced medially into large tumosity, two lateral rows of short setae extending along edges of tumosity. Legs unmodified. Elytra with single basal foveae present, discal striae absent, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. Ventricle I covered in dense, shining setae, ventrite II with shining modified setae, basally, shallow median ovate depression occupying length of ventrite. Genitalia: aedeagus asymmetrical; median lobe curved downwards, distally; dorsal diaphragm large, occupying much of length of basal bulb; right lateral process distally bifurcate; ventral process absent.

Females. Differing from males in the absence of the median ovate depression on ventrite II.

Distribution. This species is known from several localities in the Tararua Range in WD.

Comments. This species represents the single representative of the monotypic genus, “*Pselaphoaotearoa*”. Two male specimens were dissected. No variation in the form of the genitalia was noted.

Material Examined. (5 females) NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 800m 13 Feb 1985// G.W.Ramsay Litter 85/18 (LSAM); (1 male, 2 females) NEW ZEALAND: WN: Tararua Forest Park, Southern Crossing btwn. Kime Hut & Dinnan peak, 1200-1300m, 40°56'S, 175°16'E, 25.xi.2005, alpine zone w/scrub *Olearia*; FMHD#2005-038, berl., mixed litter under shrubs, A. Solodovnikov & D. Clarke; ANMT site 1154 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH).

“*Pselapholateralis*” Owens and Carlton, gen. nov.

Type species. “*Pselapholateralis*” *cavidorsis* (Broun), 1923, comb. nov.

Etymology. This genus name is a combination of the prefix used for many genera in the Pselaphini (Pselaph-) and “-lateralis”, referring to the laterally compressed maxillary palpomere IV of members of this genus.

Diagnosis. Head with median rostral sulcus, vertexal foveae separated by raised area of vertex; slightly rounded, with a few sparse erect setae in dorsal view; gular mound gently rounded, shining, broadly covering anterior portion of gula; maxillary palpomeres elongate, maxillary palpomere IV longer than head, gradually widened distally from just beyond $\frac{1}{2}$ length to apex, swollen area laterally compressed, v-shaped sensory patches present on outer face. Pronotum with antebasal sulcus absent, lateral antebasal foveae and median basal fovea absent. Mesoventrite with median shield, setose pit absent. The form of the anteriorly swollen gular

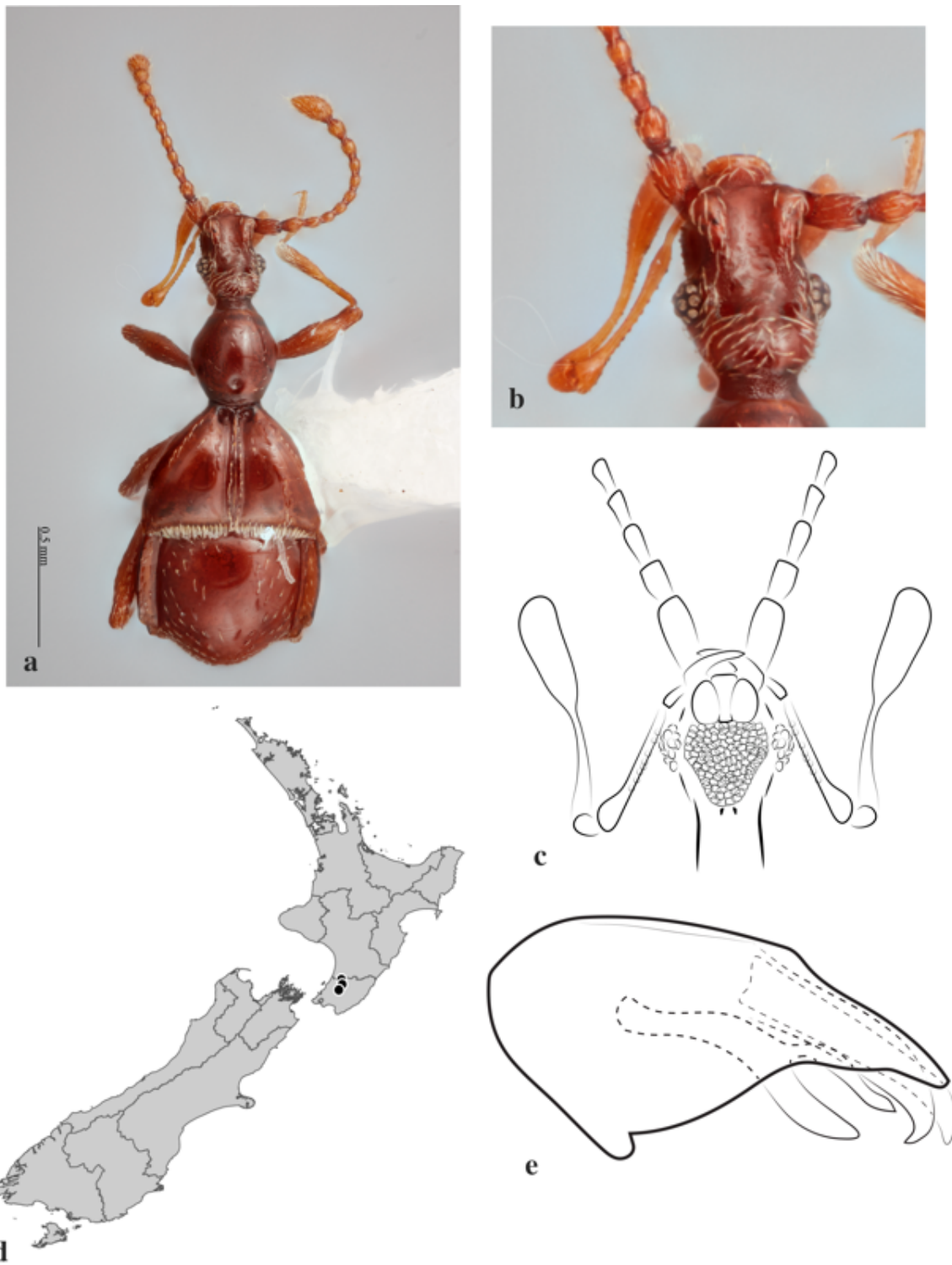


Figure 55. “*Pselaphoaotearoa rugosus*”, sp. nov. a) dorsal habitus; b) head, dorsal; c) head, ventral; d) collecting localities; e) aedeagus, lateral.

region in combination with the laterally compressed maxillary palpomere IV easily distinguish “*Pselapholateralis*” from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male lectotype. Integument: body and appendages light brown. Head: occiput with median sulcus beginning at base and extending anteriorly to apex of rostrum. Vertexal foveae large, setose, separated by raised area of vertex. Frontal margin of rostrum slightly rounded, with a few sparse erect setae in dorsal view. Antennomere 1 as long as antennomeres 2–3. When viewed laterally, gular mound gently rounded, shining, broadly covering anterior portion of gula. Area of head posterior to gular mound flattened, bearing sparse, unmodified setae, gular foveae present, paired. Maxillary palpomere I elongate; palpomere II narrow, widened distally, equal to length of head; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV longer than head, enlarged from ½ length to apex, swollen distal area laterally compressed, v-shaped sensory patch present on outer face. Thorax: pronotum widest at 1/2 length, narrowed anteriorly and posteriorly. Lateral basal sulcus absent, lateral and median antebasal foveae absent. Prosternum in front of coxae flattened, sparsely covered in flattened setae, lateral procoxal foveae present. Legs unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongeose setae, lateral mesocoxal foveae absent. Mesocoxae separated by extension of meso- and metaventrite. Metaventrite afoveate, medially depressed. Metacoxae separated by extension of ventrite I. Elytra with single basal foveae present, single discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with shining modified setae, basally, median ovate depression occupying length of ventrite.

Distribution. This genus is known only from the specimens of the type species collected in ND on North Island.

Discussion. Only “*Pselaphazealus*” also possesses a maxillary palpomere IV that is flattened. However, the differences in the form of the gula (flattened and tuberculate in “*Pselaphazealus*”, glabrous and covering anterior portion of gula in “*Pselapholateralis*”) and the declivous frontal margin of the rostrum in “*Pselaphazealus*” (rounded in “*Pselapholateralis*”) distinguish the two.

“*Pselapholateralis*” *cavidorsis* (Broun), 1923, comb. nov.

Pselaphus cavidorsis (Broun, 1923: 681), synonym.

(See Figure 56)

Type Material Examined. After observing the type series of *Pselaphus cavidorsis* in the NHM and reviewing Broun’s original description, the following specimen from the NHM was determined to be the holotype: (1 male) TYPE (red/orange label)// Oruru 6-10-1018// New Zealand Broun Coll. Brit. Mus. 1922-482 (Holotype). This specimen matches the locality, “Oruru”, provided by Broun in the original description.

Diagnosis. Head with median rostral sulcus, vertexal foveae separated by raised area of vertex; slightly rounded, with a few sparse erect setae in dorsal view; gular mound gently rounded, shining, broadly covering anterior portion of gula; maxillary palpomeres elongate, maxillary palpomere IV longer than head, gradually widened distally from just beyond 1/2 length to apex, swollen area laterally compressed, v-shaped sensory patches present on outer face. Pronotum with antebasal sulcus absent, lateral antebasal foveae and median basal fovea absent. Mesoventrite with median shield, setose pit absent. Ventrite II with median ovate depression

occupying length of ventrite. Aedeagus with blunt median lobe, short lateral processes, dorsal diaphragm small, and ventral process curved downwards, distally. The form of the anteriorly swollen gular region in combination with the laterally compressed maxillary palpomere IV, and the aedeagus with median lobe blunt, lateral processes short, and ventral process curved downwards, distally, distinguish *P. cavidorsis* from all other species in NZ.

Redescription. MALE. Integument: body and appendages light brown. HEAD: Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes small, composed of 4 facets. Antennomere 1 as long as antennomeres 2-3, antennae otherwise unmodified. Gular mound gently rounded, shining, broadly covering anterior portion of gula; gular foveae present. Maxillary palpomere I elongate; palpomere II narrow, widened distally, equal to length of head; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV longer than head, enlarged from $\frac{1}{2}$ length to apex, swollen distal area laterally compressed, v-shaped sensory patch present on outer face. Thorax: pronotum with antebasal sulcus absent, lateral and median antebasal foveae absent. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, medially depressed. Legs unmodified. Elytra with single basal foveae present, single discal stria absent, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. Ventrite I covered in dense, shining setae, ventrite II with shining modified setae, basally, median ovate depression occupying length of ventrite. Genitalia: aedeagus asymmetrical; median lobe blunt; dorsal diaphragm small, occupying less than $\frac{1}{3}$ length of basal bulb; right and left lateral processes short; ventral process narrow, curved downwards, distally.

Females. Differing from males in the absence of the median ovate depression on ventrite II.

Distribution. This species is known from several localities in ND on North Island.

Comments. This species represents the single representative of the monotypic genus, *Pselapholateralis*. Dissected male specimens did not display any variation in the form of the genitalia.

Material Examined. (2 males) New Zealand: ND: Omahutu S.F. Litter, 18 Mar 1978 SB Peck (LSAM); (1 male) New Zealand: ND: Wiamatenui, Waipoua Moss, 12 Jun 1966 JI Townsend, 66/180 (LSAM); (1 male, 2 females) New Zealand: ND: Waipoua S.F. Litter, 20 Oct 1967 JC Watt, 67/251 (LSAM); (2 males, 2 females) New Zealand: ND: Waipoua Stm., 100 m Litter 19 May 1978, SB Peck (LSAM); (1 female) NEW ZEALAND Waipoua SF Toronui Track 30 Oct 1980 G. Kuschel (NZAC); (1 female) NEW ZEALAND ND Waipoua SF Wairau Smt, 390m 14 Apr 1980 J.C.Watt// Sifted litter 80/51 (NZAC); (1 male, 1 female) Mangamuka Gorge S.R., 6.6km nw Mangamuka, 70m, 25.xi-5.xii.1984 hdwd.-podocarp forest A. Newton/M. Thayer 682/ rotting epiphytes on ground at tree fall, Winkler extraction (FMNH); (1 male) Omahuta For., Picnic Area near Kauri Sanctuary, 330m, 29.xi-5.xii.1984 20 hdwd.-podocarp for A.Newton/M. Thayer 694/ berl. Leaf & log litter, forest floor (FMNH); (2 males, 5 females) NEW ZEALAND: ND Trounson Kauri Park 250m, 3-7.xii.1984 kauri-podocarp-hdwd. A.Newton/M.Thayer 698// berl., leaf & log litter, forest floor (FMNH); (1 male, 1 female) NEW ZEALAND: ND: Waipoua SF, Waikohatu Br. 290m 11-14.iv.80 Agathis-podocarp-broadlf. A.Newton/M.Thayer 698// berl., leaf & log litter, forest floor (FMNH); (1 male, 2 females) Waipoua State Forest, Wairau Summit, 400m 27.xi-6.xii.1984 hdwd.-podocarp forest A.Newton/M.Thayer 687/ berl., leaf & log litter, forest floor (FMNH); (1 male) Waipoua State

Forest, 0.8km nw Wairau Summit 350m, 27.xi.1984 hdwd.-podocarp forest A.Newton/M.Thayer 691 (FMNH).

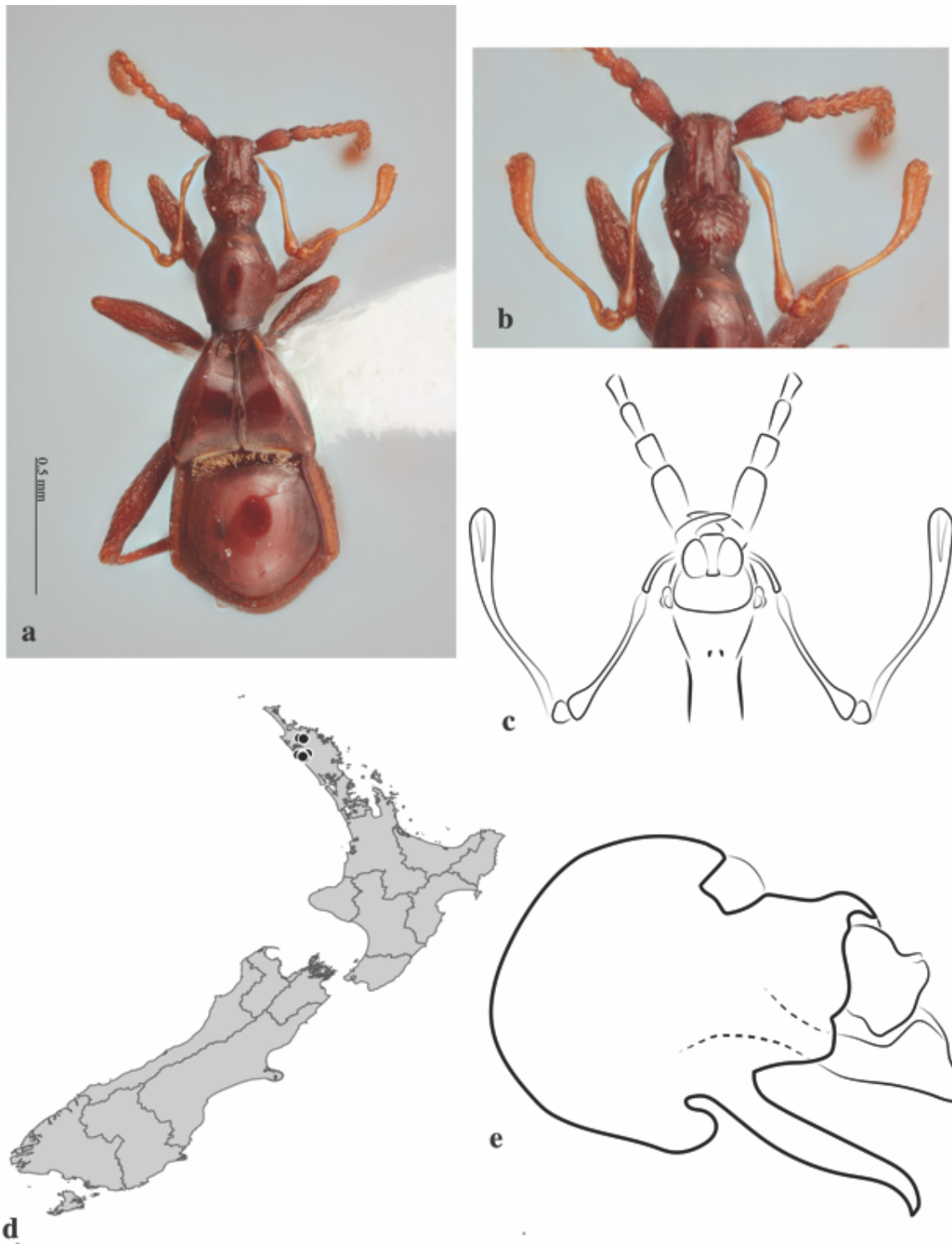


Figure 56. "*Pselapholateralis*" *cavidorsis* (Broun), comb. nov. a) dorsal habitus; b) head, dorsal; c) head, ventral; d) collecting localities; e) aedeagus, lateral.

“Pselapholobus” Owens and Carlton, gen. nov.

Type species. “*Pselapholobus*” *dulcis* (Broun), 1881, comb. nov.

Etymology. The genus name is a combination of the prefix used for many genera in the Pselaphini (Pselaph-) and “-lobus” referring to the lateral lobes visible on the pronotum.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum rounded; gular mound rounded, glabrous, as long as wide; maxillary palpomeres elongate, maxillary palpomere IV as long as head, covered in tubercles, apical sensory patch absent. Pronotum with lateral lobes delimited by deep longitudinal sulci, median longitudinal ridge along length, antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Mesoventrite with median shield, setose pit absent. The form of the pronotum with a median ridge and lateral lobes combined with the gular mound as long as wide and the tuberculate maxillary palpomere IV distinguish “*Pselapholobus*” from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male lectotype. Integument: b: body and appendages light brown. Head: occiput with median sulcus beginning at base and extending anteriorly to apex of rostrum. Vertexal foveae large, opening dorsally. Frontal margin of rostrum rounded in dorsal view. Antennomere 1 as long as antennomeres 2–3. When viewed laterally, gular region rounded, glabrous, as long as wide. Area of head posterior to tuberculate gular area covered in flattened setae, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, elongate; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV as long as head, enlarged at base and from ½ length to apex, dorsal surface of swollen apical area densely covered in tubercles, visible sensory patch absent. Thorax: pronotum widest at anterior 1/2 length, narrowed anteriorly and posteriorly; lateral lobes delimited by deep longitudinal sulci, median longitudinal ridge along length, antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Prosternum in front of coxae flattened, covered in flattened setae, lateral procoxal foveae present. Legs unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongeose setae, lateral mesocoxal foveae absent. Mesocoxae confluent, not fully separated by extension of meso- and metaventrite. Metaventrite afoveate, apically with semi-circular depressed region. Metacoxae separated by extension of ventrite I. Elytra with single basal foveae present, single discal stria, sutural striae and fovea present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with large basolateral fovea present, opening internally to form broad basal depressions, basal ½ of ventrite covered in setae, median ovate depression occupying length of ventrite.

Distribution. This genus is known only from several localities in ND and AK on North Island.

Discussion. “*Pselapholobus*” is the only genus from NZ that possesses ridges or sulci on the pronotum; all other genera known from the region possess evenly rounded pronota.

“Pselapholobus” dulcis (Broun), 1881, comb. nov.

Pselaphus dulcis Broun (1881: 660), synonym.

(See Figure 57)

Type Material Examined. After observing the type series of *Pselaphus dulcis* in the NHM and reviewing Broun’s original description, the following specimen from the NHM was determined

to be the holotype: (1 male) TYPE (red/orange label)// 1153.// Whangarei// New Zealand Broun Coll. Brit. Mus. 1922-482 (Holotype). This specimen matches the manuscript number, "1153" provided in the original species description (Broun 1881). Additionally, the locality on the label data of this specimen indicating a collecting locality in the area of "Whangarei" matches that provided by Broun (1881), "Pataua, North of Whangarei Harbour".

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum rounded; gular mound rounded, glabrous, as long as wide; maxillary palpomeres elongate, maxillary palpomere IV as long as head, covered in tubercles, apical sensory patch absent. Pronotum with lateral lobes delimited by deep longitudinal sulci, median longitudinal ridge along length, antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Mesoventrite with median shield, setose pit absent. Aedeagus with short median lobe and right lateral process, ventral process distally bifurcate. The form of the pronotum with a median ridge and lateral lobes combined with the gular mound as long as wide and the tuberculate maxillary palpomere IV distinguish, and the aedeagus with short median lobe and right lateral process and the ventral process distally bifurcate can distinguish this species from all others on New Zealand.

Redescription. MALE. *Integument:* body and appendages light brown. *Head:* Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 18 facets. Antennomere 1 as long as antennomeres 2-3, antennae otherwise unmodified. When viewed laterally, gular region rounded, glabrous, as long as wide, gular foveae present, paired Maxillary palpomere I narrow, elongate; palpomere II narrow, elongate; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV as long as head, enlarged at base and from $\frac{1}{2}$ length to apex, dorsal surface of swollen apical area densely covered in tubercles, visible sensory patch absent. *Thorax:* pronotum with lateral lobes delimited by deep longitudinal sulci, median longitudinal ridge along length, antebasal sulcus absent, lateral antebasal fovea present, median basal fovea absent. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, apically with semi-circular depressed region. Legs unmodified. Elytra with single basal and sutural foveae present, discal striae absent, sutural striae present. *Abdomen:* tergites of usual form for tribe, otherwise unmodified. Ventrite I covered in dense, shining setae; ventrite II with large basolateral fovea present, opening internally to form broad basal depressions, basal $\frac{1}{2}$ of ventrite covered in setae, median ovate depression occupying length of ventrite. *Genitalia:* aedeagus asymmetrical; median lobe short, blunt; dorsal diaphragm large, occupying $\frac{1}{2}$ length of basal bulb; right lateral process short; ventral process distally bifurcate.

Females. Differing from males in the absence of the median ovate depression on ventrite II.

Distribution. This species is known from several localities in ND and AK.

Comments. This species represents the single representative of the monotypic genus, *Pselapholobus*. Several male specimens were dissected and no variation in the genitalia was observed.

Material Examined. (2 males) New Zealand: ND: Waipoua S.F., 100 m Under kauri log bank 17 Mar 1978, S & J Peck (LSAM); (1 male) New Zealand: ND: Waipoua S.F., Te Matua Ngahere, 370 m, kauri log 19 Mar 1978, S & J Peck (LSAM); (2 males, 1 female) New Zealand: ND: Waipoua Stm., 100 m Litter 19 May 1978, SB Peck (LSAM); (1 female) Waitakere Ra., Cascade-Kauri Park, Anderson Tr., 85m, 23.xi.1984, hdwd.-podocarp A. Newton/ M. Thayer

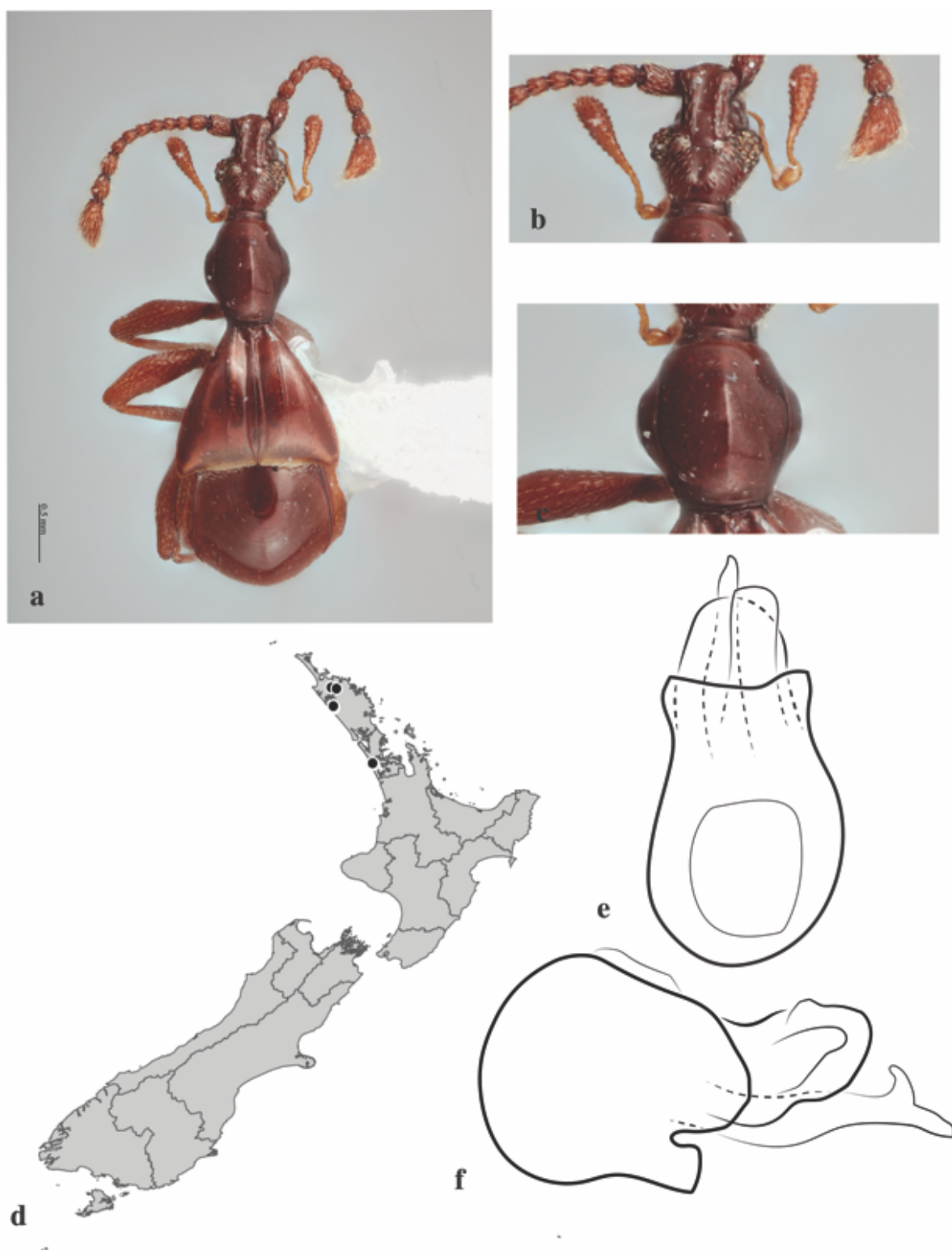


Figure 57. *“Pselapholobus” dulcis* (Broun), comb. nov. a) dorsal habitus; b) head, dorsal; c) pronotum, dorsal; d) collecting localities; e) aedeagus, dorsal; f) aedeagus, lateral.

681/ berl. Leaf & log litter, forest floor (FMNH); (1 male) NEW ZEALAND AK Waitakere Ra., Cascade-Kauri Park, Anderson Tr., 85m, 23.xi-1984, hdwd.-podocarp A.Newton/M.Thayer 681// berl., leaf & log litter, forest floor (FMNH); (1 male) NEW ZEALAND: ND Mangamuka Gorge S.R., 6.6km nw Mangamuka, 70m, 25.xi-5.xii.1984 hdwd.-podocarp forest A.Newton/M.Thayer 682 (FMNH); (1 male) NEW ZEALAND: ND Omahutu Forest, Omahutu Kauri Sanctuary, 340m, 20.xi-1984 kauri-podocarp-hdwd. A.Newton/M.Thayer 693// berl., leaf & log litter, forest floor (FMNH); (1 male) NEW ZEALAND: ND: Waipoua SF, Waikohatu Br. 290m 11-14.iv.80 Agathis-podocarp-hdwd. A.Newton/M.Thayer 693// pyrethrin-fogging fungusy log (FMNH).

“*Pselaphopegasus*” Owens and Carlton, gen. nov.

Type species. “*Pselaphopegasus rakiura*” Owens and Carlton, sp. nov.

Etymology. The genus name is a combination of the prefix used for many genera in the Pselaphini (Pselaph-) and “-pegasus” referring to the type locality at Port Pegasus on Stewart Island.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum markedly emarginate; gular mound rounded, glabrous, as long as wide; maxillary palpomeres elongate, maxillary palpomere IV shorter than head, covered in tubercles, apical sensory patch absent. Pronotum with antebasal sulcus present, lateral and median antebasal foveae present. Mesoventrite with median shield, setose pit absent. The shortened and tuberculate maxillary palpomere IV in combination with the presence of a lateral antebasal sulcus on the pronotum distinguish “*Pselaphopegasus*” from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male holotype. Integument: body and appendages light brown. Head: occiput with median sulcus beginning at base and extending anteriorly to apex of rostrum. Vertexal foveae large, opening dorsally. Frontal margin of rostrum emarginate in dorsal view. Antennomere 1 as long as antennomeres 2–3. When viewed laterally, gular mound rounded, glabrous, as long as wide. Area of head posterior to gular mound covered in flattened setae, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, shorter than length of head; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV shorter than head, enlarged at base and from ½ length to apex, dorsal surface of swollen apical area densely covered in tubercles, visible sensory patch absent. Thorax: pronotum widest at anterior 1/3 length, narrowed anteriorly and posteriorly; antebasal sulcus present, lateral and median antebasal fovea present. Prosternum in front of coxae flattened, covered in flattened setae, lateral procoxal foveae present. Procoxae angulate; legs otherwise unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongeose setae, lateral mesocoxal foveae absent. Mesocoxae confluent, not fully separated by extension of meso- and metaventrite. Metaventrite afoveate, medially concave, lateral margins of concavity forming ridges bearing short setae. Metacoxae separated by extension of ventrite I. Elytra with two basal foveae and single discal fovea, single discal stria, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with shining modified setae basally, median ovate depression occupying length of ventrite, lateral margins of concavity with short setae.

Distribution. This genus is known only from several localities on Stewart Island.

Discussion. This genus is most similar to *Pselaphaulax*, which also possesses a lateral antebasal sulcus on the pronotum. However, the shortened and tuberculate maxillary palpomere

IV (as long as head and rugose or very lightly tuberculate in *Pselaphaulax*), the absence of a v-shaped sensory patch on maxillary palpomere IV (present and often bounded by carinate ridges in *Pselaphaulax*), median antebasal fovea on pronotum present (absent or reduced to a pit in *Pselaphaulax*), and confluent mesocoxae (separated by meso- and metaventrite in *Pselaphaulax*) distinguish these two genera. Additionally, the modified procoxae of *Pselaphopegasus* appear to be unique, with modifications to the legs of male Pselaphini in NZ not being common secondary sexual characters as in many other groups of pselaphines. *Pselaphopegasus* is currently recorded only from Stewart Island, a small island 30 km off the southern coast of South Island.

“Pselaphopegasus rakiura” Owens and Carlton, sp. nov.
(See Figure 58)

Holotype. (male) New Zealand: SI: port Pegasus, Twilight Bay Litter, 22 Feb 1968 G Kuschel, 68/60 (LSAM). *Paratypes.* (6 males, 2 females) holotype locality.

Etymology. This species is only known from several localities on Stewart Island, and the specific epithet refers to the Maori name for this place: Rakiura.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum markedly emarginate; gular mound rounded, glabrous, as long as wide; maxillary palpomeres elongate, maxillary palpomere IV shorter than head, covered in tubercles, apical sensory patch absent. Pronotum with antebasal sulcus present, lateral and median antebasal foveae present. Mesoventrite with median shield, setose pit absent. Ventrite II with median ovate depression occupying length of ventrite. Aedeagus symmetrical, median lobe distally curled, lateral processes straight, short, ventral process short. The shortened and tuberculate maxillary palpomere IV in combination with the presence of a lateral antebasal sulcus on the pronotum, and the aedeagus with median process curled distally, straight lateral processes, and short ventral process distinguish this species from all others on New Zealand.

Description. MALE. Integument: body and appendages light brown. Head: Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 21 facets. Antennomere 1 as long as antennomeres 2-3, antennae otherwise unmodified. When viewed laterally, gular mound rounded, glabrous, as long as wide, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, shorter than head; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV shorter than head, enlarged at base and from $\frac{1}{2}$ length to apex, dorsal surface of swollen apical area densely covered in tubercles, visible sensory patch absent. Thorax: pronotum antebasal sulcus present, lateral and median antebasal fovea present. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, medially depressed. Procoxae angulate, legs otherwise unmodified. Elytra with two basal foveae and single discal fovea, single discal stria, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. Ventrite I covered in dense, shining setae; ventrite II with shining modified setae basally, median ovate depression occupying length of ventrite, lateral margins of concavity with short setae. Genitalia: aedeagus asymmetrical; median lobe curled, distally; dorsal diaphragm small, occupying less than $\frac{1}{2}$ length of basal bulb; lateral processes narrow, straight; ventral process short, distally curved downwards.

Females. Differing from males in the absence of the median ovate depression on ventrite II.

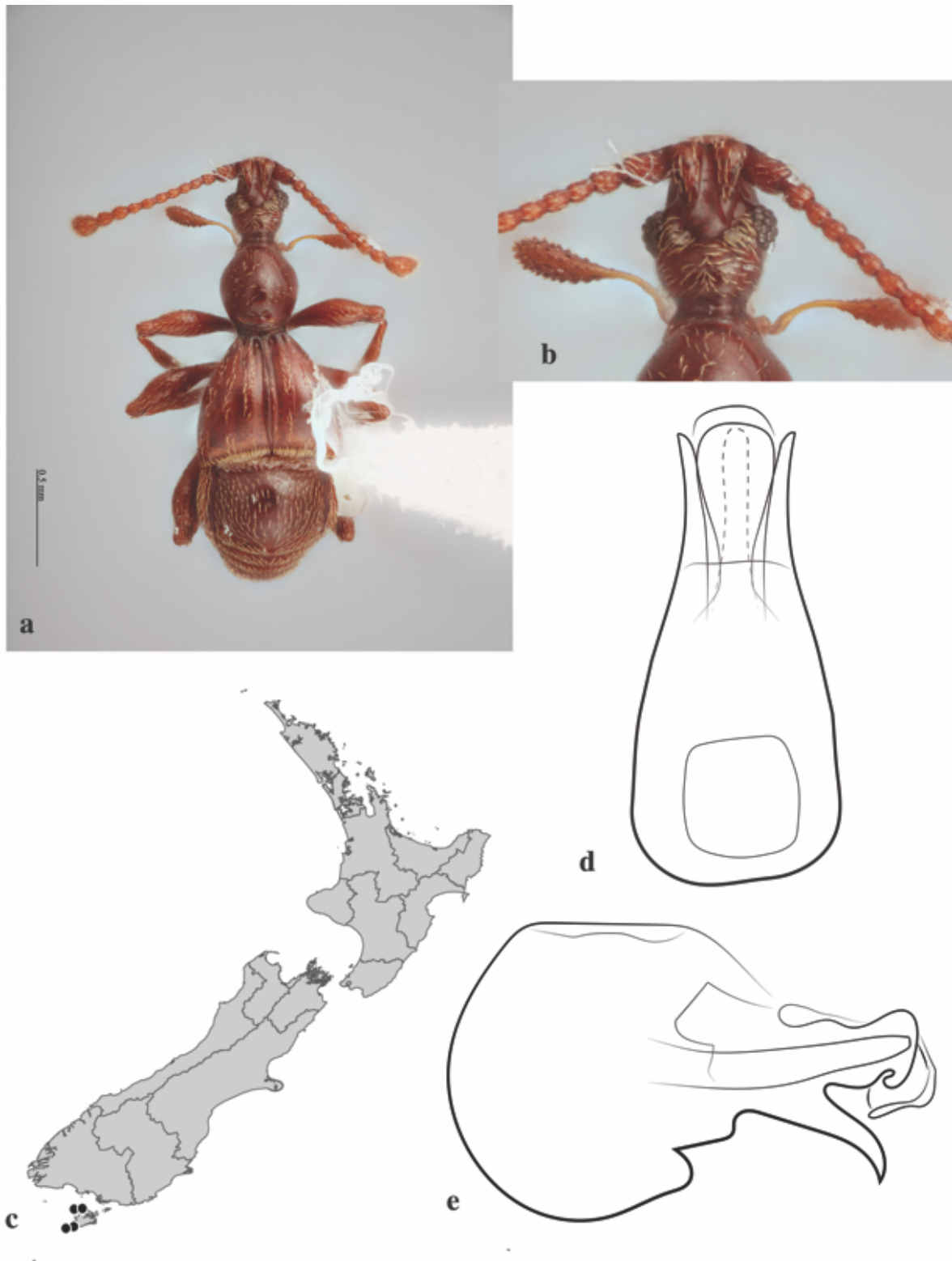


Figure 58. “*Pselaphopegasus rakiura*”, sp. et gen. nov. a) habitus, dorsal; b) head, dorsal; c) collecting localities; d) aedeagus, dorsal; e) aedeagus, lateral.

Distribution. This species is known from several localities on Stewart Island.

Comments. This species represents the single representative of the monotypic genus, *Pselaphopegasus*. Several male specimens were dissected and no variation in the genitalia was observed.

Material Examined. (1 male) New Zealand: SI: Codfish I., moss, 7 Dec 1966 JI Townsend 66/247 (LSAM); (1male, 1 female) New Zealand: SI: Codfish I., near summit 244 m Litter, 14 Dec 1966 JI Townsend, 66/443 (LSAM); (1 female) New Zealand: SI: Codfish I., E. end, Sealers Bay 61 m, litter, 9 Dec 1966 JI Townsend, 66/433 (LSAM); (1 female) New Zealand: SI: Stewart I., Big Cape I., S Peck Litter, 16 Nov 1968 J McBurney, 68/188 (LSAM); (3 females) New Zealand: SI: SW Stewart I., NE Big South Cape, 419 m, litter, 68/92 18 Nov 1968, J McBurney, 68/188 (LSAM); (1 female) New Zealand: SI: SW Stewart I., NE Big South Cape I., litter, 22 Feb 1969 JI Townsend, 69/82 (LSAM); (2 males, 2 females) New Zealand: SI: Stewart I., Big S. Cape, 5th Peak, 258 m, litter, 1 Nov 1968 J McBurney, 68/195 (LSAM); (2 males, 4 females) New Zealand: SI: Stewart Is., N Peak, Big S. Cape I., 213 m, litter, 12 Nov 1968 J McBurney, 68/177 (LSAM); (7 males, 1 female) New Zealand: SI: Stewart I., Pegasus Ck Litter, 24 Nov 1968 G Kuschel, 68/64 (LSAM); (1 female) New Zealand: SI: Stewart I., Port Pegasus, Twilight Bay, litter, 22 Feb 1968 G Kuschel, 68/61 (LSAM).

“Pselaphotuberculum” Owens and Carlton, gen. nov.

Type species. *“Pselaphotuberculum lescheni”* Owens and Carlton, sp. nov.

Etymology. This genus is a combination of the prefix used for many genera in the Pselaphini (Pselaph-) and “-tuberculum”, referring to the tuberculate gular mound.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally, separated by raised area of vertex; frontal margin of rostrum declivous, gently sloping towards labium; gular mound forming flattened circular area, covered in tubercles; maxillary palpomeres elongate, maxillary palpomere IV as long as head, covered in short, erect setae, apical sensory patch present. Pronotum with antebasal sulcus absent, lateral antebasal fovea present, median basal fovea present. Mesoventrite with median shield, setose pit absent. The form of the gular mound as a circular flattened mound covered in tubercles and the pilose maxillary palpomere 4 distinguish *“Pselaphotuberculum”* from all other genera of Pselaphini on New Zealand.

Description. MALE. Based on male holotype. Integument: body and appendages light brown. Head: occiput with median sulcus beginning at base and extending anteriorly to apex of rostrum. Vertexal foveae opening dorsally, separated by raised area of vertex. Frontal margin of rostrum declivous, sloping towards labium. Antennomere 1 as long as antennomeres 2–3. Gular mound modified into flattened circular area, tuberculate. Area of head posterior to tuberculate gular area nude, gular foveae present, paired. Maxillary palpomere I narrow, elongate; palpomere II narrow, elongate; maxillary palpomere III short, triangular-rounded; maxillary palpomere IV as long as head, from just before ½ length to apex, dorsal surface of swollen apical area densely covered in short, erect setae, visible sensory patch present. Thorax: pronotum widest at anterior 1/3 length, narrowed anteriorly and posteriorly; antebasal sulcus absent, lateral antebasal fovea present, median basal fovea present. Prosternum in front of coxae flattened, covered in flattened setae, lateral procoxal foveae present. Legs unmodified. Mesoventrite with median shield, lateral mesoventral foveae present in large pits filled with dense spongy setae, lateral mesocoxal foveae absent. Mesocoxae broadly separated by extension of meso- and metaventrite. Metaventrite afoveate, produced medially into large tumosity. Metacoxae separated by extension

of ventrite I. Elytra with two basal foveae and single sutural fovea present, discal striae absent, sutural striae and fovea present. Abdomen: tergites of usual form for tribe, otherwise unmodified. First ventrite covered in dense, shining setae. Ventrite II with shining modified setae, basally, median ovate depression occupying length of ventrite.

Distribution. This genus is known from localities in WN and AK on North Island.

Discussion. “*Pselaphotuberculum*” is unlike any other genus on New Zealand in the possession of a gular region that is formed into a flattened, circular mound covered in tubercles, and in the form of the pilose maxillary palpomere IV.

“*Pselaphotuberculum lescheni*” Owens and Carlton, sp. nov.
(See Figure 59)

Holotype. (male) NEW ZEALAND WN Tararua Ra Dundas Hut 1250m 4 Dec 1984 R.C.Craw// Sifted litter 84/89 (NZAC). Paratypes. (1 male, 3 females) holotype locality.

Etymology. This species is named in honor of Dr. Richard Leschen, a NZ Coleopterist, supporter of this project, and valued friend of the author.

Diagnosis. Head with median rostral sulcus, vertexal foveae opening dorsally; frontal margin of rostrum declivous; gular mound forming flattened circular region, covered in tubercles; maxillary palpomeres elongate, maxillary palpomere IV as long as head, covered in short erect setae, apical sensory patch present. Pronotum with antebasal sulcus absent, lateral antebasal fovea present, median basal fovea present. Mesoventrite with median shield, setose pit absent. Ventrite II with shallow median ovate depression occupying length of ventrite. Aedeagus with median lobe narrowed apically, right lateral process irregularly shaped, ventral process absent. The form of the circular, flattened, tuberculate gular mound in combination with the declivous frontal margin of the rostrum, the maxillary palpomere IV pilose, and the aedeagus with the narrowed median lobe and irregularly shaped right lateral process distinguish this species from all others on New Zealand.

Description. MALE. Integument: body and appendages light brown. Head: Wide; width between eyes greater than $\frac{1}{2}$ length of head from base of vertex to apex of rostrum. Eyes rounded, composed of 11 facets. Antennomere 1 as long as antennomeres 2-3, antennae otherwise unmodified. Gular mound forming flattened circular mound, covered in tubercles, gular foveae present, paired. Maxillary palpomere I elongate, $\frac{1}{2}$ as long as palpomere II, palpomere II narrow, slightly enlarged at base and distally, shorter than length of head, maxillary palpomere III quadrate, maxillary palpomere IV as long as head, slightly enlarged at base, widened gradually from just before $\frac{1}{2}$ length to apex, dorsal surface of swollen area densely covered in short, flattened setae, v-shaped sensory patches present. Thorax: pronotum with antebasal sulcus absent, lateral antebasal foveae present, median antebasal foveae present. Lateral procoxal foveae present. Mesoventrite with median shield, lateral mesoventral foveae present, lateral mesocoxal foveae absent. Metaventrite afoveate, produced medially into large tumosity. Legs unmodified. Elytra with two basal foveae and single sutural fovea, discal striae absent, sutural striae present. Abdomen: tergites of usual form for tribe, otherwise unmodified. Ventrite I covered in dense, shining setae, ventrite II with shining modified setae, basally, shallow median ovate depression occupying length of ventrite. Genitalia: aedeagus asymmetrical; median lobe narrowed and curved downwards, distally; dorsal diaphragm large, occupying more than $\frac{1}{2}$ length of basal bulb; right lateral process complex and irregular; ventral process absent.

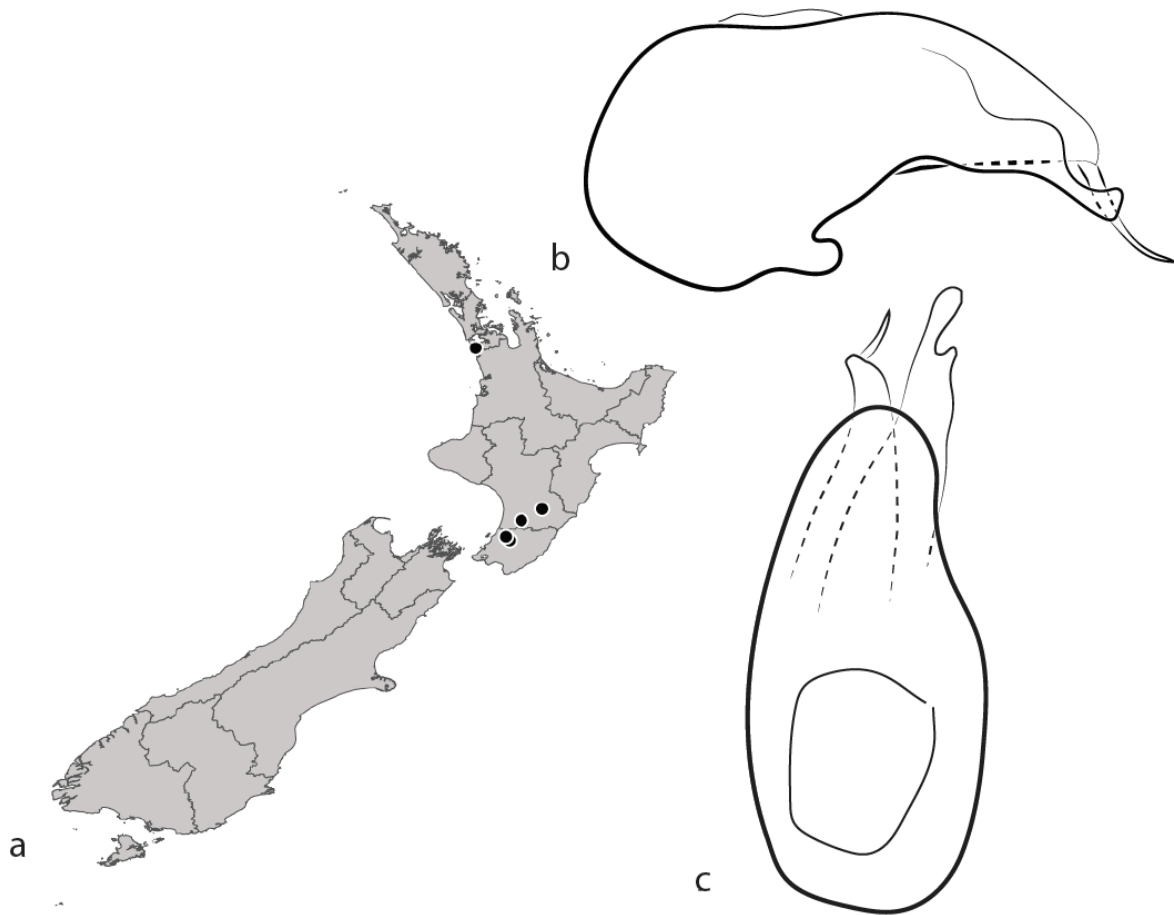


Figure 59. “*Pselaphotuberculum lescheni*”, sp. et gen. nov. a) collecting localities; b) aedeagus, lateral; c) aedeagus, dorsal.

Females. Differing from males in the absence of the median ovate depression on ventrite II.

Distribution. This species is known from several localities in WN and AK on North Island.

Comments. This species represents the single representative of the monotypic genus, *Pselaphotuberculum*. Dissected male specimens were compared, and no variation in the form of the genitalia was observed.

Material Examined. (1 male, 1 female) New Zealand: WN: Taranua Ra., West Peak 1280 m, litter, 74/31 14 Apr 1974, JC Watt (LSAM); (7 females) NEW ZEALAND WN Taranua Ra Dundas Hut Ridge 990m 3 Dec 1984// B. G. Bennett & T. K. Crosby Sifted litter 84/83 (NZAC); (1 male) NEW ZEALAND WN Taranua Ra Dundas Hut, 1250m 13 Feb 1985 B.A.Holloway// Litter and tussock 85/25 (NZAC); (1 female) NEW ZEALAND WN Taranua Ra Mt Dundas smt 9 Feb 1985 B.A.Holloway// Chionochloa spraying base (NZAC); (2 males) NEW ZEALAND WN Taranua Ra Dundas Hut Ridge, River Forks 900m 11 Feb 1985// G.W.Ramsay Litter 85/12 (NZAC); (2 males, 1 female) NEW ZEALAND WN Taranua Ra Dundas Hut Ridge, River Forks

700m 11 Feb 1985// G.W.Ramsay Litter 85/13 (NZAC); (1 male) NEW ZEALAND WN
Tararua Ra Dundas Hut Ridge Rain Gauge Knob 13 Feb 1985// G.W.Ramsay Litter 85/15
(NZAC); (4 males, 4 females) NEW ZEALAND: AK: Waipipi Scen. Res., 2km. Wsw Waipipi
40m 37.14S 174.40E 22.ii.1987 native hardwood forest in gully A.Newton & M.Thayer 835
FMHD #87-269 berl., leaf & log litter, forest floor (FMNH EtOH collection); (5 males, 8
females) NEW ZEALAND: WN: Tararua Forest Park, Southern Crossing btwn. Kime Hut &
Dennan peak, 1200-1300m, 40°56'S, 175°16'E, 25.xi.2005, alpine zone w/scrub *Olearia*;
FMHD#2005-038, berl., mixed litter under shrubs, A. Solodovnikov & D. Clarke; ANMT site
1154 95% ethanol FIELD MUSEUM NAT. HIST. (FMNH EtOH collection).

CHAPTER 4. PHYLOGENETIC RESULTS

4.1. MORPHOLOGICAL RESULTS

Three most parsimonious trees resulted from the morphological analysis (length (L) 573, consistency index (Ci) 28, and retention index (Ri) 59). A strict consensus (L=573; Ci=29; Ri=59) of those trees was generated for nodes > 50 % bootstrap values (Figure 60).

***Pselaphogenius*.** The tree supports *Pselaphogenius* as a monophyletic group. *Pselaphogenius* placed closest to two groups, one containing four of the NZ monotypic genera, and another containing two of the NZ monotypic genera and the genera *Taomica* (New Caledonia) and *Pselaphostomus* (Italy). Within *Pselaphogenius*, the non-NZ species group together, and the NZ species are arranged into three groups. These groups are not reflective of the “species groups” designated in the redescription (Chapter 3.2.), supporting these as groups of diagnostic convenience not meriting subgeneric status.

***Pselaphaulax*.** *Pselaphaulax* is not supported as a monophyletic group on the tree. Species of *Pselaphaulax* are split into two clades on the tree, one containing NZ species and sister to the branch of *Maydena* (Australia) + (*Pselaphotumulus oviceps* + *Pselaphotumulus urquharti*), and the other containing the non-NZ species from China, Bohemia, Madagascar, Malaysia, and Australia. The topology of the group of NZ *Pselaphaulax* also does not support the designation of “species groups” (Chapter 3.1.) as subgenera or formal taxonomic groupings.

***Pselaphotumulus*.** The *Pselaphotumulus* species included in the analysis (*P. oviceps* and *P. urquharti*) group together, sister to *Maydena* (Australia). The clade of *Maydena* + (*Pselaphotumulus oviceps* + *Pselaphotumulus urquharti*) is sister to the clade of NZ *Pselaphaulax* species.

***Pselaphophus*.** The two species of *Pselaphophus* included in the analysis, *P. atriventris* (Australia, NZ invasive), and *P. undescribed* species (Australia) group together on a branch with *Peckiiella* (Australia) as a sister-taxon.

Subantarctic Islands Genera. Not surprisingly, *Pselaphopluteum* and *Pselaphotheseus* are grouped together in the tree adjacent to one another. These two are found in a clade along with the Asian genus, *Nabepselaphus* (China). This grouping is sister to the rest of the Pselaphini, with the exception of *Mareeba* (Australia) and *Margaris* (Australia, root).

Monotypic NZ Genera. The monotypic genera described from NZ are scattered throughout the tree. Importantly, these genera do not group with either species of *Pselaphus*, the genus into which several of them were initially placed, or within *Pselaphaulax* or *Pselaphogenius*, the two largest genera in NZ. (“*Pselaphoaotearoa*” + “*Pselaphotuberculum*”) is part of a polytomy on a branch with “*Pselaphazealus*” and “*Pselaphopegasus*”; “*Pselapholateralis*” and “*Pselapholobus*” are on another branch forming a polytomy with *Taomica* (New Caledonia) and *Pselaphostomus* (Italy). Both of these branches of monotypic genera are grouped in a polytomy with the branch of *Pselaphogenius* species, and the sister group to this polytomy is the genus *Pselaphus*.

***Pselaphus*.** The *Pselaphus* that remains after the reassignment of the NZ species is supported as monophyletic in the tree. This group is sister to the polytomy of *Pselaphogenius* and the two groups containing monotypic NZ genera.

4.2. MOLECULAR RESULTS

Protocols for extraction, enrichment, and amplification for Coleoptera UCEs were followed (Chapter 2.7). Poor quality of the resulting PCR products for a majority of samples following amplification resulted in the cessation of the project at this point prior to sequencing until additional molecular grade specimens and funding for additional reagents can be obtained. Several possible reasons for the poor quality of products obtained from the PCR reaction can be identified for future troubleshooting, the most obvious and easy to address of these being low-quality specimens and frequency of DNA quantification. The first issue could be addressed in future studies through some combination of: a) obtaining specimens of a higher quality for DNA extraction; b) utilizing destructive sampling methods such as maceration of specimens; c) extraction of multiple individuals per taxon; d) employment of alternative extraction protocols specific to archival/museum specimens such as formaldehyde extraction. Implementing a more rigorous quantification protocol of samples from extraction to amplification could also help target “failed” samples with concentrations or fragment size that are too small to warrant further processing.

4.3. MORPHOLOGICAL CHARACTER ANALYSIS

Four characters, the form of the gular process (Character 16), shape of maxillary palpomere IV (Character 24), the antebasal sulcus on the pronotum (Character 41), and the single setose fovea on the mesoventral shield (Character 50), were examined with respect to three clades of interest on the tree: Group A) *Pselaphogenius* + NZ monotypic genera A + NZ monotypic genera B and *Taomica* + *Pselaphus*; Group B) non-NZ *Pselaphaulax*; C) NZ *Pselaphaulax* + *Pselaphotumulus* and *Maydena* (Figures 61–64).

The gular process (Character 16) appears in four character states across the Pselaphini genera mapped onto the tree: hemispherical/rounded (wider than long or about as long as wide)=0; swollen, broad mound=1; extended posteriorly as shelf-like process=2; gular process absent, gular area flattened=3; ovate mound (2x as long as wide)=4. In Group A (Figure 61a), the ancestral character state for the group is unclear and varies widely across genus groups. It appears the gular mound hemispherical/rounded evolved once in the genus *Pselaphus*. The ancestral character state for *Pselaphogenius* is unclear due to the basal polytomy between the four *Pselaphogenius* groups, with an apparent evolution of an ovate mound two separate times within the New Zealand *Pselaphogenius*, and origin of the ovate rounded form twice, once in the non-New Zealand *Pselaphogenius*, and once in the third group of NZ *Pselaphogenius*, with only *Pselaphogenius turbotti* possessing the swollen, broad mound. Although the relationships among species in this third group are unresolved, a single origin of the hemispherical/rounded is most parsimonious, with a single transformation to the broad/rounded form in *P. turbotti*. This character varies widely in the two groups of monotypic NZ genera, making interpretation without further resolution of the relationships between these genera difficult. In Group B (Figure 61b), the non-NZ *Pselaphaulax*, there appears to be a single origin of the hemispherical/rounded form. In Group C (Figure 61c), the basal polytomy creates uncertainty about the ancestral character state for this group. However, parsimony supports a single origin of the ovate/rounded form with a single loss in the group of four species (*P. hornabrooki*, *P. tararua*, *P. pelorus*, and *P. ramsayi*) possessing the ovate mound. Both *Pselaphotumulus* species possess the swollen, broad mound form, while *Maydena* possesses the hemispherical/rounded form. If a single origin

Strict consensus tree



Figure 60. Consensus tree of maximum parsimony analysis of morphological data.

61.

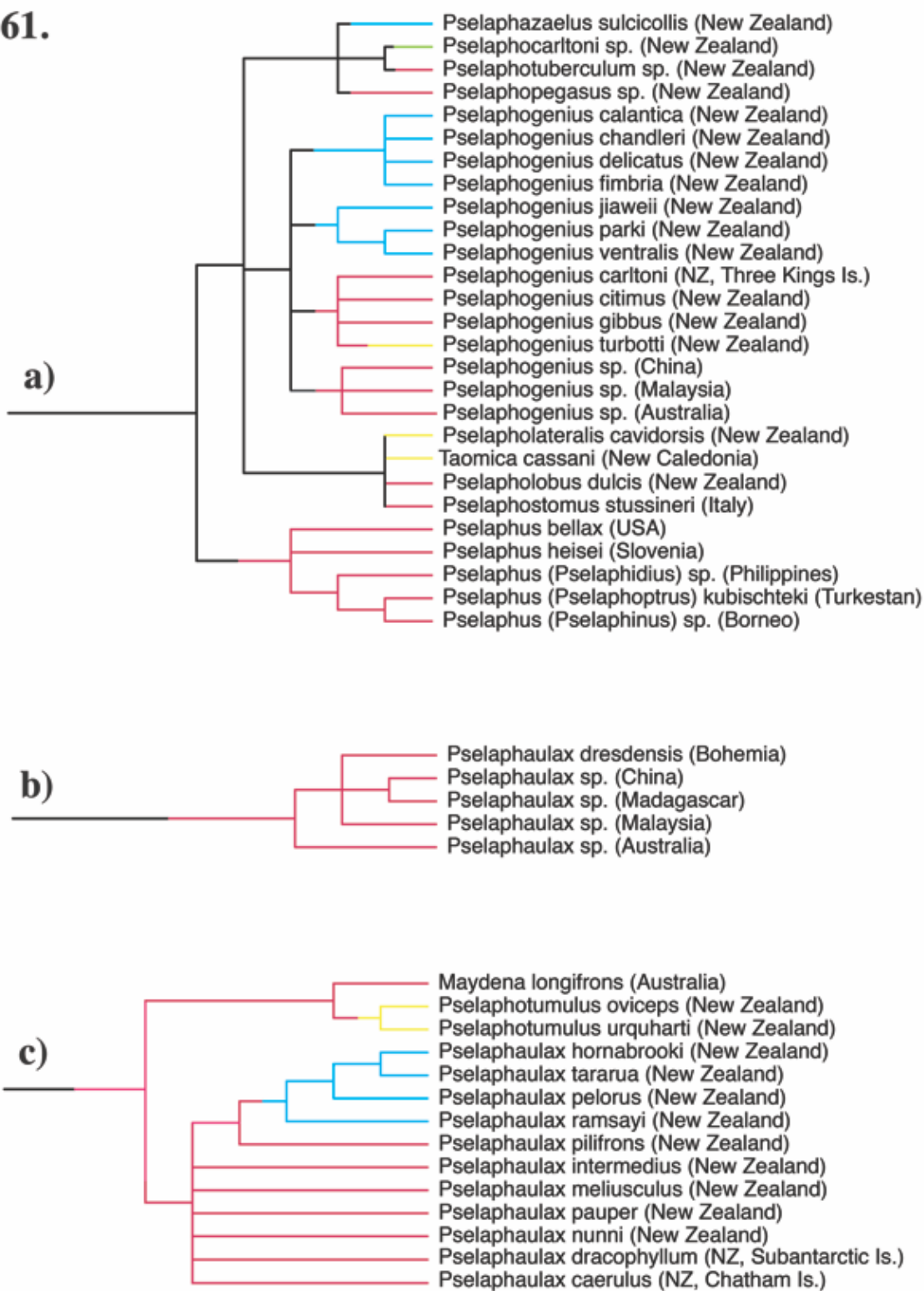


Figure 61. Consensus tree with character states for character 16 (gular process) mapped; a) Group A, b) Group B, and c) Group C.

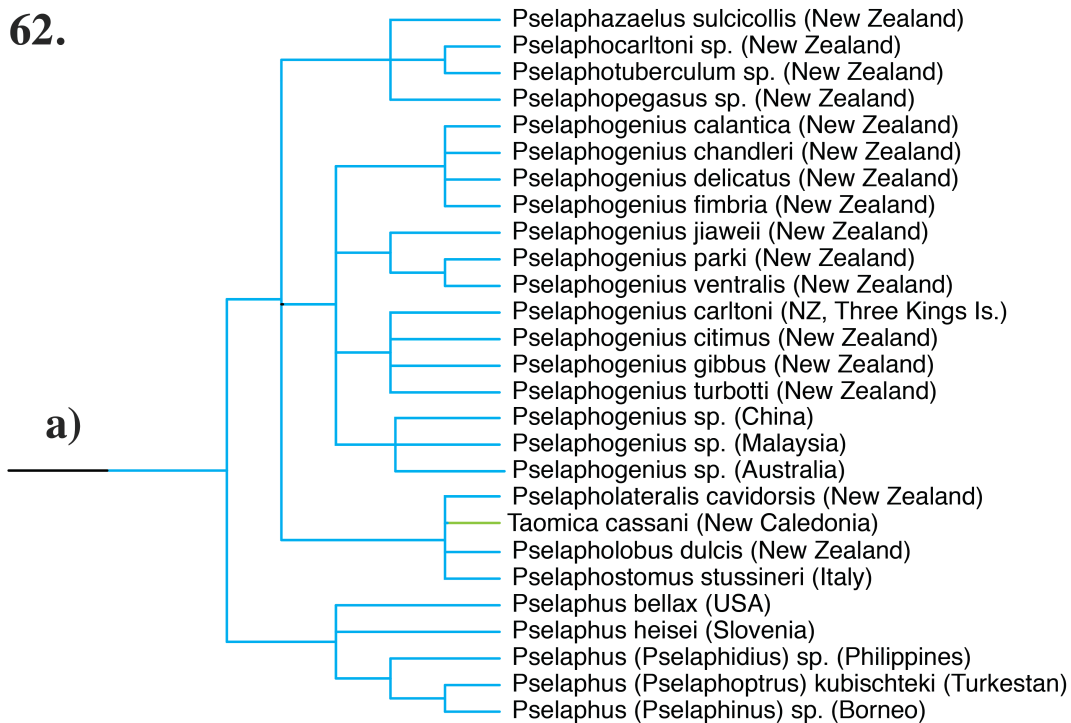
within group C (gular mound hemispherical/rounded) occurred, the *Pselaphotumulus* group could represent a single transformation series to the ovate form. In some groups, such as the non-New Zealand *Pselaphaulax* and *Pselaphogenius*, and *Pselaphus*, this character appears to be a useful diagnostic character. However, its plasticity within groups, such as the NZ *Pselaphaulax* and the NZ *Pselaphogenius*, renders ubiquitous reliance upon this character problematic.

The form of the maxillary palpomere IV (Character 24) is relatively conserved across the tree (Figure 62a–c). Although this character appears in seven different states: axillary palpomere IV shape: pedunculate (narrowed with swollen apical portion)=0; “normal”, aciculate=1, “antler-shaped”, dorso-ventrally flattened w/ seta at midline and 2 setae apically=2; globular and excavate on dorsal surface=3; broadly expanded throughout length=4; flattened and “machete-shaped”=5; with ventral lobe and external spine creating bidentate appearance= 6; gradually widened towards apex=7, the pedunculate form is the most prevalent across taxa included in the tree. Groups A, B, and C all apparently have a single origin of the pedunculate form, with only *Taomica* possessing the broadly flattened form. In the groups that do diverge from the pedunculate form, the form of the palpomere varies, sometimes with multiple states. *Pselaphopluteum* + *Pselaphotheseus* possess the aciculate form, the *Bellenden* species from Australia and China possess a broadly expanded palpomere, both species of *Pselaphophus* possess the aciculate form. In the polytomy of (*Curculionellus* + *Tyraphus*) + *Hirashimanymus* + *Mentraphus*, four different character states are present among taxa. This could point to plasticity of this character once the form diverges from the pedunculate character. If more species within these groups were available, a clearer picture of the evolution of this character across disparate lineages might be revealed.

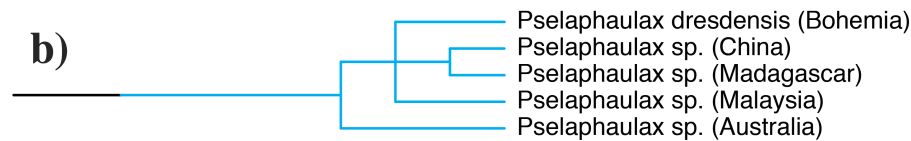
Of all of the characters analyzed, the presence or absence of the antebasal sulcus (Character 41) appears to be the most conserved across groups. In Group A (Figure 63a), the absence of the antebasal sulcus is ancestral, evolving one time. For Groups B and C (Figs. 63b–c), the presence of the antebasal sulcus is ancestral. Across the entire tree, only two branches exhibit any switching between character states among taxa: the (*Pselaphotheseus* + *Pselaphopluteum*) + *Nabepselaphus* group, and the (*Curculionellus* + *Tyraphus*) + *Hirashimanymus* + *Mentraphus* polytomy. This character is conserved across major clades and is cohesive at the genus-level for major New Zealand groupings. Further resolution of the tree would provide further insight into the ancestral states of this character.

The presence/absence of the setose fovea on the mesoventral shield (Character 50) is a character that has not been used previously for identification or analyses of genera in the Pselaphini. In Group A (Figure 64a). The absence of this fovea appears to be ancestral the state, with *Pselaphus*, *Pselaphogenius*, and the second group of monotypic genera + *Taomica* all lacking the fovea. In the first group of NZ monotypic genera, the polytomy creates difficulty in interpreting the ancestral state, but parsimony suggests the presence of the setose fovea would be ancestral, with a single loss in *Pselaphazealus*. In Group B (Figure 64b), the absence of this fovea among all non-NZ *Pselaphaulax* appears to be ancestral as well. In Group C (Figure 64c), the polytomy among the NZ *Pselaphaulax* makes interpretation of this character’s ancestral state difficult. The results suggest a single origin of this fovea among the (((*P. hornabrooki* + *P. tararua*) + *P. pelorus*) + *P. ramsayi*) + *P. pilifrons* group))). This character, as with the form of the gular process (Character 16), is not useful for generic diagnosis of *Pselaphaulax*. *Pselaphotumulus* species are united by the presence of the setae, while the absence of the fovea in *Maydena* muddies the waters as to the ancestral state in this grouping.

62.



b)



c)

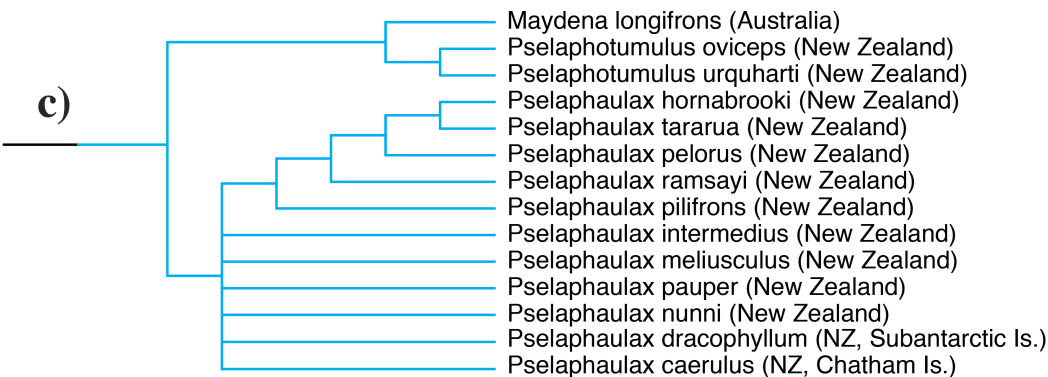


Figure 62. Consensus tree with character states for character 24 (maxillary palpomere) mapped; a) Group A, b) Group B, and c) Group C.

63.

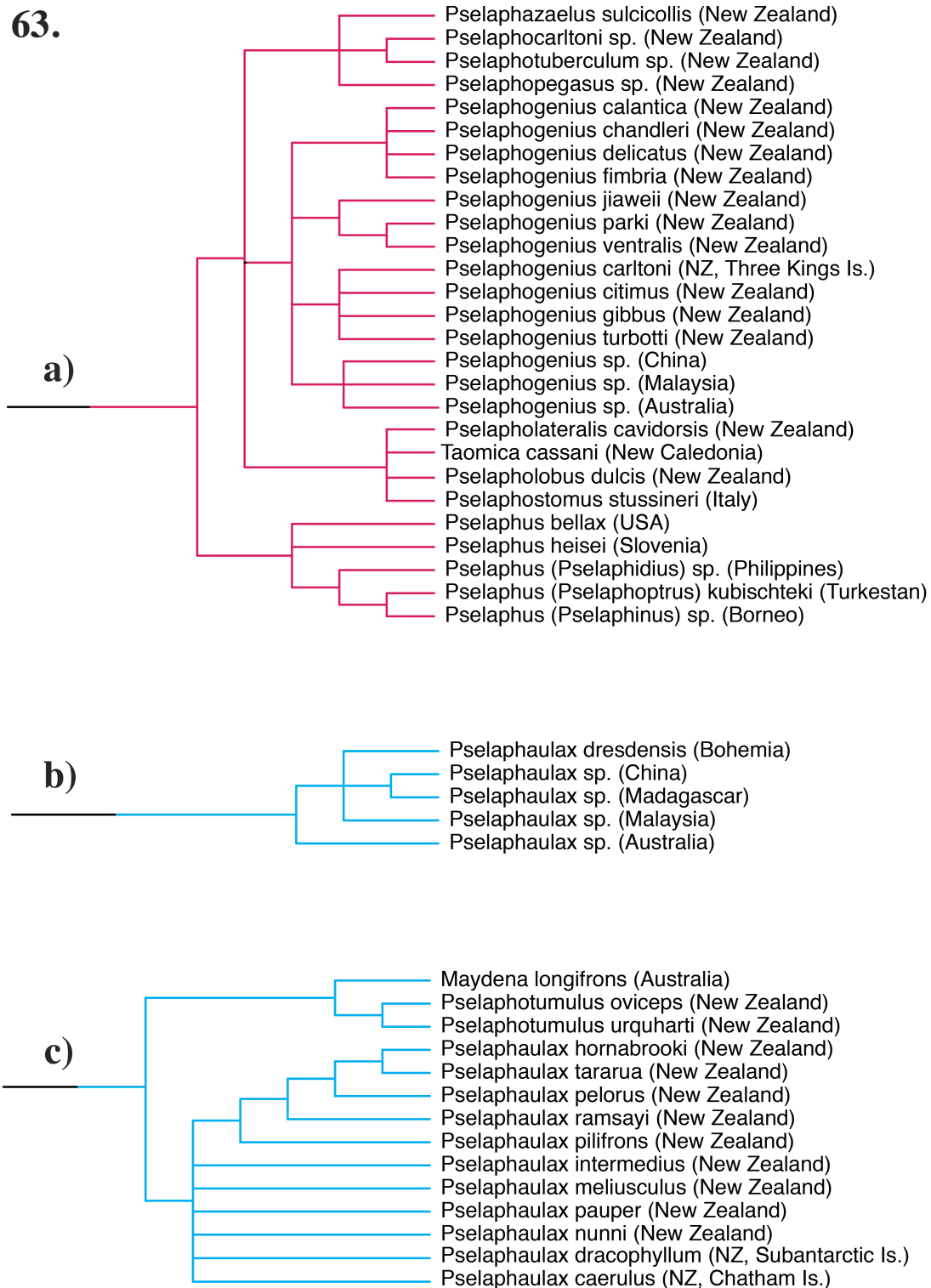


Figure 63. Consensus tree with character states for character 41 (antebasal sulcus) mapped; a) Group A, b) Group B, and c) Group C.

64.

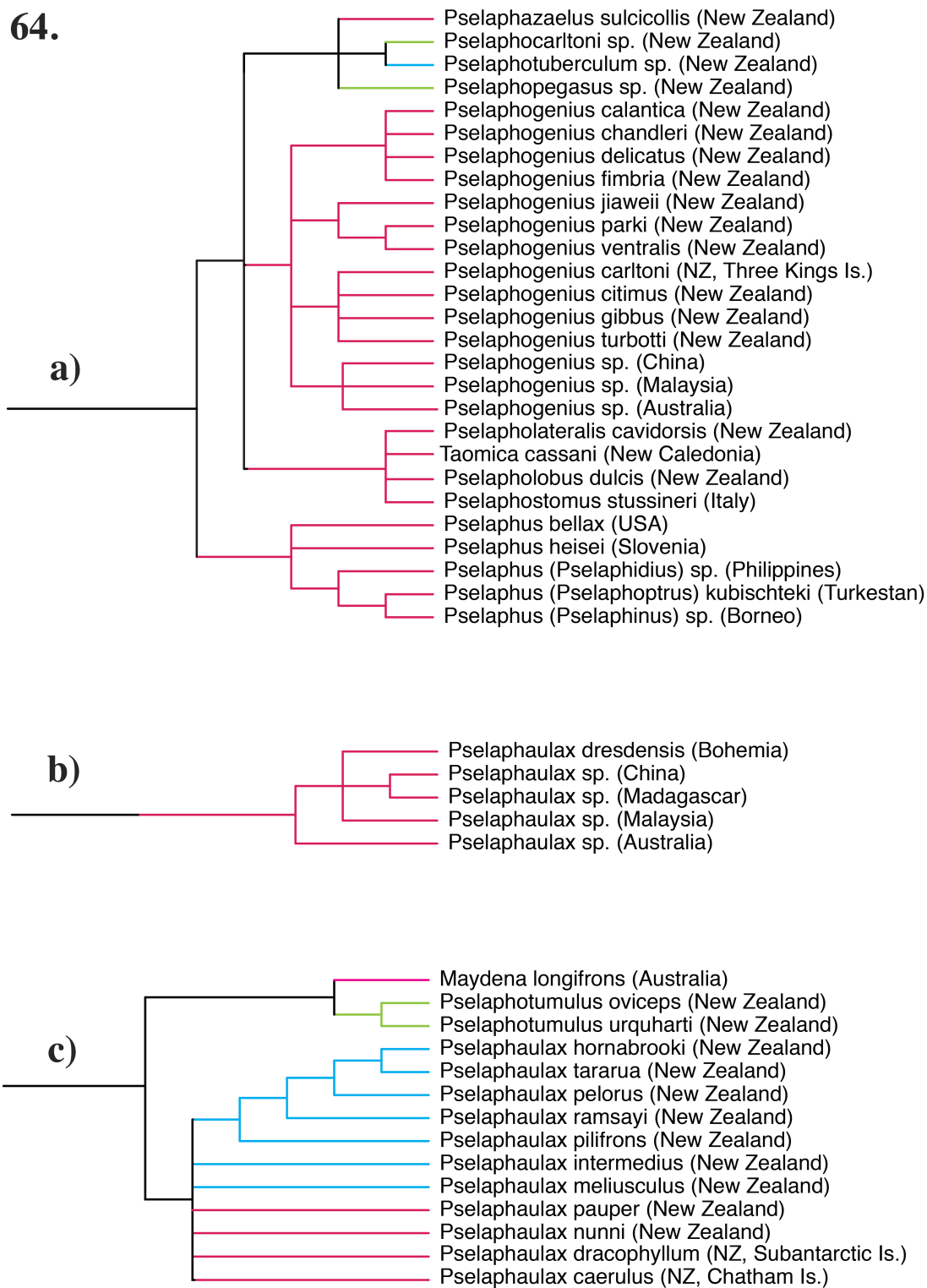


Figure 64. Consensus tree with character states for character 50 (setose fovea on mesoventral shield) mapped; a) Group A, b) Group B, and c) Group C.

4.4 Discussion.

The Pselaphini continue to be problematic with respect to utilizing morphology for genus-level identification. Certain characters that typically divide genera within tribes, such as the foveal system, are highly conserved among the Pselaphini. At the same time, some characters, such as the presence of the setose fovea on the mesoventral shield (Figure 64) can be used as diagnostic characters for some genera, while simultaneously varying within other genera. One of the most plastic characters of those examined in the tree, the form of the gular mound (Figure 61), appear to vary widely within some genera (e.g. *Pselaphaulax* and *Pselaphogenius*), while they vary widely across other regions of the tree (the two groups containing the monotypic NZ genera). While the gular region is modified in other lineages of pselaphines, this degree of variation across genera is unique to this tribe. This combination of the extreme conservation in character systems typically used to distinguish genera in other tribes, along with the incredible variation of other characters that typically do not vary widely across genera within tribes (sometimes varying within genera of the Pselaphini) highlights the importance of casting a wide net with examination of characters for genus-level diagnosis and the inclusion of multiple species across multiple geographic regions when characterizing genera in this tribe.

With regard to foveal characters, which are phylogenetically useful in many pselaphine lineages, the highly reduced and conserved foveal complement in members of the Pselaphini render them virtually uninformative for phylogenetic inference, with one notable exception, the mesoventral shield character. Across all taxa within the subfamily Pselaphinae, in situations of foveal presence/absence, the present state is typically considered ancestral due to their proliferation on members of the subtribe Faronitae, which is recovered as the most basal clade of pselaphines in all available published analyses. These foveae are apparently lost as one moves through the increasingly more derived pselaphine lineages. The mesoventral shield fovea of members of the Pselaphini is apparently an exception to this pattern. The analysis and comparison with other pselaphine taxa point to a *de novo* origin in certain groups within the tribe. Thus, it is a unique character within the Pselaphinae.

Ultimately, the morphological tree provides support for three important assertions regarding the NZ fauna: 1) the cohesion of major groups of NZ Pselaphini, especially the NZ *Pselaphogenius* and *Pselaphaulax*; 2) the new, monotypic genera described in this paper appear to be each other's closest relatives; 3) with the removal of the NZ species previously placed in *Pselaphus* by Broun, the tree suggests that *Pselaphus* now appears to be a monophyletic genus across the remainder of its distribution, although increased sampling in other regions may support further separation into other genera. Additionally, while better resolution of the tree at deeper nodes would add more insight into the relationship between critical divisions within the tribe, this first attempt to resolve the tree highlights support for the cohesion of the NZ species within genera, as well as the close relationship among many Australian, New Zealand, New Caledonian, and Asian genera. These regional relationships are not surprising, and were also supported by Chandler's (2001) work with the Australian fauna.

Increased sampling of taxa from other regions across the tribe's distribution, including the possible discovery of species in other Gondwanan regions (especially high latitudes of South America) would provide interesting insight into the relationships of taxa at deeper nodes. Increased taxon sampling combined with future efforts to develop the molecular analysis of this tribe will provide an additional level of resolution to the phylogenetic analysis. The successful extraction and amplification of DNA from dried museum specimens utilizing UCE protocols

suggests that a broader pool of specimens may be available for future studies. However, the failure of many amplified libraries to produce pools of appropriate concentration and fragment length highlights the importance of optimizing this process for the subfamily during upcoming efforts.

CHAPTER 5. SUMMARY AND CONCLUSIONS

For a landmass of its size, NZ supports an incredible number of animal species across many taxa, including Coleoptera (Klimaszewski and Watt 1997). This diversity, in conjunction with high levels of endemism highlights the value of both cataloguing the biodiversity of NZ and exploring the underpinning biogeographic and evolutionary relationships among species. The current threats of habitat conversion to agriculture, deforestation, introduced species, and climate change underscore the essential value of cataloguing biodiversity, particularly in island regions with unique, isolated biotas. Moreover, identification and classification of elements of the NZ fauna has been historically influenced by a Eurocentric viewpoint, shaping an incorrect view of NZ taxa as a subset of European or Australian groups. As part of the endeavor to catalogue the unique assemblage of species currently found on NZ that highlights the importance of this region in understanding endemism and global patterns of biodiversity, efforts are underway to completely catalogue the subfamily Pselaphinae in NZ. As the second largest subfamily of the largest family of multicellular animal life on the planet, resolving the pselaphine fauna of NZ is a major step towards understanding animal life globally. The current study, along with the previous resolution of the supertribe Faronitae (Park 2015), represents the second comprehensive modern taxonomic and phylogenetic study of a major genus-group taxon of Pselaphinae in NZ. Concurrent projects that will lead to completion of the revision of the subfamily on NZ include work on the supertribe Euplectitae (Donald Chandler, University of New Hampshire) and the supertribe Goniaceritae and remaining tribe of the Pselaphitae, mainly Tyrini (Richard Leschen and Jiawei Shen, Landcare Research, NZ). When complete, the NZ region will represent the only major landmass on Earth with a fully revised fauna of pselaphine staphylinids.

Prior to this study, 19 species in four genera of Pselaphini were known from NZ. Thirteen of these species were described in the genus *Pselaphus* by Thomas Broun during the late 19th and early 20th centuries. During my revisionary work, all Broun species were reassigned to different genera, with no true *Pselaphus* remaining in NZ. While the new genera described in this study can be distinguished based on external morphological characters, species boundaries within the two largest genera post-revision (*Pselaphaulax* and *Pselaphogenius*) were found to be heavily, if not exclusively, reliant upon the characters of the male genitalia. Thus, while Broun's sweeping generic diagnoses were likely due to his reliance upon a European perspective of the fauna, his imprecise diagnosis of species can be attributed to the lack of suitable microscope technology. Broun was the most prolific historical describer of NZ Coleoptera species, having described species in almost every major taxon, and therefore was probably limited in his knowledge of the subtle morphological variations that characterize species in this group of especially small beetles. Additionally, while Broun was active, reliance upon dissections of male genitalia for species-level diagnoses had not yet become commonplace.

Unfortunately, no single character system was found to delimit genera of Pselaphini in NZ. Instead, a frustrating consistency was observed in the foveal system of the pronotum, as well as the meso- and metaventrites, which are commonly used in other genus-groups for delineating generic boundaries. Another complicating factor, the form of the genitalia (most notably with respect to symmetry versus asymmetry), which is typically conserved in pselaphines at the genus-level, was found to be largely uninformative. Instead, a combination of characters, mainly with respect to the head (gular region, mouthparts, vertexal sulcus) were found to be most useful in distinguishing genera, while the form of the genitalia and (less commonly) secondary sexual characters on the second ventrite were most useful for distinguishing species. This pattern of

establishing generic boundaries largely overlaps with the precedent set forth for the major revision of the Australian fauna (Chandler 2001).

Following the treatment of the subfamily in Australia (Chandler 2001), the number of genera and species of Pselaphini in this region were essentially doubled, resulting in 11 genera and 52 species. These numbers are similar to the 12 genera and 52 species now known from New Zealand. Interestingly, there is overlap of only three genera (*Pselaphaulax*, *Pselaphogenius*, and *Pselaphophus*) and one species (*Pselaphophus atriventris*) between the Australian and NZ fauna. Since *P. atriventris* is considered to be introduced, NZ shares no native species with Australia. Of the remaining Australian and NZ genera, high levels of endemism and monotypy are apparent (five endemic genera and four monotypic genera in Australia, eight endemic genera and seven monotypic genera in NZ). New generic boundaries of the NZ genera were tested using phylogenetic analyses based on morphological data. The tree supported the exclusion of NZ species from the rest of the global representatives of the genus *Pselaphus*. *Pselaphogenius* was supported as a monophyletic group with the NZ species existing as each others' closest relatives. *Pselaphus* did not appear on the tree as monophyletic, and the *Pselaphaulax* and the *Pselaphaulax* representatives from other geographic areas were grouped as separate clades from the NZ members of these genera. A close relationship between the six monotypic genera from mainland NZ was supported, as was separation from *Pselaphus*, *Pselaphaulax*, and *Pselaphogenius*. The subantarctic island endemics was also supported as a monophyletic grouping of several genera.

Approximately 4000 specimens were included in this study. These represent specimens from Broun and Sharp's collections (late 19th century), specimens collected by the author on recent expeditions (2018), and those collected by various individuals and deposited in the holdings at the FMNH, LSAM, NZAC, and private collections. The pselaphine fauna of NZ has been extensively sampled by dedicated Coleopterists in NZ. Whether gaps in coverage represent actual absences or are simply indicative of low collection efforts in these areas is unclear since absence data is not available. This study resulted in the first Pselaphini described from the Chatham Islands and a new genus and new species in the genus *Pselaphaulax* from the subantarctic islands. Despite the large number of islands and island chains offshore, collecting events are limited due to access and regulatory requirements as protected areas. The paucity of molecular grade material across geographic localities and taxa complicates efforts towards the production of a molecular phylogeny for the Pselaphini regionally. Close alliance between several groups of NZ taxa and representatives from New Caledonia suggest that revisionary work there is needed for a regional resolution of the tribe. The final steps in resolving the global diversity and relationships within the Pselaphini include a species-level revision of the Australian fauna (approximately 60 undescribed species of Pselaphini, Chandler 2001), and a treatment of the poorly known faunas of Africa and Southeast Asia. Molecular analyses using next-gen sequencing techniques, particularly UCEs continue to yield phylogenies that provide essential insights into the evolutionary history, current patterns of biodiversity and biogeography, and resulting relationships of a number of Coleoptera taxa. Optimization of protocols and collection of molecular grade material across a variety of taxa is an essential next step to improve the resolution of the tribe Pselaphini and to further develop the taxon as a model for future studies dealing with overarching issues of ecology, biogeography, biodiversity, evolution, and climate change.

APPENDIX A. TAXA USED IN MORPHOLOGICAL PHYLOGENY

Afropselaphus Jeannel, 1950

1. *Afropselaphus* sp.
Locality: Africa (Senegal).
Label data: Senegal// Field Mus. Nat. Hist. (FMNH).

Bellenden Chandler, 2001

2. *Bellenden monteithi* Chandler, 2001
Locality: Australia (Queensland).
Label data: Bellenden Ker, Centre Peak summit, 17.16S, 145.51E, 1560m, vii-28-1991, Monteith and Janetzki (DSC).
3. *Bellenden* sp.
Locality: China (Sichuan Province).
Label data: CHINA. Sichuan Prov., Emeishan Mt. 2820 m, Taiziping Temple, 29°31'50"N 103°19'36"E// 8.vi.2014 Mixed forest w/ bamboo undergrowth J.Hajek & Ruticka leg. (Hlavac).

Curculionellus Westwood, 1870

4. *Curculionellus riparius* Raffray 1900
Locality: Australia (New South Wales).
Label data: AUSTL: N.S.W. NH. Kiera, 21-vii-1983 FMNHD#83-280// rainforest litter L.S. Watrous (FMNH).

Dicentrius Reitter, 1882

5. *Dicentrius* sp.
Locality: Republic of Bulgaria.
Label data: SE. Bulgaria, Rhodope (FMNH).

Hirashimanymus Nomura, 1990

6. *Hirashimanymus babai*
Locality: Taiwan.
Based on morphological description Nomura (1990: 51–55) and habitus photograph provided by the Department of National Parks, Wildlife and Plant Conservation, Thailand (<http://www.dnp.go.th/foremic/entomology>).

Kakadu Chandler, 2001

7. *Kakadu pecki* Chandler, 2001
Locality: Australia (Northern Territory).
Label data: Northern Territory, Kakadu national Park, S. Alligator River, Gungaree Rainforest, xii-17-1993, S. and J. Peck, UV Light (DSC).

Mareeba Chandler, 2001

8. *Mareeba storeyi* Chandler, 2001
Locality: Australia (Darwin).

Label data: Darwin, SCIRO, MacMillans Road, xii-1/25-1993, S. and J. Peck, FIT, Eucalypt woodland (DSC).

Margaris Schaufuss, 1877

9. *Margaris imperialis* Schaufuss, 1877
Locality: Australia (Queensland)
Label data: Eimeo, nr. McKay, Qnld. (DSC)

Maydena Chandler, 2001

10. *Maydena longifrons* (Raffray 1909)
Locality: Australia (Tasmania)
Label data: Australia: Tasmania Mt. Wellington 10 km NW Hobart 27-i-77// FMHD#77-102 ex. Dicksonia antarcticus litter J. Kethley (FMNH)

Mentraphus Sharp, 1883

11. *Mentraphus* sp.
Locality: Myanmar (Mawlamyine).
Label data: Park MS Name// Moulmein, Burma i-ii: 1954 Lois Jones leg.// Field. Mus. Nat. Hist. Orlando Park Pselaphidae Colln. (FMNH).

Nabepselaphus Nomura, 2002

12. *Nabepselaphus* sp.
Locality: China (Yunnan).
Label data: P.R. China, Yunnan, Cang Shan at Dali, N 25°41'07"E 100°06'68"
02.vii.2011, 2714m sift 33, V. Grebennikov (NZAC).

Neopselaphus Jeannel, 1951

13. *Neopselaphus mexicanus* (Park 1945)
Locality: Mexico (Tabasco).
Label data: Mex: Tab. Balancani R. Usumacinta. MF8236 2.i.1939. at light A. Dampf leg. nr. 20 m// Field Mus. Nat. Hist. Orlando Park Pselaphidae Colln. (FMNH).

Peckiella Chandler, 2001

14. *Peckiella podocarpus* Chandler, 2001
Locality: Australia (Northern Territory).
Label data: Northern Territory, Arnhemland, 33 km E Jabiru, Podocarp Canyon, xii-15/23-1993, S. and J. Peck, rainforest, flight intercept trap (Hlavac).

Pselaphaulax Reitter, 1909

15. *Pselaphaulax caeruleus* Owens, Leschen, and Carlton 2019
Locality: New Zealand (Chatham Island).
Label data: CHATHAM IS NZ Awatotara Table land bush 183m 21Feb 1967// GW Ramsay Litter 67/139 (NZAC).
16. *Pselaphaulax dracophyllum* Owens, Leschen, and Carlton 2019
Locality: New Zealand (Auckland Island).

- Label data: AUCKLAND I.: (N) Bivouac- Mt. Eden 400-50m, 10.I.1953// stream, rocks//
J. L. Gressitt Collector (NZAC).
17. *Pselaphaulax dresdensis* (Herbst, 1792)
Locality: Czech Republic (Bohemia).
Label data: Bohemia Neratovice (JTN).
 18. *Pselaphaulax "hornabrooki"*, sp. nov.
Locality: New Zealand (WN).
Label data: Wellington 1028 14/4 1949 R. Hornabrook (NZAC).
 19. *Pselaphaulax "intermedius"*, sp. nov.
Locality: New Zealand (CO).
Label data: New Zealand: CO: Rock and Pillar Ra, 1158m Swards, 13 Nov 1969 J
McBurney, 69/208 (LSAM).
 20. *Pselaphaulax meliusculus* (Broun, 1893), comb. nov.
Locality: New Zealand (FD).
Label data: New Zealand FD Hump Ridge 914m 8 Feb 1968 J.I. Townsend Litter 68/9
(NZAC).
 21. *Pselaphaulax pauper* (Sharp, 1874), comb. nov.
Locality: New Zealand (AK)
Label data: New Zealand AK Woodhill 8-15 Oct 1976 C.C. Butcher (NZAC)
 22. *Pselaphaulax "pelorus"*, sp. nov.
Locality: New Zealand (MB).
Label data: New Zealand: MB: Pelorus Reserve Litter, 15 Sep 1964 JI Townsend, 64/93//
LSAM 0249509 (LSAM).
 23. *Pselaphaulax pilifrons* (Broun, 1914), comb. nov.
Locality: New Zealand (MC).
Label data: New Zealand MC Mt Alford 1067m NW of Methven 2 Feb 1976 G.W.
Ramsay// 76/19 (NZAC).
 24. *Pselaphaulax "ramsayi"*, sp. nov.
Locality: New Zealand (NN).
Label data: New Zealand: NN: Eves Valley, Palmers Bush, litter, 20 Oct 1971 GW
Ramsay, 71/ 122// LSAM 0249688 (LSAM).
 25. *Pselaphaulax "tararua"*, sp. nov.
Locality: New Zealand (WN).
Label data: NEW ZEALAND WN Tararua Ra Dundas Hut Ridge 990m 13 Feb 1985//
C.F. Butcher sifted litter 85/20 (NZAC).
 26. *Pselaphaulax "nunni"*, sp. nov.
Locality: New Zealand (MB).
Label data: New Zealand: MB: Black Birch Ra summit 7 Feb-07// JTN collection (JN).
 27. *Pselaphaulax* sp.
Locality: Australia (Western Australia).
Label data: Australia. West Australia, Windham env. BOAB Prison Trap 15°33.22'S
128°308.49'E 21-23.i.2014 J. Horak leg. (JSC).
 28. *Pselaphaulax* sp.
Locality: China (Sichuan).
Label data: P.R. China, Sichuan NE Slope Gongaa Shan N29°55'31" E10°58'46",
17.vi.2011, 3554m, sift 19, V. Grebennikov (Hlavac).

29. *Pselaphaulax* sp.
Locality: Malaysia (Kelantan).
Label data: Malaysia W Kelantan 90km N Gua Musana Mt Basor 1700m Kampong Kubur Dalu// 1-21 iii 2015 leg. Petr Cechovsky In termite nest (FMNH).
30. *Pselaphaulax* sp.
Locality: Republic of Madagascar.
Label data: Madagascar, 2007, Andasibe-Mantadia N.P., Analamazaotra forest M. tryzna leg. 2-14.ii (JTN).

“Pselaphazealus”, gen. nov.

31. *“Pselaphazealus” sulcicollis* (Broun, 1893), comb. nov.
Locality: New Zealand (WO).
Label data: TYPE// 2263// Pirongia// New Zealand Broun Coll. Brit. Mus. 1922-482 (NHM).

***Pselaphellus* Raffray, 1908**

32. *Pselaphellus convexus* Raffray, 1908
Locality: Brazil (Corumba).
Label data: Corumba Matt. Grosso// Field Mus. Nat. Hist. Orlando Park Pselaphidae Colln. Ex. F.C. Fletcher Colln. (FMNH).

“Pselaphoaotearoa”, gen. nov.

33. *“Pselaphoaotearoa rugosus”*, sp. nov.
Locality: New Zealand (WN).
Label data: NEW ZEALAND WN Tararua Ra Dundas Hur Ridge 990m 13 Feb 1985// C.F. Butcher Litter 85/19 (NZAC).

***Pselaphogenius* Reitter, 1910**

34. *Pselaphogenius “calantica”*, sp. nov.
Locality: New Zealand (ND).
Label data: NEW ZEALAND ND Te Paki Unuwhao 12 Jan-12 Feb 2007 O. Ball (NZAC).
35. *Pselaphogenius carltoni* Thèry and Leschen 2013
Locality: New Zealand (Three Kings Island).
Label data: NEW ZEALAND ND Poor Knights Is Aorangi Knoll 200m S of Saddle 9-17 Nov 1981// J.C. Watt Pit trap 81/165 (NZAC).
36. *Pselaphogenius “chandleri”*, sp. nov.
Locality: New Zealand (BP).
Label data: NEW ZEALAND, BP Orete Forest Te Puia Hut 26 Apr 1993 G. Hall// Sifted litter 93/96 (NZAC).
37. *Pselaphogenius citimus* (Broun, 1893)
Locality: New Zealand (BP).
Label data: NEW ZEALAND, BP Prete Forest Te Puia Hut 25 Jan 1993 J.S. Dugdale// Litter 93/3 (NZAC).
38. *Pselaphogenius delicatus* (Broun, 1886)
Locality: New Zealand (AK).

- Label data: Lynfield, AK Tropicana Dr. 9.6.74 G. Kuschel (NZAC).
39. *Pselaphogenius "fimbria"*, sp. nov.
 Locality: New Zealand (ND).
 Label data: NEW ZEALAND ND Parahaki Park 5 Nov 1981 G. Kuschel// Litter and decayed wood 81/125 (NZAC).
40. *Pselaphogenius "gibbus"*, sp. nov.
 Locality: New Zealand (ND).
 Label data: NEW ZEALAND, ND Unuwahao, 270m 25 Nov 1982 G. Kuschel// sifted litter and decayed wood 82/125 (NZAC).
41. *Pselaphogenius "jiawei"*, sp. nov.
 Locality: New Zealand (BP).
 Label data: NEW ZEALAND, BP Papatea 25 Jan 1993 J.S. Dugdale Litter 93/1 (NZAC).
42. *Pselaphogenius "parki"*, sp. nov.
 Locality: New Zealand (CL).
 Label data: NEW ZEALAND, CL Coromandel FP Maumaupaki TK 23 Oct 1993 M.C. Lariviere// Litter 93/112 (NZAC).
43. *Pselaphogenius turbotti* Thèry and Leschen 2013
 Locality: New Zealand (Three Kings Island).
 Label data: NEW ZEALAND: TH: Beacon Knob, 240 m Litter, 23 Nov 1970 G Kuschel, 70/199// LSAM 0249608 (LSAM).
44. *Pselaphogenius ventralis* (Broun, 1895)
 Locality: New Zealand (WO).
 Label data: NEW ZEALAND WO Te Mata Bridal Veil Falls 19 Sep 1981 C.F. Butcher// Litter 81/88 (NZAC).
45. *Pselaphogenius* sp.
 Locality: China (Sichuan).
 Label data: P.R. China, Sichuan, NE Slope Gongaa Shan. N29°52'10" E102°02'01" 12.vi.2011. 3620m sift 16 V. Grebennikov (Hlavac).
46. *Pselaphogenius* sp.
 Locality: Malaysia (Kelantan).
 Label data: Malaysia W Kelantan 90km N Gua Musana Mt Basor 1700m Kampong Kubur Dalu// 1-21 iii 2015 leg. Petr Cechovsky in termite nest (JTN).
47. *Pselaphogenius* sp.
 Locality: Australia (Queensland).
 Label data: AUSTRALIA Qld Tallawallal Tck 1-xi-2012// Ground litter with much wood mould// *Pselaphogenius* sp. Det. J Nunn 2013 (JTN).
- "Pselapholateralis"*, gen. nov.**
48. *"Pselapholateralis" cavidorsis* (Broun, 1923), comb. nov.
 Locality: New Zealand (ND).
 Label data: NEW ZEALAND ND Waipoua SF Wairau Smt, 390m 14 Apr 1980 J.C. Watt// Sifted litter 80/51 (NZAC),
- "Pselapholobus"*, gen. nov.**
49. *"Pselapholobus" dulcis* (Broun, 1881), comb. nov.
 Locality: New Zealand (ND).

Label data: New Zealand: ND: Waipoua S.F., Te Matua Ngahere, 370 m, kauri log 19 Mar 1978, S & J Peck (LSAM).

“*Pselaphopegasus*”, gen. nov.

50. “*Pselaphopegasus stewarti*”, sp. nov.

Locality: New Zealand (WN).

Label data: NEW ZEALAND WN Tararua Ra Dundas Ridge 1430m 6-13 Feb 1985// G. Hall Pan trap 5 (NZAC).

***Pselaphophus* Raffray, 1890**

51. *Pselaphophus atriventris* Westwood, 1856

Locality: New Zealand (NN).

Label data: New Zealand: NN: Pretty Bridge valley pit trap I pasture (10) 2 Feb 1966, G Hitchings (LSAM).

52. *Pselaphophus* sp.

Locality: Australia (Tasmania).

Label data: AUSTRALIA Tas Swan Basin Strahen 19 January 2010// Sifted ground moss// JT Nunn Collection (JTN).

***Pselaphopluteum* Owens, Leschen, and Carlton, 2019**

53. *Pselaphopluteum motumaha* Owens, Leschen, and Carlton 2019

Locality: New Zealand (Auckland Island).

Label data: AUCKLAND IS. Auckland I Laurie Harbour Terror Cove 1 Mar 1981// G.W. Ramsay and T.K. Crosby Litter 81/44 (NZAC).

***Pselaphostomus* Reitter, 1909**

54. *Pselaphostomus stussineri* Saulcy, 1881

Locality: Italy (Maritime Alps).

Label data: Italia n., Alpi Marittime Terme di Valdieri env. Leaf litter sifting 1565m 44.19651N 7.27166E 30.6.2014 M. Kocian lgt. (JTN).

***Pselaphotheseus* Park, 1964**

55. *Pselaphotheseus ihupuku* Carlton and Leschen, 2001

Locality: New Zealand (Campbell Island).

Label data: NEW ZEALAND, CA, Campbell Is., Beeman Hill, 20 m, 7 Mar 2000, M. Bullians, E. Edwards, R. Leschen, *Dracophyllum* leaf litter, SUB 013, 52°32'S, 169°08'E (NZAC).

“*Pselaphotuberculum*”, gen. nov.

56. “*Pselaphotuberculum chandleri*”, sp. nov.

Locality: New Zealand (WN).

Label data: NEW ZEALAND WN Tararua Ra Dundas Hut Ridge River Forks, 700m 11 Feb 1985// G.W. Ramsay Litter 85/13 (LSAM).

***Pselaphotumulus* Owens and Carlton, 2020**

57. *Pselaphotumulus oviceps* (Broun, 1917)

Locality: New Zealand (FD).

Label data: New Zealand FD Camp 1020m Tutoko Bench Darren Mts// 15 Jan 1977 T.K. Crosby moss 77/13 (NZAC).

58. *Pselaphotumulus urquharti* (Broun, 1917)

Locality: New Zealand (WD).

Label data: NEW ZEALAND WD Lake Ianthe 7 Feb 1984 J.C. Watt// Sifted Litter and wood mould 84/22 (NZAC).

***Pselaphus* Herbst, 1972**

59. *Pselaphus bellax*

Locality: USA (Wisconsin).

Label data: USA: WI: Kenosha Co., E of Woodworth, Benedict Prairie, 31 May 1998// Litter at temporary stream, Willow leg. W. Suter (FMNH).

60. *Pselaphus heisei*

Locality: Slovenia (Bilkove Humence)

Label data: Bilk, Humence Slov. 6.5.60 Rost. Formosek (JTN)

61. *Pselaphus (Pselaphoptrus)* sp.

Locality: Turkestan.

Label data: Turkestan NHS. Ghissar F. Hauser 1898// Hauser don.// CNHM 1955 Edward Knirsch Palearctic Colln. (FMNH)

62. *Pselaphus (Pselaphidius)* sp.

Locality: Philippines.

Label data: Philippines #12 CL Remington leg. 2-8.v.45// Field Mus. Nat. Hist. Orlando Park Pselaphidae Colln. (FMNH)

63. *Pselaphus (Pselaphinus)* sp.

Locality: Borneo.

Label data: Nord-Borneo// F.C. Fletcher Collection// Field Mus. Nat. Hist. Orlando Park Pselaphidae Colln. (FMNH).

***Tyraphus* Sharp, 1874**

64. *Tyraphus howitti* (King, 1865)

Locality: Australia (Melbourne).

Label data: Melb.// F.C. Fletcher Collection// Field. Mus. Nat. His. Orlando Park Pselaphidae Colln. (FMNH).

***Taomica* Hlavac, 2006**

65. *Taomica cassani*

Locality: New Caledonia.

Label data: New Caledonia S764 20°34'Sx164°46'E Mt. Panic Refuge, 1300m, 8-9 Nov 2001 C. Burwell Pyrethrum, trees & logs// PARATYPE (Brisbane Mus.).

APPENDIX B. DATA MATRIX FOR MORPHOLOGICAL PHYLOGENY

[illegible]

APPENDIX C. TAXA USED IN MOLECULAR PHYLOGENY

Extr. No.	Extraction Taxon	Locality	Subfamily	Supertribe	Tribe
Extr. #1					
	<i>Conoplectus canaliculatus</i>	USA	Pselaphinae	Euplectitae	Trogastrini
	<i>Pseudactium carolinae</i>	USA	Pselaphinae	Euplectitae	Trichonychini
	<i>Rhexius</i> sp. (f)	Ecuador	Pselaphinae	Euplectitae	Trogastrini
	<i>Pselaphus bellax</i>	USA	Pselaphinae	Pselaphitae	Pselaphini
	<i>Nearctitychus sternalis</i>	USA	Pselaphinae	Goniaceritae	Tychini
	<i>Decarthron</i> sp. 1	USA	Pselaphinae	Goniaceritae	Brachyglutini
	<i>Ctenisodes</i> sp.	USA	Pselaphinae	Pselaphitae	Ctenistini
	<i>Hamotina</i> sp.	Ecuador	Pselaphinae	Pselaphitae	Tyrini
	<i>Tmesiphorus costalis</i>	USA	Pselaphinae	Pselaphitae	Tmesiphorini
	<i>Leptoplectus pertenuis</i>	USA	Pselaphinae	Euplectitae	Euplectini
	<i>Dasycerus</i> sp.	USA	Dasycerinae		
	<i>Sonoma</i> sp.	USA	Pselaphinae	Faronitae	Faronini
Extr. #2					
	<i>Custotychus</i> sp.	USA	Pselaphinae	Goniaceritae	Tychini
	<i>Biblopectus</i> sp.	USA	Pselaphinae	Euplectitae	Euplectini
	<i>Decarthron</i> sp. 2	USA	Pselaphinae	Goniaceritae	Brachyglutini
	<i>Arthmius</i> sp.	Ecuador	Pselaphinae	Batrisitae	Batrisini
	<i>Batrisodes</i> sp.	USA	Pselaphinae	Batrisitae	Batrisini
	<i>Sebaga</i> sp.	Mexico	Pselaphinae	Euplectitae	Jubini
	<i>Fustiger knausii</i>	USA	Pselaphinae	Clavigeritae	Clavigerodini
	<i>Euplectus</i> sp.	USA	Pselaphinae	Euplectitae	Euplectini
	<i>Sagola</i> sp.	NZ	Pselaphinae	Faronitae	Faronini
	<i>Rhytus</i> sp.	Ecuador	Pselaphinae	Goniaceritae	Arhytodini
	<i>Tmesiphorus carinatus</i>	USA	Pselaphinae	Pselaphitae	Tmesiphorini
	<i>Iniocyphini</i> sp.	Ecuador	Pselaphinae	Goniaceritae	Iniocyphini
Extr. #3					
	<i>Valda frontalis</i>	USA	Pselaphinae	Euplectitae	Valdini
	<i>Jubus</i> sp.	Ecuador	Pselaphinae	Euplectitae	Jubini
	<i>Rhinoscepsis bistratus</i>	USA	Pselaphinae	Euplectitae	Rhinoscepsini
	<i>Zeatyurus</i> sp.	NZ	Pselaphinae	Pselaphitae	Tyrini
	<i>Actiastes</i> sp.	Ecuador	Pselaphinae	Euplectitae	Trogastrini
	<i>Reichenbachia</i> sp.	USA	Pselaphinae	Goniaceritae	Brachyglutini

	<i>Metopioxys</i> sp.	Peru	Pselaphinae	Batrisitae	Batrisini
	<i>Bryaxis</i> sp.	USA	Pselaphinae	Goniaceritae	Brachyglutini
	<i>Cedius</i> sp.	USA	Pselaphinae	Pselaphitae	Tyrini
	<i>Pselaptrichus perfidus</i>	USA	Pselaphinae	Goniaceritae	Bythinini
Extr. #4					
	<i>Mayetia</i> sp.	Mexico	Pselaphinae	Euplectitae	Mayetiini
	Plagiophorus	Malaysi a	Pselaphinae	Batrisitae	Batrisini
	<i>Arianops</i> sp.	USA	Pselaphinae	Batrisitae	Amauropsini
	<i>Pselaphotumulus oviceps</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphaulax pauper</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphaulax pilifrons</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphogenius "cornus"</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphogenius citimus</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphogenius turbotti</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	"Pselapholateralis"	NZ	Pselaphinae	Pselaphitae	Pselaphini
	"Pselaphopegasus"	NZ	Pselaphinae	Pselaphitae	Pselaphini
	"Pselapholobus"	NZ	Pselaphinae	Pselaphitae	Pselaphini
	"Pselaphotuberculum"	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphophus atriventris</i>	NZ	Pselaphinae	Pselaphitae	Pselaphini
	<i>Pselaphus longiclavus</i>	USA	Pselaphinae	Pselaphitae	Pselaphini
	<i>Mipseltyrus nicolayi</i>	USA	Pselaphinae	Pselaphitae	Tyrini
	<i>Caccoplectus</i> sp.	Ecuador	Pselaphinae	Pselaphitae	Arhytodini
	<i>Machaerodes carinatus</i>	USA	Pselaphinae	Goniaceritae	Bythinini

APPENDIX D. WORLD CATALOGUE OF THE GENERA OF THE TRIBE PSELAPHINI

***Afropselaphus* Jeannel, 1950**

Type species: *Pselaphus algericus* Raffray, 1896 (original description).

Afropselaphus Jeannel, 1950: 384 (description).

Distribution: Canary Isl.; Caucasus; Mediterranean (Greece, Morocco, Tunisia); Uzbekistan. (W. Palearctic, E. Palearctic).

Number of species: Twenty-three.

***Bellenden* Chandler, 2001**

Type species: *Bellenden monteithi* Chandler, 2001 (original description).

Bellenden Chandler, 2001: 504 (description).

Synonym: *Buobellenden* Yin and Nomura, 2009: 65 (original description). Yin and Jiang, 2016: 27 (new combination as *Bellenden*).

Type species: *Buobellenden jingyuanensis* Yin and Nomura (orig. des.)

Distribution: Australia (Queensland); China (Sichuan, Gansu). (Australian, Oriental).

Number of species: Six.

***Curculionellus* Westwood, 1870**

Type species: *Curculionellus angulicollis* Westwood, 1870. (synonymy *Pselaphus punctatus* King, designated Jeannel 1951: 6).

Curculionellus Westwood, 1870: 127 (description).

Distribution: Korea, New Guinea, Australia (Queensland, NSW)

Number of species: Twelve.

***Dicentrius* Reitter, 1882**

Type species: *Pselaphus merkliei* Reitter, 1880 (monotypy).

Dicentrius Reitter, 1882: 208 (description).

Distribution: Bulgaria, Albania, Yugoslavia (W. Palearctic).

Number of species: Ten.

***Geopselaphus* Jeannel, 1956**

Type species: *Pselaphus sencieri* Coquerel, 1859 (original description).

Geopselaphus Jeannel, 1956: 152 (description).

Distribution: NW Africa, Spain, Canaries (W. Palearctic).

Number of species: Twenty- four.

***Hirashimanyus* Nomura, 1990**

Type species: *Hirashimanyus schistodactyroides* Nomura 1990 (original description).

Hirashimanyus Nomura, 1990: 51 (description).

Distribution: Japan (Ishigaki Isl.), Taiwan (E. Palearctic, Oriental)

Number of species: Two.

***Kakadu* Chandler, 2001**

Type species: *Kakadu pecki* Chandler 2001 (original description).

Kakadu Chandler, 2001: 509 (description).
Distribution: Australia (Queensland, Northern Territory).
Number of species: One.

***Mareeba* Chandler, 2001**

Type species: *Mareeba storeyi* Chandler, 2001 (original description).
Mareeba Chandler, 2001: 512 (description).
Distribution: Australia (Queensland, Northern Territory).
Number of species: One.

***Margaris* Schaufuss, L.W., 1877**

Type species: *Margaris imperialis* Schaufuss, 1877 (monotypy).
Margaris Schaufuss, 1877: 453 (description).
Distribution: Australia (Queensland, NSW).
Number of species: One.

***Maydena* Chandler, 2001**

Type species: *Pselaphus longifrons* Raffray, 1909 (original description).
Maydena Chandler, 2001: 517 (description).
Distribution: Australia (Victoria, Tasmania).
Number of species: Four.

***Mentraphus* Sharp, 1883**

Type species: *Mentraphus pselaphodes* Sharp 1883 (monotypy).
Mentraphus Sharp, 1883: 225 (description).
 Synonym: *Callithorax* Motschulsky, 1851: 482 (preoccupied; Agassiz 1846).
 Type species: *Callithorax subtilis* Motschulsky, 1851 (monotypy).
 Synonym: *Psilocephalus* Raffray, 1877: 284 (preoccupied; Swainson 1839, Salter 1866).
 Type species: *Psilocephalus formicetorum* Raffray, 1877 (monotypy).
 Synonym: *Apenicillus* Reitter, 1885: 228 (for *Psilocephalus* Raffray).
 Type species: *Psilocephalus formicetorum* Raffray, 1877 (autotypy).
 Synonym: *Callithoracoides* Strand, 1928: 2 (for *Callithorax* Motschulsky).
 Type species: *Callithorax subtilis* Motschulsky, 1851 (autotypy).
Distribution: Afrotropical, Middle East, Oriental (W Palearctic, Oriental, Afrotropical).
Number of species: Seven.

***Nabepselaphus* Nomura, 2002**

Type species: *Nabepselaphus yasukii* Nomura, 2002 (original description).
Nabepselaphus Nomura, 2002: 281 (description).
Distribution: China (Yunnan), Oriental

***Neopselaphus* Jeannel, 1951**

Type species: *Pselaphus bizonatus* Schaufuss, 1886 (original description).
Neopselaphus Jeannel, 1951: 8 (description).
Distribution: USA (Texas), Central America (Mexico), South America (Brazil).
Number of species: Six.

***Peckiella* Chandler, 2001**

Type species: *Peckiella podocarpus* Chandler, 2001 (original description).

Peckiella Chandler, 2001: 520 (description).

Distribution: Australia (Northern Territory).

Number of species: One.

***Pselaphaulax* Reitter, 1909**

Type species: *Pselaphus dresdensis* Herbst, 1792 (monotypy).

Pselaphaulax Reitter, 1909: 218 (description).

Distribution: Afrotropical, South Africa, Madagascar, Palearctic, Oriental, Australia, NZ.

Number of species: Seventy-four.

“*Pselaphazealus*”, new genus

Type species: *Pselaphus sulcicollis* Broun, 1893 (new combination).

Distribution: NZ (WO).

Number of species: One.

***Pselaphellus* Raffray, 1908**

Type species: *Pselaphus opacus* Schaufuss, 1886 (designated Jeannel 1951a: 8).

Pselaphellus Raffray, 1908: 307 (description).

Distribution: Neotropical

Number of species: Seven.

***Pselaphischnus* Raffray, 1897**

Type species: *Pselaphischnus squamosus* Raffray, 1897 (monotypy).

Pselaphischnus Raffray, 1897: 99 (description).

Distribution: South Africa

Number of species: One.

“*Pselaphoaotearoa*”, new genus

Type species: “*Pselaphoaotearoa rugosus*” (new species)

Distribution: NZ (WN).

Number of species: One.

***Pselaphogenius* Reitter, 1910**

Type species: *Pselaphus quadricostatus* Reitter, 1884 (designated Jeannel 1950a: 384).

Pselaphogenius Reitter, 1910: 155 (description).

Synonym: *Pselaphodinus* Jeannel 1950: 389

Type species: *Pselaphus longipalpis* Kiesenwetter (original description)

Synonym: *Dicentrius* Reitter, 1882: 208 (in part); Besuchet 1968: 295 (synonymy)

Distribution: Australia (New South Wales), S. Europe, Turkey, Japan, Korea, China, Taiwan, Vietnam, New Zealand, Afrotropical

Number of species: Seventy-nine.

“*Pselapholateralis*”, new genus

Type species: *Pselaphus cavidorsis* Broun, 1923 (new combination).

Distribution: NZ (ND).
Number of species: One.

“Pselapholobus”, new genus

Type species: *Pselaphus dulcis* Broun, 1881 (new combination)
Distribution: NZ (ND, AK).
Number of species: One.

***Pselaphophus* Raffray, 1890**

Type species: *Bryaxis atriventris* Westwood, 1856 (designated Lucas 1920: 544).
Pselaphophus Raffray, 1890: 139 (description).
Distribution: Australia (New South Wales, SA, Tasmania, Victoria), New Guinea, New Zealand (introduced).
Number of species: Six.

“Pselaphopegasus”, new genus

Type species: *“Pselaphopegasus rakiura”*, new species.
Distribution: NZ (Stewart Island).
Number of species: One.

***Pselaphopluteum* Owens, Leschen, and Carlton, 2019**

Type species: *Pselaphopluteum motumaha* Owens, Leschen, and Carlton, 2019: 9 (original description)
Pselaphopluteum Owens, Leschen, and Carlton, 2019: 9 (description).
Distribution: NZ (Auckland and Adams Islands).
Number of species: One.

***Pselaphorites* Jeannel, 1952**

Type species: *Pselaphorites carinatus* Jeannel, 1952 (original description).
Pselaphorites Jeannel, 1952: 260 (description).
Distribution: Afrotropical.
Number of species: Nineteen.

***Pselaphostomus* Reitter, 1909**

Type species: *Pselaphus stussineri* Saulcy, 1881 (original description).
Pselaphostomus Reitter, 1909: 218 (description).
Synonym: *Pselaphopsis* Jeannel 1950: 389
Type species: Reitter, 1882 (original description).
Distribution: Western Mediterranean (W. Palearctic)/
Number of species: Twenty-three.

***Pselaphotheseus* Park, 1964**

Type species: *Pselaphotheseus hippolytae* Park, 1964 (original description).
Pselaphotheseus Park, 1964: 391 (description).
Distribution: NZ (Campbell Is.)
Number of species: Two.

***Pselaphotrichus* Besuchet, 1986**

Type species: *Pselaphus gibbicollis* Raffray 1913 (autotypy).

Pselaphotrichus Besuchet, 1986: 259 (new name for *Trichopselaphus* Jeannel)).

Synonym *Trichopselaphus* Jeannel, 1950: 187 (preoccupied; Chadoir 1843).

Type species: *Pselaphus gibbicollis* Raffray, 1913 (autotypy).

Distribution: Afrotropical, India (Oriental).

Number of species: Six.

“*Pselaphotuberculum*”, new genus

Type species: “*Pselaphotuberculum lescheni*”, new species.

Distribution: NZ (AK, WN).

Number of species: One.

***Pselaphotumulus* Owens and Carlton, 2020**

Type species: *Pselaphus cavelli* Broun, 1893 (original description).

Pselaphotumulus Owens and Carlton, 2020: 4 (description).

Distribution: NZ (South Island).

Number of species: Seven.

***Pselaphus* Herbst, 1972: 106**

Type species: *Pselaphus heisei* Herbst 1972 (designated Shuckard, 1839: 147. Westwood 1839: 21= not valid)

Nomen nudum: *Stanosthetus* Dejean, 1821: 25.

Synonym: *Stenosthetus* Griffith and Pidgeon, 1832: 300 (attributed to Megerle, Dejean, synonymy with *Pselaphus*).

Synonym: *Pselaphoxys* Raffray 1890: 139 (as subgenus).

Type species: *Pselaphus delicatus* Raffray, 1882 (monotypy).

Synonym: *Pselaphotropus* Reitter, 1891: 139.

Type species: *Pselaphotropus kubischteki* Reitter, 1891 (monotypy).

Synonym: *Faradayus* Reitter, 1891: 217.

Type species: *Pselaphus banghaasi* Reitter, 1893 (designated Jeannel 1951a: 6).

Synonym: *Pselaphidius* Jeannel, 1951: 9.

Type species: *Pselaphus filipalpis* Reitter, 1882 (original designation).

Synonym: *Pselaphinus* Jeannel, 1951: 10 (as subgenus).

Type species: *Pselaphus pilipalpis* Reitter, 1883 (original designation).

Synonym: *Pselaphaxys* Jeannel, 1960: 189 (misspelled= *Pselaphoxys*).

Distribution: Nearctic, Neotropical, Western Palearctic, Eastern Palearctic, Oriental, Australia, Afrotropical, South Africa.

Number of species: Eighty-eight.

***Taomica* Hlavac, 2006**

Type species: *Taomica cassani* Hlavac, 2006 (original designation)

Taomica Hlavac *et al.*, 2006: 79

Distribution: New Caledonia.

Number of species: One.

***Tyraphus* Sharp, 1874**

Type species: *Tyraphus planus* Sharp, 1874 (designated Jeannel, 1951: 6)
Tyraphus Sharp, 1878: 489.

Distribution: Eastern Russia, Japan, Australia (E. Palearctic, Oriental).

Number of species: Nineteen.

APPENDIX E. CATALOGUE OF THE TRIBE PSELAPHINI IN NEW ZEALAND

***Pselaphaulax* Reitter, 1909**

Pselaphaulax Reitter, 1909: 218

Distribution in NZ: AK, CO, DN, FD, MB, MC, NN, SL, TK, TO, WD, WN; Chatham Islands; Auckland Island.

Number of NZ species: Thirteen.

***Pselaphaulax caeruleus* Owens, Leschen, and Carlton, 2019**

Pselaphus caeruleus Owens, Leschen, and Carlton, 2019: 4.

Type depository. NZAC.

Distribution. Chatham Islands.

***Pselaphaulax dracophyllum* Owens, Leschen, and Carlton, 2019**

Pselaphus dracophyllum Owens, Leschen, and Carlton, 2019: 5.

Type depository. NZAC.

Distribution. Auckland Island.

***Pselaphaulax flavus* Owens, Leschen, and Carlton, 2019**

Pselaphaulax flavus Owens, Leschen, and Carlton (2019: 6)

Type depository. NZAC.

Distribution. Chatham Islands.

Pselaphaulax "hornabrooki", sp. nov.

Type depository. NZAC.

Distribution. Wellington (WN).

Pselaphaulax "intermedius", sp. nov.

Type depository. LSAM.

Distribution. Central Otago (CO).

***Pselaphaulax meliusculus* (Broun), 1893, comb. nov.**

Pselaphus meliusculus Broun, 1893: 1044.

Type depository. NHM.

Distribution. Central Otago (CO); Dunedin (DN); Fiordland (FD); Southland (SL).

***Pselaphaulax nunni*, sp. nov.**

Type depository. NZAC.

Distribution: Marlborough (MB).

***Pselaphaulax pauper* (Sharp), 1874, comb. nov.**

Pselaphus pauper Sharp, 1874: 492.

Type depository. NHM.

Pselaphus pilistriatus Broun, 1880: 123, syn. nov.

Type depository. NHM.

Pselaphus fuscopilus Broun, 1886: 944, syn. nov.

Type depository. NHM.

Distribution. Auckland (AK); Fiordland (FD); MidCanterbury (MC); Northland (ND); Westland (WD); Wellington (WN).

Pselaphaulax “pelorus”, sp. nov.

Type depository. NZAC.

Distribution. Marlborough (MB); Nelson (NN).

***Pselaphaulax pilifrons* (Broun), 1914, comb. nov.**

Pselaphus pilifrons Broun, 1914: 93.

Type depository. NHM.

Pselaphus trifoveatus Broun (1914: 172), syn. nov.

Type depository. NHM.

Distribution. Mid Canterbury (MC).

Pselaphaulax “ramsayi”, sp. nov.

Type depository: NZAC.

Distribution. Nelson (NN).

Pselaphaulax “tararua”, sp. nov.

Type depository: NZAC.

Distribution. (NN), Taranaki (TK), Taupo (TO), Wellington (WN).

***Pselaphaulax traversi* Owens, Leschen, and Carlton, 2019**

Pselaphaulax traversi Owens, Leschen, and Carlton, 2019: 7.

Type depository. NZAC.

Distribution. NZ: Chatham Islands.

“Pselaphazealus”, new genus

Distribution in NZ: WO.

Number of NZ species: One.

***“Pselaphazealus” sulcicollis* (Broun), 1893, comb. nov.**

Pselaphus sulcicollis Broun, 1893: 1415.

Type depository. NHM.

Distribution. Waikato (WO).

“Pselaphoaotearoa”, new genus

Distribution in NZ: WN.

Number of NZ species: One.

“Pselaphoaotearoa rugosus”, sp. nov.

Type depository. NZAC.

Distribution. Wellington (WN).

***Pselaphogenius* Reitter, 1910**

Pselaphogenius Reitter, 1910: 155

Synonym: *Pselaphodinus* Jeannel 1950: 389

Synonym: *Dicentrius* Reitter, 1882: 208 (in part); Besuchet 1968: 295 (synonymy)

Distribution in NZ:

Number of NZ species: Twenty-three.

***Pselaphogenius butcherae* Thèry and Leschen, 2013**

Pselaphogenius butcherae Thèry and Leschen, 2013: 57.

Type depository. NZAC.

Distribution. Three Kings Islands.

***Pselaphogenius caecus* (Broun), 1886, comb. nov.**

Pselaphus caecus Broun, 1886: 943.

Type depository. NHM.

Distribution. Auckland (AK).

***Pselaphogenius “calantica”*, sp. nov.**

Type depository. NZAC.

Distribution. Northland (ND).

***Pselaphogenius carltoni* Thèry and Leschen, 2013**

Pselaphogenius carltoni Thèry and Leschen, 2013: 58.

Type depository. NZAC.

Distribution. Three Kings Islands.

***Pselaphogenius “chandleri”*, sp. nov.**

Type depository. NZAC.

Distribution. Bay of Plenty (BP), Gisborne (GB).

***Pselaphogenius citimus* (Broun), 1893**

Pselaphus citimus Broun, 1893: 1043; syn. (Newton and Thayer 2003).

Type depository. NHM.

Distribution. Auckland (AK), Bay of Plenty (BP), Gisborne (GB), Hawke’s Bay (HB), Northland (ND), Nelson (NN), Taranaki (TK), Taupo (TO), Waikato (WO).

***Pselaphogenius “cornus”*, sp. nov.**

Type depository. NZAC.

Distribution. Auckland (AK).

***Pselaphogenius delicatus* (Broun), 1886**

Pselaphus delicatus Broun, 1886: 943; syn. (Newton and Thayer 2003).

Type depository. NHM.

Distribution. Auckland (AK), Northland (ND).

Pselaphogenius “dismukesī”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

Pselaphogenius “elephantus”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

Pselaphogenius “fimbria”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

Pselaphogenius “gibbus”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

***Pselaphogenius hodeberti* Thèry and Leschen, 2013**

Pselaphogenius hodeberti Thèry and Leschen, 2013: 59.

Type depository. NZAC.

Distribution. Three Kings Islands.

Pselaphogenius “jiaweiī”, sp. nov.

Type depository. NZAC.

Distribution. Bay of Plenty (BP), Gisborne (GB).

Pselaphogenius “kallerī”, sp. nov.

Type depository. NZAC.

Distribution. Nelson (NN).

Pselaphogenius “kangi”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

Pselaphogenius “leschenī”, sp. nov.

Type depository. NZAC.

Distribution. Buller (BR), Marlborough (MB).

Pselaphogenius “moerewae”, sp. nov.

Type depository. NZAC.

Distribution. Northland (ND).

Pselaphogenius “otteai”, sp. nov.

Type depository. FMNH.

Distribution. Northland (ND).

Pselaphogenius “parki”, sp. nov.

Type depository. NZAC.

Distribution. Coromandel (CL).

Pselaphogenius “stouti”, sp. nov.

Type depository. FMNH.

Distribution. Northland (ND).

Pselaphogenius “turbotti” Thèry and Leschen, 2013

Pselaphogenius turbotti Thèry and Leschen, 2013: 60.

Type depository. NZAC.

Distribution. Three Kings Islands.

***Pselaphogenius ventralis* (Broun), 1895**

Pselaphus ventralis Broun, 1895: 72; syn. (Newton and Thayer 2003).

Type depository. NHM.

Distribution. Auckland (AK).

“*Pselapholateralis*”, new genus

Distribution in NZ: ND.

Number of NZ species: One.

“*Pselapholateralis*” *cavidorsis* (Broun), 1923, comb. nov.

Pselaphus cavidorsis Broun, 1923: 681.

Type depository. NHM.

Distribution. Northland (ND).

“*Pselapholobus*”, new genus

Distribution in NZ: AK, ND.

Number of NZ species: One.

“*Pselapholobus*” *dulcis* (Broun), 1881, comb. nov.

Pselaphus dulcis Broun, 1881.

Type depository: NHM.

Distribution: Auckland (AK), Northland (ND).

***Pselaphophus* Raffray, 1890**

Pselaphophus Raffray, 1890: 139.

Distribution in NZ: Australia (New South Wales, SA, Tasmania, Victoria), New Guinea, New Zealand (introduced).

Number of NZ species: One.

***Pselaphophus atriventris* (Westwood), 1870**

Bryaxis atriventris Westwood, 1870: 125.

Type depository: BMNH.

Distribution: North Island (ND to BP), South Island (NN to FD); Chatham Islands.

“*Pselaphopegasus*”, new genus
Distribution in NZ: Stewart Island.
Number of NZ species: One.

“*Pselaphopegasus rakiura*”, sp. nov.
Type depository: NZAC.
Distribution. Stewart Island.

***Pselaphopluteum* Owens, Leschen, and Carlton, 2019**
Pselaphopluteum Owens, Leschen, and Carlton, 2019: 9.
Distribution in NZ: Auckland and Adams Islands.
Number of NZ species: One.

***Pselaphopluteum motumaha* Owens, Leschen, and Carlton, 2019**
Pselaphopluteum motumaha Owens, Leschen, and Carlton, 2019: 9.
Type depository: NZAC.
Distribution: Auckland and Adams Islands.

***Pselaphotheseus* Park, 1964**
Pselaphotheseus Park, 1964: 391
Distribution in NZ: Campbell Island.
Number of NZ species: Two.

***Pselaphotheseus hippolytae* Park, 1964**
Pselaphotheseus hippolytae Park, 1964: 391.
Type depository: NZAC.
Distribution: Campbell Island.

***Pselaphotheseus ihupuku* Carlton and Leschen, 2001**
Pselaphotheseus ihupuku Carlton and Leschen, 2001: 387.
Type depository: NZAC.
Distribution: Campbell Island.

“*Pselaphotuberculum*”, new genus
Distribution in NZ: Auckland (AK), Wellington (WN).
Number of NZ species: One.

“*Pselaphotuberculum lescheni*”, sp. nov.
Type depository: NZAC.
Distribution in NZ: AK, WN.

***Pselaphotumulus* Owens and Carlton, 2020**
Pselaphotumulus Owens and Carlton, 2020: 4
Distribution in NZ: BP, BR, FD, MC, MK, NC, ND, NN, WD.
Number of NZ species: Seven.

***Pselaphotumulus aorerei* Owens and Carlton, 2020**

Pselaphotumulus aorerei Owens and Carlton, 2020: 6

Type depository. NZAC.

Distribution. Nelson (NN).

***Pselaphotumulus cavelli* (Broun), 1893**

Pselaphus cavelli Broun, 1893: 1414.

Type depository. NHM.

Distribution. Bay of Plenty (BP), Buller (BR), Nelson (NN), Westland (WD).

***Pselaphotumulus dubius* Owens and Carlton, 2020**

Pselaphotumulus dubius Owens and Carlton, 2020: 6.

Type depository. NZAC.

Distribution. NZ: Fiordland (FD).

***Pselaphotumulus oviceps* (Broun), 1917**

Pselaphus oviceps Broun, 1917: 380.

Type depository. NHM.

Distribution. NZ: Buller (BR), Fiordland (FD), Nelson (NN).

***Pselaphotumulus unus* Owens and Carlton, 2020**

Pselaphotumulus unus Owens and Carlton, 2020: 8.

Type depository. NZAC.

Distribution. Northland (ND).

***Pselaphotumulus urquharti* (Broun), 1917**

Pselaphus urquharti Broun, 1917: 379.

Type depository. NHM.

Distribution. Buller (BR), Fiordland (FD), Mid Canterbury (MC), Mackenzie (MK), North Canterbury (NC), Westland (WD).

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VITA

Brittany Owens was born in 1989 in New Orleans, Louisiana. Her childhood was spent capturing and rearing caterpillars, beetles, and other assorted arthropods in the well-appointed peanut butter jar menagerie she kept on the back porch. As with many future biologists, these early interests grew into a career path, and from the time she was nine years old she had aspirations toward becoming an entomologist. Upon enrolling into the Department of Ecology and Evolutionary Biology at Tulane University in the fall of 2008 (New Orleans, LA) she had the good fortune to meet Dr. John Caruso, a researcher of deep-sea anglerfish, who introduced her to the wonderful world of taxonomy and systematics. She was accepted as a MS student on a departmental assistantship in the LSU Department of Entomology in January 2012. She completed her Bachelor of Science degree in May 2012 and continued working on numerous collaborative projects with Tulane researchers as an identifier of arthropods for the next year. In the summer of 2012 she began working in the Louisiana State Arthropod Museum (LSAM) as a summer intern. Beginning research for her Master's Degree in the fall of 2012 with her major advisor, Dr. Christopher Carlton, she discovered her true passion for work on the Subfamily Pselaphinae and the biodiversity of the Southeastern U.S. She received her MS in the spring of 2015 and published her MS research the following year. In the fall of 2015 she began her Ph.D. program with Dr. Christopher Carlton and expects to graduate in May 2020.