1902

Pecans

F H. Burnette

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BULLETIN
OF THE
AGRICULTURAL EXPERIMENT STATION
OF THE
Louisiana State University and A. & M. College
WM. C. STUBBS, Ph. D., Director and State Chemist.

PECANS,
By F. H. Burnette, Wm. C. Stubbs, H. A. Morgan.

ISSUED BY THE LOUISIANA STATE BOARD OF AGRICULTURE AND
IMMIGRATION,
J. G. LEE, COMMISSIONER.

Baton Rouge, La.
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The Bulletins and Reports will be sent free of charge to all farmers by applying to Commissioner of Agriculture, Baton Rouge, La., or to the Director of the Station, Audubon Park, New Orleans, La.
DEAR Sir:—The numerous applications for inquiry relative to pecan culture, suggested the preparation of the accompanying pages, which I ask that you publish as Bulletin No. 69. Respectfully submitted,

WM. C. STUBBS, Director.
PECANS.

The increase in correspondence relative to "Pecans" and "Pecan Culture," during the past season, has been very great. Information has been sought as to the best localities for growing this nut; soils best adapted to it; fertilizers most desirable; whether seedlings or grafted trees were best; what varieties most desirable; time of bearing profitable crops, and the ultimate profits from a pecan orchard.

Some of these questions can be readily answered. Others can be discussed, pending full replies to the experiments already being made in various parts of the South.

In response to this large demand for information this bulletin has been prepared.

LOCALITIES OF GROWTH.

The pecan has a somewhat extensive range of natural growth. It succeeds as a forest tree over a section extending throughout the alluvial portion of the lower Mississippi Valley, up the Missouri nearly to Kansas City, a portion of the Ohio Valley, and into western Indiana. It is also found through Southeastern Texas and Northeastern Mexico. It is at home in the alluvial soils of the Mississippi, but is frequently found on the higher soils, and with proper care in the setting and early attention, its growth may be extended over a large portion of the lighter soils. It prefers a moist subsoil, and the lands which were subject to overflow in years gone by, seem to have been its natural home. While it grows much less rapidly on lighter soils, a selection of a site which includes the bottom lands in the sandier sections of the State, will prove more encouraging to their growth and produciveness. The northern limit of its growth is marked by very large trees, bearing smaller nuts with a hard shell, and it is recorded that some trees in Southwestern Indiana measure seventy-five feet to the first limb. While they grow to be
very large forest trees in Louisiana, it is here also that the
very large, thin shelled, and the most valuable market varie-
ties have originated.

BOTANICAL RELATIONS.

The pecan is a species of the hickory. Its botanical name
is Hicoria pecan (Britt); Carya olivaeformis (Nutt). There
are ten or more species of hickories growing in the United
States. Of these, the pecan, from a horticultural standpoint,
is the most important, being the only one grown in orchards
for its fruit. The tree is a rapid grower, and when it comes
into bearing, produces with reasonable regularity, annual
crops of nuts.

SOILS BEST ADAPTED TO PECANS.

As previously remarked, the pecan is at home upon the
rich alluvium of the Mississippi Valley. Here its growth is
most vigorous. Seedlings from nuts planted after the freeze
of 1895, on the grounds of the Sugar Experiment Station, are
now (1902), 11½ inches in diameter, and 34 feet tall. Rich
alluvial soil is therefore best adapted to the growth of this
tree. While this nut will grow upon most any kind of soil,
it thrives best and grows faster where an abundance of mois-
ture is available, and when suitable fertilizers are applied.
Those contemplating the planting of an orchard, should care-
fully consider the requirements of this tree before purchasing
his land. Upon thin, sandy soils, the growth will be slow,
and heavy fertilization will be required. In fact, it may be
announced as a fundamental principle in pecan culture, that
the growth and productiveness of the tree will be directly
in proportion to the fertility and moisture supply of the
soil.

Belonging to the family of hickories, it shares with them
its love for fertile bottom soils, and is rarely found native
upon poor uplands.

Yet by cultivation, proper fertilization, and the use of
improved varieties, profitable orchards may be established
upon poor soils. In purchasing a site for an orchard, of
course the first cost of the land must be reckoned. But when
good alluvial lands can be obtained at comparatively reason-
able prices, it will be found in the end to be the most economical and profitable.

**METHODS OF PROPAGATION.**

All of the older pecan groves are seedlings. Before the war, and for some time afterwards, the nuts were planted where the tree was to stand, and the resulting tree was retained whether it produced large desirable nuts or not.

The nuts used for these plantings were always the largest, finest specimens, and as they were, no doubt, better than the nuts from which they were produced, often trees were obtained that bore large and desirable nuts.

The nuts from the majority of these trees, however, were not as good as those that were planted.

This is simply the history of all of our desirable fruit trees repeated, and should be expected. So, men who desire to grow the best pecans today, do not follow this custom, but instead grow seedlings, in order to bud or graft upon the best varieties available, for there is no other sure way of obtaining nuts which are known to be the most desirable, or of perpetuating a variety.

A person should not put any confidence in the statement of any nurseryman or tree agent who offers seedling trees of desirable pecans, for he cannot guarantee them to produce fine varieties, or even as good as the seed planted to produce them.

**BUDDING.**

There are two common methods of working pecan nursery stock in Louisiana—budding and grafting.

Of the former there are also two common methods: ring or annular, and flute or veneer budding.

The common shield bud is used sometimes on young, smooth skinned trees, but is rarely mentioned by our pecan workers. The nuts are planted in the fall or very early spring, and the seedlings budded when they are two or three years old from the seeds, from three to four feet high, and about three-quarters of an inch in diameter. The operation may take place very early in spring, before the buds start, or later, in July and August, when buds have developed and matured, and thus become available for use.
Figure I gives a view of a nursery row of pecan seedlings, which may be large enough for budding next year, but will probably be crown grafted the present season.

The ring or annular method of budding is not difficult as a rule, if proper care is taken in fitting the bud. A ring of bark about one inch in width, is removed from the young seedling, and in its place is fitted another ring of bark containing a bud taken from a tree of known variety or desirable excellence. The difficulty consists in cutting the ring of exactly the same width.

By practice, expert budders seldom have to cut twice, using an ordinary budding knife, but recently a ring budding knife has been put upon the market, which seems to work well and overcome this difficulty. It was invented by Mr.
William Nelson, of Jefferson parish, probably our oldest Louisiana pecan nurseryman; and figure II gives a cut of the knife, also the manner in which it removes the ring. The parallel blades insure a perfect fit when the knife is handled properly. By little practice even a novice may cut rings. Another knife with parallel blades and set screw, has been patented by Mr. D. Galbreath, of New Orleans. These knives fill a long felt want with pecan growers. After placing the bud, it is tied firmly with some good tying material for the purpose. Waxed strips of cloth are usually used. In the flite or veneer method of budding, the portion of bark containing the bud is fitted into the place prepared for it, and in shield budding on young and very smooth bark trees, the bud slips into the incision nicely, but the experience of men who bud by these methods is that the tying must be done with strong material and carefully and very firmly, not to say tightly adjusted. Oftentimes the waxed strips are wound around the bud firmly, and on top of
these good strong cord is used to tie it the more firmly. Figure III shows a flute bud ready for placing and tied. The shield bud is so seldom used that it is unnecessary to mention it further.

**FIGURE III.**

**GRAFTING.**

Grafting is done early in the spring, and some method of crown grafting is used. When the stock is of convenient size, and in good position, the common whip and tongue method is used, otherwise the common cleft method.

These are secured in position, waxed and banked with earth to nearly the top of the scion or graft. A small stake, usually the portion of the seedling which is removed before grafting, is driven down by the side of each graft, for protection and support.
Figure IV.

Figure IV shows some nursery rows of crown-grafted pieces, each stick in the row marks a graft. Figure V

Figure V.
represents a common whip and tongue graft before tying, and
figure VI, a common cleft graft before waxing. If the stock is small only one graft is inserted.
In each and every case the grafts must be prepared smoothly and placed so that the layers
of living tissue underneath the bark meet. In all these processes the wax is applied warm
with a brush. It cools rapidly and covers all wounds quickly. For convenience it is kept in
a pot and warmed at intervals. It is the custom of some workers to entirely cover the buds
and a considerable portion of the ground with a thin coating of wax, the
object being to prevent evaporation. This
covering is probably an advantage in many cases, for the bud
when starting into growth, readily penetrates the wax. It is
found that the pecan in Louisiana responds to numerous
methods of budding and grafting, for no two nurserymen follow the same methods exactly. Each has his own method and
succeeds with it. When the buds "take," or become estab-
lished, the tying material is gradually loosened and the tops
removed.

There should be no anxiety about the wound healing
well, for very large wounds, with a reasonable amount of
care will heal over. Figure VII shows the trunk of a young
pecan tree, nine years from time of budding. The point of
union is plainly seen. In fact, this tree was selected for this
purpose, as in the majority of trees in the orchard where this
view was taken, the wound could hardly be distinguished.

After the bud or the graft becomes thoroughly estab-
lished, and the top removed, care should be taken that noth-
ing disturbs it. It is the custom in some sections, to give
support by means of stakes for some time afterwards, but
from personal observation in several pecan orchards, it is
found that this is not necessary, unless the tree is exposed in
a special way, as during a very severe storm recently, which broke down large pecan trees, none of them were broken directly at the place of working, which was very convincing in regard to this point. If the union is good, there will be very little danger.
for the purpose of working on either nursery stock or old trees. Well developed, stocky buds and twigs of the previous season's growth, from strong bearing trees should always be sought. It has been demonstrated often that buds from bearing trees come into bearing sooner than buds from young trees not yet bearing, and one should be absolutely sure that the buds and grafts used, come from trees which are known to bear desirable nuts. Undeveloped buds, as well as long jointed soft wood grafts, should always be avoided, for they lack development as well as maturity, and cannot be depended upon.

THE ORCHARD.

In planning and planting a pecan orchard, the distance between trees demands first attention. While many groves are set very irregularly, the advantages of regular setting are numerous. The common distance is probably forty to fifty feet each way, but considering the size to which the pecan grows, it would seem that a greater distance, say sixty to one hundred feet, would answer the purpose better. At seventy feet, the number of trees per acre would be eight; at eighty feet, six; at ninety feet, five, and at one hundred feet, four. It would not be advisable to plant them close enough to interfere, and seventy feet would, no doubt, be close enough for most varieties.

Those varieties of a spreading habit of growth, of course, would demand the most room. To illustrate the difference in growth between varieties, one has only to glance at figure VIII, which gives a young Frotscher pecan, and figure IX,
which gives a young Columbian. If the site chosen is such that at any time of the year stock of any kind will run in the orchard, the young trees should be fenced in, in such a way
as to protect them, and at the same time allow room for the working of the ground and the application of manures. This is not necessary if the field is fenced and cropped with corn or cotton. If a crop is grown, it should not be allowed to grow too close to the young tree, for in this case the pecan tree represents the permanent crop, and as such should be allowed full freedom below the surface of the ground as
well as above. Cropping the young orchard on the whole, is
advisable, provided the trees are manured and cultivated as
well as the crop. In fact, they would probably grow much
faster under that treatment.

METHODS OF PLANTING.

Nuts destined for seed should be gathered with care and
and placed in comparatively dry sand during the winter and
planted as early in the spring as the soil will permit. In
sandy soil, well drained, they may even be planted in the
fall.Whether planted in the field where they are to remain,
or in the nursery rows, every attention in the way of cultiva-
tion and fertilization should be given the young trees, so as
to force as vigorous a growth as possible the first season.

If planted in the nursery, great care should be taken in
transplanting them to the orchard. The tap root of the
young plant is very long, and in removing to the orchard a
goodly portion of it should be dug up with the tree. Hence
greater care is required in removing from the nursery than
with most trees. Even with extreme care the tap root will
be moderately shortened, and many growers claim that this
shortening is beneficial by inducing a greater lateral spread-
ing of the roots.

Before planting out an orchard, it should be thoroughly
prepared for the trees. Holes wide and deep should be dug,
and the soil from the same thoroughly pulverized before being
returned. If not naturally rich, this soil should be well
mixed with woods mould, well rotted stable manure, or a
fertilizer containing largely of Ammonia. The tree should
be placed at the same level that it stood in the nursery. The
well pulverized soil should be pressed lightly around the
roots, and unless the soil is already very wet, water in suffi-
cient quantity should be poured on the soil around the tree,
and over this the remaining dry soil should be placed.

Pecan trees require much care for successful transplant-
ing. When taken from the nursery, all broken or lacerated
roots should be removed, and care should be taken to shield
the roots from the sun, and to prevent them from becoming
dry.
FERTILIZING.

If the orchard is planted in rich alluvial lands, it will require little or no fertilizers. If, however, as is frequently the case, the owner desires to fertilize, one should study the age of the orchard and prepare the fertilizers accordingly. If the trees are young and only growth is sought for, the fertilizers should consist largely of Nitrogen, added, of course, by small quantities of acid phosphate and potash. This mixture should contain at least two parts of Nitrogen to one part each of Phosphoric Acid and Potash.

If, on the other hand, the trees have reached the bearing stage and nuts are desired, the above ingredients should be mixed so that they would be in equal proportions in the mixture. In many alluvial lands potash exists in large quantities and in readily available forms, and may therefore be omitted in any fertilizer destined for these soils.

Upon sandy soils, with young trees, the importance of Nitrogen is more strongly emphasized. Not only should the fertilizers applied contain an excess of Nitrogen, but the soil should be constantly cropped with some leguminous plants as cow peas, velvet beans, etc.), which should at maturity be incorporated with the soil. At the time of planting these crops, applications of acid phosphate (200 to 400 pounds per acre), and muriate of potash (50 to 100 pounds per acre) may be advantageously made. They will insure a large crop of vines, and any excess of these ingredients will be held in reserve for the growing trees. This annual incorporation of vegetable matter, rich in Nitrogen, gathered almost entirely from the atmosphere, will not only furnish the trees with the chief element of growth (Nitrogen), but will largely increase the supply of humus in the soil. Humus carries with it so many benefits that it is difficult to mention them all. To the pecan tree, however, its water-holding capacity is of the utmost importance. Besides this annual leguminous crop, trees on poor soils should be individually fertilized. This is accomplished by broadcasting around the tree in a circle whose radius is equal to the height of the tree. The quantity to be applied varies with the age of the tree. To a
tree just planted in the orchard, at least one pound of the mixture given below, should be applied in the manner described above. This quantity may be doubled each year thereafter. To illustrate, a tree just planted should receive one pound. At one year old, two pounds; at two years old, four pounds; at three years, eight pounds, and so on, until a maximum quantity of 500 to 600 pounds per acre has been applied, when the annual quantity becomes fixed. Of course, after each application, the fertilizer should be mixed with the soil, either with the plow, disc, harrow or some other implement. If the plow be used, it should be run very shallow, taking care not to break the surface roots of the tree.

As before mentioned, young and growing trees require a different fertilizer from old and bearing ones. If the practice of growing and turning under of leguminous crops be followed, the fertilizers prescribed for alluvial soils may be used to spread around the trees. If, on the other hand, it is omitted, the Nitrogen in each formulae should be increased. Of course, all fertilizers should be applied in early spring.

Nitrogen can be supplied in the forms usually found on our markets, viz: Tankage, Cotton Seed Meal, Dried Blood, Fish Scrap, etc.

An acid phosphate containing at least 14 per cent of available phosphoric acid should be preferred. Muriate of potash containing 50 per cent of potash, is the cheapest and perhaps the best form of potash for this tree.

Besides the growing of leguminous crops and the application of commercial fertilizers, it will often be found highly advantageous in light soils to top dress them with stable manure at the rates of twenty to forty two-horse wagon loads per acre. If no commercial fertilizers be applied simultaneously, it would be well to add with the stable manure, 200 to 300 pounds acid phosphate, and 50 to 100 pounds muriate of potash per acre. They may be neglected, if the trees are fertilized with the mixtures given above.

It should always be borne in mind that the pecan tree revels in a fertile, moist soil, and therefore every effort should be made to secure these conditions artificially where they do not naturally exist.
TOP WORKING OLD AND YOUNG TREES.

Until recent years it was thought to be practically impossible to remodel an old pecan tree and make it bear desired varieties. It was even questioned whether a large pecan tree could be topped and live. There is no question concerning the matter today, for even the oldest and largest trees which bear undesirable nuts, are gradually being worked over. This may be done in a variety of ways, the most common being the removal of the large limbs, allowing the sprouts to grow and budding these sprouts. Another method is to cut off a number of smaller limbs, and work these either by budding or graft. When grafted the cleft method is used. This is done very early in the season, and a part of the tree only is treated in one season. Sometimes one-third is worked each year until the tree is completely top worked. Figure X shows a tree during this process, the large limbs remaining will be removed in another season. In this manner very large and unprofitable trees are made to bear nuts of high market value. Figure XI shows an old tree injured by a severe
Tree just planted in the orchard at least one pound of the mixture for fruiting tree roots and other plants. Figure X.
storm, the top removed and the sprouts budded. That these very large wounds heal over quite rapidly may be seen in figure XII, where an old wound nearly two feet in length may be seen healing over. The small branch above was budded about six years ago. Sometimes when young trees need to be top worked, it may be done by budding the smaller limbs instead of cutting off the larger ones, as has been mentioned. A careful scrutiny of figure XIII will show the places where this tree is budded. A high strong stepladder was used in this instance. When large limbs are removed the wounds should be smoothed over and dressed with some material which will protect them as nearly as possible from exposure to moisture and to germs of decay.

Grafting wax or a solution of gum shellac may be used, although some use paint only. It is also the practice of some growers to scarify the edge of the bark around the cut end, to induce the growth of sprouts for budding. It is said that this carries a better distribution of sprouts, giving the budder a chance to select the most desirable ones which will make it easier to form the head of the new tree.

VARIEDRIES.

Quite a number of varieties have been selected and propagated until now we have about fifteen very desirable varieties of Louisiana origin. The effort in selection has been along the lines of increased size of nut and thinness of shell. It may be that too little attention has been given to plumpness and flavor of the meat; however, the importance of these qualities is now being recognized. The following list gives the Louisiana varieties known in a commercial way, and figures XIV and figure XV show some of these varieties; figure XIV giving views of both sides of the nut, and figure XV showing natural size:
Figure XV.
COLUMBIAN.

This is also known as Mammoth, Rome, and Pride of the Coast. It originated near Convent, St. James parish, and is a very large nut, medium in quality, and sometimes irregular in size and filling. See No. 4, figure XIV; Tree is of upright growth (figure IX).

CENTENNIAL.

Originated in St. Charles parish, so far as known. Is a long nut of good quality.

CARMAN.

Originated in Mound, Madison parish, upon the plantation of Mr. Samuel H. James, who has made one of the best, as well as one of the first pecan orchards planted upon a commercial scale. It is a fine, large nut, and was named in honor of Mr. E. S. Carman, late editor of the Rural New Yorker (See No. 4, figure XV.)

PROTSCHER.

Originated near Olivier, in Iberia parish, on the Bayou Teche. It is one of the best large thin-shelled pecans grown. Tree is of spreading habit (figure VIII) and very prolific. (See No. 2, figure XIV).

JAMES' GIANT.

One of the newer desirable varieties, originating in Madison parish, in the orchard of Mr. James (See No. 1, figure XV.)

JAMES' PERFECTION.

Another new production of Mr. James. Large and meaty. (See No. 2, figure XV).

JAMES NO. 1.

Also originated by Mr. James. A medium sized rather long nut, thin-shelled, and meat of good quality.

JAMES' PAPERSHELL.

A large thin-shelled pecan, rather pointed at both ends. Originated by Mr. James, and is said to be a very desirable pecan. (See No. 3, figure XV).
A long, slim pecan, said to be a heavy bearer. Originated by Mr. James. (See No. 1, figure XIV).

**MONEY MAKER.**

A very productive early bearing pecan, plump and meaty. Originated by Mr. James. (See No. 5, figure XV).

**PEARL.**

This is a very productive pecan, originated by Mr. James. It is distinct from the Pearl which originated in Texas.

**PEGRAM.**

A medium-sized, square-shouldered nut of good quality, originated by Mr. James.

**VAN DEMAN.**

This variety comes from St. James parish, and has been called by various names. It is known as the Mere, also as the Bourgeois. The late Mr. W. R. Stuart, of Ocean Springs, Miss., named it Van Deman, in honor of Prof. H. E. Van Deman, late pomologist of the United States Department of Agriculture. A very fine nut, but occasionally it does not fill well. (See No. 5, figure XlV)

**YOUNG.**

This is a very thin-shelled nut of medium size and fine quality. Tree very productive. The original tree stands between St. Martinsville and New Iberia. It has been propagated to some extent and called simply a seedling. As Mr. B. M. Young, of Morgan City, has taken such an active interest in preserving and distributing this valuable seedling, I have taken the liberty of giving it the name of Young in this list. (See No. 3, figure XIV).

The following list gives the names of the remaining varieties of pecans, together with the State in which they originated:
<table>
<thead>
<tr>
<th>Variety</th>
<th>State</th>
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<tbody>
<tr>
<td>Alba</td>
<td>Florida</td>
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<td>Biloxi</td>
<td>Mississippi</td>
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<td>Blediger</td>
<td>Texas</td>
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<td>Briden</td>
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<td>Black Jack</td>
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Figure XVI gives three of the varieties given in the foregoing list, which are propagated largely in Louisiana.

**PABST.**

A large productive, desirable nut, propagated by Mr. Charles E. Pabst, of Ocean Springs, Miss. (See No. 2, figure XVI).

**RUSSELL.**

Another good sized, very excellent nut, sent out by Mr. Pabst. Nut fills well, and tree is very productive. (See No. 3, figure XVI).

**STUART.**

A productive tree, nut large and well filled. One of the most desirable varieties. Introduced by the late W. R. Stuart, of Ocean Springs, Miss. Originated near Moss Point. (See No. 1, figure XVI).

**PROFITS IN PECAN CULTURE.**

At present all fine large nuts find a ready sale at highly remunerative prices. This demand is mainly for seed. For nuts running less than fifty to a pound, the retail price per pound is rarely less than 50-cents and frequently a dollar, and for well authenticated varieties sometimes two dollars and a half. For eating purposes in large cities, fine nuts will fetch forty to fifty cents per pound. As yet, however, the improved cultivated varieties constitute but a small proportion (about 5 per cent) of the market supply. The rest is from the wild trees of the forest, and at wholesale do not generally command more than three to ten cents per pound. There are no accurate statistics as to the size of the annual crop. It is said that one dealer in Texas has handled over 500,000 pounds in one season. There is an increasing demand for these nuts, both for direct consumption and for mixing in confectionary to make the toothsome pralines and other bonbons.

When the present demand for home consumption has been supplied, it is reasonable to expect a large foreign demand, if one may judge from the favor which this nut recently received at the late Paris Exposition. It is not unrea-
sonable therefore to expect a continuation of the demand for
clarge soft-shelled nuts at fairly remunerative prices for years
to come, and few investments promise larger profits in the
future, especially to a young man, than an orchard of selected
pecans, well cared for up to bearing.

SOME GENERAL OBSERVATIONS AND A NOTE OF WARNING.

There is no doubt but that a pecan orchard, small or
large, would be a source of great pleasure and considerable
profit when established near the farm or plantation home.
They commence to bear a few nuts at nine or ten years of
age, and at fifteen should be bearing good crops. But unless
the person who starts the orchard is deeply interested and
very painstaking, he should patronize a reliable and well es-

tablished pecan nursery, and not attempt to propagate his own
pecans. Probably on the average, from thirty to forty per

cent of the buds and grafts fail to take, and the stock has to
be reworked. So, unless one has an abundance of stock
worked, from which to select, time will be lost in obtaining a
good stand. When budded or grafted trees are obtained from
a reliable nurseryman, they may be depended upon to pro-
duce desirable nuts. Also, they may be set easily, and a good
stand obtained all at once, thus saving much valuable time.

It takes practice to bud and graft successfully, and al-
though the operation is a simple one, there are a number of
little things to be done, which are apt to escape the attention
of one not accustomed to the work, and prove fatal to the life of
the bud. Consequently, in order to emphasize this point, it
is repeated that a careless person should not enter the work of
propagating varieties of pecans, for in order to do this, bud-
ding and grafting must be done, as pecans do not produce true
from seed. Again, only trustworthy nurserymen should be
patronized, and there are several to be found in this State.
The heavy demand for desirable varieties of pecans, has led
many unscrupulous persons to enter the pecan nursery busi-
ness in name only, and these people send out anything that
even looks like a young pecan tree, give it either the name of
a well-established variety or a new one, and sell it at a high
price. The people who buy these trees are cheated out of
more than their money, for it is not an easy matter to com-
pute the value of twelve to fifteen years of care and attention
thrown away. These trees may not only bear inferior nuts,
but may be common bitternut trees from the woods. A num-
ber of these persons have been reported from various parts of
the State, during the last season, as they have been scouring
the swamps and open woods, selecting not only the young
pecans, but the pignuts and other hickories as well, and have
sold these to unsuspecting purchasers, who desire to obtain a
few good pecan trees. One of these rascals was recently driven
out of Madison parish, where he secured seedling pecans and
pignuts, and sent them out as the wonderful American Pride
pecan. Hence, if good and desirable varieties are wanted,
one should deal direct with a responsible firm, a nurseryman
of known reputation. Good business principles demand this
way of getting the best trees, as everyone knows that the
traveling pecan peddler is absolutely free from responsibility
of any kind, and will get the price of a good pecan tree,
deliver a tree, and is never heard of again. Pignuts, bitter-
nuts, and even fig trees, have been delivered to the purchaser
for high-priced pecans.

Thanks are due to Mr. B. M. Young, St. Mary’s parish;
Mr. William Nelson, Jefferson parish, and Mr. S. H. James,
Madison parish, for valuable information and practical sug-
gestions concerning the cultivation of pecans in Louisiana.

PECAN INSECTS.

The pecan has been only recently brought under cultiva-
tion, and therefore new pests may spring up from time to
time under cultural environments. The species given below
have appeared in many groves of the State and their habits
studied together with remedies for their destruction.

For the sake of convenience the insects affecting pecan
trees may be divided as follows:

(a) Those affecting the leaves.
(b) Those affecting the trunk and branches.
(c) Those affecting the nuts.
LEAF EATING INSECTS.

Two important species have occurred in Louisiana: the pecan or walnut caterpillar (Datana integerrima) and the Fall Web Worm (Hyphanthria cunea).

The pecan or walnut caterpillar varies in color in the different stages of its larval or caterpillar existence, but may be easily recognized in the last larval stage by its black ground color covered with sordid white hairs, and by the two white longitudinal lines on each side of the body. See figure XVII,

![Figure XVII](image)

The moth of this caterpillar. (See figure XVIII), deposit...
hatch in about five days. The young caterpillars feed upon the under surface of the leaves and often escape notice. Four molts are cast during the larval development, the last one (and occasionally the one before the last) occurring on the trunk of the trees. The full grown caterpillar enters the ground for pupation, in which condition it remains during the
summer from 10 to 15 days. The second brood winters or hibernates in the pupa condition.

The habits of this insect offers favorable means for overcoming its ravages. The eggs laid upon the lower leaves may, in small orchards, be collected by hand. A little practice soon makes a person proficient in observing the eggs.

The habit of the caterpillars of descending the tree for the last molt, and possibly the one before the last, offers a most convenient means of destroying them, for as long as two days may be spent in the molting operation. The leaf eating habit is taken advantage of by spraying the foliage with arsenites, such as Paris Green and Arsenate of Lead. A spray of a mixture of one-fourth pound of Paris Green, one-fourth pound of Quick Lime, and fifty gallons of water will be found a very efficient remedy. In large orchards of old trees steam spraying outfits will be found advantageous.

A number of natural enemies attack this insect in egg, larval, and pupa stages. The following parasites have been bred from different stages of the insect: Telenomus gossypii, cola, an active egg parasite, Heteropelma datae, upon the larvae and pupae, Archytas hystrix and Frontina frenchii (two Tachina flies) upon larvae and pupae.

The yellow Cuckoo or Rain Crow (Coccyzus Americanus) is a veritable enemy of the caterpillars, and should receive the protection of pecan growers.

The Fall Web Worm is a general vegetable feeder attacking a variety of trees in the State. Its attack upon pecan trees is rather vigorous, and if not remedied the defoliation and webs become very unsightly, to say nothing of the injury done. As the name "Web Worm" would indicate, the caterpillars live in webs which enlarge with the growth of the caterpillars, and the necessity for food demand. This insect should not be confused with the pecan or walnut caterpillar, though both may occur on the same tree. The latter never lives in a web, and may be found after the third molt on all parts of the tree, while the web worm confines itself during the larval life to the web. Like the pecan or walnut caterpillar, the Fall Web Worm pupates below the surface of the
ground (though not so deep) and hibernates in the pupa condition. The moth of the Fall Web Worm is white or spotted (white and black).

If young trees are carefully watched, the small webs of the young caterpillars may be removed from the trees before much damage is done. Sometimes the larger webs are destroyed with burning rags saturated with coal oil and tied on the end of a long pole. Asbestos may be used in the place of rags. The arsenite sprays used to combat the pecan and walnut caterpillars, will be equally effective upon the Fall Web Worm. A number of parasites live upon and destroy great numbers of caterpillars.

Large caterpillars, those of a species of Catacola moth, may occur in sufficient numbers upon pecan trees to do serious damage. The larvae have the habit, especially when nearly grown, of hiding during the day in the crevices of the bark. The grey color of the caterpillar resembles the color of the bark so much that it is not an easy matter to find them while hiding in the crevices. The best time to collect these caterpillars upon the trunk is during or after a rain when the grey caterpillars show more distinctly in contrast to the damp and darkened bark.

Upon the Trunk and Branches.

The trunks of pecan trees are frequently attacked by the Hickory borer (Cyllene pictus) and other forms closely akin. Injured trees are more susceptible and the greatest care should be exercised during cultivation not to injure the trunks. Should injury occur, crude petroleum should be painted over the injured parts. A common point of attack of pecan borers is in the forks of the main limbs. These should be carefully guarded and protected.

Most pecan growers are familiar with the "twig girdler" which so seriously prunes young and budded trees. The culprit is a grey colored beetle about three-fourths of an inch long. The eggs are laid in the part removed by the beetle, and the larvae or grubs live in the separated twigs for as long as a year.
As the twig girdlers attack oak and other hickory nut trees, the problem of getting rid of them by collecting and burning the cut-off branches becomes more troublesome. However, systematic collecting and burning of these twigs of pecan, oak and other trees, will greatly decrease future attacks.

UPON THE FRUIT.

Just below the nuts on many twigs may be found during the summer months a quantity of spittle-like substance, produced by a "spittle bug" (Cercopid). The attack is decidedly taxing upon the fruit, and in many instances shedding is the result. The attack of this Cercopid is not yet wide spread, but it must be regarded as a dangerous pest because of the difficulty of applying a remedy.

Upon the husk of the fruit or nut, may be seen splotches resembling fungus spots. This is invariably due to the presence of a small caterpillar which has buried itself below the husk. While this insect has not been reared at the Experiment Station, it is undoubtedly a species of Grapholitha. The vigor of the attack of the worms causes extreme dropping of the fruit. All fallen fruit should be carefully collected, or eaten by hogs, which should be allowed access to the orchard.

The Station will be very glad to receive inquiries relative to pecan insects, and will institute experiments at any time looking to the development of remedial measures.