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Forage crops, grasses, clovers and small grains.

H C. Newsom

SECOND SERIES.

No. 19.

BULLETIN

OF THE

LOUISIANA STATE EXPERIMENT STATIONS,

WM. C. STUBBS, Ph. D., Director.

FORAGE CROPS, GRASSES, CLOVERS

AND

SMALL GRAINS.

ISSUED BY THE BUREAU OF AGRICULTURE.

H. C. NEWSOM, Commissioner.

BATON ROUGE, LA.
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LOUISIANA STATE UNIVERSITY AND A. & M. COLLEGE.

BUREAU OF AGRICULTURE.

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LOUISIANA STATE UNIVERSITY AND A. AND M. COLLEGE,
STATE EXPERIMENT STATION, BATON ROUGE, LA.

Mr. H. C. Newsom, Commissioner of Agriculture:

Dear Sir—I hand you herewith results of experiments in grasses, clovers, forage crops and small grains, and ask that it be published as Bulletin No. 19.

Respectfully submitted,

WM. C. STUBBS, Director.

GRASSES, CLOVERS AND FORAGE CROPS.

In a land of cotton, cane and rice, little or no attention is paid to the cultivation of the above crops. Headlands and ditch banks are mowed and converted into hay, more with a view to keep them clean, than for stock feed, and yet on many plantations the quantity of hay thus gathered is sufficiently large to supply the wants of the working animals. The cured vines of our Cow Pea (*Dolichos Sinensis*) constitute the chief cultivated forage for the mules of the sugar plantations. While the Paspalums (chiefly *P. dilatatum*), Bermuda (*Cynodon Dactylon*) and Crab Grass (*Panicum Sanguinale*) furnish the additional hay from the headlands. In middle and North Louisiana Lespedeza Striata is largely used for both grazing and hay purposes. A few planters grow small plats of sorghum, which are cut in the green state and fed to the work stock. But all of these resources fail to supply home demands and annually large quantities of Northern and Western hay are brought to the New Orleans market and from there distributed over the State. In a State where grasses of the most exquisite palatability can be so luxuriantly and cheaply grown as in Louisiana, it seems paradoxical to be importing it at such enormous annual outlay. From Bermuda and crab grasses the sweetest and richest hay may be obtained, while the former furnishes a pasturage unexcelled by any other grass in the world. Lespedeza also furnishes a good pasture and a hay of excellent quality and in large quantities. The Paspalums cut at the right time and properly cured also make hay of fair quality. These in themselves would be sufficient to amply meet our wants, were they properly cultivated and cropped, but we are not confined to them. Our soils and climate permit of the growing successfully of a large number of foreign forage crops, grasses and clovers, provided they are rightly planted

and cultivated. To test the adaptability of our soils to these various crops, experiments of an extensive character have been carried on at all three of the Experiment Stations in this State.

The following are some of the results:

FORAGE CROPS.

SORGHUM, SACCHARINE AND NON-SACCHARINE.

Over one hundred varieties of saccharine sorghum (*sorghum vulgare. var: saccharatum*) have been grown by the Stations for testing their sugar content and their adaptability for making sugar. Of these some ten or twelve varieties have been used as forage. They should be planted in the drill in three to five feet rows, slightly covered and cultivated as corn. Twelve to thirty tons of green forage may thus be obtained to an acre, which can either be fed green or cured into a most excellent fodder. It is usually cut down in the morning and after taking the day's sun is fed to the stock at night. It is already highly esteemed by our planters and growing annually in popularity. Cured properly and cut up with an ensilage cutter and fed in conjunction with bran and cotton seed meal, the combination makes an excellent ration for milch cows. The varieties recommended for forage purposes, so as to give a succession of green feed are Early Amber, Early Orange, Coleman's and Link's Hybrid.

The non saccharine sorghums (*sorghum vulgare*) are also numerous and nearly every year witnesses a new importation of this species under some attractive name. The following have been successfully cultivated at all three Stations.

Kaffir Corn—A low stocky, erect sorghum, with alternate closely appressed leaves. Does not stool, but near the top of the stalk it branches and forms two to four well filled heads of seed, which at maturity are white, slightly flecked with reddish brown specks. It is more valuable for grain than hay. May be cut several times during the season and cures well. It should be planted in three feet rows and very thick in the drill.

Millo Maize—Two varieties are offered on our market.

White Millo Maize—Seed white with pinkish ends, suckers enormously and hence to be planted thinly. It requires all summer to mature seed. Stalks medium size, heads heavy and regular. Can be cut for green feed several times in a season; cures rapidly.

Yellow Millo Maize or Rural Branching Sorghum—The grain is yellow and large; heads fine and heavy; suckers from ground and shoots from the joints; earlier than white and harder to cure. It can be grown in high latitudes with great success.

White Dhoura or Large African Millet—Large, erect and single stalk without suckers or shoots; large seed heads well filled; cures readily.

Egyptian Wheat—Recently introduced; stalk small; panicle open and spreading; not equal to other kinds given here.

Egyptian Rice Corn—A low plant bearing large seed heads and short goose-neck stems; cures well.

Jerusalem Corn—Of similar character as the last; finishes the list of sorghums experimented upon.

If sorghums are grown for green feed, they should be planted close in the drill. If for seed heads more distance should be given. They all stand drought well and make excellent feeds, the saccharine varieties are however preferred by stock. They are excellent for horses, mules, cows and hogs, and the seed make the finest kind of food for poultry. They have all been grown with great success at all three Stations of this State.

OTHER FORAGE CROPS.

Teosinte (Reana Luxurians).—A South American plant, excelling all others in amount of forage produced per acre. Over 50 tons of green Teosinte were cut last year from an acre at Audubon Park. It is like corn in having separate pistillate and staminate flowers on same stalk; bears its grain in a shuck, one seed above the other, diminishing in size upwards, grains nearly triangular, and ears numerous at each top joint. It has seeded for several years at Audubon Park. Suckers wonderfully; one grain to a hill, two feet apart, have given here as high as 26 stalks.

Dropped like corn, can be cut several times during season and rattoons like cane; makes a poor hay crop, but excellent for soiling; should be more extensively planted. Stalks contain about 8 to 10 per cent. sugar. Grows well all over the State, though fruited only at Audubon Park.

Pearl Millet (*Penicellaria Spicata*).—Synonyms. Cat Tail, Horse or Egyptian Millet. Useful as a green food; can be cut many times in a season; thrives all over the State.

German Millet (*Setaria Italica*).—Sown broadcast after March on good land, makes a large quantity of good hay, if cut before seed are formed. After seed heads are formed, it is too woody. Two or three crops a year may be grown by reseeding.

A variety of the above, the *Golden Wonder Millet*, sent by Nothrop Beaslan & Goodwin Company, of Minneapolis, Minn., has been tried at Calhoun and Audubon Park with great success. It is worthy of extensive use.

Buckwheat (*Fagopyrum Esculentum*).—Numerous experiments have been made with the following varieties: Japanese, European and American Silver Hull. They have made, in every instance, good stands and large amount of foliage and sometimes heavy crops of grain, but frequently, in wet seasons, with little or no grain. The English sparrows are very bad on this and all small grain at Audubon Park and Baton Rouge. Several crops of Buckwheat can be grown on same soil in one year. The crop seems to be a good one for turning under as a green manure. The Japanese is far the best variety for us.

A practical test was made of the above, except Buckwheat, during the past season by spreading them before the horses, mules and cows. They, with one accord, selected—1st, Saccharine Sorghums; 2d, Teosinte; 3d, Pearl Millet; 4th, Millo Maize; 5th, Jerusalem Corn, Kaffir Corn and Egyptian Corn, without distinction. The taste of the animal places Sorghum first, while the enormous tonnage and reasonable palatability of Teosinte, should encourage farmers to grow it.

LEGUMINOUS CROPS.

COW PEA (*Dolichos Sinensis.*)

Grows in great luxuriance all over the State. Sown early a large amount of foliage is made, which is used for forage or for turning under as a green manure. Varieties numerous, some even with specific differences, which should be properly studied and classified. The following have been grown at all of the Stations in this State:

Poor Man's Pea, or Pea of the Backwoods—Originated by Ed. Fouville, of North Carolina. An early bunch pea, with but little vine; ripening in six weeks from planting; seed small, cream colored, slightly "pied;" excellent for table purposes; two or three crops may be grown in a year.

Indian—Vines heavy; fruits in sixty to ninety days; seed of "liver white and pied" color; crowded in the pod; soft and do not keep well; prolific.

King—A large black and white pea, with long and crowded pod; vines and foliage heavy; fruits in seventy days; berry too soft to keep well; very prolific.

Blue—A small blue pea with medium vine and foliage; prolific and early; fruits in nine weeks.

Whippoorwill—Berry speckled; heavy vines and used for green manuring.

Black Eye—A white pea with black eye; largely used for planting in corn when laid by; excellent for table purposes.

Clay—Berry of a clay color. Hitherto preferred by planters as the renovating crop; produces a large quantity of vines; excellent for green manuring and forage for stock.

Unknown—Recently introduced and finest pea for all purposes known; heavy vines and large quantity of fruit; vigorous and prolific; continues green and productive till frost; should be more generally used.

Conch—A small white pea, with wonderful power of making vines. One quart planted in hills upon an acre will cover the ground with vines. Does not fruit well with us.

Lady—A small white pea, with considerable vine of medium foliage; fruits in ninety days; excellent for table purposes; not very prolific.

Large White—Vines and foliage heavy; fruits very late; a large white pea and very prolific.

White Prolific—Vines large and foliage heavy; bears fruit in eighty to ninety days; berry large and yield good.

Red Tory—A red pea of wonderful powers of vitality, often remaining sound in the soil for many months. The matured pods on the vines which are turned under in the fall, and land planted in small grain, will germinate and give a good crop of peas after the grain has been harvested. Produces a large amount of vines and foliage; one of the best for green manuring; remains green till frost.

White Sugar—A white pea of excellent table qualities; of no value as a forage plant.

Calico—Similar to the Indian pea described elsewhere.

Dwarf Whippoorwill—This is a bunch variety of the regular whippoorwill; fruits in sixty days; pods full and numerous; yield good.

Black—A black pea with properties similar to the Red Tory; an excellent running variety; very vigorous and prolific.

LATHYRUS.

Three varieties of this genus have been partially tested, *Sativus, Hirsutus and Silvestris.*

Lathyrus Sativus and Silvestris are strangely alike in appearances and habits of growth. The latter was obtained from Mr. F. E. Clotten, of London, and was advertised as "The new great fodder plant," Prof. Wagner's "Improved cultivated constant," "Lathyrus Silvestris or flat pea." The circulars accompanying it were fulsome and extravagant in praises—"lasting over fifty years and giving £20 profit each year." This new plant is now growing moderately well and hopes are entertained of a realization of at least a part of its promises. It has been with great

difficulty that any of this genus has been grown. They appear delicate when young and are easily crowded out by native grasses when sown in spring unless carefully protected. Planted in the fall, they grow but little in the winter and require still, protection in the spring. As yet it is too early to pronounce upon their merits. The L. Hirsutus is an annual and produced one good crop of hay and died. The others are perennial.

VETCH.

Vicia Sativa—Sown here in the fall makes an excellent growth during winter and gives a large cutting of hay, which is only moderately enjoyed by stock. This one cutting is all that can be expected in this climate.

Vicia Villosa—Like the above must be sown in the fall to obtain a fair growth. It affords only one cutting, but the hay is preferred to V. Sativa.

Vicia ——?—A large red seeded vetch, called the Chinese was grown last year with excellent results. A rapid, vigorous grower, soon covering the ground; makes a fairly good hay; worthy of further trial.

LUPINS—*Lupinus Luteus.*

Every attempt to grow either of the three varieties of this plant in the spring or summer was attended with disaster. They turned yellow and died before maturing fruit. A patch was planted in October and grew beautifully through the winter, successfully withstanding a cold of 26° F. Perhaps in this climate it may be a success as a winter crop.

SAINFOIN—*Ornobrychis Sativa.*

All attempts to grow this plant here, either as a summer or winter crop, has so far failed, and the same may be said of Serradilla, *Ornithopus Sativus.*

SOJA BEAN—*Glycine Hispida.*

On the lighter soils of North Louisiana a partial success. In South Louisiana makes only vines without perfecting the fruit. The growth however is very heavy and luxuriant.

HEDYSARUM CORONARIUM.

When sown in the fall makes an enormous growth during the winter, which is slightly injured by every severe frost, without being killed; hardly hardy enough for a winter crop, and yet not successful as a summer one.

KIDNEY VETCH—*Anthyllis Vulneraria.*

Has done badly either as a summer or winter crop, and not promising.

MELILOTUS ALBA.

Does fairly well upon soils containing large quantities of lime; has not succeeded at either of the three Stations of this State.

BOKHARA CLOVER—*Melilotus Leucantha.*

Sown in fall, has done fairly well upon alluvial soils—a failure elsewhere.

MEDICAGOS.

Medicago Sativa (Lucerne or Alfalfa)—Sown in fall upon the alluvial lands will yield six or seven large cuttings of hay the ensuing year. Plats two and three years old, affording now excellent crops of hay every few weeks. In sandy and poor soils, hard to procure a stand. *Of great value.*

Medicago Media—Grows well from seed planted in the fall, but not as vigorous as the *Sativa*, soon yielding to the native grasses.

Medicago (*Lupulina?*)—Yellow Trefoil, grows well from seed planted in the fall, but dies in early summer.

Medicago Maculata and Denticulata (California or Burr Clover), grows well all over the State as a winter crop, but gives an inferior hay not generally relished by stock.

TRIFOLIUMS.

These must be planted in the fall all over the State to insure success.

Trifolium Repens (White Clover)—Grows wild and luxuriantly all over south and middle Louisiana, and affords our earliest spring pastures.

Trifolium Pratense (Red Clover)—Sown in the fall, makes a vigorous growth, affording about two large cuttings of hay and then succumbs to the encroachments of the native grasses. It is worthy of more extended cultivation in the alluvial lands.

Trifolium Hybridum (Alsike Clover)—Is not as vigorous or as productive as Red Clover, and is not to be recommended.

Trifolium Incarnatum (Crimson Clover)—Is thoroughly at home in every part of the State, making a large crop of excellent hay. It is an annual and as such is objectionable. A combination of cow peas and this crop affords the readiest means of restoring quickly worn-out lands, or of furnishing a continual supply of fresh hay for stock.

Lespedeza Striata (Japan Clover)—Grows wild in northern and middle Louisiana, and is by many being cultivated with great success. It furnishes excellent pasturage, and when properly managed, a large quantity of nutritious hay. It is a summer crop, and is late in coming out in the spring, and yields a harvest in late summer and early fall.

Desmodium Molle (Beggar Lice or Ticks)—Grows luxuriantly here, and gave last year two cuttings of hay. It is, however, too woody to be classed as "good hay," but when sown thickly and cut early produces a large amount of fairly good hay.

Upon large plantations and stock farms, soiling crops have become almost necessary to the well being of the animals and to the economical administration of the places. Of these the Sorghums and Teosinte are perhaps to be preferred. The Saccharine Sorghums are preferred by stock to the non-saccharine, though the latter usually make the largest amounts of grain.

In planting sorghums, a selection of varieties may be made, which will give a succession of crops lasting through the season. The Early Amber matures for the knife in sixty to seventy days. The Early Orange from seventy to one hundred days. While the Coleman's and Link's Hybrid will require from four to five months for perfecting seed. If these be planted together with Teosinte, a succession of crops will be given lasting till frost.

All of the above rattoon well, and three, and sometimes four, crops of green forage may be cut during the season. It is best, however, to cut at the time the heads begin to form seeds. If this be done only one or two subsequent crops can be obtained. The seed of Sorghum, both of saccharine and non-saccharine varieties are excellent food for all kinds of stock, but particularly for chickens.

GOLDEN WONDER MILLET.

Mention has been made of the success in growing this crop. During the past season two excellent crops have been grown upon the same soil. The last one coming from the seed shattered out of the matured heads by the English sparrow. Seed in small quantities of this plant can be had upon application to Sugar Experiment Station, Audubon Park. It is worthy of extensive trial.

COW PEAS.

It is passing strange that this plant is not more extensively used throughout the South, both as a food and renovator of soils. The sugar planters of South Louisiana alone among our Southern planters, appreciate the virtues of this wonderful plant. With them it forms an indispensable part of a rotative system, and is used either as a food for stock or turned under for amelioration of the soil. The varieties given elsewhere have been studied and cultivated. Of these the Unknown, the Clay and Black are pre-eminently adapted for green manuring, while the first one, Unknown, is also a late, but prolific bearer of seed. For table purposes some of the white bunch varieties are preferred.

It should be remembered that the Cow Pea possesses, in a most intense degree, the property enjoyed by all leguminous plants of abstracting Nitrogen from the air and storing up in its organs. Its roots are filled with little nodules (nematodes) and these are occupied by myriads of "bacteria," which are busily engaged in transforming the nitrogen of the air to the plant. Since Nitrogen is the most costly ingredient of commercial fertilizers, and the ingredient most wanting in our worn soils, the

appropriate economy of growing cow peas upon all worn soils must be apparent to every one. Some idea of the large amount of Nitrogen given to the soil by turning under of cow peas may be formed by referring to an experiment made at Sugar Experiment Station in 1887, and published in Bulletin No. 14, pages 71 and 72.

There is not an acre of well drained soil in the State that cannot, by the application of mineral manures in conjunction with the growing of cow peas, be made very rich. No kind of farming or planting is rational that does not include a system of rotation, and any system of rotation in the South which omits the cow pea, is an egregious blunder. At least one-third of the area under cultivation in this State should be in cow peas.

Of the leguminous crops other than cow peas, mentioned above, few are worthy of cultivation. Lathyrus Sativus and Lathyrus Sylvestris, are holding their ground with promise of increased vitality in the future. It is entirely too early to condemn or applaud either one.

The *Vetches* easily make one good crop in late winter or early spring, but no more. Besides the hay is not ranked "first-class" by the animals. One can therefore hardly recommend them, when several other plants are accessible with superior qualities, giving many cuttings during the year.

Red Clover fares fairly well on all three Stations. It has been successfully grown on the sandy lands of Calhoun, and a good crop secured the second year from seed dropped from the matured plant of the first. It will give two good cuttings of hay, from fall plant, and then succumb to encroachments of native grasses.

Crimson Clover is pre-eminently adapted to this State. Planted in the fall, it springs up immediately and grows during our entire winter. If cut carefully before it blooms, two or more crops of hay may be obtained, but if permitted to bloom before cutting, there will be *little or no aftermath*. Its only fault here is its being an annual, requiring reseeding every year.

Burr Clover, "Medicago Denticulata," grows easily and abundantly. In lower Louisiana, where green food may be obtained the entire winter, stock refuse to eat it. Further north where green food in winter is less abundant, it is, I believe, fairly appreciated.

ALFALFA OR LUCERNE.

Medicago Sativa, is strongly affected in its growth by soils. At Calhoun good stands have been obtained and maintained through the season, but the plant remained "off color" and sickly, despite the application of different fertilizers. At Baton Rouge whenever stands were obtained, fair growth and development ensued. At Audubon Park, this plant, under all conditions, has been a great success. There are plats now on the Station of different ages, from six months to three years old and all doing well. Every year each plat is cut six or seven times, giving a large amount of hay, easily cured and highly relished by stock of all kinds. It is the only plant yet found that will successfully occupy this ground throughout the entire year. It is best to sow, in October upon well prepared land, using rather excessive quantities of seed per acre.

LESPEDEZA STRIATA

Is too well known in Middle and North Louisiana to require any extended notice. Col. J. Burruss McGehee, of West Feliciana, who first successfully cultivated this plant and introduced its hay in our markets is still growing it with undiminished ardor. His example has been followed by a large number of farmers in the Felicianas and East Baton Rouge, and to-day thousands of acres of this plant are successfully cultivated. It is an annual, but the plant cut late in the season will drop seed enough to abundantly reseed the land. It is valuable for pasture or for hay.

LIST OF GRASSES SOWN IN THE FALL IN THIS CLIMATE WITH RESULTS.

Aira Caespitosa—Stand good, growth small.

Aira Flexuosa—Stand fair, growth small.

Agrostis Nebulosa—Stand fine, growth small but luxuriant.

Agrostis Stolonifera—Stand fine, growth medium.

Agrostis Vulgaris—Stand excellent, growth excellent.

Alopecurums Pratensis—Stand poor, growth inferior.

Anthoxanthum Odoratum—Stand poor, growth small.

Arrhenatherum Avenaceum—Stand excellent, growth excellent.

Avena Elatior—Stand fine, growth excellent.

Avena Flavescens—Stand good, growth fair.

Avena Sterilis—Stand excellent, growth excellent.

Agropyrum Japonicum—Stand excellent, growth excellent.

Bromus Giganteus—Stand fair, growth inferior.

Bromus Inermis—Stand good, growth good.

Bromus Mollis—Stand good, growth good.

Bromus Pinnatus—Stand excellent, growth excellent.

Bromus Pratensis—Stand good, growth good.

Bromus Sylvaticus—Stand poor, growth inferior.

Bromus Unioloides—Stand excellent, growth excellent.

Cynosurus Cristatus—Stand good, growth good.

Dactylis Glomerata—Stand excellent, growth excellent.

Festuca Ciliata—Stand good, growth poor.

Festuca Elatior—Stand good, growth fair.

Festuca Heterophylla—Stand good, growth inferior.

Festuca Duriuscula—Stand good, growth inferior.

Festuca Pratensis—Stand good, growth fair.

Festuca Rubra Var Dunich—Stand good, growth inferior.

Festuca Rosea—Stand good, growth inferior.

Holcus Lanatus—Stand good, growth fair.

Holcus Mollis—Stand good, growth fair.

Lolium Italicum—Stand excellent, growth excellent.

Lolium Perenne—Stand excellent, growth fair.

Phalaris Arundinacea—Stand fair, growth fair.

Phalaris Coerulescens—Stand excellent, growth excellent.

Poa Aquatica—Stand none, growth none.
Poa Arachnifera—Stand excellent, growth excellent.
Poa Compressa—Stand excellent, growth fair.
Poa Fertilis—Stand poor, growth inferior.
Poa Suedetica—Stand none, growth none.
Poa Nemoralis—Stand poor, growth inferior.
Poa Pratensis—Stand poor, growth inferior.
Phleum Pratense—Stand good, growth fair.

COMMENTS ON ABOVE.

Those grasses given above with excellent stands and growths, are worthy of trial over the State, particularly in South Louisiana. They are (Agrostis Vulgaris) Red Top, (Arrhenatherum Avenaceum) Tall Meadow Oat, Avena Sterilis, Agropyrum Japonicum (Japanese Rye) Bromus Pinnatus, Bromus Unioloides (Rescue), Dactylis Glomerata (Orchard), Lolium Italicum (Italian Rye), Phalaris Coerulescens, and Poa Arachnifera (Texas Blue).

These are to be recommended for general cultivation and a detailed account of each is herein given.

Agrostis Vulgaris, called Red Top or Herd's Grass, is a perennial creeping grass, found growing in moist soils in Northern States and Canada. It makes an excellent hay and serves well as a dairy pasture. It grows well on damp soils, and planted here in the fall makes good winter and spring growth. By repeated mowings it can be made to hold its ground during the summer. It has succeeded well at Audubon Park, Baton Rouge and Calhoun. It requires one bushel (14 lbs.) of seed per acre.

Arrhenatherum Avenaceum (Tall Meadow Oat Grass), is a perennial from the old world. Planted in the fall upon all kinds of well drained soils, it seems to do well. It is difficult to carry it through the summer, but it gives an excellent winter pasture and early spring cuttings. The seed are very light, weighing 10 to 15 pounds per bushel. Fifty to sixty pounds are required for an acre.

Avena Sterilis is a very near relative to our common oats, "Avena Sativa," and in growth and appearence strongly resembles it. The seed alone vary in having a brownish, hairy coat-

ing attached to the outer hull. It is so closely related to the oat, that it may be regarded as a variety of it. The seed of this plant not yet on the market. The Station hopes to have some for distribution next season.

Agropyrum Japonicum, a new grass of great promise recently imported from Japan by the National Department of Agriculture. It is called in its native habitat Japanese Rye. It somewhat resembles Rescue grass, though it is perennial and the seed are somewhat bearded. It begins its growth early in the fall and lasts till late in the summer. It is greedily eaten by stock and promises to be a most useful grass. No seed are yet to be obtained, but the Station hopes to be able to distribute a few next year.

Bromus Pinnatus has made a wonderful growth of rather rough looking grass. If upon chemical examination and actual trial in feeding stock it be found desirable to cultivate it, great success can be obtained with it if one can accurately prognosticate the future upon one year's trial. No seed can yet be economically obtained.

Bromus Unioloides, sometimes called Shraeder's Brome grass, but generally known as Rescue grass. It is one of our best winter grasses. It is an annual, but if it is cut before it goes to seed, it will afford two excellent crops of hay. Then if the next crop be permitted to seed before being harvested, enough seed will be dropped to abundantly reseed the land. It is an excellent grass, springing up with the first approach of chill in the fall and lasting with care well into June. It thrives best on rich moist lands. It requires thirty to forty-five pounds of seed to sow an acre.

Dactylis Glomerata (Orchard Grass), is a perennial from the Old World. It is deep rooted and loves a rich moist, rather heavy clay soil. It affords excellent hay and gives several cuttings in early spring. It is rather dormant here in midsummer, but recuperates rapidly in early fall. There is required forty-five to fifty pounds of seed to sow an acre.

Lolium Italicum (Italian Rye Grass), is emphatically a Southern winter grass, loving moisture and chilly weather. If it be

planted in September or October, it will afford two good cuttings (provided this be done before it goes to head) by April. It is here an annual, and dies down in May or June. It does not fully reseed the ground upon which it has grown, therefore it has to be planted every year. But when once grown, few farmers are willing to be without a field of it. Forty five pounds seed required for an acre of ground.

Phalaris Coerulescens, another new variety, introduced for the first time last year and full of promise and hope. It has remained green the entire summer, affording several cuttings. Its seed heads resemble timothy. Seed have been carefully saved and an increased area will be planted next year, with the hope of disseminating the seed then obtained among our farmers.

Poa Arachnifera (Texas Blue Grass). This grass is propagated with difficulty from its seed, but readily from roots. A plat may be started by dropping the roots in checks one foot apart. In a short while it will occupy the ground. It spreads rapidly by underground roots, but has none of the objectionable features of Bermuda. It is emphatically a winter grass, shooting up in early fall and lasting till late spring. It is a very desirable winter pasture grass. Roots of this grass in limited quantities may be obtained by application to the Station at Baton Rouge or Calhoun. It is worthy of extensive trial.

Besides the above, Festuca Pratensis (Randall Grass), Holcus Lanatus (Velvet Grass), Poa Pratensis (Kentucky Blue Grass), and Cynosurus Cristatus (Crested Dogtail Grass), have been partially successful at some of the stations.

LIST OF GRASSES SOWN IN THE SPRING IN THIS CLIMATE WITH RESULTS:

Aristida Depressa—Stand poor, growth poor.
Agropyrum Glaucum—Stand poor, growth poor.
Andropogon Annulutus—Stand excellent, growth excellent.
Andropogon Hallii—Stand poor, growth poor.
Anthistiria Avenacea—Stand poor, growth poor.
Anthistiria Fallii—Stand poor, growth poor.
Bouteloua Oligostachya—Stand poor, growth poor.

Cenchrus Montanus—Stand good, growth excellent.
Chloris Barbata—Stand good, growth excellent.
Chloris Schwartziana—Stand good, growth excellent.
Chloris Truncata—Stand good, growth excellent.
Chloris Virgata—Stand good, growth excellent.
Crysopogon Nutans—Stand poor, growth poor.
Crysopogon Sinulatus—Stand poor, growth poor.
Diplachne Imbricata—Stand poor, growth poor.
Eleusine Aegyptica—Stand poor, growth poor.
Eleusine Corocana—Stand excellent, growth very fine.
Eleusine Flagellifera—Stand poor, growth poor.
Eleusine Scindica—Stand poor, growth poor.
Elsmus Arenarius—Stand poor, growth poor.
Eragrostis Abyssinica—Stand good, growth good.
Eragrostis Brownii—Stand poor, growth poor.
Eragrostis Ciliaris—Stand good, growth good.
Eragrostis Conferta—Stand good, growth good.
Eragrostis Diandra—Stand good, growth good.
Eragrostis Oxylepis—Stand poor, growth good.
Eragrostis Pilosa—Stand poor, growth good.
Eragrostis Rachitricha—Stand poor, growth good.
Errichloa Aristata—Stand good, growth good.
Glyceria Fluitans—Stand poor, growth poor.
Melica Coerulea—Stand none, growth none.
Milium Effusum—Stand none, growth none.
Muhlenbergia Glomerata—Stand none, growth none.
Oryzopsis Meliana—Stand poor, growth poor.
Panicum Barbanode—Stand good, growth excellent.
Panicum Curicunum—Stand good, growth excellent.
Panicum Frumentaceum—Stand good, growth excellent.
Panicum Gibbum—Stand poor, growth poor.
Panicum Lachnanthum—Stand poor, growth poor.
Panicum Palmerii—Stand excellent, growth excellent.
Panicum Teneriffe, var. rosea—Stand fair, growth fair.
Panicum Texanum—Stand good, growth good.
Panicum Miliaceum—Stand excellent, growth excellent.
Pennisetum Languenosum—Stand excellent, growth excellent.
Phalaris Canariensis—Stand excellent, growth excellent.
Tragus Racemosus—Stand good, growth good.
Tetrapogon Tetrastachys—Stand poor, growth poor.

A considerable addition to the foregoing list has been made for next season.

Some of the above are meritorious and worthy of extended trial. Chloris Schwartziana, Panicum Palmerii, Andropogon Annulutus and Cenchrus Montanus have held their own for two years against the encroachments of native grasses. Pennisetum Languenosum makes an immense growth of apparently good hay. Unfortunately the Stations have not had time to investigate their analytical or feeding value and therefore can give only their field results.

The following chemical analyses were made in the Station Laboratory at Baton Rouge of hays grown on State Experiment Station :

ANALYSES OF GRASSES AND CLOVERS.

	Water, Per Cent.	Albuminoids, Per Cent.	Fat, Per Cent.	Fibre, Per Cent.	Carbohydrates, Per Cent.	Ash, Per Cent
Poa Pratensis (Kentucky Blue)	12 15	8.00	3.35	23.56	42.78	10.16
Dactylis Glomerata (Orchard)	12.82	7.82	3.70	28.35	36.56	10.75
Lolium Parenne (English Rye)	14.23	7.78	3.24	25.11	39.02	10.52
Phleum Pratense (Timothy)	14.51	8.38	3.48	29.63	34.25	9.75
Agrostis Vulgaris (Red Top)	14.14	7.88	3.66	23.52	38.26	11.54
Arrhenatherum Avenaceum (Tall Meadow Oat)	13.55	7.94	3.99	23.65	40.62	10.25
Holcus Lanatus (Velvet or Meadow Soft)	12.76	10 50	3.65	26.45	34.59	12.05
Medicago Maculata (Burr or California Clover)	11.15	12.65	4.15	31.76	30.97	9.32
Medicago Sativa (Alfalfa or Lucerne)	10.94	12.25	3.51	31.05	34.09	8.16
Trifolium Pratense (Red Clover)	12.85	14.87	5.49	25.28	32.07	9.44
Trifolium Incarnatum (Crimson Clover)	13.37	14.04	4.06	26.25	29.30	13.00
Poa Arachnifera (Texas Blue Grass)	10.68	11.76	4.21	30.28	34.35	8.72

OATS AND BARLEY.

In November of 1891, six acres were planted to Rust Proof Oats and Winter Grazing Barley, three acres each. The land was previously cultivated in corn and peas. The preparation consisted—1st, of deep, thorough breaking with the Oliver turn-plow; 2d, cross plowing with "bull tongues." At planting, the first acre of each was fertilized with the Station's grain fertilizer, consisting of a mixture of 200 pounds of cotton seed meal and 100 pounds of acid phosphate. The second, or middle acre, was left unfertilized and the third, or last, acre was "top-dressed" in February following, with the same mixture. The fertilizer and grain were sown and plowed in together, with turn plows, then harrowed and rolled. On acre No. 3 the same fertilizer was scattered broadcast in February and harrowed in. No damage comes from the harrowing, as is apparent at the time, but, on the contrary, the harrowing serves as a working most beneficial. Following are results:

No. of Experiment.	Name of Variety.	Kind and Quantity Manure Used Per Acre.	Bushels of Grain Per Acre	Pounds of Straw Per Acre.	Remarks.
1	Red Rust Proof Oats.	200 lbs. cotton seed meal, 100 lbs. acid phosphate, at planting.	48	2534	
2	Red Rust Proof Oats.	No manure.	23.3	1491	Ripe May 25. No rust.
3	Red Rust Proof Oats.	200 lbs. cotton seed meal, 100 lbs. acid phosphate, top dressed in February.	40.5	2324	
4	Winter Barley.....	200 lbs. cotton seed meal, 100 lbs. acid phosphate, at planting.	14	1091	Ripe May 5. Rusted.
5	Winter Barley.....	No manure.....	8.3	756	Injured by freeze.
6	Winter Barley.....	200 lbs. cotton seed meal, 100 lbs. acid phosphate, top dressed in February.	12.5	980	

The Station would here urge farmers to plant more grain for their work and domestic stock. Use tested, rust proof varieties; give thorough preparation of soil; use the above fertilizer; apply at planting, and plant in the fall, not later than October. Four years' experience and success warrant it.

Experiments in varieties of Oats were made. Land was prepared as above. Two hundred pounds per acre of oat fertilizer was used as a top dressing, in the spring. Following are the results:

No. of Experiment	Name of Variety.	Bushels of grain per acre.	Pounds of straw per acre.	Remarks.
1	Prince Edward Island Oat	29.	1576	Ripe June 5; rusted; black grain.
2	Red Rust Proof Oat	56.5	2940	Ripe May 25; no rust.
3	Beardless Rust Proof Oat.	45.6	2450	Ripe May 25; no rust; slightly injured by birds.
4	Virginia Grey Winter Oat	47.8	2670	Ripe June 10; no rust; small stem, small grain; slightly injured by birds.

The above experiments in oats are given out of many made during the last few years on all of the Stations. The soil at Calhoun is the lightest and least fertile of those under experimentation. Every year success has attended our efforts in growing oats on all three Stations, provided proper attention was paid to the following desiderata: 1st. Use pure rust proof seed. 2d. Plant in October upon well prepared land.

At Audubon Park two good cuttings of hay have been made before letting the oats go to seed. In this way three crops were obtained from same planting, two of hay and one of matured grain. In alluvial districts this practice might be universally adopted, thus insuring a large amount of hay for our stock, without much injury to the final crop of grain. Land in oats should be followed at once with a crop of peas sown broadcast, and this crop can easily be cured into hay or turned under as a fertilizer. In either event, the soil will be greatly improved.

EXPERIMENTS IN WHEAT.

It has long been known that the hills of North Louisiana would grow wheat—whether profitably as a market crop is however yet an unsolved problem. For home use, small patches are grown by our most economical farmers, and these patches could easily be enlarged, were good flour mills accessible. Elsewhere in the State, the growing of wheat has been a failure. To assist in developing this industry, the writer in a recent visit to California, procured a large number of varieties of wheat, collected by the State Experiment Station of California, from all parts of the world. These varieties were planted in duplicate at Baton Rouge and Calhoun. At the former place, every variety failed, while at Calhoun moderate success was achieved from nearly every one. The following table gives the results:

No. of Experiment.	Name of Variety.	Bushels of Grain Per Acre.	Pounds of Straw Per Acre.	Remarks.
1	Martin's Amber	13.5	1040	Ripe June 7; beardless; long heads; grain medium; partly developed; fair.
2	Carter's Flour Ba l	8.5	689	Ripe June 5; grain small and poorly developed; tall; affected by rust; rather poor.
3	White Russian	9.5	745	Ripe June 8; beardless; heads medium; long grain; small and poorly developed; slight rust; fair.
4	Arizona Indian	3.5	296	Ripe May 25; beardless; grain small; po r and undeveloped; badly rusted; worthless.
5	White Essex	11.4	900	Ripe Ju e 10; beardless; medium large grain; well developed; slight rust; fair
6	Clowson	11.	890	Ripe Mav 20; beardless; medium small grain; fairly developed; medium tall; slight rust; fair.
7	Indian Three Month's	13.5	1070	Ripe May 20; b ardless; long heads; small grain; well developed; slight rust; fairly good.
8	Common March	5.4	475	Ripe June 10; beardless; grain small; undeveloped; small head; short; rusts badly; no account.
9	Bohemian	6.4	525	Ripe June 7; beardless; heads short and small; grain small and undeveloped; rusts; poor.
10	Red Club, or Hedge H g	5.3	438	Ripe May 25; beardless; grain small; undev loped; rusted; very poor.
11	White Lama	10.4	860	Ripe June 1; beardless long heads; poor grain; f i ly developed; slight rust; fai .
12	Carter's Miller's Delight	6.2	500	Ripe June 6; beardless; medium long head; small undeveloped grain; rust; poor.
13	McGee's White Winter	9.6	750	Ripe May 25; beardless; small grain; well developed; tall slight rust; fa'r.
14	Carter's Prince of Wales	5.4	460	Ripe June 7; beardless; large, short heads; undevelo ed grain; poor; r st.

15	Carter's Pride of the Market	5.6	47[illegible]	Ripe June 10; long, small heads; poor grain; small; rust; poor.
16	California Spring	13.2	1170	Ripe May 25; beardless; medium long heads; grain small; fairly developed; slight rust; good.
17	Nonpareil	9.6	870	Ripe May 20; medium heads; small grain; fairly developed; rust; fair.
18	Hungarian Mountain	9.5	860	Ripe June 4; beardless; grain and head small; fairly developed; rust slightly; fair.
19	Hungarian Brenner	5.6	670	Ripe June 10; beardless; small heads and grain undeveloped; poor; rusts.
20	Hybrid Dottle	5.	640	Ripe June 1; beardless; small grain and head; developed; rusts badly; poor.
21	Carter's Stand Up	3.4	470	Ripe June 10; beardless; heads small; grain undeveloped; poor; rusts.
22	Four Rowed Imported Winter	3.2	450	Ripe June 10; beardless; small; poor heads; rusts badly; worthless.
23	Manchester	9.3	850	Ripe June 1; beardless; small head and grain; rust; fair.
24	Hungarian Burke	9.7	890	Ripe June 1; beardless; small grain; well developed; slight rust; fair.
25	Siberian	5.3	640	Ripe June 10; beardless; tall; long heads; poorly developed grain; rusts, poor.
26	Mold's Red Winter	3.4	470	Ripe June 10; beardless, heads long and small; poor grain; rusts badly; poor.
27	Mold's White Winter	16.8	1890	Ripe May 25; beardless; heads long, large and good; grain large and well developed; slight rust; very good.
28	Big White Club	10.4	960	Ripe May 25; beardless; small, long heads; well developed grain; fair; slight rust.
29	Carter's Pearl	9.7	920	Ripe June 10; beardless; poor heads; small grain; fairly developed; rusts slightly; fair.
30	Carter's Holburn Wonder	3.7	496	Ripe June 10; beardless; poor; small, undeveloped heads; rusts badly; worthless.
31	Red Wheat Gold Finder	3.5	482	Ripe June 8; beardless; small heads and immature grain; rusts badly; worthless.
32	Hallet's Red Winter	2.	200	Ripe May 20; beardless; small; poor; worthless; rusts badly.
33	Square Sicilian	13.	1570	Ripe May 25; beardless; small short heads, but well developed grain; rusts slightly; fair.
34	Rye Wheat	9.4	1420	Ripe May 25; beardless; heads medium long; poorly developed; slight rust; fair.
35	Thuring Row	5.5	700	Ripe May 25, beardless; heads small and poor grain; rusts badly; worthless.
36	Carter's Hundred Fold	5.5	720	Ripe May 20; beardless; poor; small heads and grain; rusts badly; worthless
37	Winter Geneose	17.8	1928	Ripe May 20; beardless; small grain; fairly developed; free from rust; very good.
38	Spaulding's Prolific	5.7	780	Ripe May 20; beardless; small heads and poorly developed grain; rusts badly; worthless.
39	Hallett's Genealogical	4.	650	Ripe May 20; worthless; rust.
40	Carter's Queen	5.6	750	Ripe May 25; worthless; rust.

RESULTS OF EXPERIMENTS IN WHEAT—CONTINUED.

No. of Experiment.	Name of Variety.	Bushels of Grain Per Acre.	Pounds of Straw Per Acre.	Remarks.
41	Mammoth	3.	400	Ripe May 25; worthless; rust.
42	Hybrid Loined	4.5	670	Ripe May 25; worthless; rust.
43	Patent Office, U. S	5.7	690	Ripe May 20; worthless; rust.
44	Propat	6.7	800	Ripe May 20; small grain; poorly devoloped; poor; rust.
45	Emmer	5.6	760	Ripe May 20; bearded; poor; small undeveloped grain; rusts badly; worthless.
46	Tojan Rod	6.4	780	Ripe May 25; beardless; poor heads; small undeveloped grain; rusts badly; poor.
47	Diamond	11.5	1370	Ripe May 25; slightly bearded; very long heads and grain not well developed; rusts only slightly; fair.
48	Russian Red Bearded	16 8	1940	Ripe May 20; bearded; large long heads; good grain, but small; no rust; good.
49	Nicaragua	10.5	1360	Ripe May 25; bearded, small heads; good grain; rust; fair.
50	Victor	5.7	780	Ripe May 25; beardless; small and no account.
51	Sicilian	10.6	1370	Ripe May 20; bearded; small head; small, well developed grain; slight rust; fair.
52	Egyptian Imported	5.7	770	Ripe May 20, small, poor heads and grain; rusts; poor.
53	Greek Atlantic	3.	495	Ripe June 1; bearded; worthless.
54	Carter's Anglo-Canadian	5.2	800	Ripe June 1; bearded; small head and grain; rusts; poor.
55	Solid Straw Poulard	5.	780	Ripe May 20; bearded; poor heads and grain; rusts; poor.
56	Ghuka or Odessa	25.4	2880	Ripe May 25; bearded; long heavy heads; plump large grain; no rust; very good.
57	Fulcaster Winter	14 8	1720	Ripe May 25; bearded; short strong heads; plump well developed grain; slight rust; good.

58	Petolia	.5	100	Failure.
59	Bearded from Mi sogen	10.4	1350	Ripe May 20; bearded; small well developed head and grain; slight rust; fair.
60	Fern or April	9.8	1300	Ripe May 20; bearded; medium long heads; fair grain; rust; poor.
70	Tunessian	5.7	800	Ripe May 20; bearded; medium heads; poor grain; poor; rust.
71	White Bonote	5.8	800	Ripe May 20; beardless; poor heads and grain; rusts; poor.
72	Egyptian	3.	480	Ripe May 25; bearded; short poor heads and grain; rusts badly; worthless.
73	Harris, from Jasper	17.8	2240	Ripe May 20; bearded; large long heads; large fairly developed grain; good; no rust.
74	Indian Winter	9.5	1300	Ripe June 1; beardless; small heads; fair grain; rusts; fair.
75	Victoria	10.6	1420	Ripe June 4; bearded; medium large heads, rather poorly developed grain; slight rust; fair.
76	Pringle's Defiance	11.2	1500	Ripe June 1; beardless; medium large heads; small grain, fairly developed; slight rust, fair.
77	Snowflake	10.8	1420	Ripe May 25; beardless, long heads; fairly developed grain; rusts badly; fair.
78	Big Long Bearded Club Brenner	14.8	1840	Ripe May 25; bearded; short strong heads, well filled with plump large grain; good; no rust
79	Champion	9.4	1340	Ripe May 20; beardless; large heads; poor grain; rusts; fair.
80	Little Club	2.	500	Ripe May 20; worthless.
81	White Club Brenner	9.5	1360	Ripe May 20; beardless; heads short; grain poorly developed though large; slight rust; fair.
82	Imported Circassian	10.	1380	Ripe May 25; bearded, heads medium long and large grain poorly developed; slight rust.
83	Winter Eagle Brenner	2.	440	Ripe June 1; worthless.
84	White Crimea Winter	1.5	300	Ripe May 20; beardless; worthless.
85	Carter's Bird Proof	9.5	1370	Ripe May 20; beardless; medium large and long heads; fairly developed small grain; fair; slight rust.
86	Diehl Mediterranean	14.	1800	Ripe May 15; bearded; medium long, large heads; good grain, well developed; slight rust; good.
87	Forelia	3.	700	Worthless.
88	Extra Early Oakley Winter	12.8	1620	Ripe May 20; beardless; long heads; large grain; rusts; fair.
89	Russian Durnuir	9.4	1260	Ripe May 20; bearded; small heads and grain; fairly developed; rust; fair.
90	Defiance	9.5	1280	Ripe June 1; beardless; medium large heads; fair grain; rust; fair.
91	Missogen	7.	1120	Ripe May 25; bearded; short heads; small grain; rusts; fair.
92	Nounette Lausanne	9.	1200	Ripe June 1; heads short; grain large; short; rust; fair.
93	Pringle's Best	2.5	560	Worthless.

RESULTS OF EXPERIMENTS IN WHEAT—CONTINUED.

No. of Experiment	Name of Variety.	Bushels of Grain Per Acre.	Pounds of Straw Per Acre	Remarks.
94	Whittington	2.8	570	Worthless.
95	Sylby's No 1	15.8	1920	Ripe May 20; bearded; heads medium large; grain good and developed; no rust; good.
96	Tangille	7.	1200	Ripe June 1; beardless; sma'l heads and grain; rusts; fair.
97	Royal Australian	8.5	1300	Ripe June 1; beardless; large heads; poorly developed; rust; fair.
98	Bearded Club Brenner	....	....	Destroyed by mice.
99	White Sonora	8.5	1300	Ripe May 25; be rdless; long heads; fairly developed grain; rust; fair.
100	Austrian	8.5	1320	Ripe May 20; beardless; fairly large heads and grain; rusts; fair.
101	Vola	8.	1300	Ripe May 25; large heads; grain fairly developed; rust; fair.
102	Oregon White Club	2.	500	Worthless.
103	Palestine	3.	589	Worthless.
	The following were grown from home-raised seed :			
104	White Russian	13.3	1890	Ripe May 20; beardless; head medium long; grain well developed; rather free of rust; g od.
105	Mediterranean	18.5	2340	Ripe June 5; bearded; medium long head; large plump grain; well matured and developed; slight rust; good.
106	White Boughten	21.6	2560	Ripe June 1; bearded; short, compact heads; grain very large and round; slight rust; very good.
107	Good Wheat	17.5	2290	Ripe May 20; beardless; medium long head; short small grain; not well developed; no rust; good.
108	Red Russian	18.5	2400	Ripe June 1; beardless; plump large heads; large well developed grain; no rust; good.
109	Red Clowson	10.	1400	Ripe June 1; beardless; small, poorly developed head and grain; rusts; fair.

110	Fulcaster	25.5	3000	Ripe May 20; bearded; small head; long; rather small, but plump well developed grain; no rust; very good.
111	Golden Cross	14.	1920	Ripe June 3; bearded; short head; well filled, with medium grain; no rust; good; damaged by mice.
112	Purple Straw	16.8	2200	Ripe June 1; beardless; long, small head; grain small and only fairly developed; slight rust; good.
113	Tuscan Island	24.	2940	Ripe May 25; bearded; head long and large; well filled with very large plump, developed grain, no rust; very good.
114	Soskatchawan	9.5	1392	Ripe May 25; beardless; head medium large and long; grain small, fairly developed; slight rust; damaged by birds.
115	*E W. Hacket	4.	620	Ripe June 1; worthless.
116	*Eustimer	12.8	1680	Ripe June 1; small, long head; plump grain; rusts badly; fair.

*Belongs to first list.

CONCLUSIONS.

Results show the importance of selecting varieties adapted to soil and climate.

Wheats grown on Station one, two and three years, produce better than new varieties just introduced. Many of the poor and worthless varieties may prove good with a few years' cultivation.

Fulcaster, 25.5 bushels; Ghuka or Odessa, 25.4; Tuscan Island, 24; White Boughten, 21.6; Mediterranean, 18.5; Red Russian, 18.5; Harris from Jasper, 17.8; Russian Red Bearded, 16.8; Mold's White Winter, 16.8; Good Wheat, 17.5; Purple Straw, 16.8; Winter Geneose, 17.8, and Fulcaster Winter, 14.8, give, large and profitable yields and can be recommended.

Wheats were planted in drills 12 inches apart. This gave smaller yields than if planted closer. Birds injured all wheats, more or less. The only fertilizer used was a top-dressing of the grain formula.

Farmers can, and should, raise wheat at least for home use.

CAUTIONS.

Before closing this Bulletin, two cautions should be given to all of those contemplating planting grasses or clovers and making hay.

1st. Prepare your land well, pulverizing in a most thorough manner. Use *good reliable* seed, purchased from well known and responsible houses, in ample quantities. Sow only when soil and season are favorable, otherwise it may be a waste of time and money. Most of our grasses and clovers succeed best sown in the fall. A good stand is the first requisite in successful grass growing.

2d. In making hay, avoid too much drying. Hay cut in the morning may be packed away in a tight barn that evening. If you have an open barn, finish the curing in small cocks, and pack away in barns or stacks as soon as possible; don't overcure. Much valuable hay is every year injured by exposure too long to our hot suns.