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## Pecan culture

George L. Clothier

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# Mississippi Agricultural Experiment Station.

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## PECAN CULTURE.



By GEORGE L. CLOTHIER.

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Much has been written about the culture of the pecan by way of advertising. The purpose of this circular is to set forth impartially the actual facts with reference to pecan culture as far as they are known to apply to Mississippi.

The first caution which we propose to emphasize is never to plant seed or seedlings in hopes of getting remunerative returns. Many orchards have been started in this state from choice seed of some of the older named varieties. The results have been universally disappointing because the pecan is as variable as the apple or peach. Grafted or budded trees of standard varieties will cost on the average about one dollar apiece. We should cheerfully be willing to make this initial expenditure to insure that our trees will bear the kind of nuts desired. Don't imagine that you are paying the propagator too much for the nursery stock providing he furnishes you good healthy trees true to name at the price above mentioned.

Grafting and budding the pecan is not the simple operation it is with the apple and peach. Skilled propagators are satisfied if fifty per cent of their efforts at budding or grafting are successful.

### Choice of Varieties.

More than one hundred varieties have been propagated and sold by nurserymen. To establish a successful orchard, it is not necessary that we plant all the varieties on the market. We will be more likely to attain satisfactory results if we limit our planting to five or six of the best varieties. For general planting in Mississippi we would recommend Stuart, Pabst, Van Deman, Russell, Schley, and Success. Other varieties highly recommended are Money Maker, Frotscher, Georgia, and Centennial. Experiments have not been sufficiently exhaustive to determine the exact area of the state to which each of the above named varieties is best adapted.

### Selection of Location and Site.

The best success with pecan growing in this state has been attained near the Gulf coast. We are not certain whether this success is due to favorable climate, hospitable soil, or to the peculiar bent of the people. If a warm, humid climate is essential to the production of large well filled paper-shell nuts, then the Gulf coast is likely to remain the chief pecan growing section of the state. If either of the other two factors suggested are responsible, there is no valid reason why the culture of this nutritious nut should not extend to all parts of the state, because man can ameliorate the soil and change his bent if he is in earnest. We would suggest that planters proposing to set pecan orchards at a distance of more than 100 miles from the coast, proceed cautiously until they have demonstrated whether or not the planting promises remunerative returns.

Good soil is essential to success in pecan growing. An ideal soil is black rich alluvial loam, well drained, and overlying a porous sub-soil with the water table at least ten feet below the surface. If the soil is not naturally ideal, it can be made so providing it does not rest on an impervious subsoil and can be thoroughly drained.

Fertilizers and manures can be used on light sandy soils to enrich and fill them with humus while dense clays may be rendered more porous and penetrable by the addition of vegetable matter. Green manuring accompanied by liberal applications of bone meal and acid phosphate will enrich a light sandy soil, while deep plowing accompanied by generous supplies of stable manure will almost invariably ameliorate a sticky clay. The sandy soil if it can be made sufficiently rich in phosphates and lime is likely to prove the very best soil obtainable for pecan culture.

The nitrogen, of which there must be a plentiful supply in the soil, may be obtained by growing leguminous crops, such as cowpeas, soy beans, garden peas, and the various clovers and vetches and plowing the crops under when the stems begin to get woody. There is no excuse for the purchase of nitrogen in Mississippi when it can be obtained from the atmosphere at so small a cost through the aid of legumes.

Wet swampy soil must be drained if it is to be devoted to pecan culture. Black limy soil is suited to the pecan provided it is well drained and well filled with humus. If there is any doubt about the permanent drainage of the site proposed, it would be better to abandon the project rather than run the risk of failure, because the pecan tree cannot endure "wet feet."

### **Purchasing Nursery Stock.**

Purchase trees only from a reputable nurseryman. Traveling agents are not usually trustworthy. The tree peddler almost invariably represents nobody but himself, and after he has taken his orders, he seeks a nursery that will sell him a lot of unsalable odds and ends at a very low price. With this kind of stuff he fills his orders, substituting other varieties or even seedlings for the high-priced fancy varieties he sold his customers from the pictures he carried along with which to entice the unwary. Next to the tree peddler in unreliability is the small local dealer who advertises that he has a nursery and begs the people to patronize "home industries," but who purchases nearly everything he sells, from wholesale nurseries located in distant states. Trees handled in this way are liable to be damaged in shipment and are often not true to name. Purchasers should insist that nurserymen furnish the stock purchased without any substitution, and should prosecute every case of substitution to the full extent of the law, no matter whether a more costly or inferior tree is substituted. What a purchaser of nursery stock wants to be sure of above all other contingencies is that he is getting the variety he has ordered, and any substitution that may be made without his consent is obtaining money under false pretenses and should send the nurseryman making the substitution to prison.

Since the propagator of the pecan has a very difficult task to perform, it often happens that the graft or bud fails and the seedling stock makes a second growth from a point just below where the scion ought to have started. This causes the seedling to look like a budded or grafted tree. The propagator may be tempted by financial straits to sell such bogus trees for true named varieties, and so it behooves the purchaser to know his nurseryman personally to be sure that he is getting grafted trees that are actually true to name. The guarantee afforded by the reputation of the dealer is what the purchaser is expected to pay for; and if the nurseryman is inflexibly honest, he ought to be paid well for this guarantee, hence "cheap trees" are not recommended.

### **Returns from Pecan Orchards.**

Fabulous tales have been told with reference to the returns that may be legitimately expected from a pecan orchard. A few isolated trees have produced annually from 100 pounds to 300 pounds of nuts per tree and these yields have been heralded abroad as the possible production that may be expected by an investor from a large orchard. The writer knows of no instance where a whole orchard of any con-

siderable area has shown such prolificacy. It is unsafe to generalize with reference to pecan yields because our data from which to draw conclusions are so meager. The one thing that an investor may be sure of, is that his investment will not turn out as it has been painted by the advertisers of the pecan industry. A pecan orchard is a long-time investment with deferred dividends. The average orchard will not begin to earn rental on the land it occupies until it is ten years old. Dividends on the investment need not be expected much short of fifteen years. To the one who can afford to wait fifteen years, a pecan orchard of choice grafted paper-shell varieties on good soil may possibly prove a bonanza yielding its thousand fold to its owner. That the market for the crop is practically unlimited is a fact beyond question.

Heavy crops of nuts every year need not be expected. The pecan is a forest tree with such a short period of domestication to its credit that we must expect it to behave somewhat as the wild trees do. Wild trees are notoriously unreliable as to their seed production. It is likely however to prove more regular in its bearing than the peach, because the production of its nuts on the new wood, tends to render its blossoms immune against late frosts.

#### **Planting the Orchard.**

After the investor has decided for himself that a pecan orchard is a promising investment and has selected his location and become owner of the proposed site, the next problem he has to solve is how to get the trees planted and started off growing. No amount of pains should be spared in the preparation of the site. Don't plant the trees with the expectation that the preparation will be given after they have been set out. Preparation by deep plowing and subsoiling of every square foot of the site should be begun a year before the trees are planted. Cowpeas or other legumes should be grown on the land and plowed under to a depth of ten or twelve inches.

The best season to plant pecan trees is in December and January. Repeated failures with spring planting have convinced the writer that spring is not the best time to plant in Mississippi. The soil is usually too wet to handle in spring time in such a manner as to prevent its puddling. December and January are the months in which the soil is usually in best condition, and winter planting gives the roots a chance to start before the buds burst.

The ground should be staked out early in the fall so as to afford accurate information with reference to the number of trees required to fill the site. The order for the trees should be sent to the nursery

not later than October, with instructions for shipment in time for use when needed.

The orchardist may lay out his orchard so that the trees will be equal distances apart in squares or equilateral triangles, or he may plant in rectangles in which the distances will not be the same in two directions. Many writers recommend setting the trees 60 to 80 feet apart, but the writer believes that 50 feet apart in equilateral triangles will prove to be the best spacing. To lay off the field by this method a row is lined out 22 to 25 feet from the boundary of the orchard parallel with its longest side. Beginning 25 feet from the end of this first row a stake is set, and stakes are set every 50 feet along this first row. Two wires exactly 50 feet long with loops in each end are fastened over two adjacent stakes at one end of the first row and swung around so that the loops on the other two ends of the wires will be placed over each other. Another stake is driven through these loops; and the wires are then carried to the opposite end of the field and a new stake set in the same way and from these stakes a second row is lined out which should be exactly 43 feet and 4 inches perpendicularly from the first row. The second row is then measured off into 50-foot intervals marked by stakes just as was the first row, but the measurements are made in the opposite direction. The two end stakes of the third row are set by the help of the wires in the same way, and the position of these stakes corrected to make the perpendicular distance between the rows exactly 43 feet and 4 inches as was done in laying out the second row. The 50-foot intervals are then laid off on the third row in the same direction as was done in laying out the first row.

After the field has been laid out in this careful manner, it will be necessary to correct any errors of position of stakes by sighting across the field in three directions. To do this accurately, three men should do the sighting and one adjust or reset the stakes. When digging the holes a planting board six feet long and eight or ten inches wide should be used. A notch in the middle of this board about four inches deep marks the position of the tree, and two-inch augur holes near the ends will permit pegs to be driven through the board to hold it in position. Before digging a hole the planting board is laid on the ground with the center of the notch close up against the stake that marks the position of the tree. The two pegs at the ends of the board are then driven into the ground and left standing and the board is removed. The hole is dug and the removed soil is so placed as to allow the planting board to be put down again in exactly the same position it occupied the first time. When planting the tree, its stem is held erect close against the board in the middle of the notch,

and thus the tree is made to occupy the exact spot where the stake marking its site was driven.

Another method that gives fairly good results is to dig a post hole three feet deep, where the stake is driven, marking the site of the tree, and when the soil is dug out from around the post hole the workmen are instructed to leave the bottom of the post hole undisturbed. The tree is then set so that its stem is vertical over the center of the bottom of the post hole.

Marking out a field in squares or rectangles is so simple that instructions here need not be given. The triangular method affords the best possible spacing and utilizes all the ground permitting the planting of ten to fifteen per cent more trees on the same area than can be planted in squares with the same spacing. An acre will hold 19 1-3 trees set 50 feet apart in equilateral triangles, or 17 4-10 trees set the same distance apart in squares. When set 60 feet apart by the triangular method 13 9-10 trees may be placed on an acre; if set 60 feet apart by the square method, 12 1-10 trees will be required.

Since the pecan tree naturally develops a tap root which should be removed with the tree to a depth of 20 to 30 inches when digging it from the nursery, it is necessary to dig deep holes for planting the trees. A good plan is to remove at least a cubic yard of soil from each hole. Digging the holes may be commenced in October and it is desirable that they all be dug before planting is begun. When the tree is planted, the hole should be filled as nearly as possible with rich surface soil. A pound of bone meal sifted in around the roots of the tree at the time it is planted is advisable. The planting operation should be done with great care. Any broken or bruised roots should be pruned back to sound wood, but the tops should not be cut back. If it is necessary to reduce the top to correspond with the curtailed root system, wait till the buds are bursting in spring and then prune and coat every cut surface with grafting wax at the time of pruning. Fall pruning exposes the tree to loss of moisture during the winter season, and should never be practiced on a newly planted tree.

#### **How to Cultivate and Care for a Pecan Orchard.**

The pecan orchard should be kept as well cultivated during its formative age as the cotton field. While the trees are approaching the fruiting age, the spaces between the rows should be used for the growth of crops that will keep the weeds in subjection and pay for the labor of cultivating the trees. Truck crops such as potatoes, sweet potatoes, cabbage, tomatoes and beans are excellent to grow between pecan trees. Cowpeas should be grown on the orchard site

as frequently as possible and the peavines should be turned under with the plow to keep up the supply of humus in the soil.

Rank growing crops like corn should not be planted in the pecan orchard, neither should the small grains be sown. If it is necessary to grow a field crop, cotton is much to be preferred to corn. Hay crops should not be grown.

Winter cover crops should be grown on the orchard site to prevent the soil from washing and leaching. Oats and vetch serve this purpose well, but the crop should never be allowed to mature into a hay or grain crop. The oats and vetch should be plowed under early in the spring. A good rotation is oats and vetch for green manure followed by potatoes, and these followed by cowpeas. The cowpeas should be permitted to ripen and the grain may be gathered by hogs. The pea vines should be plowed under late in the fall and oats and vetch should again be sown. In working the land between the rows of trees, great care should be used to prevent the teams and implements from skinning the trees. Every wound made on a tree in this way endangers its life.

The pecan orchard should not be permitted to become sodded until the trees are practically mature, and at that date Bermuda grass should be excluded. Blue grass and white clover form the very best permanent sod that can be put into an orchard. Alfalfa may follow the blue grass and white clover after the trees reach an age of 30 years, but it should never be sown in a young orchard. If after lying in sod a few years, the orchard shows signs of poor health, the sod should be broken out and cultivation renewed. It is never wise to permit trees to become "sod-bound."

### **Pruning.**

Pruning is a surgical operation at best and should only be applied by one who knows exactly what result is to be attained. The chief purpose of pruning is to shape the crown of the tree to suit the orchardist. Low heads are better than high facilitating the picking of the nuts, and affording less opportunity for wind to damage the trees.

Pecan trees cannot be kept circumscribed within the limits desirable with fruit trees, hence pruning the pecan should aim chiefly to secure the ideal hemispherical head free from dead limbs and having the bearing wood distributed where it will receive abundant sunlight. If the branches in the interior of the crown are so thick as to interfere with each other, thinning out the excess may be necessary. There is a popular superstition that cutting off the branches of a tree will exert some mysterious influence to make the tree more fruitful



or more thrifty. This is a fallacy, and the best advice that can be given to one holding this view is not to prune at all, since ignorance of the laws of plant growth may cause the would-be benefactor of the tree to injure or destroy it with the knife.

### Top Working Old Trees.

Millions of wild pecan trees in the Southern States are now cumberers of the ground that might be made a source of great profit, if their owners would but have the confidence to top work these inferior trees with prolific paper-shell varieties. Top working is no easy project and costs, on the average, about five dollars per tree. The top of the inferior tree is nearly all cut back in the winter season so that the limbs are nothing but short stumps. Young, vigorous sprouts start from the short stumpy limbs in the spring, and in August or September of the first season these young shoots are budded with the desired variety. After the buds "take" the supernumerary young sprouts are cut off close up to the old limbs. The budded sprouts are cut back to an inch or two above the bud the next season, and all the energy is thus thrown into the bud. From ten to a dozen buds are set to form the new crown of each tree, and after the permanence of the new growth is assured, all the old top should be pruned away.

In four or five years, a top-worked tree will be paying its owner handsome returns. It is possible that grafting may be performed upon the sprouts with good results, but the proper season for making the grafts is February or March, at the end of the first year's growth of the young sprouts. After the bark of the pecan becomes more than one year old, it is difficult to work either by budding or grafting.

In conclusion, the writer wishes to urge that the pecan tree deserves more attention than it is now receiving from the people of the South. Its planting should be promoted by sane and conservative business men who have a personal interest in the outcome. Extravagant claims for the industry can only do harm. Very much must be yet learned before we can assert that certain premises with reference to its culture are facts. We need to know very much more definitely than we now know the best regions for the cultivation of each named variety. Experiments for the determination of facts with reference to the productiveness, hardiness and soil requirements of different varieties must extend through a number of years to obtain valuable information, because the pecan naturally does not fruit early. Plant more pecan trees, but be prepared to wait patiently for results. Experiment if you will, but do not make your experiment too large for you to carry it to a successful conclusion.