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The Tung Oil Nut Tree

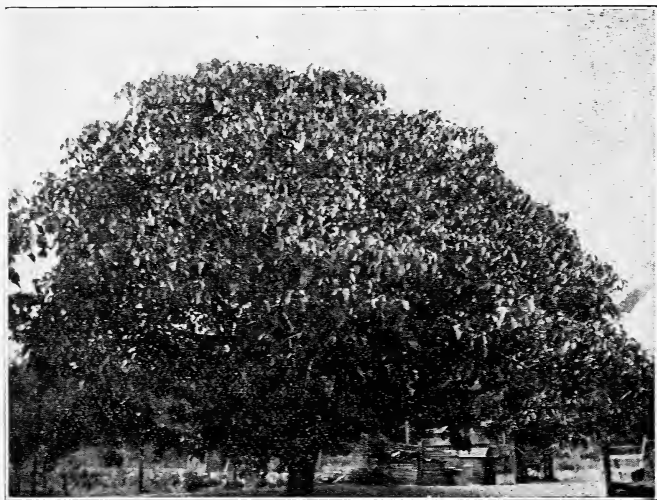
A Brief Statement of Facts

Regarding It

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U. S. DEPARTMENT OF AGRICULTURE

By

J. B. WIGHT, Cairo, Ga.



For Description of this Tree See Page 5





THE Chinese Tung Oil nut tree has been growing for ages in the wilds of China, although there are a few cultivated trees. The first importation of nuts or trees into the United States was about 1905, by the U. S. Department of Agriculture. These were widely distributed by the Department for experimental purposes; but very little attention has been paid to the tree as a commercial proposition until the last few years. There is now a very wide interest in its development. The writer, during the past season, shipped 2,000 trees to Argentina in South America; and he has sold many nuts to be planted in New Zealand. The main value of the tree is as a source of oil. The only place in the United States at the present time where the growing of tung oil nuts has assumed commercial proportions is in the neighborhood of Gainesville, Fla. A compression plant for the extraction of the oil was erected there in 1928.

But the constantly increasing demand for the oil for use in various arts and industries, and the inadequate supply obtainable from China, has developed a wide-spread interest in its growth in the limited parts of the United States adapted to its growth. The demand for the oil is greater than the supply. Improved methods of production and compression enable us to successfully compete with China in growing it. Experience has fully demonstrated that the oil can be produced here; and hence the growing interest in tung oil as a commercial proposition.

TUNG OIL AND ITS USES

Many millions of dollars are sent each year to China for tung oil. The Chinese product, however, is so inferior, due to their crude method of compression, and to the further fact that they adulterate it with peanut and other oils, that this source of supply is unsatisfactory. The constantly increasing uses for the oil is causing the demand to exceed the supply. For this reason a more reliable source for the oil is necessary, and this has resulted in a wide-spread demand that we get it nearer home. It has been found that the tree transplants readily, and responds to cultural methods. The compression of the oil is simple. The tree is symmetrical in growth, and makes an attractive shade. It is unusually attractive when in full bloom.

The uses of the oil are very numerous, and they are constantly increasing. The following from Dr. Wilmon Newell, Director of the Florida Experiment Station, gives some of the leading uses of tung oil:—"In America and other countries, tung-oil is used in making varnish, enamel paint, floor paint, flat-wall paint, paint driers, and, with rosin, water-proof or spar varnish. It is also used in the manufacture of oil-cloth and linoleum, and with aluminum oxide it is made into aluminum tungate which is used as a fire-proofing and water-proofing material. The oil is also used as a dressing for leather and in the manufacture of soap. Fatty acids from it are utilized in making lacquer or substitutes for shellac. As already stated, the oil has largely

replaced the copal gums, no longer available in sufficient quantities to meet the needs of paint and varnish manufacturers."

NORTHERN LIMIT

The northern limit of successful tung oil culture is yet undetermined. Many years ago experimental plantings were made at the Georgia Experiment Station near Griffin. Most of these trees have died; but a few are living and bearing regular crops of nuts.

Mr. R. L. Canty of Americus, Ga., writes me as follows concerning some trees near his city: "For twelve years the trees on the Adderton Place have been prolific bearers, and during the fifteen years they have been here, there has not been the slightest indication of cold kill."

While further tests are necessary, I do not advise the setting of commercial orchards north of a line drawn through middle Georgia. Young trees will not stand as much cold as older ones. A planting of nuts on good land at Cairo, Ga., was made February, 1929. Some of these grew during the first season to a height of seven to eight feet. A few of the most thrifty of these trees were injured by a freeze in December when the temperature went to 17 degrees F., while those that did not exceed five feet in height were unhurt. The explanation of this is that the wood of the more rapid growing trees did not have sufficient time to harden up before the cold came. As trees grow older they are more resistant to cold and will stand lower temperatures.

SOIL

I have seen the tung oil tree growing successfully on all grades of land from the light sandy soils of Florida to the heavier clay soils of Georgia. Observation has convinced me that a sandy loam soil underlaid with clay is the best for the tung tree. Any land well adapted to cotton or corn will grow this tree. However, it should not be planted on land that is underlaid by lime rock near the surface. It seems to thrive best on land with a slightly acid reaction. Furthermore, it should not be grown on low flat land that is subject to overflow. It is not friendly to wet feet, and will die where the land is submerged by water for any great length of time. It seems able to stand adverse conditions better than almost any other tree. I recently visited Mr. C. O. White near Mobile, Ala., who has been a successful grower in a small way of tung oil trees for many years. Mr. White has trees growing in his native pine forests, and they are holding their own and bearing nuts on land where the pine trees have already preempted the soil. Briefly, it will do well on most of the lands in the southern part of the cotton and corn belt.

FERTILIZING

Tung trees need to be fertilized in order to get best results. A high grade guano applied about the trees when they

are young and later to the whole ground when the orchard has reached the bearing age is recommended. An application of 400 to 800 pounds per acre of high grade guano to a grove in good bearing ought to be adequate.

The idea that profitable crops of anything may be taken year after year from land without the addition of fertilizer is erroneous. Any crop will remove some plant food; and this must be returned in some form, if the fertility of the soil is to be maintained and continued productivity sustained. Furthermore, the humus content of the soil must be kept up if profitable crops are grown. This applies to field and tree crops of any kind.

CULTIVATION

So far, it seems that tung trees respond very readily to good land and good cultivation. The best authorities recommend the growing of a cover crop like crotalaria, beggarweed or velvet beans to be turned under to add humus to the soil. A winter cover crop of Austrian winter peas is also good for the same purpose. As the tung tree is somewhat susceptible to root-knot a cover crop which harbors this disease should not be used among tung nut trees. Shallow cultivation should be practiced during the summer.

For the first three or four years after setting an orchard, or until the trees come into profitable bearing, some other crop may be planted among the trees. This will both help the trees and will yield a money crop, and so reduce the cost of bringing the orchard into profitable bearing. This crop should be well fertilized and the trees will get their share of the fertilizer.

DISTANCE

Tung Oil culture is not old enough to determine the best distance at which to set trees. Known orchards are set at various distances like the following:

30 x 15	ft. (97 trees per a.)
30 x 12	ft. (118 trees per a.)
25 x 25	ft. (70 trees per a.)
25 x 12½	ft. (140 trees per a.)
20 x 20	ft. (109 trees per a.)

Where trees are set nearer one way than the other the purpose is to remove a part of the trees when they begin to crowd each other. 25 x 25 feet is a safe distance at which to set them. This will permit other crops to be grown among the trees until the tung trees come into profitable bearing.

HARVESTING

Tung nuts fall from the trees during October and early November. They may remain upon the ground for several weeks without damage. When gathered they are kept in barns or sheds until the compress is ready to use them. The rapidity of gathering and simplicity of storing make the

harvesting and storage of the crop very economical. There is no crop that can be handled with greater ease than this. No damage to the nuts results from leaving them on the ground even until early spring. No animals will eat them.

HEALTH OF TREES

No serious insect or fungus trouble has yet attacked the tung oil tree—even in China where they have grown in the wild for thousands of years. Care should be had not to grow tung oil trees on land infested with nematode or root galls. The cottony cushion scale has also been found on trees in Florida. Dr. Newell of the Florida Experiment Station does not fear these, as he thinks they will be held in check by natural enemies. Mules and cows do not graze on the foliage. A warning should be given here that the nuts are unfit for human food. In fact they seem to contain a poison. The meal, after the compression of the oil, makes a first-class fertilizer, but is unfit for stock feed.

BY-PRODUCTS

The pomace, or residue after compressing the oil from the seed, has about the same value as a fertilizer as cottonseed meal. Owing to its poisonous properties it will not do as a feed for animals. A competent chemist gives the following analysis of the pomace or meal:

Ammonia	6.42%
Phosphate	3.78%
Potash	1.28%

The meal will pay for the cost of extracting the oil, and in addition a good dividend on money invested in the compression plant.

YIELD AND INCOME

The tung oil tree on good land usually begins bearing the second or third year after transplanting; but it is the fourth or fifth year before it comes into profitable bearing. At eight to ten years of age the yield should be from one to three tons per acre of unhulled nuts. Individual trees at this age yield from 25 to 150 lbs. of nuts per tree, owing to land, cultivation, fertilizing, etc. I have one tree now twenty-one years old that has averaged 200 pounds of nuts per year for the last four years. This tree has a spread of top of 36 feet, and a trunk circumference three feet above the ground of sixty-three and one-half inches. Up to 1930 this tree has never received any special care or fertilizer. It has never shown any insect pests or fungous diseases. (See cut of this tree on title page.)

The average oil yield per acre of the following well known plants furnishes an interesting comparison:

Cottonseed	150 lbs. oil per acre
Flaxseed	255 lbs. oil per acre
Peanuts	300 lbs. oil per acre
Tung trees ..	1200 lbs. oil per acre

A grove of 800 trees near Albany, Ga., in its third year of growth is estimated by good authorities to promise a yield of 6 to 8 lbs. of nuts per tree this (1930) year. During the last five years the price of tung oil has varied from eleven cents to thirty-five cents per pound. There are eight pounds of oil in one gallon.

OVERPRODUCTION

Practically all of our tung oil now comes from China. Their crude methods of manufacture, labor conditions, distance from our markets, and political upheavals make it imperative that we have a more reliable source of supply for our growing demands for this oil. Furthermore, Chinese tung oil is now imported free of duty. As soon as there is a sufficient American supply it is likely that an import duty will be placed upon the chinese oil, thus protecting us from the inferior Asiatic product. The limited area in which tung oil can be produced in America makes it extremely unlikely that the supply will ever exceed the demand. This is especially true when we recall that new uses are constantly being found for this oil.

PROFITS

The growing of tung oil nuts is not recommended as a financial cure-all, but it is named as one which practically all of our farmers in the tung nut territory will find a valuable addition to the list of their money crops. Well cared for orchards can safely be relied on to yield two to three tons of nuts per acre when eight to ten years of age. No crop is more easily or economically handled. The tree is a rapid grower and an early bearer. It makes an attractive tree. It can be grown in many nooks and corners of the farm that otherwise might go to waste or weeds. The tung nut is well worthy of consideration by the land owner who wants another money crop.

Compression plants for extracting the oil will follow when the supply of nuts justifies this. Tung nuts being more valuable than cotton seed, can with equal ease, be carried by truck or rail to these tung oil mills.

AN EXPERT SPEAKS

The following letter from an expert, Dr. A. C. Whitford, Agricultural Chemist, who has studied the tung oil industry closely is so full of information that I am by permission giving it as he wrote it:

“Wiggins, Miss., Dec. 16, 1929.

“Citronelle Nursery Co.,

“Citronelle, Ala.

“Dear Mr. Scott:

“Some time ago you asked me for some information in regard to Tung Oil production, etc. Unfortunately I have

been so busy here making soil surveys that I have hardly had time to breathe, let alone write letters. I am giving you the following information which I believe to be accurate and conservative.

"The following figures are based on the fact that dried fruit should yield 50% nuts when shelled and the dried nuts should yield 45% oil and 55% cake. The cost per ton to process the nuts is figured at \$2.50 and the oil to be worth 13c per lb., and the cake \$30.00 per ton. In the overhead there is taken into account interest on investment, depreciation and amortization, etc. It is assumed that the plant would desire to make \$10.00 per ton of fruit processed.

"The yields are based on estimates from counting fruit on actual trees and not only one tree, but from 25-100 trees and then taking the average:—

"3rd year dried fruits 8 lbs.
 "4th year dried fruits 21 lbs.
 "5th year dried fruits 41 lbs.
 "6th year dried fruits 60 lbs.
 "7th and after 80-90 lbs.

"The cost to the mill for processing will be:

"Processing, per ton	\$ 2.50
"Profit per ton dried fruit	10.00
	\$12.50

"The returns per ton of dried fruit will be as follows:

"One ton dried fruit yields 450 lbs. oil @ 13c	\$58.50
"One ton dried fruit yields 550 lbs. cake	8.25

"Total	\$66.75
"Deduction for profit and expenses	\$12.50
	\$54.25

"Price that can be paid grower

"The returns that the grower can reasonably expect per acre, based on above yield and assuming \$50. per ton for dried fruit:

"3rd year	\$ 25.00
"4th year	60.00
"5th year	119.00
"6th year	174.00
"7th year and after	230.00

"I believe that the above figures are about as they should be. I trust that they will be of some service to you.

"Very truly yours,

"(Signed) A. C. WHITFORD."

THE PROOF OF THE PUDDING

The Chamber of Commerce of Cairo through its officers has investigated the industry very thoroughly. They have visited the principal orchards in Georgia, Florida and Alabama. They have weighed both its advantages and disad-

TUNG OIL

(Reprint from Cairo Messenger,
October 24, 1930.)

In view of the interest that is being paid to tung oil in Grady county, a new magazine just started is significant. It is "TUNG OIL," and is published at Orlando, Fla. Its editor is Mr. A. L. Matthews, who is a business man and scientist of wide experience. It stresses tung oil as a new and promising industry, and one that should prove profitable to those who realize the opportunity for farm diversification which it affords. Macon, Georgia, is named as the northern limit of where tung oil can be successfully grown. South Georgia is named as a locality where it is already succeeding.

Facts are given to show that the world can no longer depend upon China for its supply of this oil, which every day is becoming more and more important in commerce and industry. Figures given show that it would require 200,000 acres of tung oil trees to supply the present demand for tung oil; and that with the increased uses which are constantly being found for this oil that 400,000 acres will be required in the near future. It states that 7,000 acres of orchards have already been set; and that about 10,000 acres will be added the coming season.

We are fortunate in having made a start with this most promising industry in this county. There are enough trees now being grown by more than one hundred farmers in Grady county to set from 2,000 to 3,000 acres the coming winter. As far as possible every one of these trees should be kept here at home. We have the opportunity to be the leaders in this new industry if we will only use it.

Tung Oil Association For Grady Co. Formed

(Reprint from Cairo Messenger,
Nov. 14th, 1930.)

At an enthusiastic meeting held at the Courthouse in Cairo last Saturday, there was organized the first association of tung oil growers in America. The courtroom was filled to overflowing and about sixty members were signed up, while at least twenty-five other growers were prevented from attending the meeting by bad weather. These and many more will come in later.

This meeting was the outgrowth of the efforts of the Chamber of Commerce put forth last year in the distribution of something like 7,000 lbs. of seed nuts to nearly a hundred farmers of the county.

The object of the organization as set forth at the meeting is to co-ordinate the efforts in growing tung oil; to keep the members posted as to cultivation, markets, etc.; and to be in readiness to install co-operatively a crushing plant when the groves come into commercial bearing.

Dr. C. A. Van Duzee, a prominent local orchardist and farmer, was elected president and J. M. Hughes was chosen secretary. The meeting provided for the appointment of five directors from five districts of the county, composed entirely of farmer growers. Applications from nearby counties are coming in for membership in the association.

The people of Grady county are to be congratulated on the outlook for this promising new industry. It means much to be the first to engage in it in Georgia. Every farm in Grady county might well have at least a few acres in these trees. Those who have not already enrolled as members may do so by getting in touch with J. M. Hughes and do so at once.

vantages. The result is that they have decided that it is a field of sufficient promise to justify entering it on a large scale.

Last fall 7000 pounds of nuts were bought. These have been distributed to more than one hundred farmers of Grady County. These nuts were planted and the young trees are now growing. These trees will be set during the winter of 1930-31. There are enough of these trees to set 2000 to 4000 acres. This acreage will be added to from year to year. At least two hundred farmers will engage in this enterprise, the acreage of each ranging from one to one hundred and fifty acres.

As soon as the yield from these trees is sufficient (in 3 to 4 years) it is planned to build a compression plant for extracting the oil. There is now but one of these plants in America—at Gainesville, Fla., though it is certain that as the industry grows, they will, in the tung oil territory, be as common as cotton seed oil mills.

AN INVITATION

If you are interested and want to investigate this industry further, come to Cairo. We will show you what is probably the largest tung oil tree in America, and also other large tung trees; you will see young orchards, and thousands of trees in nurseries. You can then draw your own conclusions.

All indications point to the fact that we are at the beginning of a new and profitable industry. Starting now, one can if he wishes, be in on the ground floor. A few hours here will not be wasted.

