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Growing Peanuts in Alabama

A POPULAR EDITION OF BULLETIN NO. 193

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GROWING PEANUTS IN ALABAMA

By

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O. H. SELLERS.

SUMMARY.

The average yield of unshelled peanuts obtained from regular variety tests, made in different parts of the State and covering a period of five years, ranged from 871 pounds of McGovern to 1244 pounds of Red Spanish per acre. Taking the yield of Red Spanish as a basis (100 percent), the percentage yield of the different varieties averaged as follows:

Red Spanish	100	Tennessee Red	86
Valencia	91	Virginia Bunch	86
White Spanish	88	Virginia Runner	85
McGovern	87	North Carolina Runner ...	84

The average percentage of shelled nuts or "meats" of each variety, obtained by carefully weighing and hand-shelling a given amount of dry unshelled peanuts, shows a remarkably wide variation, from 39.3 percent in Jumbo to 75.1 percent in White Spanish. The true commercial value of the crop of an acre is based, not on the number of pounds of unhulled peanuts, but on the number of pounds of "meats" produced.

The common varieties of peanuts are divided into two great classes—those having an upright or bunch habit of growth, and those having a low spreading or running habit. To the bunch varieties belong the White Spanish, Red Spanish, Valencia, Virginia Bunch, and Tennessee Red. Among the running varieties are the North Carolina or African, Virginia Runner, McGovern, and the Running Jumbo.

In a number of experiments there were found great differences in the weight of single unshelled peanuts, of "peas" of different varieties, and the average percentage of sound "peas" per pod. The heaviest unshelled peanuts were the Tennessee Red (246 pods to the pound), and the lightest, the White Spanish (461 pods to the pound).

Based on the average percentage of sound nuts of each variety and of its oil content, the varieties arranged according to the number of pounds of oil produced per ton take the following rank: White Spanish 702 pounds, Red Spanish 693 pounds, Valencia 572 pounds, McGovern 548 pounds, Tennessee Red 527 pounds, North Carolina Runner 524 pounds, Virginia Runner 493 pounds, and Jumbo 354 pounds.

The average yield of unshelled peanuts as reported by Alabama oil mills, is estimated at 850 pounds per acre. From a ton of Spanish peanuts the mills obtain from 600 to 700 pounds of oil, and from 1200 to 1300 pounds of peanut cake. All the oil mills reporting preferred the White Spanish variety, except one mill which preferred the North Carolina Runner because it claimed that the yield of the latter per acre is in excess of the other varieties.

From many complete fertilizer tests with peanuts, located in different parts of the State and covering a period of six years, it is concluded:

1. That acid phosphate at the rate of 200 to 300 pounds per acre produced a profitable increase in peanuts grown on sandy and other soils that are well adapted to this crop;

2. That potash applied in the form of kainit at the rate of 100 and 200 pounds per acre did not always prove profitable, except in a few experiments located on infertile sandy soil;

3. That slaked lime at the rate of 600 pounds per acre made a profitable increase in yield when applied on sandy soil;

4. That cottonseed meal as a source of nitrogen did not give profitable increases in yield, and is, therefore, not to be generally recommended for this leguminous crop.

The average yield of peanut straw (vines after removal of peanuts) from four experiments varied from 2316 pounds of North Carolina Runner, to 1234 pounds of Virginia Bunch per acre. The average percent of dried unhulled peanuts to the weight of the whole plant ranged from 32 percent in North Carolina Runner, to 39 percent in Red Spanish.

INTRODUCTION.

The peanut industry is growing rapidly in Alabama. This rapid growth is coming as a result of the crop diversification campaigns, the change from the one crop system of cotton due to the invasion of the Mexican cotton boll weevil, and the growing demand for peanut oil and cake for stock feed and fertilizer.

In soil and climate Alabama is well adapted to peanuts. Its cottonseed oil mills are being converted into peanut mills to manufacture oil and cake. The farmer has most of the implements on hand needed for the planting and culture of this crop. The additional equipment most needed is a custom picker for each community that grows any considerable amount of peanuts.

VARIETY TESTS OF PEANUTS.

Some of the experiments, from which the conclusions contained in this bulletin were drawn, were made on the Experiment Farm at Auburn. Most of them were made on farms scattered throughout the State. These latter tests constituted part of the work conducted under the provisions of the Local Experiment Law. Each experiment made away from Auburn was planned and supervised by a Station representative. The soil, fertilizer and cultural treatment for each variety in any particular experiment was the same. The same strains of seed peanuts were supplied to every experimenter making variety experiments in a given year. The experimenter or a representative of the Station harvested plots of uniform size and reported the weight of the nuts after they had been thoroughly dried.

In all cases, the experiments were located on some type of sandy soil, ranging from sandy loam, with clay subsoil, to fine sand. A complete commercial fertilizer was used under nearly all the experiments.

Bulletin No. 193 contains full explanations of the experiments. It contains tables of results which are omitted in this condensed bulletin.

RELATIVE YIELDS OF VARIETIES.

For comparison, the yield of *unhulled nuts* of Red Spanish is taken as a basis, and hence this yield is rated at 100 percent. Then each variety is compared with the Red Spanish, but only in those years in which

the compared variety and the Red Spanish were both tested along side. The results are given below:

In 7 out of 12 experiments Red Spanish proved superior in yield to White Spanish.

	<i>Pounds per Acre</i>	<i>Relative Yield</i>
White Spanish	1094	88
Red Spanish	1244	100

In 7 out of 12 tests Valencia was exceeded by Red Spanish:

Valencia	1137	91
Red Spanish	1244	100

In 8 out of 10 experiments North Carolina Running was equalled, or exceeded in yield of unhulled nuts by Red Spanish:

North Carolina Runner	1068	84
Red Spanish	1268	100

In 6 out of 10 tests Virginia Runner was surpassed in yield of unhulled nuts by Red Spanish:

Virginia Runner	1087	85
Red Spanish	1275	100

The comparison is still more unfavorable to Virginia Runner on the basis of pounds of meats per acre, since in a number of the tests this variety had a large proportion of pops. The four localities in which Virginia Runner exceeded Red Spanish in yield of unhulled nuts were Pinckard, Dale County; Honoraville, Butler County; Jasper, Walker County; and Auburn, Lee County. In only one of the six tests (Pinckard) did Virginia Runner afford a larger weight of *meats* per acre.

In 3 out of 5 tests McGovern was exceeded in yield of unhulled nuts by Red Spanish, and in every year in which the meats were separated Red Spanish afforded a larger weight of meats per acre:

McGovern	871	87
Red Spanish	1005	100

In 6 out of 9 experiments Tennessee Red was surpassed by Red Spanish on the basis of unhulled nuts:

Tennessee Red	1079	86
Red Spanish	1252	100

In all experiments, except one, the yield of meats from Red Spanish was greater than the yield from Tennessee Red.

In 4 out of 6 tests Virginia Bunch was exceeded in yield of unhulled nuts by Red Spanish:

Virginia Bunch	1193	86
Red Spanish	1397	100

In every case where the meats were separated Red Spanish afforded a larger yield of meats per acre than did Virginia Bunch.

DESCRIPTION OF VARIETIES OF PEANUTS.

The many different names used both for distinct varieties and for those whose characters do not mark them as distinct are confusing. It is unfortunate that some seedsmen and farmers, zealous to sell seed, should attach new names to old varieties, and thereby confuse and mislead the buyer. There is no objection to a grower attaching some distinguishing mark to a greatly improved strain or to a distinctly new variety, but it should be shown that he has improved the old variety or found a distinctly new one. If the originator would tell the true source of his improved strain or the origin of his new variety, this knowledge would help the farmer to appreciate more fully the characters for which the new strain or variety is notable. A name should distinguish the variety from other varieties. The great number of variety names, without distinguishing characters, is a source of much confusion.

The common varieties of peanuts may be divided into two great classes; those having an upright, bunched habit of growth, and those having a low spreading or "running" habit.

Among the common varieties of the first group are the White Spanish, Red Spanish, Valencia, Virginia Bunch and Tennessee Red. Those having the spreading habit are North Carolina, sometimes called African, Virginia Runner and McGovern. In this division may also be included one of the varieties called Jumbo, which name is listed by some seedsmen as a bunch and by others as a runner.

White Spanish.—This variety has an erect habit of growth, is about 10 to 14 inches high when grown on average soil, is early, and grows an abundance of foliage. Its pods grow in a cluster about the base of the stems and adhere well to the vines when they are harvested.

The pods are small and require about 461 unshelled peanuts to weigh a pound. The peas vary in color

from light pink to cream. The unhulled nuts yield 75.1 percent of meats. The average amount of oil contained in a ton (but not all capable of being extracted) is 702 pounds, which is more than the amount of oil found in a ton of any other variety. The pods of both Spanish varieties are assumed to weigh 30 pounds per bushel, though 28 pounds are sometimes sold as a bushel. This is probably the most productive variety.

Red Spanish.—This variety in habit of growth is very much like the White Spanish. Its pods are larger, 390 weighing a pound. It shells out about 72 percent of light, red nuts. The amount of oil per ton is 693 pounds, which is the second largest amount obtained.

Valencia.—This variety, sometimes called Improved Valencia, is erect in habit and grows from 12 to 24 inches high. Its pods grow close to its roots and cling poorly to the vines when they are pulled up.

The pods are medium in diameter and are long, with two, three or four peas crowded closely together. About 266 pods weigh a pound. The peas are red and small, and form about 60 percent of the weight of the pods. In unshelled perfect pods the percentage of oil was 28.6, or 572 pounds per ton. A bushel weighs about 24 pounds.

Virginia Bunch.—This is a semi-erect variety. Its pods cluster about the base of the stems; they are bright, nearly smooth, and require about 283 to weigh a pound. They contain one, two and sometimes three pale or pinkish peas. The percentage of meats found in the unshelled pods was 46, and of oil 21.2. The total oil contained per ton of unshelled peanuts was only 424 pounds. The usual weight per bushel is 22 pounds.

Tennessee Red.—This variety resembles the Spanish varieties in type of plant. It is medium early, and its pods cling to the stems when they are pulled up. The pods have two or three peas, and about 246 unshelled peanuts are required to weigh a pound. It shells out 56 percent of meats. The peas are red. The percentage of oil in the unshelled pods is 23.6, or 527 pounds per ton. A bushel is usually assumed to weigh 22 pounds.

North Carolina.—This variety, sometimes called African or Wilmington, has a low spreading habit of growth. The variety called McGovern or Florida seems to be nearly the same as this, with probably this differ-

ence, that the McGovern seems to have more resistance to rotting of the nuts and to leaf spot. The stems of McGovern are long, slender and spreading.

The pods of the North Carolina are small, and do not cling well to the stems when the vines are pulled up. A pod usually has two small reddish peas. This variety is late. It required about 440 pods to weigh a pound; and yielded about 66 percent meats. The percentage of oil found was 26.2 percent, or 524 pounds in a ton of unshelled pods. A bushel is assumed to weigh 22 pounds.

Virginia Runner.—This variety is sometimes called Virginia Improved. It resembles, in habit of growth, the North Carolina or African variety, except that its pods are considerably larger. Its pods and peas, in size and color, closely resemble those of the Virginia Bunch variety; 279 pods weighed a pound, and yielded 53.1 percent of meats. This variety yields 24.6 percent of oil, or 493 pounds per ton.

Jumbo.—Under this name, seedsmen have listed a running Jumbo and a bunch Jumbo. The two resemble each other in every respect, except in habit of growth of vines. In habit of growth and size of pods these two forms closely resemble the Virginia Bunch and Virginia Runner. Of the Jumbo samples studied, 276 of the pods weighed a pound, and yielded only 41 percent of meats. It seems that the name Jumbo has been applied to large nuts, and does not represent a distinct variety. A Jumbo may be a Virginia Bunch or a Virginia Runner, or even a Tennessee Bunch.

The varieties grown under the name of Jumbo averaged lowest in oil, 17.7 per cent, or 354 pounds of oil in a ton of unshelled peanuts.

Based on the average percent of oil and of sound peas, the varieties of unshelled peanuts take the following rank in pounds of oil per ton:

White Spanish	702
Red Spanish	693
Valencia	572
McGovern	548
Tennessee Red	527
North Carolina Runner	524
Virginia Runner	493
Jumbo	354

OIL PRODUCTION AND YIELD AS REPORTED BY THE OIL MILLS.

From a questionnaire that was sent to a number of Alabama oil mills known to be crushing peanuts, the following facts were learned. These manufacturers are using the Anderson Expeller type of mill, which has a capacity ranging from 400 to 600 gallons of oil per day of 24 hours. The operators of these mills report that this machinery extracts from 92 to 95 percent of the oil contained in the peanuts.

They report from a ton of peanuts of the Spanish varieties, from 600 to 700 pounds of oil and from 1200 to 1300 pounds of peanut cake or meal. A ready sale for all peanut products is reported by the mills.

Some mills report that the color of the shelled peas is a matter of no importance. Others express a preference for "white" peanuts. All mills except the one at Brundidge prefer the White Spanish variety. The Brundidge mill prefers the North Carolina Runner, stating that its yield is higher than the yield of Spanish. The yield of peanuts in the locality of the mills in 1916 was estimated by the mills at 850 pounds of nuts per acre, and the average price for the past season was placed at about 3 cents per pound.

PREPARATION AND PLANTING.

Peanuts are grown on a wide range of soils, sandy or loamy being best adapted. Soils having considerable clay and lime produce good crops. A hard, compact soil is poorly adapted because the pod stems, called "needles" or "pegs," do not penetrate its surface. Poorly drained and sour land will not give good yields. The mechanical condition of the soil is important. A liberal amount of humus, and lime and available plant food is essential to securing the largest yields.

Land intended for peanuts and not occupied by a winter crop should be plowed in the early spring. In case it is so occupied, the soil should be plowed as soon as the spring crop is removed. Where there is considerable trash on the surface from some preceding crop, this trash should be plowed under before planting in time for it to rot or at least to permit the soil to settle. About the same treatment given to land to prepare it for cotton is sufficient to prepare it for peanuts. The importance of planting peanuts after a clean cultivated crop should not be overlooked. If the preceding crop had an abundance of grass and weeds it

will be difficult to keep the peanut crop clean. It is not good practice to plant peanuts after peanuts. Some regular system of rotation of crops should be followed.

Planting a row of peanuts in the middles of corn rows, as practiced in southeast Alabama, has the advantage of making a peanut crop with little expense except the cost of the seed and the planting. The peanuts are cultivated at the same time the corn is cultivated. This is a satisfactory practice where the peanuts are gathered by hogs (except that it increases the amount of fencing); but when they are gathered for commercial purposes, the corn plants hinder the harvesting.

Peanuts should not be planted on high beds because such beds dry out quickly, which condition tends to make a poor stand.

For the bunch variety, the rows may be made from 2½ to 3 feet wide, that is just wide enough to permit easy cultivation with ordinary cultivating implements. For the running variety, the rows should be from 3 to 3½ feet wide.

The seed of the bunch varieties may be dropped from 4 to 8 inches apart in the drill. The running type may be dropped from 12 to 15 inches apart in the drill. The seeding should be so thick that the vines will nearly cover the ground when they are fully grown. Planting should not begin until the middle of the usual period for planting cotton, and for the Spanish or early maturing varieties it may continue until the first of June, or even until the middle of June. The soil should be thoroughly warm.

Allowing for faulty nuts and occasional placing of two nuts in a hill, we may conclude that about the following amounts of seed should be provided per acre:

For Spanish varieties, rather close planting (6 x 30 in.)	7 pks.
For Spanish varieties, thin planting (10 x 36 in.)	4 pks.
For North Carolina or similar running kinds, thick planting (10 x 36 in.)	7 pks.
For North Carolina or similar running varieties, rather thin planting (12 x 42 in.)	5 pks.

A special peanut planter, or an ordinary Cole planter and doubtless other types of one-horse planters may be used for planting shelled peanuts. The seed should be covered from 1¼ to 2 inches deep.

The varieties of peanuts that have large pods should be shelled in order to secure a good stand. Such varieties as the White and Red Spanish may be planted without shelling the nuts. However, shelling of any va-

riety insures more prompt germination and a better stand.

CULTIVATION.

It is well to harrow the rows to destroy the young weeds and grass before the peanuts come up. One cultivation or more with a weeder or light spike-tooth harrow should be given before the plants get much growth. Following this time, the ordinary implements used for the cultivation of cotton may be employed. The cultivation may continue close up to the plant, until the fruit stems begin to form, after which time the cultivating implements should not run close to the row. The covering of the blooms with dirt is unnecessary.

HARVESTING.

The tops of the vines usually turn yellow and some of the leaves begin to drop off when the peanuts are ripe. If the harvesting is delayed the early maturing nuts of the Spanish varieties may sprout in the ground.

The harvesting may be done by hand or plow. Varieties whose pods cling well may be pulled up from very sandy land by hand. This is a slow method. An ordinary turning plow with its mold board removed to avoid covering the plants may be employed to raise the plants. The bunches may be collected in piles with an ordinary hay fork.

CURING AND PICKING.

The plants are usually left on the ground, after harvesting, for at least two or three hours. They should then be stacked. This is done by firmly setting up stakes about 6 feet high, at the bottom of which are nailed two or three cross pieces 3 or 4 feet long. Around this stake the plants are stacked with the vines exposed, and the nuts inward. Ventilation is thus secured for the peanuts within, while they are protected from the weather by the vines.

From 15 to 20 such stacks will be necessary for one acre. The stacks should be capped with grass and remain 3 or 4 weeks in the field until the pods have become dry. They are then ready for a picker.

Some of the Florida growers have made use of a curing shed. On the posts are spiked cross timbers and on these timbers horizontal poles are placed suf-

ficiently close to support the green peanut vines. From one floor of poles to the next is kept a vertical distance of about 5 or 6 feet. This space allows complete ventilation and the peanuts remain spread upon the poles until they become thoroughly dried. This method of curing secures a better quality of hay and bright pods.

The picking of the peanuts off the stems by hand is slow and expensive. In a community where a large acreage is planted a custom picker may be operated profitably. There are several types which are now offered on the market. One type depends for the removing of the nuts from the vines on the use of a system of vibrating wire screens, and is used exclusively for peanut *picking*. The other type of picker is an ordinary grain *thresher* with a special cylinder and concave for peanuts. This last machine readily removes the nuts and makes them ready for oil mill purposes, but according to the statement of the president of one of the peanut oil mills in Alabama, the peanut thresher breaks up the pods and injures the nuts for planting purposes.

PEANUT HAY AND STRAW.

Peanut vines make a fine quality of hay if cut before the leaves drop. Their chemical composition is nearly that of alfalfa hay. Valencia, Virginia Bunch, and the Spanish varieties are the best suited for hay making on account of their upright habit of growth, which makes them easy to mow.

Peanut straw (the cured peanut plant after the filled pods have been picked off) has a larger proportion of woody stems and a smaller proportion of leaves than peanut hay, which render the former somewhat less nutritious than peanut hay.

CHEMICAL COMPOSITION OF PEANUT STRAW.

The chemical composition of peanut straw, as reported by the Chemical Department of this Station, is as follows:

Water, 10.72 percent; ash, 6.03 percent; crude protein, 10.69 percent; crude fat, 1.66 percent; crude fiber, 29.5 percent; carbohydrates, 41.39 percent.

Its composition shows that it carries 1.2 percent potash, and 0.50 percent phosphoric acid.

RESIDUAL FERTILIZING EFFECT OF PEANUTS.

This table records the result of a test made to show the fertilizing effect of peanuts on following crops. As indicated in the table, peanuts were harvested in different ways, and the succeeding yields of rye and sorghum hay are compared with the hay yields from a plot on which corn had been grown.

TABLE VIII. *Residual Fertilizing Effect of Peanuts Compared With Corn. (*)*

Crop—Summer of 1899	Succeeding Crops	
	Rye Winter of 1899-1900	Sorghum Summer of 1900
	Lbs. per Acre	Lbs. Per Acre
Spanish peanuts—nuts harvested -	1080	4480
Spanish peanuts—grazed by hogs -	4280	4000
Running peanuts—turned under -	2582	6320
Corn—ears pulled -----	1080	5040

The peanut plots gave a yield of rye higher than that of the non-legume plot in two instances; where the peanuts were grazed and the plot got the benefit of the droppings from animals, and where the luxuriant growth of vines were turned under on account of the running peanuts failing to make.

Two of the peanut plots yielded less sorghum hay than did the corn plot, and only on the plot on which the vines were turned under did the yield of this second succeeding crop prove greater than that following corn.

The conclusion is that a crop of peanuts harvested in the usual way for seed does not improve the soil for a succeeding crop.

INOCULATION OF PEANUTS.

The peanut is a legume, roots of which should be abundantly supplied with tubercles to make sure that it makes use of the nitrogen of the air rather than that of the soil. So far as the observations of the writers go, the peanut plant on Southern soils is naturally stocked with tubercles. Hence artificial inoculation, either with soil or with pure cultures, seems to be a useless expense.

Probably the usual occurrence of tubercles on the roots of the peanut plant results from natural inoculation carried on the seed in the dust from the old field. This dust from the hulls comes in contact with the

(*) Bul. 104, Alabama Experiment Station.

shelled nuts in any process of shelling, and is of course still more abundant if unshelled nuts are planted.

Experiments made on sandy land on the farm of the Alabama Experiment Station, at Auburn, showed no increase in yield from inoculating peanuts with appropriate soil, and no apparent increase in the number of tubercles per plant.

DISEASES OF PEANUTS.

Leaf spot, which appears as a small, brown spot on the leaves and stems, is caused by a fungus disease (*Cercospora personata*). It usually attacks the grown leaves, though it may attack the young ones causing them to fall off, thereby reducing the value of the hay and the yield of peanuts.

This leaf spot fungus may be carried from one year to the next on old peanut leaves and stems. Crop rotation and plowing under all old vines and stems are, therefore, recommended as good farm practice to lessen the amount of the disease in a succeeding peanut crop.

Sclerotial rot, (caused by *Sclerotium Rolfsii*) attacks the roots and peas, and destroys the pods. The top of the plant may be healthy in appearance, but when it is pulled up, many of its pods may be found completely rotten. The rotten pods may appear wet or dry, as other organisms of decay may have become associated with the decayed nuts.

No means of combatting sclerotial rot is known.

Red rot attacks the pods of the peanut and causes them to appear brown or reddish. The crop should be dug as soon as it matures to avoid loss from this disease. (See Alabama Station Bulletin No. 180).

AVERAGE YIELD OF PEANUTS.

According to figures furnished by the Bureau of Crop Estimates of the United States Department of Agriculture, the average yield of peanuts for the United States for the past five years has been 38.6 bushels per acre. For the same period, the Southern States averaged as follows:

State	Bushels	State	Bushels
North Carolina	42	Alabama	37
South Carolina	45	Louisiana	32
Georgia	40	Mississippi	34
Florida	36	Texas	33
Tennessee	48	Oklahoma	38

As a rule, the yield is very nearly in proportion to the thickness of the stand. Especially is this true with the Spanish varieties. The largest yield on record is one made on the farm of Dr. J. F. Yarbrough, at Columbia, Alabama. The yield, as reported by Dr. Yarbrough, on the basis of 24 pounds of Spanish peanuts per bushel, was $214\frac{1}{2}$ bushels on an acre. On the basis of 28 pounds per bushel the yield was 183.9 bushels. These peanuts were planted in rows 17 inches apart. The nuts were very carefully placed 4 inches apart in the drill. Cultivation was chiefly with a weeder and by hand. The soil was a deep, loose sand, fertilized per acre as follows:

- 1,000 pounds ground limestone.
- 1,600 pounds 16 percent acid phosphate.
- 1,600 pounds kainit.