PEANUT PRODUCTION GUIDE

For North Carolina Farmers

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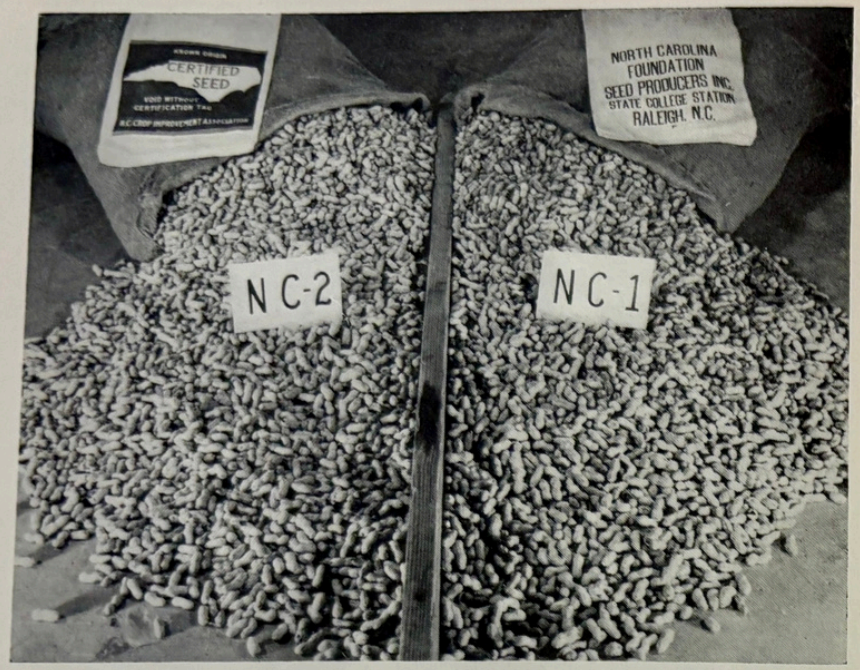

Research is aiding the peanut grower. Two new varieties of Virginia Bunch peanuts (above) were released by the N. C. Agricultural Experiment Station in January, 1953. Certified seed is now available to farmers for planting. Both varieties have shown up well in comparison to farmers stock peanuts. (See page 4.)

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PEANUT PRODUCTION GUIDE

FOR NORTH CAROLINA FARMERS

Peanut production in North Carolina has a long history dating back to pre-Civil War days. Although only 18 counties located in the Northern Coastal Plains area produce peanuts commercially, it is still the third ranking cash crop in North Carolina.

In 1954 North Carolina peanut growers planted more than 172,000 acres of peanuts that sold for more than $35,000,000. This represents over 65 per cent of the nation's Virginia type and 10 per cent of all peanuts produced in this country. In addition, peanut hay is a valuable by-product of the crop and most farm stock in the peanut section are wintered on this type of feed.

Most of the peanuts grown in North Carolina are the large seeded bunch and runner varieties. Most of the runners are produced east of the Chowan River in the counties of Chowan, Perquimans and Gates. Virginia Bunch peanuts rank first in all other major peanut producing counties.

From Civil War days until 1950 the average yield of peanuts in North Carolina remained constant at about 1150 pounds per acre.

New varieties and better production practices since 1950, however, have increased the average yield to around 1600 pounds per acre with many farmers averaging above 3500 pounds per acre. Even with this almost spectacular increase, there are still many production practices that need to be improved by most peanut farmers.

An extensive research program has been under way in recent years at the North Carolina Experiment Station to clear up many of the problems connected with peanut production. From these tests many new ideas have arisen and improvements have been recommended for all production practices. The following pages will summarize these practices.

While it is recognized that these practices are not the final word in peanut production, it is felt that by adopting these practices most farms will show a considerable increase in yields. This is the best known way to increase yields and improve the quality of the crop.

Varieties

There is considerable interest in good seed peanuts among peanut growers. Two ways in which growers can get these seeds are:

(1) Produce or buy seed peanuts that have been developed through a careful program of hill selecting and testing.

(2) Buy certified seed that have been bred and tested for high yield and quality.

These seed can be kept pure by preventing mixing when the peanuts are dug, threshed and shelled.

The peanut is a self pollinated plant. Most of the mixing is mechanical (digging, threshing, shelling) rather than by cross pollination in the field. A peanut variety should stay pure unless there is some mechanical mixing. This characteristic makes it fairly simple for a careful peanut grower to maintain the quality of his seed for several years.

In recent years work has been stepped up to improve the varieties of peanuts being grown. The North Carolina Agricultural Experiment Station released two new varieties, NC-1 and NC-2, in 1953, the first certified peanuts ever to be released by the North Carolina station. The release of new varieties from a well organized breeding program should prove a great aid to North Carolina peanut production.

Variety tests conducted by county agents in the principal peanut counties in 1954 show the superior marketing quality and higher returns per acre of the two new varieties, NC-1 and NC-2, in comparison with farm stock peanuts (Table 1).

The two new varieties just released produce good yields of high quality peanuts, but peanut breeders are continuing their search for new, improved varieties. Higher yielding, better quality varieties can be expected within the next few years.

Table 1. MARKETING QUALITY COMPARISON OF NC-1 and NC-2 WITH FARM STOCK PEANUTS (17 tests, 1954)

Variety	Sound Mature Kernels (%)	Damaged Kernels (%)	Hulls (%)	Fancy Size (%)	Support Price (100 lbs.)	Yield (lbs.) (per acre)	Value (per acre)
NC-1	66	1	31	82	$13.85	2094	$290.10
NC-2	70	1	28	76	$15.01	2359	$354.33
Farm stock	66	1	31	65	$13.67	2026	$277.05

Soils

An ideal soil for peanuts is a well-drained, light-colored, loose, friable sandy loam.

Probably not more than 50 per cent of the peanuts grown are planted on what would be classified as an ideal soil. Soils high in organic matter or clay content may stain the pods to such an extent as to lower the market value of the crop—even though such soils may produce satisfactory yields. Peanuts may also be more difficult to harvest in soils containing a lot of clay.

Peanuts have a long tap root very much like alfalfa. They must be grown on well aerated soils with good drainage. Even under favorable conditions it is sometimes hard to get a good stand. In wet, poorly-drained soils, it is almost impossible to get satisfactory stands.

Soils with desirable physical properties are generally low in organic matter and reserves of plant nutrients. The fact that peanuts are grown on soils of low native fertility serves to emphasize the need for a very careful program of fertilization and management to get high yields per acre.

Fertilization

The main fertilization problem with peanuts is that of supplying enough potash and calcium. Other fertilizer materials seldom increase yields on soils where peanuts are grown in rotation with well fertilized crops such as corn and cotton.

The first step is to have the soil tested and to follow the recommendations. A discussion of certain plant nutrients and their effect on peanuts is given below.

POTASH

Peanuts have long had a reputation for being "hard on the land." Recent studies at the North Carolina Experiment Station have indicated that where diseases and nematodes are not problems the harmful effect of peanuts on soil productivity is due primarily to the removal of large amounts of potash.

The generally low level of potash in peanut fields is indicated in a recent summary of soil analyses by the Soil Testing Division of the North Carolina Department of Agriculture. This summary shows that almost two-thirds of all the soil samples from the nine principal peanut producing counties were "low" or "very low" in potash (Table 2).

TABLE 2. POTASH LEVELS OF SOIL SAMPLES FROM NINE PRINCIPAL PEANUT COUNTIES

County	Number Samples	Potash—% of Soils Testing				
		Very Low	Low	Med.	High	Very High
Bertie	332	9	57	24	6	4
Chowan	105	6	58	26	6	3
Edgecombe	121	6	59	29	4	2
Gates	157	14	48	24	7	7
Halifax	141	6	52	35	4	3
Hertford	106	6	51	26	2	5
Martin	78	5	50	23	12	9
Northampton	342	8	54	27	5	6
Perquimans	142	7	51	28	8	6
TOTALS	1524	8	54	27	6	5

On soils low in potash, peanuts may respond to direct application of potash fertilizers. On such soils it is desirable to apply 100 to 150 pounds per acre of muriate of potash to soils with high phosphorus level or 300 pounds per acre of 0-10-20 to soils with a low phosphorus level. The fertilizer may be broadcast and turned under before planting or placed in bands two to three inches to the side and one to two inches below the seed at planting.

Adequate levels of potash can be maintained for peanuts, and better yields of all the crops are produced, if larger than normal rates of potash are applied to the other crops in the rotation. For example, in a two year rotation of cotton and peanuts, it is better to apply 80 pounds of potash (K_2O) to the cotton and none to the peanuts than to apply 40 pounds to each crop. (80 lbs. potash is equivalent to 160 lbs. 50% muriate of potash, or the potash in 800 lbs. 5-10-10 fertilizer.)

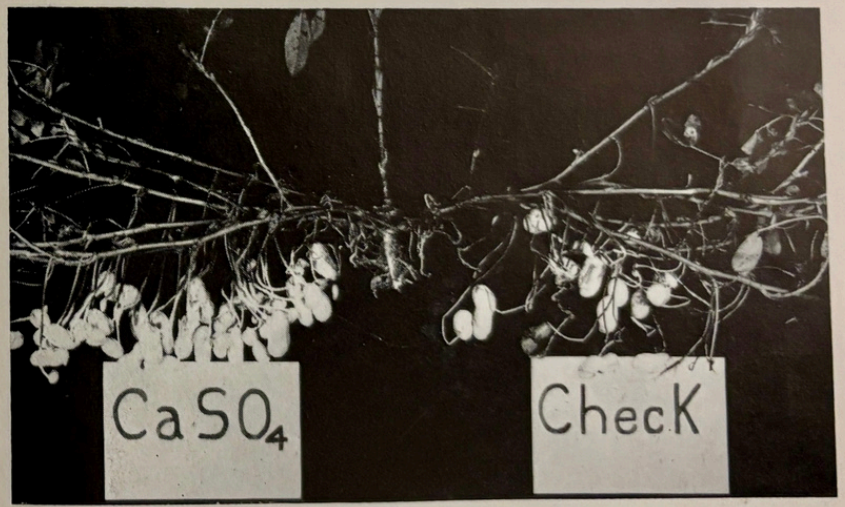
CALCIUM

Growers have long followed the practice of applying lime or land plaster (gypsum) to peanuts. Both materials supply calcium, which promotes kernel development and reduces the number of "pops" or unfilled pods. The preference for lime or land plaster depends on the acidity of the soil. Lime neutralizes soil acidity and would be preferred on soils which have not been adequately limed. Land plaster is neutral and would be preferred where additional soluble calcium is needed on a soil which has been adequately limed. Excessive use of lime results in manganese deficiency, characterized by yellow foliage and reduced yields.

Calcium is absorbed by the developing fruit or pods as well as by the roots. It is relatively immobile in the plant and does not move in large enough quantities from the roots to produce well filled nuts. To be most effective calcium must be in the vicinity of the developing pods.

You can expect the best results with land plaster when it is applied as a topdressing when the plants begin to bloom. This is usually around the first week in July. The material falls around the base of the plant and is worked and leached into the area where the fruit is formed. An application of 400 to 600 pounds per acre is considered to be sufficient. It is important to apply this early (around July 1) so the calcium will be available when pegs begin forming.

Liming materials are most effective when applied broadcast three months, or preferably longer, before planting in order to neutralize soil acids before the peanuts are planted. Ideally the soil should be limed to approximately pH 6-1 or 6.2. Where this is done, enough calcium is usually available to meet the needs of the developing fruit. On the sandier soils you may have to add a netural soluble calcium material like land plaster. The low level of magnesium in many of the soils on which peanuts are grown makes it desirable to use a dolomitic liming material.



Calcium applied to the pegging zone on one side of the peanut plant in tests had very little effect on pod development on the other side of the plant. Peanuts on the left received land plaster ($CaSO_4$); those on the right received no calcium.

Oyster shell lime or potash lime does not supply magnesium needed by other crops in the rotation.

When soils are limed enough to make the soil pH above 6.2 or 6.3, peanuts commonly show manganese deficiency symptoms and yields may be greatly reduced (see Picture). Because of the likelihood of over-liming injury when too much is used, soils tests should be made to determine the exact amount needed. Once the desired soil pH has been reached, applications of 1,000 to 1,500 pounds of lime every three to four years is usually enough to maintain the proper pH and a satisfactory calcium level. Annual applications of such materials as potash lime may bring about an over-limed condition.

Where peanut soils are over-limed, the use of acid forming fertilizer and nitrogen topdressing materials will help reduce the over-limed condition. For example, 400 pounds sulfate of ammonia applied to corn to supply approximately 80 pounds of nitrogen will make the soil more acid by neutralizing the effect of 456 pounds of lime per acre. The fastest and most direct way to overcome an over-limed condition is to mix sulfur with the soil. Approximately 320 pounds of sulfur is needed to neutralize 1000 pounds of lime. Use soil tests to determine how much sulfur you need.

Mechanical equipment is now available that will do a good job of applying land plaster to the rows. In the photo land plaster is being applied to 24-inch rows.

Care should be taken to avoid over-liming peanut soils. The stunted, yellow plants in the center were due to manganese deficiency caused by the use of too much lime.

Mechanical equipment is now available that will do a good job of applying land plaster to the rows. In the photo land plaster is being applied to 24-inch rows.

NITROGEN

The peanut is a legume. When properly inoculated it will respond little, if any, to nitrogen fertilizers. When peanuts are grown on the same soil every two to four years, you don't need to inoculate the seed before planting. Inadequate inoculation may result in soils on which peanuts have not been grown for five years or longer. Under such conditions, inoculate seed before planting.

Seed treated with Arasan can be successfully inoculated if the inoculum is applied just before planting.

Nitrogen deficiencies may also occur when peanuts are grown on very acid soils, even though the seed and soil are inoculated. This situation may be corrected by liming the soil to a desirable level (pH 6.1 to 6.2).

Many growers apply small quantities of nitrogen in mixed fertilizers at planting. You can often see a response to this nitrogen in early season, but by mid-season or at harvest it is usually difficult to tell any difference in the fertilized and unfertilized plants.

PHOSPHORUS

Although phosphorus is an essential element, the peanut has a low phosphorus requirement. Young seedlings may sometimes develop phosphorus toxicity symptoms when as much as 70 to 100 pounds of phosphate per acre is applied at planting (equivalent to the phosphate in 750-1,000 lbs. 0-10-20). Little response to phosphatic fertilizers has been observed with peanuts except on soils which were low in this element. When other crops grown in rotation with peanuts are properly fertilized, phosphorus fertilizers give little if any increase in yields.

OTHER NUTRIENTS

Rather widespread deficiency of manganese has been observed with peanuts in fields which have been over-limed. This condition may be overcome by applying sulfur to reduce the pH and to increase the solubility of manganese. Satisfactory results have been obtained by spraying a solution of manganese sulfate on the leaves or by mixing the material with land plaster.

Numerous experiments have failed to show any general response of peanuts to any of the other essential elements. In view of the low fertility of many of the soils on which peanuts are grown, you should at all times be on the alert for deficiencies of some of the so-called "secondary" and "trace elements." Deficiencies of boron, zinc, copper and other trace elements have been observed with other crops on soils in the peanut area. Until a specific need for fertilizers supplying these elements has been demonstrated, general use of such fertilizers is not recommended. Additions of these elements, where not needed, may be harmful.

Spacing

One of the principal factors limiting peanut yields in many areas is the low plant population. The failure of peanuts to respond to many fertilization and management practices may result from plant populations which are only 40 to 60 per cent adequate because of poor stands or wide rows (see chart on back cover).

Despite the fact that the major portion of the fruit is produced in a circle of only 4 to 6 inches from the tap root, the large seeded bunch peanuts are normally grown in 34 to 36 inch rows. In peanut spacing studies, yields have been increased 600 to 1,200 pounds per acre by reducing the row width of the Virginia Bunch type peanuts from 36 to 24 and 18 inches. Higher yields

have also been obtained with the Jumbo Runner variety grown in 36 inch rows instead of 40 to 42 inch rows.

Experiments with the large seeded type have shown little effect of varying the spacing of plants within the row from four to twelve inches. To help make up for poor germination and to provide an adequate stand after the loss of plants from insect damage, diseases and cultivation, it is recommended that seed be planted six to eight inches apart in the drill.

Row spacing should be such that you can use the equipment now on the farm. This presents a problem since there are both four-wheel and tricycle type tractors used quite generally on peanut farms.

For the four-wheel tractor, the recommended row spacing is 24 inches. With this spacing, three rows can be planted and cultivated at one time using a wheel spacing of 72 inches. This spacing would also be suitable for cultivating other crops planted in 36 inch rows.

The close-row spacing has been more difficult with the tricycle type tractor. Alternate rows of 17 and 23 inches were used in test work in 1951 and 12 and 28 inches in 1952. The 12 and 28 inch rows were more satisfactory because they gave more room for the large wheels.

Close-row spacing is used primarily to increase yields. However, close planting also aids in weed control and reduces the amount of cultivation.

Rotations

A good rotation is the foundation of a peanut production program. Although there is no single superior peanut rotation, there are several factors which should be considered in the planning of rotations including peanuts.

Grow peanuts in rotation with crops receiving relatively heavy potash fertilization. Supplying enough potash is a major problem in North Carolina because of low native potash reserves.

Grow peanuts in a three to five year rotation. This helps maintain adequate plant nutrient levels as well as to afford better insect and disease control. Use root knot nematode resistant crops. Cotton, corn and small grains are some of the best crops to use.

There are many indications that insects and diseases, particularly nematodes, are more serious problems with a particular crop when that crop is grown often in a rotation. Where nematodes are present, at least a three year rotation is desirable. Including

less adapted land for peanuts in the rotation may be more profitable than a short rotation on the best adapted soils.

Small grains (for grain) fit in well after peanuts since the peanuts are harvested early enough to permit seeding the small grain on time. In addition, almost no crop residues are left on the land following a peanut crop, and fall planted small grain provides some protection over the winter. Although small grains fit in well following peanuts, recent tests have indicated that peanut yields may be lowered if small grains come just before the peanut crop.

Corn fits in well just before peanuts since the large amounts of stover may serve to maintain a better physical condition, particularly in the fine textured soils. Cotton is also a good crop to use just before peanuts, since it is resistant to the peanut root knot nematode. Don't use lespedeza, tobacco, soybeans, or sweet potatoes just before peanuts, since these crops may increase the nematode population and Southern stem rot damage.

Weed Control

The control of weeds is a major factor in peanut production. The primary purpose in cultivating and hoeing is for weed control because:

1. Weeds compete with peanuts for light, moisture and fertilizer. The fewer weeds, the more peanuts.
2. Weeds may harbor diseases and insects. A healthy plant is needed for best production.
3. Weeds seriously interfere with harvesting. Since harvesting is the most expensive operation in peanut production, a clean crop means more money in your pocket.

METHODS OF CONTROL

There are many methods to control weeds but in every case the time these methods are used is very important. For best results follow these suggestions:

1. Start early. Many weeds can be killed just before and just after the peanuts come up.
2. Cultivate shallow at all times. Most weeds germinate in the top one-half inch of soil.
3. Do not cover the peanut plants. Covering the vines will increase loss from Southern stem rot.

EQUIPMENT.

In recent years the rotary hoe has been employed with good results, but the weeder is still used by the majority of growers.

WEEDERS have long been used as an effective tool in controlling weeds. Use just before and just after the peanuts come up.

ROTARY HOE is very effective for early cultivation. It cuts cultivating time at least one-fourth and hand hoeing time one-half. The following methods and precautions should be followed when using the rotary hoe:

1. Start early and repeat every four to five days. The first cultivation should be before the peanuts come up and the last cultivation when the plants start blooming.
2. Don't use the rotary hoe just as peanuts are coming up. You may do a lot of damage at this time.
3. Operate the rotary hoe at a speed of at least five miles per hour. This completely pulverizes the soil and kills the small weeds.
4. Use with sweeps where possible. The gang unit does a good job, but with sweeps it does a better job. The picture below shows the equipment for cultivating three 24-inch rows using the rotary hoe attachment and sweep arrangement. The hoe is placed to run over the row and by its rotating action pulverizes the soil. This kills the weeds—most of which germinate in the top layer of the soil—without damage to the peanuts which have deep taproots. The sweeps are set to shed soil to the outside wheels of

The rotary hoe is very effective for early cultivation. Three 24-inch rows are being cultivated using the rotary hoe attachment and sweep arrangement in the photo above.

the rotary hoe attachment. The rotating action of the hoe breaks the soil up and allows the fine particles to sift around the plants.

CHEMICAL WEED CONTROL

Two chemicals show promise in controlling weeds when applied as premergence treatment slightly before or at the time the peanuts begin to crack the ground. Their use at the present time should be limited to trial plots. The kind of weed control you get will depend on soil moisture and soil temperature. A light rain before treatment is desirable.

Low volatile esters of 2,4-D—when used at 1 and ½ pounds 2,4-D acid per acre—should give good weed control for five to seven weeks. This amount may have some effect on growth of leaves when plants first come up.

Dinitro gives good weed control for about the same length of time when used at the rate of nine pounds active DNOSBP per acre.

At the end of the four to seven week period it is necessary to cultivate to control the weeds which grow after the effects of the chemicals are gone.

Peanut Disease Control

Peanut diseases include seed decay, leafspot, rootknot, southern stem rot, and other various stem, root, peg, and pod rots.

SEED TREATMENTS

Seed treatment is an inexpensive insurance to prevent seed decay, to insure better stands, and higher yields of nuts. Peanut seed can safely be treated anytime from 90 days before planting up to just before being placed in the planter.

MATERIALS. The recommended peanut seed protectants are listed in Table 3.

TABLE 3. MATERIALS, COST AND RATE OF APPLICATION

Treating Materials (dust)	Cost of Material (per 100 lbs. of seed)	Rate of Application (per 100 lbs. of seed)
Arasan	$0.38	3 ozs.
2% Ceresan	0.28	4 ozs.
Yellow Cuprocide	0.14	4 ozs.
Spergon	0.56	4 ozs.

Caution— (1) Do not treat seed with more than one material.
(2) Treated seed not to be consumed by humans, animals, or sold to oil mills.

EQUIPMENT. The barrel treater, commonly used for treating cotton seed, may be used for peanuts if it is turned slowly. A barrel or lard stand with close fitting lid can be used. Most commercial firms which shell peanuts are also equipped to treat seed. When this service is available, it is probably more practical for the grower to have seed peanuts treated at shelling time.

TREATING THE SEED. The steps in the successful application of seed protectants on the farm are:

1. Fill the container about one-half full with a known weight of peanut seed.
2. Carefully measure and add the required amount of treating material.
3. Tightly close the lid of the container.
4. Rotate slowly until every seed is uniformly coated.

To be most effective, each peanut seed should be completely covered with a layer of dust.

LEAF-SPOT CONTROL

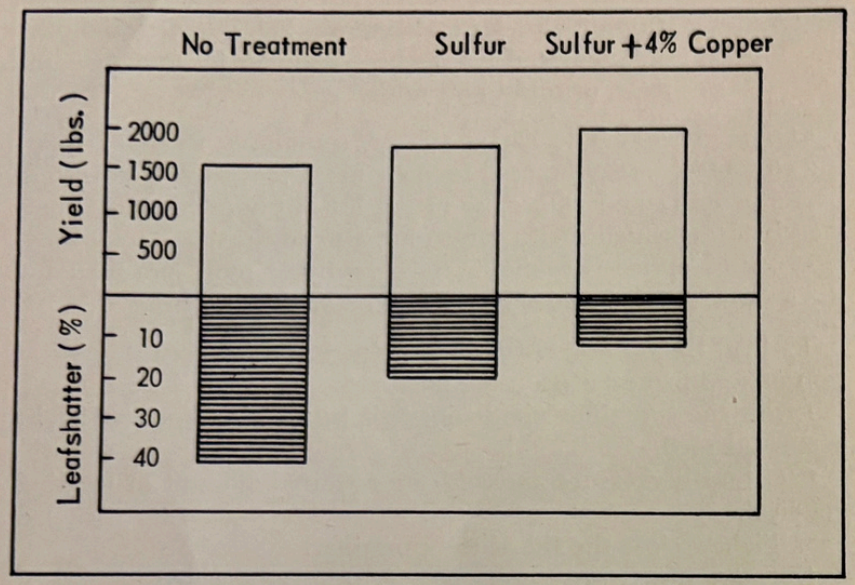
DUSTING PAYS OFF. Leafspot diseases cost North Carolina peanut growers about $7,000,000 each year. These diseases can be effectively controlled by dusting with sulfur dust plus 4 per cent copper at an average cost of $3.50 an acre. The increased net value due to this treatment is worth over 12 times the cost of the dusts (average 1949-51 prices).

Table 4 is a summary of 37 demonstrations under farm conditions with county agents in major peanut producing counties in northeastern North Carolina, 1949-1951.

Table 4. SUMMARY OF 37 LEAF-SPOT CONTROL DEMONSTRATIONS, 1949-1951.

Treatment	Leafshatter (%)	Nut Yields Per Acre (lbs.)	Increase Per Acre Due to Treatment (lbs.)	($)
Sulfur plus 4% copper	13.3	1986	402	43.73
Sulfur	21.4	1794	210	22.92
No treatment	40.8	1584	-----	-------

(See graph, page 21)



Dusting pays off in leaf-spot control. Tests show (as charted above) that sulfur alone or sulfur plus 4 per cent copper increases yields and reduces leaf shatter.

With peanuts at 11¾ cents per pound, the average extra income to the grower amounted to $43.73 an acre for sulfur plus 4 per cent copper and $22.92 an acre for plain dusting sulfur.

In order to receive the greatest profit from your dusted peanuts, delay digging one week to 10 days longer than for undusted nuts. Allow the vines to cure for one-half day before stacking.

MATERIALS. The most effective and practical dust for peanut leafspot control is sulfur plus 4 per cent copper dust of 325 mesh or finer.

Plain dusting sulfur of 325 mesh or finer is somewhat less expensive than the copper-sulfur mixture. It gives fair control, but is not as effective as the dust containing copper.

WHEN TO DUST. Make the first application on bunch and runner type peanuts between July 1-10. This application may be made a week or 10 days later on peanuts which were planted very late, or about two weeks earlier for Spanish type peanuts. Dust every 14-days until three or four applications have been made. The first application should be at the rate of 15 to 18 pounds per acre and the following applications at 20 pounds per acre. If dusts are washed off by rain within 24 hours after application, repeat as soon as possible.

Apparently the time of day the dust is applied does not influence the effectiveness of the material. Drifting is reduced if dusting is confined to early morning and late afternoon.

EQUIPMENT. Ordinary dusting equipment may be used. The basic requirement is a duster with adequate dosage regulation and a strong air blast so the dust will be forced throughout the plant, covering all the leaves.

SOIL-BORNE DISEASES

Diseases caused by organisms which live in the soil and attack that part of the plant under or in contact with the soil are included in the group of soil-borne diseases. They are caused by fungi, bacteria and nematodes. Some of these are widespread and cause severe losses to peanut growers.

SOUTHERN STEM ROT. This disease is also known as "southern blight", "wilt", and "white mold". It may cause the sudden death of part or all of the plant. A white mold growth or brown sclerotia (seed-like bodies) can be seen about the base of the infected plant (see picture). The disease also attacks many other crops and weed plants.

The disease is nearly always present to some extent in North Carolina peanut fields. At times it is very severe. We don't know all the reasons for the attack. However, the following research results and observations indicate possible control measures:

1. Complete and deep burial of the trash of the preceeding crop greatly reduces losses from this disease.

Southern stem rot, showing the white mold growing about the base of infected plants.

2. The disease is more severe when Southern stem rot susceptible crops are grown in rotation with peanuts.

3. N. C. 2, has a greater tolerance to Southern stem rot than general farm stock Virginia Bunch peanuts.

4. Severe outbreaks are often associated with the hilling or bedding of peanut rows during the late cultivations. When the green leaves and stems are covered they are more susceptible to attack by the disease.

5. The accumulation of dead leaves about the base of the plants due to defoliation by peanut leafspot increases the spread of the disease from plant to plant as the mold grows very rapidly on the dead leaves during damp weather.

Thus, deep burial of crop residue, adequate crop rotation, use of the more resistant variety, leafspot control, and flat cultivation throughout the growing season should all help to reduce losses from Southern stem rot.

PEANUT ROOT-KNOT. This disease of peanuts, like root-knot of other crops, is caused by nematodes which feed in the roots of the plant. The peanut root-knot nematode *(Meloidogyne hapla)* causes the formation of small galls and excessive lateral roots. This results in a matted root system. Peanuts growing in heavily infested soil will make poor and uneven growth and give very low yields. This disease is widespread, occurring in 70 per cent or more of the peanut fields in North Carolina.

A two year rotation of corn or cotton with peanuts was compared with continuous peanuts in both lightly and heavily nematode infested soil at the Upper Coastal Plain Research Station, Rocky Mount. Average yields in 1951 are given in Table 5.

In heavily infested soils where peanuts were planted after peanuts, root knot greatly reduced yields. Rotations with corn or cotton greatly reduced the disease and increased the yield of peanuts, even in two year rotation. Root knot still cut down yields at both levels of infestation indicating the need for a longer rotation with non-susceptible crops. The resistance of all crop plants to this nematode is not known. Certain soybean and lespedeza varieties, tobacco and tomatoes are susceptible, however.

In heavily infested soil it may be necessary to grow non-susceptible crops, such as cotton, corn, small grain and watermelons for at least two years between peanut crops. Where you're limited on good peanut land and your land is heavily infested with peanut root-knot nematodes, you should consider soil fumigation. Fumigation may not generally be economical for peanut production, however. Don't use Ethylene dibromide just before peanuts as bromide salts accumulate in the hay.

Table 5. EFFECT OF ROTATION USING CROP RESISTANT TO THE PEANUT NEMATODE.

Rotation (Crops)		Peanut Yield (lbs./A.)	Peanut Yield (lbs./A.)
1950	1951	Low infestation	High infestation
Cotton	Peanuts	2512	2015
Corn	Peanuts	2634	2038
Peanuts	Peanuts	1382	957

PEG ROTS. The shattering of mature nuts from the vines before and during harvest is usually caused by a decay of pegs. Several organisms cause this condition. Losses due to peg rots are greatly increased by early loss of leaves, not enough fertilization, and other conditions which lower the general vigor of the plant. Leafspot control and digging at the right time reduce the losses from peg rots.

OTHER SOIL-BORNE PEANUT DISEASES. Other peanut diseases which occur more locally and are of less importance are bacterial wilt, collar rot, sting nematode injury, meadow nematode injury, split stem disease, and brown spot of pods.

Peanut Insect Control

SOIL INSECTS

The most important damage to peanuts by insects is that done to the developing and mature pods. The greatest portion of this damage is caused by the southern corn rootworm. This worm is cream colored with a dark head and tailplate and may be up to one-half inch long. Rootworms tunnel into the pegs and pods, feeding as they go. Moisture, mold and disease may also enter the tunnels and cause further damage (see picture).

Yellow and red-brown wireworms and white grubs also do considerable damage to pegs and pods. In light sandy soils and during dry years in heavy soils, pods may be injured by the lesser cornstalk borer, a quick moving, blue-green worm.

These insects, with the exception of the lesser cornstalk borer, may be controlled by applying aldrin or heptachlor to the soil. Aldrin should be used at two pounds per acre (for example, 40 lbs. 5% dust); heptachlor at 1½ pounds per acre (for example, 30 lbs. 5% dust). Toxaphene at 20 pounds per acre is also of value against rootworms.

Apply these materials directly to the row just after the plants come up. Soil insecticides may be applied as sprays (liquid), dusts or granulars. Granular (pelleted) materials have given good results and have several advantages. If applied when the plants have many leaves, the granules will go through and reach the ground. The insecticide that reaches the soil counts. Also, there is less tendency to drift in a wind than with dusts.

Equipment used for applying land plaster or fertilizer or a power duster can be used for treating with granulars. If clay-base granulars are applied with a power duster the agitator should be disengaged for best results.

THRIPS

Thrips are minute, slender, agile insects, rarely as long as one-eight inch. They live in the buds and blossoms of the plant. Injury is brought about by their feeding on the upper surfaces of the leaflets before they unfold. This may cause a stunting of the plants and a wrinkling of the leaves, a condition sometimes called peanut "pouts".

If granular aldrin is applied for rootworm control after the plants come up, thrips will also be controlled. Heptachlor will give protection against thrips damage if applied in the same way. However, if soil insecticides are not applied, thrips may be controlled by applying the equivalent of three fourth pound DDT or 1½ pounds toxaphene per acre. Best control and greatest benefits are obtained by treating early.

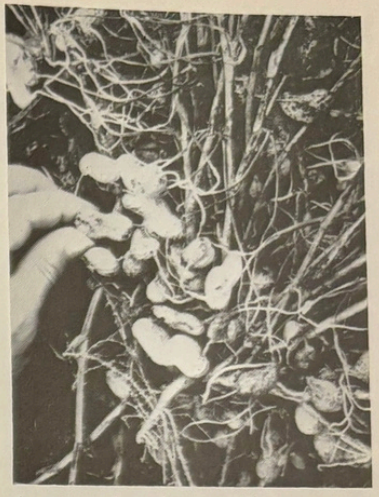
LEAF-FEEDING INSECTS

Most damage is done to the above-ground portions of the peanut plant late in the season by the corn earworm and the fall armyworm. The worm may do two kinds of injury. The corn earworm feeds for a time after hatching on the buds and leaves, then moves down the pegs and feeds on their tips. The fall armyworm feeds mostly on the leaves.

The use of DDT at one pound or more per acre (10 lbs. or more of 10% dust) or toxaphene at two pounds or more (10 lbs. or more of 20% dust) will control these pests. Such an application of DDT, usually made in August, may also provide protection against the lesser corn-stalk borer.

Earlier in the season smaller, striped green worms, the green cloverworm, and the velvetbean caterpillar may be found feeding on peanut foliage. Spotted cucumber beetles and bean leaf beetles may be controlled by applying DDT or toxaphene at the rates recommended above for thrips control.

Leafhoppers suck plant juices from the stem and leaves. This results in a yellowing of the leaves and an unhealthy appearance. The use of DDT or toxaphene as for thrips will control leafhoppers. These insecticides can be used to greater advantage if combined with sulfur. Sulfur has some controlling effects on the leafhoppers and applications, which should be made every 14 days, will also give protection against leaf-spot.



A mature plant damaged by rootworms.

Harvesting

The fruiting period of a peanut plant is almost as long as the life of the plant itself. However, about 80 per cent of the flowers are produced in the three months after planting. In order to harvest when the maximum number of pods are mature, the fruiting habit of the peanut should be understood. It takes from 65 to 70 days for a peanut flower to develop into a mature pod. When this time is added to the three months period given above, it is evident that a period of at least five to 5½ months is required for peanut production.

Make careful examinations often around digging time. Pull up some plants and examine the pods. When a peanut is ripe, the veins of the hulls become larger, and the inside of the hull turns dark. The pod is not mature if the inside of the hull is white. Since it is impossible to harvest when all the pods are mature, harvest when the majority of pods are ripe.

A large amount of labor is needed to dig peanuts. It may take two to three weeks to dig and stack the entire crop. It may be necessary to dig some before the nuts are ripe and some after the nuts are overripe.

There are many types of machines used in digging peanuts. All work better when peanuts are free of grass and weeds. Some of the implements being used are mold board plow, digging plows with fingers to lift vines from the soil, and digger-shakers that leaves vines on top of the ground. Much labor can be saved if shaking attachments are used to shake the dirt from the pea-

Oyster shell lime or potash lime does not supply magnesium needed by other crops in the rotation.

When soils are limed enough to make the soil pH above 6.2 or 6.3, peanuts commonly show manganese deficiency symptoms and yields may be greatly reduced (see Picture). Because of the likelihood of over-liming injury when too much is used, soils tests should be made to determine the exact amount needed. Once the desired soil pH has been reached, applications of 1,000 to 1,500 pounds of lime every three to four years is usually enough to maintain the proper pH and a satisfactory calcium level. Annual applications of such materials as potash lime may bring about an over-limed condition.

Where peanut soils are over-limed, the use of acid forming fertilizer and nitrogen topdressing materials will help reduce the over-limed condition. For example, 400 pounds sulfate of ammonia applied to corn to supply approximately 80 pounds of nitrogen will make the soil more acid by neutralizing the effect of 456 pounds of lime per acre. The fastest and most direct way to overcome an over-limed condition is to mix sulfur with the soil. Approximately 320 pounds of sulfur is needed to neutralize 1000 pounds of lime. Use soil tests to determine how much sulfur you need.

Mechanical equipment is now available that will do a good job of applying land plaster to the rows. In the photo land plaster is being applied to 24-inch rows.

Care should be taken to avoid over-liming peanut soils. The stunted, yellow plants in the center were due to manganese deficiency caused by the use of too much lime.

Mechanical equipment is now available that will do a good job of applying land plaster to the rows. In the photo land plaster is being applied to 24-inch rows.

NITROGEN

The peanut is a legume. When properly inoculated it will respond little, if any, to nitrogen fertilizers. When peanuts are grown on the same soil every two to four years, you don't need to inoculate the seed before planting. Inadequate inoculation may result in soils on which peanuts have not been grown for five years or longer. Under such conditions, inoculate seed before planting.

Seed treated with Arasan can be successfully inoculated if the inoculum is applied just before planting.

Nitrogen deficiencies may also occur when peanuts are grown on very acid soils, even though the seed and soil are inoculated. This situation may be corrected by liming the soil to a desirable level (pH 6.1 to 6.2).

Many growers apply small quantities of nitrogen in mixed fertilizers at planting. You can often see a response to this nitrogen in early season, but by mid-season or at harvest it is usually difficult to tell any difference in the fertilized and unfertilized plants.

Closer Spacing Pays

Peanut yields and profits can be increased by closer spacing of the rows. The photo above shows equipment at work planting 24-inch rows. The chart below shows the yield increases you can expect from closer spaced peanut rows. (See pages 10 & 11.)