Chestnuts: Blight resistant chestnuts continue to bear annual crops and appear to be well adapted but the fruit is of low quality.

Persimmons: Since Japanese persimmons are an edible fruit that matures when fresh fruit in the home orchard is scarce, it should be included in all plantings in the lower Coastal Plain.

Other Fruits: Fruits that are still surviving but that show poor adaptability are cherries, walnuts, and quince.

Fruits that have failed to survive are apricots, hazlenuts, prunes, and raspberries.

REPORT OF FIELD STATION IN McIntosh COUNTY
UPLAND SOILS

In order to exercise definite control over experimental projects on upland soils, a tract of land has been leased and will be used for such studies as: (1) the effect of winter and summer covers on yield of truck crops, (2) the effect of crop rotation on insect and disease control, (3) the effect of rates of applying fertilizer on yield, (4) the effect of commercial fertilizer and barnyard manure on yield, (5) lime requirements for truck crops, and (6) the effect of irrigation on yield.

Practically all of the leading truck crops are included in the plantings on the upland soils, but with the exception of sweet potatoes, all yields were below levels necessary for successful commercial crop production. With this in mind, definite studies are underway to determine the most economical method of increasing productivity to profitable commercial levels.

DELTA SOILS

Work on the delta soils has been in progress over a longer period of years and includes studies with a wide range of truck and vegetable crops. Among those that grow well under tide water conditions are: beans, beets, broccoli, cabbage, carrots, cauliflower, cucumbers, English peas, lettuce, mustard, okra, onions, spinach, squash, tomatoes, and turnips.

Lettuce

Lettuce has shown the widest degree of commercial adaptability and is now produced commercially on the delta soils of that area.

Varieties: At the present time Imperial strains of Iceberg lettuce No. 847 and No. 44 are showing to best advantage. No. 847 apparently being best suited for early plantings while No. 44 seems more tolerant to heat and therefore is considered best for the late harvest.

Planting Dates: With normal seasonal conditions, lettuce seeded in the field between November 15 and December 1 will mature heads and be ready to harvest during the intervening mild period occurring between the excessive cold of late winter and the damaging drought and heat which usually occur in April.
Fertilizer: A study of the fertilizer requirements of lettuce shows that under the conditions of this test and when preceded by a leguminous cover crop, 1200 to 1500 pounds per acre of a formula containing 2 per cent nitrogen, 10 per cent phosphoric acid, and 6 per cent potash will satisfy the plant food requirements of this crop. The usual custom in applying fertilizer is to broadcast about 1200 pounds before planting and add the remaining amount as a side dressing after the thinning operation.

In order to force early spring growth it usually is necessary to side dress either with 200 pounds of nitrate of soda or some similar nitrogen carrier, or 200 to 250 pounds of 10-0-10 (NPK).

Varieties of winter vegetables adapted to the coastal area of Georgia:

- Beets—Crosby’s Egyptian
- Broccoli—Green Sprouting
- Cabbage—Copenhagen and Charleston Wakefield
- Carrots—Imperator and Chantenay
- Collards—Georgia
- Cauliflower—Early Snowball
- English Peas—Improved Telephone and Thomas Laxton
- Kale—Early Green Curled
- Lettuce—Imperial No. 347 and No. 44
- Mustard—Tendergreen
- Onions—Bermuda, Prizetaker, and Australian Brown
- Radish—Early Scarlet Globe
- Ripe—Dwarf Essex
- Rutabaga—Improved American
- Spinach—Virginia Blight Resistant and Norfolk Savoy
- Turnips—Purple Top and Shogoin

Varieties of summer vegetables adapted to the coastal area of Georgia:

- Beans (lima)—Henderson Bush
- Beans (pole)—Kentucky Wonder, rust resistant
- Beans (bush)—Giant Stringless Green Pod and Tendergreen
- Corn (roasting ear)—Golden Cross Bantam and Trucker’s Favorite
- Cantaloupes—Mildew Resistant No. 45, Improved Perfecto, and Honey Rock
- Cucumbers—A. & C. Special and Stay Green
- Eggplant—Florida Highbush
- Okra—Clemson Spineless and White Velvet
- Peas—Conch and Crowders
- Pepper—California Wonder and World Beater
- Potatoes (Irish)—Red Bliss and Cobbler
- Spinach—New Zealand
Squash—Yellow Crook Neck and Yellow Straight Neck
Sweet Potatoes—Porto Rico (copper colored)
Tomatoes—Marglobe and Pritchard
NEMATOLOGY

Work on Nematology at this Station is in cooperation with the Division of Nematology, Bureau of Plant Industry, United States Department of Agriculture.

CHEMICAL CONTROL OF ROOT KNOT

The root knot nematode, *Heterodera marioni* (Cornu) Goodey, can be controlled by fumigation of the soil with chloropicrin, carbon bisulphide, ethylene dichloride or methyl bromide. Advantages and limitations of these chemicals as indicated by experiments at this Station during the past several years are discussed below. Further information will be furnished on request.

None of the chemicals can be applied to soil containing living plants. Best results have been obtained when the soil contained no undecayed roots.

Chloropicrin is applied by injecting measured quantities a few inches under the soil surface at intervals of 10 to 14 inches over the area where the nematode is to be controlled. In our sandy loam soil, good results are usually obtained when one to three cubic centimeters of the chemical are used at each application point. This requires 200 to 400 pounds per acre. To prevent damage to seed or transplants, the application should be made at least 5 days before the crop is planted. Soil moisture content should be in the vicinity of 6% to 8%, that is, the soil should be just moist enough to hold its shape when molded in the hand. This is important, as total failure may result if the soil is either too dry or too wet. Any soil temperature between 60° and 90° F. seems to be satisfactory for the effectiveness of chloropicrin. Immediately after fumigation, some sort of cover must be placed over the soil to prevent too rapid escape of the fumes. Glue coated paper or gas impervious cloth may be used, but excellent results can be obtained by the use of a water seal. This is formed by sprinkling the soil surface with enough water to wet the top inch or two.

Cost of chloropicrin in large quantities is about 80 cents per pound or $160 to $320 per acre. Cost of application adds $20 to $40 to this. If the work is carefully done, the grower can expect that the first crop after fumigation will be more than 90% free of root knot. Some control of soil fungi and bacteria can also be expected.

With crops planted in widely spaced rows or hills, considerable savings may be made by fumigating only the portions of the field which will be occupied by the roots of the plants. Root knot nematodes move through the soil very slowly, so a plant in a comparatively small area of treated soil will escape infection in the early stages of growth and will often not be seriously damaged thereafter. In an experiment with watermelons, applications of two or three cubic centimeters of chloropicrin were made directly under each hill location one week before the seed was planted. An area of one square yard around this spot was sprinkled with water to form a water seal. Thirty-eight days after planting, less than one per cent of the treated hills had been attacked by nematodes, while the untreated hills were 96% infested. At harvest, 109 days after planting, less than three per cent of the treated hills were lightly infested, while nearly all of the untreated hills were heavily infested.
If watermelon hills are placed 3 feet apart, cost of chloropicrin for spot treatment is about $5 per acre. Another $3 to $5 would cover cost of application.

Aside from its cost, the principal disadvantage of chloropicrin is that it is disagreeable to handle. This feature can be minimized by the use of special applicators which are now available commercially. However, chloropicrin is not dangerous in the sense that permanent harm is apt to ensue from exposure to the small concentrations encountered in field or greenhouse work. There is no fire hazard.

Ethylene dichloride is also effective as a fumigant for soil infested with root knot nematodes. It is applied in much the same way as chloropicrin, except that individual applications must be spaced at intervals of 7 to 10 inches and at least 4000 lbs. per acre must be used. Cost per acre would be around $300 at present prices and application would add $40 to $60 to this. Spot treatments with ethylene dichloride have not been satisfactory.

Ethylene dichloride is not so unpleasant to handle as chloropicrin. However, it burns readily and must be handled as carefully as gasoline.

Carbon bisulphide is the cheapest effective soil nematocide yet tested. It, also, is applied like chloropicrin. Good results have been obtained with applications of 500 to 1000 pounds per acre at a cost of $50 to $70, including application. Its serious disadvantage is that it is highly inflammable and produces explosive vapors and is therefore very dangerous.

Methyl bromide is a highly effective soil fumigant, but its usefulness is limited because it is a gas at temperatures above 40° F. and not a liquid like the chemicals mentioned above. Special techniques and applicators are necessary for its use. Small areas of field soil, greenhouse beds or benches may be fumigated by releasing methyl bromide under a gas tight cover, placed over the soil with the edges buried. Excellent results have been obtained using this technique, with minimum applications of one cubic centimeter of methyl bromide (liquid) per square foot of soil surface, or about 167 pounds per acre. Cost of this amount would be about $125 at present prices, not including cost of covers or application. Methyl bromide mixtures can also be obtained. These usually consist of 10% methyl bromide mixed with chemicals of higher boiling point so that the mixture can be handled like any ordinary liquid. These mixtures are also effective against root knot, but little information on amounts and techniques is yet available.

It is evident that chemical control of root knot is not yet a practical proposition for the great majority of field crops, though possibilities have been considerably extended by development of the spot treatment technique. However, chemical control is more than able to pay its way on crops of high unit value, or on small areas such as seed beds. In the greenhouse, it can replace steam sterilization to a large extent. Here one great advantage of chemicals over steam is the comparatively low cost of equipment. Chemicals are also available for use where steam is not.

ROOT KNOT AND PEACHES

Especially on sandy soil, the root knot nematode is one of the most serious pests of peach trees in the South. Heavily infected trees can easily be recog-
nized by their generally unthrifty growth and sparse and yellowish foliage. The best method of minimizing damage from this cause is by the use of nematode resistant rootstocks. Two of these, named Shalali and Yunnan, are now commercially available and should be used exclusively in this section.

When trees on common rootstocks are inadvertently planted in infested soil, root knot damage may be minimized by proper selection of cover crops. If cover crops highly resistant to root knot are used, the nematode population of the areas between the trees will be greatly reduced. Nematodes on the tree roots will not be eliminated, but the new roots formed as the tree increases in size will grow into uninfested soil and so escape infection to a large extent. If root knot susceptible cover crops are used, the nematode population of the areas between the trees increases and the new roots have no chance to escape infection.

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>Trunk Diameter Increase (3 Yrs.) Inches</th>
<th>Yield of Peaches per Tree (1 Yr.) Pounds</th>
<th>Per Cent Roots Infected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susceptible Cover Crop</td>
<td>1.7</td>
<td>12.6</td>
<td>93.5</td>
</tr>
<tr>
<td>Resistant Cover Crop</td>
<td>2.4</td>
<td>41.4</td>
<td>52.5</td>
</tr>
<tr>
<td>Clean Cultivation</td>
<td>2.7</td>
<td>42.0</td>
<td>71.6</td>
</tr>
<tr>
<td>Trap Crops</td>
<td>3.1</td>
<td>41.1</td>
<td>69.5</td>
</tr>
</tbody>
</table>

This is illustrated by an experiment started three years ago. The experiment consists of 96 peach trees in 16 plots divided into four groups of four plots each. In one group of plots the peach trees are interplanted with Clay cowpeas, *Vigna sinensis* (Torner) Hassk., in the summer and Austrian winter field peas, *Pisum sativum* L., in the winter, both crops highly susceptible to root knot. In a second group of plots, *Crotalaria spectabilis* Roth is planted in the summer and oats in the winter. *C. spectabilis* is highly resistant or immune to root knot. Oats are highly resistant and occupy the soil during cold weather when the nematodes are largely inactive. In the third group of plots, no cover crop is used. Instead, the soil is kept clean cultivated at all times. This is also an effective method of reducing the nematode population. Trap crops are used in the fourth group of plots. That is, susceptible cowpeas are planted from time to time but allowed to grow for two to three weeks, and are then destroyed by plowing under. Thus the nematodes in the plant roots are destroyed before they develop sufficiently to reproduce.

Growth of the trees is measured by increase in trunk diameter from year to year. In addition, one crop of peaches has been harvested and one examination of the tree roots has been made to determine the severity of the infection. Average data from these examinations are given in Table 87.

The susceptible cover crop plots had the smallest increase in trunk diameter, the largest percentage of infected roots, and produced less than one-third as many peaches per tree.
As the trap crop method of reducing the root knot nematode population is impractical because expert supervision is necessary to insure success and an excessive amount of labor is required, the choice is between the other two methods of reducing root knot damage. Of these, the resistant cover crop method is probably the best as it requires less labor than clean cultivation and the *Crotalaria spectabilis*, being a legume, furnishes some of the nitrogen requirements of the trees.

**ROOT KNOT AND SOYBEANS**

Laredo, Biloxi, Otootan, Clemson and Georgian soybeans [all vars. of *Soja max* (L.) Piper] were tested for root knot resistance. Laredo was found to be highly resistant, Biloxi and Otootan moderately resistant and Clemson and Georgian highly susceptible. None of the five varieties was found to be sufficiently resistant to warrant recommendations for inclusion in rotations designed to reduce the nematode population of soil. The tendency of all varieties tested was to increase the nematode population.