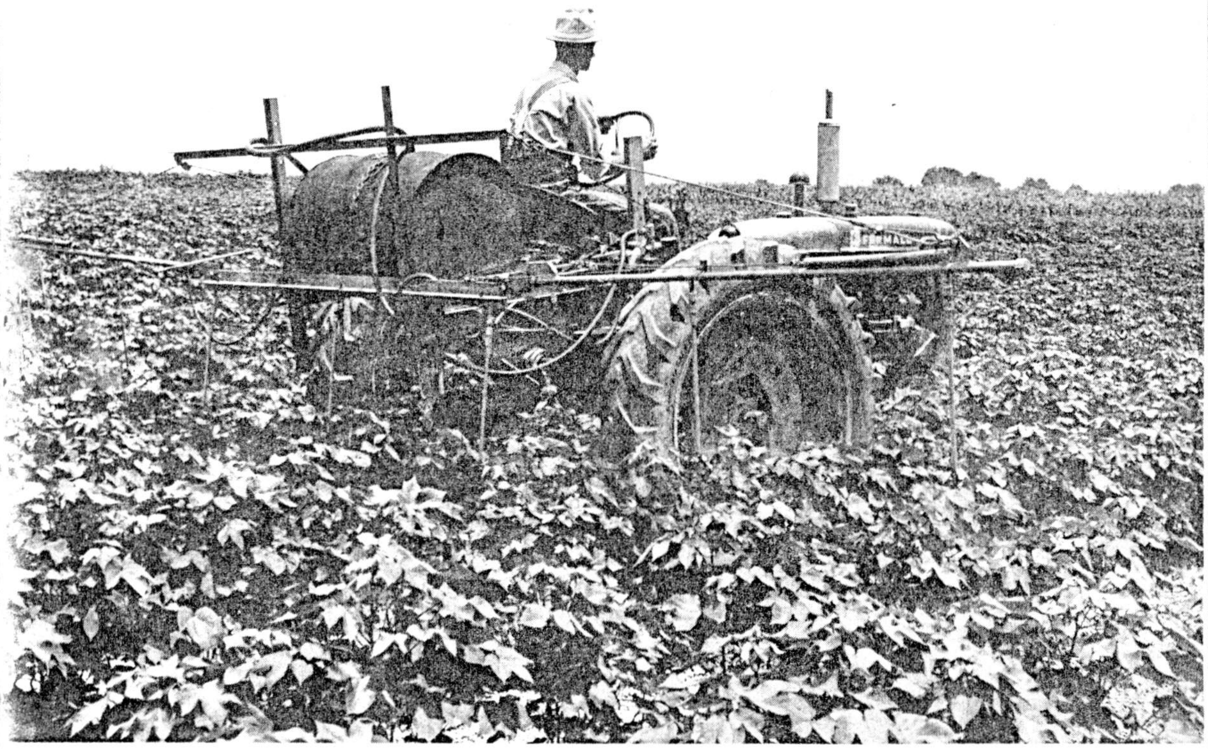
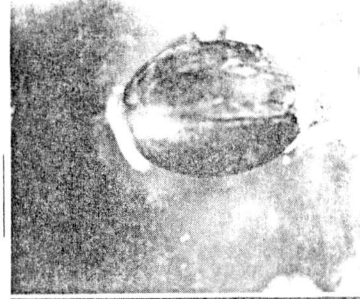
FALL 1959

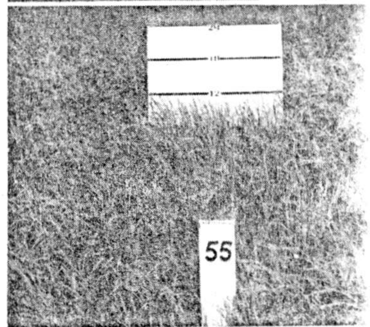
# HIGHLIGHTS

*of*

# AGRICULTURAL RESEARCH








AGRICULTURAL EXPERIMENT STATION SYSTEM

*of the*

ALABAMA POLYTECHNIC INSTITUTE

**A Quarterly Report of Research Serving All of Alabama**

# HIGHLIGHTS *of* Agricultural Research

VOLUME 6, No. 3 FALL, 1959

## *In this issue . . .*



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## *New and Timely* PUBLICATIONS

Listed here are timely and new publications reporting research by the Agricultural Experiment Station.

**Bul. 315. Marketing Cattle and Calves on Alabama Auction Markets.**

**Cir. 129. Owner Experiences With Farm Ponds in East-Central Alabama.**

**Cir. 130. Farm Marketing of Truck Crops in Baldwin County.**

**Cir. 131. Beef Preferences and Purchasing Practices.**

**Cir. 132. Farm Marketing of Truck Crops in Houston County.**

**Cir. 133. Cost of Clearing Land.**

**Cir. 134. Consumer Reactions to Presto-Pi.**

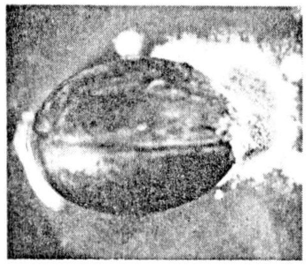
**Leaf. 62. Warrior Vetch—A New Variety for Alabama.**

**Leaf. 63. Cooler Homes from Attic Ventilation.**

**Prog. Rept. 74. Opportunities for Profit on Your Farm.**

Free copies may be obtained from your County Agent or by writing the API Agricultural Experiment Station, Auburn, Ala.

U. L. DIENER *and* H. S. WARD
*Department of Botany and Plant Pathology*



# MOLDS *and* PEANUT QUALITY

Do MOLDS AFFECT peanut quality? Recent investigations by the API Agricultural Experiment Station have revealed that they do. Results show that molds (fungi) are associated with deterioration or break-down in quality of stored peanuts.

### Research

To determine mold effects, six of the most important storage fungi were grown separately on sterilized peanut kernels at 86° F. The six included four species of the *Aspergillus glaucus* group, *Aspergillus tamarii*, and *Penicillium citrinum*.

After 2, 4, and 8 weeks, samples of the peanuts were removed and weighed to determine loss in dry matter (shrinkage). They were then analyzed chemically for various quality factors. Peanuts subjected to the same conditions but not inoculated with fungi were used as controls.

Changes in quality of peanuts, whether from molds or other causes, are in part measured by chemical analysis. The quality of the oil, which makes up 50% of the peanut, is judged from determination of free fatty acids, peroxide value, carbonyls, iodine number, and the kind of fatty acids making up the oil.

An increase in free fatty acids means a lowering of quality because of hydrolytic rancidity. An increase in peroxide value, carbonyls, and iodine number is associated with a lowering of quality because of oxidative rancidity. In the peanut oil, a substance known as tocopherols prevents oxidative rancidity.

Quality of peanuts is also determined from the sugars and proteins. A decrease in sugars probably is related to poor flavor. A loss in protein would mean a less nutritious peanut. Other changes in oil quality are based on color, odor, and flavor.

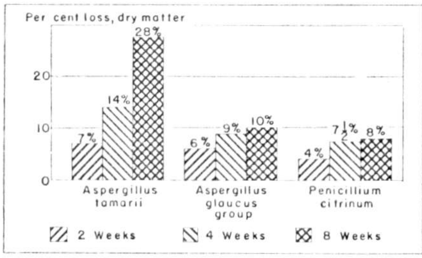



**Fig. 1. The mold, Aspergillus tamarii, caused the most serious loss in dry weight of the six molds tested.**

### Effect of Molds

After 2, 4, and 8 weeks, the growth of the molds resulted in a loss of dry weight, a decrease in per cent oil, and an increase in free fatty acids, as shown in Figures 1, 2, and 3. The fungus species, *A. tamarii*, caused a much greater change than did either *P. citrinum* or the four species making up the *A. glaucus* group. The molds caused the oil to have an objectionable yellow to dark reddish-orange color, and a strong musty odor. However, the molds did not increase the peroxide value, carbonyls, and iodine number in the oil, because the tocopherols (natural anti-oxidant) was unaffected. Fatty acid composition of the oil was not greatly affected by the molds.

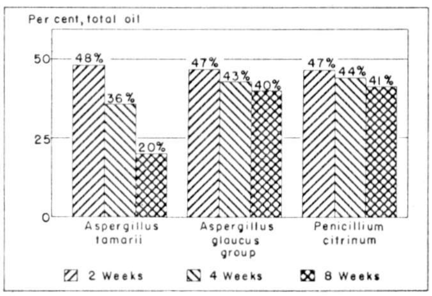



**Fig. 2. All six molds seriously affected the percentage of oil of the stored peanuts in the experiment.**

Another striking change as a result of mold growth was the almost complete loss of sugars in 2 weeks. On the other hand, the mold did not appreciably affect the proteins.

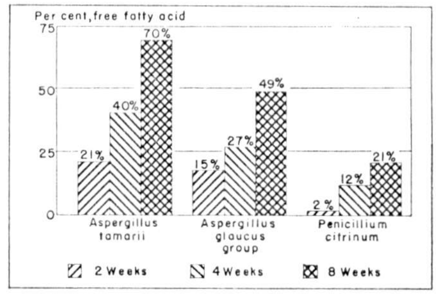


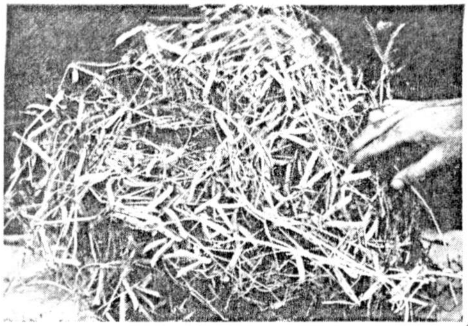

**Fig. 3. Aspergillus tamarii also caused the greatest increase of free fatty acids, or greater rancidity.**

### Results

In general, results show that storage molds lowered peanut quality by causing hydrolytic rancidity of the oil, by decreasing the oil and sugar content, and by causing a loss in dry weight. These changes in the peanut were the result of mold development and growth.

The loss of dry weight demonstrated that molds are one of the causes of "shrinkage" during commercial warehouse storage of peanuts. A decrease in oil content accompanied by hydrolytic rancidity results in peanuts of low quality and unacceptable for processing into edible products. The molds investigated were not shown to be associated with oxidative rancidity of the oil.

Other storage studies by Auburn have shown that lowering of quality of the type revealed in this mold inoculation research was related to storing peanuts with kernel moisture content above 7%. Therefore, prevention of mold damage is possible by placing in storage only those peanuts with kernel moisture content of 7% or less.

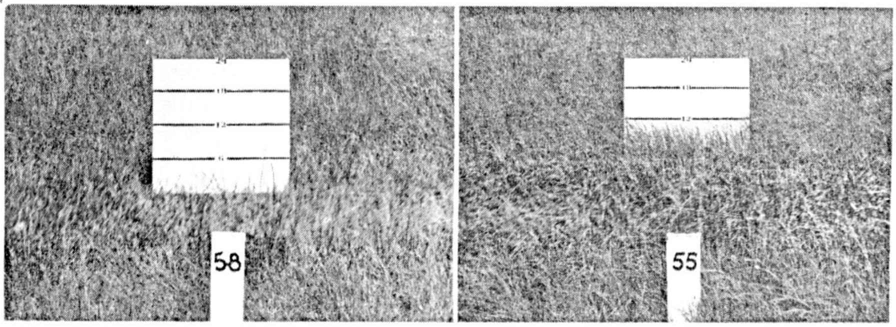


Seed pods of Warrior are shown above. At right is shown effect of Warrior vetch on growth of Coastal Bermudagrass: Left—Coastal without vetch or nitrogen; right—Coastal grown with Warrior vetch.

# WARRIOR VETCH—

## *promising new variety*

E. D. DONNELLY, *Associate Plant Breeder*
W. R. LANGFORD, *Associate Agronomist*[1]




A MILLION DOLLAR boost to Alabama's economy. . . .

That could result from development of Warrior, a new vetch variety produced at the API Agricultural Experiment Station.

Before you say impossible, consider the importance of vetch seed sales in the State and who "pockets the money" for production. Last year alone, 6 million lb. of vetch seed was planted in Alabama. But, 95% of it was grown in the West. Cost of this "imported" seed ran to a million dollars.

The million dollars is for Alabama alone. The potential market is greater, since other Southeastern States also depend on western production.

There's a good reason why Alabama farmers haven't been producing vetch seed. Varieties normally grown as green manure crops do not make profitable seed yields in the State. But, this new variety has opened the door for vetch seed production. Warrior has produced good yields of high quality seed in Experiment Station tests. In addition, it compares favorably with other good varieties as a green manure and grazing crop.

### Development and Description

Warrior (*Vicia sativa*) is a composite of five lines selected for seed and herbage production and cold tolerance. An early maturing variety, it is similar to Willamette in appearance, cold tolerance, and herbage production.

Warrior does not shatter readily. However, it cannot be depended on to reseed. Research is underway to incorporate a hard seed coat into the variety so it will reseeed. Warrior appears to be resistant to the vetch bruchid, an insect that does extensive damage to seed of susceptible varieties. It is cold hardy enough for the southern two-thirds of the State and probably for the entire State except in unusually cold years.

### Seed and Green Manure

Good yields of high quality seed have been produced by Warrior since 1955. Small plot seed yields of 500 to 1,000 lb. and combine-harvested production of 300 to 600 lb. per acre have been obtained. Warrior's seed production has been considerably higher and of better quality than hairy or Willamette. Experience has shown that a support, such as cotton stalks or small grain, is necessary for maximum seed yields.

In 3-year tests (1956-58) at Tallassee and Brewton, Warrior has produced as much green manure as hairy and Willamette. At Alexandria, in northern Alabama, Warrior yielded as much green manure as hairy, except during the cold winter of 1957-58. Hairy produced twice as much as either Warrior or Willamette in that year.

### Use for Pasture

Warrior is well adapted for production of fall and winter pasture when seeded alone or in mixtures with small grains. It is valuable for improving perennial grass pastures on light sandy soils in southern Alabama.

Seed of Warrior are large, giving it advantages over smaller seeded legumes. Seedlings are vigorous and stands can be obtained under adverse conditions, such as in sods too dense for emergence of smaller seeded crops. Another advantage in dry weather is that the larger seed can be planted deeper. Results of tests throughout the State reveal that Warrior generally produces pasture earlier than crimson clover.

Mixtures of Warrior vetch with Coastal Bermudagrass or Pensacola Bahiagrass were more productive than crimson clover-grass mixtures at the Wiregrass Substation in 1957-58. Both legumes increased yields of the grasses. Warrior vetch-grass mixtures without commercial nitrogen produced as much forage as the grass alone fertilized with 160 lb. of nitrogen per acre. Production of crimson clover-grass mixtures was equal to that of grass alone receiving 90 lb. of nitrogen. Effect of Warrior on growth of Coastal is shown in the photos.

In Alabama research, Warrior has been easy to establish in grass sods and furnished early grazing. It has demonstrated two excellent potential uses: (1) for improving grazing, particularly on sandy soils of southeastern Alabama, and (2) for producing seed for on-the-farm use or for sale.

A limited acreage of Warrior was planted for seed increase in the fall of 1958. Seed should be available in quantity by 1961.

[1] Resigned.

The survey meter shown at right is used to trace radioactivity in plants.

L. E. ENSMINGER
*Soil Chemist*

# "TAGGED" PHOSPHATE—

## *useful tool in fertility research*

RADIOACTIVE MATERIALS are useful tools in today's "atomic age." And agriculture is in step with the times. Radioisotopes are being used to study a variety of farm problems involving soils, fertilizers, and plant relationships.

In soil fertility studies, use of radioisotopes offers a sensitive and direct measurement of certain treatment effects. Radiophosphorus has been used since 1950 in field and greenhouse tests by the API Agricultural Experiment Station to measure availability of soil and fertilizer phosphorus.

"Tagged" superphosphate (containing radiophosphorus) has been used as the standard for determining availability of residual soil phosphorus as well as that of rock phosphate. Radioactivity of phosphorus taken up by plants grown on soil that received "tagged" superphosphate shows how much of the phosphorus came from fertilizer and how much from the soil.

This technique is often helpful in explaining results obtained by less direct methods. One of the main advantages is that treatment effects can be measured in the absence of yield responses.

### Residual Availability

Applied phosphates accumulate to some extent in soils. Accumulation depends on such factors as application rate, erosion losses, and crop grown. This accumulation is of real importance for succeeding crops.

Many tests in Alabama have measured the residual value of phosphates in terms of crop yields. Radiophosphorus was used in two such field tests in 1950 and 1951. Results showing effect of residual phosphorus on cotton yields and amount of available phosphorus in the soil are given in the table. Availability (called "A" values) was determined by uptake of radiophosphorus by the cotton plants. Since "tagged" superphosphate was used as the standard, "A" values indicate the amount of soil phosphorus that has the same availability as that in superphosphate.

As shown by these results, all rates and sources of phosphorus gave an appreciable increase in availability. However, residual availability of superphosphate was somewhat greater than that of rock phosphate applied at an equivalent $P_2O_5$ rate, but less than that in basic slag. In general, increased yields of seed cotton indicated about the same residual effects as did "A" values (see table).

RESIDUAL VALUE OF PHOSPHORUS SOURCES AS MEASURED BY COTTON YIELDS AND RADIOPHOSPHORUS UPTAKE, TWO SOILS

| Phosphorus treatment | | Average per acre results, by soil type | | | |
|---|---|---|---|---|---|
| | | Greenville fine sandy loam | | Decatur silt loam | |
| Source | $P_2O_5$/acre annually 1930-45 | Seed cotton yield increase 1946-49 | $P_2O_5$ "A" values[1] 1950-51 | Seed cotton yield increase 1946-49 | $P_2O_5$ "A" values 1950-51 |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| None | 0 | | 79 | | 58 |
| Superphosphate | 24 | 60 | 110 | 255 | 76 |
| Superphosphate | 48 | 91 | 213 | 325 | 176 |
| Basic slag | 48 | 180 | 400 | 457 | 229 |
| Rock phosphate | 48 | 54 | 132 | 128 | 161 |
| Rock phosphate | 96 | 96 | 176 | 249 | 253 |

[1] "A" values represent the amount of phosphorus in the soil that is as available as that in tagged superphosphate.

### Rock Phosphate Availability

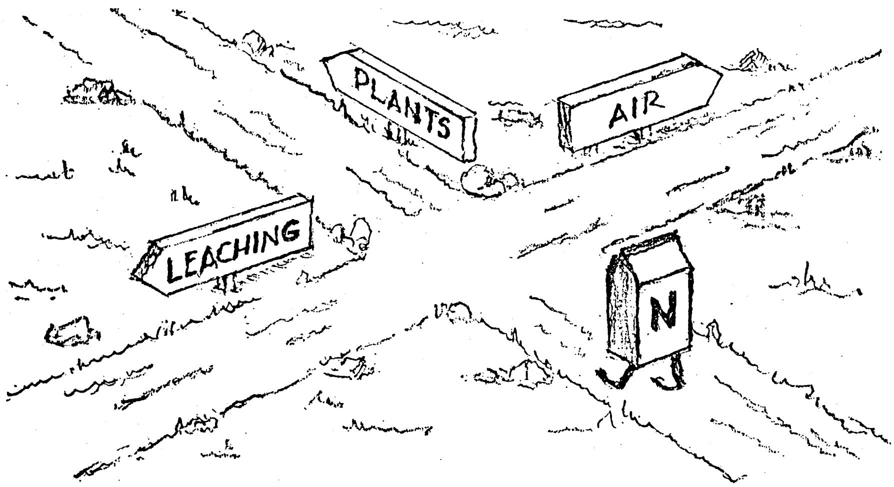
It is difficult to properly tag such fertilizer materials as rock phosphate. However, the "A" value technique permits evaluating rock phosphate in the same manner as for residual effects. This can be done by comparing the "A" value of the soil alone with the "A" value of soil plus rock phosphate. The magnitude of the increase in "A" values is a measure of the availability of rock phosphate.

Given below are "A" values showing availability of rock phosphate to Ladino clover on two soils. Each soil received 80 lb. of $P_2O_5$ per acre from tagged superphosphate, with different amounts of rock phosphate added.

| *$P_2O_5$ from rock phosphate, lb. per acre* | *"A" values, lb. $P_2O_5$/a.* | |
|---|---|---|
| | *Cecil clay loam* | *Eutaw clay* |
| 0 | 3 | 2 |
| 40 | 14 | 16 |
| 80 | 14 | 35 |
| 160 | 22 | 58 |
| 320 | 57 | 88 |
| 640 | 97 | 125 |

Changes in availability when rock phosphate was added indicate it is more available in Eutaw clay than in Cecil clay loam. However, $P_2O_5$ in rock phosphate was much less available than in superphosphate, even on Eutaw Clay. This was confirmed by yield results.

Although radiophosphorus offers an approach to phosphorus fertility problems, its use should not replace other methods. Practical application of results should still be based on yield response.




# WHERE does your nitrogen go?

FRED ADAMS and
A. E. HILTBOLD

*Department of Agronomy and Soils*

FOR HIGH crop yields, abundant nitrogen is needed. Yet only a portion of this nitrogen ends up in the harvested crop.

Numerous experiments have shown that well fertilized crops recover only one-half to three-fourths of the nitrogen applied. The remaining nitrogen is lost either (1) as nitrate carried by water percolating (leaching) through the soil, or (2) as gas into the air from chemical (bacterial) action.

Ability to use nitrogen varies among crops. Other factors affecting nitrogen use are soil type, rainfall, time of application, tillage, weed and insect control, soil fertility, temperature, and cropping system. Furthermore, crops become less efficient in using nitrogen as application rate is increased.

With recommended use of high rates of nitrogen for high yields, nitrogen loss has become a problem of economic importance. For instance, a corn crop under good growing conditions will use about 30 lb. of the 40-lb. rate of nitrogen applied. On the other hand, only about 50 lb. will be used when the crop is fertilized with 100 lb. of nitrogen per acre.

Soil organic nitrogen content usually remains about the same from year to year. Unlike phosphorus and potassium, little increase in the soil nitrogen level can be expected from repeated applications of fertilizer nitrogen. This is because fertilizer nitrogen not absorbed by the crop usually will not remain very long in the soil.

### Loss by Leaching

Results of research by the API Agricultural Experiment Station and by other state experiment stations show that nitrogen is leached in large amounts only in nitrate form. The amount leached depends upon the nitrate supply and intensity of leaching. Vigorous growing crops greatly reduce loss by absorbing the nitrate, and water that would otherwise leach the nitrate. Roots of growing crops as well as decaying crop residue stimulate growth of soil micro-organisms. These, too, absorb nitrate and temporarily prevent loss.

Little leaching of nitrate occurs in clay soils when crops and crop residues are maintained on the soil during fall and winter. Sandy soils are more subject to losses of nitrate by leaching.

### Loss As Gas

Fertilizer nitrogen may change into a gaseous form that is then lost into the air. The nitrogen gas will be either ammonia or atmospheric nitrogen. (Atmospheric nitrogen makes up about 78% of the air.) Loss of nitrogen in the form of ammonia gas is small if the fertilizer material is applied properly in the soil. For instance, little or no loss of anhydrous ammonia will occur if applied within the soil because the ammonia is retained by the soil particles.

Conversion of fertilizer nitrogen to atmospheric nitrogen is a bacterial process that has been considered important only in water-logged soils deficient in oxygen. However, recent research has shown that soil bacteria bring about this change even in soils that are well supplied with oxygen. The conditions that are known to stimulate loss of nitrogen in this manner are also conditions that are most favorable for plant growth. Thus, a combination of abundant crop residue and nitrogen may result in considerable change of fertilizer nitrogen into nitrogen gas.

Split applications of nitrogen will avoid excessive accumulation of nitrate. This will reduce the amount of nitrogen converted to gas, as well as that lost by leaching. The nitrogen, however, should be applied at times and in amounts that will adequately meet crop needs.

Regardless of the form applied, all fertilizer nitrogen may be lost at one time or another. The loss may be considerable in many cases, even though the exact amount is not predictable at present. However, loss of some nitrogen should not discourage use of adequate amounts.

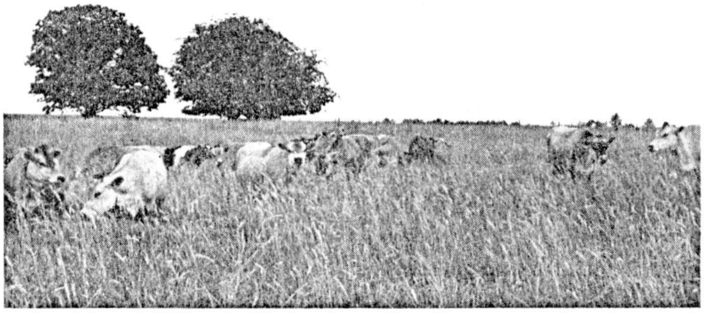
### Looking Ahead

New research is in progress at Auburn aimed at a complete understanding of what "triggers" the reaction that brings about loss of nitrogen into the air. Results of this basic exploratory work can possibly bring about revised soil management and fertilizer practices that will greatly reduce nitrogen losses.

# SURPLUS MILK
## *can be profitable*

S. E. GISSENDANNER, *Superintendent, Sand Mountain Substation*

J. H. BLACKSTONE, *Agricultural Economist*



Cows grazing rye planted in September. Small grain crops are relied on heavily for fall, winter, and spring grazing.

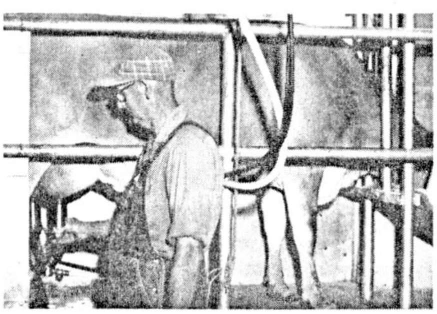
As a Grade A dairyman, you can boost your total net cash income considerably. How? – by producing more milk even though the additional production is sold as surplus.

This would be particularly true (1) when cows are not producing at their capacity, or (2) when too few cows are being milked. In neither case would labor, dairy buildings and equipment, and other fixed capital items be used at full capacity. A combination of these two may occur on some dairy farms.

### Supporting Research

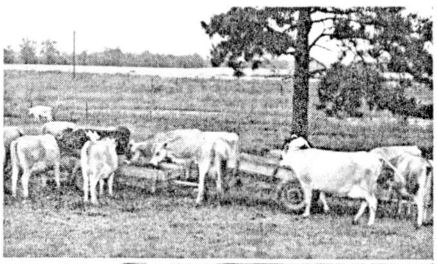
A Grade A dairy management unit at the Sand Mountain Substation increased its net cash income nearly 40% in 1958 over that of 1957. This increase resulted from higher production per cow and more cows milked. The additional milk was sold as surplus.

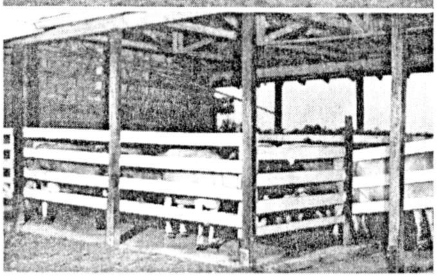
The Grade A unit is an 83-acre farm with 4 acres in cotton and the remainder devoted to feed crop production for the dairy herd. In 1957, one man handled the entire farm operation, including an average of 15 milk cows. Production per cow was low, largely because of a summer slump. In 1958, the same man handled the farm, with the average number of cows increased to 18 for the year.



A two-cow, V-type milking parlor with machine milker, pipeline, and bulk tank make for efficient operations.

A better feeding program was followed and production per cow was increased over the previous year. No changes were needed in the dairy barn or milk tank. Nor was it necessary to add any dairy equipment or farm machinery, since these items were not used to full capacity during 1957.





Above: Silage, corn, or alfalfa, is fed in trailers for easy handling. Below: With limited-size hold pen (25 head), a cow is always awaiting turn.

### Comparative Business

In 1957, the 74,860 lb. of milk sold brought $4,993. The following year 118,475 lb. of milk was sold for $6,359. The 43,615-lb. increase in milk sold in 1958 added $1,366 of gross income, or an average of $3.13 per cwt. This price was typical for surplus milk that year. The additional production resulted from better feeding and management, and from milking an average of 3 more cows than in 1957.

Cash operating expenses in 1957 totaled $2,930, as compared to $3,481 a year later. The increase in operating expenses of $551 was for producing 58% more milk, or $1.26 per cwt. Cash expense items both years were for fertilizer, seed, gas, oil, repairs and tractor parts, machinery, dairy equipment and supplies, American Dairy Association dues, breeding fees, bought feed, taxes, insurance, National Dairy Council and Milk Control Board fees, hauling milk, electricity, and other miscellaneous costs.

Although the cash cost for the additional production was $1.26 per cwt., there was also a non-cash cwt. cost of 34¢. This was for depreciation and interest on the additional cows and for a small amount of labor. The combined cash and non-cash cost amounted to $1.69. This amount deducted from the $3.13 received for surplus milk, leaves $1.53 as net return. In effect, the net return was a reward to management.

### Conclusions

This example is not an isolated one. Many dairymen could improve milk production per cow by better feeding and management. Most farmers could add a few cows without need of additional labor or equipment. It would be largely a case of using resources at hand.

Some Grade A plants need additional milk for production of manufactured products. Also, manufacturing milk plants that buy milk from Alabama producers are short of milk. Production of surplus milk for manufactured dairy products can be expanded many times its present volume in Alabama's now available markets. Expanded surplus milk production can be profitable.


# *The* SAND MOUNTAIN SUBSTATION

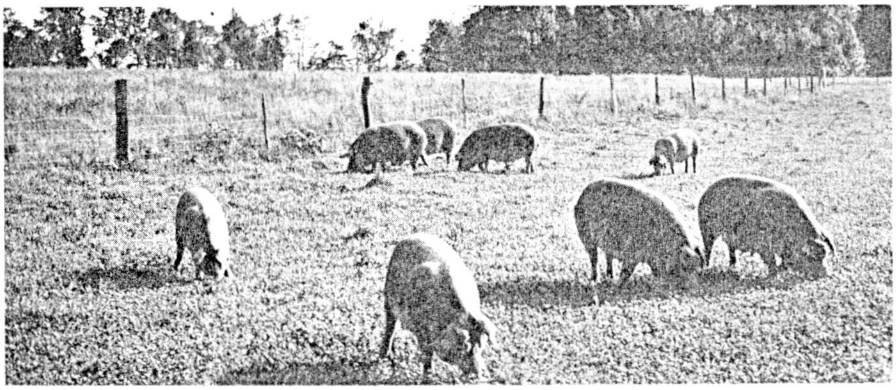
## *a story of research for farms of the area*

E. L. McGRAW, *Associate Editor*
S. E. GISSENDANNER, *Superintendent*

SMALL FARMS CAN be efficient, especially in the Sand Mountain Area.

Since the establishment of the Sand Mountain Substation of the API Agricultural Experiment Station in 1929, research there has been directed toward methods of increasing efficiency of the small farms characteristic of the area.

The 1927 Act of the Alabama Legislature authorized establishment of five branch agricultural experiment stations. It specified that one of these be located in that part of Alabama generally known as the Sand Mountain area. Accordingly, a branch agricultural research station, consisting of 240 acres, was located near Crossville in DeKalb County.



Hogs grazing good pasture on the cotton-hog management unit.

### Soils and Crops

The soils of this area are less variable than those of any other large agricultural section of Alabama. Practically all of the upland soils were derived from sandstone or related shale.

Cotton and corn occupied most of the available land of the area, and, naturally much of the early research dealt with these major crops. However, the research program was rapidly expanded to include experiments with grain and forage crops that might be used as a basis for an adapted livestock program.

This area is one of the State's leading cotton producing areas; it has produced a considerably higher average lint yield per acre than have other areas of the State. While cotton for many years has been the main cash crop of farmers in this area, poultry and poultry products have become important sources of farm income.

### Early Experiments

One of the first experiments dealt with grades of fertilizers that would give best results on Sand Mountain soils. In a very few years, it was shown that a bale of cotton per acre could be made on the average by applying 600 lb. of 6-10-4. It was also shown that nitrogen was the dominant need for cotton.

The importance of nitrogen was shown where cotton was grown each year with vetch planted in the middles in the fall to be turned the following spring. For 22 years the average annual yield was 1,702 lb. of seed cotton per acre following a crop of vetch. On an adjoining area, treated annually with the same amounts of phosphate and potash, but without vetch or nitrogen fertilizer, the average yield over the same period was 544 lb. of seed cotton per acre.

### Recent Experiments

In recent years experiments with larger amounts of nitrogen have proved that farmers can safely use more than 36 lb. of N per acre. In these experiments, applications of 90 lb. of N resulted in an average yield of 1,955 lb. of lint per acre over an 8-year period.

Other factors contributing to higher cotton yields have been changing the tradition of planting corn first and then cotton, and the use of the best producing, high quality varieties. So, the present cotton program of the Sand Mountain area is based largely on (1) heavier applications of higher grade fertilizers, (2) planting about 2 weeks earlier than formerly, and (3) use of top performing tested varieties.

Research on mechanization during 1948-56 and the use of pre-emergence chemicals for control of weeds since 1951, has also contributed to the success of cotton production in the area.

Alfalfa in May fertilized according to recommendations for the Sand Mountain area. This 10-acre field produced 3 tons of hay per acre plus grazing in 1958.

The importance of research on weed control is indicated by the fact that more than 2,000 acres of cotton in DeKalb County alone this year were treated with pre-emergence chemicals.

### Cotton-Hog Unit

Realizing what cotton acreage control would mean to Sand Mountain farmers, an adjoining 96-acre farm was bought in 1938 for adding another source of cash income through some form of livestock.

Hogs and cotton were chosen for the chief items for sale from this management unit. The farm was devoted to 17 acres of cotton, feed crops for the hogs, and a few acres of garden and truck crops. For the first 10 years the unit was cultivated with mule power. After World War II a tractor was purchased.

Ten years' results from the cotton-hog management unit showed that the income from the unit doubled when home-grown grain and forage crops were sold through hogs. After deducting all cash expenses from total farm sales the average annual cash balance was $3,225.60. The farm's production averaged per year 10,536 lb. of lint cotton, 1,685 bu. of corn, and 16,591 lb. of hogs for market.

A cash balance of $3,225.60 was realized after paying all cash expenses. For 6 years an exact record was kept on the returns from "hogging off" corn on an average of 13 acres of land. The average yield was 56 bu., the average amount of hogs produced sold for $3,344, a return of $2.54 per bu. and $132 per acre.

Two other management units in operation are a 70-acre dairy-cotton unit and a 30-acre poultry-cotton unit.

Replacement pullets on the cotton-poultry management unit.

A field of cotton treated with a pre-emergence chemical for weed control.

The dairy-cotton unit consists of 4 acres of cotton, 15 to 18 cows, and feed crops for the cows. Cash sales from the unit in 1958 were $8,918.70 and net cash income was $5,103.43. This is a one-man operation.

A fairly typical 30-acre farm has been operated for several years as a cotton-poultry unit. In recent years, the land on this farm has been used as follows: cotton 3.6 acres, corn 23, alfalfa 1, and farmstead buildings, lots, garden, and roads 2.4 acres. Cotton yields have varied from a low of 400 lb. of lint per acre to a high of more than 1,000. Corn yields varied from 20 to 60 bu. per acre.

The poultry flock is kept in 3 houses. Each house is built to handle 500 to 550 laying hens. Two houses are in constant use for layers. Total egg production for 1956-57 was 21,600 dozen. Cotton yields were extremely good in 1956 but far below normal in 1957. Egg sales averaged 35.17¢ per dozen in 1956 and 33.95¢ in 1957. Sales were sufficient in each of these years to (1) pay all expenses, allow for depreciation of buildings, machinery and equipment, feed and supplies, and of the flock; (2) to pay 6% interest on average investment; and (3) to pay the operator approximately $1 per hour for all work done on the farm.

### Corn Research

Significant changes have been made in corn yields as a result of research. Corn is a major crop of the area from the standpoint of acreage. The average yield for the area has increased from 12 to 15 bu. when the Station was established to more than 30 bu. in recent years.

A 2-year rotation of cotton-vetch-corn proved valuable in this yield increase. Also contributing to a more successful corn program was the use of hybrid corn varieties, tested by the Experiment Station System, thicker spacing, and the abandoment of "pulling fodder."

### Forage Research

Some of the most interesting and valuable results came from experiments dealing with alfalfa production. The crop had never been grown successfully on Sand Mountain soils. In 1937 it was tried with a number of soil treatments involving lime, phosphate, and potash, but the crop failed after the first year.

A new experiment was started in the fall of 1939 that differed basically from the first only in heavier application of potash. All plots except one failed at the end of the third year. This one received an annual application of 100 lb. of muriate of potash. This plot produced 8 crops that averaged 3 tons of cured hay per acre per year. The extra potash proved to be the clue to successful alfalfa production. Other controlling factors are good seedbed preparation, the use of phosphate, lime, and boron.

Another hay crop that has been tested and proved is lespedeza sericea. Yields of 2 to 3 tons of hay per acre have been made on the same land for many years.

Crimson clover has also proved to do well on Sand Mountain soils when properly handled. White Dutch and Ladino clovers have also been found to do well under proper conditions.

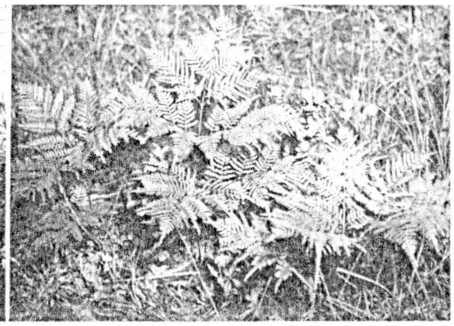
Research results from experimental plots and management units have pointed the way to better living for Sand Mountain farmers. By increasing yields of row crops and by adding livestock enterprises that utilize family labor, such as poultry, dairy or hogs, efficiency can be maintained. Controlled cotton acreages made this necessary; research made it possible.

# POISONOUS PLANTS

HENRY WARD *and* E. T. BROWNE, JR.

*Department of Botany and Plant Pathology*

**Oleander**



**Bracken Fern**

BEWARE OF THOSE innocent looking wild plants in areas used for grazing. They may cause death to livestock!

When good forage is short during periods of severe winter killing and droughts, illness and death in livestock become frequent as a result of browsing poisonous plants.

### Common Poisonous Plants

Of the several hundred species of poisonous plants in Alabama, either native, introduced, or cultivated, investigations have shown that only a small number cause the majority of illness and death in livestock. Among these plants are: (1) yellow jessamine, (2) mountain laurel, (3) oleander, (4) scrub oaks, (5) bracken fern, (6) white snakeroot, (7) ergot on Dallisgrass, (8) wild cherry, and (9) laurel cherry. Other plants that sometimes cause poisoning are poisonous hemlocks, red buckeye, crotalaria, and chinaberry.

### Danger Periods

During winter and spring, the evergreen type of plant is a source of trouble. The most common plant of this group is yellow jessamine. This vine is often intertwined with honeysuckle and eaten by an animal when browsing. From the central part of the State northward along streams and rocky hillsides, mountain laurel, an evergreen shrub, often causes poisoning. The ornamental evergreen shrub, oleander, growing in central and southern Alabama, is sometimes a source of poisoning. This shrub is eaten by animals, either when they have access to grazing near dwellings or when pruned limbs are thrown into the feeding area.

During late spring and early summer dry periods, death of cattle may be caused by eating an excess of scrub oak leaves. Cattle are endangered when allowed to graze cutover woodland areas with a large amount of scrub oak.

As dry weather continues during the summer over the State, causing an absence of suitable grazing, cases of death in cattle may be traced to bracken fern poisoning. It is thought rather large amounts of bracken fern must be eaten by animals before death can occur.

### Example

During one summer in a recently established pasture area of the Black Belt, the grass and legume plants were killed by the summer drought. One of the few green plants left for grazing was a robust, perennial, herbaceous weed known as white snakeroot. Investigation showed rather large amounts of the white snakeroot had been browsed, and several cattle had died.

### Other Poisons

Another common type of plant poisoning not associated with periods of scarce forage is from ergot on Dallisgrass. In damp weather after Dallisgrass has formed seed heads, a pinkish to dark brownish appearing mold called ergot appears on the seed head. As a result of eating these seed heads cattle are poisoned.

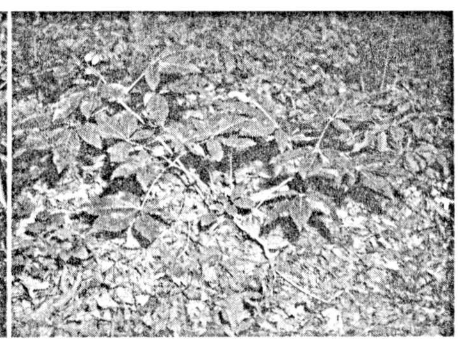
It is thought that none of these seven poison plants causes rapid illness and death in livestock. Symptoms of poisoning usually occur in the animal only after it has eaten the poisonous plant for several days or sometimes weeks. This is a cumulative type of poisoning.

There are several plants in the group of cyanide-forming plants that may give trouble. These are the wild cherry, laurel cherry, and two evergreen species of photinia that are cultivated in the State and are likely to persist around old home sites. Unlike the other poison plants named, only small amounts of the wilted leaves of these are necessary to cause quick death of even the largest stock animals. Johnsongrass and a few other normally harmless kinds of plants may, under conditions of drought or frost injury, cause cyanide poisoning of animals when eaten.

### Poisoning Symptoms

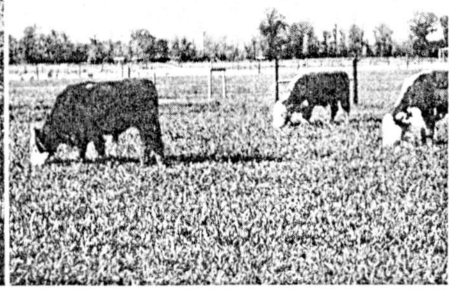
Symptoms in a particular type of animal from a specific species of poisonous plant are not diagnostic as the symptomatic conditions are generally the same from all poisonous plants. Generalized symptomatic conditions are: depression, loss of weight and appetite, inability to stand, nervousness, and bloody feces. Therefore, illness and death to livestock can be definitely associated with poisonous plants only if the browsed plant is found in the grazing area or if an identifiable part of a plant is removed during postmortem from the animal's stomach.

**Mountain Laurel**



**Red Buckeye**

The oats-crimson clover on prepared land (right) was ready for grazing Nov. 13, 1957. Rye-crimson sod-seeded on Coastal Bermudagrass (left) was not stocked until the following March. Both photos were made Nov. 28, 1957.



# PASTURE *know-how from winter* GRAZING TRIALS

R. M. PATTERSON, *Associate Agronomist*
W. B. ANTHONY, *Animal Nutritionist*
V. L. BROWN, *Supt., Lower Coastal Plain Substation*

KNOWING WHAT to expect from a winter grazing crop or mixture is important to cattlemen. Information on carrying capacity and livestock performance is needed in planning a pasture program.

To provide needed pasture information, several winter grazing trials are being carried out by the API Agricultural Experiment Station.

### Mixtures Evaluated

Potential production of several winter grazing mixtures was studied at the Lower Coastal Plain Substation during the 1957-58 and 1958-59 seasons. Each mixture was seeded on a river terrace soil in early September on prepared land and sod-seeded in early October on permanent pasture. Animal performance and forage production were measured every 28 days on four 2-acre pastures of each mixture.

Lime was applied according to soil test and 500 lb. of 0-14-14 fertilizer per acre was applied before planting. Nitrogen (50 lb. per acre) was applied in both fall and early spring. Half of the plots were irrigated once in 1957 and twice in 1958.

Long yearling stocker steers of good beef breeding were grazed when forage was adequate. When not on test, the steers were either grazed on similar forage or fed a low-cost, high-roughage ration.

### Results

Given in the table are averages of all four paddocks of each forage mixture. Results were averaged since irrigation did not produce an important response in either season.

The oats-crimson clover and rye-ryegrass-crimson clover pastures seeded on prepared seedbeds gave best production. These mixtures furnished more days of grazing, carried more steers per acre, and produced more beef per acre than rye-crimson sod-seeded on Coastal Bermudagrass or rye sod-seeded on Dallisgrass-white clover pastures.

The grazing periods were 197 days for the first season and 209 days for the second. Days that other feed was required during the grazing season varied from 53 for rye-ryegrass-crimson clover to 98 days for rye sod-seeded on permanent pasture in 1957.

In 1957-58, both mixtures seeded on prepared land produced over 100 lb. more beef per acre than the sod-seeded crops. Only oats and crimson clover maintained this much advantage the second season. Rye seeded in early September had poorer stands and was less productive in early season in 1958 than in 1957. This is one reason rye-ryegrass-crimson clover was less productive than oats-crimson clover in 1958-59.

Except for rye sod-seeded in Dallisgrass-white clover, all crops produced less beef per acre the second season than the first. However, forage production was as great or greater than that of the first season. Early forage production was associated with high beef yields.

Daily gains of steers were measured during the second season for steers that were on the forage throughout the grazing season. Average gains were slightly above 2 lb. daily on all of the forages. Slaughter grades of a high percentage of the steers were Good and high Standard. The long yearling steers used in the trials were 1 year older than steers used in most grazing trials by the Station.

Mixtures seeded on prepared land showed advantages over forages sod-seeded on permanent pastures. However, cost of production, days other feed is required, final finish of animals, and net financial returns must be considered in choosing forages and systems of production.

PRODUCTION OF DIFFERENT FORAGE MIXTURES, FALL, WINTER, AND SPRING

| Forage mixture and seeding method | Season | Carrying capacity and production | | | |
|---|---|---|---|---|---|
| | | Days grazed | Steers per acre | Beef gain per acre | Dry forage per acre |
| | | *No.* | *No.* | *Lb.* | *Lb.* |
| **On prepared land** | | | | | |
| Oats-crimson clover | 1957-58 | 122 | 1.46 | 445 | 4,207 |
| | 1958-59 | 154 | 1.02 | 371 | 6,420 |
| Rye-ryegrass-crimson clover | 1957-58 | 144 | 1.45 | 445 | 6,083 |
| | 1958-59 | 154 | 1.01 | 320 | 6,007 |
| **Sod-seeded** | | | | | |
| Rye-crimson on Coastal Bermuda | 1957-58 | 118 | .91 | 322 | 4,580 |
| | 1958-59 | 114 | .84 | 228 | 5,690 |
| Rye on Dallisgrass-white clover | 1957-58 | 98 | 1.27 | 291 | 4,322 |
| | 1958-59 | 140 | .94 | 286 | 4,094 |

# FATTENING CATTLE *for* SLAUGHTER

W. B. ANTHONY, *Dept. of Animal Husbandry and Nutrition*
J. G. STARLING, *Wiregrass Substation*
J. K. BOSECK, *Tennessee Valley Substation*

WHY SELL a weaned calf when he can make money for you as a stocker steer?

Top profits in slaughter cattle production are possible by growing calves after weaning to about 1,050-lb. weights. To be successful, average rate of gain should be at least 1.7 lb. per day and final slaughter grade Good or Choice.

Feeding and management systems for producing Good and Choice heavy beef have been worked out in research at several substations of the API Agricultural Experiment Station. These systems are designed to return maximum profits to producers.

### Profitable System

One of the systems that has given good results calls for putting calves in feedlot when weaned in late summer. A full ration of corn or sorghum silage plus 2 lb. of ground corn and 1½ lb. of protein supplement is fed. A small grain-clover pasture is established on prepared seedbed for use after summer feeding. Almost 1 acre of grazing is required per stocker calf in the Wiregrass Area, but the carrying rate in northern Alabama is usually 2 animals per acre. Calves are transferred to grazing in December or when there is enough growth to ensure ample feed without over-grazing.

When pasture is depleted, May or before, the cattle should grade Standard and have gained at least 1½ lb. daily since weaning. At this time the cattle are put in dry lot and full fed a complete mixed fattening ration for about 120 to 140 days. Weights should be around 1,000 lb. when ready for market with carcass grades of Good or Choice.

Calves can be put directly in the feedlot at weaning and fattened for slaughter. However, this system has greater risks and less margin of profit. It costs about 19¢ to put a lb. of gain on young cattle. At present, a 500-lb. Choice feeder calf worth 33¢ per lb. must bring 27.75¢ per lb. when finished at 800 lb. just to break even.

### New Developments

Development of management systems that make use of maximum roughage and minimum concentrates is the most significant recent development in production of slaughter cattle. Research at the Tennessee Valley Substation shows results of such systems of growing and finishing young cattle.

Beginning in fall, 1957, four systems were used to grow out beef calves (see table). Lot 1 was not pastured, but was fed all the corn silage they would eat plus 2 lb. of ground ear corn and 1½ lb. of cottonseed meal daily. In late May they were placed on a complete fattening ration and finished for slaughter. Lot 2 was handled the same as Lot 1, except they grazed small grain-clover pasture when available from November until May.

Lot 3 was grazed and fed with Lot 2 until the small grain-clover pasture was finished. They were then transferred to permanent pasture and Starr millet was established on the winter pasture area. The cattle came off permanent pasture to graze the millet and were finished out beginning in August. Lot 4 was wintered on sorghum silage and supplement. They were on Orchardgrass-clover pasture from March until late August. Feeding out and marketing was the same as for Lot 3.

All lots yielded high Good and Choice carcasses and returned a profit.

The corn silage fed was low in quality and cost per ton was high because of low yields. Thus, results from Lot 1 probably could be improved.

Cattle in Lots 1 and 2 were on test about 11 months and Lots 3 and 4 about 13½ months. They were about 18 to 20 months of age when slaughtered. They made rapid, low-cost gains from weaning until finished for slaughter. Carcasses were of the correct weight and grade to meet consumer demands.

RESULTS FROM DIFFERENT FEEDING SYSTEMS FOR PRODUCING SLAUGHTER CATTLE, TENNESSEE VALLEY SUBSTATION, 1957-58

| Item | Results from each feeding system | | | |
|---|---|---|---|---|
| | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
| Initial weight, lb. | 396 | 380 | 369 | 401 |
| Market weight, lb. | 997 | 957 | 1,003 | 1,099 |
| Days on test, no. | 343 | 343 | 404 | 404 |
| Average daily gain, lb. | 1.75 | 1.71 | 1.57 | 1.72 |
| Gain per head while growing, lb.[1] | 267 | 243 | 347 | 366 |
| Gain per head in feedlot after growing, lb. | 334 | 334 | 287 | 332 |
| Cost of calves, pasture, silage, concentrate | $192.41 | $178.08 | $180.57 | $170.31 |
| Sale price per head | $246.22 | $239.20 | $257.87 | $279.54 |
| Return per steer above value of feeder, feed | $ 53.81 | $ 61.12 | $ 77.30 | $109.23 |
| Cost per cwt. gain | $ 18.43 | $ 17.27 | $ 16.46 | $ 12.54 |

[1] Lot 1 gain was all from silage and supplement; Lot 2 all from winter grazing plus silage and supplement; Lot 3 gained 239 lb. on winter pasture plus silage and supplement, 79 lb. on permanent pasture, 29 lb. on Starr millet; Lot 4 gained 221 lb. on Orchardgrass-clover and 145 lb. on silage and supplement.

SHERMAN D. WHIPPLE
*Associate Forester*

# *Improving* the FARM WOODLOT

THE AVERAGE FARM WOODLOT today is a poor producer! Yet, 10 years of good management can change this situation to high producers with desirable species of trees.

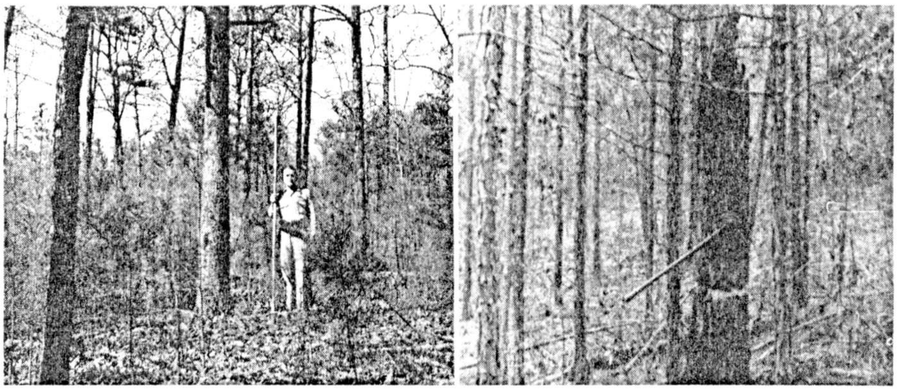
Stocking volumes of only 1,000 bd. ft. and growth of less than 100 bd. ft. per acre per year are found too frequently throughout Alabama.

### Management Practices

An inventory of trees 4 in. diameter at breast height (dbh) and larger on a 237-acre woodlot at the API Agricultural Experiment Station forestry unit, Fayette, made in 1951 indicated a large percentage of low quality trees and undesirable species, see photo. On approximately 100 acres, advanced pine reproduction existed beneath a growth of poor quality trees.

Initially, trees on 104 acres were marked for cutting because of disease defects, wolfishness, or crowding. From a total of 216 M bd. ft. (Int. ¼-in. rule), 43 M bd. ft. of pine and 22 M. bd. ft. of hardwood were offered for sale. This cut of just over 600 bd. ft. per acre was sold for $620.

Hardwood control of 35 acres was attempted by girdling stems over 3 in. dbh. On another 97 acres, cull trees were frilled and poisoned with a mixture of 1 part 2,4,5-T in 50 parts water. This treatment required 340 man hours labor and cost $291, less than half the amount received from timber sales.



Woodlot in 1951, left, had overstory of hardwood and some pine. Many young pines were in the understory but growing slowly because of the hardwood. Woodlot in 1959, right, after hardwood overstory was removed shows young pines taking their place.

Growth rate of pine in the pine stands was 175 bd. ft. per acre per year, while all timber on the rest of the forest had a growth rate of 38 bd. ft. per acre per year.

A 1956 inventory of the same area indicated an increase in stocking and improvement in stand conditions (see table). Basal area had more than doubled in all stands except the hardwood type, where 60% to 70% of the original basal area had been removed.

An improvement cut was made similar to the original. In addition to a sawtimber sale of 43 M bd. ft. of pine and 20 M bd. ft. of hardwood, 46 cords of pine pulpwood were sold. The sale of pine sawtimber stumpage returned $1,111, the hardwood sawtimber $192, and the pine pulpwood $192. A total of 305,000 bd. ft. was left after cutting.

BASAL AREA AND VOLUME PER ACRE REMOVED BY CULTURAL TREATMENTS

| Stand component | 1951 | | | | 1956 | | | |
|---|---|---|---|---|---|---|---|---|
| | Basal area present | Basal area cut | Volume | | Basal area present | Basal area cut | Volume | |
| | *Sq. ft.* | *Pct.* | *Pct.* | *Bd. ft.* | *Sq. ft.* | *Pct.* | *Pct.* | *Bd. ft.* |
| Pine in pine stands | 18.2 | 3.3 | 18.1 | 32.2M | 36.2 | 8.0 | 22.1 | 42.5M[1] |
| Pine in pine-hdws | 6.1 | 0.6 | 9.8 | 7.4M | 13.3 | 3.3 | 24.8 | 7.5M |
| Pine in hdw stands | 5.5 | 0.6 | 10.9 | 3.9M | 9.4 | 1.0 | 10.6 | 2.5M |
| Hdws in pine and pine-hdw stands | 1.8 | 1.5 | 83.0 | 10.2M | 7.4 | 6.0 | 81.0 | 11.7M |
| Hdws in hdw stands | 24.3 | 12.7 | 52.2 | 12.5M | 30.3 | 21.2 | 70.0 | 8.3M |

[1] Pulpwood cut of 35 units of 5 ft. wood (160 cu. ft.) estimated at 2.8 units per 1,000 bd. ft. added to saw timber volume cut.

Growth rate of pine in predominantly pine stands was 232 bd. ft. per acre per year. Timber in the remaining forest showed an annual per acre growth rate of 63 bd. ft. This was a considerable increase over the growth rate per acre before 1951. A greater increase in growth is expected within 5 years.

Established reproduction of satisfactory species and numbers is now present on all but 29 acres, see photo. Future treatment includes planting the 29 acres with loblolly to be followed by immediate release of competing hardwood.

### Good Investment

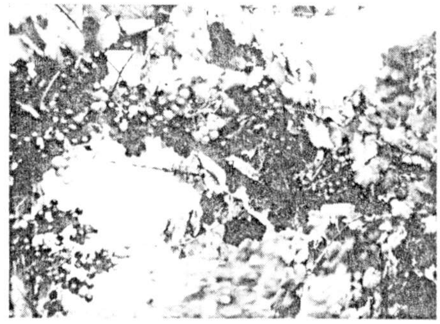
Any assistance given nature to improve woodlots is a good investment. Increases in quality, quantity, and accelerated growth should add considerably to the woodlot owner's income in a relatively short time.

In mixed stands, treating hardwood stems to a minimum dbh of 3 in. does not reduce hardwood competition sufficiently to ensure best growth of established pine. A light treatment for control of hardwoods in predominantly pine stands will aid pine growth.

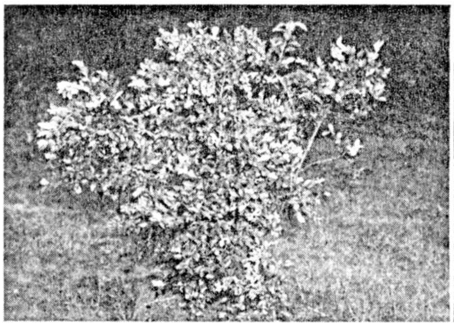
Poor quality, rundown woodlots can be transformed to productive forests of desirable species within a 10-year period. Costs can be kept below the income derived from improvement cuts.

# *New* COMMERCIAL FRUIT CROPS *for Alabama*

HUBERT HARRIS *and* J. M. BARBER
*Department of Horticulture*



Muscadine Grape



Blueberry

Plum

THERE ARE POSSIBILITIES for additional commercial fruit crops on Alabama farms!

These possibilities of such crops have attracted the interest of growers, processors, and others. Several fruits including muscadine grapes, plums, and blueberries, adapted to different areas of the State, have been considered. The uncertainty of markets is one of the principal reasons why some of these fruits have not been planted commercially.

### Current Research

Research is being conducted to improve market potentials, and to answer production problems. Improved varieties and selections are resulting from breeding projects at several experiment stations in the Southeast. Studies of processing and utilization of some of these fruits are also being made.

The horticulture processing laboratory at the API Agricultural Experiment Station has done extensive research with the use of fruits in jams and jellies. A major result is the new freeze-concentration jelly process.[1] This process retains much of the aromatic fruit flavors that are easily lost by conventional boiling processes.

### Muscadine Grapes

The muscadine grape is a native of Southeastern United States, and is well adapted to most parts of Alabama. It is highly resistant to many common fruit hazards, such as insect and disease damage, frost injury, and alternate year bearing. The early production age and high yields at maturity are indicated by the data on two standard varieties, Table 1.

Evaluation of new varieties and selection of muscadine grapes is a part of the processing research at this Station. Grape samples from breeding lines at other stations are tested for different products. High qualities of promising selections from Meridian, Miss., in comparison to the Hunt variety, are evident from data presented in Table 2.

### Plums and Blueberries

Commercial preservers have indicated an interest in production of plums in Alabama for use in jams. High quality jam has been made from the Sapa variety. New varieties better suited to Alabama needs are being developed at the API Station.

The Rabbiteye blueberry is well adapted to some areas of Alabama. Breeding of this fruit is being done at Tifton, Ga., and Raleigh, N.C. Improved varieties that have been developed include Tifblue, Menditoo, and Garden Blue. There appears to be promise for this fruit as a commercial crop in areas of the Southeast, especially for local markets.

These research accomplishments and the continued progress of the studies should be of much interest to growers, processors, and others concerned with the potentials for new fruit crops.

TABLE 1. MUSCADINE YIELDS AT AUBURN[1]

| Age of vines | Variety | |
|---|---|---|
| | Hunt | Thomas |
| *Yr.* | *Lb.* | *Lb.* |
| 3 | 4,639 | 2,653 |
| 4 | 10,778 | 7,789 |
| 5 | 9,995 | 8,300 |
| 6 | 13,043 | 9,801 |
| 7 | 16,169 | 13,585 |

[1] Based on yields in test planting of 17 varieties, 3 vines of each variety, spaced 12 × 20 ft.

TABLE 2. QUALITIES OF MUSCADINE GRAPE SELECTIONS[1]

| Selection | Fresh berries | | Jelly samples | |
|---|---|---|---|---|
| | Soluble solids | Flavor | Sparkle | Flavor |
| *No.* | *Pct.* | *Score*[2] | *Score* | *Score* |
| 13 | 18.2 | 8.5 | 9 | 10 |
| 15 | 18.3 | 8.8 | 9 | 8 |
| 18 | 18.0 | 7.8 | 9 | 9 |
| 19 | 19.0 | 7.8 | 9 | 10 |
| 45-16-D | 18.2 | 8.5 | 10 | 10 |
| 42-12-B | 17.0 | 7.0 | 9 | 10 |
| 43-12-B | 19.8 | 9.0 | 10 | 10 |
| Hunt | 16.2 | 7.0 | 8 | 7 |

[1] Selections from breeding lines at U.S. Hort. Field Sta., Meridian, Miss.
[2] Score range: 1—very poor; 6—fair; and 10—excellent.

[1] "New Process Produces Superior Jam and Jelly," *Highlights of Agricultural Research*, Vol. 4, No. 4, Winter 1957.

# *How* SAMPLES ARE CHECKED *for* NEMATODES

E. J. CAIRNS, *Nematologist*
N. A. MINTON, *Nematologist, USDA*

WHY IS IT IMPORTANT to have soil and plant samples checked for nematodes?

Except for the easily recognized root gall symptoms produced by the root-knot nematodes, an examination of the roots and surrounding soil is necessary to determine if harmful nematodes are present.

Because these parasites range from a sixteenth of an in. to less than a hundredth of an in. in length, special procedures are necessary for detecting their presence. Also, it is necessary to use a microscope to distinguish the harmful species from the harmless and beneficial ones that are to be found in all cultivated soils. Knowing exactly which species of the parasites and how many of each are present is necessary for making recommendations for control by various means.

### When to Take Samples

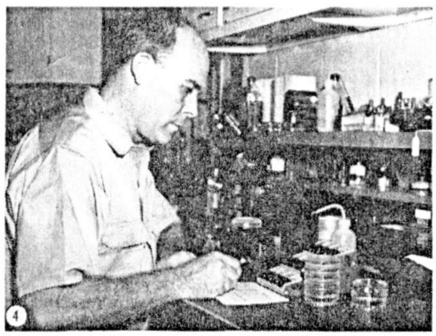
When to take samples depends on local conditions. When indications of plant decline are first apparent is, of course, a logical time to have the plants and soil checked so that if a remedy can be applied it won't be too late. However, a better time to check for nematodes is in advance of the next planting because problems are better prevented than cured. In all cases sampling is best done while the existing crop or planting is near the end of its season but still growing. The nematode population then will be large and most easily detected. For example, sampling in the fall would be the best time to check for nematodes and to get advice as to the ways for control before spring planting.

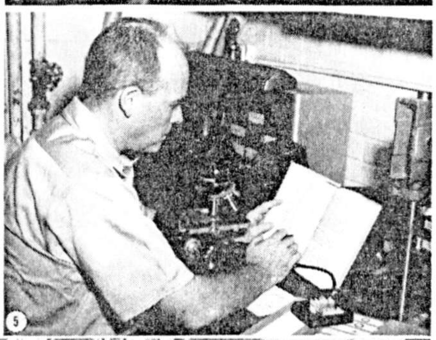
### How to Take Samples

How the soil samples are taken and checked for nematodes is illustrated by the accompanying photographs. Not shown are the special techniques used to check the inside tissues of the roots, stems, and other parts as is also done in the routine examination of the plants. The purpose of the checking is to determine how many of each kind of nematode parasite is present in the soil and in the plant. From this information a diagnosis can be made as to whether the nematodes are a factor. Also, this information is essential for the advisory service to the grower who is planning ahead for the next planting. Details of the advantages of doing this for control of the root-knot nematodes have been explained in the previous two issues of Highlights.

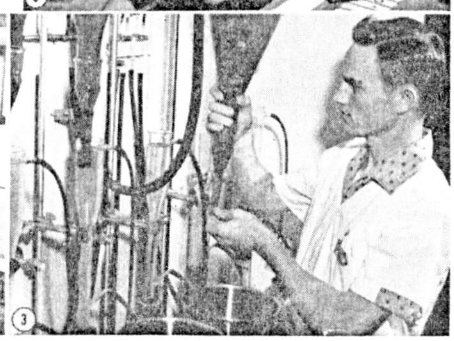
### Where to Send Samples

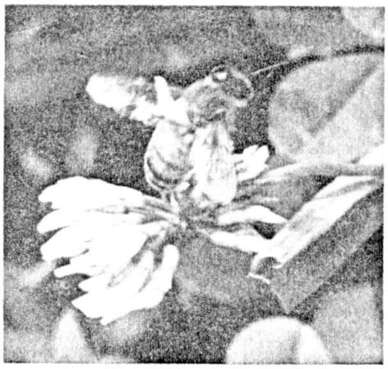
Where are the samples sent for checking? Your county agent will be helpful in assisting in the examination and sampling of the plantings, or you may wish to check on the situation by yourself. In either case, because of the necessity for laboratory processing of samples, they should be sent with description of conditions to the Plant Nematology Laboratory, Department of Botany and Plant Pathology, API Agricultural Experiment Station, Auburn. A complete analysis and recommendations will be made free of charge in about 1 week.



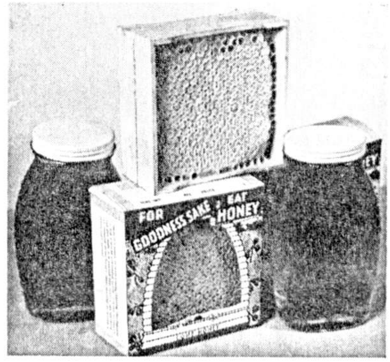


**1. A complete sample consists of both the plant roots and about 1 qt. of soil from immediately around the root system. 2. Samples should be promptly sent or brought to the laboratory. 3. Soil samples are processed on a special apparatus that separates the nematodes from the soil particles. 4. The nematodes after being freed from the soil are concentrated into small dishes where the identifications and counts of the different kinds are made with the aid of a low-power microscope. 5. Finally, exact identifications are made using a microscope with high magnification.**





# *The* HONEY BEE —*a friend to man*




G. H. BLAKE, JR., *Associate Entomologist*

Do you ever think when you see a honey bee drifting from flower to flower, just how much you owe this industrious creature? In her search for nectar and pollen, the honey bee renders immeasurable service.

Pollination of plants is probably the greatest service of the honey bee. Many fruits, including apple, pear, cherry, blackberry, strawberry, and grape, depend on honey bees for pollination. Watermelon, cucumber, and cantaloupe production and quality are greatly increased when honey bees are available for pollination. Honey bees are also highly important for producing seed of many vegetables, such as cabbage, carrots, collards, onions, pepper, beans, and asparagus, and such field crops as clovers, vetches, and cotton.

### Clover Pollination

White clovers produce practically no seed unless pollinated by honey bees.

Experiments in Alabama have revealed that crimson clover seed can be increased 4 to 10 times by placing 1½ to 2 colonies of bees per acre in or around the clover fields.

Other insects contribute to pollination of crops, but they cannot be depended upon. Honey bees are highly efficient pollinators, since they gather nectar or pollen from only one kind of plant at a time. A bee that begins gathering nectar from crimson clover will continue to work on this crop until it returns to the hive. In addition, the honey bee is the only insect that can be moved to an area where pollination is needed.

While pollinating your crops, the honey bee is busily engaged in gathering food for its own use. Without pollen, no young bees can be produced. In some areas of the country pollen or a pollen substitute must be fed to the bees. Nectar is gathered, concentrated, modified chemically, and stored in waxen bottles for later use. The end product is honey. The bees must have honey to survive the winter, but they generally have more than they need. Thus, man gets another benefit of the honey bee's labor.

### Valuable Food

Honey is a highly nutritious food. It consists of the sugars levulose and dextrose, but it also contains small quantities of essential minerals, vitamin C, and vitamins of the B complex. The dextrose in honey does not require digestion but is ready for use by the body. The levulose provides energy over an extended period. For this reason honey is widely used by athletes as a source of energy.

Honey has other valuable uses. It is used in pastry baking to prevent rapid drying out. Sufferers from hay fever may obtain relief by eating honey containing pollen that counteracts the hay fever. Honey is widely used in cough syrups and antiseptic preparations, and physicians may prescribe honey for diabetes in its early stages. Many doctors prescribe honey for use in infant formulas.

Another important product of the honey bee is beeswax. Principally used in cosmetics, beeswax is responsible for the white, pearly emulsion of all typical cold creams. Its next most important use is in church candles. Such candles remain firm at high temperatures. Beeswax is also used in adhesives, crayons, chewing gum, ink, lubricating oils, electrical insulation, and many other common products.

Honey bees can also serve man as an interesting, relaxing, and profitable hobby. Many overworked and worried men and women find relief from their troubles by keeping bees. No one can work with bees and have their mind on other problems. If they do, they generally are brought back to the business at hand by the business end of the honey bee.

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