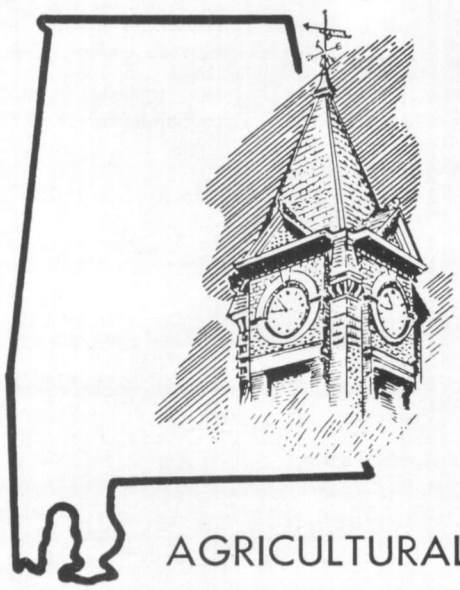
VOLUME 13, NUMBER 1 SPRING 1966



# HIGHLIGHTS of AGRICULTURAL RESEARCH

AGRICULTURAL EXPERIMENT STATION, AUBURN UNIVERSITY

# HIGHLIGHTS *of* Agricultural Research

*A Quarterly Report of Research Serving All of Alabama*

VOLUME 13, NO. 1 SPRING, 1966


## *In this issue . . .*



***On the cover.*** The past 5 years have seen a major face lifting at the Ornamental Horticulture Field Station, which has made it into a well equipped facility for specialized research on important nursery problems. The cover photograph was made from the lower of three bench leveled areas that are covered with greenhouses and service buildings. In the foreground is a new type greenhouse, covered with a semirigid plastic, that is being tested at the Station in a continuing study of greenhouse design. At right on the next higher level is a service building that was recently completed. Details of work at the unit are described in the story on pages 8-9.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*Auburn, Alabama*




## *New and Timely* PUBLICATIONS

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

**Bul. 344. Effect of Deep Turning and Non-Dirting Cultivation on Bunch and Runner Peanuts.**

**Bul. 346. Effect of Seed Size on Vigor and Yield of Runner Peanuts.**

**Bul. 347. Coastal Bermuda Pastures Compared with Other Forages for Dairy Cows.**

**Bul. 362. Response of Planted Loblolly Pine Following Various Conversion Methods.**

**Bul. 363. Forage Systems Compared for High Producing Cows.**

**Bul. 364. Homemaker Response to Poultry Promotion.**

**Cir. 136. Nitrogen for Dallisgrass Pastures in the Black Belt.**

**Cir. 149. Crop Varieties for Alabama—Field, Forage, Turf.**

**Leaf. 68. Spider Mites on Cotton in Alabama.**

**Prog. Rept. 87. Summer Annual Grasses.**

**Prog. Rept. 88. Effect of Several Insecticides and Application Schedules on Cotton Insect Control.**

Free copies may be obtained from your County Extension Chairman or by writing the Auburn University Agricultural Experiment Station, Auburn, Alabama.

# SUGAR—

# NEW CROP FOR ALABAMA?

CARL S. HOVELAND, *Dept. of Agronomy and Soils*
H. F. YATES, *Gulf Coast Substation*
J. W. LANGFORD, *Plant Breeding Unit*
J. K. BOSECK, *Tennessee Valley Substation*

GROW SUGAR IN ALABAMA?

This may not be as far-fetched as it sounds. Recent research indicates that sugar production is feasible on Alabama farms if problems of quotas and processing are solved.

What crop can be used for sugar production? Sugar beets have been unsatisfactory, as shown by the following average of six varieties:

| | *Yield of beets, tons per acre* | *Per cent sucrose* |
|---|---|---|
| Tennessee Valley Substation, Belle Mina | 6.1 | 8.1 |
| Gulf Coast Substation, Fairhope | 10.8 | 15.2 |

Yields were low when grown as a summer crop at the Tennessee Valley Substation and as a winter crop at the Gulf Coast Substation. In addition, sugar content of the beets was too low and leaf diseases were serious. In commercial production areas sugar beets contain 15 to 20% sucrose and yield 15 to 25 tons per acre.

Sweet sorghum appears to offer a much better possibility for sugar production. Varieties commonly grown in northern Alabama for syrup making are not suitable for sugar production. However, in recent years plant breeders have developed varieties with high sucrose content that could be used for sugar production.

Rio is a new variety developed at the USDA Sugar Crops Field Station, Meridian, Mississippi. This variety grows about a foot taller and matures a week later than Tracy sorghum, and it is highly resistant to rust and leaf anthracnose disease. Stalks are less juicy than Tracy but higher in sucrose. Lodging has not been a problem, although hurricane or tornado winds could be expected to cause serious losses.

Sweet sorghum experimental varieties for sugar production have been tested at the Plant Breeding Unit, Tallassee, and Gulf Coast Substation in cooperation with the USDA Sugar Crops Field Station. Tests were planted in late April and harvested in early to mid-September.

**Possibility of growing sorghum cane for sugar production is showing promise at the Gulf Coast Substation. Shown here is a new variety, named Rio, that has performed well in the tests. It makes high yields of cane, and sugar content is satisfactory.**

Rio has performed well in Alabama. Sugar yields of this variety, recorded in the following table, have been high and compare favorably with sugar cane in Louisiana:

| | *Stripped stalks, tons/acre* | *Per cent sucrose* | *Sugar yield, lb./acre* |
|---|---|---|---|
| Plant Breeding Unit, 5 years | 18.5 | 14.6 | 3,380 |
| Gulf Coast Substation, 2 years | 14.5 | 15.7 | 3,214 |

Sugar yields have varied considerably from year to year, mainly because of differences in stalk yields. At the Gulf Coast Substation, the 1964 sugar yield was 4,291 lb. per acre, but it dropped to 2,136 lb. in 1965 when there was a drought in April, May, and early June. Irrigation would likely give excellent yield response with this crop.

At present a sugar sorghum variety like Rio is suitable only for production of liquid sugar, a commodity used by soft drink bottlers and food processors. Demand for liquid sugar can be expected to increase. Current USDA research is seeking improved processing techniques for using sorghum in liquid sugar, as well as in solid sugar production.

Sugar processing plants are expensive and require a sizeable acreage of sugar crops in the vicinity. Land would need to be in large tracts and suitable for complete mechanization. Harvesting could be spread over a 6- to 8-week period. Research data indicate that Rio sorghum quality and yield hold up well for this length of time.

Cost of producing a pound of sugar from sweet sorghum is estimated to be competitive with the cost from sugar beets or sugar cane. Possible farm prices would depend on sugar prices, but farmers probably could expect $6 to $8 per ton of stalks at present sugar prices.

Of the many problems to be solved, government quotas is the biggest. Political consideration, both national and international, weigh heavily in allotment of sugar quotas. A nation does not want to be totally dependent on others for a commodity as essential as sugar, particularly when it could be grown at home. Sweet sorghums are well suited to Alabama and could possibly be the basis for a new agricultural industry to meet domestic sugar needs.

# EGG BREAKAGE *determined by* SIMPLE TEST

J. R. HOWES and C. H. MOORE
*Department of Poultry Science*

ABOUT 10% of the table eggs produced never reach the consumer because of breakage. In Alabama this percentage represents a yearly loss of more than $6 million. A major part of this loss is caused by careless egg handling. A minor portion is the result of physical makeup of the bird as influenced by breeding, age, temperature of laying house, and nutrition.

The producer, egg buyer, and contractor are interested in preventing or reducing breakage loss. But, they must have a method of determining whether excessive breakage is caused by substandard handling methods or by the physiology of the birds.

### Laboratory Studies Begun

Laboratory studies were conducted by Auburn University Agricultural Experiment Station to devise and test methods of measuring shell strength aimed at determining normal breakage. The results indicated that the specific gravity method is to be preferred to crushing, perforating, bombing with ball bearings, or rolling eggs down inclines. The specific gravity technique does not require destruction of eggs and large samples can be used economically to obtain better evaluation.

For some time it has been known that eggs with inferior specific gravities have thin shells, and therefore, have lower keeping quality and are more subject to breakage than those with superior gravities. This relationship, however, has never been clearly described so that it might be applied to field conditions.

### Flock Owners Cooperate

Owners of eight commercial laying flocks, each separately managed, cooperated for a complete laying cycle to compare egg shell quality evaluated by both field and laboratory methods. Each flock of White Leghorns, on floor litter, came into lay at about the same time. One hundred ungraded eggs were collected from each of the eight northern Alabama farms at four different times of the year and were transported to Auburn — about 200 miles.

At Auburn the eggs were stored overnight, weighed, and checked for specific gravity. The percentage of checks and various categories of egg breakage were obtained from all flocks on each occasion. These were statistically compared with the laboratory test data.

### Field Use Devised

A highly important negative (mathematical) relationship was obtained between specific gravity and percentage of broken eggs for all periods and flocks. These data are based upon total breakage from time of lay through the process of cartoning. Plotted data gave a straight line relation, indicating that it is possible to accurately assess egg breakage from specific gravities of the relatively small number of eggs tested. (See chart.)

For example, in the field, a contractor could assume total normal breakage of no more than 6% in a flock with a specific gravity of 70. If actual breakage in this flock happened to be 8%, the contractor or grower could assume some management or egg handling problem such as (1) poor nesting materials, (2) too few nests, (3) infrequent egg gathering, or (4) rough handling in gathering or packaging.

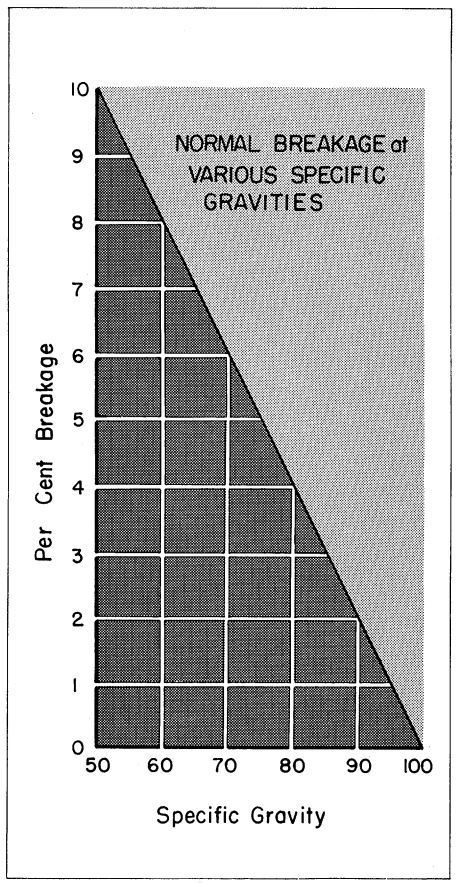
It is possible to organize a similar graph for any given strain of birds fed the same diet and use it to determine egg shell quality and normal breakage between houses, farms, or workers supervising birds. The only facilities needed are some plastic containers for the salt solutions, a hydrometer, a supply of common salt, and a small weighing scales to measure the salt. The test is presently being used by breeders to determine eggs with inferior shells which are unlikely to hatch.

After the various salt solutions are made and checked with a hydrometer and adjusted where necessary, eggs are placed in the solutions and moved from solution to solution until they just break the surface. The particular solution in which the egg just floats is the correct specific gravity. Because of variations between egg shells from birds within a flock, it is necessary to figure an average specific gravity. The number of eggs needed for this determination is dependent upon the desired accuracy and increases with the degree of variation within the flock. If a large number of determinations are being made, it is advisable to check solutions for corrections at frequent intervals. When determinations are being made, the eggs and solutions should be at approximately the same temperature which can be made possible by allowing the eggs to be in the same room as the solutions for a few hours prior to testing. This test represents the first time that a dependable field testing method has been devised for use by producers and contractors to reduce egg breakage and financial loss.

The following table indicates salt and water ratios necessary to prepare solutions of desired specific gravities.

*Salt Needed for Specific Gravity Solutions*

| *Specific gravtiy* | *Oz. per gallon* |
|---|---|
| 50 | 10.2 |
| 60 | 12.2 |
| 70 | 14.2 |
| 80 | 16.2 |
| 90 | 18.4 |
| 100 | 20.5 |






**Heavy seed crop produced by the hybrid vetch is shown by photo 1. Photo 2 illustrates how the new crop reseeds in grass sods. The excellent stand of vetch in soybean stubble, photo 3, reseeded after soybeans were grown and harvested following crop of the hybrid vetch that was managed for seed production.**

# Hybrid Vetch Reseeds Well in Summer Grass Sods

E. D. DONNELLY and C. S. HOVELAND, *Department of Agronomy and Soils*

R. M. PATTERSON, *Research Data Analysis*

A NEW HYBRID VETCH developed at Auburn does exactly what it was bred to do – reseed in perennial summer grass sods.

A high percentage of hard seed is the primary reason that the new vetch is able to reseed. These seed mature in late May or early June. Later they drop into the sod where they remain until cool temperatures and fall rain cause them to germinate.

In addition to its reseeding ability, this hybrid vetch has other desirable qualities. It produces high yields of seed and forage, seed do not shatter, and it is resistant to the vetch weevil and to the most commonly occurring species of root-knot nematodes in Alabama. (Early results of Auburn vetch breeding research were reported previously in HIGHLIGHTS OF AGRICULTURAL RESEARCH: *Developing New Vetches*, Vol. 8, No. 3; *Prospects Good for Reseeding Vetch*, Vol. 10, No. 3; and *Temperature Controls Germination of Hard-Seeded Vetch*, Vol. 12, No. 3.)

The new vetch is a hybrid resulting from a cross made in 1958 between *Vicia sativa* (Ala. 1894) and *V. angustifolia* (P.I. 121275 from Turkey). During the past 3 years it has been studied in Coastal bermuda and Pensacola bahiagrass sods.

RESEEDING OF VETCH LINES IN COASTAL BERMUDA AND PENSACOLA BAHIA, AUBURN, 1963

| Entry | Plants per 2 × 2 ft. | | | |
|---|---|---|---|---|
| | Coastal | | Bahia | |
| | Nov. 8 | Dec. 18 | Nov. 8 | Dec. 18 |
| | *No.* | *No.* | *No.* | *No.* |
| Hybrids | 10 | 82 | 6 | 40 |
| Warrior | 0 | 1 | 0 | 2 |

### Reseeding Ability Demonstrated

On August 24, 1962, unscarified seed of several hybrid vetch lines were broadcast on small plots in grass sods. An excellent stand was obtained in late autumn. The following spring a heavy seed crop was produced, as shown in photo 1, and seed were permitted to fall back into the sod. After summer grass stopped growing (fall 1963), plots were mowed and the residue removed. However, no disking or other soil tillage was done. Successful reseeding is shown by the thick volunteer stand in photo 2, and by data in the table.

Although Warrior vetch, which produces soft seed, had made a heavy seed crop the previous spring, there was practically no fall reseeding. Soft seed of this variety germinated in late June and July when moisture was adequate, but seedlings died in August.

Vetch stands were better in Coastal bermuda than in bahia, as shown by data in the table. Coastal had produced a thicker sod than bahia, and it was observed that soil moisture was more favorable for vetch seedlings in the thicker sod. The following year (1964), however, vetch stands were as good in Pensacola bahia as in Coastal bermuda.

### Possible Forage Crop

Potential of the hybrid vetch for forage production was shown when harvests were made January 27, 1965, after vetch had reseeded for the second year. Several of the most vigorous hybrids had already produced about 1,400 lb. of dry forage per acre in both grasses by this date. Such high yield of early winter forage from a reseeding stand cannot be overlooked.

Seed of the new vetch have been increased in cotton stalks at the Plant Breeding Unit, Tallassee, for larger scale field plantings for grazing tests. More than 2,000 lb. of seed was combined from 2 acres in 1965 (cleaned seed averaged 1,000 lb. per acre).

Following vetch seed harvest, the area was planted to soybeans. The soybeans were combined the first week in November, and the vetch reseeded to an excellent stand, as shown by photo 3. On a second area managed similarly, two volunteer vetch stands have been obtained from this sequence: Vetch for seed in cotton stalks, field peas, volunteer vetch (seed combined in spring), soybeans, and a second volunteer vetch stand in 1965. Thus, it appears that the hybrid vetch could be used in rotations with certain summer crops.

The new hybrid vetch is being tested in all sections of Alabama. It is being evaluated as a reseeding annual legume for grazing at several locations.

Still in the experimental stage, the hybrid has not been released as a variety. If it continues to perform satisfactorily, seed will be increased for farmer use.

# Managing Sorghum-Sudan Hybrids for Best Dairy Cow Pasture

J. A. LITTLE and G. E. HAWKINS, *Dept. of Dairy Science*
L. A. SMITH and H. W. GRIMES, *Black Belt Substation*

SORGHUM-SUDANGRASS HYBRIDS have been widely publicized. Their fast growth rate and high forage yields under ideal moisture and fertility conditions are well known. Because of this reputation large acreages have been planted for summer grazing.

Rapid acceptance of the sorghum-sudan hybrids made these forages important in Alabama's dairy feeding program, despite lack of information on managing the crop. To fill this information void, Auburn University Agricultural Experiment Station began tests at the Black Belt Substation, Marion Junction. Continuous grazing and rotational grazing management systems were compared for their effect on productivity and feeding value of the forage.

### Management Systems About Equal

Continuous and rotational grazing proved equal from the standpoint of forage quality and cow performance. Measurements used were milk production of grazing cows, forage consumption by cows, forage digestibility, and pasture carrying capacity. As with other crops, continuous grazing was the simplest management method.

Two 6-week tests were done during consecutive summers, with four cows grazed on each system during both years. The sorghum-sudangrass was seeded in 8-in. rows on prepared seedbed. Grazing was begun when forage was 20 to 22 in. tall (this averaged 43½ days after planting).

For rotational grazing, paddocks were divided into four subareas. Cows were shifted from one to another about every 5 days. Cows on continuous grazing had access to the entire area at all times. Concentrate feeding was the same for all test cows in milk — 1 lb. for each 3 lb. of 4% fat corrected milk (FCM) produced daily during the week immediately preceding the tests.

### Forage Quality Similar

Management system made little difference in forage quality, but amount eaten by cows was slightly different, as shown by data in the table. Cows on continuous grazing consumed more dry matter per 100 lb. body weight than those on rotational grazing. Ranges in dry matter intake were 1.94 to 3.25 lb. per 100 lb. body weight for continuous grazing and 1.81 to 2.34 lb. for those on rotational grazing. Intake measurements were made during the second and sixth weeks of each test.

EFFECT OF MANAGEMENT SYSTEMS ON QUALITY OF SORGHUM-SUDAN, 2-YR. AVERAGE

| Quality measurement | Result, by grazing management system | |
|---|---|---|
| | Continuous | Rotational |
| Forage intake, dry matter/cwt. | 2.4 lb. | 2.1 lb. |
| Digestibility of dry matter | 67.7% | 67.4% |
| FCM/cow/day | 33.9 lb. | 34.6 lb. |
| Acreage/cow | 0.55 A. | 0.57 A. |
| Milk/day/acre | 61.6 lb. | 60.7 lb. |

Digestibility of forage was similar on the two pasture systems. This decreased from a high of about 72% at beginning of the test period to a low of 63% during the final week. Although advancing maturity affected digestibility and intake, regrowth was relatively rapid and supplied immature forage at all times on both continuous and rotationally grazed pastures.

Milk production showed little difference as a result of grazing management method. Production was compared on the basis of 4% FCM. Nevertheless, cows in both groups dropped in production faster than was expected. This was associated with the decrease in digestibility of forage grazed.

### Per Acre Comparisons Made

Acreage required to support one cow was about the same for continuous and rotational grazing. Because of lodging and trampling losses, more forage was wasted when pastures were rotationally grazed. This probably accounts for the slightly lowered carrying capacity and forage intake by cows on the rotational system. Areas grazed under both systems were stocked to capacity.

On the basis of milk production per acre, grazing management system had little effect under study conditions. The daily average was 61.6 lb. for continuous and 60.7 lb. per acre for rotational grazing. Acreage required per cow was almost identical for the two systems.

Body weight changes varied between systems and between years. Cows on continuous grazing gained weight during each 6-week test. Those on rotational grazing lost during the first test but gained during the second year's trial.

Preliminary results of a current study indicate that wider row spacing may improve sorghum-sudangrass pastures. Seeding in 24-in. rows reduced amount of lodging and extent of trampling damage by grazing cows without lowering forage quality and animal performance. Clipping of forage when needed is another management practice that can aid in keeping forage quality high.

**Sorghum-sudan hybrids are widely grown in Alabama to provide high quality summer grazing for dairy cows. Management tests with these annuals at the Black Belt Substation showed that quality of forage and milk production of grazing cows were the same on continuous and rotational grazing. However, management proved simpler when continuous grazing was practiced.**

**Tomato plot at left received 1,500 lb. 8-8-8 fertilizer but no manure; center plot received 6 tons of broiler manure but no fertilizer; and plot at right received 1,500 lb. 8-8-8 plus 6 tons broiler manure.**

# Effective Use of Poultry Manure Influenced by Rainfall

L. M. WARE and W. A. JOHNSON, *Department of Horticulture*

THE AMOUNT and distribution of rainfall have a marked influence on the effective use of fertilizers and manures.

The most important factor is the time of excessive rains as related to time of application of the materials. A deficiency of rainfall may be overcome by irrigation. Little can be done about excessive rains.

Studies were conducted at Auburn University Agricultural Experiment Station in 1964 and 1965 with tomatoes on a sandy loam soil to measure current and residual effects of a commercial fertilizer and broiler manure. Results provided an excellent opportunity for determining the influence of leaching rainfall on effective use of commercial fertilizers and animal manures. Irrigation was applied when needed; therefore, moisture was not a factor. However, there was no control of excessive rain.

In 1964, rainfall measured at the plots was 18.10 in. in April, 3.01 in. in May, and 3.98 in. in June. Periods of high rainfall were 3.70 in. April 5, 4.72 in. April 6, and 5.55 in. April 26.

In 1965, records showed rainfall of 8.38 in. for March, 1.91 for April, 1.06 for May, 7.35 for June, and 4.37 for July. Periods of high rainfall were 2.23 in. March 17, 1.97 in. June 13, and 2.14 in. June 24. Manure was applied in February 1964 and March 1965. Fertilizer was applied on April 13 and May 13, 1964; and applied April 12 and May 12, 1965. The 1964 crop was planted April 16 and the 1965 crop April 15. Harvest in 1964 extended from June 23 through July 27 and in 1965 from June 22 through July 13.

Treatments for the 2 preceding years, 1962 and 1963, and for the 2 years, 1964 and 1965 are given in the table. Also given are the marketable yields on acre basis for 1964 and 1965, the 2 years of great contrast in rainfall patterns.

Data show effects of different rainfall patterns on effectiveness of the two fertilizer materials for different years. Yields from plots receiving no commercial fertilizer but 6 tons manure per acre each year for both 1962-3 and 1964-5, were 19,467 lb. per acre in 1964 and 53,504 in 1965. Yields from treatments of 1,500 lb. fertilizer each year of both periods but no manure were 26,016 lb. in 1964 and 32,909 in 1965. The yield in 1964 was 34% or 6,549 lb. higher on the treatment receiving fertilizer only than from the one receiving manure only.

The 1965 yield from the application of manure only was 63% or 20,595 lb. higher than from the one receiving fertilizer only. Similarly, treatments of both fertilizer and manure each year for both periods produced 128% or 24,878 lb. more in 1964, whereas in 1965 they produced only 28% or 15,123 lb. more than the plot receiving manure only. By contrast the crop that received both fertilizer and manure each year produced 70% or 18,329 lb. more in 1964 and 108% or 35,718 lb. in 1965 more than the crop receiving only fertilizer each year for both periods.

Similar comparisons of high practical importance may be made from the table by comparing relative yields for 1964 and 1965 from plots receiving fertilizer only, manure only, or both for either the first period (1962-3) only, for the second period (1964-5) only, or for both periods. Yields of plots receiving both fertilizer and manure during 1962-3 produced only 21,038 lb. tomatoes in 1964 without fertilizer or manure, 31,763 without fertilizer but with manure, and 43,174 lb. with fertilizer but no manure. By contrast, yields in 1965 from the corresponding treatments in order were 20,038, 50,105, and 50,214 lb.

Soil nitrates seemed to be an important factor in determining yield from different treatments. In 1964, soil nitrates were less than 20 p.p.m. $NO_3$ in all plots prior to the second fertilizer application. On May 25, after the second fertilizer application on May 14, plots receiving only fertilizer had 15 p.p.m. Those receiving only manure had 11 p.p.m. Those getting both treatments had 27 p.p.m. $NO_3$. On May 10, 1965, before the second fertilizer application, soil nitrates in plots receiving only fertilizer was 26 p.p.m. Plots getting only manure had 43 p.p.m. Those receiving both had 106 p.p.m.

YIELDS OF MARKETABLE TOMATOES FROM RESIDUAL AND CURRENT APPLICATIONS OF FERTILIZERS AND MANURES IN YEARS OF DIFFERENT RAINFALL PATTERNS AND SOIL NITRATES BY PERIODS

| Treatments | | | | Yields of marketable tomatoes | | | | Nitrates | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1962-1963 | | 1964-65 | | | | | | 1964 | | | | 1965 | | |
| Fert. 8-8-8 | Manure | Fert. 8-8-8 | Manure | 1964 | | 1965 | | 5/6 | 5/14 | 5/25 | 6/10 | 5/10 | 6/2 | 6/21 |
| *Lb/a* | *Ton/a* | *Lb/a* | *Ton/a* | *Lb/a* * | *Per cent* * | *Lb/a* * | *Per cent* * | *p.p.m.* | *p.p.m.* | *p.p.m.* | *p.p.m.* | *p.p.m.* | *p.p.m.* | *p.p.m.* |
| 0 | 6 | 0 | 6 | 19,467c | 70.3a | 53,504b | 78.8a | 8 | 11 | 11 | 9 | 43 | 58 | 7 |
| 1500 | 6 | 1500 | 6 | 44,345a | 68.7a | 68,627a | 79.6a | 10 | 14 | 27 | 15 | 106 | 25 | 9 |
| 1500 | 6 | 0 | 6 | 31,763b | 66.4a | 50,105b | 76.6a | 12 | 17 | 13 | 9 | 16 | 29 | 7 |
| 1500 | 6 | 0 | 0 | 21,038c | 64.5a | 20,038d | 75.2a | 6 | 13 | 12 | 9 | 8 | 41 | 3 |
| 1500 | 6 | 1500 | 0 | 43,174a | 69.6a | 50,214b | 80.5a | 13 | 19 | 32 | 18 | 29 | 28 | 6 |
| 1500 | 0 | 1500 | 0 | 26,016b | 60.0a | 32,909c | 74.2a | 9 | 11 | 15 | 12 | 26 | 39 | 8 |

* Differences significant for yields if letters different.

General layout of Field Station is shown in view from lower level (left). Field plots are in foreground, with levels devoted to buildings in background. Photo at right above shows how simplified framing supports greenhouse covering of the new, semirigid PVC plastic, which has the added advantage of longer life than polyethylene.

*special research for special needs—that's mission of*

# ORNAMENTAL HORTICULTURE FIELD STATION

R. E. STEVENSON, *Department of Publications*
RAYMOND L. SELF, *Ornamental Horticulture Field Station*

A SEVERE FREEZE along Alabama's Gulf Coast in December 1950 wiped out most of the area's satsumas and much of the nursery stock. Despite such losses, the damaging freeze was actually a blessing in disguise for Mobile's nursery industry. This near calamity provided the final push needed for starting a research program geared to the area's nursery needs.

Reacting to the research interest, the 1951 Alabama Legislature appropriated funds for operating a research unit of Auburn University Agricultural Experiment Station in Mobile. Work was begun in 1952 at the unit, which was officially named Ornamental Horticulture Field Station.

### History Dates to 1928

Although the current Field Station has been operating only since 1952, work of the Spring Hill facility dates back to 1928. That year Dr. L. L. English, Experiment Station entomologist, set up a temporary laboratory in the Spring Hill section and began work on satsuma insect pests.

The present location was put into use in 1930 when the City of Mobile deeded 6⅔ acres to Alabama Polytechnic Institute for a research facility. Another acre was added in 1934. In 1965 the City provided an adjoining area, bringing total acreage to about 15½.

The Alabama State Department of Agriculture and Industries furnished and equipped the original buildings, and assigned Dr. G. F. Turnipseed in 1930 to cooperate in research on satsumas and pests of azaleas and camellias. This work continued until 1945 when English and Turnipseed left the Lab.

In 1941 an agreement with USDA, State Department of Agriculture and Industries, and experiment stations of South Carolina and Louisiana provided for research on azalea flower spot, a new disease problem in Gulf and Atlantic states. Dr. Cynthia Westcott and Dr. D. L. Gill were assigned to the project by USDA Bureau of Plant Industry.

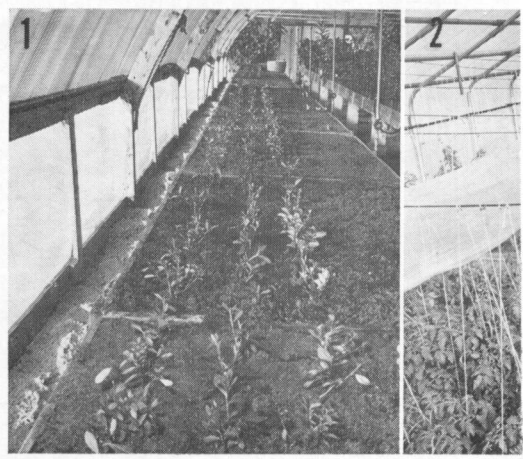
The next major shift was the 1952 establishment of the facility as it is known today. Dr. R. L. Self was transferred from the Main Station to direct an expanded research program emphasizing disease, insect, and fertility problems of azaleas, camellias, and other ornamentals, which he still heads.

### Varied Problems Studied

Throughout its history, the Spring Hill research facility has made numerous contributions. A wide variety of nursery and homeowner problems has been studied since the expanded program was begun in 1952. During that time, nursery production in the Mobile area has shifted from emphasis on field and liner beds (mainly camellias followed by azaleas) to container-grown stock. With this change that made marketing easier, nurserymen increased kinds of landscape plants being produced. The resulting problems in propagation, fertilization, and pest control have been attacked at the Station.

A striking development was design of a low cost plastic greenhouse that was widely accepted throughout the Nation. The curved roof type house used a special welded wire that supported the polyethylene plastic covering to replace more expensive framing. Construction of hobby and commercial size plastic houses was described in Progress Report 81.

Latest greenhouse design development has been adaptation of a new type plastic, a semirigid, corrugated polyvinyl chloride (called PVC) that is sold in long sheets. With this covering only a minimum of support – center posts and pur-




Types of research at the Field Station are illustra photos: 1. Different bedding mixtures are being this research area. 2. Greenhouse tomato producti attention in new study. 3. Result of putting mi

lins – is needed for houses as wide as 36 ft.

Disease control work of the Field Station resulted in publication of Progress Report 80. An extensive study of the azalea petal blight problem revealed that two disease organisms are involved, and Thylate was found to control both. Another study identified cylindrocladium as the organism causing most damping off in greenhouses. Found effective against this organism and leaf blight is a 30-minute soak before sticking cuttings, using 2 lb. per 100 gal. of Thylate, Polyram, or Dac 2787 followed by weekly sprayings if needed.

Methods of controlling numerous ornamental insect pests resulted from cooperative studies with Main Station entomologists. Effective control of chinch bug in St. Augustine grass, reported in Progress Report 79, made possible continued use of this grass in the area.

A major development in ornamental fertilization was the finding that azaleas and camellias can tolerate more lime than was formerly thought. Use of extra lime stimulates root growth and makes plants more resistant to Phytophthora root rot. The major soil fertility problem of nurserymen and homeowners was defined as high phosphorus-low calcium.

Several years of cold protection studies resulted in two findings that can prevent much damage to container plants: (1) light colored cans reduced injury, since both freeze and thaw damage proved greater in black or green cans; and (2) shavings or sawdust should not be used under containers because these materials prevent heat radiation from the soil. Recent cold damage tests revealed that peatmoss froze and thawed slowest of all potting mixtures, followed by charcoal. Sandy clay or topsoil froze quickest. Polystyrene can liners protected roots against freezing and rapid thawing.

### Current Research

Six major areas are receiving emphasis in the current research program:

(1) Potting soil studies are being intensified because of the need for local substitutes for peatmoss.

(2) Best methods of using the PVC covering for curved type greenhouses is being sought.

(3) Creating much interest is a greenhouse tomato project. Tuckcross O variety is being used in the second year's work, following 1965 comparison of varieties. Currently being investigated are types of growing media, single vs. multiple stems, systemic insecticides, and use of a plastic tube connected to the heater for more uniform temperatures.

(4) Safety of new, systemic nematocides are being determined for a variety of ornamentals.

(5) New fungicides are being tested for effectiveness against root rotting and leaf spotting of ornamentals.

(6) Weed control emphasis includes not only determining rates that provide needed control, but safety of new weed killers to ornamentals.

Future plans call for continuing current research, stressing quality plants produced at low costs.

Scarcity and expense of nursery labor call for expanded studies of synthetic potting mixtures. The aim is to use only processed material to avoid necessity of sterilization and initial fertilization of soil containing mixtures. Mixtures of the future will probably include systemic fungicides, insecticides, and nematocides for continuous protection, and long lasting fertilizers.

Future research plans reflect the need for increased cold hardiness to reduce freeze loss of plants. Additional fertility studies are aimed at more accurately determining needs for minor elements.

An intriguing area that will be expanded concerns use of growth retardants for home as well as nursery use. If methods of using these chemicals can be perfected, size and shape of ornamentals and lawn grasses could be regulated by spraying, to eliminate shrub pruning and lawn mowing.

### Station Has Face Lifted

A face lifting during the past 5 years has taken the Field Station from an era of completely inadequate buildings to a well equipped facility. The main area is developed in four large stair-step level areas, with the top three having greenhouses and other buildings and the bottom level devoted to field plots. A 260-ft. deep, 4-in. well is located on tier two.

Additions in 1965 were a paved main service road and a new service building. This building is a pole frame structure on a concrete slab, measuring 41 × 108 ft. It has a small cold storage room and shop, and is large enough to drive in a semi-trailer truck.

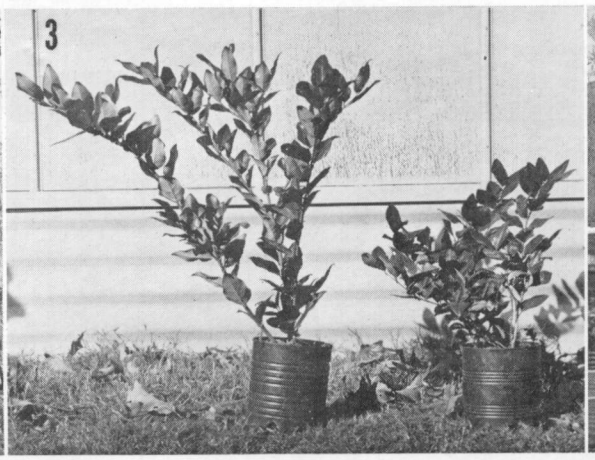
In addition to the laboratory-office building, these greenhouses complete the Station's physical facilities:

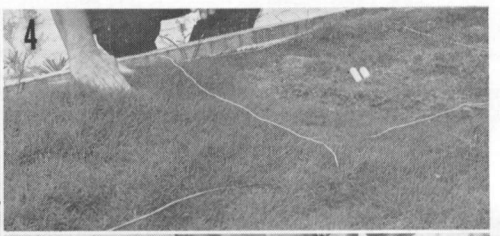
Glass type – two measuring 25 × 93 and 25 × 62 ft., equipped with automatic ventilation and forced air heaters.

Plastic covered (curved wire with PVC covering) – one measuring 30 × 96 and two of 25 × 96 ft. size. These were originally polyethylene houses that were re-covered with the new plastic.

New curved type PVC (wood frame) – two measuring 19 × 88 and 36 × 88 ft.

Aluminum frame, PVC covered – two measuring 36 × 96 ft.





**y these ated in getting element**

**mixtures into potting mix is shown here by plant at left, contrasted with other that got no minor elements. 4. Healthy grass plot at left, which received urea-formaldehyde fertilizer plus herbicide, is contrasted with check plot at right. 5. Possible use of growth retardants is getting attention. Untreated grass in center made normal growth, while others were held back by retardants. In addition to controlling growth, retardants may also make grasses more tolerant of shade.**

# The ALABAMA SLAUGHTER CATTLE INDUSTRY

M. J. DANNER, *Department of Agricultural Economics and Rural Sociology*

Movement of people from rural areas to urban employment has had a definite impact on meat processing and consumption in Alabama.

Commercial cattle and calf slaughter has increased from 195,000 head in 1944 to 296,000 head in 1964, an increase of about 52%. Calf slaughter, in 1964, was less than one-fifth of the total.

Consumers with rising incomes have increased per capita consumption of beef and decreased per capita consumption of pork. Although cattle production has continued to expand in Alabama, direction has been principally toward non-slaughter kinds, primarily, feeder calves. Thus, Alabama slaughter plants have found it necessary to go outside the State to purchase mature, good quality cattle suitable for sale as block beef.

Although cattle slaughter has increased, the major activity of meat packing plants still is pork processing. Local, independent plants dominate though several plants have regional distribution in adjoining states. Swift Packing Company is the only meat packer with national distribution that has slaughter facilities in Alabama. There are 45 packing plants in Alabama with an annual cattle and calf slaughter above 300,000 lb. liveweight. Six plants have federal inspection and may legally ship meat across state lines. Most plants slaughter less than 2 million lb. liveweight cattle and calves annually and have fewer than 20 workers per plant.

### Composition of Slaughter

Results of a study in 1962 by the Auburn University Agricultural Experiment Station show that the major portion of the cattle and calves commercially slaughtered in Alabama that year was sold as block beef, see figure. However, noticeable differences existed in the type processing done by different slaughter plants. Federally inspected plants, for example, processed 51% of their slaughter as block beef, whereas major emphasis in nonfederally inspected plants was on boned beef. Boned beef generally is not salable as retail beef cuts.

Steers and heifers accounted for 49% of the total cattle and calves purchased by Alabama meat packers. Cows, slaughter and veal calves, and bulls and stags made up 26.9, 20.9, and 3.2%, respectively. Federally inspected plants slaughtered about four-fifths of all cattle and calves processed in 1962.

Grade and class of cattle slaughtered varied with plant size. Steers and heifers accounted for 50.6% of the slaughter by federally inspected plants, whereas medium nonfederally inspected plants slaughtered 32.7% steers and heifers. Cows were the principal class slaughtered by these latter plants, accounting for 44.5% of total slaughter. Almost 85% of the steers and heifers purchased for slaughter during 1962 graded Good and above.

### Source of Cattle

About three-fourths of all cattle for slaughter were bought within the State. More than 50% of the steers and heifers were bought in Alabama, see table. Slaughter calves, as well as cows, were purchased largely within the State. Steers and heifers constituted the major portion of purchases obtained from out-of-state sources. About 20% of the steers and heifers were bought in Midwestern States and 10.4% were bought in Western States.

The auction market was the major source of slaughter cattle in 1962. More than 6 out of 10 cattle and calves were bought at auction markets. About one-fifth of the cattle and calves came from farmers and commercial feedlots. Livestock dealers supplied 10.3% of the cattle and calf supply. Other sources were packers' feedlots and terminal markets.

The percentage of cattle obtained direct from producers without an intervening transaction between the producer and the slaughter plant amounted to 22% of total animals purchased during 1962. Steers and heifers were the principal kinds of slaughter cattle bought direct as shown below:

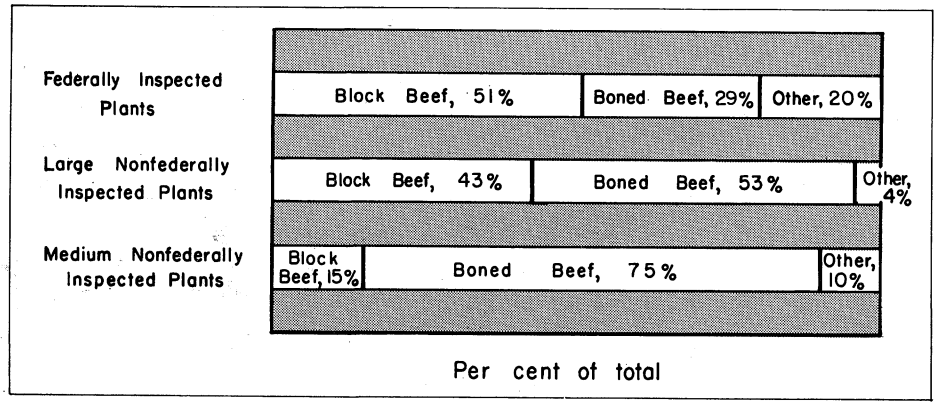
| *Market class* | *Percentage purchased direct* |
|---|---|
| Steers and heifers | 28.6 |
| Calves and veal | 3.2 |
| Cows | 8.4 |
| Bulls and stags | 11.1 |
| All cattle | 22.0 |

Federally inspected plants had a higher proportion of direct purchases for heavier steers and heifers in the higher grades than did other plants. For example, 45% of the Good and Choice animals weighing more than 500 lb. were bought direct by these plants.

Mature, good-quality slaughter cattle will undoubtedly continue to be shipped into Alabama until adequate supplies of steers and heifers are produced within the State.

Sources of Cattle Purchased by Slaughter Plant Operators, Alabama 1962

| Area of origin | Class | |
|---|---|---|
| | All cattle | Steers and heifers |
| | *Per cent* | *Per cent* |
| Alabama | 74.0 | 55.2 |
| Border states | 10.9 | 13.7 |
| Other southern states | 0.1 | 0.2 |
| Midwestern States | 10.0 | 20.5 |
| Western States | 5.0 | 10.4 |




**This graph shows composition of beef processed in Alabama slaughter plants in 1962.**

# IMPORTANCE of PLANTING DISEASE RESISTANT VARIETIES

J. A. LYLE, *Department of Botany and Plant Pathology*

DEVELOPMENT OF RESISTANT VARIETIES of basic food and feed crops that can resist destruction caused by diseases, insects, and unfavorable weather conditions would be a major breakthrough in agricultural research.

Plant pathologists have found that the ideal way of controlling diseases is by planting disease-resistant varieties. However, it is unlikely that all major diseases will be controlled in the near future by this method. Many diseases have been brought under control by a combination of planting moderate resistant varieties and using improved fungicides. Some of the more serious diseases cannot be controlled economically by cultural practices or use of fungicides by the grower. These include root and crown rots of cereal grains, legumes, and many other plants; gibberella head blight of wheat and barley; stalk rots and ear rots of corn; destructive rusts of cereals; and numerous other diseases caused by fungi, viruses, and bacteria.

### Contributing Factors

Disease damage varies from year to year and from one locality or field to another depending on the host, the environment, and the causal organism. All three factors must be present for the development of a disease.

A serious and destructive disease of oats occurred in 1944-47 in Alabama and throughout the country known as Victoria or Helminsthosporium blight. Oat varieties of Victoria parentage resistant to leaf or crown rust and smut, dominated plantings in 1946. Thus, in breeding for resistance to these two diseases, a relatively unimportant disease reached epidemic proportions when a susceptible host was planted, when the causal organism was present, and when favorable environmental conditions occurred.

Smuts of small grains, corn, and related crops, for many years a headache to growers, have been controlled largely through the planting of adapted, resistant varieties.

### The Fight Continues

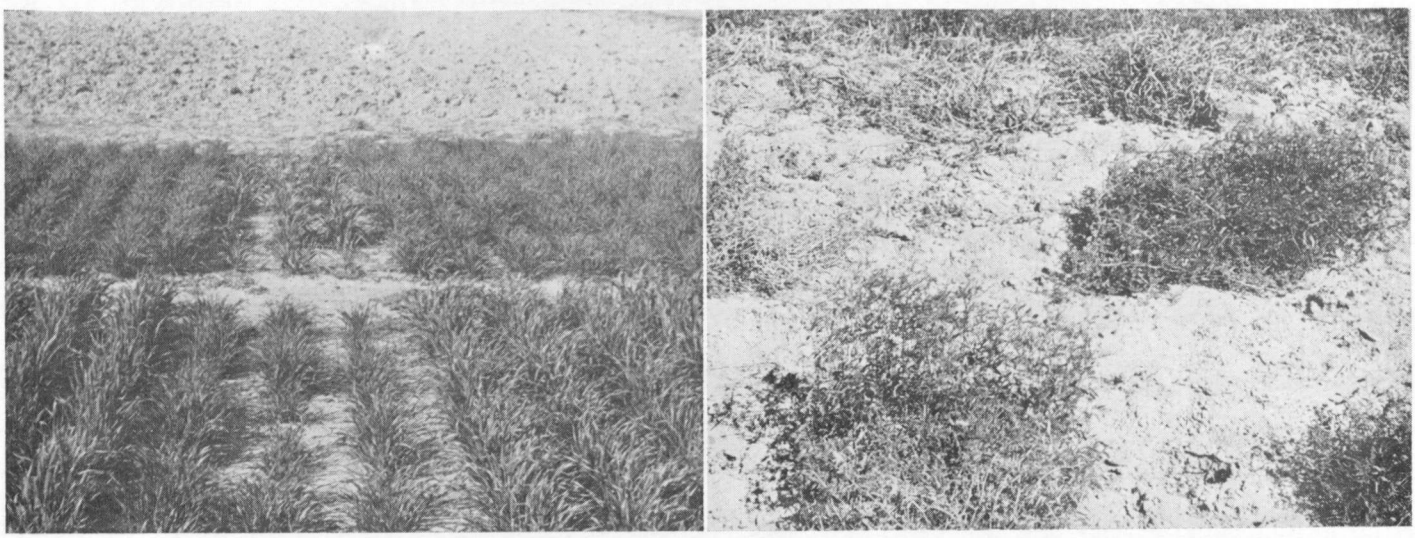
Ravages produced by rust fungi affecting small grains present a challenge to the plant breeder and plant pathologist. A major problem is that most plant disease organisms, the rust and smut fungi, especially the former, are continually producing new varieties or strains of causal organisms to which many of the crop varieties available to the grower show varying degrees of resistance and susceptibility.

Some of the small grain varieties recommended for planting in Alabama contain no specific factors for disease resistance and frequently vary in susceptibility. Such variation may result from differences in environment, type, race, and prevalence of the disease-causing agent, and the development and physiological condition of the host. Similar variation prevails among the leguminous crops as vetch, alfalfa, the clovers, and others.

### Other Diseases

In recent years a malady of corn, corn stunt disease caused by a virus, has resulted in major damage in corn plantings in the United States, especially in the South and Midwest. Hopefully adapted, resistant varieties will be available in the near future to offset this potentially devastating corn disease, since there are marked differences to the disease in varieties and inbred lines.

Plant diseases are tremendously important factors in increased costs and decreased amounts of our basic food and feed crops. Thus, it is paramount that man must learn how to control more diseases and how to control many diseases better. There must be decreased cost and increased efficiency. The planting of adapted, resistant varieties is a must with all crops.



**Plot at left shows reaction of oat varieties in seedling stage to Victoria blight. Compare irregular stand of varieties in center with those on either side in the foreground and background. Plot at right shows the reaction of vetch clones to crown rot. Note healthy and vigorous growth of unaffected clone in right background with five other diseased and unthrifty clones.**

# PLANTING TIME *affects performance of* SOYBEAN VARIETIES

W. C. JOHNSON, *Dept. of Agronomy and Soils*

SOYBEANS MAKE HIGHER YIELDS when planted at the right time. Planting date is critical for some varieties, whereas others can be planted over an extended period and still make satisfactory yields.

Effect of date of planting was shown by 3 years of tests at the Gulf Coast Substation, Fairhope. Four adapted varieties, representing a range in maturity from very early to very late, were each planted at approximately 2-week intervals from May 1 to July 15. Yields and plant measurements were taken on all varieties at maturity to determine reaction of each to the different planting times.

The relationship of varieties to planting date is illustrated by data in the table. Varieties are listed in order of increasing time to maturity, Hood being 3 to 4 weeks earlier than Bienville.

Yield of all varieties was high and showed little effect of planting date through mid-June. Planting after that date reduced yields of all varieties, but the most severe decline was by the early variety, Hood. Plant height and bean height reacted similarly to time of planting. Bean placement is critical because of excessive harvest losses when beans are too low on the plant.

Although these results are from southern Alabama tests, the same trends were noted in northern Alabama. Actually, time of planting effects on varieties are more marked in northern Alabama because of the greater change in day length.

Time of flowering and bean maturity are largely determined by length of day. In midsummer when days are long the plants remain vegetative and continue growing. When flowering begins, growth stops and all the plant energy goes to setting and maturing a crop of beans.

Varieties differ in the day length needed to initiate flowering. A late maturing variety requires a shorter day to start flowering than does an early maturing bean. Therefore, when planting is late and time for making vegetative growth is limited, a late variety will make a larger plant than an early variety. Because of this, one of the later adapted varieties should be selected when planting is delayed.

The latest possible planting date with a reasonable chance for success is July 15 in southern Alabama and 3 to 4 weeks earlier in northern Alabama.

This general rule of thumb provides a good guide to follow: After June 1 in northern Alabama and June 15 in southern Alabama, you can expect a reduction in yield of ½ bu. for each day's delay in planting.

Despite the importance of planting time, soil moisture is an essential element of success. Moisture must be adequate to get a good stand regardless of date.

It is desirable to plant varieties of different maturity to extend the harvest season. Also, circumstances may require delayed planting. In either case, variety selection is important. When planting early, either early or late varieties may be used, but only late maturing varieties are suitable for plantings that are made late.

PERFORMANCE OF DIFFERENT SOYBEAN VARIETIES PLANTED AT VARIOUS DATES, GULF COAST SUBSTATION, 1960-62

| Variety and planting date | Per acre yield, 1960-62 | Plant height, 1960 | Height of lowest bean, 1960 |
|---|---|---|---|
| | *Bushels* | *Inches* | *Inches* |
| **Hood variety** | | | |
| May 1 | 45 | 23 | 4 |
| May 15 | 45 | 18 | 3 |
| June 1 | 48 | 24 | 5 |
| June 15 | 41 | 22 | 4 |
| July 1 | 30 | 16 | 3 |
| July 15 | 15 | 16 | 3 |
| **Jackson variety** | | | |
| May 1 | 41 | 34 | 7 |
| May 15 | 45 | 37 | 8 |
| June 1 | 44 | 34 | 6 |
| June 15 | 45 | 21 | 6 |
| July 1 | 43 | 26 | 4 |
| July 15 | 32 | 24 | 4 |
| **Yelnanda variety** | | | |
| May 1 | 38 | 42 | 12 |
| May 15 | 44 | 42 | 12 |
| June 1 | 46 | 40 | 9 |
| June 15 | 41 | 35 | 9 |
| July 1 | 42 | 35 | 8 |
| July 15 | 29 | 29 | 8 |
| **Bienville variety** | | | |
| May 1 | 42 | 39 | 7 |
| May 15 | 45 | 39 | 7 |
| June 1 | 46 | 36 | 6 |
| June 15 | 42 | 31 | 6 |
| July 1 | 39 | 25 | 5 |
| July 15 | 29 | 24 | 4 |

# ATTITUDES of RURAL ADULTS

JOHN E. DUNKELBERGER, *Dept. of Agricultural Economics and Rural Sociology*

RURAL PEOPLE in much of the South and in areas of Alabama have a long history of chronic under employment and low income. Recent federal legislation has focused new attention on these problems. Many of the new programs created by this legislation will be used in this State.

To implement effectively these programs, as much information as possible is required about the people to be helped. Knowledge about size and characteristics of the population is needed. In addition, information on attitudes of the people is important, especially as these attitudes are related to changing social and economic conditions. People's attitudes are major barriers to development. If attitudes are not known and taken into consideration in the planning of programs, little success is likely.

Facts about several attitudes held by rural people in five Alabama counties, classified as "low-level of living farm areas" by the USDA, are available. They were obtained from a sample of about 800 household heads and homemakers. (See table.)

### Pessimism is Common

Responses to six statements describing different viewpoints on life and the future showed that about half of the people were pessimistic. Almost two-thirds of the people gave pessimistic responses to at least three of the six statements. Household heads (men in most cases) were somewhat more likely to be pessimistic than were homemakers.

Given in the table are the attitude statements used to measure the presence of pessimism. (The reader may wish to test his own level of pessimism by noting the number of statements with which he agrees. Zero or 1 agreement indicates an optimist; 2 and 3 agreements are average, and 4 or more agreements indicate pessimism.)

One statement pertaining to the sincerity of public officials is of special interest in terms of rural development programs. More than half the people interviewed indicated they did not believe public officials were concerned much with their problems. Household heads especially tended to feel this way. This apparent distrust of the motives of public officials reflects disillusionment with aspects of our democratic society.

ATTITUDES AMONG RURAL PEOPLE IN LOW-INCOME AREAS OF ALABAMA, 1960

| Attitudes | Per cent agreeing | | |
|---|---|---|---|
| | All adults | Heads | Homemakers |
| **Indicating pessimism** | | | |
| Nowadays, a person must live pretty much for today and let tomorrow take care of itself | 51 | 51 | 51 |
| In spite of what some people say, the lot of the average man is getting worse, not better | 49 | 50 | 47 |
| It's hardly fair to bring children into the world with the way things look for the future | 40 | 44 | 36 |
| These days a person doesn't really know whom he can count on | 81 | 82 | 79 |
| There is little use writing to public officials because often they aren't really interested in the problems of the average man | 56 | 62 | 51 |
| Things have usually gone against me in life | 25 | 28 | 21 |
| **Indicating individualism** | | | |
| Even if his family objects, a man should choose a job that he thinks is best for him | 89 | 89 | 89 |
| If a man loses his job, he can always fall back on his relatives for help in an emergency | 38 | 43 | 32 |

It is highly probable that government programs and the people implementing these programs are viewed with much the same distrust and hostility by many people they are trying to assist. Because they represent the government and indirectly public officials, this attitude is transferred to these workers. If real progress in development is to be achieved in low-income rural areas, one of the first needs is to acquire the confidence of the people in the belief that the program is a sincere attempt to assist them.

Another statement of special interest dealt with one's ability to rely on other people; 81% indicated they did not know on whom they could count. Such feelings are typical in societies undergoing rapid social change. As old patterns disappear, new ways are introduced, and social relationships change, people become confused and alone. The result is reflected in pessimistic attitudes and a strong desire to return to the "old days."

The statement dealing with the way life has treated the individual provides some indication of how deeply this pessimism is ingrained. Pessimism was quite extreme in about a fourth of the respondents. These were either older people or people with extremely low family incomes.

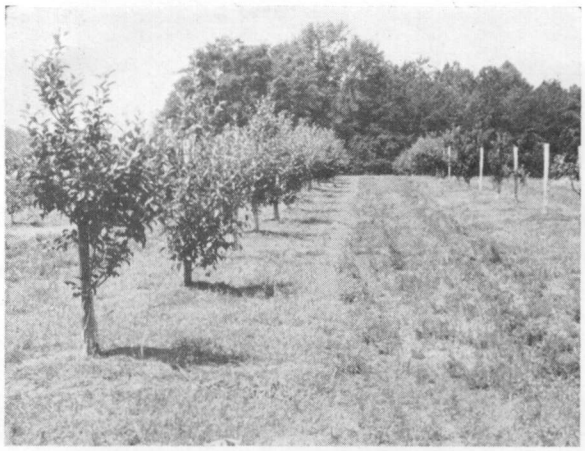
### Individualism is Strong

Rural people are noted for their independence and individualism. When asked whether the family or the individual should make decisions about a man's future employment, it was almost unanimous (89%) that the final decision belonged to the person who was going to fill the job.

A similar indication of the desire for independence was shown by a general lack of willingness to call on one's relatives for economic assistance; 62% of the respondents indicated they did not want to depend on relatives in a financial emergency. This does not mean they would not ask for assistance if the need arose, but that a strong aversion to asking for assistance existed.

These findings were somewhat surprising after other data had shown the high value these people placed on relations within the family. It was believed that the close family ties would act to create attitudes of interdependence among family members.

Data such as these provide important insights about people in low-income rural areas. Use of this information may mean the difference between success and failure in programs of social and economic development. Successful programs will consider these and other attitudes of the people so as to win their confidence and cooperation.



Control of weeds as in this orchard is possible through the use of herbicides.

# MINIMUM TILLAGE for APPLE and PEACH PRODUCTION

H. J. AMLING, J. L. TURNER and W. A. DOZIER, JR.
*Department of Horticulture*

CULTIVATING PRACTICES used in peach and apple orchards need to be re-evaluated from the economic and labor standpoint.

Heretofore, cultivation has been a production practice in peach and apple orchards primarily to control weeds, thus eliminating weed competition for nutrients and moisture. However, each cultivation or hoeing contributes to the total cost of production in man hours, equipment breakdowns, fuel, and equipment depreciation.

### Weed Control Studies

Studies in progress at Auburn University Agricultural Experiment Station indicate an opportunity for peach and apple growers to replace current cultivation practices by minimum tillage practices. This opportunity involves no disturbance of the soil with weeds being controlled by herbicides. If weeds are controlled continually by herbicides without soil disturbance, the amount of viable weed seed in the top few inches of soil will decrease steadily with accompanying decreases in the emergence of weed seedlings. However, any redistribution of the soil such as by cultivation will bring new weed seed into a more favorable germinating environment of upper soil layers. This reestablishes a high weed population defeating the minimum tillage concept of weed control.

Shifts in the kind of weed species making up orchard weed populations will occur under minimum tillage practices necessitating changes in herbicides used. Such changes in weed species generally involve a buildup in population of perennial weeds such as blackberry, dewberry, common bermudagrass, and deep-seeded annual weeds such as horse nettle, cocklebur, and coffeeweed.

### Preparation for Herbicide Use

Prior to starting a minimum tillage program and immediately before the first pre-emergent herbicide application, if one will be used, the orchard floor should be leveled and rolled. Simazin, one promising preemergence herbicide, adsorbs to organic matter, consequently the orchard floor should be relatively free of plant debris if Simazin is used. In those parts of the orchard where erosion constitutes a problem, perennial grass strips or areas should be mowed and boundaries held in check by use of Dalapon. Spray equipment used for applying herbicides in orchards should not be used for insecticides and fungicide foliar sprays or for applying herbicides to other crops. This is particularly true if the 2,4-D type herbicides were applied with the equipment. Use of herbicides requires precision in the techniques of application. Calibration of spray equipment to apply recommended rates will require the utmost attention of the grower. Exceeding the recommended rate will injure the trees, while less than the recommended rate will fail to control weeds. *The following are suggested herbicides and combinations of herbicides for weed control in peach and apple orchards that are registered for such use unless specified otherwise and have been evaluated under Alabama conditions.*

### Pre-emergent Herbicides

**Simazin:** This material registered for Atlantic Coast states for peaches, not yet registered for use on peaches in Alabama but is registered for use on apples in Alabama. For control of most annual weeds, use at rates of 2 to 3.2 lb. actual ingredient per acre. An intervenal chlorosis of leaves will occur at such rates. However, it has been noted in trials at Auburn and in other states that despite the appearance of the chlorosis Simazin applications induce more vigorous trees than nontreated trees even where no weeds were present. Apply only one application per year. Do not apply Simazin to peach or apple trees transplanted less than one year.

**Casoron:** Use on newly set peach or apple trees at rates of 6 lb. actual ingredient per acre. Shallow incorporation improves results.

### Post-emergent Herbicides

**Dalapon:** For control of perennial grasses. Use at rates of 1.5 lb. active ingredient in 30 gal. of spray containing .5% surfactant per acre. Apply on actively growing perennial grasses during the spring months. Re-treat when regrowth occurs, generally 2 to 3 weeks after initial treatment. Extreme caution should be employed in using Dalapon in peach orchards. Only those areas infested with perennial grasses should be treated. Crop phytotoxicity will be a problem in the use of this chemical in peach orchards but less a problem in apple orchards.

**Amine salt of 2,4-D:** For control of annual broadleaf weeds not controlled by the Simazin applications and for perennial broadleaf weeds. Use at a rate of 1.6 lb. equivalent in 30 gal. of solution per acre at 40-lb. pressure: Do not use nozzles that would allow spray drift or apply on windy days. Spray when broadleaf weeds are young and rapidly growing. Weeds in the seedling stage are the most sensitive to the Amine salt of 2,4-D.

**Oil Dinitro Mixture:** To be used as a general post-emergent spray for both broadleaf weeds and grasses. Mix 5 gal. of diesel oil No. 2, one pint non-ionic emulsifier and 2 to 3 pt. of Dow General dinitro with 25 gal. of water and apply the mixture at the rate of 30 gal. per acre. Repeat when necessary.

**Ammate:** For control of most vegetation around apple trees only. Use 50-60 lb. per 100 gal. water plus .5% surfactant.

*Index to Articles Published in*

# HIGHLIGHTS of Agricultural Research

## 1965

THE LAST WINTER (1965) issue of Highlights of Agricultural Research completed the 12th year of publication. The research quarterly was started in the spring of 1954 as an 8-page report to 8,000 farm and urban families, farm leaders, and others interested in what's new in agricultural research. Four years later the magazine was doubled in size (16 pages) and its mailing list was increased to 10,000. Since its first edition, staff members of Auburn University Agricultural Experiment Station have authored more than 500 articles reporting results of their research. For back numbers (as far as spring issue, 1960), address your request to Editor, Auburn University Agricultural Experiment Station, Auburn, Alabama.

### Animal Science

ALABAMA FORAGES AND MINERAL NEEDS OF CATTLE—Anthony and Harris. Vol. 12, No. 4. 1965.

FINENESS OF FEED AFFECTS EFFICIENCY OF HOG PRODUCTION—Brown. Vol. 12, No. 2. 1965.

PASTURES FOR BEEF COWS NURSING CALVES—Anthony, Harris, Nix, Starling, and Brogden. Vol. 12, No. 1. 1965.

PELLETS—KEY TO FATTENING ON FORAGE?—Anthony, Nix, Starling, and Smith. Vol. 12, No. 3. 1965.

RESTRICTED VS. FULL FEED FOR OVER-WINTERING BEEF COWS—Harris, Brown, and Anthony. Vol. 12, No. 3. 1965.

WEANED BEEF CALF PRODUCTION-COST AND RETURNS—Nolen. Vol. 12, No. 1. 1965.

### Consumer Economics

HOW MUCH DO URBAN FAMILIES PAY FOR FOOD?—Hammett. Vol. 12, No. 2. 1965.

### Dairy Science

HIGH CONCENTRATE LEVELS + COASTAL INADEQUATE FOR DAIRY COWS—Rollins and Guthrie. Vol. 12, No. 2. 1965.

MANAGING STARR MILLET FOR DAIRY COWS—Autrey, Blackstone, and Yates. Vol. 12, No. 1. 1965.

PASTURE VS. DRYLOT SYSTEMS FOR DAIRIES IN THE GULF COAST AREA—Blackstone, Autrey, and Yates. Vol. 12, No. 2. 1965.

RANCID MILK—COMPLEX PROBLEM FACING DAIRYMEN—Cannon and Rollins. Vol. 12, No. 3. 1965.

SUDAX-11 SILAGE IMPROVED BY USE OF PRESERVATIVE—Little, Smith, and Hawkins. Vol. 12, No. 1. 1965.

### Farm Economics

ALABAMA EGG INDUSTRY MAKES IMPORTANT GAINS—White. Vol. 12, No. 4. 1965.

ALABAMA FARMERS ARE CONSERVATIVE BORROWERS—Dunkelberger. Vol. 12, No. 3. 1965.

FARMER CO-OPS IN ALABAMA—Kern. Vol. 12, No. 4. 1965.

HOW AND WHERE ALABAMA BROILERS ARE SOLD—Leath. Vol. 12, No. 2. 1965.

MILK PRICE CHANGES HAVE VARYING EFFECT ON CONSUMPTION—Wilson. Vol. 12, No. 3. 1965.

MILK QUOTA TRANSFERS—Harris and Wilson. Vol. 12, No. 4. 1965.

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# Do SUPPLEMENTS increase utilization of COASTAL PASTURES by BEEF STEERS?

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YEARLING CATTLE grazing Coastal bermudagrass pastures produce high per acre gain but low grade cattle.

These cattle gain from 1.00-1.25 lb. per day on the average but usually have a Utility or low Standard finish at the end of the grazing season. Animal researchers at Auburn University Agricultural Experiment Station are looking for management practices that will result in improved slaughter finish and at the same time take advantage of the high stocking rates of Coastal.

### Grazing Tests Conducted

During each of the grazing seasons 1960, 1961, and 1962 yearling beef steers were supplemented with energy, protein, minerals, and a combination of these while grazing Coastal pastures at Auburn's Lower Coastal Plain Substation. Supplements were as follows: (1) grazing only, (2) 2 lb. 41% cottonseed meal, (3) 2 lb. shelled corn, (4) complete mineral mixture, and (5) a combination of CSM, corn, and minerals.

The 60 cattle were grazed together and brought into separate pens once daily where supplements were fed. The 3 test pastures were approximately 14 acres each, with cattle being rotated at 21-day intervals. Mineral fertilizer was applied according to soil test, and nitrogen was added at the rate of 180 lb. per acre annually in split applications.

### Results

Gains for the grazing season and corresponding average daily gains (ADG) were low (1.02-1.30 lb.) for animals on all treatments. All of the cattle had either Utility or low Standard finish for slaughter by the end of the grazing season. Supplements did not enhance the utilization of Coastal pasture and increased animal gains hardly reflected increased nutrients supplied in the supplements.

### Feedlot Performance

Feedlot performance of these cattle following grazing was excellent. The fact that these cattle gained about 3 lb. daily probably can be explained by: (1) low grazing gains and (2) a relatively short fattening period. When fed to an average slaughter weight of approximately 1,000 lb. and to a grade of Good, the cattle gained at about the same rate irrespective of the supplementary treatments used during the pasture phase.

When pasture and feedlot gains were combined, total gain, there were only small differences in treatments. Thus, it would appear that cattlemen should graze slaughter steers on Coastal pasture without supplemental feed until pasture quality declines. At that time they should be put into drylot and finished on a fattening ration.

TABLE 1. STEER PERFORMANCE ON GRAZING[1]

| Item | Control | CSM | Corn | Minerals | Comb. |
|---|---|---|---|---|---|
| Av. seasonal gain (129 days), lb. | 139 | 148 | 153 | 132 | 169 |
| ADG | 1.07 | 1.15 | 1.19 | 1.02 | 1.30 |
| Estimated slaughter grade, end of grazing[2] | 4.61 | 5.31 | 5.11 | 4.61 | 5.98 |

[1] Values reported are 3-yr. averages.
[2] Low Standard = 6; High Utility = 5; Utility = 4.

TABLE 2. STEER PERFORMANCE AFTER GRAZING[1]

| Item | Control | CSM | Corn | Minerals | Comb. |
|---|---|---|---|---|---|
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Av. feedlot gain, (80-82 days) | 241 | 242 | 245 | 239 | 239 |
| ADG | 2.93 | 3.03 | 3.08 | 2.92 | 2.98 |
| Total gain (FL + grazing) | 380 | 390 | 398 | 371 | 408 |

[1] Values reported are 3-yr. averages.

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