

M. L. Loomis

Highlights OF

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of research serving
all of Alabama



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New and Timely PUBLICATIONS

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

Bul. 328. Bermudagrass for Forage in Alabama reports results of tests with common, Coastal, and other varieties of Bermudagrass for pasture and hay.

Bul. 329. Planting Dates for Oats for Forage and Grain gives yield data on oats planted at different dates in northern, central, and southern Alabama.

Cir. 137. Producing Fence Posts from Thinnings points up possibilities for income from sale of fence posts produced by thinning pine stands.

Leaf. 52. Building A Pole Barn covers advantages of pole construction and gives detailed instructions on each step in building a pole barn.

Leaf. 64. Ball Clover presents results testing of this winter annual legume at eight Alabama locations since 1953.

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

Restricted light can be used to delay sexual maturity of pullets even if reared in open type shelters.

USE OF ARTIFICIAL LIGHT for laying hens has been a fairly common practice for many years.

Few poultrymen, however, realize that perhaps greater benefits can be obtained from correct use of lights on pullets during the growing period. The reason for using lights during the growing period is to delay the time pullets start to lay. If sexual maturity is delayed 10 to 14 days, the birds during the laying year will lay more eggs and produce fewer small eggs. The same advantages can be obtained from delaying sexual maturity by restricting the feed during the growing period. However, it is believed to be easier and safer to obtain these results by proper use of light.

Sexual maturity can be delayed in growing pullets by two different light procedures: (1) restricting the length of light period each day during the growing period and keeping it constant from day-old to 5 months of age; and (2) starting day-old chicks on a relatively long light period each day but reducing the length of light day each week during the growing period. Your choice will depend largely on the type of house available for growing pullets.

Restricting Amount of Light

The less light pullets receive each day during the growing period the older they will be when they start laying. The effects of various day lengths on age of maturity and subsequent egg production are given in Table 1.

In comparing the average age of sexual maturity, there is a direct decrease in maturity age as the amount of light is increased. Production results show that pullets raised on a 6-hour light day will outlay pullets raised under natural daylight by 20 to 24 eggs per hen per year. If a windowless, fan-ventilated house is available for growing pullets, the birds

TABLE 1. EFFECT OF AMOUNT LIGHT IN GROWING PERIOD ON AGE TO 10% PRODUCTION AND RATE OF LAY FOR FOLLOWING 4 MONTHS, 2-YR. AV.

Light treatment	Age of 10% 4-month production rate of lay	
	Days	Per cent
dark	167	75.4
2 hours	163	84.9
4 hours	157	83.2
6 hours	155	84.6
8 hours	152	77.8
10 hours	151	70.6
12 hours	149	84.0
14 hours	147	76.5



ARTIFICIAL LIGHT for growing pullets

D. F. KING, Poultry Husbandman

should receive 6 hours of light and 18 hours of darkness each day throughout the growing period.

Reducing Length of Day

Pullets provided a long light day when they are young with weekly decreases in day length will be older when they start laying than pullets raised on a constant 14-hour day. Likewise they will be older than pullets raised on a weekly increasing light schedule, Table 2.

Pullets raised on a light schedule in which the day length was decreased weekly by about 40 minutes per day ma-

best rate of lay for the year. It is suggested, therefore, that a weekly decrease of 15 minutes per day be used during the growing period. This light schedule can be used in an open front type house by giving the day-old chicks about 5 hours more light than they will receive from natural daylight when they are mature. Light is reduced weekly 15 minutes per day throughout growing period.

Either of these lighting schedules can be used for growing pullets hatched any time during the year. They are advantageous for both light and heavy breed pullets.

When the lights are supplementing natural daylight, the bulbs should be of the size to provide 1 watt per bird. The bulbs should provide 2 watts for each bird when all light is artificial.

When the houses are supposed to be dark, they should be sufficiently light-tight that the operator standing inside cannot see white birds on the floor. Houses with dim light during the dark period are considered unsatisfactory.

Pullets raised on either light schedule may be given a constant day in the laying house or provided weekly increases during the laying period.

Birds on this growing program should be full fed. Use of restricted feed in combination with restricted light is not recommended.

TABLE 2. EFFECT OF INCREASING OR REDUCING LIGHT IN GROWING PERIOD ON AGE TO 10% PRODUCTION AND RATE OF LAY FOR FOLLOWING 4 MONTHS, 2-YR. AV.

Light treatment	Age of 10% 4-month production rate of lay	
	Days	Per cent
Increased from 6 to 22 hours	145	79.3
Constant 14-hr. day	147	76.5
Decreased from 22 to 6 hours	168	90.8

tured 21 days later than pullets raised on a constant 14-hour day. These and other research results indicate that this delay in maturity is a little too severe for



INFLUENCES on BUYING HABITS

MILDRED S. VAN DE MARK
Associate Home Economist

NEWSPAPER advertisements, samples tasted at the store, food stamps, recipe books, and store displays — all play a part in influencing consumer buying habits.

Most effective single influence on food purchases in a study recently completed by Auburn University Agricultural Experiment Station was found to be ads in newspapers. More than one-fourth of all white and Negro housewives interviewed said newspaper ads served as a food shopping guide.

A comparative study of consumer buying habits, preferences, and family characteristics was made to determine the kinds of meat and poultry products purchased as related to race and city size in Alabama cities of two sizes. The study covered consumer buying habits, inducement food choices and expenditures, influence of retail marketing service, and kinds and sources of information used by family food buyers.

In the larger city of more than 100,000, a larger percentage of food buyers listed newspaper advertisements as principal motivating factor — 40% of white buyers and almost 30% of Negroes.

Homemakers reached by food adver-

tisements in newspapers were mainly in the middle income bracket and spent 20 to 40¢ per person for meals. Those having a high school education and above, more often read food advertisements and were influenced by them than were homemakers with less education. Food shoppers over 40 years of age reported more frequently the favorable influence of newspaper advertisements in their food marketing.

Families in smaller cities of 10,000 to 25,000 responded to food advertisements on radio and TV more than did those in larger cities, but effectiveness of these media was limited. Highest interest reported was 13% by Negro buyers in small cities.

Samples of products tasted in the store were effective in causing consumers to buy certain products. Food stamps issued for purchases made was found to influence a high percentage of food buyers in selection of a store. White food buyers indicated almost twice as much interest in stamps as Negro buyers.

To determine which food buyers were influenced by food stamps, homemakers indicating their use were studied from the standpoint of per capita income, age, and education. More families in the middle income group were affected. Homemakers under 39 years of age were more attracted by food stamps than were those 40 years and over. Food buyers having only high school education or less were more attracted by food stamps than were those with more education.

Recipes on the package influenced more homemakers in small cities to buy a certain product. The newspaper food section and food articles in magazines were read by more white homemakers in smaller cities. Of all educational and other influencing media studied, recipe books were reported to be most effective.

Homemakers in smaller cities, too, responded to attractive market displays, highlighting new foods on the market and "specials."

Children's requests for certain foods were found to have a strong influence in making food marketing decisions. This was particularly true of packaged goods that contained prize items appealing to children.

Family food buyers in larger cities purchased frozen fryers and turkeys more regularly than did buyers in smaller cities. This followed in direct relationship to the store's promotional program that was reported to be stronger in larger cities.

In the use of commercially prepared meal dishes for family meals, homemakers in larger cities served more pot pies and TV dinners than did consumers in smaller cities, Figure 1. White consumers purchased more of both of these frozen products than did Negro homemakers. Source of information concerning TV dinners came by way of radio and TV for people in large cities and mainly through stores for people living in small cities.

More than one-half of the white and Negro families in cities of both sizes patronized only one store for groceries. This trend was stronger among families living in larger cities. Chain stores were more often patronized by all families in the study, as shown in Figure 2. Principal reasons given for store preferences were cheaper foods, convenience of store with parking facilities, and availability of products preferred by the homemaker.

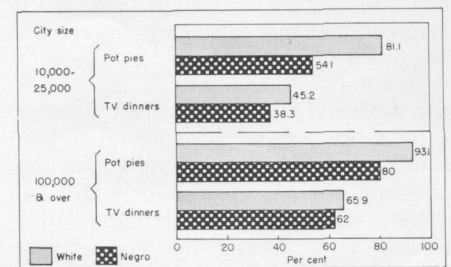


FIG. 1. Percentages of homemakers serving frozen prepared meat dishes during past year, by race and city size.

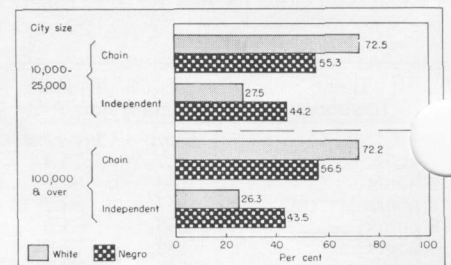


FIG. 2. Types of stores patronized in past 7 days, by race and city size.

NEW IMPROVED varieties of tomatoes having the capacity to produce good yields of quality fruit can be expected soon by Alabama commercial growers, canners, and home gardeners.

They are the products of a regional breeding and testing program carried on the Auburn University Agricultural Experiment Station and 14 other State Stations, and the U. S. Regional Vegetable Breeding Laboratory at Charleston, S. C. Last year this coordinated program involved 27 field locations in the 15 states. Only the best varieties throughout the country are included in the testing and breeding work in the Southern Tomato Exchange Program (STEP).

Qualities Sought

Modern "factory-farm" production methods have pointed up the need for superior varieties. The type sought in this program would meet the high standards of a main crop variety. As such it should please the grower for the green-wrap trade, the canner, and the home gardener.

Such a variety should include the following characteristics: (1) vigorous vine resistant to Fusarium wilt; (2) good foliage cover to protect against sun scald; (3) earliness; (4) good yield; (5) large fruits of near globe shape; (6) light green immature fruit color with slightly darker shoulder; (7) even ripening to a deep red color; (8) freedom from catface; (9) resistance to shoulder cracks; (10) uniformly deep red internal color, ripening from the center out, like Rutgers; (11) meatiness (high solids) with thick fruit walls; (12) good taste (sugar-acid balance); and (13) high vitamin C.

In field trials at this Station, the fruits are judged by appearance, by yield, and by taste. There are 10 plants per plot

and 4 plots per variety located at random on the test areas. This randomized system is used to average differences resulting from soil variation on large areas.

Harvesting Test Plots

To accurately measure yields, the tomatoes are harvested carefully and according to a standardized method to avoid overlooking fruit that would rot by the next picking. Thus, real yield differences between varieties are safeguarded.

All tomatoes from mature green to ripe (when 20% of total fruit shows color) are picked. This method reduces losses from rots to a minimum.

The harvested tomatoes are graded—marketable and culls, and then weighed



TOMATOES for TOMORROW

W. H. GREENLEAF, *Vegetable Breeder*
and
C. C. CARLTON, *Supt., Chilton Area Horticulture Substation*

and counted. Average fruit weight is obtained from the actual number of weighed fruits.

Results

To date the best tomatoes bred include three numbered experimental varieties (Southern Tomato Exchange Program) and two now on the market—STEP 341, Homestead 24, STEP 311, STEP 314, and Marion. The three STEP numbers are so good that they will probably be given names and released soon.

STEP 311, STEP 314, and Marion are tall-growing varieties and, therefore, are better suited for staking. The other two are intermediate in height.

At Auburn, STEP 341, a large fruited first cross hybrid from the Hawaii Agricultural Experiment Station significantly outyielded Homestead 24, the present standard for yield. However, its fruits tend to be rough and catfaced. Since it is a first cross, its use is limited.

STEP 311, a pale green, uniform ripening type, is 3 to 4 days earlier than Rutgers, has a slightly flat fruit that is meaty, developing excellent internal color. (See table for score.) The quality of both STEP 311 and Marion is better than that of Homestead 24.

STEP 314 has an especially vigorous vine. Its large, globular fruit ripens 2 to 3 days later than that of Rutgers. It lacks good internal color. However, STEP 314 should be desirable for home gardeners.

No variety tested to date combines all of the desirable qualities wanted. Several recently developed varieties regularly outyield Rutgers, but few equal or surpass this old standard of quality, excepting STEP 311, Marion, and STEP 281. The challenge continues to be in quality rather than in yield.

TOMATO VARIETY TRIALS AT TWO LOCATIONS, 1959-60

Variety	Av. wt. per fruit	Internal color score ¹	Average plot yield (10 plants per plot)							
			1959				1960 ²			
			Auburn		Clanton		Auburn		Clanton	
Oz.	Lb.	Rank	Lb.	Rank	Lb.	Rank	Lb.	Rank		
STEP 341	5.2	2					83.1	1	91.4	2
Homestead 24	4.8	2	55.6	2	55.9	3	71.1	2	89.4	3
STEP 311	5.2	4	49.9	3	45.6	6	68.4	3	104.6	1
STEP 314	4.9	1	47.3	4			65.2	4	78.2	7
STEP 346	4.0	2					63.3	5	66.1	11
Marion	5.1	3	43.4	6	60.1	2	60.6	6	83.3	4
Homestead S & L	4.7	2					59.9	7	81.1	5
Rutgers	4.9	3	27.9	9	40.5	7	59.4	8	78.3	6
Ohio W.R. Jubilee	5.2	2					58.8	9	77.9	8
STEP 329	4.6	1					56.3	10	76.2	10
STEP 281	5.2	4	39.4	7	64.8	1	54.8	11	76.5	9

¹ Scoring—1 = poor, 5 = excellent.

² Based on the 1960 trials, any variety that outyielded another by 10 lb. at Auburn or 19 lb. at Clanton may be regarded as superior in yielding ability.



Creep-fed rations make up nutritional deficiencies in baby pigs.

CREEP FEEDING

an aid to early weaned pigs

HOWARD F. TUCKER,
Associate Animal Husbandman

ADEQUATE NUTRITION for the baby pig is one of the most neglected phases of hog production. Yet, getting pigs off to a vigorous start is important in making a profit from hogs.

Creep rations are fed to meet these nutritional deficiencies. Creep feeding is a management practice that supplies suckling pigs with a supplemental feed not accessible to the sow.

Management Practices

Another management practice closely related to creep feeding is early weaning. In using the creep feeding system, the sow is removed from the pigs before the normal weaning age of about 8 weeks. Research has shown that only under the best management conditions and with adequate facilities should weaning be earlier than 4 to 5 weeks of age.

From birth to about 8 weeks of age or 50 lb. weight is the most critical period in the nutrition and management of hogs. During this period the highest quality feeds and the most exact nutrient formulations are required. Necessarily these rations are the most complex and expensive of all swine rations. Attempts to save by feeding cheaper, improperly balanced rations is poor economy. Pigs weaned at 5 weeks of age and fed to 8 weeks will gain about 1 lb. per day on 2 lb. or less of feed. Even less feed per lb. of gain is needed when creep-fed.

Food Needs of Pigs

A graphic representation of the food needs of baby pigs is shown in the graph. There are 3 sources of food available to the nursing pig: (1) sow's milk, (2) sow's feed, and (3) a creep ration. After the third to fourth week, milk produc-

tion of the sow begins to decline. This is the rapid growth rate period of the suckling pig. Although feed consumed from the sow ration is helpful, it is inadequate because of critical nutritional needs of the baby pig. Unless a creep ration is offered, the maximum expression of growth rate is inhibited.

Much research at the Station has gone into the development of a relatively simple and low-cost ration that could satisfactorily be used as a combination creep-early weaning ration. Availability of ration ingredients have been given consideration. This research report deals only with significant factors that have dictated the formula.

The table gives the composition of the creep-early weaning ration currently being used at this Station.

Ingredient	Pounds
Corn, ground yellow.....	520
Soybean meal, 50%.....	180
Meat and bone meal, 50%.....	60
Fish meal or fish solubles.....	30
Dried skim milk.....	50
Sugar, table.....	100
Fat or oil.....	50
Salt, trace mineral-swine formula.....	5
Vitamin-antibiotic premix*	+

* The feed is mixed to contain at least the following per 1,000 lb. of ration: riboflavin, 2 grams; calcium pantothenate, 4 grams; niacin, 9 grams; vitamin B₁₂, 9 milligrams; vitamin A, 2,000,000 units; vitamin D, 400,000 units; aureomycin, terramycin or combination penicillin-streptomycin, 125 grams.

Results from Creep Feeding

Growth rate, feed efficiency, and palatability tests have been conducted on this ration. Best results will be obtained if this ration is placed before the pigs at a few days of age and continued until

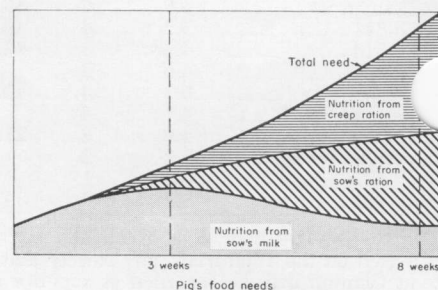
they reach 8 weeks of age or at least 50 lb. of weight.

Pigs at this Station have accepted the ration more readily and gained somewhat faster when a combination of penicillin-streptomycin has been included. However, any of the antibiotics can be used satisfactorily. Antibiotic additions are necessary for the growth promoting effects that are related to the control of non-specific disease conditions. Degree of infection or disease level determines effectiveness. If scouring becomes a problem, it may be necessary to increase the antibiotic level from 200 to 500 grams per 1,000 lb. of feed. This level is continued for a few days until the condition is under control.

Additives Aid Palatability

Dried skim milk adds to palatability and increases growth of the pig. Sugar and fat or oil contribute the most to palatability. Vitamin additions supplement the other ingredients to provide the necessary vitamins needed.

Whether the producer weans his pigs early or late on concrete or pasture, increased weaning weights and fewer runts result when a well balanced creep-early weaning ration is fed. This practice is a sure way to get hogs to market earlier with more profit to the producer.



ALABAMA CONSUMERS get their pork from two major sources — farm and commercial slaughterers.

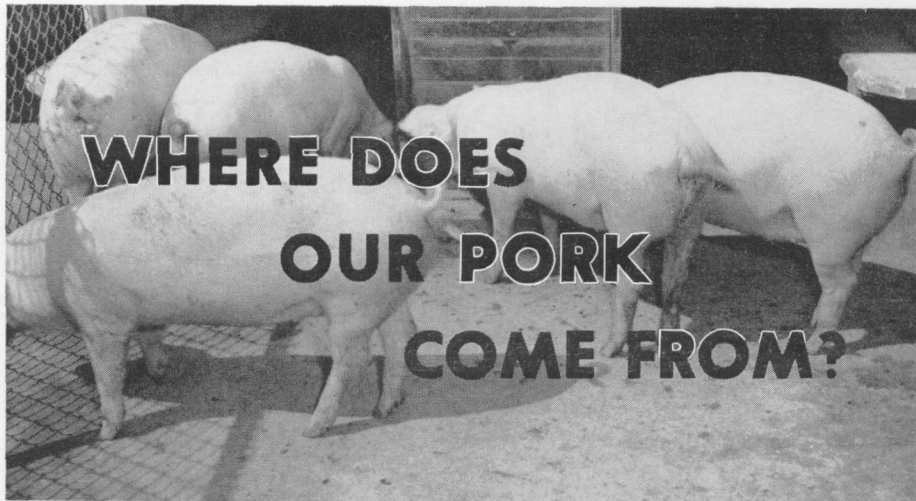
Although farm slaughter is decreasing rapidly, it is still fairly important. An estimated one-sixth of all pork consumed in Alabama in 1959 was farm slaughtered, Figure 1.

Most pork consumed in Alabama is supplied by commercial meat processing plants. Slaughter plants within the State supply most of this pork, with about one-fourth coming from out-of-state slaughterers. The largest percentage of out-of-state pork comes from plants in the Midwest and is distributed through chain food stores. Important quantities of pork are also received from Georgia and Mississippi. About two-thirds of Alabama's consumption of commercially slaughtered pork is slaughtered in the State.

Alabama Slaughterers

Three types of processors slaughter and sell pork products in Alabama. These are local butchers, small local meat packing plants that may produce such specialty items as sausage, and wholesale packing plants, including federally inspected packers. There are four federally inspected plants processing pork in Alabama. Only federally inspected slaughterers may legally ship pork out of the State.

In 1959, local butchers and small local plants supplied an estimated 8% of the commercial pork slaughtered and consumed within the State. Wholesale packers supplied the remaining 92%. Federally inspected wholesale packers supplied about half of the State's commercially



slaughtered pork, Figure 2. Including commercially slaughtered pork that is shipped into Alabama, it is estimated that 60% comes from federally inspected plants.

Pork Deficit

Although the State is an important commercial hog producing area, there has been a net deficit of pork produced in recent years. This was estimated at about 16% in 1959.

Although amount of pork handled by Alabama plants is considered a measure of the State's self sufficiency in pork production, these plants do not depend on Alabama produced hogs as their only supply source. On the other hand, Alabama hogs are sold to out-of-state packers.

During the 12-month period ending September 1960, the 10 major pork processors accounted for more than 75% of the commercial production of pork, based on a 4-week sample period. These

packers relied on Alabama hogs for 60% of their total kill. Hogs from Tennessee and Kentucky accounted for almost 30% of those slaughtered, the Corn Belt was the source of 8%, and the remainder came from Mississippi and Florida, Figure 3.

Local Supply Preferred

Most Alabama packers who depended on out-of-state hogs for a big percentage of their kill said they did so because of inability to get high yielding hogs from local sources. The extra distance that live hogs must be hauled obviously increases meat packing costs. Therefore, all packers are interested in improved hog production in Alabama to reduce expenses involved in obtaining a supply of hogs.

Based on these data, expanded hog production appears to provide opportunities for many Alabama farmers. The market is available in the State, if producers will provide the high quality hogs to meet market demands.

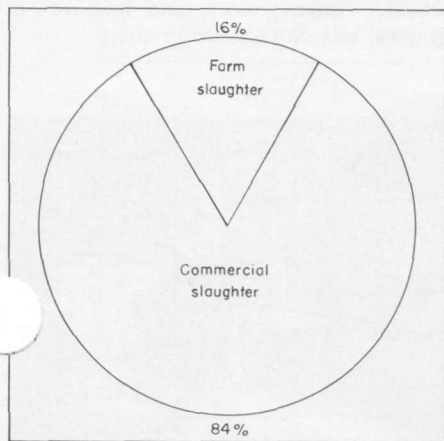


FIG. 1. The proportion of Alabama-consumed pork that is slaughtered commercially and on farms is shown above.

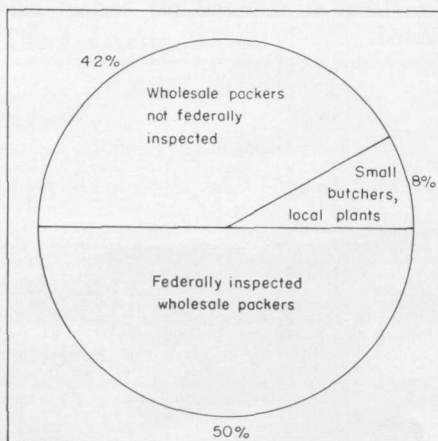


FIG. 2. This graph shows percentage of commercially slaughtered pork that is processed by different types of plants.

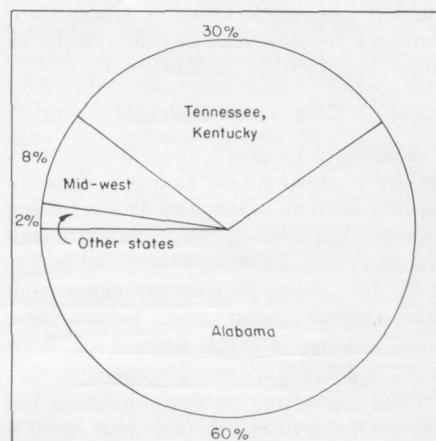


FIG. 3. Origin of live hogs slaughtered by the major pork processors in Alabama is shown in the graph above.

The UPPER COASTAL PLAIN SUBSTATION

*a summary of research
that changed a cropping system*



Substation Auditorium

E. L. McGRAW, Associate Editor

W. W. COTNEY, Superintendent

SIXTEEN CROPPING SEASONS have come and gone since the establishment of the Upper Coastal Plain Substation at Winfield in October 1944.

During this period results from research with land, crops, and livestock have pointed up the potentials of this region as a livestock area and have given the agriculture of the area a fresh viewpoint and new incentive.

This substation is in addition to the original five located in strategic regions of the State authorized by a legislative act in 1927. Its establishment was made possible by the passage of an act by the 1943 Legislature. It is located on a 735-acre tract of open cropland and timber donated by Fayette County to the Agricultural Experiment Station System of Auburn University.

The tract was chosen from several available because it included sizeable acreages of the kinds of soil typical of the Upper Coastal Plain. It showed advantages of opportunities for study of crops and fertility requirements.

Crop Yields Increased

Acre yield from the general corn crop on the substation, for example, was increased from an average of 41 bu. for the first 3 years, 1945-47, to 71 bu. per acre this year and 3-year average (1958-60) of 67 bu. This 83% increase came from using hybrid corns suited to the area, thick spacing, correct amount of fertilizer, and soil improving crops.

Corn harvesting on the substation has taken a modern trend. One man using a self-propelled combine can harvest in one day as much corn as 10-12 men harvesting by hand. Three men harvest,

haul, and dry, easily 10-15 acres or 800 to 1,000 bu. in one day. This is equivalent to the total yield for an average farm of the area a few years back.

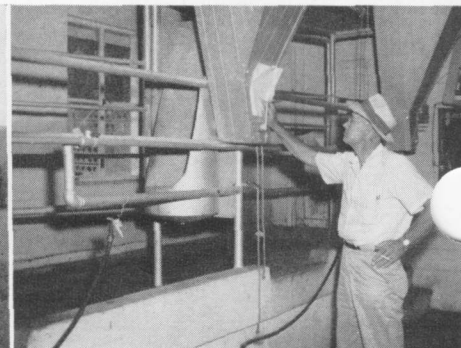
An experiment on grain harvesting and drying has been in progress on the substation 3 years. This is a cooperative project with the agricultural engineering department at Auburn. Results show that corn can be harvested as shelled corn with 20 to 30% moisture content, dried to 13%, and stored 2 to 4 weeks earlier than usual harvesting. The cost of drying for storage has averaged less than 4¢ per bu. for butane and electricity during the 3-year period.

Advantages from this system of harvesting are: (1) It produces more corn because harvesting is done before any appreciable lodging occurs, (2) sounder corn is harvested with less insect damage, (3) gives the farmer an opportunity to plant winter crops on time, and (4) less labor is required per bushel harvested.

Grazing Crops Tested

Although alfalfa at one time was not regarded as one for this region, the crop has produced excellent yields when grown on well-drained soils of the substation. The importance of lime, phosphorus, potash, and boron had been established previously at other substations in the State. However the work at this substation showed that 3 to 4 tons lime are necessary rather than the usual 1 to 2 tons. This higher lime rate resulted in more hay per acre and in longer lasting alfalfa stands. This has proved to be a very important grazing crop in the production of hogs, milk, and growing pullets.

It was found that broomsedge land on the substation, so typical of the region, would produce sericea and Coastal Bermudagrass for summer grazing and hay. It was also found that this same land would produce good yields of oats, wheat, winter grasses, and mixtures of grasses and clovers for grazing.



Some of the dairy animals are shown at left grazing Coastal Bermuda. W. W. Cotney, substation superintendent, is shown at right checking daily feed records of dairy herd.



Alfalfa is a major grazing crop for hogs on the substation as shown at left. An advantage of harvesting corn early is that land can be

prepared early for a winter crop of small grains as shown at right. It also allows the crop to become established before cold weather.

An unusual practice has been followed in establishing Coastal at the substation. A total of 31 acres has been planted over a 3-year period using green clippings. It has been found that 1 acre of clippings will plant about 8 acres. One planting was made with clippings on July 15, 1959, and the area was covered before frost. Ten acres of the area this year carried 8 to 14 dry cows and heifers. They were unable to consume all the growth and the grass had to be cut for hay.

Livestock Research Promising

Paralleling this work with grain, forage, and hay crops has been livestock research involving production of meat-type hogs by cross breeding, pullets and eggs for market, milk for manufacture, better quality beef for breeding and feeding, and sheep.

A program of up-grading mixed hogs by breeding to Duroc boars was begun in 1945. Six years later, 1951, one-half of the grade Duroc sows were crossed with a Hampshire boar. The following year some of the Duroc-Hampshire sows were back-crossed to a Hampshire boar. In 1955, this work was revised. Using one-half of the herd, breeding was re-

tated with Landrace, Poland China, and Hampshire boars. Breeding of the other half of the herd was continued on a straight Duroc basis. This experiment was designed to determine the value of boar rotation.

In another experiment with hogs, different systems of management are compared. These include hogs fed a mixed feed on concrete, hogs fed mixed feed on grazing including alfalfa in summer and crimson clover in winter, hogs self-fed shell corn and 40% supplement on grazing and on concrete, and hogs on grazing self-fed shell corn and a limited amount of 40% supplement.

In dairy research changes are being made this year to set up a complete dairy unit including 30-35 cows. The unit will include 140 acres with 106 acres open land. A walk-through milking barn has been constructed. Purpose of this unit is to determine income from a family size unit selling milk at manufacture milk prices. The unit will include labor-saving devices. Replacements will be grown, artificial insemination will be used, and the WDAM program will be followed. Concentrates will be fed according to milk production.

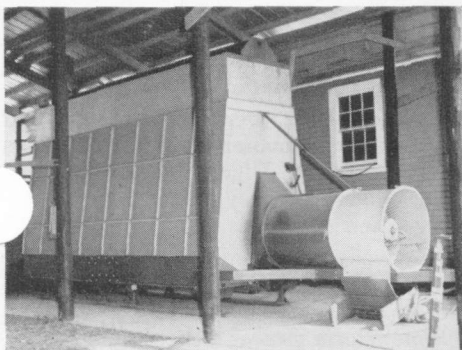
Beef cattle research includes use of fast- and slow-gaining Angus and Herefords. The first crop of calves of last fall from this experiment is now on grazing. The experiment is a progeny testing program to determine the relation between calves as compared with performance of their sires in ability to make rapid gains. Weights are compared at weaning, again at end of the grazing period, and finally at end of the feeding period in the feedlot.

In 1955 work was begun with hybrid-layer-strain chickens. Day-old sexed chicks were bought February 1 each year, were moved to range houses on alfalfa April 1, and were placed in the laying house July 1. Radiant floor brooders were used in brooding.

Chicks were started on starting mash, and grain sorghum or scratch grain was added at 4 to 5 weeks. When the birds were 8 to 9 weeks old, the ration was gradually changed to 26% mash supplement, corn, and oats plus alfalfa grazing. In the laying house, the same ration was fed, with oyster shell added and alfalfa hay was substituted for alfalfa grazing. Chicks were inoculated against coccidiosis and the pullets were vaccinated against fowl pox and Newcastle disease. Over a 2½-year period, the layers gave a return to labor including depreciation of \$3.25 per bird.

Work with sheep at the substation has been limited to a comparison of early-dropped and late-dropped ewe lambs as flock replacements. Object of the comparison is to determine if a sheep grower should save his early ewe lambs that will sell for a higher price or save later ones that will bring a cheaper price.

With all of these developments those experts of an earlier era who declared much of this area to be submarginal and should be given back to the Indians are having to eat their words.



Drier at left is used to bring moisture content of corn down from more than 20% to 13% for storage. At right is part of the substation's beef herd.



CHRYSANTHEMUMS

for pleasure and profit

HENRY P. ORR and TOK FURUTA
Department of Horticulture

CHRYSANTHEMUMS are a source of enjoyment to home owners. Mums provide a profusion of color in yards and in the home.

Aside from personal enjoyment, mums can be a source of profit. They can be sold as plants for transplanting and flowering plants are in demand in pots or as flowering landscape specimens.

The chrysanthemum is known as the "Flower of the East." For many centuries it has been grown and developed in the Orient. Adaptable to southern conditions, the garden mum is one of the most valuable perennial flowers grown in Alabama. It is easy to grow and makes a larger show than most garden flowers.

Methods of Producing

Following good practices ensures success with mums. In studies at the Auburn Agricultural Experiment Station, successful practices have been perfected.

Chrysanthemums are easily propagated by stem tip cuttings. Cuttings made around May 1 are usually well-developed rooted plants for planting in beds during late May or early June. Making of cuttings earlier than May 1 is not advisable because length of day influences bud initiation.

Soil is prepared 2 to 6 weeks before planting. A deep, friable, sandy or clay

soil that is high in organic matter and well drained but retains moisture is ideal. Sterilizing the soil mixture by chemical or heat method is desirable. About 2 weeks before planting, soil should be tested to determine acidity and fertility levels. A pH of 6.0 to 6.5 and relatively high phosphorus and potash levels give best results.

With soils of average fertility, 2 to 3 lb. of a complete fertilizer, such as 8-8-8, per 100 sq. ft. of bed area is needed before planting and 1 to 2 lb. monthly after plants are established.

Height and total size of plants at flowering were the only differences observed because of time of planting in experimental plots at Auburn. Excellent plants resulted when small potted plants (2½-in. pots) were set out as late as July. However, these plants averaged only two-thirds the size of those set in mid-May and early June.

Care in watering, pinching, spraying, and mulching is also necessary for satisfactory growth. Soil should be thoroughly watered at each application, but allowed to dry almost to the wilting point of plants between waterings.

To develop well-branched plants, each shoot must be pinched (tip removed) when it is 6 to 8 in. in length. Pinching is discontinued August 1.

Spraying or dusting to prevent damage is the best method of controlling diseases and insects. An all-purpose garden dust is effective if applied lightly during the growing season.

As soon as plants are established in beds, a 1- to 2-in. mulch of organic material is applied.

Varieties Tested

Since 1948, many excellent varieties have been grown in experimental gardens at Auburn. The exact date a variety flowers depends on climate as well as variety inheritance. Plant height is dependent on time of planting, methods of pinching, and variety. Generally, color of flowers was the same as the catalog listing for other areas.

All varieties did well during most trial years. Personal preference and planting site determine selection of a particular color, type of flower, and size of plant that can be used. The following list of excellent varieties is presented as an aid in choosing varieties.

Single flower varieties. Gold Rush (yellow), Lyric (white), Calico (bronze), Rajah (red), and Serenity (white).

Cushion flower type. Yellow Cushion (yellow), White Cushion (white), Champion Cushion (bronze), Bantam Yellow (yellow), and Lipstick (ruby orange).

Decorative flower varieties. Bokhara (red), D. D. Ahrens (white), Defiance Hardy (yellow), Chris Columbus (white), Kathleen Lehman (bronze), Hilite (yellow), Dark Knight (red), Lassie (deep pink), Silverplate (white), Joybringer (lavender rose), Alert (dark purple), and Iowa (yellow).

Button flower type. Classic (white) and Yellow Irene (yellow).

Pompon flower type. Avalon (bronze), Jewell (lavender), James Stewart (yellow), Charles Nye (yellow), White Wonder (white), Vintage (red), Sarasota (lemon).

Spoon flower varieties. White Spoon (white), Orchid Spoon (lavender), and Cardinal Spoon (bronze).

Varieties that were exceptionally good during the unfavorable 1959 season were Bantam Yellow, Hilite, Dark Knight, Lassie, Silverplate, Joybringer, Alert, Vintage, and Sarasota.

A well-grown garden mum, flowering in fall has great appeal. Opportunities exist around most southern population centers for a grower of hardy mums.

Garden mums can provide fun and profit.

PLANT DISEASE CONTROL

what it means to the farmer

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

IN FARMING, as in any business, many factors determine success. Among the numerous risks that endanger the prosperity of even the best farming enterprise is the hazard of plant diseases.

Prevention Measures

Bad weather, plant diseases, and insect pests are hazards of good crop production. The relative importance of these factors vary by season and situation. In preventing losses from diseases, there are different approaches that have as their goal increased crop yields. These include improved cultural methods, breeding productive disease-resistant varieties, seed treatment, and application of fungicides for the control of foliage and fruit diseases.

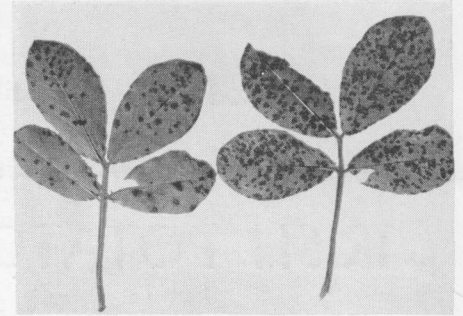
The rotation of cotton with certain crops can reduce the amount of rootknot nematode infestation. Thus, a valuable cultural practice is available for reduction of wilt resulting in increased yields. The use of crop rotations to control plant parasitic nematodes is based on the fact that nematodes cannot live indefinitely

nor reproduce unless they can feed on living plants. In addition, such rotations help to control other diseases of cotton, such as ascochyta blight of young plants, a disease that sometimes becomes epidemic.

The plant disease situation is a changing one. There is always a new problem confronting the plant pathologist. A crop variety developed for resistance to one disease however, may be very susceptible to another that has been of no economic consequence. Such a situation occurred with the Victoria blight disease of oats that developed so suddenly and destructively about 14 years ago. The ideal way of controlling all plant diseases is to plant adapted resistant varieties. Even the most economical control measures add to production costs and may require operations that individual plant growers find difficult to follow.

Seed Treatment Important

Once crop plants become established, they are subject to attack by a number of hostile organisms that may reach the



These peanut leaves show *Cercospora* infection.

plants through air, soil, or other means. Thus, it is necessary that external protection be provided for seeds and growing plant parts. Effective seed treatments destroy seed-borne diseases and protect the germinating seed until it has become established as a young plant. These treatments are used to control a wide range of diseases on many economic crops. For example, in cereals the organic mercurials have proved to be very effective in controlling loose and covered smuts, seed-borne leaf stripe, halo and stripe blights, *Fusarium* seedling blights, and certain other seed- and soil-infesting diseases of oats. Economical and effective control of such diseases of oats and wheat has been attained in tests conducted throughout the State.

Dusts and Sprays Effective

External plant protectants, such as dusts and sprays, are used extensively for control of many foliage or fruit diseases. Peanut leafspot, generally regarded as one of the most important diseases of this crop, occurs frequently in southern Alabama. It is probably one of the easiest diseases to control as determined by extensive research investigations conducted at the Wiregrass Substation, Headland. During these investigations, many different fungicides were tested and various schedules tried. Sulfur dust containing about 3.2% metallic copper was the most consistent in disease control and, except in unusually dry years, 4 applications gave the best results.

INCREASE IN YIELDS FROM DUSTING PEANUTS

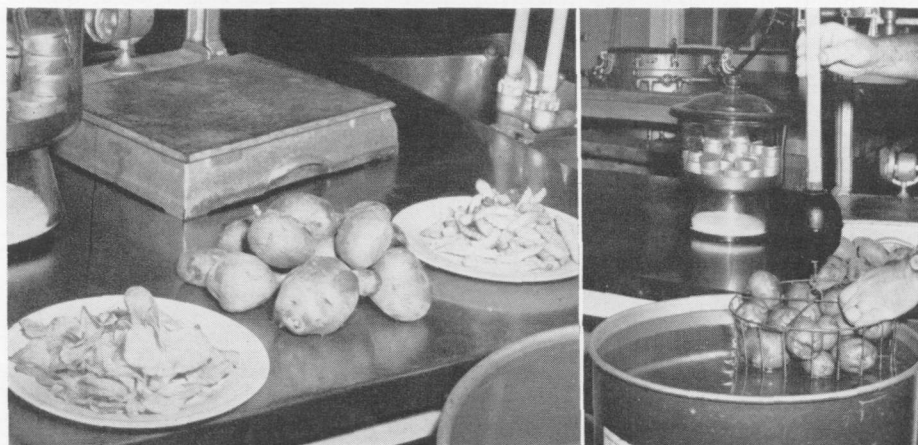
Year	Yield per acre	Increase from dusting
	<i>Lb.</i>	<i>Lb.</i>
1945	1,599	231
1946	2,079	267
1947	2,053	261
1948	3,302	1,149
1949	2,393	496
1950	1,888	322
1951	3,335	18
1952	1,405	252
1953	1,127	108



The above plots show the effect of seed treatment on oat stand; note poor stand from untreated seed in center.

Production factors— important to quality of IRISH POTATO PRODUCTS

HUBERT HARRIS and J. M. BARBER
Department of Horticulture



Samples of potato products are shown at left that are studied in laboratory for quality. A special hydrometer, at right, is used for determining specific gravity of whole potatoes.

THE QUALITY of french fries and other Irish potato food items on your table is greatly affected by production factors on the farms where the potatoes were produced.

These factors are equally as important as methods used in storage, processing, and marketing. Differences in chemical and physical properties of raw potatoes may result from climate, soil, variety, fertilizer, or cultural treatments.

The important potato properties are total solids, starch, sugars, and amino acids. Total solids, often expressed as specific gravity, is usually the most important property affecting quality.

High total solids content of potatoes is usually associated with mealiness in baked and french fried potatoes. It also determines the crispness, high yield, and low oil content of chips and french fries. Potatoes that are low in total solids are not well suited for baking, french fries, or chips. As boiled or steamed potatoes, they usually rate high in firmness and absence of sloughing, but often fail to rate high in flavor.

Research has been conducted at the Auburn Agricultural Experiment Station to determine effects of certain production practices on quality of potatoes grown under Alabama climatic and soil condi-

tions. Results of studies on the effects of fertilizer rates, organic material, irrigation, and storage on total solids are presented in Tables 1 and 2. The effect on chip color is given in Table 2. There was a consistent decrease in total solids of potatoes as the rate of complete fertilizer was increased. This trend was consistent regardless of variety, use of organic material, or irrigation. Irrigation lowered chip color of Red Lasoda but did not affect chip color of the Sebago variety. Organic materials did not affect quality of potatoes or products.

TABLE 2. EFFECT OF FERTILIZER RATES, ORGANIC MATERIALS, AND IRRIGATION ON TOTAL SOLIDS AND CHIP COLOR OF SEBAGO POTATOES¹

Fertilizer ²	Total solids					Chip color ratings ²				
	Irrigation or organic					Irrigation or organic				
	None	Irri.	Org.	Both	Mean	None	Irri.	Org.	Both	Mean
Lb/a.	Pct.	Pct.	Pct.	Pct.	Pct.					
800	17.3	18.1	16.2	17.6	17.3	7.4	7.5	7.4	8.3	7.7
1,600	16.3	17.4	15.6	17.1	16.6	7.4	7.8	7.5	8.2	7.7
2,400	15.5	17.2	14.8	16.3	15.9	7.3	8.0	8.2	8.2	7.9

¹ Average of 1958-1959 crops grown at Auburn, Alabama.

² Chip color ratings based on 10 as lightest to 1 darkest.

³ One-half as 4-12-12 applied under and one-half as 8-8-8 applied to side 4 weeks after planting.

TABLE 1. EFFECT OF FERTILIZER RATES, ORGANIC MATERIALS, AND IRRIGATION ON TOTAL SOLIDS OF RED LASODA POTATOES¹

Fertilizer ²	Total solids				
	Irrigation or organic				
	None	Irri.	Or- ganic	Both	Mean
Lb/a.	Pct.	Pct.	Pct.	Pct.	Pc
1,200	17.0	17.2	16.7	17.3	17.1
1,800	16.3	16.3	15.9	16.8	16.3
2,400	15.6	15.8	15.3	16.1	15.7
3,000	15.0	15.5	15.1	15.9	15.4

¹ Average of 1958 and 1959 crops grown at Auburn, Alabama.

² One-half as 4-16-8 at planting, one-half as 8-8-8 in two side applications.

In studies on rates of potash, there was a general decrease in total solids as the rate of potash was increased. When high rates of potash were used, potassium sulfate resulted in slightly higher total solids in the potato than the muriate form. However, when lower rates were used a combination of the two gave the highest total solids. In potatoes grown at the Gulf Coast Substation, Fairhope, the muriate form of potash gave higher total solids than the sulfate.

In a study on sources of nitrogen, total solids was lower when all nitrogen was supplied as ammonium sulfate than when some or all was supplied as ammonium nitrate or sodium nitrate. Sodium nitrate produced slightly higher total solids than ammonium nitrate. Cottonseed meal, Nugreen, ammonium hydroxide, and calcium cyanamid lowered the total solids.

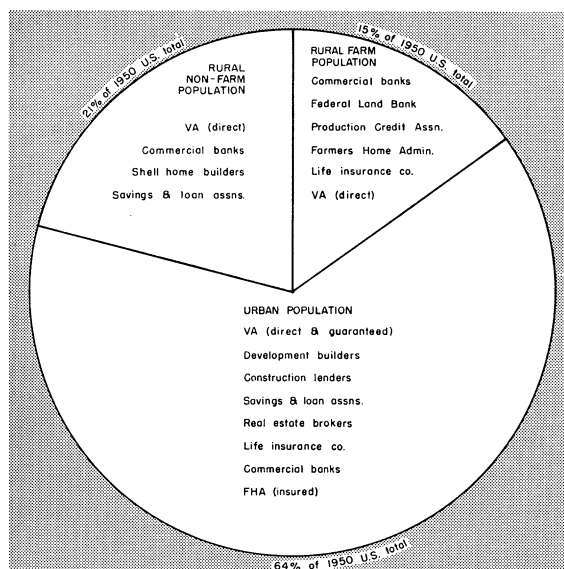
There were no important differences in flavor of steamed potatoes from any of the treatments.

Results show a trend for decrease in total solids of the potatoes as the rate of complete fertilizer is increased. However this effect was partially corrected by irrigation or by irrigation with organic material. Good production practices that included an ample supply of fertilizer resulted in high yields of No. 1 potatoes with only a small reduction in total solids.

Sources of home mortgage loans are shown by the graph for urban, rural non-farm, and rural farm residents. Also shown is percentage each group is of total U.S. population.

Financing Homes for Rural Residents

JAMES R. HURST and BOYD B. ROSE
Department of Agricultural Economics



MOST HOMES are built with borrowed money. Few people have the necessary funds to pay cash for home construction.

In recent years, almost 90% of houses built in the United States have been financed by first mortgage loans. However, this does not hold true in rural areas of the Southeast—a region where better housing is vitally needed. In this area, only 57% of those who built or purchased houses since January 1, 1951, borrowed money.

Why has housing credit been used less in the Southeast? It can be blamed on financial inability of rural residents to use available credit, reluctance to borrow, and lack of knowledge concerning credit sources.

Credit Is Available

Rural housing could be improved by increased knowledge of sources of available housing credit. Sources generally available to urban, rural non-farm, and rural farm people are shown in the chart, along with agencies that facilitate the flow of credit.

Savings and loan associations are sources of housing credit for rural non-farm residents with regular incomes to meet monthly payments. Commercial banks extend primarily intermediate-term housing credit (1-5 years) to farm and non-farm rural residents. Life insurance companies usually make loans only on good commercial farms.

Production Credit Associations make long-term loans to farmers for periods up to 5 years for remodeling or repairs. Federal Land Bank Associations make long-term loans that can be used to finance construction, purchase, or improvement of farm houses. Farmers can also obtain loans from Farmers Home Administration

for purchase of a farm with a home, providing other sources of credit are not available. This agency also provides a special housing loan with favorable terms to rural people who produce \$400 worth of farm products annually (1944 price basis) if they are unable to obtain reasonable credit from other sources.

The Federal Housing Administration insures and the Veterans Administration guarantees improvement or construction loans obtained from commercial lenders to finance rural farm and non-farm houses. However, few loans of these types have been made in rural areas. Lenders generally favor investing in urban instead of rural property. A limited number of VA direct home loans are made to urban and rural residents where housing credit is not readily available.

Shell home builders are most active in the Southeast in building and financing homes for residents in rural areas. They are selling low-cost houses to residents who cannot readily obtain loans from other sources.

Credit Sources Being Used

Sources of available credit, as well as sources being used by rural residents in the Southeast, were learned in an Auburn Agricultural Experiment Station study. Carried out under contract with the Housing and Home Finance Agency, the project included interviews with 665 households and 175 credit agencies in Mississippi, Alabama, Georgia, and South Carolina.

Of the rural residents interviewed, 48% were non-farm, 17% were full-time farmers, 10% were part-time farmers, 9% were farm laborers, and 16% were retired, disabled, or unemployed. Almost 60% owned the house they lived in, 30%

rented, and the others occupied houses rent free.

More than half of the owners acquired their houses since January 1, 1951, and 39% built or bought since 1953. Slightly more than one-fourth had remodeled (spent \$300 or more or changed floor plan) since January 1, 1951.

Of the 57% who borrowed funds to finance houses in rural areas, 37% obtained a first mortgage loan from savings and loan associations, 16% from commercial banks, 5% from life insurance companies, and 5% from mortgage or realty companies. Sixteen per cent borrowed from individuals and relatives and 7% from Farmers Home Administration, Federal Land Bank Associations, or Veterans Administration. The remaining 14% got funds from other sources.

Eleven per cent of those interviewed planned to build or buy a new house. For sources of funds, 18% listed Veterans Administration, 11% commercial banks, and 15% Federal Housing Administration or Farmers Home Administration. Twelve per cent planned to pay cash and the remainder named various other planned sources of funds.

Owners who remodeled spent an average of \$1,056, with 63% paying cash. Commercial banks were the source of remodeling funds to 48% of those who borrowed. More than 61% of owners who planned to remodel said they would pay cash or remodel as finances permitted, 16% said they would borrow from commercial banks, and the remainder named various other sources.

As with other expenditures, "shopping around" can be worthwhile. Considering alternative sources of financing ensures getting the plan and method of financing that best fits the need.

CHANGING Values and Taxes on Farm Real Estate

J. H. YEAGER, *Agricultural Economist*

FARMERS ARE MAJOR holders of real estate. About three-fourths of a farmer's business investment is in farm real estate — land and improvements. Livestock, machinery and equipment, and inventories of feed, seed, and supplies generally account for the remaining investment.

High prices for farm real estate are of real importance to Alabama's farm economy. High prices make it difficult for a young man to begin farming. In addition, many farmers find it necessary to increase their farm size to produce under present-day competition. Property taxes on farm real estate also influence farm profits.

Values Move Up

Alabama farm real estate prices have increased since 1940 (see illustration). The same has been true for the United States as a whole, with increases in about the same proportion. However, Alabama's farmland is still below the average U.S. value — \$79 per acre as compared with \$108 in 1959. Highest values were in New Jersey (\$591 per acre) and lowest in Wyoming (\$32).

There are many reasons for the in-

crease in prices. Farmers have been buying land to enlarge present holdings. Growing cities and towns have helped raise values. Government farm programs, highways, capital gains income tax structure, and forestry and mineral development have contributed to the upward push in values.

Value of farm real estate is basically related to the net income it will produce. Since 1948, the rate of return on market value of farm real estate used for agricultural purposes has decreased. In 1959, the average rate of return on U.S. farm real estate was only 3%. A relatively low rate of return does not attract investment in farms at a time when higher investments are needed for farm efficiency. The future of farm real estate values is uncertain.

Property Taxes Grow

Property taxes, as well as real estate values, increased since 1940. The national increase in taxes was much greater than for Alabama, as shown by the illustration. Taxes for the nation went from an average of 39¢ per acre in 1940 to \$1.11 in 1959, a 185% increase. The Ala-

bama increase during the same period was 50%, from 20¢ to 30¢ per acre.

Taxes levied on farm real estate are generally highest in the Northeast and Corn Belt. They are lowest in the South, Southwest, and Mountain Area. For example, taxes levied on farm real estate in New Jersey averaged \$9.15 per acre in 1959. New Mexico had the lowest rate, 10¢ per acre. Other states were between these extremes.

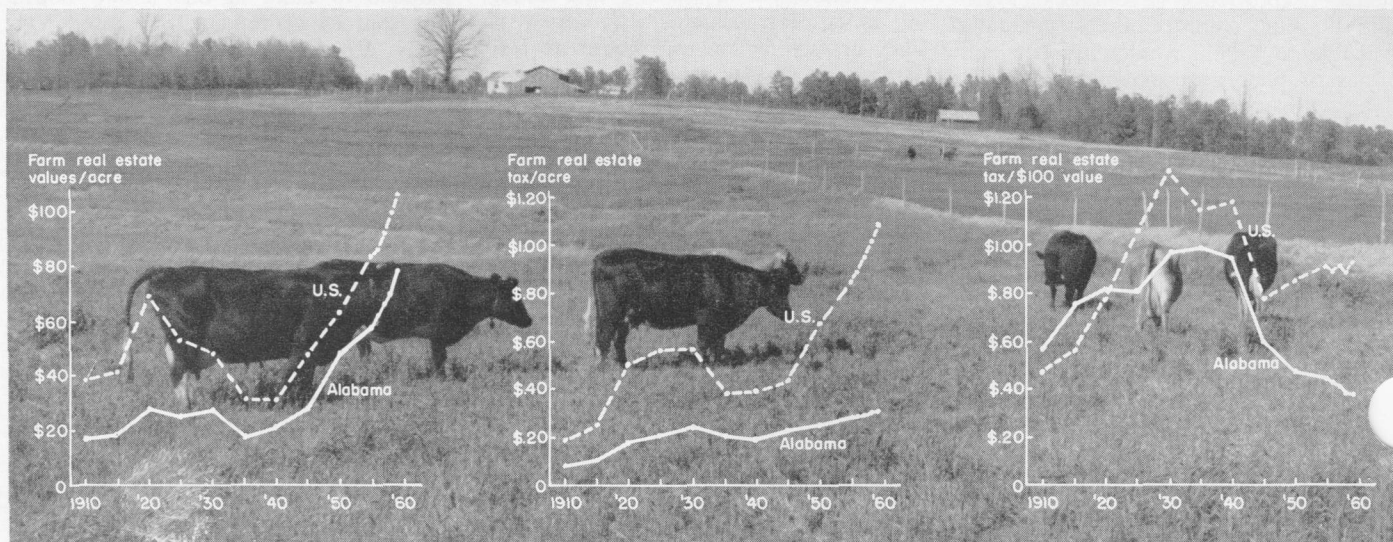
Considering taxes relative to value of property affords a better basis for looking at changes and making comparisons. As shown by the illustration, Alabama taxes on farm real estate per \$100 value have actually decreased since 1935. U.S. figures generally show increases since 1945.

On a per \$100 value basis, 1959 taxes levied on farm real estate in Alabama averaged 37¢ compared with 93¢ for the U.S. Only New Mexico was lower than Alabama in taxes per \$100 value. Louisiana's rate was equal to Alabama's.

Farm real estate taxes as a percentage of net farm income are also lower in the Southeast. In 1959, Alabama farmers paid an average of 2% of their net farm income for real estate taxes, lowest of any state. U.S. average was 8%.

Property tax was more heavily depended on for revenue in the 18th Century than at present. An argument against property tax is that ownership of property does not indicate ability to pay taxes. Also, there are serious administrative problems with property taxation.

Higher values for farm real estate mean increased investments in farms. Higher net incomes, therefore, are necessary to receive a return on investment equal to that of previous years.



Shown above in the graphs are: Left—average per acre value of U.S. and Alabama farm real estate; center—taxes levied per acre on farm real estate in Alabama and U.S. average; right—taxes per \$100 value of farm real estate in U.S. and Alabama.

ACCURATE PREDICTIONS of the need for nematode control based on analyses of soil samples can be valuable to farmers producing low-profit crops.

To make these predictions possible changes in population levels of rootknot nematode larvae in the soil are being studied throughout the year in field plots by nematologists of the Auburn Agricultural Experiment Station.

Testing Methods

The tests are similar to chemical analyses for soil fertility. The situation is complicated by the variations in the quantity of nematodes present in soils at various times of the year and under various environmental conditions. Nematologists can readily determine if nematodes are involved in the cause of existing plant disorders. Yet, predicting whether a disease is going to develop in the next crop is much more difficult. However, this is what the farmer needs to know if losses are to be avoided. There is particular need for this service for growing crops having a low-profit margin. By knowing the nematode population, a farmer can avoid the additional cost and delay of soil treatment.

Research Procedures

The research is not simply a determination of the presence of nematodes in field soil; but decisions are made on tolerance to parasitic nematodes.

Rootknot nematodes in the experimental plots are exposed to various practical control methods including rotation, fallowing, and soil fumigation. Spring, summer, and fall crops or cover plantings are also made. The research, in its second year, shows definite trends in fluctuations in the quantities of larvae in the soil during the year regardless of effects of various treatments. This overall annual population change thus far in 1960 has been generally the same as that in

1959. Thus, beginning at harvest of the fall crops and continuing through the winter months, there was considerable drop in the number of larvae that could be extracted from the soil. In March the number of larvae increased slowly and even more through spring planting in April and May. However, the larval counts began to increase before plants were present in the spring.

Seasons Influence Hatchability

This indicated a seasonal influence causing increased hatching of larvae from eggs or increased activity of the larvae, or both, after a period of winter dormancy. In 1960, in contrast to the previous year, the larval populations underwent a decrease by the end of June prior to removal of the summer crop. Such differences in population trends for corresponding times in different years perhaps will be found related to weather conditions as data for the entire 5-year test period are accumulated. Larval populations were high again in July, reduced somewhat in August, and increased again during September. They will continue to increase until after harvest, if last year's pattern is followed.

Results Evaluated

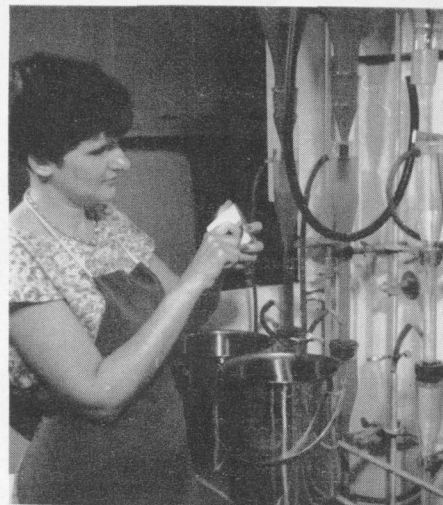
Results have shown the most reliable

ROOTKNOT NEMATODES

*a year 'round
problem on
Alabama farms*

E. J. CAIRNS,
Nematologist

W. A. JOHNSON,
Assistant Horticulturist



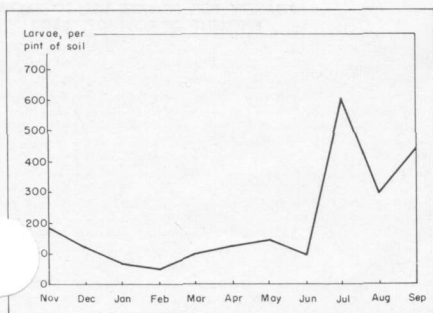
A laboratory technician above is using special apparatus to extract nematodes from soil sample that has been mixed thoroughly, screened to remove roots and rocks, and made into a water suspension.

soil samples for nematode evaluation are those taken from rows where plants are or have been growing. Soil from between the rows does contain nematodes, but numbers are smaller. At the test locality near Auburn, rootknot larvae were extracted throughout the winter from soil in plots irrespective of the presence of plants. Two-year results show that, if 25 or more larvae per pint of soil are present at the spring planting date, the subsequent bean crop was damaged. No consistent relationships between the number of larvae initially present and amounts of yield reduction and root-galling have been found for the spring bean crop. This suggests that the selection of the time of planting a rapidly growing or early spring crop may be a way to avoid appreciable yield losses in rootknot nematode-infested soil.

Winter Decreases Populations

Winter weather was about as effective as Nemagon, a soil fumigant, for decreasing larval populations to a satisfactory low level by the mid-April planting time. However, the population numbers in fumigated soil remained depressed on through the summer crop of corn, and up to the mid-September planting date.

The results indicate another useful service to growers based upon research.



General population fluctuation of rootknot nematode larvae in field plots under observation near Auburn is shown in the graph. The dates plotted extend from November 1959 through September 1960.

Land Management for Good Quail Hunting in The Piedmont

DAN W. SPEAKE, Assistant Leader,
Cooperative Wildlife Research Unit

GOOD QUAIL RANGE is scarce in the Piedmont. A major reason is land use pattern, according to results of Auburn Agricultural Experiment Station studies.

Large blocks of hardwood forest and pine plantations are of little value to quail. The same is true of large areas of improved pasture.

Ideal quail range has small blocks of desirable cover interspersed with idle fields, small patches of woods, and small thickets arranged so protective cover is everywhere within easy flying distance. Corn, sorghum, or field peas usually provide good food and cover.

Attractiveness of idle upland fields to quail is associated with abundance of wild legumes (see chart), largely determined by plant succession. When fields are abandoned in the Piedmont, important quail food plants usually do not become abundant before the second or third year, except after small grains. From the third to about the tenth year, quail food plants reach their peak. Earlier years of the period are best. Then

SEASONAL FOOD HABITS OF 86 BOBWHITES COLLECTED DURING THREE SEASONS AT PIEDMONT SUBSTATION, 1955-58

Food item	Percentage in caw of quail, by volume		
	Oct.-Nov.	Dec.	Jan.-Feb.
	Pct.	Pct.	Pct.
Crop plants			
Corn	10.5	20.9	21.9
Vetch	12.1	2.0	3.1
Sorghum	6.5	9.7	---
Cowpeas	4.2	---	---
Bicolor lespedeza ¹	2.9	38.0	25.8
Partridge peas ¹	trace	2.1	19.1
Wild plants, insects			
All grass seed and insects	28.3	0.9	trace
Wild legumes	17.1	15.4	19.2
Mast (mostly pine)	11.7	1.6	1.7
Common ragweed	1.5	1.2	4.6
Doveweed	4.2	---	---
Green material	trace	0.8	4.2
Other	1.0	7.4	0.4

¹ Bicolor and most partridge peas from feed patches.

there is a rapid decline to a condition where quail use almost stops around 17 years after cultivation.

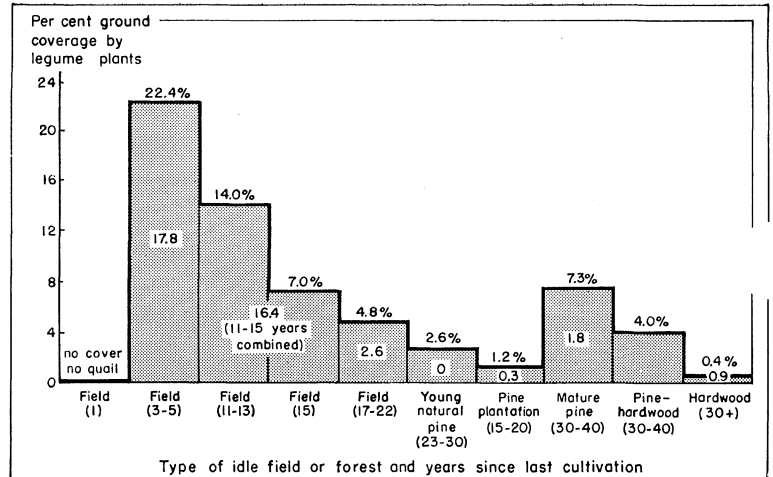
A pine forest that has been selectively cut usually has more quail food plants than young forests. Stands of wild legumes can be established and maintained in old fields and pine woods by controlled late winter burning. Seedling loss and some stand damage is to be expected.

Seeds of such crops as corn, sorghum, cowpeas, and vetch are important to quail, especially in fall (see table). Waste corn may not be available late in the season except from hard-seeded varieties.

Food patches of bicolor lespedeza and large partridge peas can be valuable, but are not preferred foods in fall. Areas with abundant fall foods but scarce wild legumes benefit by these food patches.

Small grain stubble provides good brood territory and fall habitat. Common ragweed, a fair quail food producer, usually volunteers after small grain harvest. Cattail millet and alfalfa produce superior brood raising territory.

Quail are attracted to pastures and hayfields to nest. More nests are afield during May and early June than at any



Relationship of ground cover by legume quail feed, years from cultivation, and forest type to quail prevalence is shown in the graph. Numbers inside bars are covays flushed per 10 acres during 5 years at the Piedmont Substation. Cover percentage is based on analysis made during summer, 1957. Size of pine-hardwood area was too small for accurate count of covey flushes.

other time. Delaying mowing around fields until late June protects nests.

Common lespedeza is a first class quail food and will produce some seed for quail even when grazed.

Since quail show seasonal food preferences, short food migrations can be a problem, especially on small areas. Migrations include those in fall from pasture and hayfield to grain fields and idle fields and fall movement to pine woods for mast. A shift in range may also occur in winter. Food patches are most valuable at this time.

In a normal fall population, there are about 80 birds of the year to 20 old birds. Therefore, reproductive success, largely determined by weather, is important every year. However, this high reproductive potential makes it possible to harvest at least half of the fall Piedmont quail population without bad effects.

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