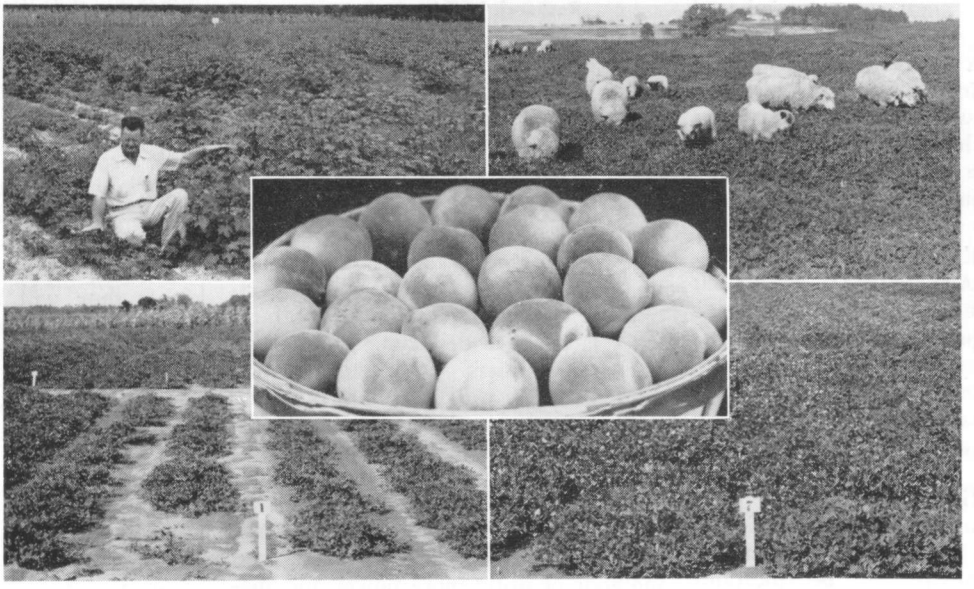
HIGHLIGHTS *of* AGRICULTURAL RESEARCH



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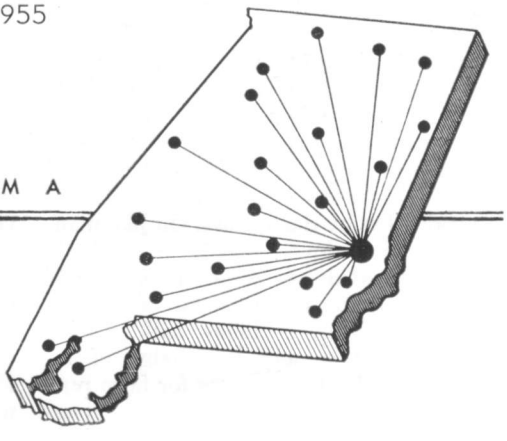


SERVING ALL of ALABAMA

AGRICULTURAL EXPERIMENT
STATION SYSTEM
of the
ALABAMA POLYTECHNIC INSTITUTE

Today's RESEARCH and Tomorrow's DEMANDS

COYT WILSON, *Associate Director*

A GOOD RESEARCH PROGRAM is based in part on guesswork – crystal-gazing the future. A scientist can deal with facts in studying today's problems. For the future, however, he must rely upon experience, sharp observations, and common sense in planning research to answer problems that may arise tomorrow.

Much of the agricultural research underway in Alabama deals with such current problems as increasing yields of crops and production of animals, improving quality of feed and fiber, reducing drudgery of farm work, and improving marketing of agricultural products. Results of these experiments will continue to contribute to the welfare of Alabama's agriculture for many years; however, these experiments are based on immediate problems and cannot be expected to answer all the questions that will arise in the future.

What Does Future Hold?

At this point, guesswork or prediction enters the picture. What kind of problems can we expect 10, 15, or 25 years from now? It is fairly easy to predict some of the most important questions if present trends continue. However, one or two major discoveries might change the picture completely. For example, information on the production of indigo was of little value after the chemists discovered methods of making synthetic dyes. The development of a process for making oleomargarine from vegetable oils resulted in a decreased emphasis on butterfat production by dairy cows. In like manner further developments in synthetic fibers could decrease the importance of cotton, or the development of atomic-powered farm machines could render useless our present knowledge of internal combustion engines for farm purposes.

Research Looking to Future

Whatever developments may occur, it appears likely that we can expect a continued and steady increase in population in the United States. At the same time, we can expect that the growth of industries and municipalities will slowly but gradually reduce the land area available for agriculture. Thus, the need for further increases in yields is obvious. As industrial development continues, the supply of farm labor is likely to decrease. These facts plus the farmers' desire to produce more with less work points to the need for more labor-saving machinery. For this reason, Alabama's agricultural research program includes basic studies on such questions as chemical weed control, methods of producing more meat or milk per unit of feed, and methods of using more power and machinery in farm work.

Even now water supplies are barely adequate in many areas of Alabama and the demand for water is likely to increase. Water for irrigation, except on a few farms, will be inadequate to fill the needs. To help solve this problem, research has been started to learn what crops respond most to irrigation and what must be done to obtain the highest returns from these crops in order that the available water may be used most efficiently.

Like woman's work, that of the plant and animal breeder is never done. Breeding programs are concerned with the improvement of fiber quality in cotton, with disease resistance and high yields in horticultural and field crops, with greater rate of gain and improved carcass quality in animals, and with higher yields, more palatability and greater adaptability of forage crops.

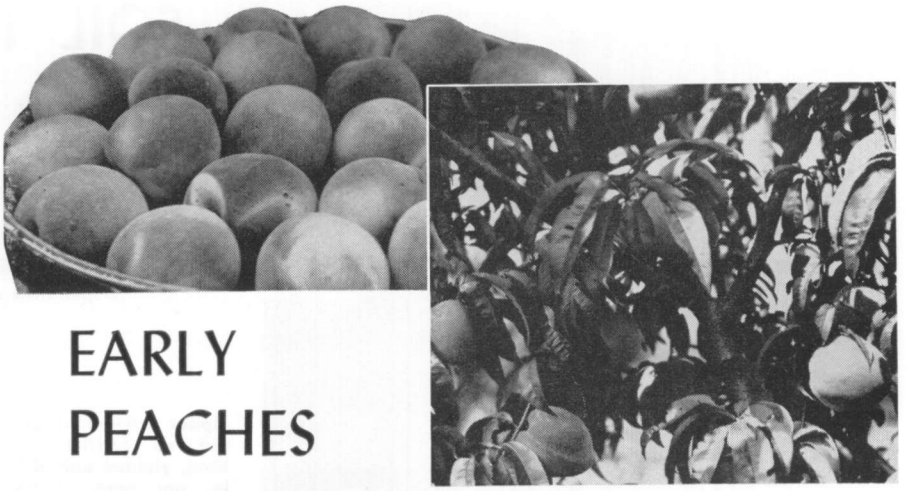
It may not be possible to predict what shape or color of houses people will prefer to live in 25 years from now, but it is certain that they will be interested in houses that are comfortable and economical. Research underway at present on insulating materials, methods of ventilation, structural design, and functional storage walls will contribute to better housing for the next generation.

Research needs in forestry production are easily identified. Within the next 20 years we will need to double our production of pulpwood and increase our production of lumber by about 5 per cent in order to meet estimated needs. Future developments in utilization and marketing cannot be anticipated easily. The needs and demands of the consumer 20 years from now will depend upon developments in many fields, including synthetic fibers, plastics, and metallurgy. However, basic research underway on wood properties and wood treatments should provide information that will enable wood processors to meet future demands.

As long as people are interested in plants they will be interested in the soil in which plants grow. The soil is a highly complex mixture of living and non-living parts. The living portion of the soil includes bacteria and other organisms that decompose organic matter and convert gaseous nitrogen into forms that can be used by crop plants. It also includes fungi and nematodes that attack and destroy crop plants.

Whether a soil is good or bad for a particular plant may depend upon the balance that exists among the various kinds of soil microorganisms. The development of a desirable balance is dependent upon a better understanding of the growth and activities of the various microorganisms in the soil. Studies have been started recently to provide more information on this subject. These include research on nematodes, on disease-producing fungi and bacteria, and on the beneficial bacteria and fungi. Although results of these studies are not expected to be put into general use within the next 10 years, they are much more likely to have a lasting value than are some of the studies of a more practical nature.

Alabama's agricultural research program is constantly changing. New studies are being started and old ones closed. These changes are made after careful considerations in order to eliminate as much of the guesswork as possible. Full value of today's research, however, cannot be adjudged until years in the future.



Choice, very early peaches for Alabama. Dixired in basket, Cardinal on tree; both are 6 to 6½ weeks earlier than Elberta.

EARLY PEACHES

Mean more profits for growers

T. B. HAGLER and W. A. JOHNSON
Department of Horticulture

EARLY-RIPENING, yellow-fleshed peach varieties are the key to added profits for Alabama peach growers.

Since Alabama is in the early peach area, growers can cash in on the high prices that prevail early in the season. To do this, special consideration must be given to selecting varieties that ripen early and produce high quality peaches that satisfy the consumer. Now available are several new varieties that are early enough for the early season market, yellow-fleshed to meet market demands, and highly colored for extra attractiveness.

When competing areas that produce later peaches market their crops, prices drop immediately – sometimes as much as $2 a bushel. Marketing ahead of competing areas is of prime importance to Alabama peach growers. By planting early varieties, such as Dixired, Alabama growers can market their crop before competing areas flood the market and wreck prices.

New Varieties

Many new peach varieties have been introduced by state and federal experiment stations and private breeders during the last few years. These varieties were developed to meet present market demands. Many varieties and selections have been tested at the A.P.I. Agricultural Experiment Station to determine their suitability for Alabama conditions. Most of the varieties have been tested at Auburn, and many of the newer ones have been tested at the Chilton Area and North Alabama horticultural substations. Most of the newer varieties tested have proved superior to older ones of the same ripening period.

Recommended Varieties

Recommended varieties for central and northern Alabama are given in Table 1. It is noted that more than one variety is listed for a specific ripening period. Since there is a difference in cold weather requirements of different varieties, it is desirable to plant varieties with high and low chilling requirements as insurance against variable weather in Alabama.

No varieties ripening later than Elberta are recommended generally for planting in Alabama because of competition from other areas and excessive damage by diseases and insects. Growers who have a good local market for late varieties, such as roadside stands, might plant a limited number of such late varieties as Shipper's Late Red, Rio Oso Gem, and Afterglow.

There has been considerable interest in peach growing on a limited scale in the southern half of Alabama. Because of the mild winters in that area, special consideration must be given to selecting varieties. All peach trees require enough cold weather to break their dormancy before February 15 for normal spring growth and development, but some varieties require much less cold than others. Only those varieties with low chilling requirements should be planted south of Montgomery. Recommended varieties for the southern half of Alabama are given in Table 2.

TABLE 1. VARIETIES FOR COMMERCIAL AND HOME PLANTINGS IN CENTRAL AND NORTHERN ALABAMA

Variety	Weeks earlier than Elberta	Variety	Weeks earlier than Elberta
Very early varieties		**Midseason varieties**	
Hiland	6½	Triogem	3
Cardinal	6½	Fairhaven	2½
Dixired	6	Sunhigh	2
Redcap	6	Southland	2
		July Burbank Elberta	2
Early varieties		Halehaven	2
Coronet	5	Loring	1½
Dixigem	4½	Redskin	0
Redhaven	4	Elberta	

TABLE 2. VARIETIES FOR THE SOUTHERN HALF OF ALABAMA

Varieties	Weeks before Elberta
Hiland	6½
Redcap and Maygold	6
Newday	3
July Burbank Elberta, Southland, and Sunhigh	2
Loring	1½
Redskin	0

SOIL TESTS—*the Key to more profits from peanuts*

C. E. SCARSBROOK and J. T. COPE, Jr.
Department of Agronomy and Soils

Upper left—This plot got no fertilizer or lime; yielded only 273 lb. per acre. Lower left — Plot got phosphate, potash, lime, and produced 2,152 lb. (Photos taken at Wiregrass Substation, 1950.)

Are you using the right kind and amount of fertilizer and lime under peanuts? If not, a dollar invested in a soil test to determine fertilizer and lime needs may show a return of 5, 10, 25 fold or more.

Field tests are continually being conducted to determine how soil test measurements go "hand in hand" with yields in the field. A total of 18 fertility experiments was conducted by the API Agricultural Experiment Station in five southeastern Alabama counties in 1952, 1953, and 1954. The purposes of these experiments were: (1) to check or verify the recommendation that no nitrogen be applied to runner peanuts; and (2) to obtain additional information on the value of soil tests in predicting the amounts of lime, phosphate, and potash that should be applied.

No Yield Response From Nitrogen

Many farmers in Alabama use nitrogen on runner peanuts even though research has shown no yield benefits. A survey of a group of representative farms in southeastern Alabama in 1950 showed that an average of 8 pounds of nitrogen per acre was being used on this crop. At this rate of application, over $200,000 is being spent annually for nitrogen on peanuts. Not one of the 18 field experiments showed peanut yield response to nitrogen, although in some experiments vines did grow off faster when nitrogen was applied. These tests support Experiment Station recommendations made for many years — that nitrogen should not be applied to runner peanuts.

Response From Minerals, Lime

The table shows the response to calcium (gypsum) and potash when their levels in the soil were low, medium, or high. The importance of a balanced fertilizer and liming program is brought out in the table. On soils low in calcium, gypsum dusted on unfertilized peanuts at early blooming time resulted in an increase of 159 pounds of nuts. On these same soils receiving 300 pounds of 0-12-20 fertilizer, the yield increase from gypsum was 243 pounds. No yield increases were obtained from gypsum on unfertilized soil when the soil test for calcium was medium. However, there was a 77-pound increase when gypsum was added to these medium-calcium soils receiving 0-12-20. While these responses were obtained with gypsum, equally good results can be obtained from calcium in such other forms as ground oyster shells, dolomitic or calcitic limestone, or basic slag.

An increase in yield of 153 pounds was obtained from 100 pounds of muriate of potash where the soil level of potash was low and lime and phosphate had been added. Potash was of much less benefit when the soil level was medium. It is pointed out that none of the soils tested was high in potash.

These data emphasize the importance of using both mineral fertilizer and lime when soil tests show that they are needed. Maximum returns cannot be obtained from applied calcium unless the potash supply is adequate, and vice versa.

Yield increases were not obtained from phosphate even where soil tests showed fairly low amounts of phosphorus. Some phosphorus is generally recommended on these soils, for, if peanuts were grown continuously without adding phosphate, yields would eventually be reduced.

Costs Small Compared To Gain

At present the cost of the proper kinds and amounts of fertilizer and lime is small as compared to the value of peanuts that they will produce when the supply in the soil is inadequate. The figures presented here are evidence of the good returns that may be expected by peanut farmers when they use fertilizer on a scientific basis by obtaining recommendations based on a soil test. These and many other data collected by the Experiment Station in the past show that runner peanuts will not return a profitable response from nitrogen.

Soil Test Results and Responses from Gypsum and Potash in 18 Experiments

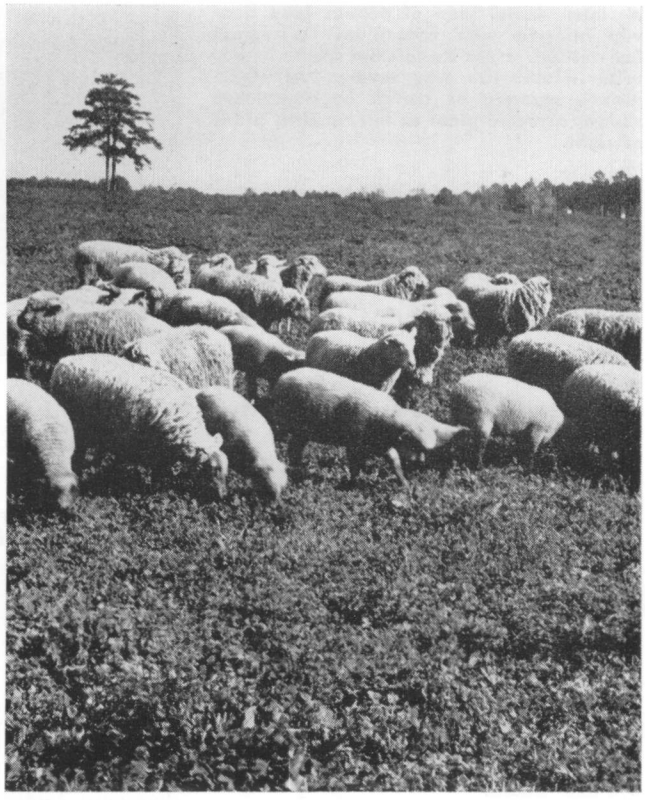
Soil test level of element	Increased yield in pounds per acre from—		
	500 pounds gysum		100 lb. 60% muriate of potash
	No fertilizer added	300 lb. 0-12-20 added	
Low	159 (8)*	243 (8)	153 (13)
Medium	6 (9)	77 (9)	22 (5)
High	–117 (1)	–15 (1)	

* Numbers in parenthesis are number of tests included in the average.

SHEEP—

On the comeback in Alabama

CHARLES M. MARTIN
Associate Animal Husbandman



Some of the ewes being used in breeding studies at the Main Station. Research with sheep is under way at seven locations in the State.

SHEEP ARE on the comeback in Alabama!

A steady decline in number of sheep over a period of 50 years hit bottom in 1950 when only 18,000 sheep and lambs were on Alabama farms. Since then there has been a growing interest in sheep, particularly in spring lamb production. This has been evidenced by the importation of western ewes, the purchase of good rams, and the increase in number on farms.

Back of this revival of interest in sheep production are four major reasons: (1) the advent of phenothiazene for easier and more efficient control of internal parasites; (2) an improved forage production program in the State; (3) the development of satisfactory markets; and (4) the need for profitably utilizing diverted crop land.

Research Program

The API Agricultural Experiment Station now has under way research in lamb production at seven locations in the State. This research is directed at improvement in lamb production through better breeding and better management practices.

One of the growers' most important problems in producing early lambs is getting the ewes bred during the summer. It is well known that considerable variation exists among and within present breeds in the date of onset and duration of effective breeding season. Recent work on physiology of reproduction indicates a possibility of improving summer breeding efficiency by the use of hormones as well as through changes in management systems.

At the Tennessee Valley, Piedmont, Black Belt, and Lower Coastal Plain substations, studies are under way to compare spring lamb production of ewes and rams of different breeds, breed composition, and sources. Ewes included in this study are Dorset, Rambouillet purebreds; Dorset-Merino, Suffolk-Rambouillet, and Columbia-Rambouillet crossbreds; and some mixed breeds. Dorset, Montadale, Suffolk, Southdown, Hampshire, and Rambouillet rams are being studied for seasonal variation in breeding capacity.

Early-dropped and late-dropped lambs are being compared for their ability to breed as lambs and to breed for fall lambing. This experiment at the Upper Coastal Plain Substation near Winfield is expected to determine if the earliest dropped ewe lambs may be saved profitably for the breeding flock.

Profitable utilization of late-dropped lambs is the object of the experiment at the Lower Coastal Plain Substation near Camden. Results of 2 years' work show that, in general, late lambs carried through the winter on grazing and sold the following spring returned about double the original investment. They were good quality, locally produced lambs bought at the last lamb sale in June or July. This study is being expanded to include western feeder lambs and different systems of grazing and feeding.

Study Breeding Capacity

To get information regarding seasonal variation in ram breeding capacity, semen samples are being taken periodically throughout the breeding season from all rams used in the experiment.

The influence of flushing and hormone treatment upon breeding capacity of both rams and ewes will be studied at the Main Station, Auburn. Recent research indicates that successive injections of progesterone, followed by an injection of pregnant mare serum will cause ewes to come in season and ovulate normally. Thyroprotein administered to rams has been shown to be of value in preventing summer sterility. These and other related compounds will be tested for their value in inducing ewes and rams to produce lambs at the desired time of the year.

Research on winter grazing and feeding of feeder lambs will be conducted at the Gulf Coast Substation near Fairhope.

At left: Aerial view of peanut land heavily infested with nematodes (Wiregrass Substation). Note stand skips where nematode infestation was severe. At right: growth stunting of cotton by nematodes shown; affected plant at left, healthy plant at right.

FUMIGANTS—

Destroy Soil Pests

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

A. L. SMITH, *Department of Agronomy and Soils, and U.S.D.A.*

THE SOILS of many Alabama farms are teeming with nematodes and other soil pests that are causing large crop losses. Cotton and peanuts are the crops that have been hardest hit in the State by these tiny parasites.

Research workers studying this problem at the A.P.I. Agricultural Experiment Station have found that fumigating the soil with chemicals will kill these soil pests. Gasses applied to the soil in liquid form move through the soil and kill nematodes and their eggs. They also penetrate plant roots, killing nematodes in the roots. Wire worms and larvae of other root-feeding insects are also killed.

With the development of various fumigants and ways of application, soil pests are being controlled successfully and economically. Soil fumigation is being used effectively on many crops. Its use is not a substitute for but is an aid to good farming practices.

Cotton

Soil fumigation studies started in 1944 have been invaluable in clarifying the fusarium wilt-nematode relationship of cotton. In 1945, it was demonstrated that nematodes provide the means of entrance for the wilt organism to the water conducting vessels of cotton roots. In this study, wilt occured only in soils where nematodes were prevalent. This explains the severity of the disease in sandy soils. Both nematodes and wilt were controlled with the application of a nematocide.

For many years plant breeders had attempted to determine the inheritance of wilt resistance in cotton. The answer was obtained at the Tallassee Plant Breeding Unit by soil fumigation studies. In earlier tests an insufficient amount or an excess of wilt resulted in failure to obtain inheritance ratios. At Tallassee, the fusarium wilt and nematode infestations were too severe until reduced with soil fumigants. It was then found that in upland cotton, wilt resistance is inherited with a single dominant factor. A large part of the resistance to wilt in cotton was found to result from nematode resistance. With this information, emphasis in the wilt breeding program has been shifted to improved nematode resistance as a means of increasing wilt resistance and yield.

Extensive studies have been made to determine the best way to apply soil fumigants for wilt and nematode control. It was found that row application gave the same results as broadcast application at one-third the cost for materials. Best results were obtained by planting wilt-resistant varieties on fumigated soil. Yield increases from 100 to 200 pounds of lint per acre can be expected with fumigants on heavily infested soils.

Peanuts

Nematode damage to peanuts occurs in each of the nine commercial peanut counties in Alabama. This does not mean that every poor-yielding field is infested with plant parasitic nematodes. However, it does mean that, in those fields where yields have been consistenly low for several years, nematode damage might be one of the reasons for such poor yields.

Soil fumigation is the surest and quickest way to control nematodes that attack peanuts. Cooperative research at the Wiregrass Substation over the past several years have shown that soil fumigation is a profitable disease control practice in nematode-infested fields that are planted to peanuts. In 1950, fumigation of soils resulted in yields of 1,524 pounds of peanuts per acre in one area and 1,744 pounds in another as compared with 728 pounds on unfumigated land. This was an increase in yield by fumigation of 800 to 1,000 pounds of peanuts per acre. In 1953, fumigated land yielded 1,494 pounds per acre and unfumigated land 495 pounds, an increase of 1,000 pounds. In 1954, a relatively poor year for peanut yields, fumigated land made 1,100 pounds of peanuts per acre and unfumigated land 450 pounds, an increase of 650 pounds.

At the present time the cost of material and labor for soil fumigation is about $15 to $30 per acre, depending on how applied. Although this is expensive, farmers with fertile cotton and peanut land known to be infested with nematodes and wilt can hardly afford to pass up fumigation.

In the near future we can expect fumigants that will be easier to use and cheap enough to make soil fumigation profitable on all soils of the State. This could make soil fumigation a standard farm practice, just like poisoning to kill boll weevils.

LEUCOSIS—*the Killer of 50 million hens a year in the U. S.*

G. J. COTTIER, FRED MOULTRIE, and D. F. KING
Department of Poultry Husbandry

Leucosis kills more hens than any other disease. This killer takes a toll of 50 million hens a year from the nation's flocks. Since this amounts to a 75-million-dollar annual loss, poultrymen have ample reason to consider leucosis one of their major problems.

The disease shows up in several forms. It affects the eyes, causing a bulging and graying and results in blindness. The nerves of the neck, wings and legs are affected, resulting in paralysis. Occasionally the bones of the body, especially the legs, are affected causing a great increase in bone size. Leucosis also attacks the internal organs causing enlargement; this type is called visceral lymphomatosis, or "big liver disease." This is the most common form of the disease, accounting for three-fourths or more of the mortality from leucosis. Since this type can be determined only by post mortem, many poultrymen are led to believe the disease is not present in their flocks. The form affecting the nerves is the second most common type; it is called fowl paralysis. The bone type is rather rare, occurring largely in males.

Studies Begun in 1934

Since leucosis was first reported in the U. S. in 1913, it has been under investigation. The A.P.I. Agricultural Experiment Station has been studying the problem since 1934, approaching a control of the disease by breeding. In this study the objective has been to reduce adult mortality from all causes, not just leucosis. During the period of this study, adult mortality was reduced from 89% in 1935 to 20% in 1953.

Leucosis has been the major cause of mortality during the 19-year study. During the 5-year period 1949-53, leucosis accounted for a high of 37.8% mortality in 1949 and a low of 19.1% in 1953 (Figure 1). Mortality from leucosis is 15% to 25% lower in the Auburn Strain than in strains not selected for resistance to leucosis.

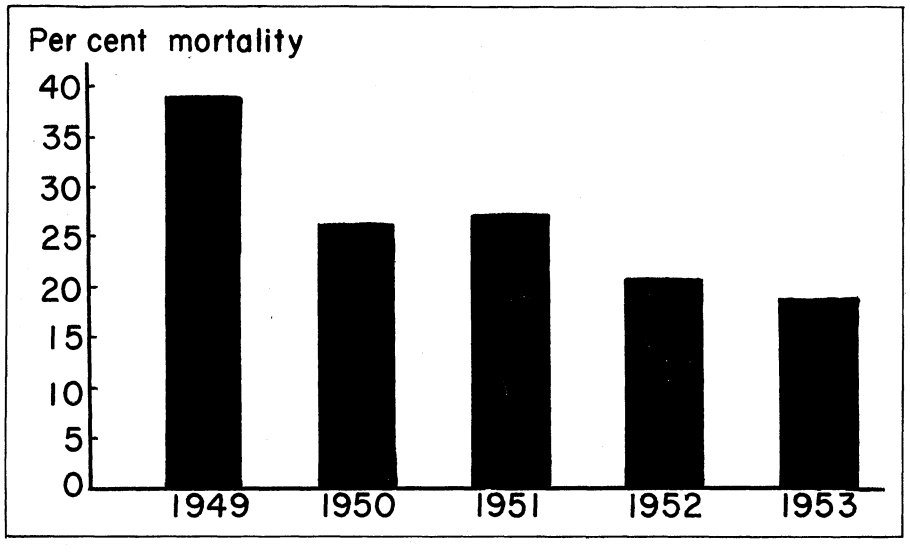


Figure 1. Percentage of death losses from leucosis by years, 1949-53.

When the breeding project was started at Auburn, mortality from leucosis was about evenly divided among the eye, nerve, and visceral (organ) types. At present most leucosis in the Auburn Leghorn is of the visceral lymphomatosis type, with this form accounting for around 95% of the mortality from leucosis. In a study of the organs involved, the liver, spleen, and kidney were most generally affected. On a percentage basis, these organs were affected in 82%, 41%, and 38% respectively, of the birds that died with the visceral lymphomatosis form of leucosis (Figure 2). Other organs, such as the heart, intestines, ovary, and uterus, were affected in a few cases, each less than 2%. Here again it is stressed that chickens must be posted to know the amount of leucosis.

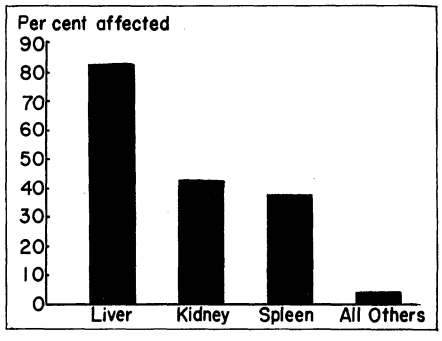


Fig. 2. Liver, kidney, and spleen most generally affected.

Control of Leucosis

Since leucosis is such a problem in laying flocks, every effort is necessary to reduce the incidence of the disease. Two practices are recommended to help in its control:

(1) Purchase the most resistant strains that are available. Unfortunately, there are few strains that have been bred for resistance to this disease. The Auburn Leghorn is probably as resistant as any strain available, but still some leucosis occurs. No strain is 100% resistant.

(2) Rear young stock in isolation. The chicks should be raised at least 100 feet away from adult stock for at least 12 weeks. Greater distances and longer periods of time increase chances for success.

The U. S. Department of Agriculture has announced a vaccine for leucosis. However, it is still in the experimental stage, and at present it is not available.

PRODUCTIVITY—*the basis of Farm Land Values*

B. F. ALVORD, *Head, Department of Agricultural Economics*

WHAT IS my farm worth? What is the worth of the farm I'd like to buy?

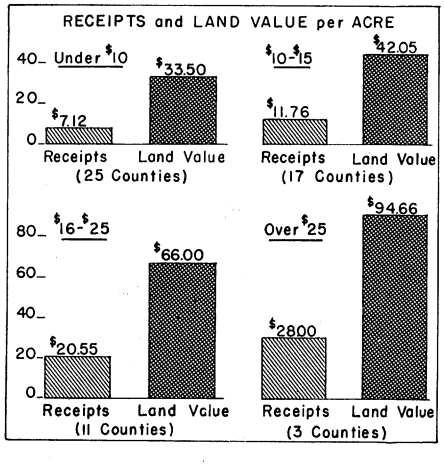
Since few farmers sell or buy farms more than once or twice in a lifetime, such transactions become tremendously important for the reason that prices paid often spell success or failure.

To sell a farm for less than what it is worth means lost opportunity for income. Similarly, buying a farm at a price above its worth establishes a handicap and loss from the start.

Farm land values may be affected by many things, such as size and condition of dwelling and other buildings, improvements, and location in regard to markets, towns, highways, schools and churches. While these have a bearing on farm land prices, most important in the judgment of Alabama farmers, however, is the productivity of the farm in terms of cash receipts.

In a study of the relationship of farm receipts and farm land values, the U. S. Census was used as a source for average values as reported by farmers of each county. Reports were used from 56 counties in which 55% or more of the population was rural. Eleven counties were omitted because of large city populations, which would tend to increase the value of much of the farm land for residential purposes.

Shown in the diagram is the relation of per-acre farm value in 1950 to the per-acre receipts from sale of farm products in 1949 for the 56 Alabama counties. The four groupings are according to the following gross receipts per acre: under $10, $10 to $15, $16 to $25, and $26 and over.



Farmers in the two lowest counties sold about $4 worth of products per acre in 1949. They estimated farm land value in their counties at $30 per acre. In contrast, farmers in the three top counties averaged $26 to $32 in products sold per acre, and valued land of all farms in those counties at $90 to $100 per acre. Although a $30 value per acre seems a bit high for the $4 level of cash receipts, farms have value as homes as well as producers of products for sale. This tends to prevent values of less productive farms from falling to extremely low levels.

This study further showed that nearly nine-tenths of the difference in average reported per-acre value of farms of the 56 counties was explained by differences in reported cash receipts. Therefore, it is very important for the prospective buyer or seller to determine from records or careful estimates what receipts to expect in order to make value estimates.

It is well to remember, too, that on the average farmers seem to consider each dollar per acre of added annual receipts was an adequate basis for $3 greater price per acre.

New and Timely PUBLICATIONS

Listed here are new and timely publications reporting results by the Agricultural Experiment Station:

Bul. 298. Price Differentials for Slaughter Hogs in Alabama is a report of differentials in prices paid for hogs of different weights, during different seasons and at different market locations.

Cir. 115. Factors Affecting Pecan Yields reports factors that limit pecan yields in Alabama and gives recommendations for increasing nut production.

Leaflet 28. Poultry Range Shelter is an illustrated report telling the advantages and how to construct movable range shelters.

Leaflet 43. Chemical Control of Cherokee Rose, Alder and Certain Other Pasture Weeds.

Special Leaflet. General Fertilizer Recommendations for Alabama.

Free copies may be obtained from your county agent or by writing the API Agricultural Experiment Station, Auburn, Alabama.

HIGHLIGHTS
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