Mr Lowery

VOL. 3 NO. 2 SUMMER 1956

HIGHLIGHTS of AGRICULTURAL RESEARCH

In this issue—Quality Pastures Are Money Savers . . . New Remedy for Roundworms in Poultry . . . Systemics May Be Future Control of External Parasites . . . Single Design for Low-Cost Barns . . . Improved Sorghums Produce High Yields of Silage and Syrup . . . Trend Toward Larger Farms in Alabama . . . Pigs Need Zinc Too.

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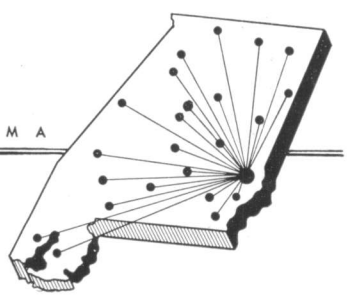


Note absence of clover in unfertilized plot at right; plot at left received adequate lime, potash, and potassium.

Quality PASTURES *are* MONEY SAVERS!

E. M. EVANS, *Associate Agronomist*

SAVING BY SPENDING may sound a little farfetched, but it can be true. Greater economy is possible from larger expenses if volume of production and economy of production are both increased.

Take the case of fertilizing pastures, for an example. Many farmers have questioned continued pasture fertilization since cattle prices are lower, thinking this a good place to reduce expenses. A study of the facts may lead to a different conclusion.

Research has shown that it is three to five times more expensive to barn-feed cattle than to pasture them. The important problem thus becomes, how to grow the best quality pastures most economically? As a rule, the better quality forage plants (particularly legumes) have higher fertility requirements than do the low quality plants. This means that the desirable plants cannot compete and will be crowded out by the rougher types unless a good fertilizer program is followed.

High Quality Pastures

A question frequently raised is "Do I really need a high quality clover-grass pasture?" The answer is yes, but the amount needed depends on the type of livestock program being followed. If calves are to be kept to heavier weights without losing too much finish, a high quality forage is necessary. In the ordinary cow-calf system where calves are sold "off the cow," a high quality pasturage will help the cow to give enough milk to bring the calf along at a good rate of growth. There is no question that a high producing dairy herd must have lush, high quality pasturage for maximum economical production.

"How do ranchers in the West get by without having to fertilize their pastures?" is a question many farmers ask. There are several reasons. Western soils are relatively young and under lower rates of rainfall the minerals have not leached nearly to the extent that is generally true for Alabama. The rancher in the West is willing to allot 10 to 20 acres of range for a cow and calf, more than Southern farmers can afford. Some western grasses retain a fairly high nutrient content even when standing dry and apparently dead. This is not the case with our adapted grasses under our higher rainfall conditions. Southern native grasses similar to those of the West have an estimated carrying capacity of one mature animal to 6 to 12 acres for a 9-month period of the year. Few Alabama farmers are content to stock at such a low rate.

Poor Land Pastures

Many fields are too steep, drouthy, stony or eroded to enable establishment and maintenance of white clover-Dallisgrass pastures. On these areas, hardier crops such as lespedeza sericea, Bermudagrass, Bahiagrass or kudzu are better adapted. It may be necessary to compromise on quality in order to utilize the rougher land to the best advantage. After a few years of erosion control and good management, these soils may be built up to the extent that more desirable perennials may be established. Until this time, quality and production may be improved by use of annual legumes like crimson clover or vetch in combination with Bahia or Bermuda grasses.

Planning a successful forage program requires consideration of the needs of the livestock, the kind and acreage of land available and the amount of money available to do the job.

Cost of Pasture Improvement

It costs about 25 to 30 dollars p acre to establish a Dallisgrass-whi clover mixture on most areas and about 10 or 12 dollars to maintain an acre each year thereafter. A little more than one-half of this cost is for fertilizer and lime. Test results show that a good job of fertilization pays off. (See table and photo.) In this test where lime, phosphorus and potassium were applied, the yield was about tripled, and the forage quality was better because a good growth of white clover was maintained. A good stand of white clover makes earlier growth than the summer grass and usually lengthens the grazing season by about 2 months. On many soils lespedeza sericea also responds to fertilizer (table). Good fertilization doubled the sericea yield in this test.

PER ACRE PASTURE YIELDS OF DRY FORAGE FROM VARIOUS FERTILIZER TREATMENTS, 3-YEAR AVERAGE

Pasture crop	Fertilizer treatment				
	Check	LK	PK	LP	LPK
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*
White clover-Dallisgrass[1]	1,732	2,910	3,894	4,407	5,428
Sericea lespedeza[2]	2,611	3,130	4,973	4,328	5,267

[1] Grown on Susquehanna fine sandy loam soil.
[2] Grown on Ruston fine sandy loam soil.

New remedy for ROUNDWORMS *in* POULTRY

S. A. EDGAR, *Poultry Pathologist*

Long worms are the large roundworms and small ones are cecal worms; both are common, important parasites in poultry.

Rid chickens of large roundworms and cecal worms at low cost? That is what commercial flock owners can do – and without reducing egg production!

Until recently the most often used remedies for these two common and important roundworms were nicotine and phenothiazine. Because they are not soluble in water, the drugs must be given in tablet form or in the feed. They were quite effective when given in small doses in the feed for a period of 3 or more days. In tablet form, as often given, both drugs are toxic and are not very effective. The commonly followed 1-day treatment often is not effective, particularly against cecal worms, and sometimes is toxic to layers, causing as much as 30% drop in egg production.

Research at Auburn

Experiments by the API Agricultural Experiment Station revealed that several piperazine compounds were effective against roundworms of poultry. Started in 1950, the work with these compounds as vermifuges was among the first to be done in this country.

Results from the many series of experiments may be summarized as follows:

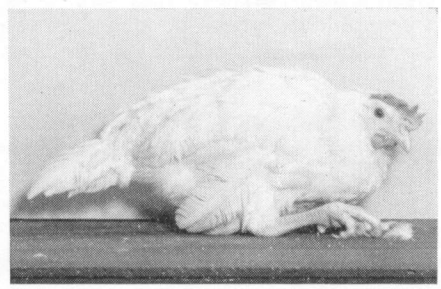
(1) Drug can be administered in the drinking water or in the feed.

(2) Six-hour treatment is about as effective as one 24 hours long.

(3) Four-tenths of 1% of drug is about as efficient as twice that amount.

(4) Cost should not exceed ⅛ to ¼ cent per broiler or layer.

(5) Treatment levels are not toxic to growing chickens and layers, with no reduction in rate of lay.

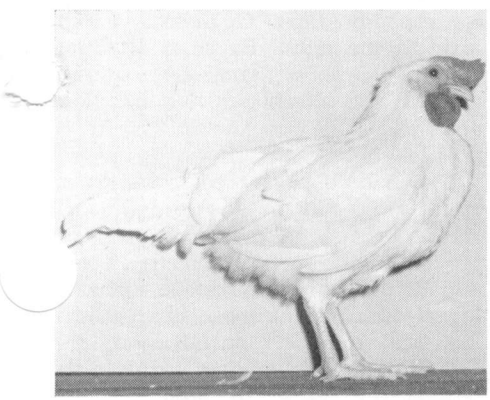


Untreated pullet shows typical symptoms of roundworm infestation.

In the Auburn experiments it was found that 1 rounded tablespoon (14.5 grams) of piperazine hexahydrate (43% piperazine) per gallon of drinking water is effective against the large roundworm. One gallon is sufficient to treat 60 hens; 100 to 125, 6- to 8-week-old broilers; or 20 to 25 mature turkeys. This concentration allows 1/15 gram of piperazine for a half grown broiler and 1/10 gram for a mature chicken, resulting in elimination of 95 to 100% mature and 50 to 90% of the immature large roundworms. More than 90% of the worms eliminated were passed during the first 6 hours of medication. Water starvation resulted in more uniform drug intake when given in the drinking water for a limited period of time than when birds were not water-starved. Other piperazine compounds were effective when administered in either the feed or water.

Piperazine compounds at the foregoing levels were less effective against cecal worms and threadworms (Capillaria), causing from 20 to 85% elimination. Two to 4 times as much resulted in good elimination, usually better than that with nicotine-phenothiazine tablets. Piperazines are not effective against crop worms in turkeys nor against two types of tapeworms in chickens.

Piperazine appears to be another important addition to the ever increasing array of effective vermifuges, because of its high degree of activity against not only the large roundworm of chickens, but also against certain important nematodes of man and other animals.



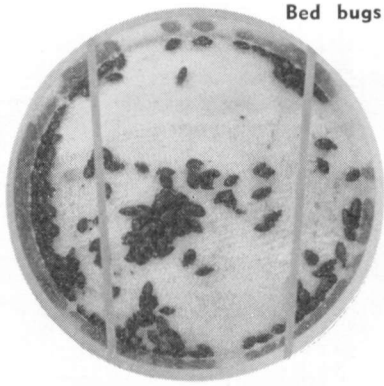
Pullet after treatment with piperazine.

Effectiveness of Piperazine Hexahydrate in Eliminating Three Species of Roundworms from 2-Month-Old Single Comb White Leghorn Cockerels

Amount of drug in drinking water	Percentage of efficiency[1]			Number birds
	Large roundworms	Cecal worms	Threadworms	
None	–	–	–	13
0.4%, 6 hours[2]	98	66	20	12
0.4%, 24 hours	97	75	23	12
0.8%, 24 hours	98	87	49	11

[1] Large roundworms, cecal worms and threadworms averaged 13, 28 and 42 worms respectively in untreated control group.

[2] One tablespoon (14.5 grams) per gallon of water equals 0.4%.



Bed bugs feeding on test rabbit.

SYSTEMICS—*May be future control of external parasites*

T. R. ADKINS, Jr., *Graduate Assistant in Entomology*

DID YOU EVER THINK that some day you might be grateful to the bed bug?

There was a time when we were cursed with the bed bug because he roomed in our houses and dined on our blood. In the near future this same pest may be credited with helping us to raise healthier livestock.

New Type Parasite Control

Bed bugs are used in experiments dealing with a new type control of external parasites such as ticks, lice, fleas, and flies (ectoparasites). This revolutionary method is known as systemic, or chemotherapeutic, control. Certain chemicals are put into the feed of the animals; blood-feeding ectoparasites receive a death-dealing dose from the blood stream. You can visualize the ease with which these pests can be controlled by simply adding chemicals to the animal's feed rather than spraying or dipping.

A chemical for use as an animal systemic must have the following:

(1) It must be able to move into the blood stream from the digestive tract after being given in the animal's feed.

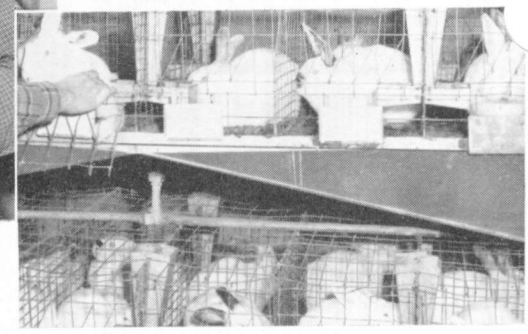
(2) It must have a wide difference between the dose required to kill the parasite and the amount that would harm the animal.

(3) The toxic ingredient must remain in the blood long enough and strong enough to poison parasites feeding on the animal.

Systemic control of parasites is not new. Some insects that feed on plants are now being controlled by systemic insecticides. We have all taken systemic chemicals in one form or another, such as sulfa drugs and quinine, to control such parasites as bacteria, protozoa, and viruses that made us sick. Some of these drugs are actually toxic to us as well as to the "germs." However, there is that wide margin between the two toxicities. This type of control of disease-causing parasites by drugs is actually parallel to control of ectoparasites by systemic insecticides.

Research at Auburn

The API Agricultural Experiment Station began animal systemic research in 1953*. In the animal systemic laboratory at Auburn, the domestic rabbit plays the role as an experimental host animal in which various chemicals are screened for systemic activity. Rabbits were chosen because they are fairly susceptible to various poisons, they can be economically maintained in small cages, and their initial cost is considerably lower than that of larger animals such as cattle.



Above: Rabbit being dosed with systemic insecticide. At right: Cages housing rabbits in systemic laboratory at Auburn.

Bed bugs were used in the laboratory as test insects because they are easy to rear in large numbers, feed readily on the host animals, and are susceptible to most insecticides. No attempt has been made to control the bugs in the usual sense. They simply feed on rabbits that have been dosed with the chemicals, and the number of bed bugs killed proves whether the toxic materials are being absorbed through the digestive tract and dispersed within the blood.

Some of the most promising chemicals have been tested for their systemic activity against ticks and will be tested against mosquitoes and stable flies.

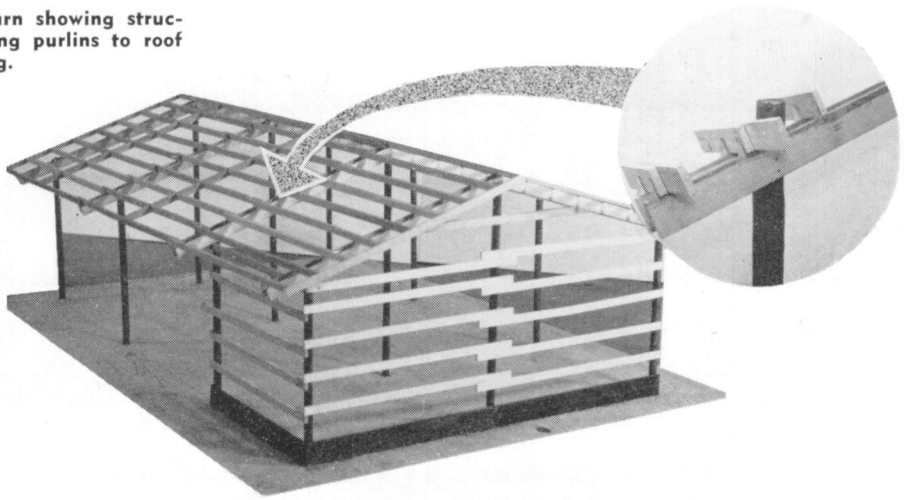
Thirty-eight chemicals have been screened for systemic activity within animals. These chemicals have undergone preliminary toxicity tests to rabbits and to bed bugs, which fed upon the dosed rabbits. The chemicals were administered to the rabbits through a stomach tube, and the bed bugs were then allowed to feed upon the rabbits at various intervals. Some of the chemicals controlled the insects.

Ten of the 38 chemicals showed systemic action by killing 50 to 100% of the bugs that fed on the dosed rabbits. Only 5 of these 10 systemics have been tested against ticks. Of these 5, 4 were toxic to the ticks. Bayer L 13/59 is one of the most promising material used. It was effective against bed bugs and ticks and was low in toxicity to rabbits.

Systemic control of ectoparasites on animals is still in the experimental stage. Because of the unknown possible dangers of these chemicals, no compounds will be recommended for treating livestock until more experimental data are available from laboratory studies. Research is now underway to determine the effect of promising systemics on various animals.

* This investigation is supported in part by a research grant, P.H.S. G-4065(c), from the Division of Research Grants, National Inst. of Health, Public Health Service.

Model of low-cost, multiple purpose pole barn showing structural detail. Inset shows method of attaching purlins to roof rafters. Note the absence of diagonal bracing.



A single design for LOW-COST BARNS

WALTER GRUB, *Associate Agricultural Engineer*

A REASONABLE number of years of service . . . simple construction . . . sufficient strength . . . good engineering design . . . and low cost!

These are basic features of a multipurpose pole barn designed for Alabama farmers by the Agricultural Engineering Department of the API Agricultural Experiment Station.

The structural frame is so designed that it may be adjusted to a variety of purposes. Variation in pole spacing can be used to advantage for machinery storage and farm shop, permitting bays of varying widths for different width machinery. The barn can be a cattle shelter or, by using taller poles, it can be used for hay and feed storage. Another use is as a poultry house, with the pole spacing varied for different house widths and arrangements.

The building is low in cost and requires only locally available materials. The cost of these materials will vary from 25 to 35 cents per square foot of floor area, depending upon the materials used; this does not include side wall materials. The building can be erected by farm labor with only those hand tools common to the average farm. The construction is simple and all cutting and fitting is kept to a minimum.

Advantages vs. Disadvantages

The advantages of this building in comparison with a conventional frame building are as follows: (1) low cost; (2) simple to construct; (3) rough cut lumber used throughout; (4) no masonry footing or foundations required; and (5) no diagonal bracing required.

The major disadvantage is the difficulty in handling and raising the long, heavy poles.

Construction

The poles are the most critical material used in this building. They are the main supporting members and give the building its rigidity and strength. The lower ends of the poles are set firmly in the soil and serve as the footing and foundation.

To prevent damage or loss from wood rot or termites, the poles must be treated with a wood-preserving material. A pole that has been pressure treated with 8 pounds of No. 1 creosote per cubic foot of wood will last at least 30 years. Preservatives that are painted on the wood surface do not penetrate and are not considered acceptable.

To provide enough area for nailing the framing members to the pole, the small end of the pole should be at least 5 inches in diameter. Smaller poles do not have enough area for holding the nails that fasten the rafters to the poles, and larger poles are too heavy and difficult to handle.

Side-wall nailing girths that come in contact with the soil should be treated to prevent damage by termites and wood decay. This lumber also should have the same pressure treatment as the poles.

All other framing members, both roof and side wall, can be rough cut, yard dried, No. 2 yellow pine or equal.

Metal roofing can be applied directly to the roof purlins, which are spaced 24 inches on center. If the metal roofing to be used requires a closer spacing, the purlins can be moved to meet such requirements. A solid wood deck, if required for other types of roofing materials, can be nailed to the purlins. The side wall material is fastened directly to the horizontal nailing girths, which are spaced from 24 to 48 inches on center. Such exterior wall materials as vertical rough cut boards and battens, exterior grade building boards, or metal siding may be used. Any one of these will prove satisfactory and should be selected on the basis of cost, availability, and ease of installation.

The roof pitch can be changed without any major changes in structural design. However, it should conform to the minimum pitch recommended by the roofing material manufacturer. Spacing of the poles along the length of the building can be varied from 11 to 17 feet without varying the timber sizes of the rafters or purlins. The roof purlin length will vary with the pole spacing, since the purlins must reach from rafter to rafter with enough overlap to allow for irregularity in rafter spacing. Extra sections can be added to increase the width of the building in units of 11 to 13 feet without varying timber sizes or structural framing.

The design has been experimentally tested and found satisfactory. Three such barns have been built by farm labor at the Brewton and Tuskegee experiment fields and at the Plant Breeding Unit near Tallassee.

Construction plans for this pole barn may be obtained through your County Agent (Extension Plan No. PB6).

Improved sorghums produce HIGH YIELDS *of* SILAGE *and* SYRUP

W. R. LANGFORD, *Associate Agronomist*
I. E. STOKES, *Agronomist, USDA*

THERE WAS THE TIME and not too long ago that we had no choice but to accept low-yielding sweet sorghum varieties.

But things have changed. New sweet sorghum varieties have been developed that produce high yields of silage and syrup, and that are also resistant to lodging.

Sart and Tracy are two new varieties that have proved superior for both silage and syrup production. Both varieties are products of research at the USDA Sugar Crops Field Station near Meridian, Miss. They have been tested several seasons alongside well known varieties at the Sand Mountain and Piedmont substations, and the Brewton Experiment Field in cooperation with the USDA.

Sart

Sart is a late-maturing variety that reaches the hard dough stage 140 to 160 days after planting, depending on date of planting and weather conditions. Stalks of this variety are large in diameter, and they reach a height of 12 to 15 feet under favorable growing conditions. Sart suckers freely and therefore tends to compensate for sparse stands.

Stalks of Sart do not lodge readily and usually remain straight until harvest, greatly facilitating harvest operations. Characteristics contributing to this advantage are: A firm rind that prevents excessive bending of stalks; a well anchored root system that minimizes "caving over" of plants; and resistance to stalk rot – the disease that is often responsible for the failure of Hodo, a widely grown variety comparable to Sart in maturity.

Sart yields a slightly lower tonnage of stalks per acre than does Hodo, but the high sugar content of Sart results in a higher yield of syrup per ton of stalks, and usually more per acre. In 3 years at the Sand Mountain Substation, Sart averaged 248 gallons per acre.

During the 3-year period of 1950 to 1952, Hodo produced more silage per acre than did Sart, (28.1 to 25.4 tons) but Hodo lodged badly making harvesting operations quite difficult.

Seed of Sart are quite large and vary in color from light gray to chalky white except at the point of attachment which is dark brown and the apex which is reddish brown.

Tracy

Tracy is a mid-season variety that is comparable in maturity to White African, another widely grown variety. It

Sart is a late-maturing sweet sorghum.

reaches the hard dough stage about 100 to 105 days after planting. Since it is a mid-season variety, yields of Tracy should not be compared with yields of such late-maturing varieties as Sart and Hodo. Late-maturing varieties are generally more productive than earlier varieties. Mid-season varieties can be planted later or harvested earlier so as not to compete with other crops for time and labor.

Stalks of Tracy are medium in diameter and reach a height of 9 to 12 feet under favorable growing conditions. They are quite juicy and the juice has a high sugar content that results in high yields of syrup. Three-year average syrup yields at the Sand Mountain Substation were 288 gallons per acre from Tracy as compared with 269 from White African.

Tracy does not lodge as readily as White African. Limited lodging that has been observed in the Tracy variety has been associated with "caving over" of plants during high winds, rather than bending of the stalks. Following a windstorm at the Sand Mountain Substation in August, 1953, 72% of White African plants were lodged, whereas only 27% of Tracy and less than 1% of Sart were lodged.

During the 3-year period of 1950 to 1952, Tracy produced an average of 22.4 tons of silage per acre, 2 tons more than did White African.

Seed of Tracy are small and vary in color from light to dark reddish brown.

Both Sart and Tracy produce light amber colored syrup with a pleasing flavor that meets the demand of the most exacting market.

In silage production studies at four locations in 1955, both Sart and Tracy outyielded Dixie 18 corn by a considerable margin. Sart averaged 28.8 tons per acre in 3 tests as compared with 20.7 tons of corn. In 2 tests Tracy produced an average of 22.5 tons per acre as compared with 15.4 tons of Dixie 18 corn. During less favorable corn years, this difference might be even greater in favor of sweet sorghum.

Seed stocks of Tracy and Sart are in good supply. If you are planning to grow sorghum for syrup or silage, it may pay you to check with your seed dealer right away.

Tracy is a mid-season variety, 40 to 55 days earlier than Sart. (USDA photo.)

Trend toward LARGER FARMS *in Alabama*

J. H. YEAGER, *Associate Agricultural Economist*

EVERYTHING SEEMS to be getting bigger lately – TV screens, cars, crop yields, businesses, and fishermen's stories, to mention a few.

Alabama farms are staying in step with the times and getting larger too. The average size farm in the State has increased from 68 acres in 1930 to 118 in 1955. The census definition of a farm has changed somewhat since 1930, but there is substantial evidence of a trend toward larger farms.

Analysis of farm records almost always shows that farm size influences net earnings. In many respects, acres act as a multiplier of net income. But this does not necessarily mean that small farms do not have a place in our economic system.

Opportunities for Small Farms

The growing poultry enterprises in the State show that volume of business can be increased without adding acres. Enterprises built on purchased feed programs can often increase net income. In addition, there are numerous cases where the farm provides supplementary income to that from non-farm sources. By combining the two, a satisfactory income is obtained.

In general, farms of less than 260 acres have decreased in numbers since 1935, while larger farms have become more numerous. Actually, statistics show that farms of less than 10 acres increased from 1950 to 1955. This indicates that general statements about averages and trends in size do not present a complete picture of what is happening. The table shows changes in numbers of different size farms from 1935 to 1955.

Farm size	Number of farms 1935	1955	Change
Acres	*Thousands*		*Pct.*
Under 10	19.1	18.2	–4.8
10-49	142.4	71.4	–49.8
50-99	60.7	40.0	–34.0
100-179	32.6	24.5	–24.8
180-259	9.2	8.8	–4.3
260-499	6.5	8.0	23.6
500-999	2.1	3.6	73.8
1,000 and over	.9	2.4	158.7
TOTAL	273.5	177.0	–35.3

Why has the average Alabama farm increased in size? The answer, at least in part, lies outside of agriculture. Because of industrial expansion, many families have found it easier and quicker to increase income by working off the farm than by expanding their farm capital investment and working full time on the farm.

Fewer Farms Produce More

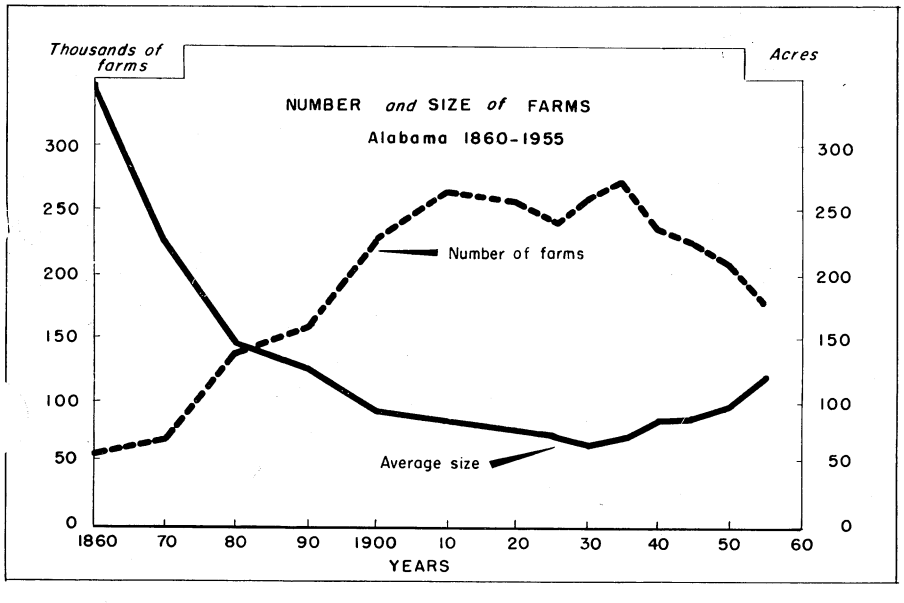
Along with industrial expansion came more and better machines, fertilizers, varieties, breeds, facilities, insect and disease control measures, and work methods that made greater agricultural production possible with fewer farmers. Fewer farmers are needed today than in former years to produce food and fiber for our population.

Alabama has lost 55,000 farmers since 1940. Tenants declined 55% while owner-operators increased 21%. The increase in part owners was much greater than the increase in full owners. Cash tenants and croppers showed a greater percentage decline than share tenants.

What has happened to the land left by those who quit farming? In many cases it has been purchased or leased by adjoining land owners. In the case of farms once operated by croppers who have left agriculture, it is a change in type of operation, which amounts to fewer and larger farms. Or if the land was previously rented by two farmers, it may now be rented by only one.

Most farmers who have increased their land area have also expanded total production. With relatively high initial and operating costs on farm machinery, they have spread these costs over more acres or units of product. Possibly, some farmers have purchased additional land with the idea of expanding production at a later date. They have considered land a good investment.

In many cases, farmers acquiring additional land have completely reorganized their land-use program. Part of the land acquired is being cropped along with part of their original holding. Likewise, parts of both holdings may have been put to forestry uses. Other areas have been put to improved permanent pasture. Total livestock numbers have been increased. It appears that in making the decision to increase size it is the additional income from the whole farm rather than income from the added part that swings the pendulum in favor of enlarging.



HOGS *need* ZINC *too!*

HOWARD F. TUCKER, *Assistant Animal Husbandman*

Reddening, scaliness, and cracking of the skin are signs that your hogs may not be getting enough zinc!

Under certain conditions pigs need zinc to prevent a skin disease known as parakeratosis.* This disease, which results in slow growth and sometimes death, was first observed in some experimental hogs at the API Agricultural Experiment Station in 1950. It was suspected to be mange, but skin scraping indicated that it was not. Between 1950 and 1955, the disease assumed great economic importance in the United States and in foreign countries.

Parakeratosis is associated primarily with dry lot feeding of growing-fattening swine. A majority of the cases will develop in pigs of weaning to 125-pound weights. Good grazing, such as alfalfa or Ladino clover, will prevent or cure the disease. Although observed in all breeds of hogs, some breeds are seemingly more susceptible than others.

In the table are the results of an experiment at Auburn in which the control ration produced a high percentage of parakeratosis cases. Growth rate was very slow. Addition of zinc carbonate to the fattening ration resulted in faster growth and no pigs developing the disease. Excess amounts of calcium and phosphorus in the ration were found to aggravate the disease.

Results from Zinc Added to Ration Containing High Calcium and Phosphorus Levels

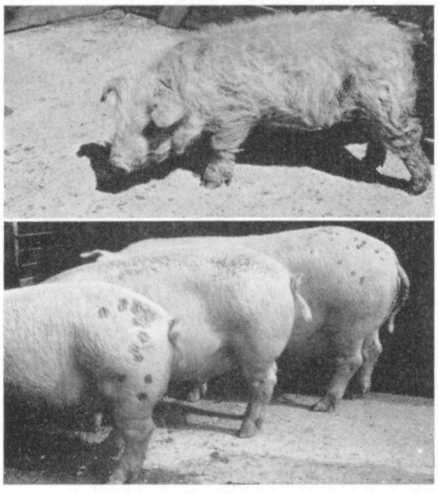
Feed	Av. daily gain, lb.	Cases of disease, %
Fattening ration	0.26	83
Fattening ration + zinc	1.06	0

Such natural swine feeds as corn, soybean meal, and meat and bone meal contain enough zinc if the calcium and phosphorus amounts are not excessive. However, there must be enough calcium and phosphorus to prevent rickets or posterior paralysis. The two are deficiency diseases caused by insufficient amounts of either of these minerals.

Most swine rations contain enough phosphorus but not enough calcium. The requirements for growing-fattening swine are 8 pounds of phosphorus and 14 pounds of calcium per ton of mixed ration. These amounts should be carefully adjusted. If there is an excess of either or both calcium and phosphorus, addition of 4/10 pounds zinc carbonate per ton will prevent parakeratosis.

Nutrition research, thus, has discovered the cause and how to prevent a serious disease of hogs.

* First reported in 1955 Proceedings, Society of Experimental Biology and Medicine by the author and W. D. Salmon, head, Department of Animal Husbandry and Nutrition.



Above: Typical symptoms of parakeratosis due to insufficient zinc. Below: All pigs treated with zinc carbonate. Pig in front is same as one above after treatment.

New and Timely PUBLICATIONS

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

Leaflet 48. Peach Varieties for Alabam- reports results of peach variety testing the API Agricultural Experiment Statio

Leaflet 49. Results of Hay Crushing Tests presents a comparison of curing time and quality of crushed and uncrushed hay.

Progress Report 61. Construction and Operation of Outdoor Brooder describes how open structure is built and how it is used. Includes simple construction plan.

Progress Report 62. Commercial Fishworm Production describes methods of growing fishworms in the Southeast.

Progress Report 63. Comparative Yields of Early- and Late-Harvested Corn gives yield differences between early- and late-harvested corn under different weathe conditions.

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

HIGHLIGHTS *of* AGRICULTURAL RESEARC

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Auburn, Alabama
Permit No. 1132—5/56-8M

PENALTY FOR PRIVATE USE TO AVOID PAYMENT OF POSTAGE, $300