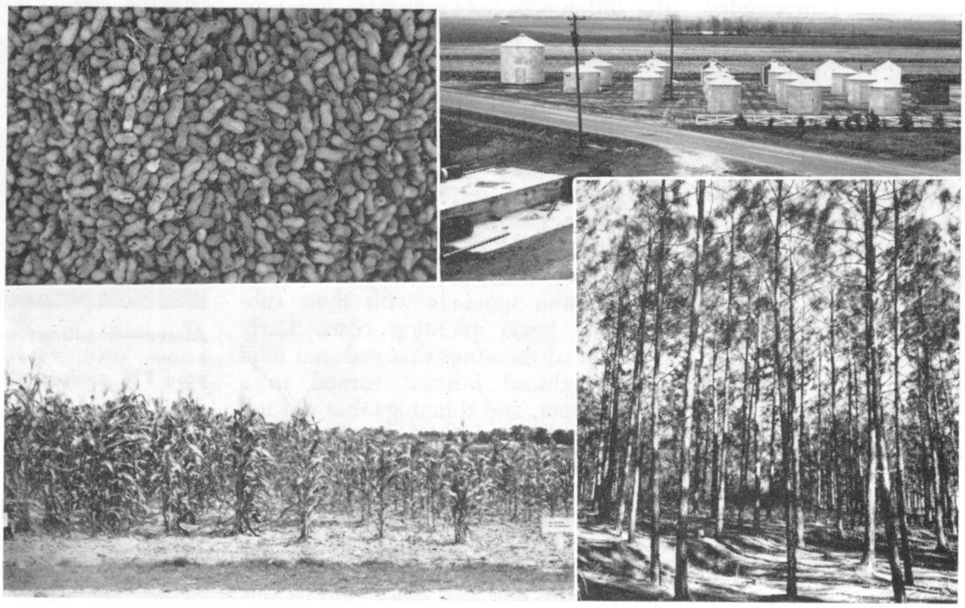
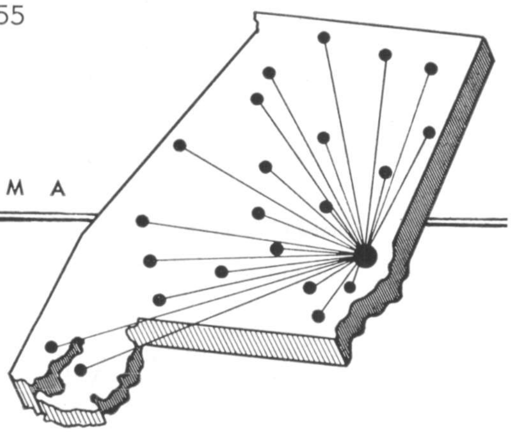
HIGHLIGHTS
of
AGRICULTURAL RESEARCH



In this issue—Pines Pay . . . Results Tell Time for Planting Oats . . . Hybrid Vigor at Lower Cost . . . Grow or Buy Nitrogen for Corn? . . . Peanuts, a Favorite Delicacy of Stored Food Insects . . . What Happens to Peanuts During Storage? . . . Research Points to Arrest of Plant World Thugs.

VOL. 2, No. 3 — FALL 1955



SERVING ALL of ALABAMA

AGRICULTURAL EXPERIMENT
STATION SYSTEM
of the
ALABAMA POLYTECHNIC INSTITUTE

Even on abandoned crop land

PINES PAY

KNOX LIVINGSTON and J. E. CAROTHERS
Department of Forestry

NINE PER CENT compound interest earned – and, on land too poor for cultivated crops!

Rates up to 9 per cent compounded annually for 19 years have been earned by slash pine planted on abandoned fields at Auburn. These fields are gently rolling, and the soil is mostly loamy sand underlain by sandy clay. Their average site quality is perhaps a little better than that of the average Alabama land now growing slash pine, but the best parts of the area would be extremely poor for cultivated crops.

Pulpwood Yields

Tree growth and pulpwood production in the first 19 years have varied with spacing and with site quality. Production and returns shown in the table are for slightly below the average site quality of the experimental area. On all except the poorest sites, highest production occurred at the closest spacing. There is good indirect evidence that theoretical maximum yield falls between the 4 x 4 and 6 x 6-foot spacings, with most pulpwood produced in 19 years at a little below 2,723 trees per acre on the best sites and a little above 1,210 trees per acre on the poorest sites.

Thinnings had little effect on total wood production, but those made as early as age 12 did reduce merchantable pulpwood yield. The age 8 thinning cannot be considered commercial on the normal stumpage market, and an appreciable volume of wood cut in the age 12 commercial thinning was below pulpwood size. Thinning at age 14 or 15, especially in the more widely spaced stands, removed little material below pulpwood size.

Financial Returns

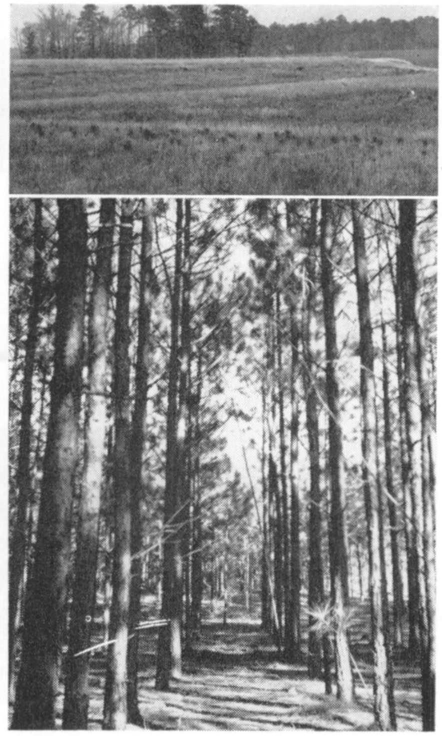
In order that gains due to inflation do not appear as returns to the forestry enterprise, computations are based on current costs and prices estimated from an informal survey in Lee County. Values used are $25.00 per acre for abandoned crop land; $11.50 per thousand seedlings for planting; 30 cents per acre per year for taxes, fire protection, and supervision; and $4.00 per cord for pine pulpwood stumpage.

Percentage of return on investment in an enterprise depends not only on the difference between total expenses and value of products, but also on the time that expenses and earnings occur. A dollar spent in the beginning has a greater effect than one spent or earned later. This economic fact places the close spacings, with their relatively high initial planting cost, at a disadvantage.

Highest percentages of return were earned not at the closest spacing with its greatest merchantable yield but at the medium spacings with their substantially lower planting costs. Early commercial thinnings that reduced total yields reduced interest earned to a lesser extent, and thinnings that did not change total yields increased returns.

Medium spacings not only have yielded higher interest rates for the first 19 years, but they appear to be in the best condition for future growth. Harvests in the future will yield saw timber and perhaps poles and piling, all with a much higher value than pulpwood. In the densest stands, trees are overcrowded and many are dying. At the widest spacings, trees are large, but mostly rough and of poor quality because of large knots formed by persistent lower branches.

Medium spacings with no thinning before age 14 or 15 look best at this time on the basis of both past returns and future outlook.



Above—Seedlings on worn-out crop land; below—6X8, 19-year-old plantation that paid 9% compound interest on investment.

YIELDS AND RETURNS FROM 19-YEAR-OLD SLASH PINE PLANTATIONS, AUBURN, ALABAMA

Trees planted per acre	Planting spacing	Early thinning: Practice	Early thinning: Stand age	Pulpwood yield: Cut in thinning	Pulpwood yield: Standing at age 19	Pulpwood yield: Total in 19 years	Compound interest earned on investment	Amt. a dollar would earn in 19 years at the indicated rate[1]
No.	*Feet*		*Years*	*Cords per acre*			*Per cent*	*Dollars*
2,723	4×4	None	--	--	45.2	45.2	6.8	2.49
2,723	4×4	Pre-commercial	8	--	35.4	35.4	5.5	1.77
1,210	6×6	None	--	--	41.8	41.8	8.4	3.63
1,210	6×6	Commercial	12	4.2	31.6	35.8	8.0	3.32
908	6×8	Commercial	14	7.3	31.3	38.6	9.0	4.14
681	8×8	None	--	--	31.9	31.9	7.9	3.24
681	8×8	Commercial	15	5.2	26.8	32.0	8.3	3.51
483	9½×9½	None	--	--	27.3	27.3	7.6	3.02
303	12×12	None	--	--	22.1	22.1	7.0	3.62
170	16×16	None	--	--	18.5	18.5	6.5	2.31
121	19×19	None	--	--	17.0	17.0	6.2	2.14

[1] In contrast, a dollar invested at 3 per cent compound interest for 19 years would earn only 75 cents.

Yields in the table are adjusted to represent a site quality slightly below the average for the area.

Results tell the TIME *for* PLANTING OATS

F. S. McCAIN and F. L. SELMAN
Department of Agronomy and Soils

WITH NO ADDED COSTS you can step up your yield of forage and grain as much as 25% to 50% by planting oats at the right time.

In general, this crop is planted 20 to 30 days later than what research results show to be the best planting dates for top yields in Alabama.

Time-of-Planting Tests

What planting dates are best for grain only and for grazing and grain, and what are the advantages from earlier plantings are answered in the results from the oats date-of-planting tests by the API Agricultural Experiment Station. Nortex 107 and Victorgrain 48-93 have been the test varieties used in this 4-year experiment conducted at several locations throughout the State. Starting August 20, the two varieties were planted at 20-day intervals continuing until November 10.

In addition to plots grown for grain only, companion plots were planted to the same variety and at the same dates. These plots, fertilized in the fall with additional nitrogen, clipped until March 1 to simulate grazing, and then allowed to make grain, were used to determine forage yields and total animal feed produced per acre. In order that all results from these tests were on the same basis, the forage yields were converted to bushels of grain per acre. The conversion factor used was roughly 500 pounds of green weight of forage equaled 3 bushels of oats in feed value. Therefore, total yields of feed from the grain-forage plots are expressed in bushels per acre.

Results

Four years' results from this experiment show that the best time for planting oats varies (1) for different parts of the State and (2) for use to be made of the crop – for grain only or for grain and grazing. The best time to plant oats for grain only in northern and central Alabama is later than that for forage and grain. However, in the southern part the best planting dates are the same for grain only and for grain and forage. (See Figures 1, 2, and 3.)

In general, grain yields decreased from north to south regardless of planting dates. Clipping until March 1 did not materially affect the grain yield in northern and central Alabama. However, in southern Alabama clipping until March 1 reduced grain yields of the September 30 planting as much as 10 bushels per acre. On the other hand, the total grain equivalent from that planting date (forage converted to grain plus grain harvested) was greater in southern Alabama than in other parts of the State.

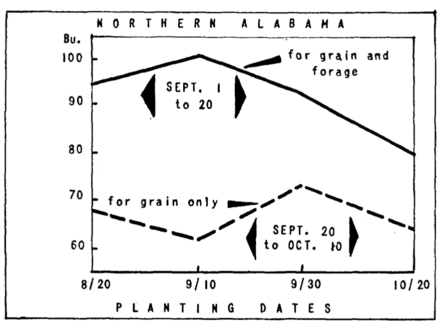


FIGURE 1

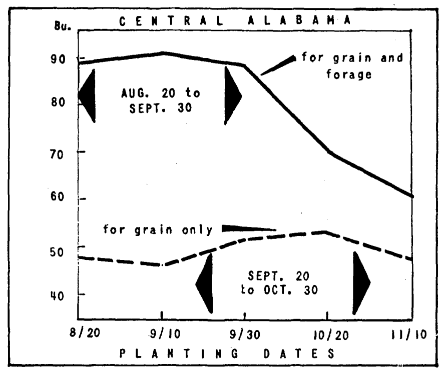


FIGURE 2

Forage yields increased from north to south, with the major increase occuring between central and southern Alabama. Fall application of nitrogen and clipping until March 1 significantly increased the total feed produced over that of oats grown only for grain regardless of location or date of planting. Although forage yields were greatest in southern and central Alabama, farmers throughout the State should graze their oats to make maximum use of total feed produced.

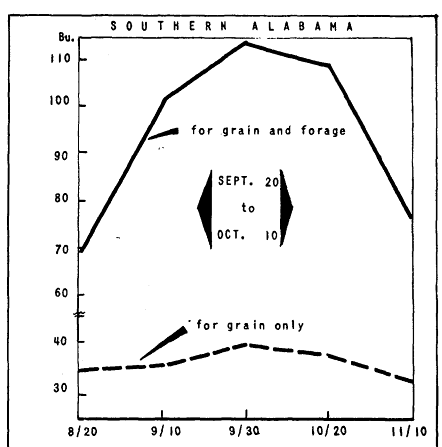


FIGURE 3

YIELD OF OATS PLANTED FOR GRAIN ONLY AND FOR GRAIN AND FORAGE AT DIFFERENT PLANTING DATES, SIX LOCATIONS, 1954

Planting date	Northern Alabama		Central Alabama		Southern Alabama	
	For grain	For grain and forage	For grain	For grain and forage	For grain	For grain and forage
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
August 20	67.3	93.3	44.1	89.4	34.4	69.3
September 10	62.2	100.6	43.1	91.1	35.2	100.2
September 30	72.8	92.5	51.0	88.4	39.2	113.9
October 20	64.3	79.5	52.7	70.5	37.6	109.2
November 10	----	----	47.2	60.8	32.9	76.7

HYBRID VIGOR *at lower cost*

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

Crossing of noninbred strains offers excellent possibility for production of low-cost, high-producing layers.

Since about 1940, the trend in breeding for higher egg production has been toward crossing inbred lines to produce chicks with hybrid vigor. Birds produced by this system generally are excellent egg producers. However, because of the years of inbreeding and testing necessary for development of suitable parent lines, chick prices for the resulting "hybrids" are considerably higher than for standardbred chicks.

Within the past few years, considerable interest has been shown in the crossing of noninbred strains. Many breeders have found that crossing of certain strains produces chicks with a great amount of hybrid vigor. This system of breeding, being less complicated and less expensive, permits the sale of good chicks at lower cost.

Since 1949, the API Agricultural Experiment Station has been crossing the disease-resistant Auburn Strain White Leghorn (Strain A) with another White Leghorn strain (Strain D), which also has been bred for several years at this station.

Each year chicks of the two pure strains and of the strain-cross (A X D) have been hatched, reared, and housed together to 500 days of age, or until the end of their first laying year. During each test year, a study was made of their performance with respect to several characteristics, the two most important being (1) laying-house or adult mortality, and (2) first-year egg production.

Over the 5-year period, Strain A averaged 16.5 per cent adult mortality, and Strain D averaged 31.6 per cent. Mortality of the strain-cross averaged 19 per cent, indicating that livability of this particular cross was almost as good as that of the better parent, Strain A, and far superior to that of Strain D. Figure 1 shows laying-house mortality.

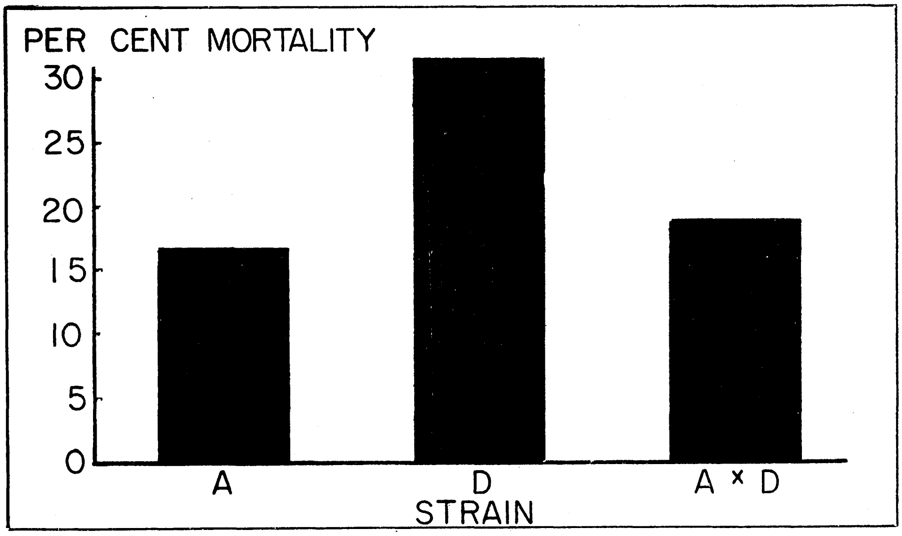


Fig. 1. Laying-house mortality of pure strains and strain crosses housed, 1949-53.

Egg production averages, based on number of pullets housed and number of survivors, are shown in Figure 2. On a survivor basis, Strains A and D were the same, averaging 205 eggs per bird. Strain-cross birds averaged 221 eggs or 16 more than their purebred parents. On a pullet-housed basis, where both livability and egg production influenced results, Strain A averaged 185 eggs per bird, Strain D averaged 167 eggs, and the strain-cross birds averaged 196 eggs or approximately one dozen more per bird than the better parent strain.

Both parent strains used in making this successful cross are good strains that have resulted from many years of selection for superior performance. Strain A has been selected at Auburn since 1935 for livability and egg production. Strain D, although not as disease resistant as Strain A, is an excellent egg producer and originated from one of the leading commercial strains in the country.

It is well known that crossing just any two good strains does not guarantee good results. It also is well known that crossing a good strain with an average strain or even crossing two average strains may result in an outstanding strain-cross bird. Poultry breeders who want to profit from the hybrid vigor obtainable by strain crossing can set up systematic crossing and testing programs for identifying those strains that "nick" or combine well.

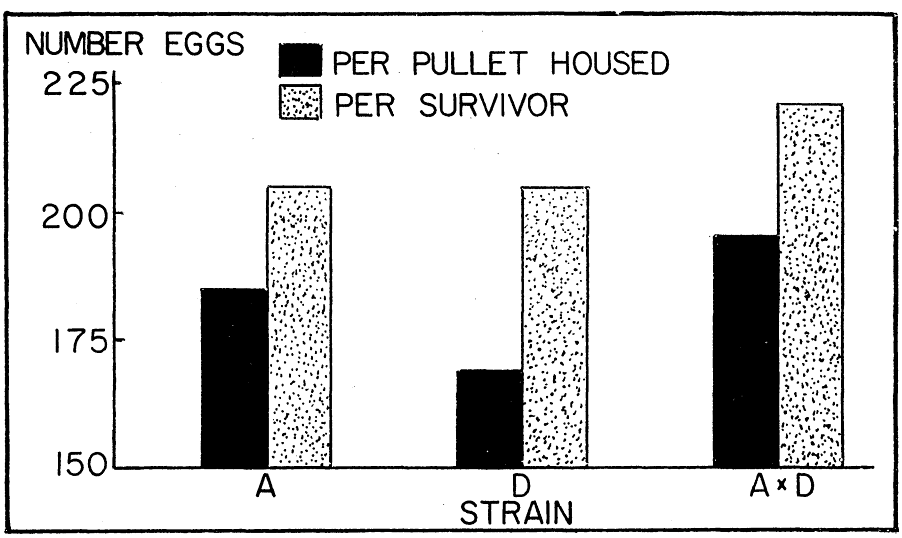
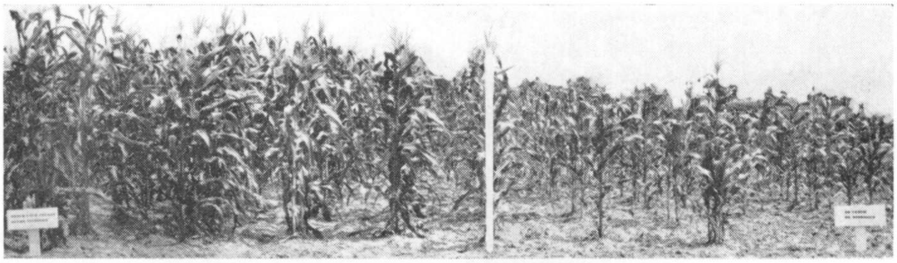


Fig. 2. First-year egg production of pure strains and strain crosses housed, 1949-53.

Difference between 14 and 54 bu. per acre from plots at right and left due to commercial nitrogen or to vetch.



GROW or BUY NITROGEN for CORN?

J. T. COPE, Jr.
Associate Agronomist

WHETHER TO GROW their own nitrogen for corn or get it from a sack is a big question with many farmers.

The API Agricultural Experiment Station for many years has recommended that farmers grow winter legumes to supply nitrogen for corn. With the drop in price of commercial nitrogen in recent years, there has been a decline in acreage of winter legumes. Much controversy has developed over the relative costs and efficiencies of the two systems of supplying nitrogen.

Research Supplies Answers

For the last 30 years, experiments have been carried on to compare winter legumes with various rates of nitrogen at many locations in Alabama. Down through these years results have been much the same and they should help to clarify points in this controversy.

In the table below are summarized 6 years' results from two experiments at three locations. All plots were fertilized alike with adequate amounts of phosphorus and potassium. Compared here are the yields of corn from vetch turned, vetch plus 32 pounds of commercial nitrogen, and 32-, 48-, 64-, 72-, and 96-pound rates of commercial nitrogen. It is pointed out that in most instances vetch alone produced more corn than even the higher rates of commercial nitrogen.

In an 8-year experiment at Auburn, vetch has been compared with 80 pounds of nitrogen. Plots getting no nitrogen or vetch averaged 14 bushels of corn per acre; average yields from other treatments are: 80 pound commercial nitrogen, 49 bushels; vetch turned, 53 bushels; and vetch plus 80 pounds commercial nitrogen, 54 bushels. Vetch yields in this experiment have averaged about 12,000 pounds of green weight, or enough to supply about 100 pounds of nitrogen per acre.

While winter legumes have been used very effectively by some farmers, many have become discouraged with them because of disappointing results. Late planting probably has been the most frequent cause of dissatisfaction. Legumes require fertilization with phosphate and potash and in many cases, require lime. This need not increase fertilizer expense because the minerals that would ordinarily be applied to corn are applied to the legume instead.

Comparative Costs

The most important factor that will determine whether you should use commercial nitrogen or winter legumes is the relative cost of the two systems. The data show that yields of corn are about the same from a good crop of winter legume as from 60 to 90 pounds of commercial nitrogen – the rate recommended for corn in Alabama. Nitrogen in ammonium nitrate at $85 a ton costs 13 cents per pound, while that in sodium nitrate at $64 a ton costs 20 cents per pound. Costs of nitrogen per pound in other solid sources are intermediate between 13 and 20 cents. Thus, the cost of 60 pounds of nitrogen from solid sources for sidedressing would vary from about $8 to $12 per acre. Cost of nitrogen in anhydrous ammonia is some cheaper than in solid sources.

How much does it cost to grow winter legumes? Seed cost is the biggest item. Seed of vetch, crimson clover, or lupine, usually cost $2 to $4 per acre. In southern Alabama, crimson clover and lupine often are more productive than other winter legumes. Cost of seeding these legumes is $2 or less depending upon method used.

In the case where corn follows a winter legume, the phosphate and potash are applied to the legume and nothing to the corn. The cost of 300 pounds of 0-16-8 or 0-14-14 per acre applied to the winter legume is about the same as that of 250 pounds of 4-12-12 or 300 pounds of 4-10-7 applied at planting time to the corn that does not follow a legume.

Labor and machinery costs, other than planting legumes, are about the same for the two systems. Stalks must be cut and the land turned in either case. Legumes do not increase the cost of land preparation if tractor equipment is used.

Thus, it is evident that winter legumes can be produced for $2 to $6 an acre less than the cost of 60 pounds of nitrogen for sidedressing. These figures do not include the cost of applying the nitrogen sidedressing.

Farmers who can utilize winter legumes for both grazing and green manure should certainly use them. Others can effect some savings by use of winter legumes and produce excellent yields of corn provided legumes are handled properly.

AVERAGE CORN YIELDS FROM LEGUMES AND COMMERCIAL NITROGEN IN TWO EXPERIMENTS AT THREE LOCATIONS IN ALABAMA, 1949-54[1]

Treatment No.	Commercial N	Winter legume	Yield by location: Monroeville	Sand Mountain	Tennessee Valley[2]	Av. 3 locations
	Lb.		*Bu.*	*Bu.*	*Bu.*	*Bu.*
Two-year Rotation Fertilizer Experiment						
7	0	Vetch	53.0	71.4	49.8	58.1
8	32	Vetch	54.2	71.2	52.3	59.2
10	32	None	43.0	21.2	33.8	32.7
13	64	None	51.3	42.6	44.2	46.0
Sources of Nitrogen Experiment						
10	48	None	47.8	39.0	31.0	39.3
11	72	None	52.4	57.3	40.2	50.0
12	96	None	54.1	64.2	44.2	54.2

[1] All plots received adequate phosphorus and potassium.
[2] Five-year average, no 1954 harvest.

Flour beetles on stored peanuts.

PEANUTS—*a favorite delicacy of stored food insects*

L. L. HYCHE, *Assistant Entomologist*

B. WAYNE ARTHUR, *Assistant Entomologist*

"PEANUTS!. FRESH, ROASTED PEANUTS!" This is a familiar cry heard throughout the year. No football game, county fair, 'possum hunt, or baseball game would be complete without roasted peanuts. Proper storage of the fall harvested crop by processors and farmers enables the consumer to enjoy freshly roasted peanuts, peanut candy, and other peanut products the year round.

However, peanut storage is not accomplished without its problems. Unfortunately, man's ever-present enemies, the insects, also consider peanuts a delicacy. Alabama produces 20 to 35 million dollars worth of peanuts annually; these peanuts must be protected from insects until they are consumed.

Insects and Damage

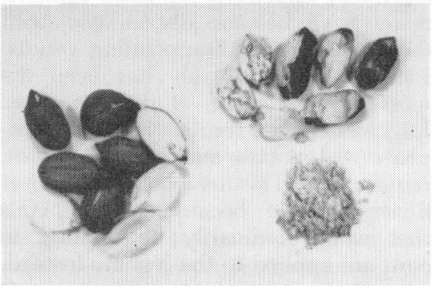
Research by the API Agricultural Experiment Station since 1952 has revealed that almost all of the insects known to infest stored grain, milled products, dried fruit, and other stored food products also attack peanuts in storage.[1] Over 20 species of insects have been collected from stored peanuts. Some of the more common and important of these are the flour beetles, the saw-tooth grain beetle, and the meal moths. These insects may be found in storage bins and warehouses containing peanuts at any time of the year; however, the greatest buildup of populations occurs in the spring and summer.

Insect Control

More than 400 tons of farmer's stock peanuts have been used in research on the control of insect pests of stored peanuts conducted during the past 3 years. Results of this research indicate that many measures recommended for control of insect pests of other stored products also are effective against pests of stored peanuts.

Bin Preparation

A pre-storage cleanup program will prevent a rapid buildup of insect populations for several months. Such a program should include thorough cleaning of bins and the application of a residual spray to the inner surface of bins and beneath the floors. Removal of trash and old kernels from the bins eliminates insect breeding grounds, and spraying wipes out existing insect infestations. For this purpose, DDT, methoxychlor, and TDE (Rothane) have been effective when applied as 5% emulsion sprays at the rate of 2 gal. per 1,000 sq. ft. of surface. Dusts can be used instead of sprays when treating beneath floors.



Left—kernels of peanuts kept free of insects; right—results of insect feeding on unprotected stored peanuts.

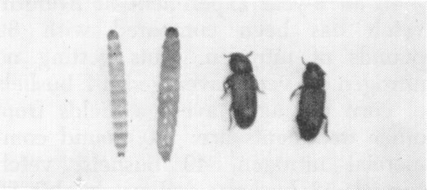
Fumigation

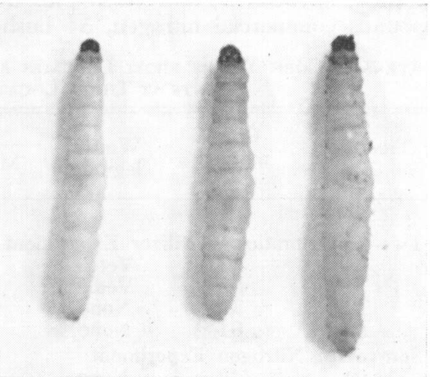
Fumigation is an excellent means of killing insects that infest peanuts in storage. Results of fumigation tests have proved, however, that bins or storage receptacles must be air tight for effective kill of insects. Fumigants are highly volatile compounds, and the gases escape rapidly from unsealed bins. Several fumigants recommended for use against many pests of stored products are equally effective for fumigation of peanuts. Two fumigants that have given 100 per cent kill of insects in air-tight wood and steel bins are: (1) 3-1 mixture of ethylene dichloride and carbon tetrachloride applied at the rate of 6 gallons per 1,000 cubic feet; and (2) methyl bromide, 1 to 1½ pounds per 1,000 cubic feet. A 48-hour exposure period is recommended. For best results, bins should be fumigated at temperatures above 65° F.

The gases of fumigants are toxic to animals and human beings; therefore, precautions should be taken to prevent exposure. Results of analyses of peanuts for residues after fumigation have revealed no harmful amounts.

Protectant Dusts

Pyrenone dust containing 0.05 per cent pyrethrins and 0.8 per cent piperonyl butoxide has been somewhat effective in preventing insect buildup and damage to peanut kernels. Presence of the dust, however, was undesirable when peanuts were subsequently handled in shelling and loading.





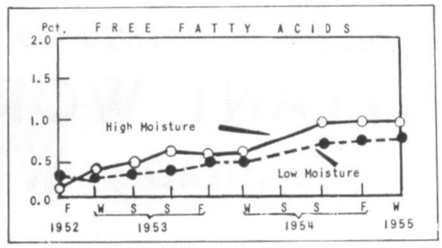
Two important insect pests of stored peanuts. Above—red-rust flour beetle adults at right, larvae at left; below — Indian meal moth larvae. (Magnified 5 times.)

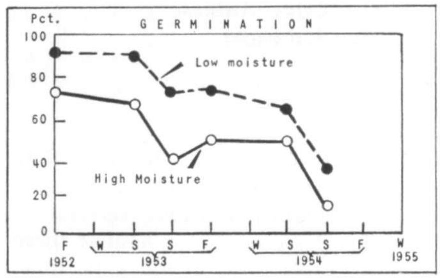
[1] This is a cooperative experiment with the Commodity Credit Corporation and Agricultural Marketing Service, USDA.

WHAT HAPPENS—

to peanuts during storage?

H. S. WARD, Jr., *Associate Botanist*
J. H. YEAGER, *Associate Agricultural Economist*
J. L. BUTT, *Associate Agricultural Engineer*



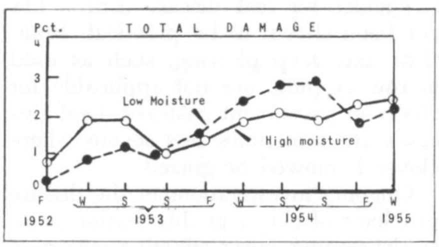


PEANUTS ARE NOT "PEANUTS" to Alabama farmers from an income standpoint! The marketing of peanuts in the State was a source of 11 to 35½ million dollars as cash farm income from 1948 through 1954.

Upon leaving the farm, peanuts are placed in storage for a few days or several months prior to shelling. What changes occur in the peanut during this storage period? Is quality maintained during a longer than normal storage period – through the summer's heat? Is it feasible for farmers to store peanuts in farm-size structures and thereby even out marketings or gain higher prices? The questions of marketing and prices are difficult to answer. Changes in quality of the peanuts in storage as well as the price support program will affect the storage and marketing practices of growers.

In the fall of 1952, a storage experiment[1] was started at the Wiregrass Substation near Headland, Ala., with a series of farm-size bins. Runner peanuts with kernel moisture contents between 5 and 17% were placed in these bins in 1952, 1953, and 1954. Four bins of peanuts of the 1952 crop have been in storage since the start of the experiment. Samples were withdrawn from seven different positions in each of these bins and analyzed for sound mature kernels, total damage, germination, and free fatty acids. Sampling was done at regular intervals throughout the year.

The accompanying graphs show trends that have taken place in various quality factors for peanuts stored more than 2 years in farm-size bins. The letters F, W, S, and S are symbols for fall, winter, spring, and summer, respectively. The solid line is based on data for one bin lot of 9% and one for 11% kernel moisture peanuts at the time they were placed in storage (fall, 1952). The broken line is based on data for two bin lots of peanuts of 6% kernel moisture at time of storage.



Shortly after placing these peanuts in storage, the kernel moisture contents in all 4 bins were approximately 7%, at which level they remained. Low moisture content of the kernels was probably the reason why quality other than germination did not change greatly.

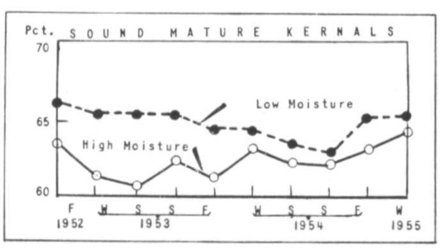
From a dollar value standpoint, the percentage of sound mature kernels and the percentage of total damage are two of the most important quality factors of peanuts. Changes in percentage of sound mature kernels during storage were neither consistently down nor up. In other cases, there have been indications of a slightly downward trend in percentage of sound mature kernels during storage. On the other hand, the total damage percentage in both initially high- and low-moisture peanuts increased fairly consistently. Total damage increased from less than 1% to slightly more than 2% during a period of approximately 2 years. This represented a loss in value of more than $3 per ton.

An increase in percentage of free fatty acids indicates a loss of quality in peanut oil. The percentage of free fatty acids increased slightly during storage. Less than 1% free fatty acids usually is not considered sufficient to greatly affect the quality of peanut oil.

After 1 year of storage, low-initial-moisture peanuts were above 60% germination. Peanuts with high initial moisture decreased in germination most rapidly and had declined to less than 50% after 1 year of storage. Most rapid losses in germination occurred between spring and summer during the first and second years of storage. Storage of seed peanuts under conditions similar to those in the experiment should not exceed the time between fall harvest and the following spring.

In general, results showed that peanuts could be stored in farm-size bins with minimum changes in sound mature kernels, total damage, and percentage of free fatty acids. Quality and moisture content of peanuts, when they are placed in storage, are of utmost importance in achieving successful storage and minimizing dollar losses.

[1] This experiment is on a cooperative basis with the Commodity Credit Corporation and Agricultural Marketing Service, USDA.



Research points to arrest of PLANT WORLD THUGS *Threatening* WHITE CLOVER

E. A. CURL, *Assistant Plant Pathologist*

GANG WARFARE can destroy white clover. At least 15 species of parasitic fungi are known to cause diseases of clover in Alabama, and several of these may attack the plant at the same time.

Some fungi attack the leaves; others attack the stolons; still others attack all parts of the plant.

Leaf diseases of white clover appear in the form of spots or dead areas of various sizes and shapes depending upon the organism causing the disease. These spots may range from numerous tiny flecks over the entire leaf surface to a few large, scattered, irregularly shaped spots that eventually kill most or all of the leaf tissue. Leaf diseases lower the palatability of leaves and cause excessive defoliation during growth. Examples of the more common leaf diseases of white clover are Pseudoplea leaf spot or pepper spot, Cuvularia leaf spot, Cercospora leaf spot, Stagonospora leaf spot, black patch, and Cymadothea leaf spot or sooty blotch.

Stolon or stem diseases and root rots may kill entire plants. Circular areas of dead or dying plants can often be seen in a field where these diseases are present. Such diseases are caused by a complex or group of soil-borne fungi such as *Rhizoctonia, Fusarium* and *Sclerotium.* These organisms may live in the soil for several years after death of the plant and attack succeeding clover crops.

Experiments conducted at the API Agricultural Experiment Station during 1953 and 1954 showed that climatic factors affect the incidence and severity of white clover diseases. Leaf spots are most likely to be seen during cool moist weather in May and June and again in January and February. Some of these diseases, however, can be found throughout the year particularly in low wet pastures or during periods of high humidity. Such environmental conditions cause rapid growth of the disease-causing fungi. Their seed-like spores are spread rapidly from diseased to healthy plants by wind and splashing rains.

Stolon and root diseases get their start in the early spring under conditions of high moisture when the plants are recovering from winter injury. The greatest damage to stolons occurs during the period of July to October when temperatures are high and growth of the plants are retarded. Experiments have shown that disease damage to stolons is greater than that to leaves. Stolon diseases, being caused mostly by soil-borne fungi, may be spread by the trampling of cattle and by farm machinery.

Controlling diseases of clover poses a difficult problem. At present, the most promising is breeding for resistance to specific diseases. The use of fungicides for leaf disease control has not been shown to be practical. Rotations and deep plowing, such as used in row croping, are not applicable for clover in permanent pastures. Leaf diseases are sometimes less severe where clover is mowed or grazed.

Ongoing investigations of the disease problems of clover at this Station point to developing more effective means of control.

New and Timely PUBLICATIONS

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

Bul. 294. Merchandising Dairy Products in Alabama Retail Food Stores is a report of efficiency of retailing dairy products in Alabama.

Bul. 295. Seasonal Variations in Prices Received by Alabama Farmers reports seasonal price changes for various Alabama-produced farm products.

Bul. 296. Economics of Pastures in Feeding Systems for Dairy Cows discusses cost and feeding value of selected grazing crops in Piedmont area of Alabama.

Bul. 297. Production and Marketing of Cage-Laid Eggs in Alabama covers production and marketing practices and costs on Alabama farms.

Leaflet 41. Storing Shelled Corn in Alabama.

Progress Report 56. Caley Pea Silage and Johnsongrass Hay in the Ration of Dairy Cows.

Progress Report 57. Summary of Performance Tests of Small Farm Mixer-Grinder.

HIGHLIGHTS *of* AGRICULTURAL RESEARCH

Published Quarterly by
Agricultural Experiment Station *of the* Alabama Polytechnic Institute
Auburn, Alabama

E. V. SMITH .... *Director*
COYT WILSON .... *Assoc. Director*
CHAS. F. SIMMONS .... *Asst. Director*
KENNETH B. ROY .... *Editor*
R. E. STEVENSON .... *Asst. Editor*

FREE Bulletin or Report of Progress
AGRICULTURAL EXPERIMENT STATION
of the ALABAMA POLYTECHNIC INSTITUTE
E. V. Smith, Director
Auburn, Alabama
Permit No. 1132—8/55-8M

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