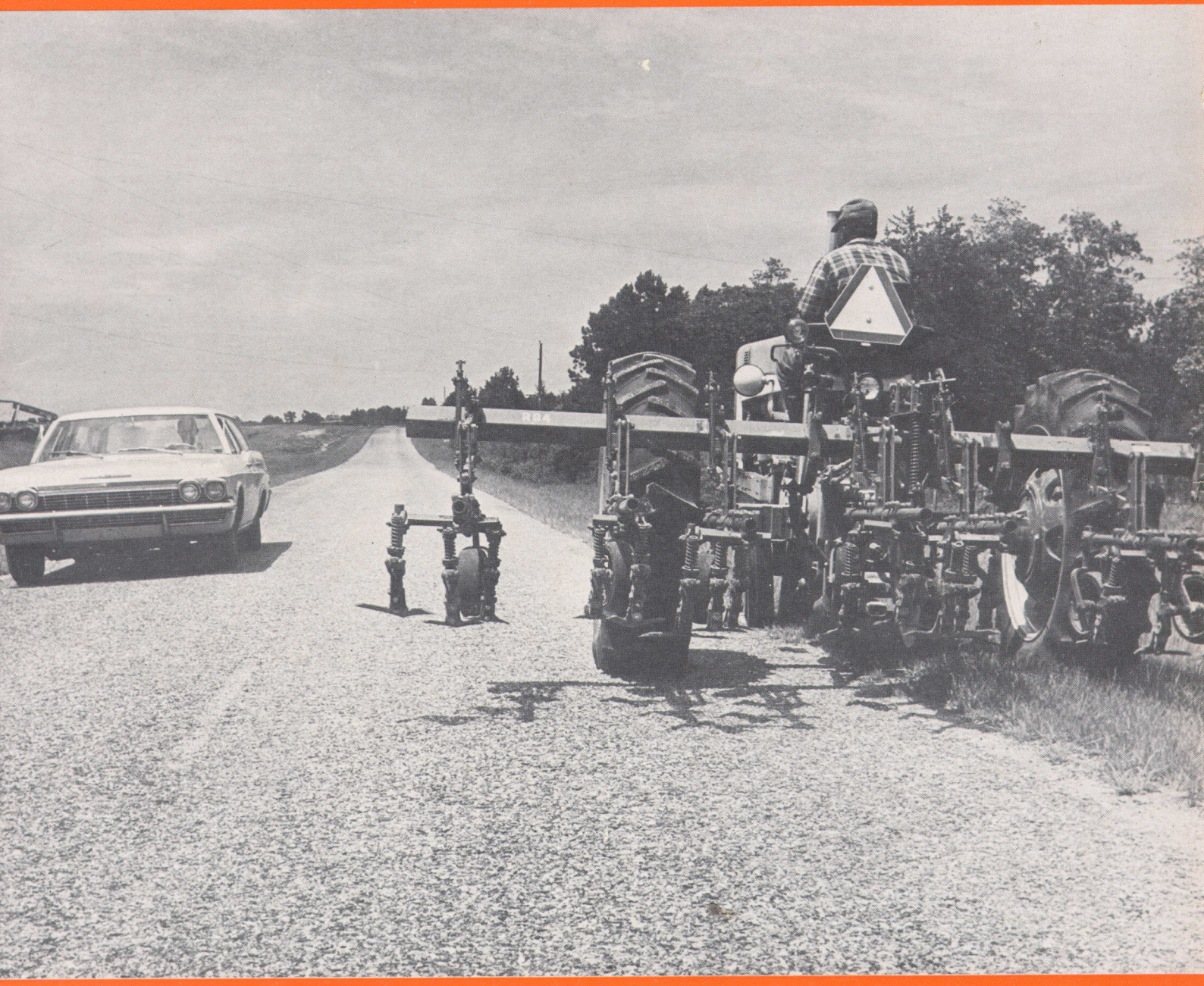
VOLUME 14, NO. 3 FALL 1967

HIGHLIGHTS

OF AGRICULTURAL RESEARCH



AGRICULTURAL EXPERIMENT STATION
AUBURN UNIVERSITY

FARM SAFETY . . .
accident rate high,
see story on page 5

HIGHLIGHTS *of* Agricultural Research

A Quarterly Report of Research Serving All of Alabama

VOLUME 14, NO. 3 FALL 1967

In this issue . . .

Published by

AGRICULTURAL EXPERIMENT STATION of AUBURN UNIVERSITY

Auburn, Alabama

E. V. SMITH ..... *Director*
R. D. ROUSE ..... *Associate Director*
CHAS. F. SIMMONS ..... *Assistant Director*
T. E. CORLEY ..... *Assistant Director*
KENNETH B. ROY ..... *Editor*
E. L. MCGRAW ..... *Associate Editor*
R. E. STEVENSON ..... *Associate Editor*

Editorial Advisory Committee: R. D. ROUSE; R. T. GUDAUSKAS, *Associate Professor of Botany and Plant Pathology;* J. L. TURNER, *Instructor in Horticulture;* T. DON CANERDAY, *Assistant Professor of Zoology-Entomology;* AND KENNETH B. ROY.

New and Timely PUBLICATIONS

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

Bul. 374. Family Camping in Alabama provides information on campers and camping that could be used by campground operators in planning and operation of facilities.

Cir. 153. Observations on Species of Cypress Indigenous to the United States describes natural stands of different species of cypress found in the Southwest.

Cir. 154. Energy Levels of Gestation Rations for Sows covers results of nutrition studies at Lower Coastal Plain Substation.

Cir. 155. Crop Varieties for Alabama lists varieties of field, forage, and turf crops that performed best in Alabama tests.

Cir. 156. Chemical Weed Control in Southern Forest Nurseries gives results with several herbicides in nurseries growing pine, cypress, poplar, sweetgum, and sycamore.

Leaf. 74. Tomato Fruitworm Control is a report of experiments on control of this important pest of tomatoes in Alabama.

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

REACTIONS *of* SMALL GRAINS *to* DISEASES

ROBERT T. GUDAUSKAS
Department of Botany & Plant Pathology

Diseases of oats, wheat, barley, and rye are numerous and destructive. Ofttimes, they are the chief causes of limited forage and grain production in Alabama.

Many of the important diseases are caused by microscopic agents, such as fungi, bacteria, nematodes, and viruses. The most practical method for controlling small grain diseases is to grow resistant varieties. Such varieties are resistant to attack by disease agents or tolerate a disease to the extent that yields are relatively unaffected. Some of the small grain varieties recommended for planting in Alabama contain specific factors for disease resistance whereas some do not. Even the "resistant varieties" often vary in susceptibility from area to area because of difference in type and prevalence of the disease agent, environment, and condition of the host.

Table 1. Reactions of Oat Varieties to Some Diseases in Alabama

Variety	Crown rust	Helmintho-sporium leaf blotch	Septoria leaf blotch	Loose smut
Northern Alabama				
Bruce*	R	R	R	R
Carolee	S	R	S	R
Coker 242*	R	R	R	R
Coker 62-42	R	R	R	R
Coker 66-24*	R	R	R	R
Moregrain	R	S	S	R
Moregrain 62-11	R	S	R	R
Nora*	R	S	R	R
Ora*	R	S	R	R
Roanoke	R	R	R	R
Sumter	S	S	R	R
Sumter 3*	R	S	R	R
Central Alabama				
Carolee	S	S	S	R
Coker 242*	R	S	R	R
Coker 62-42	R	S	R	R
Coker 64-35	R	S	R	R
Coker 66-16*	R	R	R	R
Florida 500*	R	S	R	R
Moregrain	R	S	S	R
Moregrain 62-11	R	S	R	R
Ora	R	S	R	R
Roanoke	S	S	S	R
Sumter	S	S	R	R
Southern Alabama				
Carolee	S	S	S	R
Coker 242*	S	S	R	R
Coker 62-42	S	S	R	R
Coker 64-35	R	S	R	R
Florida 500	R	S	R	R
Moregrain	S	S	R	R
Moregrain 62-11	S	S	S	R
Ora*	R	S	R	R
Roanoke	S	S	S	R
Sumter	S	S	S	R
Sumter 3*	S	S	S	R
Suregrain	R	S	R	R

* One-year data.

Yearly evaluations of disease resistance are made on entries in small grain variety tests planted at 15 locations in the State by the Department of Agronomy and Soils. This report is a summary of data taken from these tests since 1963. For a summary of earlier data as well as detailed descriptions of various small grain diseases, see Auburn University Agricultural Experiment Station Cir. 147.

Varietal reactions to diseases are presented in Tables 1, 2, and 3. Several occur on small grains, but only those that are most common and damaging in Alabama are included here. Except where noted these reactions are *averages* obtained over a period of 2 to 4 years from the various locations in the State. A rating of R, or resistant, means that the variety has thus far appeared unaffected or only slightly so by the particular disease. A rating of S means that the variety is susceptible to the extent that appreciable damage has occurred when conditions were favorable for disease occurrence and development.

Since these ratings deal solely with disease resistance, they should be used *in conjunction with* the list of varieties recommended for planting in a particular area.

Table 2. Reactions of Wheat Varieties to Some Diseases in Alabama

Variety	Powdery mildew	Leaf rust	Septoria leaf blotch	Loose smut
Northern Alabama				
Ace	S	S	S	R
Andox*	R	S	S	R
Blue Boy*	R	S	R	R
Coker 61-19	S	S	R	R
Coker 65-20*	R	S	R	R
Georgia 1123	S	S	S	R
Knox 62	R	S	S	R
Monon	S	S	S	R
Wakeland	S	R	S	R
Central Alabama				
Ace	S	R	S	R
Andox*	S	S	S	R
Blue Boy*	R	S	R	R
Coker 61-19	S	S	S	R
Coker 65-20	R	S	R	R
Georgia 1123	S	S	S	R
Hadden	R	R	R	R
Monon	S	S	S	R
Wakeland	S	R	S	R
Southern Alabama				
Andox*	R	S	S	R
Blue Boy*	R	S	S	R
Coker 61-19	S	R	R	R
Coker 65-20	R	S	S	R
Georgia 1123	S	S	S	R
Hadden	R	S	S	R
Wakeland	S	R	S	R

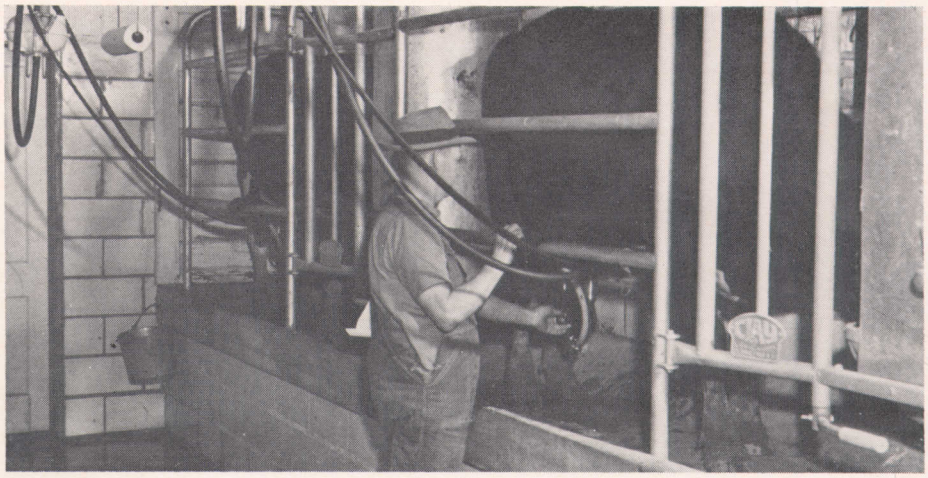
Table 3. Reactions of Barley and Rye Varieties to Some Diseases in Alabama

Variety	Powdery mildew	Spot blotch	Net blotch	Leaf rust	Scald
Barley					
Borsay*	R	R	R	S	R
Colonial 2	S	S	S	S	S
Dayton	S	S	S	S	S
James	R	S	S	R	R
Wade	R	S	S	R	R
Rye					
Bonel*	R			S	R
Elbon	S			S	R
Emory	R			S	R
Explorer	S			S	R
Weser	R			S	R
Wren's Abruzzi	S			S	R

* One-year data.

LABOR—*a problem on Alabama dairy farms*

K. M. AUTREY
Dept. of Dairy Science



THE STEADY DECLINE in numbers of Alabama Grade A dairymen in the last several years is in part the result of increasing labor problems growing out of low returns for labor and management.

To study the labor situation on Alabama dairy farms and contributing factors, a recent survey was made of DHIA dairymen (on production testing program) by Auburn University Agricultural Experiment Station. Of the 119 dairymen responding to questions about number of milkers and wages paid, 70 had at least 2 milkers, 15 had 3 or more, and 6 had 4. More than half of all milkers were paid a weekly rate of $50 or less. The pay of only 26 of the 210 milkers was in the range of $70 to $90 per week. The highest paid milkers earned less than the average factory worker — $100 + per 40-hour week. Generally milkers work longer hours, most of them working a "split shift" (early morning and afternoon). Most milkers get free housing and some free milk as side benefits. However, the pay scale of those not receiving these extras was similar to that of the others.

Most dairymen say they are not financially able to pay wage rates comparable to factory wages (average of more than $2.60 per hour). Some dairymen expect to pay higher wages for labor in the next 1 to 3 years, but only 8 expect to pay as much as $90 to $100 per week.

In large, efficient California dairies, weekly pay rates often are in the range of $150 to $225. However, the per man "harvest" in these dairies is more than 600,000 lb. annually and sometimes over 1,000,000 lb. At such levels of efficiency, the weekly rates paid are reasonable and competitive with factory rates. The Alabama study reported here did not permit accurate estimates of "milk harvest" per man per year, but in the most efficient dairies the yield ranged from 300,000 to 400,000 lb. per milker.

With average investment in Alabama dairy farms well above $100,000, the caliber and education level of milkers and herdsmen is an important consideration. Responding to questions about education level of milkers were 142 dairymen reporting on 250 milkers. More than half the milkers, 137, had no more than a 7th grade education. Less than one-fourth were high school graduates.

Education level of milkers is less important in dairies where adequate supervision is available. One-third of the dairymen said they did not have such supervision and indicated they would hire trained herdsmen if available. However, only 2 dairymen expected to pay as much as $120 to $130 per week for a qualified herdsman. About one-fourth of the dairymen expressing need for herdsmen expected to pay no more than $60 per week — not much more than they paid milkers yet expected herdsmen to provide know-how and supervision.

The survey indicated the following:

- dairies to grow larger,
- more milking parlors being built to replace traditional stanchion barns,
- more sanitary pipelines to convey milk from cow to cooler,
- use of more commercial mixed feeds and less home-grown feeds,
- increase in use of automatic feeding facilities,
- pasture becoming less important as a source of forage than silage and hay,
- and use of more free-stall housing.

A large majority of the dairymen do not have a satisfactory system of manure removal, which is considered a disagreeable chore on the dairy farm.

Typical comments of dairymen were:

- "Dairy labor is aging."
- "The growing acceptance of the philosophy of getting something for nothing is evident among our workers."
- "We are not attracting new people into dairying."
- "We must go to more automation and more efficient arrangement of facilities to overcome labor shortages."
- "A herdsman's short course would help in training my man."
- "I am getting fed-up with the drudgery of a 365-day job and the low price of milk."

This study underscores the severity of labor problems on Alabama dairy farms. Most dairymen are either unwilling or financially unable to pay attractive wages to milkers or herdsmen. It is also apparent that few qualified milkers or herdsmen are available.

WEEKLY PAY RATES AND EDUCATIONAL LEVEL OF MILKERS

Item	Farms, no. milkers				Total
	1	2	3	4	
Weekly pay rate					
Under $30	13	16	5	2	36
$30-$50	43	23	6	3	75
$50-$70	43	26	4	—	73
$70-$90	20	5	—	1	26
TOTAL	119	70	15	6	210
Formal education level					
None	11	6	1	2	20
7th grade or less	54	52	10	1	117
1-4 years high school	32	17	3	1	53
High school graduate	33	8	1	—	42
1-4 years college	12	3	2	1	18
TOTAL	142	86	17	5	250

FARM MACHINERY SAFETY

E. S. RENOLL, *Department of Agricultural Engineering*

EVERY HOUR a farm resident is killed in an accident. Every 40 seconds an additional one suffers an injury that disables him at least 1 day. Accidents on the farm kill 200 people every month. This is the accident record made by farm people in our country during the past year.

Farming is the third most dangerous occupation. Mining and building construction are the only industries that have higher accidental death rates than agriculture. Agriculture is the only major industry that does not have a well organized and well coordinated industry-wide safety program.

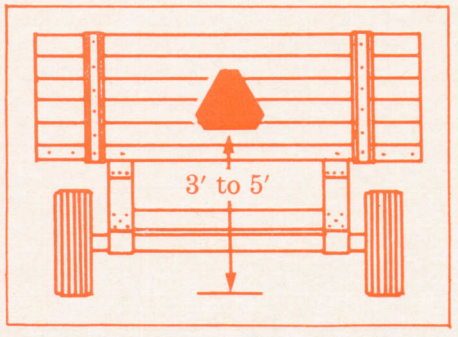
Farm Machinery Accidents

Tractors and farm machines are the largest single cause of farm accidents. These two account for 55% of all farm accidents. Fatal accidents and the farm tractor are closely associated. The tractor is involved in two out of every five fatal farm accidents. The most common type of tractor accident involves overturning. These upsets include turning both backwards and to the side. Turning the tractor over sideways many times is associated with ditches, roadbanks, and excessive field speeds. Turning over backwards frequently results from improper drawbar hitching or excessive drawbar loads.

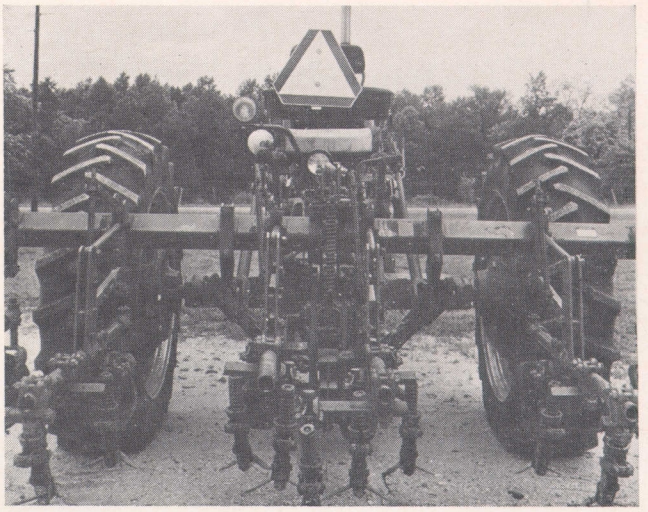
Tractor Accidents

Tractor accidents are usually classified either by type of accident or by tractor use at the time of the accident. The following tables show tractor accidents according to these two common classifications.

Not all farm machinery and tractor accidents occur on the farm. Off farm accidents are on the increase. Last year 3 out of 10 farm machinery accidents took place on highways and rural roads.



The SMV emblem should be displayed as shown. Locate on the rear-center of a vehicle at a height of 3 to 5 ft. This position is best for eye contact and is within normal auto head-lamp beam.



The SMV emblem on the rear of this tractor warns motorists to be alert for the slow moving vehicle.

Use of Tractor At Time of Accident

Tillage, planting, harvesting	29%
Tractor en route to a site	15%
Materials handling	15%
Towing vehicle or implement	11%
Passenger riding	6%
Clearing land	4%
Stationary power	4%
Others	16%

Types of Tractor Accidents

Tractor upset	58%
Fall from tractor	13%
Crushed	9%
Run over	8%
Motor-vehicle collision	6%
Power takeoff	3%
Others	3%

Slow Moving Vehicles

Farm tractors and machines traveling on highways with fast moving traffic present safety problems. These slow moving machines are a hazard to faster traffic and are in effect a standing invitation for a rear end collision.

Various safety devices have been designed for use on the rear of these slow moving machines. These safety devices warn the motorist that a slow moving vehicle (SMV) is ahead.

These warning devices have included flashing red or amber lights on the rear of the tractor and flags or lights on a pole 8 to 10 ft. tall attached to the tractor. Reflective paints, tapes, and glass reflectors also have been used.

A new safety emblem has recently become available. It is a unique identifying emblem that is attached to the rear of slow moving vehicles (SMV) as a warning to motorists. The emblem is a 14-in. high equilateral triangle with fluorescent orange in the center, and reflective red as a border. It is designed for identification of vehicles that travel less than 25 m.p.h., such as farm tractors, trailing equipment, self-propelled farm machinery, and construction equipment.

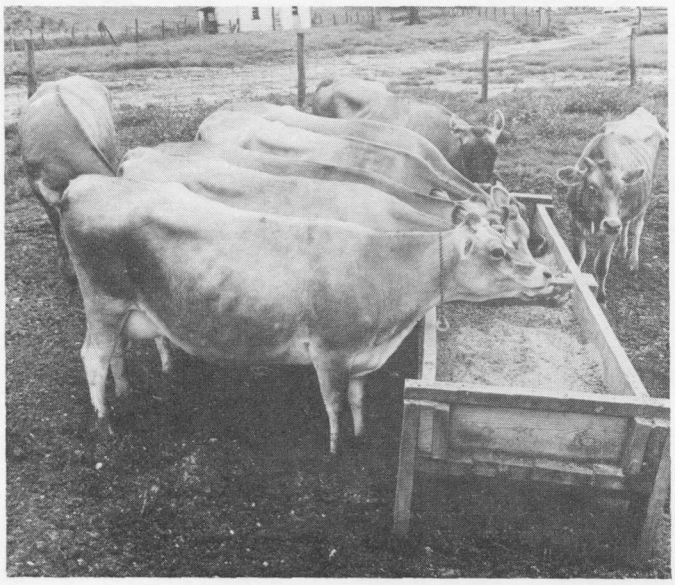
The shape, color, and size of the emblem were chosen after many tests on visibility, shape perception, and response time of truck and car drivers. The size and shape of the emblem make it quickly identifiable and the reflective and fluorescent materials make it easily visible day and night. The emblem was designed to be visible for a distance of 1,200 ft. This will provide ample stopping distance for cars traveling up to 70 m.p.h.

Research has shown that the SMV emblem is most easily identified when located on the center rearmost part of the machine. The emblem should be located approximately 3 to 5 ft. above the ground. It is not meant to replace other legal safety devices but rather to supplement them.

The SMV emblem has been recommended and approved by both the National Safety Council and the American Society of Agricultural Engineers. It has been adopted as a legal safety device in several states for slow moving farm machinery traveling on highways.

Group Feeding of Concentrates to Milking Cows

GEORGE E. HAWKINS, *Department of Dairy Science*



LABOR COSTS represent a high percentage of the total cost of producing milk. In a recent survey of Alabama DHIA dairymen it was found that a shortage of qualified labor is among their most serious problems.

Labor Savings Sought

Because of the existing labor shortage, dairymen are interested in feeding and management procedures that might reduce labor requirements. One practice that appeared to have possibilities was group feeding of concentrates instead of feeding individually according to milk production.

Some problems are immediately apparent for a group feeding operation. The method gives the most aggressive cows an opportunity to dominate the feed trough, thereby penalizing less aggressive animals. It is conceivable, however, that group feeding could be advantageous to some dairy cows by promoting competition at the feed trough.

Group feeding would be expected to increase milk production of some of the most aggressive cows in a herd because such animals would eat more than under conventional feeding practices. Conversely, some cows probably would convert extra feed to body fat.

Means are available for minimizing any undesirable effects of group feeding of concentrates, primarily by grouping cows according to (1) level of milk production, (2) body size, (3) age, and (4) aggressiveness at feed trough.

Effect on Production Studied

An Auburn University Agricultural Experiment Station study was done to determine how group feeding of concentrates affected lactation response of cows that were group fed roughages. Sixteen cows in the University herd that were producing 29.5 to 42.7 lb. of FCM (4% fat corrected milk) daily were selected as test animals. The cows were paired as evenly as feasible on the basis of average daily FCM and average body weight. Subsequently the cows from each pair were assigned randomly to one of two lots that received their concentrates as a group or as individuals.

The concentrate allowance for the group fed lot was equal to the sum of the individual allowances when they were fed individually. This was 5 lb. of concentrates for the first 20 lb. of FCM plus 1 lb. for each additional 2 lb. of FCM produced daily. Alfalfa hay was group fed at the rate of 80 lb. per day to each eight-cow lot. In addition, the cows in each lot were group fed all of the corn silage they would eat.

Average daily consumption of concentrates by test cows was about the same for the two groups: 13.8 lb. for those fed individually and 14.0 lb. for group fed animals. FCM production from individual feeding averaged 31.8 lb. per cow daily, as compared with 30.6 lb. for group feeding. During periods in which the cows were individually fed, persistency of FCM production was 95.6%. This compares with 89.3% when concentrates were group fed.

Production response of cows when changed from one feeding system to the other during the three test periods is a good indicator of treatment effects. When going from group to individual feeding, a total of nine cows increased in production. Only four showed an increase when changed from individual to group feeding.

Milk fat percentage averaged 4.74 and 4.88%, respectively, during individual and group feeding, showing no definite effects from method of feeding concentrate. In contrast, cows were noticeably heavier at the end of periods of individual feeding than after group feeding. Weight gain averaged 47.6 and 13.1 lb. for individual and group feeding, respectively. Differences in body weight probably resulted from changes in body fill rather than in flesh differences.

Study Identifies Problems

Findings of the Auburn pilot study suggest that there are problems associated with group feeding of concentrates to dairy cows. It appears that production of some cows will decrease under group feeding, although a small percentage will increase their milk yield. In the study reported, the cow with the greatest decrease of FCM under group feeding was one of the highest producers at the beginning of the test.

In large herds where groupings can be made with ranges of up to 10 lb. of milk, and with size and aggressiveness of cows taken into account, group feeding of concentrates may be feasible. Problems of group feeding of concentrates may be minimized with high producing cows where concentrate allowance approaches capacity of appetites. Within small herds in which grouping potential is limited, however, group feeding appears impractical.

Additional research is needed to learn best methods of separating cows for group feeding.

PERFORMANCE OF COWS FED CONCENTRATES INDIVIDUALLY AND IN GROUPS

Performance criteria	Method of feeding	
	Individually	Group
FCM/cow/day, lb.	31.8	30.6
Milk fat, per cent	4.74	4.88
Weight change/28 days, lb.	47.6	13.1

HOW FAT IS FAT?

ELIZABETH S. PRATHER
Department of Home Economics Research

Is there a difference between overweight and overfat? How do we know if we are overfat? What is a desirable amount of fat? Do women and men differ in desirable total amount of body fat?

These are questions that nutritionists and doctors are frequently asked. To most people overweight and fat, or obesity, are the same. However, it has been shown that an individual may be overweight according to standard height-weight tables and yet not have excessive amounts of body fat. Since overfatness, or obesity, has been shown to be detrimental to health and long life, it is desirable to lose excess fat. However, if there is no excessive body fat, an individual should not try to reduce.

A study at Auburn University Agricultural Experiment Station is being conducted to determine the percentage of fat in women from 13 to 60 years of age, and to find an inexpensive, easy yet accurate way to measure fat in humans.

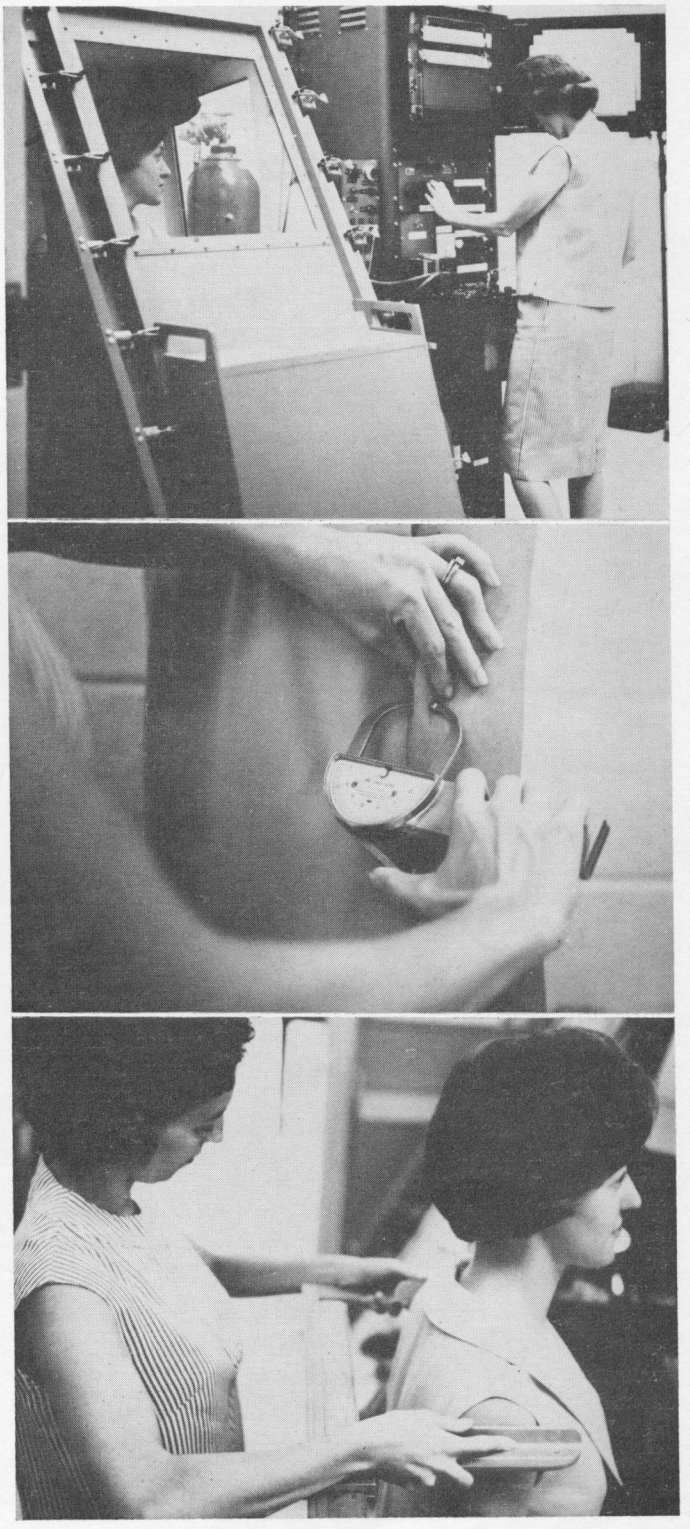
To accurately evaluate the amount of body fat requires special apparatus and equipment. One technique being used at Auburn involves determination of body volume, which is measured by an apparatus that consists of two connected chambers to form a closed system. The "subject" sits in one chamber for a specified time when a metered quantity of helium is injected into the chamber. From the dilution of helium, volume of the "subject" is calculated, and body fat may be estimated with good accuracy from body volume and weight data.

Body fat may also be predicted but with less accuracy from various body measurements, such as skinfold, diameter of shoulder, hip, and chest, and circumference of such areas as chest, hip, waist, thigh, calf, and arm.

Studies of the amount of distribution of fat have shown that about half of the body fat is located under the surface of the skin. Therefore, measurements of skinfold at well chosen spots may be used for prediction of the relative degree of fatness. Skinfold measurements are relatively inexpensive and easily determined. Since it has been shown that fat accumulates at different sites according to sex and age, it is necessary to derive equations for estimating fat by this technique from groups of different age and sex.

Special calipers have been developed that may be used to measure thickness of skinfolds. One of the best sites for skinfold measurement is at back of arm midway between the shoulder and tip of elbow. Other good sites include the skin on the back just below the shoulder blade and various diameters, such as hip, shoulder, and chest, have been useful in determining body build.

Results from the present study indicate (1) that standard height-weight tables do not always give a true picture of degree of fatness; and (2) that when time, money, and availability of special apparatus are limited for estimating body fat, use of skinfold, diameter, and circumference measurements are of practical value.



(Top) Apparatus used for determining body volume. (Center) Measurement of a skinfold thickness at the triceps. (Bottom) Measurement of shoulder diameter.

Eventually data from this research should provide clinically useful equations that may be used to predict the degree of fatness of women on the basis of measurements of skinfold thickness, selected diameter, and circumference measurements.

CONDEMNATION of BROILERS Means LOSS in VALUE

MORRIS WHITE, *Department of Agricultural Economics and Rural Sociology*

CONDEMNATION, or pounds condemned, is a familiar term to broiler growers.

They know that the number of pounds written opposite these terms in a settlement sheet received from the processor means a reduction in payment. Birds are condemned when judged unwholesome for human consumption. The cause may result from any of several reasons. Elimination of such birds is necessary to help maintain market outlets and provide assurance of a quality product for consumers.

An average of 2.6% of young chickens slaughtered were condemned during the past 6 years. The annual average percentage rate of condemnation has remained remarkably steady in Alabama with the increase of 0.8% in 1966 being the greatest change since 1960. This rate compares favorably with the 2.8% in Georgia, 2.9% in Arkansas, and 2.3% in North Carolina.

Pounds of broilers produced have consistently increased, and with a stable rate of condemnation the number of pounds condemned annually has increased (see table). Pounds of young chickens inspected in Alabama increased 60% between 1961 and 1966, but the pounds condemned were 105% greater in 1966 than in 1961.

Variation in rates of condemnation has been greater within a year than among years. Condemnations were higher during winter and lower during summer (see chart). The rate dropped from 3.5% in January to 2.1% in July, August, and September, and rose again to 3.5% in December. Pounds produced and inspected increased during the summer months so that total pounds condemned did not decrease in proportion to the fall in rates of condemnation. Although there was a drop of 40% in the proportion of inspected pounds condemned, there was only a 16% drop in total pounds condemned during the summer.

Slaughter reports usually list the number of birds condemned for each of 10 causes. In 1966, this group comprised approximately 98% of all condemnations. Airsacculitis, septicemia, and leukosis were causes of most condemnations in Alabama. Two out of three birds condemned in 1962 and four out of five condemned in 1966 were attributed to one of these three causes.

The most important changes among causes between 1962 and 1966 were increases in condemnations resulting from septicemia and leukosis. A greater number of birds was condemned for airsacculitis than for any other cause during both years, but the proportion of condemnations from septicemia increased from an average of 2.6% to 18.6%. Condemnations resulting from leukosis increased from 2.5% to 11.9% of the total.

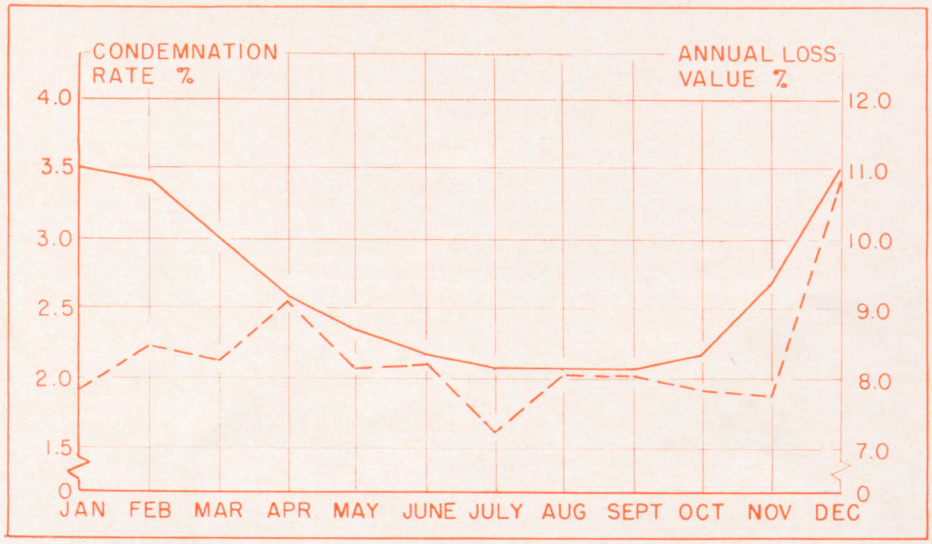
Causes that originate in the processing plant like contamination, cadaver, and over scald, resulted in less than 8% of the average annual loss through condemnations. The proportion of condemnations from contamination was seasonal and was almost three times as great in August as in December and January. There were no significant changes between 1962 and 1966 in the proportion of condemnations because of these causes over which processing plant managers had some control.

Pounds of broilers condemned in Alabama in 1966 would have supplied 687,390 average consumers. Condemnation losses are shared by various segments of the broiler industry starting with the grower. Reduction in payments to contract growers amounted to an estimated half million dollars, or an average of $1.65 per thousand broilers grown.

Because birds are usually condemned before processing is complete, the pounds condemned are reported as New York dress (NYD) weight. When the pounds of broilers condemned in Alabama in 1966 were converted to a ready-to-cook weight and multiplied by the average price processors received, the estimated value of condemnations was $6,054,943.

POUNDS OF BROILERS CONDEMNED POST-MORTEM, BY MONTHS, ALABAMA, 1961-1966

Year	Month											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Thousand pounds											
1961	880	621	710	941	1,188	1,171	1,201	1,232	1,010	1,137	1,221	1,176
1962	1,584	1,281	1,554	1,261	1,232	1,111	868	991	751	915	914	1,219
1963	1,405	1,137	994	1,005	885	1,057	1,147	1,108	1,030	965	896	1,577
1964	1,880	1,530	1,432	1,090	1,045	1,083	954	904	848	893	750	1,085
1965	1,372	1,289	1,397	1,312	1,197	1,287	1,193	1,558	1,573	1,400	1,332	1,758
1966	1,883	2,189	1,894	2,459	2,070	2,026	1,707	1,781	1,929	2,178	2,112	3,409
Total	9,004	8,047	7,981	8,068	7,617	7,735	7,070	7,574	7,141	7,488	7,225	10,224
Av.	1,500	1,341	1,330	1,345	1,269	1,289	1,178	1,262	1,190	1,248	1,204	1,704
Pct.	9.5	8.4	8.4	8.5	8.0	8.1	7.4	8.0	7.5	7.9	7.6	10.7



The average seasonal rate of condemnation (solid line) and loss in value (broken line) for broilers in Alabama, 1961-66.

Picker versus Stripper Harvesting of Cotton*

T. E. CORLEY, *Administration*
I. W. KIRK, *AERD, ARS, USDA*

Left—making first picking September 8, 1965; right—stripping on October 12, 1965.

STRIPPER TYPE cotton harvesters cost less than spindle pickers, but Alabama growers have accepted pickers more readily. Alabama studies during 1948-56 identified problems that prevented stripper acceptance: (1) inadequate ginning facilities for stripped cotton, (2) weather loss while waiting for all cotton to open, and (3) poor defoliation or second growth, or both.

Following development of the brush type stripper, 2-year comparisons of stripping with once-over and twice-over picking were made at the Agricultural Engineering Research Unit. A Hesston V-22 Brush Harvester (stripper) and low drum IHC and John Deere pickers were used. A storm resistant variety, Auburn 56, was used for all tests. Plants grew about 3 ft. tall.

Detailed Comparisons Made

In the stripping versus once-over picking comparison, machines harvested alternate two-row plots in one field until each machine had harvested 3 bales in 1963 and 4 bales in 1964. The cotton was ginned on two local gins. Each gin was equipped with drier, green leaf and stick machine, and two lint cleaners; one had a 6-cylinder cleaner and bur machine and the other an impact cleaner.

The stripping versus twice-over picking comparison used 3 bales each from first picking, second picking, and stripping in each of three fields in 1965 and 1966. Yield records were taken from four sets of paired plots (1/100-acre) laid out in uniform cotton in each field.

Excellent defoliation was obtained for the first 3 years and fair defoliation in 1966. Except in 1963, a desiccant was applied each year to the regrowth of the stripped cotton several days ahead of harvesting. Weather conditions and poor timing each year prevented making the first picking in the twice-over harvest comparison until about 90% of the cotton was open, rather than when about 75% bolls were open as desired.

Harvested cotton from the 1965-66 tests was sent to the USDA-ARS Southeastern Cotton Ginning Research Laboratory at Clemson, South Carolina, for ginning tests. The 27 bales of the 1965 test were processed through the ARS Pilot Spinning Plant at Clemson. Results from only the conventional machinery arrangement are included in this report, with findings from the ginning and spinning treatments to be published by Laboratory personnel. Equipment arrangement for the conventional treatment was: automatic feed control, tower drier #1, 7-cylinder cleaner #1, green leaf and stick machine, tower drier #2, 7-cylinder cleaner #2, extractor-feeder-cleaner, 90-saw 12-in. gin, and 2 unit saw type lint cleaners in tandem.

Machine Differences Revealed

Detailed results are summarized in the table. The stripper got more lint per acre than the picker except for the rainy harvest season of 1966. Stripped cotton was almost one full grade below that of the picked cotton, resulting in a decreased value of over 2¢ per lb. of lint. Gross lint and seed value of the stripper cotton was greater than for once-over picking, but less than for twice-over picking.

The gross value comparison of the two machines does not take into consideration differences in initial cost and operational expense. This may be 2 to 3¢ per lb. of lint lower for the stripper than the picker. However, additional trash of the stripper cotton will increase ginning and handling costs and desiccation will increase production costs for the stripper, totaling as much as 1 to 1.5¢ per lb.

Although strippers were shown to have potential for lowering harvest costs, this type harvester is not likely to gain wide acceptance in Alabama in the near future because of these reasons:

(1) Inadequate ginning facilities for ginning stripped cotton.

(2) Lack of high yielding, quality varieties suitable for stripping.

(3) Greater demand for quality cotton and larger discounts for lower grades.

(4) Grade and yield losses resulting some years from weathering with any method for once-over harvest.

* In cooperation with AERD, ARS, USDA.

STRIPPER VERSUS SPINDLE PICKING

Item	1963-1964		1965		1966	
	Stripper	Picker, once-over	Stripper	Picker, twice-over	Stripper	Picker, twice-over
Harvested sample, lb./a.	3,534	2,374	3,338	2,510	2,408	1,853
Harvested lint, lb./a.	888	811	921	913	556	613
Gin turn-out, %	25.1	34.2	27.6	36.4	23.1	33.1
Lint grade[1], index[2]	84.9	93.9	85.0	90.5[4]	76.0	85.8[4]
Staple[1], 32nd in.	32.3	32.5	34.0	34.1[4]	33.7	34.0[4]
Lint value[3], cents/lb.	28.50	30.75	26.74	28.34[4]	16.12	18.68[4]
Lint value, dol./a.	253.08	249.38	246.28	258.74	89.63	114.50
Seed value, dol./a.	37.37	33.32	34.55	33.86	24.02	25.80
Lint + seed value, dol./a.	290.45	282.70	280.83	292.60	113.65	140.30

[1] C&MS Classing Office (9 of the 13 stripped bales were lowered in grade because of bark content).

[2] Mid-100, SLM-94, LM-85, SGO-76, GO-70.

[3] CCC Loan Rates (including premium and discounts for micronaire in 1966) 1963 Mid 1″ = 33.33¢, 1964 Mid 1″ = 30.55¢, 1965 Mid 1″ = 29.32¢, 1966 Mid 1″ = 21.30¢.

[4] Weighted averages of first and second pickings.

STATE CONTROL of MILK PRICES

LOWELL E. WILSON
Dept. of Agricultural Economics and Rural Sociology

ALABAMA'S MILK CONTROL LAW, as amended, provides for fixing milk prices to producers, dealers, and consumers.

All Grade A milk producers, processor-distributors, and stores located and selling milk in Alabama are regulated by the present act, which was originally passed July 1935 by the Alabama State Legislature.

Under the present amended act, authority to fix milk prices and otherwise regulate the fluid milk industry is a seven-member Milk Control Board appointed by the Governor.[1] The Board is authorized to supervise and regulate production, transportation, processing, distribution, and sale of fluid milk products. Licenses are required for milk producers, distributors, stores, milk dealers, "bob-tailers" (sub-distributors), and cooling stations doing business in the State.

The law's major feature and one of most public interest is the price fixing authority. It requires that evidence showing need for price changes be presented at public hearings before milk prices may be established or changed. In other states, price adjustments follow milk pricing formulas and usually less public attention and publicity are directed at the milk industry.

Producer Prices

Milk producers are paid according to use made of their milk. The highest price use classification is for milk sold in fluid products designated as Class I. Alabama milk producers are currently paid $6.63 per 100 lb. for milk used in Class I products, Table 1. About 80% of total producer sales of milk are used in Class I products. Wholesale and retail prices of all Class I products are fixed by the Board. A special classification is made for fluid milk products sold to U.S. Government agencies. Class II milk, often referred to as surplus milk, is the amount in excess of fluid milk uses. In Alabama, most of Class II milk is used in cottage cheese, ice cream, and ice milk mixes. Wholesale and retail prices are not fixed for these and other manufactured milk products.

Wholesale and Retail Prices

Minimum and maximum wholesale and retail prices are fixed for 14 groups of fluid milk products, including homogenized sweet milk, chocolate drink, buttermilk, chocolate milk, skim milk, and cream products. Prices for sweet milk and cultured buttermilk in the various containers are listed in Table 2. These products account for 78.6 and 10.8%, respectively, of fluid milk product sales.

Transactions Regulated

Control of milk prices can be effective only if all transactions among licensees are regulated. Thus, effective price regulation requires broad economic control of the dairy industry. The Board has the power to make and enforce rules and regulations covering transactions and trade practices among licensees. Price rebating and discounting of regulated products are prohibited by the Board. Also, special services, gifts, or other considerations that would make the act inoperative are illegal. Effective control of trade practices, which tend to circumvent the objectives of the law, has been a serious problem in Alabama and other states with fixed wholesale and retail prices. Where prices are fixed, price competition can not be legally used by milk handlers to maintain or gain a larger share of the market.

Funds to administer the law are obtained by assessments on milk producers, distributors, "bob-tailers," stores selling milk, milk cooling stations, and fines. Most of the funds are derived from producers and distributors who each pay a license fee of 1 cent for each 100 lb. of milk produced or sold in the State. The Board employs an executive secretary with a staff of 10 supervisory and office personnel. During the 1966-67 fiscal year, the budget of the Board was $150,000. The office of the Milk Control Board is located in Montgomery, Alabama.

TABLE 1. USES, DEFINITIONS, AND MINIMUM PRICES FOR GRADE A MILK, ALABAMA, 1967[1]

Classification	Use of milk[2]	Price per 100 lb. (3.5% butterfat)
		Dollars
Class I	Fluid milk products (include sweet milk, buttermilk, chocolate, cream, and other fluid products)	6.63
Class II	Milk in excess of Class I and Government contract uses (cottage cheese, ice cream mixes, and other manufactured products)	3.90[3]
Government contract	Milk sold to U.S. Government agencies—not subject to orders of Board	6.00

[1] See Alabama Milk Control Board, Official Orders 1-67, 2-67, 3-67, dated March 10, 1967.
[2] Definition of products in each use is stated in official Order 2-67.
[3] Class II price for June 1967, usually changes monthly.

TABLE 2. MINIMUM AND MAXIMUM WHOLESALE AND RETAIL PRICES FOR SWEET MILK AND CULTURED BUTTERMILK, ALABAMA, 1967[1]

Item	Sweet milk[2]		Cultured buttermilk[3]	
	Wholesale	Retail	Wholesale	Retail
	Cents	*Cents*	*Cents*	*Cents*
Half-pint	8¾	---[4]	6	---[4]
Pint	16	18	11	13
Quart	27¾	30	22	24
Half-gallon	53½	57-58	50	44

[1] Alabama Milk Control Board Official Order 3-67, March 10, 1967. Home delivery price may be 1 cent per unit above prices listed.
[2] Same prices apply for raw and pasteurized creamline milk, sweet milk, chocolate drink, whole buttermilk, and clabbered whole milk.
[3] Same prices apply for skim milk with added solids.
[4] Retail prices are not fixed.

[1] Recent legislation changed the Board membership from six to seven: two milk producers, two milk distributors, one consumer, one member-at-large, and the Commissioner of Agriculture and Industries.

Typical slash pine as found planted on recently cultivated field.

REESTABLISHING FOREST STANDS in UPPER COASTAL PLAIN

G. I. GARIN, *Department of Forestry*

MANY DEEP SANDY soils in Autauga County are quite infertile, and subject to rapid erosion. Generally, they are considered to belong to the Norfolk and related series and are in the Upper Coastal Plain of Alabama. In the past, longleaf pine forest dominated the landscape. Also present were some loblolly pine-hardwood forests.

Virgin forests were cut early in this century, and an attempt was made to use this area for growing row crops. Only the relatively flat portions are now being used for cultivation. Abandoned areas have reverted to forest growth. The areas burned or heavily high-graded have become eroded and have developed a growth of scrub hardwoods consisting almost entirely of turkey and post oaks, with a scattering of different oak species, other hardwoods, and longleaf pine. Such areas are unproductive and are difficult to bring back into pine cover.

On one such area three species of pines, longleaf, loblolly, and slash, were planted experimentally in 1942. All were planted at a 6 x 6-ft. spacing, or about 1,200 trees to the acre. Longleaf and loblolly pines are native to the area, slash pine to more southerly parts of the State. Slash pine is a tree noted for rapid growth while it is young, making it a desirable species for pulpwood production. Three types of planting site were recognized: recently cultivated fields, old abandoned fields with some young trees, and woodlots with a considerable growth of scrub hardwoods. All trees except occasional small pines were cut before the planting was begun.

Ten years after planting the surviving trees were inventoried. Results are given in Table 1. In addition, the second set of figures shows trees 20 years after planting, or 5 years after a pulpwood thinning in 1957. In Table 2, yield in cords at the time of thinning is listed along with the volume 5 years later, or 20 years after planting. At each inventory it was difficult to distinguish between the planted longleaf and loblolly pines and trees of the same species present as a result of natural reproduction. A small amount of error in counting planted trees of both of these species must be assumed.

Despite the fact that longleaf pine was originally the most abundant natural tree species, its survival was below the minimum necessary to develop adequate stocking. Survival was poorest in the woodlot area where soils had been most subject to erosion because of relatively steep slopes and where some competition from sprouting hardwood stumps was a factor. The small volume was directly related to the small number of surviving trees. Apparently, longleaf pine would be a desirable species to plant only if poor survival can be overcome. The success of this species depends mainly on its rate of survival. Longleaf grows well in second growth natural stands on nearby areas.

Loblolly had an excellent rate of survival under all three field conditions. Five years after thinning, adequate stocking was present on all types of planting sites. Soil changes associated with varying field conditions and erosion lowered site quality and reduced growth of loblolly pine. Its growth was reduced by 37% on the cleared woodlot area as compared with that on the recently cultivated field. Loblolly is apparently the most reliable species of pine to use in planting to restore sandy areas to pine cover.

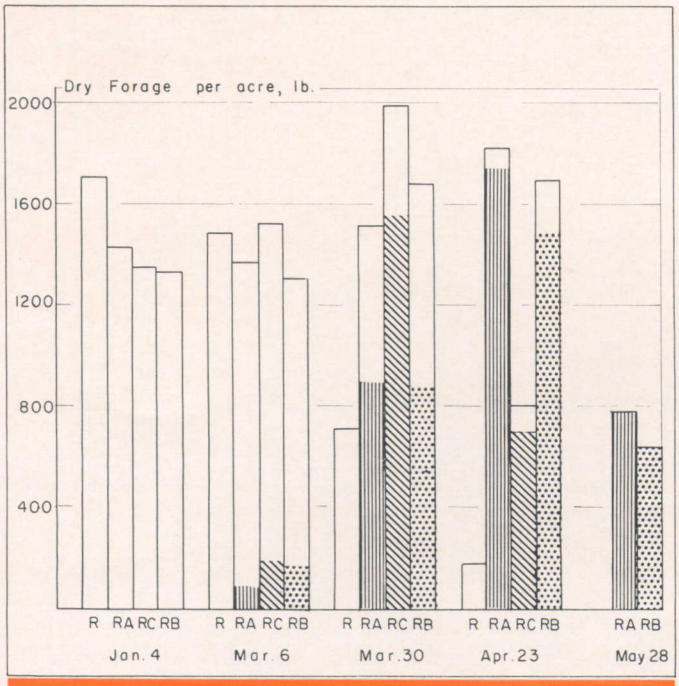
Slash pine had good survival and excellent growth, and it produced adequate stocking on recently cultivated land. Here it did almost as well as loblolly pine and can be used for planting with good results. This was not true for the old field and cleared woodlot plantings. Survival was poor in both cases and growth particularly poor in the cleared woodlot where volume was only 45% of that of slash pine on the recently cultivated field and 64% of that of loblolly pine volume on the cleared woodlot. The growth rate was equal to that of loblolly, but poor survival had an adverse effect on yield. Slash pine can be used successfully under less desirable site conditions than the recently abandoned field only if better survival can be achieved.

TABLE 2. PULPWOOD YIELD IN CORDS PER ACRE FROM PINE THINNINGS 15 YEARS AFTER PLANTING AND INVENTORY IN CORDS PER ACRE 20 YEARS AFTER PLANTING

Planting site	Longleaf		Loblolly		Slash	
	15-year thinning	20-year inventory	15-year thinning	20-year inventory	15-year thinning	20-year inventory
	Cords per acre					
Recently cultivated field	0	16.2	10.6	32.8	7.5	31.6
Old abandoned field	0	9.4	6.2	26.9	2.5	22.4
Cleared woodlot	0	5.9	3.8	23.8	2.0	15.7

TABLE 1. NUMBER OF SURVIVING TREES PER ACRE OF DIFFERENT PINE SPECIES 10 YEARS AND 20 YEARS AFTER PLANTING

Planting site	Longleaf		Loblolly		Slash	
	Age 10	Age 20	Age 10	Age 20	Age 10	Age 20
	Numbers per acre					
Recently cultivated field	141	141	491	376	531	289
Old abandoned field	103	93	575	295	263	206
Cleared woodlot	60	60	502	274	238	173



Variation in winter and spring forage production is illustrated here for different forage combinations (R is rye, RA is rye-arrowleaf clover, RC is rye-crimson, and RB is rye-ball clover). Clear areas of bars represent forage from rye, and the hatched areas show forage production by clovers in the combination.

ANNUAL GRASS-CLOVER *Mixtures for* WINTER GRAZING

C. S. HOVELAND, *Dept. of Agronomy and Soils*
F. T. GLAZE, *Alexandria Experiment Field*
J. W. RICHARDSON, *Brewton Experiment Field*
J. W. LANGFORD, *Plant Breeding Unit*
F. E. BERTRAM, *Prattville Experiment Field*

WHEN MANAGED properly, annual pasture crops provide high quality grazing during the fall-spring season. Major problem with these crops is their short productive season, but certain combinations of grasses and clovers can extend the grazing period.

Rye, ryegrass, and rescuegrass in combinations with arrowleaf, ball, and crimson clovers were tested at Tallassee, Alexandria, Brewton, and Prattville. Plantings were made on prepared land from September to November, depending on availability of moisture. Rye and rescuegrass were seeded in 6-in. rows, and clovers and ryegrass were broadcast. A total of 50 to 80 lb. of nitrogen was applied during fall. Harvests were made at about monthly intervals.

Total forage yields were increased considerably when clover was planted with rye, Table 1. Even higher yields of rye could have been expected if higher rates of nitrogen had been used. A combination of ball clover and rye made as much or more forage than rye and crimson clover. However, yields of ball fluctuated more than crimson clover from year to year, probably because ball is more adversely affected by spring droughts. Yuchi arrowleaf or ball clover with rye were the top producers at Prattville.

Seasonal distribution of forage is often more important than total production. Generally, rye has made more growth than oats, wheat, or rescuegrass during the coldest months. Data for rye-clover mixtures during one season at Prattville, given in the graph, show that clovers contributed little to the forage supply before March. From November through February the forage was mainly rye. In April, the small amount of rye present was tough and unpalatable.

Crimson was most productive early, with quantity and quality of forage declining in April and May at the time when arrowleaf was making rapid growth. In some years arrowleaf produces forage well into June, although quality declines. Ball clover follows a seasonal pattern similar to arrowleaf except that it matures several weeks earlier. It is less dependable for late season production than arrowleaf because of spring drought injury.

Results at the Plant Breeding Unit, Tallassee, show the advantage of rye over rescuegrass for late fall and winter forage, Table 2. Adding ryegrass to rye and crimson clover nearly tripled April and May forage yields. This was not the case with rye and arrowleaf clover, where ryegrass did not improve spring yields. Rescuegrass and arrowleaf clover made the highest total yield, but most of this was concentrated in April and May. Rye and crimson produced more early winter forage than rye and arrowleaf.

The highest and most uniform production over the entire season at Prattville was made by rye and arrowleaf clover, making this combination most attractive for a long grazing season. However, chance of bloat on pure clover in spring might make it desirable to add ryegrass to the mixture.

Several excellent annual winter mixtures can be used, depending on which is best suited to the overall farming program. Rye and crimson clover make a good combination for winter production of high quality forage. Arrowleaf clover or ryegrass, or both, can be used to extend the grazing system if needed. On wet soils, ball clover is better suited than the other two clovers.

TABLE 1. TOTAL FORAGE PRODUCTION OF RYE AND RYE-CLOVER COMBINATIONS

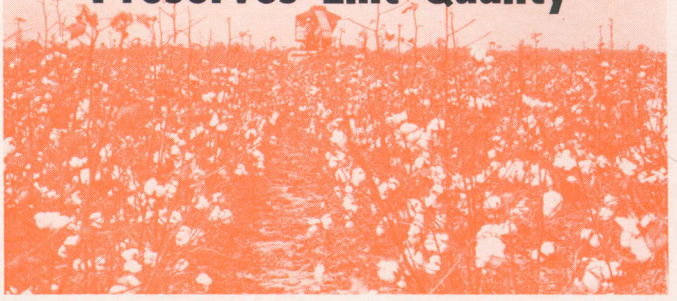
Location and length of test	Per acre yield of dry forage			
	Rye	Rye-crimson	Rye-ball	Rye-arrowleaf
	Lb.	*Lb.*	*Lb.*	*Lb.*
Alexandria, 4 years	2,757	4,760	4,740	----
Prattville, 2 years	3,589	4,663	4,901	5,178
Brewton, 4 years	2,504	3,515	4,105	----

TABLE 2. SEASONAL FORAGE PRODUCTION OF ANNUAL WINTER MIXTURES, PLANT BREEDING UNIT, 2-YEAR AVERAGE

Mixture	Per acre yield of dry forage			
	Sept.-Dec.	Jan.-Mar.	Apr.-May	Total
	Lb.	*Lb.*	*Lb.*	*Lb.*
Rescuegrass-arrowleaf clover	655	2,364	5,169	8,188
Rescuegrass-crimson clover	563	2,235	4,819	7,617
Rye-arrowleaf clover	1,671	3,068	2,837	7,576
Rye-ryegrass-arrowleaf clover	1,444	3,115	2,513	7,072
Rye-ryegrass-crimson clover	1,597	3,228	1,969	6,794
Rye-crimson clover	1,793	3,308	750	5,851

JAMES R. HURST, *Department of Agricultural Economics and Rural Sociology*

Proper Cotton Harvesting Preserves Lint Quality



ALL SEGMENTS of the cotton industry are desperately searching for ways to increase the competitive position of cotton. Survival of the industry is at stake, since man-made fibers continue to take a large share of the fiber market.

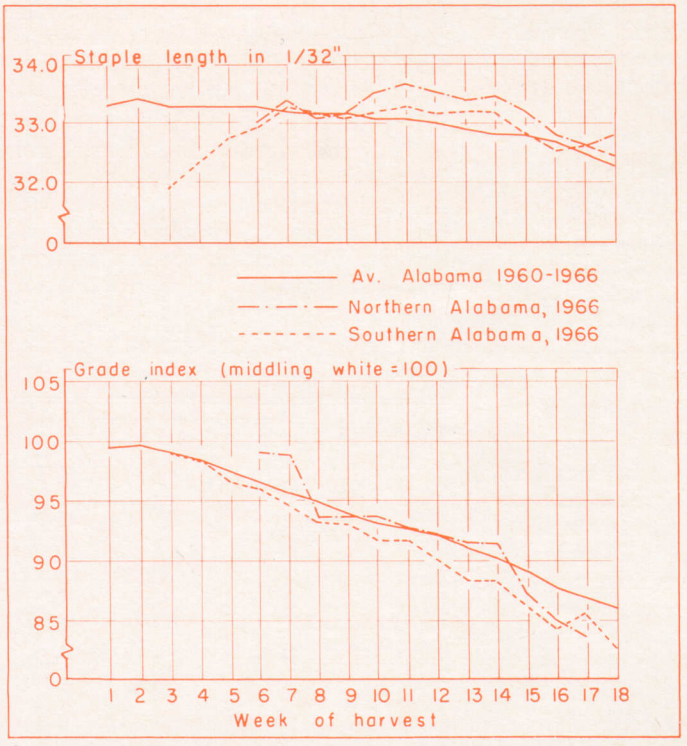
Cotton producers in Alabama and the entire Southeast have an equally pressing problem – competition from other cotton growing areas. The need for improving southeastern cotton quality is emphasized by the large volume of cotton from this area that is in CCC stocks. Despite a short crop in 1966, coupled with high mill consumption, about one-third of Alabama's 1966 crop remains in CCC stocks.

Although the need for quality improvement is recognized, development of new varieties is being looked to as the solution. Thus, proved methods of improving quality of adapted high yielding varieties are being neglected while waiting for plant breeders to solve the problem.

Harvest Time Affects Quality

Proper production, harvesting, and ginning can do much to improve and preserve quality characteristics of cottons now being planted. Timely harvesting has been shown to make important contributions to quality improvement and preservation. A study of weekly cotton classing reports for 1959-66 shows a direct relationship between grade and staple and date of harvest.

The average grade of cotton classed by Consumer and Marketing Service in Birmingham and Montgomery has shown a definite seasonal decline each year from 1959 through 1966. Grade index (middling white = 100) has consistently declined from approximately 100 at the beginning of the harvest season to a low of about 88 at the close of the season. This trend is illustrated in the graph.



A steady decline in staple length and grade index during late season cotton harvest is evident in the graphs shown here.

For staple length, a somewhat different pattern of decline is shown by the graph. Staple length increases initially and then declines sharply near the end of the season. From a peak of about 33.5/32 in. at the sixth week of harvest, staple declines to about 32.5/32 at season end.

The date that harvest begins varies from year to year, but the rate of seasonal quality decline is about the same each year. Average quality of the crop does not alter the seasonal decline either. Bad weather caused the 1966 crop to be abnormally low in quality, but the same seasonal decline was evident.

In most years, grade and staple decline more rapidly after the first week of November. Percentage of low middling in 1966 was 40% before November 1, but increased to 70% of that harvested after that date. In most years during 1959-66, about 10% of the crop in southern Alabama and 25% in northern areas was harvested after November 1.

Price difference between low middling and strict low middling in 1966 averaged 200 points, or 2¢ per lb. Assuming that Alabama producers could have harvested all cotton before November 1 and maintained the grade, this price difference would have meant an additional $340,000 income for State farmers. Another $110,000 increase could have come from maintaining average staple.

In addition to increasing income by $450,000, the increased grade and staple resulting from early harvest would have placed more cotton in trade channels instead of CCC stocks. Earlier harvest can also improve strength and other fiber properties desired by mills, thereby helping return Alabama cotton to a position of stronger demand.

Early Cotton Also Cleaner

Early harvest of cotton, coupled with late season weed control, defoliation, and proper harvest methods, will result in cleaner cotton being delivered to the gin. This is important since the ginner can only preserve quality, not improve it. Excessive cleaning and drying in attempts to improve grade damages the fiber and lowers spinning quality.

Reducing cleaning and drying can increase grower income because of added lint weight and price premiums. This can amount to as much as $11.50 per bale, according to results from other states.

Based on available information, it seems apparent that a well planned program covering production, harvesting, and ginning of available high yielding varieties will permit Alabama growers to meet competition from other cotton areas.

Marketing and Storage Facilities Needed by State Soybean Industry

J. H. YEAGER, *Dept. of Agricultural Economics and Rural Sociology*
C. A. ROLLO, *Dept. of Agricultural Engineering*

LIKE THE PROVERBIAL beanstalk, Alabama's soybean industry has grown rapidly. Growth has been in acreage planted and total production, not in yield. Per acre yields have not changed greatly since the 1950's.

Since 1960, acreage of soybeans produced in Alabama has more than doubled. Acreage harvested in 1966 was 280,000, with an average yield of 24.5 bu. per acre. Thus, total production amounted to 6.9 million bu. valued at $19.5 million. Average price received by farmers in 1966 was $2.83 per bu., almost 10% above the average for the past 5 years.

Baldwin, Mobile, and Escambia counties produce more soybeans than any other area of Alabama. However, much of the recent increased acreage has been in the Black Belt counties of Dallas, Sumter, Marengo, and Perry. Old pastures on some farms have been plowed and planted to soybeans, in some cases by owners and in other instances by persons or firms that have rented or leased land.

Reasons for Growth

There are several reasons for the steadily increasing acreage of soybeans. It is a crop that is adapted to mechanization. Labor requirements are relatively low, about 6 man-hours per acre, and soybeans can be planted later than most other crops. Many farmers find that soybeans fit well following small grains, grazing crops, or vegetables. Therefore, the land charge can be spread between two crops.

Much of the soybean producing area in the State is favored as far as an export market is concerned. In 1965, State Docks at the Port of Mobile exported more than twice the amount of soybeans produced in Alabama. Growth of the livestock and poultry industry in the State also offers a ready market for soybean meal. It is estimated that 18.2 million bu. of soybeans would have been required in 1966 to meet total protein requirements of Alabama poultry and livestock.

A bushel of soybeans when processed yields about 10.8 lb. of oil and 47.5 lb. of soybean meal. Oil typically makes up two-fifths of the value of the products, while meal provides three-fifths.

Marketing Problems

Growing production of soybeans in Alabama is not without its problems. In some cases markets have been long distances from producers. Storage facilities, both on- and off-farm, are limited. Grain facilities in the Midwest were naturally suited for handling soybeans when production increased. In the Southeast, market facilities for grain handling are not as well developed. Where cotton production has declined, storage and handling facilities generally are not adapted for soybeans.

Important decisions must be made. Should on-the-farm storage be provided? Should commercial marketing and storage facilities be provided? Should the job be done with farmer cooperatives? Where should marketing and storage facilities be located?

Providing Facilities

As production expands it is imperative that marketing facilities be provided near producing areas. Beans can be shipped from local markets by barge, rail, or semitrailer truck to processing plants, terminal markets, or export markets. In providing marketing and storage facilities, both engineering and economic requirements must be met.

Normally soybeans are harvested at a moisture content too high for safe storage. No. 1 soybeans cannot exceed 13% moisture content, and No. 2 beans 14%. Maximum moisture recommended for safe storage is 11% or less. Where moisture content is too high, soybeans must be dried. Initial moisture content will affect length of drying time, drying temperature, and length of time beans can be held before drying. Volume to be dried at one time determines requirements for size of drying bin and size of fan and heater.

Storage provided must keep beans as dry and cool as possible throughout the storage period. This may require aeration during dry weather. Beans in storage must be checked frequently.

Storage Possibilities

Producers who store either on or off the farm should consider the possibility of gains as well as losses that may occur. Typically, many Alabama growers have sold beans at harvest time. However, storing in fall and selling at a higher price the following spring or summer can increase profits when the seasonal price increase is greater than all storage costs. Depending on kind and volume of storage and method of handling, as well as losses, storage costs will be 12-15¢ per bu. for 6 months of storage.

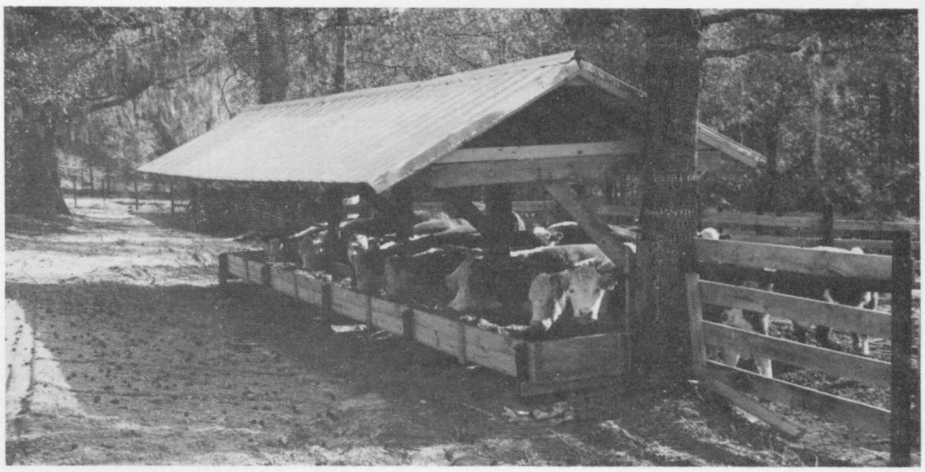
From November 1965 to May 1966, price for soybeans received by Alabama farmers increased from $2.40 to $2.85 per bu. The next season, however, there was a decrease of 5¢ per bu. (between November 1966 and May 1967). As an average for the past 10 years, price increased an average of 20¢ per bu. between November and the following May.

During the past 5 years the seasonal price increase has been considerably less than 20¢ per bu. In 3 of the last 5 years, however, the November to May price increase amounted to 15¢ or more. The other 2 years there was a decline during the same period. It is anticipated that prices received this fall will be at or near the $2.50 per bu. support level.

As with any expansion, there is likely to be growing pains in Alabama's soybean industry. Soybean producers and industry representatives should evaluate their situation and needs to make the best decisions possible for future growth and development of the overall industry.

AVERAGE MONTHLY PRICE RECEIVED BY ALABAMA FARMERS FOR SOYBEANS, SELECTED PERIODS

Month	Average price per bushel		
	1957-66	1962-66	1966
January	$2.30	$2.56	$2.60
February	2.39	2.63	2.80
March	2.42	2.64	2.80
April	2.47	2.65	2.85
May	2.46	2.61	2.85
June	2.44	2.60	2.85
July	2.37	2.56	2.75
August	2.38	2.58	3.00
September	2.34	2.55	3.00
October	2.30	2.56	2.85
November	2.26	2.56	2.80
December	2.30	2.60	2.85
AVERAGE	$2.37	$2.59	$2.83



Heifers shown here are those in the confined silage treatment at Lower Coastal Plain Substation test.

MANAGEMENT of BEEF CATTLE in CONFINEMENT

R. R. HARRIS and W. B. Anthony, *Dept. of Animal Science*
V. L. BROWN, *Lower Coastal Plain Substation*

INTENSIVE LAND USE will be of major importance especially for beef cow-calf operations, as land prices continue to increase.

Therefore, feasibility of confinement feeding of the brood cow herd is based on two important concepts: (1) maximum production of feed per unit of land and (2) supplying feed to the cow according to her needs. If these two concepts can be attained, then confinement of the beef brood cow may be both practical and economical.

Experiment Conducted

On November 1, 1963, research was started at the Lower Coastal Plain Substation on confinement feeding of beef cows using either Coastal bermudagrass hay or sorghum silage as the major feedstuff. Fifteen grade Hereford females were assigned to each of the following treatments: *Conventional* – grass hay + CSM during "winter," Coastal grazing during summer, surplus grazing, if any, cut for hay, 1 acre per cow – 200 lb. N per acre; 3 pastures, rotationally grazed; *Confined silage* – cows confined to 3-acre waste area, fed NK-300 sorghum silage + protein supplement, calf given grain creep; *Confined hay* – cows confined to 3-acre waste area, fed Coastal hay and protein supplement, calves creeped on grain.

Annual Feed Consumption

Feed consumption for the 3 years (1963-66) has been fairly consistent. The conventional-fed cows have averaged eating 1.55 tons of hay and 305 lb. of CSM. Cows confined and fed silage ate 12.71 tons of sorghum silage and 444 lb. of protein supplement. The confined "hay" cows consumed 4.18 tons of Coastal hay and 157 lb. of protein supplement. Calves of the confined cows consumed an average of 1,293 and 1,243 lb. of creep mixture for the "silage" and "hay" groups, respectively.

Calf Weaning Weights

Calves are weaned at 250 days of age and weight data are adjusted for age of dam and sex. Weaning weights are shown in the table. Calves from the confined-fed cows were heavier each year than those from cows on the conventional production system. Calves from the "silage" group averaged 92 lb. and those from the "hay" group 51 lb. heavier at weaning than the "conventional" calves; however, it should be emphasized that these calves had access to grain creep whereas the "conventional" calves did not.

CALF WEANING WEIGHTS—CONFINED COW STUDY, LOWER COASTAL PLAIN SUBSTATION, 1963-65[1]

Year	Conventional	Silage	Hay
	Lb.	*Lb.*	*Lb.*
1963-64	431	554	510
1964-65	426	521	454
1965-66	453	513	500
3-year average	437	529	488

[1] Adjusted for age of dam and sex.

Forage Production

The assumption was made in 1963 that 1 acre of sorghum would provide sufficient silage to carry 2 cow units throughout the year. Based on the 3-year average silage consumption of 12.71 tons, an acre would have to yield slightly more than 25 tons of ensilage. The actual average yield has been 12.2 tons. It must be noted that 2 of the 3 years have been extremely dry during the growing season and under favorable moisture conditions possibly the goal could be reached. Nevertheless, 1 acre of sorghum supported 1 cow unit in confinement.

Coastal hay yields on the 15-acre pasture-hay area were not high in 1966 – drought drastically reduced yields. The area did provide grazing for the 15 cows and produced a total of 11.82 tons of hay in addition. Normally it requires about 1.5 tons of hay to "winter" a cow using the conventional system; therefore, only about half enough hay was produced in 1966. Surplus hay was available in 1964 and a slight deficit existed in 1965 so that 1 acre has almost supported a cow unit annually. The original goal was to produce enough hay and grazing on 1 acre of Coastal to support 1 cow unit throughout the year except for a small amount of protein supplement. This goal appears to be attainable.

Coastal hay yields have averaged 7.24 tons per acre during the 3-year study. At this rate of production it will require 8.66 acres to produce the hay necessary to feed 15 cows in confinement. The original assumption that 8 acres would be adequate is essentially correct.

It should be emphasized that the Coastal sward used for production of hay is limed and receives mineral fertilizer according to soil test, and nitrogen is applied at rates up to 400 lb. per acre in split application. Coastal used for grazing and hay receives similar treatment except 200 lb. of nitrogen is applied.

Economics

A lack of maximum crop yields (hay and silage) caused the conventional production system to be favored at this time. Obviously, a change in land or feed prices could change this relationship.

WORMING COMPOUNDS for HOGS

H. F. TUCKER, *Department of Animal Science*
S. E. GISSENDANNER, *Sand Mountain Substation*

Hogs are host for a variety of internal parasites.

The large round worm, *Ascaria lumbricoides*, is the largest of the common internal parasites. It is observed in droppings and almost invariably present wherever hogs are grown.

Producers quite often attribute the problem of unthrifty, poor-performing pigs to heavy infestations of ascarids. Actually, the observed unthriftiness may be a result of many causes such as inadequate nutrition and poor management, and not exclusively to specific parasitic infestation.

Various chemical compounds have shown safe and efficient results in the removal of adult parasites, and routine worming is practiced in many hog operations. Too often previous experimental investigations have been concerned only with the efficiency of removal of parasites. Evaluation of the merits of a treatment based on the effect it may have had on subsequent growth of the pig to market weights has not received proper attention.

Tests were conducted by Auburn University Agricultural Experiment Station to measure the possible effect of worming treatment for internal parasites of weanling pigs on growth to market weight. In two trials weanling pigs were divided according to litter, sex, and weight. They were then randomly assigned to the four test groups of 40 animals per group. In Trial I the treatment groups were: (1) control, (no medication); (2) hygromycin, to 125 lb. average weight; (3) piperazine, one dose; and (4) Atgard V, one dose. In Trial II, Atgard V was replaced by a piperazine treatment of two doses with a 30-day interval. These medicants were incorporated into the rations at the beginning of the trial. They were fed at the dosage level and duration of time recommended by the manufacturers.

The pigs were maintained under confinement conditions and self-fed a 16% mixed ration throughout the entire test.

The presence of ascarids in hogs of both trials was confirmed. Mature worms were observed to have been eliminated in all groups that received medication.

The results are presented in Table I. In Trial I the control group (no medication) gained fastest, whereas pigs that received hygromycin gained slowest. The piperazine and Atgard V groups were intermediate in rate of gain.

In Trial II rates of gain were slightly more variable than in Trial I. However, in Trial II, pigs that received the one dose of piperazine gained slightly faster than the control group. Again, the poorest gaining group was the one that received hygromycin. Treating with two doses of piperazine, at a 30-day interval, was not as effective as the one-dose treatment.

When treatment data for the two trials were combined, identical rates of gain were made by the pigs that received no treatment, and the best performing group that received the one-dose piperazine treatment. Pigs that were treated with hygromycin gained at the slower rate. This 0.07 lb. per day slower gain resulted in approximately 6 additional days to reach market weights.

Data from this experiment indicate that the control group receiving no worming medication gained at a rate as fast or slightly faster than those treated with either piperazine, hygromycin, or Atgard V. These results may have a logical explanation that is related to the established migratory life cycle of the ascarid as it develops. The egg is hatched in the contents of the small intestine and transverses the tissues of the intestine, liver, and lung before reaching the intestinal tract to mature into the adult form. It would appear that the greatest damage and stunting effects occur from the ascarid's penetration of the tissues and not its presence in the intestine. The medicants used in this trial are considered to be ineffective against the developing ascarid. A compound capable of preventing development of the larva before it starts to migrate would be a more effective worming medicant than those used in this study.

EFFECTS OF VARIOUS WORMING COMPOUNDS ON PERFORMANCE OF GROWING-FINISHING HOGS

Treatment	Initial wt.	Final wt.	A.D.G.
	Lb.	*Lb.*	*Lb.*
Trial I			
None	44.8	226.7	1.37
Hygromycin[1]	44.7	224.4	1.30
Piperazine	42.9	225.7	1.33
Atgard V	45.4	224.9	1.33
Trial II			
None	47.0	226.9	1.64
Hygromycin	47.3	226.5	1.59
Piperazine, 1 dose	47.4	225.6	1.67
Piperazine, 2 doses, 30-day interval	47.6	223.1	1.61
Av. Trials I & II			
None	45.9	226.8	1.50
Hygromycin	46.0	225.4	1.43
Piperazine, 1 dose	45.4	225.6	1.50

[1] Hygromycin furnished courtesy of Eli Lilly Co., Indianapolis, Indiana.

AGRICULTURAL EXPERIMENT STATION
AUBURN UNIVERSITY
AUBURN, ALABAMA 36830
E. V. Smith, Director
PUBLICATION—Highlights of
Agricultural Research 8/67 10M

POSTAGE PAID
U.S. DEPARTMENT OF AGRICULTURE