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HIGHLIGHTS *of* Agricultural Research

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VOLUME 9, No. 3 FALL, 1962

In this issue . . .

On the cover. Here sweet sorghum at the Tennessee Valley Substation, Belle Mina, is being mechanically harvested preparatory to storing in silo. The results of a 7-year study at that Substation of the comparative costs of producing, harvesting, and storing sorghum and corn silages are reported on page 3. Comparisons are made on the bases of both cost per acre and cost per ton of silage.

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New and Timely PUBLICATIONS

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

Bul. 325. Rod Closets for Southern Farm Homes.

Bul. 327. Establishment and Maintenance of White Clover-Grass Pastures in Alabama.

Bul. 329. Oats for Forage and Grain.

Bul. 335. Crimson Clover in Alabama.

Cir. 133. Cost of Clearing Land.

Leaf. 62. Warrior Vetch—A New Variety for Alabama.

Leaf. 64. Ball Clover.

Leaf. 66. Forage Production of Winter Annuals Sod-Seeded on Dallisgrass-White Clover.

Prog. Rept. 72. Artificial Light for Growing and Laying Birds.

Prog. Rept. 75. Grinding and Molassifying Hay for Dairy Cows.

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

SILAGES—Production and Storage Costs in Northern Alabama

W. B. ANTHONY, R. R. HARRIS, J. K. BOSECK, and J. H. BLACKSTONE*

SILAGE IS GROWN more in Alabama today than ever before. High quality forage is recommended as the basis of a successful feeding program for beef and dairy cattle. Quality of livestock on many farms requires a quality forage.

How much does it cost per acre or per ton to produce, harvest, and store silage? This is a question facing farmers who wish to include silage in their feeding programs. It is a difficult question to answer because of wide variations in silage making practices, types of equipment used, types of storage facilities used, and different silage crops grown. Other factors related to the profitableness of silage on a given farm include the kind of livestock to be fed and level of production; availability and cost of other feeds; availability of work force and machinery needed to make silage and method of acquiring these items; and kind and size of silo used.

Research Conducted

Research on silage crops by the Auburn Agricultural Experiment Station conducted at the Tennessee Valley Substation, Belle Mina, included sorghum and corn. As one phase of this silage research, special emphasis was placed on securing both physical and cost data in the production and harvesting of these crops. When cut for silage, the corn grain was dented, and the sorghum was in the milk to early dough stage. These crops are grown on Humphrey's silt loam soil, that is underlain by a chert bed. Oats were seeded after sorghum and used for grazing and silage during 3 of the 7 years of sorghum silage research. In all years, oats were seeded after harvest of corn silage and was used only for grazing. See production and cost data in table.

* Animal nutritionist, assistant animal nutritionist, superintendent of Tennessee Valley Substation, and agricultural economist, respectively.

AVERAGE COST PER ACRE AND PER TON FOR CORN AND SORGHUM SILAGE BY SPECIFIC OPERATIONS

Item	Corn silage costs		Sorghum silage costs	
	Per acre	Per ton	Per acre	Per ton
	Dol.	*Dol.*	*Dol.*	*Dol.*
Production costs	36.06	3.03	34.04	2.40
Harvesting	13.48	1.13	12.32	.87
Hauling, unloading	13.17	1.11	12.25*	.86*
Filling silo	4.94	.42	4.21*	.30*
Packing	1.92	.16	1.13*	.08*
Storage	11.00	.93	9.43*	.66*
TOTAL COSTS	80.57	6.78	73.38	5.17
Av. no. acres studied each year	14.4	——	12.5	——
Av. yield, tons green weight	11.89	——	14.19	——

* During 4 years out of the 7, sorghum was stored in a trench silo, which lowered the average cost for unloading, filling, packing, and storage. Corn silage was stored in an upright silo in all years.

Results

As an average over a 6-year period, corn silage costs were $6.78 per ton for all costs, cash and noncash, including all operations from production through storage. Costs by years for corn silage have varied from a low of $5.84 per ton to a high of $13.03. Yields of corn silage have varied from a low of 5.70 tons per acre to a high of 16.15 tons. Yields exceeded 12 tons in 4 years out of 6.

As an average over a 7-year period, sorghum silage costs were $5.17 per ton for all costs, cash and noncash, for all operations from production through storage. Costs per ton have varied from a low of $4.36 to a high of $7.32. Yields per acre have varied from a low of 9.07 tons to a high of 19.81 tons. The average cost per ton of sorghum silage of $5.17 is perhaps low by an average of 50¢ per ton due to its having been stored in a trench silo 4 years out of 7 when compared to corn silage. Corn silage was stored in an upright silo in all years.

Detailed data have not been developed on the cost of feeding silage. This cost would vary from farm to farm based on type of unloading equipment used, kind and arrangement of feeding equipment, and amount of silage fed per feeding. These costs would be expected to vary from a low of 50¢ per ton to a high of $2.00 depending upon the efficiency of the feeding arrangements.

Summary and Conclusions

Making silage is an expensive operation. However, it can be one of the cheaper forms of providing livestock with a high quality forage when handled in an efficient manner. An efficient goal to strive for would be a cost for corn silage not to exceed $6 per ton, or sorghum $5 per ton, for all costs – cash and noncash, including production through storage costs in an upright silo. Labor requirements should not exceed 12-14 hours of man labor and 8-10 hours of tractor time per acre.

In feeding tests by the Auburn Agricultural Experiment Station with cattle, corn silage has been superior to sorghum silage in the production of both beef and milk. The sorghum silages fed have included the sweet sorghums and the high grain-yielding hybrids. Corn silage, properly supplemented with grain and protein, can be a low cost method of wintering stocker steers or feeding dairy cows when costs are kept within the range found in this study.

The stage of maturity of plants when cut for silage, as well as the method of storage, materially influences silage quality. Livestockmen making silage for the first time are urged to seek technical advice before the crop is harvested. This is especially true for sorghum silage.

PERFORMANCE TESTED BULLS
Sire High Quality Calves

TROY B. PATTERSON, *Department of Animal Science*
W. W. COTNEY, *Superintendent, Upper Coastal Plain Substation*

ALABAMA NEEDS heavier beef calves at weaning with sufficient quality to demand top market prices.

Gross as well as net returns per calf are dependent upon a combination of price per cwt. and final market weight. In breeding research at the Auburn University Agricultural Experiment Station attention has been directed towards bulls that will produce calves that meet these requirements.

A need for further information on the merits of bulls with different performance records prompted a study at the Upper Coastal Plain Substation, Winfield.

Procedure

Brood cows used in this study were developed on the Winfield Station from a group of grade Hereford and cull Jerseys obtained in 1946. Purebred Hereford and Angus bulls have been used since that time with replacement females being retained from succeeding calf crops. Some culling plus replacement females produced a herd of approximately ¾ or better grade cows.

Bulls used in this study were furnished by the Main Station at Auburn and were selected each year at the end of the annual performance test. Only bulls that indicated inherent ability to gain rapidly throughout the entire test period were saved as high gainers. These bulls were heavier at weaning, gained faster on test, and had a higher weight per day of age than average. Two Angus and two Hereford bulls were retained with these qualifications. The same number of bulls of each breed were retained as low gainers. These bulls represented the lowest of their breed with respect to gaining ability each year.

The cow herd was divided into four groups of about 20 cows each according to breed, age, and previous record. Except during breeding season the cows were handled as a single unit in order to eliminate any unnecessary environmental effects. The calves were caught at birth and the sire, dam, birth weight, sex, and birth date recorded. The calves were weaned at approximately 10 months of age and each calf was weighed, graded, and evaluated. All calves were placed on a permanent type pasture of Dallisgrass and white clover for an average of 100 days. Because of poor gains the first year each calf received corn supplement at the rate of 1% of their body weight during the second year. Little benefit was realized from this practice. At the end of the grazing season, the calves were weighed, graded, and re-evaluated. Replacement heifers were retained from the two high gaining groups and the remaining calves were full fed for an average of 143 days on a high roughage ration. At the end of the feeding period, the calves were weighed, graded, evaluated, and sold to packers in the area on the basis of carcass weight and grade.

TABLE 1. PERFORMANCE OF ANGUS AND HEREFORD SIRES (2-YEAR AVERAGE)

Breed and no. bulls	Daily gain birth to weaning	Daily gain on test	Wt. per day of age	Breeder grade*
	Lb.	*Lb.*	*Lb.*	
High A —2	1.98	2.38	2.10	11.5
Low A —2	1.85	1.78	1.76	12.0
High H —2	1.99	2.74	2.22	12.5
Low H —2	1.80	1.78	1.76	13.0
Av. High —4	1.99	2.56	2.16	12.0
Av. Low —4	1.82	1.78	1.76	12.5
Difference	0.17	0.78	0.40	-0.5

* 11-High Good, 12-Low Choice, 13-Medium Choice

The performance of the eight sires used during the two years are given in Table 1. The difference of 0.40 lb. per day of age probably is a more accurate evaluation of the true difference in gaining ability between the two groups of bulls. Since differences of as much as 1.5 lb. per day of age have been noted among tested bulls, the differences between groups shown here are well within the expected range. Effort was made to keep the two groups equal with respect to grade. This was not possible and a difference of 1/6 of a grade existed in favor of the low gaining bulls.

Summary

The results of the progeny test of calves produced by these two groups of bulls are presented in Table 2. Calves by high gaining sires out performed calves by low gaining sires in all respects except grade. The calves by the high sires graded 1/9 of a grade lower and brought slightly less per cwt. than the other group. For the 2-year average the difference in weight gain in favor of the high sire group amounted to 31 lb. at weaning, 35 lb. at the end of the grazing period, and 52 lb. at slaughter. As a result of the heavier weight, the calves by the high sires grossed $10.02 more per calf.

Projected to a bull unit of 30 cows with a 90% calf crop, each high gaining bull would return the producer $270 more per year than a low gaining bull. Or for the normal useful life expectancy of 6 years an increase of $1,420. Since the cost of maintenance and production of the two groups are approximately the same, this increase would be profit with the exception of the difference in initial cost of each bull. A significant fact is that over half of this increase is realized by weaning time.

TABLE 2. PERFORMANCE OF CALVES BY SIRE GROUPS (2-YEAR AVERAGE)

Group	Calves	Daily gain birth to weaning	Daily gain on pasture	Daily gain in feedlot	Final slaughter	Slaughter grade*	Gross returns per calf
	No.	*Lb.*	*Lb.*	*Lb.*	*Lb.*		*Dollars*
High Angus**	30	1.53	0.69	1.93	857.9	10.5	$212.17
Low Angus	28	1.48	0.62	1.81	805.5	10.5	199.48
High Hereford**	29	1.59	0.57	1.88	829.4	9.6	199.85
Low Hereford	30	1.45	0.56	1.74	780.7	10.3	193.66
Av. High	59	1.56	0.63	1.91	844.7	10.1	$206.48
Av. Low	58	1.46	0.59	1.77	792.6	10.4	196.46
Difference		0.10	0.04	0.14	52.1	-0.3	10.02

* 9-Low Good, 10-Medium Good, 11-High Good
** Only 22 calves by the high Angus and 18 by the high Hereford were fed out during the two years.

Root-Rot and Spittlebugs in Coastal Bermudagrass

R. T. GUDAUSKAS, *Asst. Plant Pathologist*

COASTAL BERMUDAGRASS, an important grazing and hay crop in many parts of Alabama, has been observed to die-back occasionally in recent years.

Serious damage on Coastal was first reported in the summers of 1958 and 1959 from southern Alabama. Small areas of mature grass died during hot humid weather. The areas became progressively larger, sometimes involving entire fields. The above-ground portions of affected plants were dead and brown in color, appearing as though they had suffered a heavy frost.

During the past 1½ years, research has been carried on by the Auburn Agricultural Experiment Station to determine the cause of this die-back in Coastal Bermudagrass. Results to date reveal that a fungus and an insect are capable of causing damage apparently similar to that which occurred previously. The fungus, *Helminthosporium spiciferum*, causes a rot of stems, crowns, and roots. This disease was previously unknown to occur on Coastal. The insect, the meadow or red-banded spittlebug, attacks leaves and stems and has been recognized as a possible serious pest of Coastal.

Spittlebug

The adult spittlebug is about ½ in. in length. It is dark brown in color with two red lines or bands running parallel across its back. The immature (nymphal) form is light brown in color and covered with a white, foamy froth or "spit." The "spit" containing the nymphs can be seen on various parts of the grass. The piercing and sucking activity of the nymphs results in the brown color of attacked plants.

Generally, spittlebug damage is more severe in pastures where excess growth is not used. The resulting dense mat of vegetation provides favorable conditions for development and multiplication of spittlebugs and other pests, including disease-causing fungi. Burning off Coastal pastures in late fall or early spring where a legume is not present has been practiced in some areas to remove the dead accumulated growth.

Root-Rot

The root-rot disease was originally found in a restricted area within one field in western Alabama. The affected plants were dead or dying with various stages of decay showing in stems, roots, and crowns. Associated with the disease was a heavy infestation of spittlebugs. The insects and their feeding damage were apparent throughout the field, but only those plants within the restricted area had dying stems, crowns, and roots.

Of several fungi isolated in the laboratory from the diseased tissues, only the *Helminthosporium* was found capable of causing disease. The stems, crowns, and roots of test plants were rotted within 30-40 days after the fungus was injected into the plants with a hypodermic syringe and needle.

First symptoms on experimentally infected plants were overall stunting, spindliness of stems, and yellowing and browning of leaves. Close examination of the inoculated areas on stems revealed black streaks originating from the inoculation points. Internal examination disclosed a brown to black rot throughout the stem tissues. When the crowns were inoculated, the rot rapidly invaded and destroyed the entire crown and root system, finally spreading into the stems.

The importance, severity, and distribution of this disease in Coastal Bermuda fields of Alabama are currently under investigation. Factors influencing the development and spread of the disease and the responsible fungus are being studied to determine the most likely methods for control. The possible relationship of spittlebugs to establishment and spread of the disease is receiving special attention.

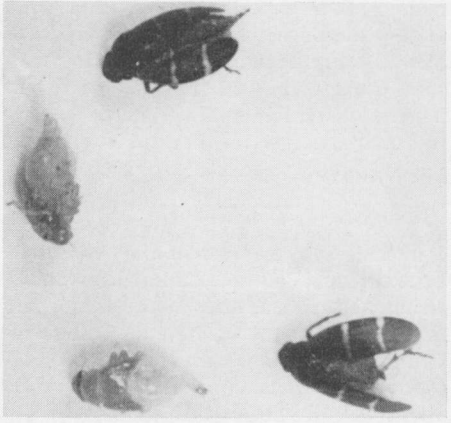


FIG. 1. Adult and immature stages of spittlebug that attack Coastal Bermuda.

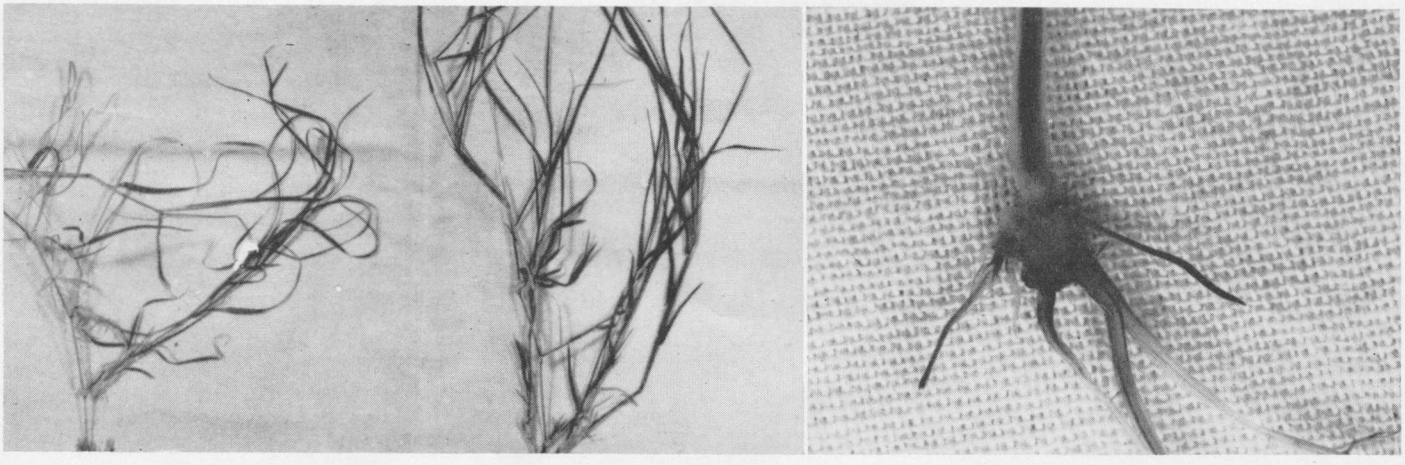


FIGURE 2. Left, Coastal Bermudagrass infected with root-rot fungus. Center, healthy plant of the same age. Right, lower portion of Coastal plant split lengthwise to show root-rot development after fungus had been injected into plant crown. Note spread of root-rot (gray to black) color into stems and roots from the infected crown.

IRRIGATION *by measuring light*

TOK FURUTA, FRED PERRY
and W. C. MARTIN
Department of Horticulture

A DEVICE that measures light and activates a magnetic valve to turn water on and off is not a dream but a reality.

It is a precise but simple instrument that indicates soil moisture depletion and irrigation needs, takes the guesswork out of irrigation, and can reduce labor and other costs by measuring solar energy (light).

In greenhouses of Auburn Agricultural Experiment Station, many cut flower, pot plant, and woody plant crops have been grown experimentally using solar energy measurements to control the time of water applications. In comparison with such other means as "by feel" or experience and tensiometers, irrigation control by solar energy resulted in high crop yields, quality, and cash returns.

Equipment

In addition to the customary irrigation system, the needed equipment is an instrument that measures solar energy and maintains an accumulated total. The instrument operates satisfactorily off batteries as well as light current. It costs about $30 to build, but its service life has not been determined. The instrument uses a photoelectric tube to measure light and a counter to maintain an accumulated total of light energy. Modifications made the instrument a controlling device to operate magnetic water valves or other electrical equipment to automatically irrigate crops. The counter was modified to activate the irrigation system at a predetermined light energy count and an interval timer to regulate duration of irrigation period.

Application

Soil moisture depletion is the result of evaporation from the soil surface plus moisture loss through the plant (transpiration). There is a direct positive relation between the amount of solar energy falling on a crop and the depletion of soil moisture.

The amount of available soil moisture depends on the soil mixture and volume of soil in which the plants are growing. Soil mixtures used for greenhouse crops vary tremendously in amount of available moisture. Typical examples are: ⅓ clay loam, ⅓ peat moss, ⅓ sand – 2¼ pints per cubic foot of mixture; ½ peat, ½ perlite mixture – nearly 5 pints per cubic foot.

If the soil is allowed to become too dry before moisture is applied, plant growth is poor and yields and quality are reduced. Not all aspects of plant growth are equally affected by water stress. Therefore, precise control of plant growth is possible by varying irrigation frequency. Use of solar energy measurements permit more accurate control of moisture stress than such methods as "by feel." For instance, height of Easter lily plants was limited more by this means than other quality factors – number of flowers and flower size.

Conclusions

Crop yields and quality have been excellent. By incorporating a fertilizer injection device into the irrigation system, it has been possible to completely automate irrigation and fertilization.

As with all instruments, periodic check of the controller has been necessary to ensure good operation. Less difficulties were encountered with this light controller than with automatic controls using tensiometers. Considerable savings in labor cost resulted when compared with hand or semi-automatic methods of applying water.

For each soil mixture, there is a maximum amount of moisture that can be stored and available for plant growth. Irrigation restores moisture as it is depleted. For proper irrigation usage, the growers must know how much moisture is stored (the amount available for plant growth), how fast soil moisture is being depleted, and how dry can the soil be allowed to become without reducing yields or quality.

Income may be increased because of higher quality and greater yields, and labor costs can be reduced. One experimental crop on a 4 × 100-foot bench grossed $528 when irrigation was based on experience. With irrigation based on solar energy, a bench of the same size made a gross return of $536. In the latter case, considerably less labor was required to irrigate the crop.

Complete automation of crop irrigation and fertilization by light measurement is practicable. Advantages are: (1) precise control of plant growth by regulating amount of moisture supplied, (2) water applications timed to actual soil moisture depletion, (3) damage to plants avoided, (4) soil and roots undisturbed; and (5) suitable to growing plants in benches, bed, or pots and other containers.

Chrysanthemum plants in bench are irrigated and fertilized by automatic light control unit. At left foreground is magnetic water valve; at upper right is phototube for light control unit. Perforated plastic tube distributes the water along bench.

Beautiful, Functional Hedges from a Variety of Plants

HENRY P. ORR, *Horticulturist*

A NEAT, THRIFTY HEDGE is a thing of beauty. And hedges can be used in many ways and serve different purposes.

Many desirable woody plant species not normally grown as hedges can be easily adapted for this landscape usage. Such plants become hedges when grown close together in a line with their branches touching or interlacing so that individual plants are not distinct.

The hedge collection at Auburn University contains Cleopatra Sasanqua Camellia, Burford Chinese Holly, India Privet, Bronze Elaeagnus, Tobira Pittosporum, Fortunes Capejasmine, Pink Perfection Common Camellia, Loquat, Mentor Barberry, Bigleaf Hydrangea, Common Juniper, Ashford Common Juniper, Spiny Greek Juniper, and Japanese (multiflora) Rose. The first six listed are outstanding.

Choose Adapted Species

Almost any kind of woody plant can be developed into some type of hedge. The species selected should be adapted to soil and climate where it is to be grown.

Desired dimensions of a hedge determine to a considerable extent what species is selected for planting. A tall hedge cannot be developed from a low-growing species. It is possible to keep a large, fast-growing species cut back to form a low hedge, but frequent clipping is necessary and rugged, unsightly cut branch-ends will develop.

The type of hedge and purpose intended also influence species selection. For barrier hedges, such thorny types as Thorny Elaeagnus, Mentor Barberry, and Trifoliate-Orange are especially desirable. Plants with small leaves and fine branches, such as Glossy Abelia, Convexleaf Japanese Holly, and Dwarf Yaupon, are preferred for hedges used as edgings. Plants with coarse branches and large leaves are best for background hedges or informal hedges. Loquat and Burford Chinese Holly are ideal for this use. Species used as background hedges for annual and herbaceous perennial flowering plants should not have extensive root systems that would be competitive. Shrub and tree species with dense vegetative growth and showy flowers are suitable for untrimmed hedges.

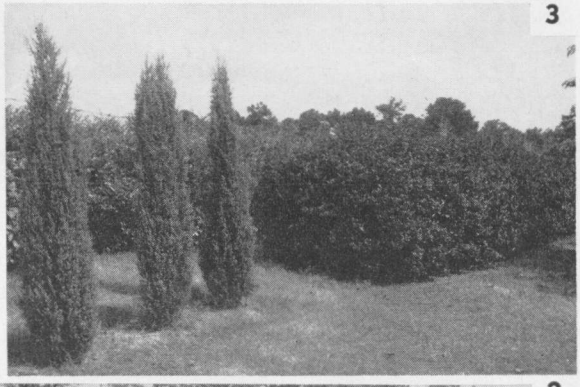
The shape to which a hedge is pruned is largely a matter of personal taste. The one important cultural requirement is that the bottom must be the widest part of the hedge to allow light to reach lower leaves. The "leggy" appearance of many square or rectangular hedges is the result of dying of lower branches that received insufficient light.

Steps in Establishment

A good way to prepare soil for planting hedges is to cultivate thoroughly a strip 4 to 5 ft. wide and incorporate into it a heavy application of well-rotted manure or other organic material. The soil mixture should be adjusted to the optimum pH (acidity) for the species chosen. After planting healthy, young plants, they should be cut back to within 5 to 6 in. of the soil. Hedges are generally planted in a single row or a staggered row of trees or shrubs.

Spacing of plants varies with species. For a low, compact hedge, plants can be placed 6 to 12 in. apart. Such species as Cleopatra Sasanqua Camellia and Burford Chinese Holly are spaced 18 to 24 in. Small tree species can be wider spaced.

Photo 1: Excellent low hedges can be easily maintained with Glossy Abelia (foreground and background) and with Roundleaf Japanese Holly (right center). Photo 2: Three desirable hedges are Oleifera, a Camellia sasanqua variety (left), Fortunes Capejasmine (center), and Cleopatra (right), a desirable Camellia sasanqua. Photo 3: Burford Chinese Holly (right) can be easily shaped into an excellent large hedge. For a narrow, upright hedge, narrow junipers should be spaced 12-18 in.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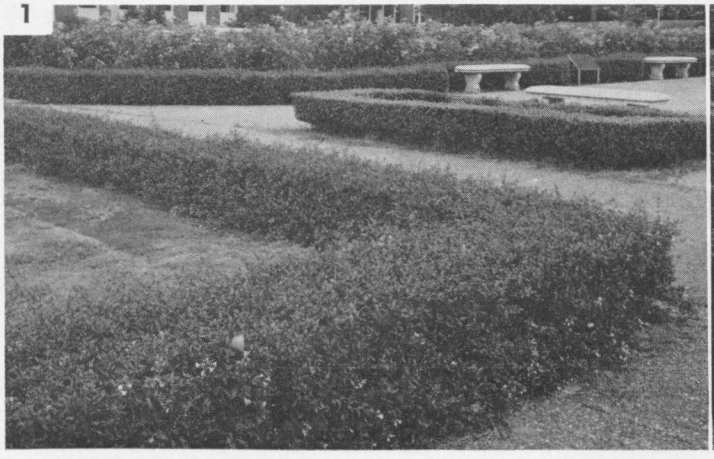
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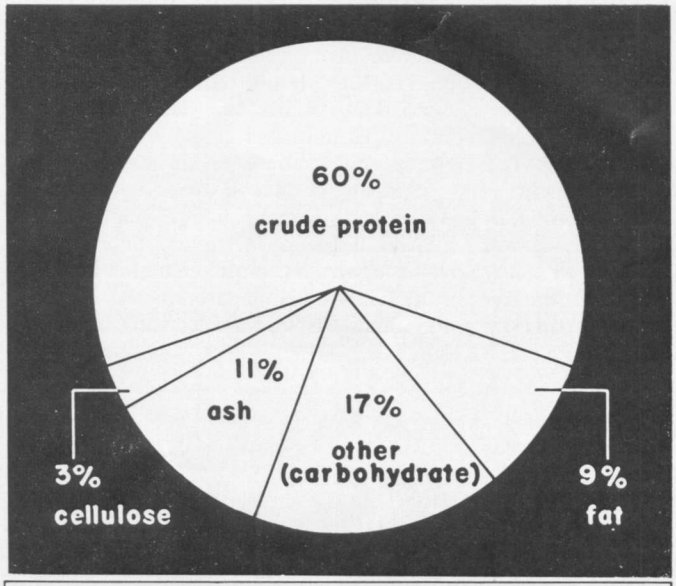
POULTRY DUST— What is it? What causes it?

J. L. KOON and WATER GRUB, *Dept. of Agricultural Engineering*
J. R. HOWES, *Dept. of Poultry Science*



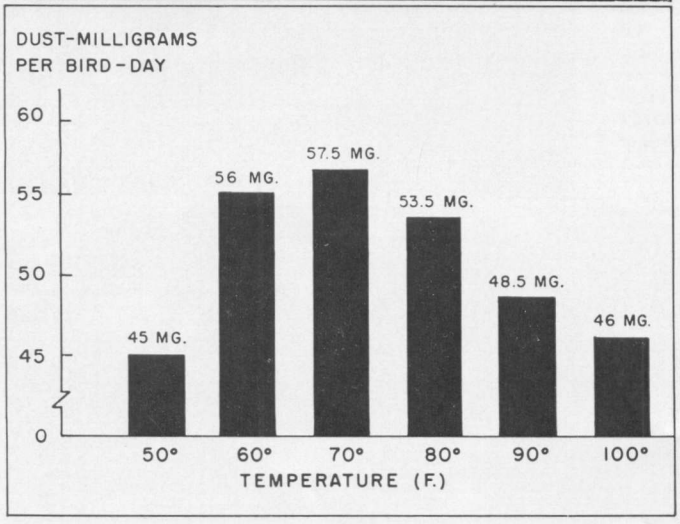


FIGURE 1 (top): Crude protein was the major component of dust from Leghorn hens in Auburn tests, as shown by the graph. FIGURE 2 (bottom): Temperature has a decided effect on quantity of dust produced by chickens. The graph shows differences in amount produced by Leghorn hens at different temperatures.

DUST AND POULTRY HOUSES seem to go together naturally! All poultrymen are bothered by the dust problem, but finding a solution has been impossible. It's much like the weather problem – everybody complains but no one can do much about it.

It has been generally believed that feed and litter are responsible for all the dust in a poultry house. But this theory is no longer valid, according to results of studies in environmental chambers at Auburn Agricultural Experiment Station. These results reveal that feed and litter contribute very little to the dust problem.

Two Dust Types

All poultry house dust may look alike, but it is not. Microscopic analysis reveals that there are two distinct types of dust particles. One type is flat and flaky with oily droplets visible. This was identified as skin tissue. The other is long and cylindrical particles with nodes similar to sugar cane. These were identified as broken feather barbules.

The flat, flaky particles ranged in size from 1 micron to 450 microns (1 micron equals 40 millionth of an inch). The long cylindrical particles had an average diameter of 4 microns and an average node length of 115 microns. Little dust from litter or feed was observed in the test.

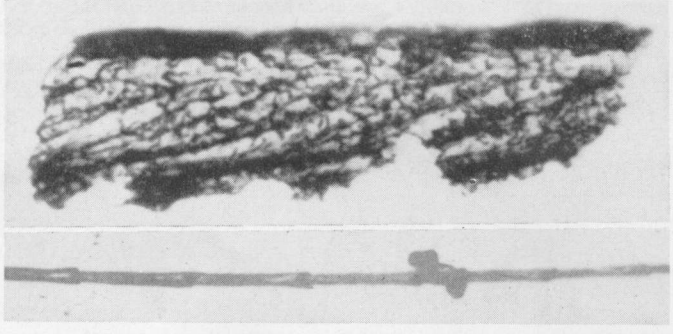
Chemical analysis of the dust revealed wide variations in content. Crude protein was the major constituent. With broilers, crude protein made up 90% of the dust, as compared with 60% for Leghorn hens. Fat content (dry weight basis) ranged from 9% for Leghorn hens to 3% for White Rock broilers. Composition of dust from Leghorn hens is given in Figure 1.

Temperature Affects Amount

Temperature had a decided effect on the quantity of dust produced by birds, Figure 2. Amount produced by Leghorn hens ranged from 45 mg. per bird per day at 50° F. up to 58 mg. per bird-day at 70° F. At temperatures above 70° F., the quantity produced declined uniformly to a low of 46 mg. at 100° F.

Dust produced by White Rock broilers varied with both age and environmental temperature. The maximum amount was produced at 55° F. when the birds were 7 weeks old, the time the test was terminated.

Results of these preliminary studies indicate that, contrary to popular belief, raising birds on wire will not eliminate most dust. Such birds still produce important quantities of dust derived from skin and feather particles.



Two types of dust particles produced in poultry houses, identified in the study, are shown in these photographs made through microscope. (Scale: 1 in. = 50 microns.)

GULF—IMPROVED RYEGRASS VARIETY

C. S. HOVELAND, *Associate Agronomist*

MORE FORAGE during the critical winter months and much better rust resistance. . . .

That's the story of Gulf ryegrass, a new variety now available to Alabama farmers. Performance of this rust-resistant variety indicates it may well solve some ryegrass problems that have plagued the State.

Ryegrass is widely planted in Alabama, and with good reason. Its excellent forage quality and capacity to furnish grazing in the spring when small grains are on the decline make it a valuable forage crop. Much of the ryegrass is seeded in combination with small grains and crimson clover.

A serious handicap of common, or Italian, ryegrass is its susceptibility to crown rust, which reduces yields and quality of forage. Until now, no improved ryegrass varieties have been available to farmers in the South.

New Variety Better

Now available is a new variety, Gulf, that has good possibilities for more and better winter grazing. This is indicated by results of 2 years of testing at the Alexandria Experiment Field, Plant Breeding Unit at Tallassee, and the Gulf Coast Substation, Fairhope.

Gulf is a seed increase by the Texas Agricultural Experiment Station of La Estanzuela 284, an improved variety developed in Uruguay. It is a winter annual like common ryegrass. Leaves lie close to the ground until April when stem elongation results in upright growth. Seed matures about 2 weeks earlier than common ryegrass.

Although Gulf has produced from 9% to over 20% more forage than common ryegrass during winter months, total production has been only slightly higher where rust was not a problem. However, the advantage of Gulf was obvious when rust conditions were favorable, such as at the Gulf Coast Substation in 1961-62, see chart.

Common ryegrass often becomes badly rusted during warm, humid weather in March, April, and May. Leaves turn orange to red and, under severe conditions, plants may die before they mature seed. Yields of common ryegrass were sharply reduced at the Gulf Coast Substation by a heavy infestation of crown rust. Disease readings made on the ryegrass variety test by Dr. R. T. Gudauskas, Department of Botany and Plant Pathology, showed that Gulf had little or no crown rust, whereas common was severely rusted.

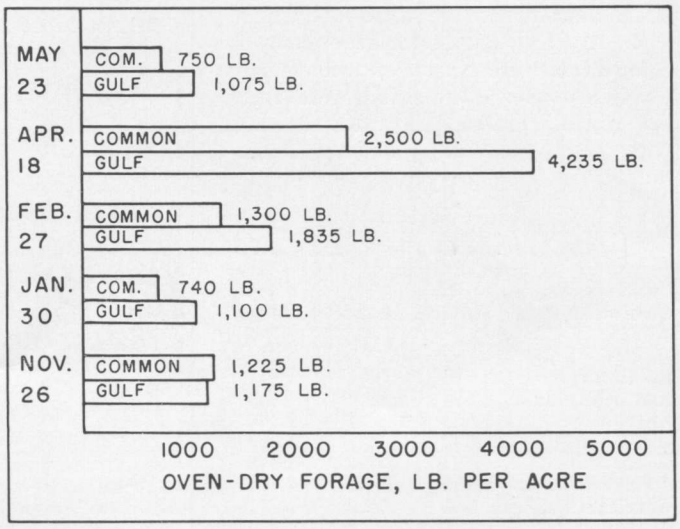
Early Seeding Important

Ryegrass is often seeded too late for satisfactory winter production. Earlier planting would ensure larger plants capable of making forage growth before cold weather. Earlier grazing can be obtained by seeding ryegrass during August in northern Alabama and during September in southern Alabama. With early planting, 3 to 4 tons of dry forage per acre have been harvested annually from ryegrass at the various test locations. When seeded early, ryegrass has been productive from November until May.

In addition to grazing, Gulf ryegrass is used for hay or silage. Because of its rust resistance, Gulf plants harvested for hay or silage will have higher quality than common. Hay should be cut when plants are in early bloom stage.

Testing of ryegrass is being continued. Several now being tested look better than Gulf for winter forage production. Until these are released, however, Gulf is the best variety now available.

Growth of common (Italian) and Gulf ryegrasses on March 21 at Auburn are shown. Plots were clipped 1 month earlier.



Yield data show that Gulf ryegrass produced more than common during winter and spring at Gulf Coast Substation in 1961-62.

The above untreated area shows typical problem of numerous low-grade hardwoods.

SURVIVAL and GROWTH of planted pines after stand treatment

SHERMAN WHIPPLE,
Associate Forester

ALABAMA'S UPLAND SOILS are frequently stocked with low-grade hardwoods that are not capable of producing returns comparable to pines on similar areas.

Various methods of converting hardwood stands to pine stands employed by progressive landowners in recent years have posed the question of – "What responses can be expected in survival and growth of planted loblolly pine seedlings following various methods of conversion?"

A study was begun in 1959 on the Fayette Experiment Forest of the Auburn University Agricultural Experiment Station to test seven different methods of conversion for effects on survival and growth of planted pine.

The herbicide used in treatments 2,3,-5, and 6 was a Dionoxol compound of half 2,4-D and half 2,4,5-T at a concentration of 4 lb. of acid equivalent per gal., see table. Treatments were as follows:

1. Scarification by bulldozer – With bulldozer blade at ground level, all stems were pushed over or uprooted and all slash windrowed.

2. Axe frill and herbicide – Stems 1-3 in. d.b.h. were cut off at a convenient height. Stems over 3 in. d.b.h were single axe frilled. Herbicide in a 1-to-30 ratio with diesel fuel was applied to cut surfaces.

SURVIVAL AND TOTAL HEIGHTS OF PLANTED PINE AT THE END OF THREE GROWING SEASONS.

Treatment	Survival per/a[1]		Total hts[2]
	No.	*%*	*Ft.*
Bulldozer	719	89.1	4,817
Axe frill	663	82.2	4,442
Injector	673	83.4	4,240
Girdle only	590	73.1	3,894
Chain frill	581	72.0	3,718
Foliage spray	438	54.3	2,365
Check	599	74.2	1,917

[1] Original stand of 807 per acre.
[2] Total heights are the sum of the heights of all live trees.

3. Injector-applied herbicide – Stems 1 in. d.b.h. and larger were injected around base at 1 in. spacings except for hickory and maple that received a frill of injections. Herbicide was applied in a 1-to-12 ratio with diesel fuel.

4. Girdle without herbicide – Stems 1-3 in. d.b.h. were cut off at a convenient height. Stems over 3 in. d.b.h. were axe girdled, chipping out a 3 in. wide strip of bark and cambium.

5. Chain girdle and herbicide – Same as treatment 2 except that a Brady Handy Girdler was used on stems over 3 in. d.b.h.

6. Foliage spraying plus axe frill and herbicide – Spraying was applied from a tractor rig through a 3-nozzle, 12 ft. "A" frame. Approximately 60 gal. were applied per acre in a ratio of 1 part herbicide, 2 parts diesel fuel, and 57 parts water. This is about twice the rate of application currently considered best for foliage spraying. Stems over 4 in. d.b.h. were frilled and treated with herbicide as in treatment 2.

7. Check.

Prior to treatment a sale was made of all merchantable timber that averaged 2M bd. ft. per acre (Int. ¼ in. rule). Stand conditions were uniform and the site average to good. In January 1959 treatment No. 1 was applied. During February 1959 all areas were planted to pine at 6 × 9 ft. spacings. Treatments 2 through 6 were applied after hardwood leaves had fully developed.

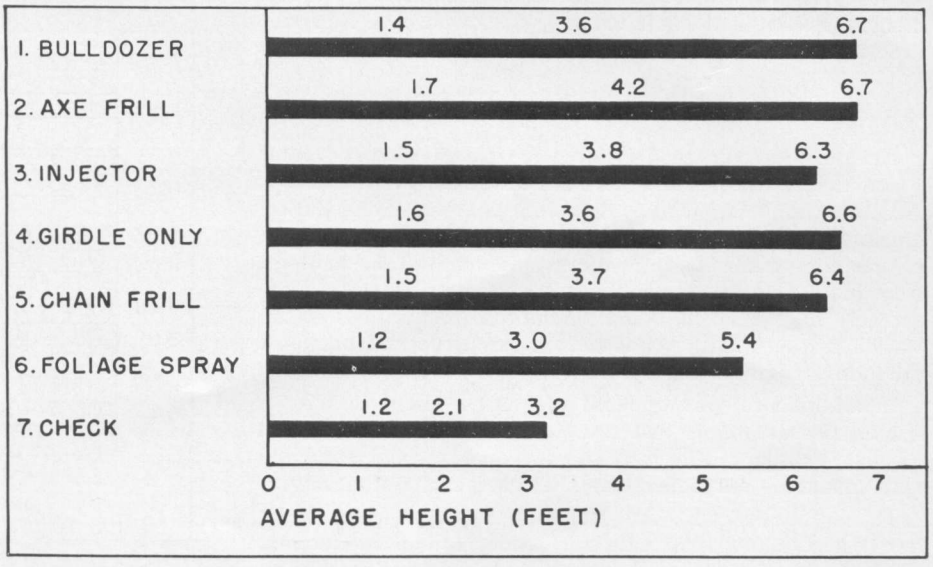
Survival after 3 years ranged from 54% for treatment 6 to 89% for treatment 1, see table. A mortality of 25% following treatment 6 is a direct result of foliage spray on young pine seedlings. Average height of pine for the check treatment was less than for all other treatments after 3 years. After 2 years average height of pine following foliage treatment was less than for all treatments except the check, see figure. The sum of the heights of all live trees (last column in table) was less, in the check and foliage treatments than all other treatments.

1. After 3 years greatest survival and growth of planted pines were recorded on the bulldozed plots.

2. At the very heavy dosage of herbicide applied, foliage spraying hardwood vegetation caused considerable mortality to planted pines and retarded growth rates of surviving pines for 2 years.

3. Insignificant differences were indicated in the average heights of pine for the first 5 treatments.

4. Satisfactory survival and growth can be obtained for planted pine after several different treatments designed to control upland hardwoods.



Average height of planted pines by treatment at the end of 1, 2, and 3 growing seasons is shown in figure above.

VETCH makes high CORN YIELDS

D. G. STURKIE, *Agronomist*

VETCH AS THE only source of nitrogen not only produces maximum corn yields the first year but gives a "bonus" for several years after it is turned in additional bushels of corn.

In 1947 a test was begun by the Auburn University Agricultural Experiment Station to study the value of commercial nitrogen, vetch, and vetch residue for producing corn. The experiment was conducted at Auburn on a Norfolk sandy loam soil. To ensure that other nutrients were not limiting corn yields, the following amounts of fertilizer were applied to all corn plots each year: 80 lb. of P_2O_5 from superphosphate, 60 lb. of K_2O from muriate of potash 1947-55, and 120 lb. K_2O 1956-61; and 10 lb. of zinc sulfate. All plots were limed as needed to maintain the pH at approximately 6.5

Plots were arranged so that the following comparisons could be made in corn yields:

(1) No nitrogen and no vetch vs. vetch turned each year, every 2 years and every 3 years; (2) no nitrogen vs. 80 lb. of commercial nitrogen; and (3) 80 lb. of commercial nitrogen plus vetch turned every other year vs. 80 lb. of nitrogen annually plus vetch turned every third year.

Results of this experiment are given in Table 1. A good crop of winter legume turned each year (without additional nitrogen) produced the maximum corn yield in the experiment, 67 bu. per acre as an average for 15 years. Plots that received 80 lb. of commercial nitrogen each year (no winter legume) averaged 56 bu. during this same period. No increase in corn yield was obtained when 80 lb. of N was applied in addition to the winter legume. Using the no nitrogen plot as a base, the increase in yield from 80 lb. of N was 43 bu., from vetch alone 54 bu., and from vetch plus 80 lb. of N 55 bu.

At left is field of corn without nitrogen or winter legumes. At right is corn with winter legumes annually.

The yield of corn from the residual value of the legume for the second and third year after turning is given in Table 2. The effect of the winter legume was at a maximum the first year after turning (52-55 bu.), but 33 bu. can be attributed to the legume the second year after turning, and 16 bu. the third year.

Research results indicate that maximum corn yields can be obtained with vetch as the only source of nitrogen when it is turned annually ahead of corn. It is necessary to produce a good growth of vetch. Vetch residue continued to produce additional corn the second and third years after vetch was turned. The increases in yield any one of the 3 years will more than pay the cost of seed and planting the winter legume. There were 2 years (1958 and 1960) in which the yields were exceptionally good. In these 2 years there was an increase of over 100 bu. from the winter legume. In 1960, the third year after the winter legume, the residue produced an increase of 23 bu. of corn. However, if the residue alone had been depended on, a loss of over 70 bu. occurred over what was produced with adequate nitrogen. The residual value of winter legumes was large, but it should not be depended on for all the nitrogen fertilization. Either grow legumes each year or use some form of commercial nitrogen for maximum yields.

TABLE 2. YIELD OF CORN OBTAINED FROM RESIDUAL VALUE OF VETCH TWO AND THREE YEARS AFTER TURNING.

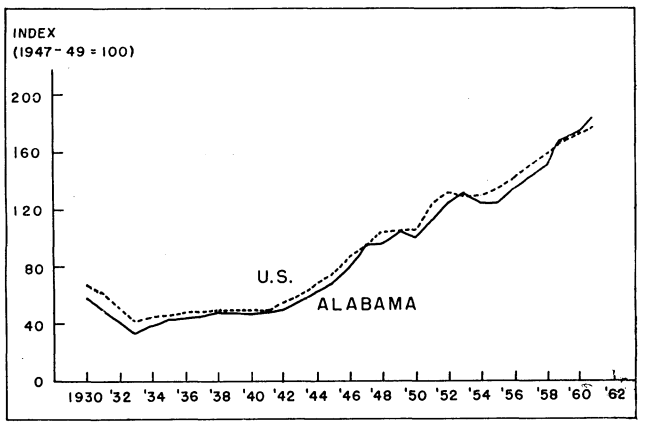
Treatment	Yield	Increase over no N
	Bu.	*Bu.*
(13 comparisons)		
80 lb. N	59	45
1st year residue[1] (2nd year after turning)	47	33
Winter legume annually[1]	66	52
No N	14	----
(5 comparisons)		
80 lb. N	53	42
2nd year residue[1] (3rd year after turning)	27	16
Winter legume annually[1]	66	55
No N	11	----

[1] No commercial nitrogen

TABLE 1. THE YIELDS OF CORN AND VETCH IN AN EXPERIMENT WITH VARIOUS FREQUENCIES OF VETCH AND COMMERCIAL NITROGEN—AUBURN, ALABAMA—1947-61

Treatment				Yield per acre of corn in bushels vetch in 1,000 lb. green weight														15 Yr. av. '47
No.	Vetch	N[1]	Crop	'47	'48	'49	'50	'51	'52	'53	'54	'55	'56	'57	'58	'59	'60	'61	'61
1	No vetch	0	Corn	7	11	15	14	13	17	23	12	18	6	15	10	9	6	23	13
2	Vetch ea. year	0	Vetch	17	14	15	12	5	22	15	14	10	25	23	16	15	17	6	15
			Corn	45	60	79	61	54	33	78	18	47	56	103	125	64	96	92	67
3	Vetch ea. 2 years	0	Vetch	....	16	....	15	....	25	....	18	....	22	....	17	....	16	....	18[2]
			Corn	14	57	38	60	51	31	67	13	43	56	65	120	51	123	68	57
4	Vetch ea. 3 years	0	Vetch	....	....	16	....	....	26	....	....	13	....	....	19	....	....	7	16[3]
			Corn	15	12	72	43	27	35	69	28	47	33	39	118	48	29	88	47
5	No vetch	80	Corn	45	52	64	60	59	29	65	18	55	36	65	81	69	73	66	56
6	Vetch ea. year	80	Vetch	6	12	15	10	5	20	12	16	8	25	25	17	17	16	5	14
			Corn	53	57	80	51	55	31	87	20	50	51	112	116	62	102	91	68
7	Vetch ea. 2 years	80	Vetch	....	16	....	15	....	25	....	18	....	24	....	17	....	18	....	19[2]
			Corn	52	61	77	55	55	33	76	22	47	54	103	111	64	110	86	67
8	Vetch ea. 3 years	80	Vetch	....	....	13	....	....	28	....	....	11	....	....	19	....	....	7	16[3]
			Corn	53	57	84	61	58	28	83	9	52	49	90	117	67	108	94	67

[1] As nitrate of soda
[2] 7-yr. av.
[3] 5-yr. av.



Average per acre values of Alabama and United States farm real estate during 1930-61 are shown by the chart. Given are index values, with the 1947-49 period assigned a value of 100.

Farm Real Estate Values Go Higher and Higher

J. H. YEAGER, *Agricultural Economist*

HIGHER AND HIGHER . . .

That has been the trend in Alabama farm real estate values for several years. And the spiral will likely continue because many factors are exerting pressures to push prices higher.

Alabama Situation

Value of farm real estate in Alabama in 1961 was about 80% greater than in 1950. During these 11 years, the increase averaged 7.3% per year. An Alabama farm worth $60 per acre in 1950 was worth an average of $108 per acre in 1961. These estimates of market value and changes are based on USDA figures.

The upward trend in farm real estate values (see chart) has shown indications of leveling out only twice since 1940: First in 1949-50 and again in 1953-54. These were periods immediately following declines in the general price level of the economy.

Trends in Alabama farm real estate values have closely followed the national trend. Before 1947 the U.S. index of values was above that of Alabama for all years. Since 1947, however, there have been 6 years in which the U.S. index was below the Alabama index. In 1961, the Alabama index was 5 points above that for the Nation.

Will future farm real estate values increase faster in Alabama than the U.S. average? The situation during 1959-61, when Alabama's values were higher than the U.S. average, may be a clue for the future. Much will depend on economic development in the State.

County Values

In 1959, average value of farm land and buildings in Jefferson County was $309 per acre, highest in the State (see map). Mobile County was second.

Counties in the Tennessee Valley and Sand Mountain areas had the highest average farm real estate values. Gulf Coast counties of Mobile and Baldwin, and Escambia, Montgomery, and Elmore were the only counties in the southern half of the State that had average farm land and building values in excess of $100 per acre.

Lamar County had the lowest value, $33 per acre. Generally, counties in the Piedmont and parts of the Lower and Upper Coastal Plains areas had relatively low per acre values.

Increases in farm real estate values in the past 5 years were greater in counties with low per acre values than in those with high values. Four counties had increases of more than 100% from 1954 to 1959.

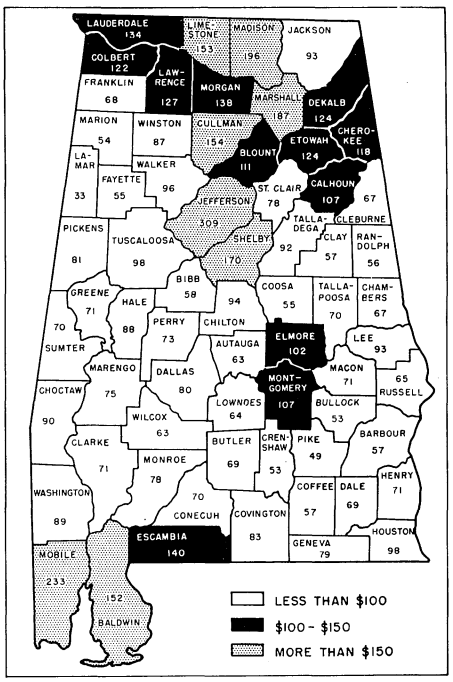
Why Values Increase

Population pressure on land and associated variables seem to account for a major part of the value increase of farm land. In 1960, persons per square mile numbered 568 for Jefferson, 253 for Mobile, and 146 for Madison County. Average for the State was 64 persons. Increased demand for space for homes, work, and recreational activities naturally ups values.

Associated with population growth has been an increase in number of automobiles, which also require space for driving and parking. It is estimated* that in the year 2000 there will be 230 million autos in use in the United States, as compared with 58 million in 1959. Population is expected to grow from 180 million in 1959 to 330 million in 2000. Based on these figures, there will be an auto for each 1.4 persons in 2000, as compared with one for each 3.1 in 1959.

Other variables, such as higher per acre yields on farm land, government programs, and demand for farm or rural land as an investment are pushing values higher. Most factors for higher real estate values seem likely to continue, causing the trend toward higher and higher prices.

* A projection by Resources for the Future, a nonprofit corporation founded in 1952 and financed by grants from the Ford Foundation.



The map shows average per acre value of farm land and buildings in Alabama, according to 1959 Census of Agriculture.

BUYING PRACTICES *of* PORK PROCESSORS

D. A. LINTON and M. J. DANNER*

ALABAMA is an important commercial hog producing area even though pork consumption has exceeded production in recent years. The State's shortage was estimated at about 16% in 1959.[1]

The amount of pork handled by Alabama slaughter plants is considered a measure of the State's self sufficiency in pork production. However, many slaughter plants do not depend on Alabama-produced hogs for their only source of supply. On the other hand, Alabama-produced hogs are sold to out-of-state pork processors. In addition to the out-of-state movements of live hogs, processed pork is shipped out of state, while at the same time pork is shipped into Alabama. These movements are normal market adjustments, but they determine to a great extent purchasing practices of pork processors.

Processors' Needs

Needs of pork processors in Alabama are primarily for barrows and gilts. The proportion of total hog slaughter for 1959-60 by classes was: barrows and gilts, 96%; sows and boars, 3%; and butcher pigs, 1%. Marketing of hogs other than barrows and gilts generally must find slaughter outlets out of state.

Results shown in this report are based on a survey currently in progress. The study is an attempt to determine the pattern and seasonal distribution of the movement of livestock and meats in Alabama and the Southeast. The previously cited report described the makeup of the pork slaughter industry in Alabama and the origin of live hogs slaughtered by processors. About 60% of the hogs came from Alabama sources with Tennessee, Kentucky, and the Corn Belt furnishing most of the remainder.

Seasonal patterns of commercial hog slaughter, and thus purchases, are shown in Figure 1. Fall and winter periods accounted for the heaviest amount of slaughter. The lightest period was in summer, although the variation between seasons was not great.

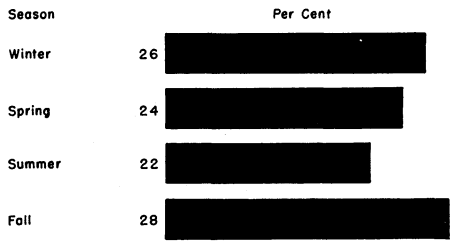


FIGURE 1

Supply Sources

Processors in central Alabama relied on out-of-state sources for hogs much more than did those in other Alabama areas. Processors in all areas were heavy importers of hogs during the fall, with out-of-state sources accounting for about half of all hogs purchased. Lack of hogs marketed locally undoubtedly forces processors to seek out-of-state sources. With more care exercised in production and marketing programs, hog producers should be able to supply the fall needs of pork processors.

Only the larger wholesale plants buy hogs outside of Alabama. Local plants (those slaughtering 300,000 lb. live weight or less annually) relied on local sources within 75 miles of the plant. Reasons given by managers of wholesale plants for buying hogs from other states included: (1) not enough hogs available locally, (2) proper market classes not available locally, (3) shipped-in hogs were of higher quality and yielded higher percentages of primal cuts, and (4) shipped-in hogs were cheaper.

More Direct Buying

Alabama pork processors have turned more to direct buying from farmers during the last 10 years, relying in 1959-60 on direct sources for about half of their pork slaughter. Agencies from which Alabama processors obtained their hogs in the 1959-60 period are shown in Figure 2. More than half of their direct purchases were obtained from farmers at the plant. A 1950 study of agencies selling hogs to slaughter plants showed that these plants bought only 25% of their hogs direct from farmers.[2]

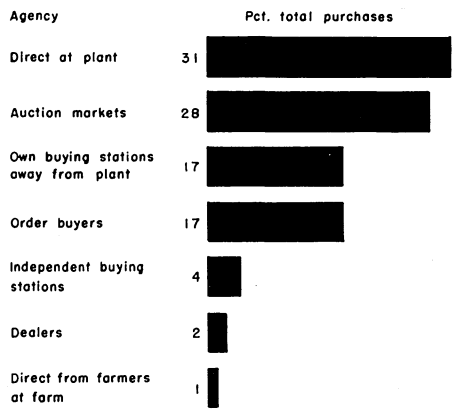


FIGURE 2

Direct buying increased remarkably. However, the proportion of hogs purchased from auctions remained about the same. Apparently other sources are relied on much less now than during the earlier period.

The use of direct buying from farmers enables the processor to more nearly control the quality of hogs purchased. This trend is likely to continue. Hog growers, as indicated by these studies, must become exceedingly quality conscious both in producing and in marketing. Auction markets must also be aware of the need for quality in their offerings if they wish to continue as a major market outlet.

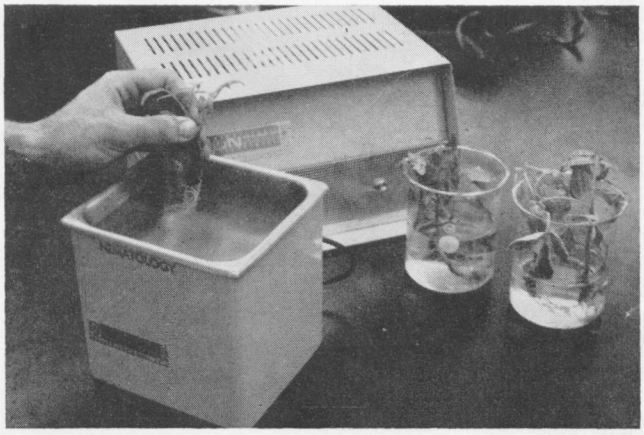
* Extension livestock marketing specialist, former graduate student in agricultural economics; and agricultural economist.

[1] M. J. Danner and D. A. Linton. "Where Does Our Pork Come From?" Highlights of Agricultural Research. Vol. 7, No. 4. Winter 1960.

[2] M. J. Danner. "Livestock Marketing Agencies in Alabama." Auburn University Agricultural Experiment Station Bul. 284. 1952.

ULTRASOUND— Space-Age Nematode Killer

E. J. CAIRNS, *Nematologist*



Method of treating plant roots with ultrasound to destroy nematodes is shown here. Roots of the tomato plant are subjected to high-frequency sound waves in water tank.

A NEW AND UNUSUAL way to control plant-parasitic nematodes is being studied at Auburn Agricultural Experiment Station. Early results appear promising, even if not yet practical.

Essentially what has been learned is that nematodes can be killed with treatments of ultrasound without harming the plant parts that harbor the nematodes. Certain limitations make the treatment effective only for bare-rooted plants or their parts, such as tubers, bulbs, and seeds, that can be treated in tanks of water.

What is Ultrasound?

Ultrasound or "silent sound" is a special variety consisting of sound waves at frequencies above the range of human hearing. Ultrasound begins at about 20,000 cycles per second and can go as high as 5 million cycles in solids. Frequencies of 20,000 to 100,000 cycles are most widely used.

Ultrasound is not new. Bats successfully fly through intricate obstacle courses in total darkness by emitting ultrasonic signals and detecting obstacles by the reflected echoes. Sonar, or echo ranging, for ship and submarine navigation and depth finding is a development of ultrasound. Industrial use includes rapid and complete cleaning of intricate machine parts, testing for flaws in the surface or interior of solid objects, drilling holes of any shape in hard and brittle materials, and welding together practically any similar or dissimilar metals. Medical uses include ultrasonic therapeutic treatments, surgery, and less painful dental drilling.

Agricultural Uses and Limitations

Gases are effective insulators against passage of ultrasound, liquids are good conductors, and solids are still better. Since much of soil volume consists of microscopic pores that are usually filled with air or other gases, ultrasound moves poorly through the soil and has little effect on nematodes. Saturating soil with water increased ultrasound transmission, but effectiveness was still reduced. This was probably because sound energy is absorbed by the soil particles.

Because of power and equipment limitations, ultrasound cannot compete with the already developed and accepted field and greenhouse treatments with chemicals or heat. However, the removal or rapid destruction of nematodes on and just beneath the surface of plant parts that can be dipped in a tank for treatment may provide the answer to a serious need that has not been met by chemical or heat treatments.

Another intriguing possibility is control of nematode parasites in the blood stream of animals by circulation past an external or implanted ultrasound transducer. Many other practical and fundamental uses may be tried in future research.

Basic Information Learned

An important finding has been that frequency of ultrasound used is critical. Under test conditions, a frequency of 90,000 cycles per second killed and then disintegrated nematodes in less than a minute. Exposures to 20,000-cycle sound for 12 hours or more apparently had no effect, even at 10 times the energy required at 90,000 cycles. Yet, 20,000-cycle waves are routinely used to sterilize glassware and instruments.

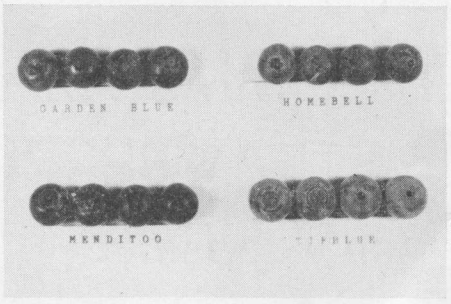
Strength of the ultrasonic field (corresponding to volume of regular sound) is important too. The stronger the field the quicker the effect on nematodes. Lessening of energy can be counteracted by increasing time of exposure, but only to a certain extent. A point is reached when the ultrasound is no longer harmful, even at the same frequency.

A particularly meaningful finding is that seed plants show no injury from lengthy exposures to the nematode-lethal frequency of 90,000 cycles per second. This indicates the possibility of using ultrasound to penetrate deeper into plant parts to destroy internally parasitic nematodes.

It has been reported that plant tissues can be harmed by high-frequency ultrasound. Apparently a frequency range around 90,000 cycles may be ideal—lethal to nematodes but harmless to plants. However, further information is needed to determine if this is the most effective frequency range.

Effects of 90,000-cycle ultrasound on nematodes follow a successive series of events. First to be noted is an increase in nematode activity, followed by a slowing of locomotion, spasmodic or twitching reactions followed by immobilization, then indications of organ disruption, death, and finally disintegration. The entire sequence may occur within a few seconds or take longer, depending on power of the ultrasound and exposure time.

Initial cause of death of nematodes is not necessarily visible disruption of their organs. The exact nature of ultrasound's lethal effects, particularly in complex organisms, is another problem of importance that is being investigated in the Auburn study.



A basket of Tifblue rabbiteye blueberries is at left and samples of varieties at right.

RABBITEYE BLUEBERRY for Alabama

J. L. TURNER and H. J. AMLING, *Department of Horticulture*

RABBITEYE BLUEBERRY, a true blueberry and native to southern Alabama, Georgia and northern Florida, will grow well in all parts of Alabama if properly cared for.

Improvement of the rabbiteye blueberry was started several years ago by the USDA and in cooperation with several state experiment stations. As a result, considerable improvement has been made in size, color, quality, plant characteristics, and yield. New selections of rabbiteye are superior to older native varieties and are well adapted for home use, and for local or wholesale markets.

The homeowner who is searching for exotic plant material for landscaping will find the attractiveness and colorfulness of the improved rabbiteye blueberry adapted for use in many places around the home where a husky cane-type plant is preferred, keeping in mind that the fruit produced is delicious. The home garden or orchard should include several plants of different varieties.

Tifblue, Homebell, Menditoo, and Garden Blue have performed very well at the Auburn University Agricultural Experiment Station in a 3-year-old planting and should be desirable for home use. Woodard is another promising variety being tested at Auburn. Menditoo is the largest fruited variety in the present planting. It will average ½ in. in diameter if properly pruned. Plants of Menditoo are not as vigorous as other varieties and tend to produce low 3- to 4-foot plants by the third growing season. Menditoo has good quality with a very attractive dark colored skin.

The variety Tifblue produces high yields of good quality berries with an attractive blue skin. Fruits of this variety average approximately ½ in. in diameter if properly pruned.

Homebell produces a light green colored plant that tends to become erect if not pruned. Although Homebell does not produce yields comparable to those of Garden Blue and Tifblue in the third growing season, the quality of this variety is outstanding. Fruit are large and dark colored.

These rabbiteye blueberries are growing on the Auburn Station.

Garden Blue produces the highest yields of the varieties tested. Fruit size is satisfactory and picking presents no problem. Fruits are light blue in color. Quality of Garden Blue is excellent. Garden Blue plants grow erect and spreading and are desirable for hedges around the home.

Yield records indicate that Tifblue and Garden Blue produce considerable fruit in the early season, whereas Menditoo and Homebell are somewhat later in maximum yields of mature fruit. At Auburn, Menditoo and Homebell have not set fruit as heavily as the other two varieties.

The homeowner should follow these steps to ensure success growing the rabbiteye blueberry.

Prepare a hole 2 × 2 × 2 ft. for proper root growth. Mix one-half peat and one-half topsoil for fill soil. No additional organic matter is necessary. Mulch with well-rotted sawdust to a depth of 8 in.

One-year field grown plants are desirable for transplanting and normally give satisfactory results. Set the plants the same depth as they came from the nursery, packing the soil mixture well around roots. Water thoroughly after setting. In order to develop good plant size, remove all blossoms the first year.

No fertilizer should be placed in the hole at the time of planting. Apply ½ lb. of 8-8-8 on top of the fill soil around the base of the newly set plant. Nitrate forms of N should not be used for fertilizing blueberries. Additional N can be supplied in June with ¼ lb. of diammonium phosphate or ammonium sulfate. Apply 1 lb. of either the second year in early spring. Continue to increase the rate by 1 lb. per year up to a maximum of 3 lb. per plant. It is not necessary to go above this rate. Sulfur can be used to lower the pH when necessary. Apply ⅛ to ¼ lb. around each plant and work into soil.

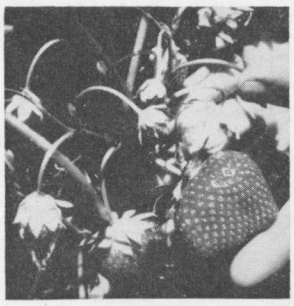
In most years supplementary irrigation will give increased yields and growth.

Pruning is essential if good yields of high quality berries are to be obtained. Blueberries naturally overbear. This results in small, poor quality berries and poor shoot and leaf development. Consequently, at least ½ of the flower buds should be removed by pruning back fruiting shoots during the winter. Most all twig-type shoot growth should be removed. A cone-pruning system should be used to cut back canes to ground level when they are 5 to 7 years old. In addition, all weak growing canes should be removed.

YIELD AND DATE OF HARVEST FOR FOUR BLUEBERRY VARIETIES, AUBURN, ALABAMA, 1962

Variety	Date of harvest	Yield per plant at first picking
		Pts.
Tifblue	6/26/62	6½
Homebell	6/26/62	3
Menditoo	6/26/62	2¼
Garden Blue	6/26/62	7⅔

COMMERCIAL STRAWBERRIES in Alabama?



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STRAWBERRIES ARE a potential money crop in many areas of central and southern Alabama.

Market values of strawberries during the prevailing harvest period of these areas have been excellent during the past 5 years. However, changes in current production and marketing practices must be made to realize such potential.

Every effort should be made to obtain the largest strawberry plant possible the year prior to fruiting. The following practices from results of experiments at the Auburn University Agricultural Experiment Station must be followed to obtain this objective.

Varieties – Plants of a given variety vary considerably when grown in different areas. Local adaptation should be determined by the individual grower. This is a standard practice in the strawberry growing areas of many states and should be adapted in Alabama. Varieties suggested for use in southern Alabama are Dixiland, Albritton, and Klonmore. Trial plantings of Dabreak, Headliner, and Pocahontas should also be made.

In central Alabama, Dixiland, Pocahontas and Albritton (on sandy soil only) are recommended with trial plantings of Dabreak.

Irrigation – Strawberries are shallow-rooted. Consequently, supplementary irrigation during the growing and harvest seasons is a must if high yields of good quality berries are to be consistently obtained. Sprinkler irrigation should be used to provide frost protection, a much needed practice in most areas of the State.

Weed control – A serious objection to strawberry growing has been the labor requirement for controlling weeds. New promising herbicides for annual weed control have been tested by the Auburn Station that decrease considerably the labor requirements in weed control. Two chemicals, Dacthal and Tillam have been registered for use on strawberries. Another herbicide, not yet cleared for use on strawberries, is Diphenamid. Perennial grasses as Bermuda and Johnsongrass must be eradicated by spraying with dalapon a year prior to planting strawberry plants.

Blossoms must be removed the first year after planting to induce early runner formation and early establishment of daughter plants. The earlier the daughter plants become established, the larger they will be by fall.

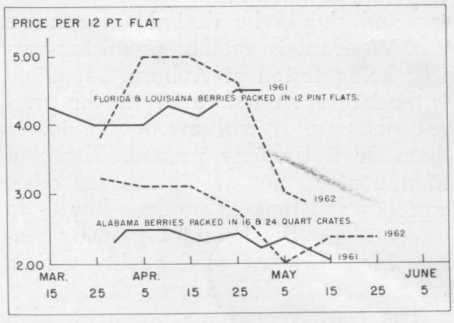
Daughter plants should be spaced no closer than 7 in. apart in the bed. Excess daughter plants should be removed.

Proper fertilizer practices allow sufficient nitrogen (N) to be available to the plant throughout the growing season. Soil applications supplemented by urea sprays will accomplish this. Critical periods in regard to N requirements of strawberry plants occur at the time of runner formation. This is in late spring and early summer, and when flower buds form in late summer or early fall. Since flower buds form only at various day lengths and temperatures, certain varieties in southern Alabama will respond to N applications applied in late fall and early winter by increasing the number of flower buds. Such applications are recommended for southern Alabama. However, considerable caution must be taken in central Alabama in applying N in the spring prior to fruiting. Applications of nitrogen should not exceed 15 lb. per acre of actual N. If proper management is maintained during the growing season prior to harvest, the nitrogen needs of the strawberry plant will be low during the fruiting season.

At the end of harvest the beds should be narrowed immediately to 8 in. and the fertilizer and chemical weed control programs started.

Strawberries are a highly perishable crop. Therefore, considerable effort must be made toward rapid removal of field heat by cooling immediately after harvest. This needs to be standard procedure if Alabama growers are to put a quality berry with good shelf life on the market.

Alabama strawberry growers should switch to the 12 pt. fiberboard tray container rather than continue to use the 16 or 24 qt. crate. Unit prices of Florida and Louisiana strawberries packed in 12 pt. fiberboard trays consistently were nearly double that of Alabama strawberries packed in 24 qt. crates during the same harvest period.



This chart shows the Birmingham market quotations for strawberries from March through late May for Alabama, Florida, and Louisiana berries packed in both the pint flats and quart crates.

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