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AGRICULTURAL EXPERIMENT STATION
GALE A. BUCHANAN, DIRECTOR

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DIRECTOR'S COMMENTS

COMMODITY ORGANIZATIONS are as varied as the products they represent. Despite their differences, however, each group can play a positive role in enhancing the scope and effectiveness of agricultural research.

In Alabama, several commodity organizations have made important contributions to research efforts of the Alabama Agricultural Experiment Station. We acknowledge and appreciate these contributions and look forward with keen anticipation to even more effective support of our research program in the years ahead.

GALE A. BUCHANAN

As noted in previous *Highlights* editorials, the mission of the Alabama Agricultural Experiment Station is specific and straightforward. That mission is to provide the research base for the most efficient utilization of the resources that go into agricultural production.

Two key elements of a sound, viable research program are (1) the identification of problems and the setting of their respective priorities, and (2) the providing of financial support needed to research the problems. Commodity organizations can be helpful in both of these.

Such groups can be especially helpful in identifying research problems. Their membership is comprised of individuals who are knowledgeable about a particular commodity and who have the most to gain from solving problems related to that commodity.

The role that commodity organizations can play in obtaining financial support for our research programs is not well understood. Two reasons probably account for this: (1) There is the human tendency to ask for something whether truly needed or not, and (2) commodity groups are not necessarily experts in the ways of promoting financial support.

In seeking a base of financial support for agricultural research, one must understand the significance of the research and how much it is going to cost. As the number of people who understand and appreciate agriculture continues to diminish, it becomes ever more critical for those involved in agriculture, and are knowledgeable about its many aspects, to be effective in selling agricultural research needs to the total population. The centerpiece of selling, of course, must be with members of legislative bodies at both state and national levels.

A direct way for commodity groups to provide positive support for research is through check-off monies. Several highly effective check-off programs in Alabama are making substantial contributions to our research programs on a continuing basis. Other commodity groups choose to make contributions on special occasions rather than a continuing basis. In any event, such contributions to our research efforts are important, enabling us to accomplish specific research objectives that would otherwise be neglected.

Commodity organizations are most effective when their ideas and suggestions are carefully developed and broadly representative of their membership. Furthermore, such input is best when conveyed directly and on a continuing basis. Participation of Auburn scientists and administrators in commodity meetings and participation of commodity members in Experiment Station field days and meetings provide excellent opportunities for interchange of information between the two groups. An occasional special meeting to bring commodity groups and Experiment Station scientists and administrators together also can be highly effective.

During this period of depressed state and federal funding for agricultural research, it is more important than ever that commodity groups play an even greater role helping the Alabama Agricultural Experiment Station to fulfill its mission. This office stands ready to meet and work with commodity groups to define problems and opportunities of mutual concern.

may we introduce . . .

Dr. Claude E. Boyd, professor, Department of Fisheries and Allied Aquacultures. Born in Hatley, Mississippi, Dr. Boyd attended Wood Junior College in Mathiston, Mississippi, received his B.S. and M.S. degrees in entomology from Mississippi State University, State College, Mississippi, and received his Ph.D. from Auburn University in 1966. He worked as an aquatic biologist with the Southeastern Water Laboratory in Athens, Georgia, and then returned to Auburn in 1971 as an associate professor after a 3-year stint as plant ecologist at the Savannah River Ecology Laboratory in Aiken, South Carolina. Dr. Boyd teaches courses in water quality while at the same time carrying on Station research in water quality management and pond hydrology.

Dr. Boyd is a member of Sigma Xi, Phi Kappa Phi, American Society of Limnology and Oceanography, Ecological Society of America, and American Fisheries Society. He is the author of many journal articles, station publications, and a book, "Water Quality in Warmwater Fish Ponds," published by the Station.

HIGHLIGHTS of Agricultural Research

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ON THE COVER: Harvesting was the final stage of an Experiment Station field study to determine time and fuel required for specific production practices for cotton. See corresponding story on page 5.

Liquid Fertilizers For Fish Ponds

CLAUDE E. BOYD, Department of Fisheries and Allied Aquacultures

FISH PONDS are normally fertilized by either broadcasting fertilizer granules over shallow water areas or by placing fertilizers on underwater platforms so water currents disperse the nutrients as they dissolve.

Recent studies show that less than 15% of phosphorus (the most important nutrient in pond fertilizers) in fertilizer granules dissolves while the granules settle through 6 ft. of water. The rest of the phosphorus dissolves while the granules lay on mud. It is rapidly absorbed by the mud and has little further value in increasing fish production.

Fertilizer granules applied on platforms do not contact mud, but the rate of nutrient release from fertilizers on platforms is slow. Liquid fertilizers, which are becoming quite popular in agriculture, are highly soluble; all of the phosphorus in them quickly dissolves so it may be rapidly absorbed by phytoplankton. Of course, any phosphorus not absorbed by phytoplankton will soon be adsorbed by muds and rendered essentially unavailable.

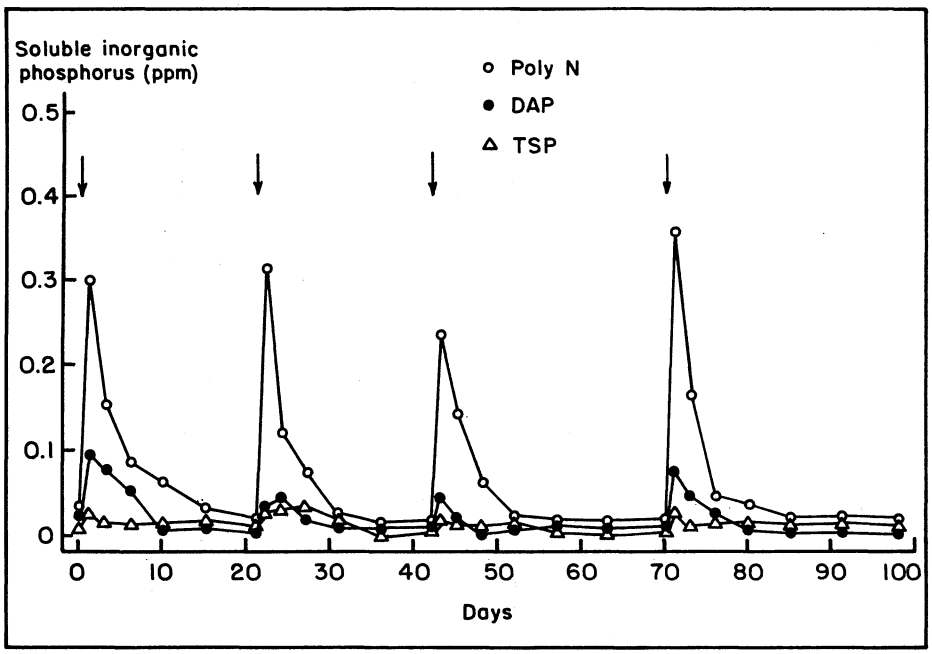
In the figure, a comparison of inorganic phosphorus concentrations in water following the broadcast applications of equal quantities of phosphorus in two granular fertilizers (diammonium phosphate and triple superphosphate) and a liquid fertilizer (Poly N®, Allied Chemical Company) shows that the liquid fertilizer is clearly superior in elevating phosphorus concentrations. Hence, the phosphorus from liquid fertilizer has a greater chance of being absorbed by phytoplankton and later increasing fish production than that from the granular fertilizers.

The effects on sunfish production of several fertilizer treatments in experimental ponds are summarized in the table. These findings demonstrate that fertilization will greatly increase fish production and that liquid fertilizers are effective in fish ponds. The greatest fish production was achieved with liquid fertilizer (13-38-0) at 20 lb. per acre per application. This rate was equal to 7.6 lb. of P_2O_5 per acre per application—about the same rate at which phosphorus was applied in granular 20-20-5 or 0-20-5. The lowest liquid fertilizer rate (1.9 lb. of P_2O_5 per acre per application) increased fish production to nearly three times that of the unfertilized ponds. Liquid fertilizers may be used at 2 to 4 lb. of P_2O_5 per acre per application in ponds with light or moderate fishing and at 8 lb. of P_2O_5 per acre application in ponds with heavy fishing. The application rate in gallons may be calculated as follows:
gallons of fertilizer per acre are equal to pounds of P_2O_5 per acre divided by (decimal fraction of P_2O_5 in fertilizer times weight of fertilizer in pounds per gallon).

PRODUCTION OF SUNFISH IN EXPERIMENTAL PONDS

Fertilizer treatment	Rate/acre/app. Fertilizer	Rate/acre/app. P_2O_5	Fish prod. per acre
	Lb.	*Lb.*	*Lb.*
None	0	0	100
20-20-5, Granular	40	8	321
0-20-5, Granular	40	8	287
13-38-0, Liquid	5	1.9	276
13-38-0, Liquid	10	3.8	281
13-38-0, Liquid	20	7.6	373

Each treatment was replicated four times and fertilizers were applied 11 times between mid-February and October.



Concentrations of inorganic phosphorus in ponds treated with either liquid fertilizer (Poly N®), diammonium phosphate (DAP), or triple superphosphate (TSP) at rates of 8 lb. of P_2O_5 per acre application. Arrows indicate application dates.

Liquid fertilizers may be sprayed over the shallow edges of ponds with either a small garden sprayer or a larger power sprayer. The fertilizer can be sprayed from readily accessible shoreline because it is not necessary to treat more than 25% of the shallow water edge. Liquid fertilizer may also be discharged from a small tube (¼- to ½-in. inside diameter) into the propeller wash of a gasoline or electric outboard motor as the boat is navigated over the pond. For ponds of 1 acre or less in area, liquid fertilizer can be diluted with water and splashed over the pond surfaces. Liquid fertilizer should not be poured directly into ponds because it is heavier than water and will flow to the bottom without mixing.

Presently, liquid fertilizers are not marketed in small, convenient containers for use in fish ponds. However, in areas where liquid fertilizers are sold for agricultural use, pond owners can furnish their own containers and purchase the desired volume of fertilizer. Liquid fertilizers store well for at least 1 year. After a few months storage, they become cloudy and some crystals form in the bottom of the container. However, this material is still suitable for pond fertilization.

Fumigation increased tree growth and early-year production of this peach orchard that was planted following two generations of peach trees at the Chilton Area Horticulture Substation.

Growth and Yield Response of Peaches From Fumigating New Orchards on "Short Life" Sites

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PEACH TREE SHORT LIFE, also called peach decline, has only recently been observed in Alabama. Research effort is already underway by the Alabama Agricultural Experiment Station to prevent this problem from developing into the serious one that it is in the older peach production areas of the Southeast.

The most obvious symptom of short life is the sudden death of peach trees shortly after spring growth begins. This is caused by cold injury to the cambial tissue, which disrupts translocation of plant nutrients and water. While cold injury is what ultimately kills the tree, such factors as diseases, nematodes, low fertility, low pH, and possibly toxins from roots of previous peach trees "set up" the trees for cold injury.

In the past, growers could expect an orchard planted on land which had not been in peaches before to last 15 to 20 years. Orchards planted following one or two generations of trees on the same land—a "short life" site—may live only 6 to 10 years.

Rootstock selection, pruning, subsoiling, fertilizing, liming, and fumigating are practices that have been reported to reduce or eliminate the short life problem. The Auburn research, begun in 1978 at the Chilton Area Horticulture Substation, is evaluating effects of lime sources and placement and soil fumigation on survival and performance of peach trees on an old orchard site.

The site chosen for the study has had two consecutive generations of peach trees. The second generation was planted in 1959 and removed in 1977. Lime and fumigation treatments were established in the fall of 1977 and the orchard was planted the following spring.

Lime treatments were sufficient amounts of (1) hydrated, (2) calcitic, and (3) dolomitic lime to raise the soil pH to 6.5 in the top 10 in. of soil, and (4) sufficient dolomitic lime to raise the pH to 6.5 in the top 6 in. Initially, all plots received 1,000 lb. per acre of 10-10-10 incorporated into the top 10 in. of soil. All subsequent nitrogen was applied as calcium nitrate.

One-half of each lime plot was fumigated with DBCP prior to planting and repeated in spring 1979. The fumigant was applied 6 in. deep by the use of a fluted colter applicator with colters 12 in. apart.

Correll peach trees on Lovell rootstock were planted in spring 1978 on 20- x 20-ft. spacing with four trees per plot. Recommended fertilizer rates and control measures for insects, diseases, and weeds were used uniformly on all plots.

Trunk diameter and tree height measurements were taken in fall each year. Mature leaves from the mid-portion of the current season's growth were collected each year in June and analyzed for nitrogen, phosphorus, potassium, magnesium, and calcium. Fruit production began in the third leaf (1980) and yield data were taken in 1980 and 1981.

Soil fumigation had a dramatic effect on tree performance. Nutrient content of leaves from the fumigated plots was higher for most elements in the first year, but there have been few significant differences since. Trunk circumference of trees in the fumigated plots was 17% larger after the first year, 12% larger after 2 years, and 12% larger after the third leaf, see table. Fumigated trees also were taller during the first 2 years, but mechanical pruning masked any differences after the second year.

Yield differences from fumigation were striking. Trees on fumigated plots yielded 72% and 19% more fruit in the third and fourth leaf, respectively, than nonfumigated trees.

No differences in nutrient content of leaves, tree growth, tree survival, and yield at the end of the fourth leaf have shown up among the different lime treatments to date.

To date, no trees have been lost to peach tree short life in this study.

The cost of fumigation was more than recovered with increased yields during the first harvest year. Additional benefits from fumigation, and possibly from liming, are anticipated as the orchard gets older.

EFFECT OF SOIL FUMIGATION ON TREE PERFORMANCE OF CORRELL PEACH TREES

Year and treatment	Trunk circumference	Tree height	Yield per acre	Increase per acre from fumigation
	In.	*In.*	*Bu.*	*Bu.*
1978				
Fumigated	4.2	59.5		
Not fumigated	3.6	52.8		
1979				
Fumigated	9.3	119.4		
Not fumigated	8.3	109.0		
1980				
Fumigated	12.5	133.4	105	44
Not fumigated	11.2	131.0	61	
1981				
Fumigated			297	48
Not fumigated			249	
Cumulative				
Fumigated			402	92
Not fumigated			310	

Fuel requirements and machine time per acre were measured for each field operation in the cotton production system.

Fuel Requirements for Cotton Production

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SINCE WORLD WAR II, there have been frequent warnings, in the United States and elsewhere, about the uncertainty of the fossil fuel supply. Most of these warnings went unheeded until the OPEC embargo of 1973, an event that made the world, especially the United States, acutely aware of its dependence on petroleum as an energy source.

For the past 4 or 5 decades, fossil fuels were abundant and extremely low in cost compared with what could be accomplished in crop production by their use. The recent rapid price increase and uncertainty of supply have created economic pressures that demand a reexamination of our energy-intensive crop production systems.

Production costs of an acre of cotton have doubled in the last 10 years and fuel is an important part of that increase. Not only is the cost of fuel important to cotton producers, but adequate supplies are critical at the peak energy requirement periods of seedbed preparation, planting, and harvesting. If the farmer has an insufficient fuel supply during these critical periods, his total production may be severely limited. If he operates within a limited fuel supply, he must know the fuel requirements for all phases of production so he can budget his supply to that crop demand.

A field study, conducted at the Agricultural Engineering Research Unit, was initiated in 1980 to determine the time and fuel required for specific production practices for cotton. An 18.5-acre field of sandy loam soil, containing 300 rows (40-in.) ranging from 62 to 1,289 ft. in length, was used for the study. About 15% of the rows were less than 300 ft. with 42% being longer than 1,000. The turning area at the end of the rows was smooth and large enough to permit efficient turning with all machinery. A 60 h.p. tractor was used for all operations except insect spraying and harvesting. Travel speed for each machine was selected by an experienced operator depending upon type operation and soil and plant conditions.

Data were collected in 1980 and 1981 from the test area for a conventional 4-row production system consisting of stalk cutting, disk harrowing, moldboard plowing, bedding, bed conditioning, planting, cultivating, insect control, and harvesting. The above system required 21 machine trips across the field. Results from the test area are shown in the table.

The total fuel required for the production system studied was 11.02 gal. per acre. The two practices having the most influence on fuel requirements were seedbed preparation and harvesting. These two practices required 8.37 gal. of fuel per acre or 76% of the total fuel used. A total of 3 hours and 43.7 minutes of field time per acre was required to produce and harvest cotton. Productive time was 84% of the total field time with the remaining 16% used for support functions. These support functions included such things as machinery adjustments, filling hoppers and sprayer tanks, dumping cotton, and turning.

Data from other production systems will be collected in the future. Once this fuel data base is established for various cotton production systems, fuel use information will be available to aid farmers in budgeting their energy or fuel supply and in selecting energy efficient production systems.

FUEL AND TIME REQUIRED PER ACRE FOR PRODUCING COTTON

Operation[1]	Machine size	Machine speed	Time per acre	Fuel per[2] acre
	Rows	*M.P.H.*	*Min.*	*Gal.*
Cut stalks (rotary mower)	2-row	4.8	18.8	0.65
Disking (disk harrow)	10 ft.	4.8	13.7	0.71
Plowing (moldboard)	4 ft.	4.4	29.1	2.05
Bedding (disk bedder)	4-row	4.1	10.8	0.75
Condition beds and incorporate herbicide (roto-tiller)	4-row	4.3	11.8	0.78
Planting	4-row	4.3	13.2	0.34
1st cultivation (sweep)	4-row	3.3	11.8	0.27
Side-dress nitrogen (centrifugal)	8-row	4.5	7.2	0.17
2nd cultivation (sweep)	4-row	4.4	9.9	0.24
Post-directed spray	4-row	4.3	11.1	0.26
3rd cultivation (sweep)	4-row	6.0	6.8	0.24
Insect spraying 8x	12-row	5.8	22.3[3]	0.48[3]
Cotton harvest (first picking)	2-row	2.9	31.0	2.05
Cotton harvest (second picking)	2-row	3.1	26.2	2.03
Totals			3 hr. 43.7 min.	11.02

[1]60 h.p. tractor for all operations except insect spraying and harvest.
[2]Gasoline for insect spraying, all others diesel.
[3]Eight applications per season.

Soybean Stem Canker: A Serious Disease In Alabama

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SOYBEAN STEM CANKER, a disease caused by the fungus *Diaporthe phaseolorum* var. *caulivora,* has been found in soybeans grown from Canada to the Gulf of Mexico. However, until recently severe losses from this disease had not been observed in Alabama. In 1977, several thousand acres of soybeans in Montgomery county were infected with this fungus and severe crop losses occurred. This region of Alabama was severely drought-stressed at the time, which probably contributed to the severity of the disease. No further outbreaks of the disease were recorded until 1980.

During the 1980 and 1981 seasons, stem canker occurred throughout the Black Belt counties of central Alabama, as well as several river bottom areas adjacent to this zone. Severe outbreaks were also reported in Mississippi's Black Belt and adjacent areas. In both 1980 and 1981 severe drought stress was recorded throughout central Alabama and Mississippi.

Symptoms of the disease are small reddish-black lesions originating typically in the leaf axils, becoming black, sunken, and elongate on the stem. As the disease becomes severe, plants typically show chlorosis (yellowing) between leaf veins, followed by death of the interveinal tissue and chlorosis near the veins. In advanced stages of the disease, the plant dies. Whole fields were frequently destroyed as a result of this disease.

Research from several regions of the country indicates that stem canker is seedborne and that this is the primary method by which the disease is introduced into new fields. Once established, the fungus survives from season to season on crop debris.

Experiments have been conducted for the past 2 years to evaluate varieties for resistance as well as chemicals for control of the disease. Disease control using fungicides, table 1, are encouraging based on 1980 results.

These data indicate that performance of the registered fungicides was poor, but that the addition of Penetrator® (oil-surfactant blend) improved overall performance. Applications were made at intervals presently recommended for fungicides applied to soybeans.

Varieties differed significantly in stem canker ratings, table 2. Tracy M and Tracy were most resistant (agreeing with data from Mississippi); several other varieties were rated as good as Tracy M, but multi-state data are not yet available to confirm these observations. A large group of varieties had intermediate levels of resistance (ratings between 1.5 and 2.3), while ratings greater than 2.4 indicate that severe losses can occur. It should be emphasized that disease severity within varieties can vary from year to year and location to location, and only the most resistant varieties can be expected to be tolerant to stem canker under the broadest range of conditions (see Coker 156 in table 1 vs. table 2).

Several strategies are available to farmers who are growing soybeans in areas with a history of stem canker: (1) deep turn the soil in the fall to bury crop debris in those areas where the disease has occurred and that will not be damaged by erosion; (2) *do not* plant seed from infested fields; and (3) plant the most resistant varieties available.

Preliminary research suggests that additional benefits *may* be gained by: (1) fungicidal seed treatments of seed from unknown seed sources, and (2) the use of Benlate plus Penetrator whenever farmers in infested areas plan to use foliar fungicides on their soybeans. Research is presently being conducted to determine the benefits of seed treatment and to better identify fungicides and times of application that will lead to the control of stem canker in soybeans.

This research was supported in part by a grant-in-aid from the Alabama Soybean Producers Association.

TABLE 1. CONTROL OF STEM CANKER USING FUNGICIDES APPLIED BY GROUND SPRAYER TO COKER 156 SOYBEANS, 1980

Fungicides[1] (rates/acre)	Stem canker[2]	Yield bu./acre
1. No treatment	3.9	17.2
2. Benlate 8 oz.	3.7	17.9
3. Benlate 8 oz. + Penetrator	2.3	21.2
4. Mertect 340F, 8 fl. oz.	3.5	18.5
5. Mertect 340F + Penetrator	3.2	19.6
6. Bravo 500, 3 pt.	3.3	17.1
LSD (P = 0.05)	0.6	NS

[1]All fungicides applied at ¼ in. pod and 17 days later, Penetrator use rate changes with spray volume.

[2]Rated 1-5, where 1 = no disease and 5 = all plants dead.

Soybean stem with typical stem canker symptoms.

TABLE 2. STEM CANKER RATINGS MADE ON SOYBEAN VARIETIES ON TWO SOILS AND TWO PLANTING DATES AT BLACK BELT SUBSTATION, 1981

Variety maturity	Ratings[1] by soil and planting dates		
	Planted May 12		Planted June 2
	Vaiden clay	Sumter clay	Sumter clay
VI			
Tracy M ...	1.0	1.0	1.0
Tracy	1.5	1.0	-
RA 680	1.0	1.0	-
McNair 600	1.4	1.0	-
Coker 156 ..	1.3	1.3	1.7
Davis	1.5	1.0	2.5+
Centennial ..	2.0+	1.3	1.5
Terra Vig 606	2.0+	1.3	-
Deltapine 506	2.0+	1.8	-
Deltapine 416	2.0+	2.8+	-
Lee 74	2.5+	1.8	-
Brysoy 9 ...	3.0+	2.3+	-
R A 604 ...	2.5+	3.5+	-
VII			
Braxton	1.5	1.0	1.3
Wright	1.5	1.0	1.6
Coker 317 ..	1.5	1.5	-
Ransom	2.0+	1.5	1.5
A P 70	2.0+	2.0+	2.3+
Ga Soy 17 ..	2.0+	2.0+	1.9+
Bragg	2.0+	2.3+	3.2+
Wilstar 790 .	2.0+	3.3+	3.3+
Brooks	3.0+	2.8+	-
Coker 237 ..	3.0+	2.5+	3.4+
R A 701 ...	4.0+	2.5+	-
Terra Vig 708	2.5+	2.5+	3.2+
VIII			
Cobb	1.5	1.8	1.4
Coker 488 ..	1.0	1.3	1.6
Dowling ...	1.5	1.0	1.2
A P 70	1.5	2.3+	-
Foster	2.0+	1.3	-
Coker 338 ..	3.0+	3.5+	3.1+
Hutton	3.5+	2.8+	3.6+
R A 800 ...	4.0+	2.5+	-
LSD .05 ...	1.0	0.9	0.8
C.V. %	25	25.4	26

[1]Rating for disease: 1 = none found to 5 = very severely infected. Values with + following are significantly more susceptible as compared to Tracy M.

Significance of Agricultural Exports

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THE 1960's were marked by large commodity surpluses in this country which kept farm prices low into the 1970's.

However, demand for farm products increased fairly rapidly in some countries as incomes increased. World crop production in 1972 was short and excess grain stocks decreased and at the same time the volume of U.S. agricultural exports increased. They almost doubled from 1973 to 1974 and have continued to increase.

Therefore, U.S. agriculture has come to depend to a greater extent on foreign markets. This presents some important questions. Just how important are exports to farmers? How much of our land area is being used to produce for exporting? What is the significance of the growing trend in farm commodity exports to the overall economy?

Ag Exports Increase

In 1970, the U.S. exported $7.3 billion of agricultural products, see table. By 1979 this figure increased to almost $35 billion and in 1980 was $41.3 billion. Thus, exports in recent years were almost six times, in terms of dollar value, what they were in 1970. Total domestic exports of all products for the U.S. have also increased during this time period. The proportion that agricultural exports are of total exports has not changed greatly. Concessional exports under government-financed programs in calendar year 1980 declined.

Major increases in quantity of agricultural exports have not been uniform for the major farm products. Greatest increases in exports since 1970 have been registered for meat and meat products, poultry and poultry products, grains and feeds, vegetable oil and oilseeds, fruits and vegetables, and cotton and linters. A decline has occurred in the export of dairy products since 1970.

Japan was by far the major country for our agricultural exports in 1980 with purchases of over $6 billion. Japan accounted for 15% of total U.S. farm-produced exports. Other major countries that bought U.S. agricultural exports were the Netherlands, Soviet Union, Canada, Federal Republic of Germany, Republic of Korea, and United Kingdom. Rising incomes in developing countries have made increasing purchases possible.

In 1980, leading markets for U.S. agricultural products shifted significantly. Sharp increases in exports to Mexico and China more than offset a decline from suspension of sales to U.S.S.R. However, Japan continued to be the leading market followed by West Germany.

U.S. Share of Exports

Not only have U.S. agricultural exports increased in recent years, but our share of world agricultural exports has grown. The U.S. share of world agricultural exports grew from 12.7% per year in 1951-55 to 16.6% per year in 1975-79. The U.S. accounted for almost three-fourths of the increase in total world grain exports between 1970-72 and 1977-79, about one-half of the increase in world wheat exports, and 85% of the increase in coarse grain exports. It is estimated that at present the U.S. accounts for somewhat over 50% of world grain exports, almost 40% for wheat, and more than 60% for coarse grains.

With increasing exports, the acreage used to produce crops and export products has advanced. In 1970, USDA reported that 72 million acres out of a total of 293 million acres of cropland harvested, or 25% were used to produce farm exports. In 1979, one-third of our cropland harvested acres was used to produce exports.

In recent years, exports have taken a major share of total production for certain crops. For wheat, exports have accounted for about 58% of production, for soybeans 40%, for cotton 51%, for corn 33%, and for grain sorghum 33%.

Benefits

From the standpoint of the contributions made through exports, the American farmer with his high level of efficiency and productivity has made this country the breadbasket of the world. Agriculture is one of the few remaining industries that can compete successfully with producers in other parts of the world.

Agricultural exports have also made a tremendous contribution to the U.S. balance of trade. Since 1967, the agricultural sector has been the principal source of earnings from trade. In the markets for nonagricultural goods and services, more has been spent than earned since 1968. Thus, agricultural exports have made it possible to finance increasing deficits in markets, in particular to increase the imports of oil.

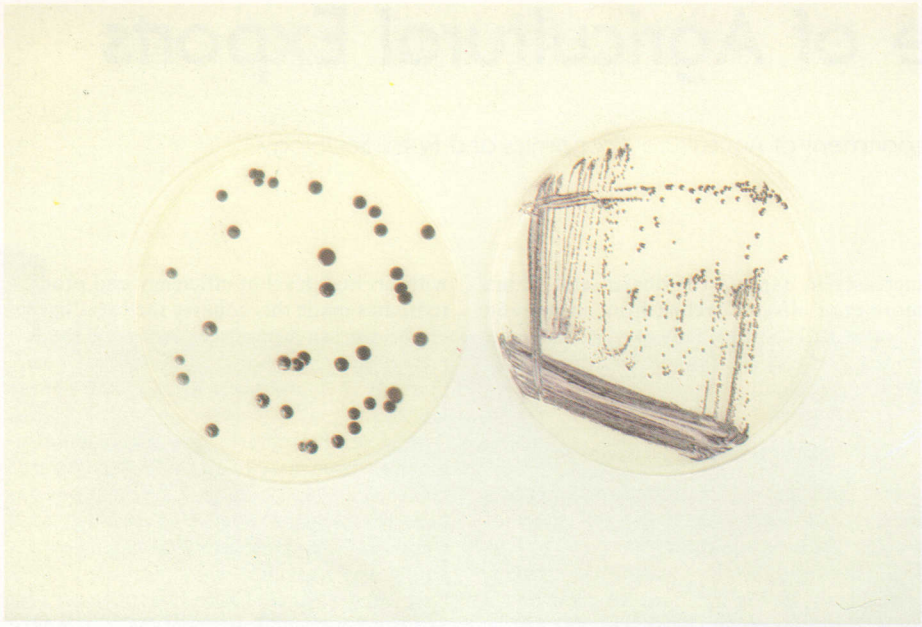
Farm product exports not only have benefited farmers, but they have also generated employment, incomes, and purchasing power in the nonfarm sectors.

As the U.S. has become more involved in world trade, it has also become more vulnerable to changing world conditions. Farmers must not only take into account what happens domestically, but they must keep up on world conditions affecting agriculture. Price instability in grain markets has risen in the past several years. International shifts in supply and demand conditions, changes in foreign government policies, and fluctuating exchange rates influence the farm sector. In total, they also have their effects on the domestic economy. This situation must be taken into account in our food and agricultural policy.

In summary, our highly efficient and productive agriculture has not only the opportunity to continue to contribute to our balance of payments and provide a dependable supply of wholesome food for the American consumer, but also the potential for improving the lot of mankind.

VALUE OF TOTAL EXPORTS, AGRICULTURAL EXPORTS AND AGRICULTURAL IMPORTS, U.S., SELECTED YEARS

Year ending June 30	Total exports	Agricultural exports		Agricultural imports	Excess of agricultural exports over imports
		Total	Percentage of total		
	Mil. Dol.	*Mil. Dol.*	*Pct.*	*Mil. Dol.*	*Mil. Dol.*
1965	27,135	6,229	23	4,087	2,142
1970	42,590	7,259	17	5,770	1,489
1975	106,218	21,884	21	9,310	12,574
1976	113,128	22,997	20	10,992	12,005
1977	118,944	23,636	20	13,439	10,197
1978	141,154	29,384	21	14,805	14,579
1979	178,578	34,745	19	16,725	18,020
1980	216,592	41,256	19	17,366	23,890



Violet pigmentation of colonies of *Chromobacterium violaceum.*

Chromobacterium violaceum: An Opportunistic Pathogen Associated with Animal Wastes

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IN LATE SUMMER of 1978, a Kentucky youth contracted a rare infection while vacationing with his family in Clearwater, Florida. Three-year-old Matthew Carey was suddenly struck by a high fever, and following hospitalization for 6 days in Fort Pierce, Florida, was transferred to the University of Kentucky Medical Center where treatment was continued.

Cultures from blood and material from the throat grew a Gram-negative (by the Gram-stain procedure) rod-shaped bacterium which showed purple or violet colonies on growth media and was subsequently identified as *Chromobacterium violaceum.* Disease symptoms were a fever of 105° F, large skin lesions, swollen index finger (later amputated), lesions in the lungs and liver (as revealed by X-rays), pneumonia, and diarrhea. The patient also developed a bone infection (osteomyelitis) in the left knee after 25 days; following drainage of the knee abscess from which the bacterium was isolated, the patient responded to the massive dosage of antibiotics (chloramphenicol, gentamicin, carbenicillin, ticarcillin) he had been receiving. The patient was discharged after 55 days of hospitalization.

This incident is one of the most thoroughly documented cases of chromobacteriosis. More recently (January, 1981), the Morbidity and Mortality Weekly Report (Center for Disease Control, Atlanta, Georgia) presented a similar case in Tampa, Florida, in which a 49-year-old man (a near-drowning victim 6 weeks prior to symptoms) was hospitalized for 4 weeks with chromobacteriosis before recovering.

Resistance of *C. violaceum* to several antibiotics emphasizes the importance of rapid diagnosis. Isolates of *C. violaceum* screened by the authors have demonstrated resistance to the penicillins, including carbenicillin, which is frequently used in treatment of Gram-negative infections. The organism is sensitive to tetracycline, chloramphenicol, streptomycin, and gentamicin. Gentamicin is commonly used to treat chromobacteriosis, but the authors have observed spontaneous mutation of isolates to gentamicin-resistance, which may account in part for the longevity of reported infections.

Fewer than 30 cases of chromobacteriosis have been reported in humans since the first report in 1927. Infections have occurred in Malaysia, Panama, West Africa, Vietnam, and France, with at least 10 cases reported in Southeastern United States. *C. violaceum* is very sensitive to refrigeration and may reflect its reported occurrence only in warm climates. Identification has been primarily based on the violet or purple pigment, see figure, of colonies of bacteria growing on a nutrient agar. Non-pigmented isolates have been recently reported and are usually misidentified by clinical laboratory technicians; thus chromobacteriosis may be much more prevalent and historically a greater problem than was once thought.

Several of the chromobacteriosis victims reportedly had previous contact with stagnant or polluted water, especially water which had received animal or feedlot wastes. Strains of *C. violaceum* were more often detected by enrichment downstream from farms discharging excessive wastes or having high organic runoff into the streams. Hog lots and lagoons receiving swine wastes may contain the organism, emphasizing the potential for infections in swine.

Chromobacteriosis was first reported in 1905 as causing septicemia in a water buffalo in the Philippines. Since that time, infections have been reported in swine, cattle, monkeys, dogs, cats, mice, and humans. In 1950, an outbreak was reported in Georgia which caused over 60 swine fatalities; however, the disease is not highly contagious, as cross-infection did not occur between infected and healthy pigs. Several zoos have also experienced sporadic cases of chromobacteriosis, and the source of infection was attributed to contaminated water or soil.

C. violaceum strains isolated from soil and water by the authors are not as virulent as clinical isolates from documented chromobacteriosis cases when tested in mice, suggesting that highly virulent strains in these environments may be uncommon.

Although systemic infections by *C. violaceum* are rare, the severity and high mortality rate for both human and livestock victims emphasize the importance of rapid diagnosis. The existence of strains which do not show the characteristic purple pigmentation is of concern to clinicians, and symptoms associated with the disease and/or the occurence of purple pigmentation by a clinical isolate, especially in the Southeast, should alert one to the possibility of infection by *C. violaceum.*

Prostaglandins in Human Milk

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Research Associate interviewing mother with baby.

PROSTAGLANDINS are hormone-like substances derived from dietary essential fatty acids — a type of polyunsaturated fat which the body needs for normal growth and development. Prostaglandins are produced by almost every tissue. As normal constituents in the body, they modulate a variety of physiological processes, including reproduction, kidney function, inflammation, immunity, and cardiovascular function. As powerful drugs, they are used for such problems as the synchronization of estrus in cattle and the healing of gastric ulcers in humans.

Recently, researchers in the Nutrition Laboratory in the Department of Home Economics Research, Alabama Agricultural Experiment Station have found that two of these compounds, prostaglandin E_1 (PGE_1) and prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) are present in human milk. The relationship between these compounds and the type of fat in the diet of nursing mothers has been investigated.

During the hydrogenation or hardening process of edible oils, the chemical structure of some of the fat is altered. Nonphysiological compounds called *trans*-fatty acids are formed. The production of prostaglandins in the body is thought to be inhibited by these *trans*-fatty acids found in hydrogenated fat. Thus, it was proposed that the type of fat in the maternal diet could influence the concentration of prostaglandins in human milk.

In the experiment supported by a USDA/SEA Competitive Grant, eight nursing mothers with 2-month-old babies were provided with food for two 5-day periods. The meals for one period were identical to those in the second period except for the type of fat they contained. Hydrogenated fats, such as margarine, shortening, and hydrogenated salad oil, were used in preparing the meals for one period; nonhydrogenated sources of fat such as butter, lard, and corn oil were used in preparing the meals for the other period. One-half of the subjects were given the diet prepared with hydrogenated fat first, while the other half were given the "nonhydrogenated" diet first. A 2-day period in which subjects could consume diets of their own choice was allowed between the two dietary periods.

Samples of milk were hand-expressed by each subject after the morning nursing on Day 1 through Day 5 of the two dietary periods. Milk samples were also taken on Day 6, the day following each dietary period. As shown in table 1, the *trans*-fatty acid content was much lower in the diets prepared with butter and other nonhydrogenated fats than it was in the diets containing margarine and other hydrogenated fats (1.0% vs. 11.8%). The human milk samples collected during the time the mothers were consuming these hydrogenated fat diets contained a higher level of *trans*-fatty acids than the milk collected during the period of nonhydrogenated fat consumption (2.2% vs. 6.1%). During the period of hydrogenated fat consumption, the amount of *trans*-fatty acids in the milk reflected the amount of *trans*-fatty acids in the diet of the mothers on the previous day.

TABLE 2. PROSTAGLANDINS IN HUMAN MILK DURING EXPERIMENTAL PERIODS

Prostaglandin	Period of nonhydrogenated fat consumption	Period of hydrogenated fat consumption
$PGF_{2\alpha}$ (pg/ml)	112 ± 15**	118 ± 10
PGE_1 (pg/ml)	147 ± 13	162 ± 14

**Values are mean ± S.E.M.

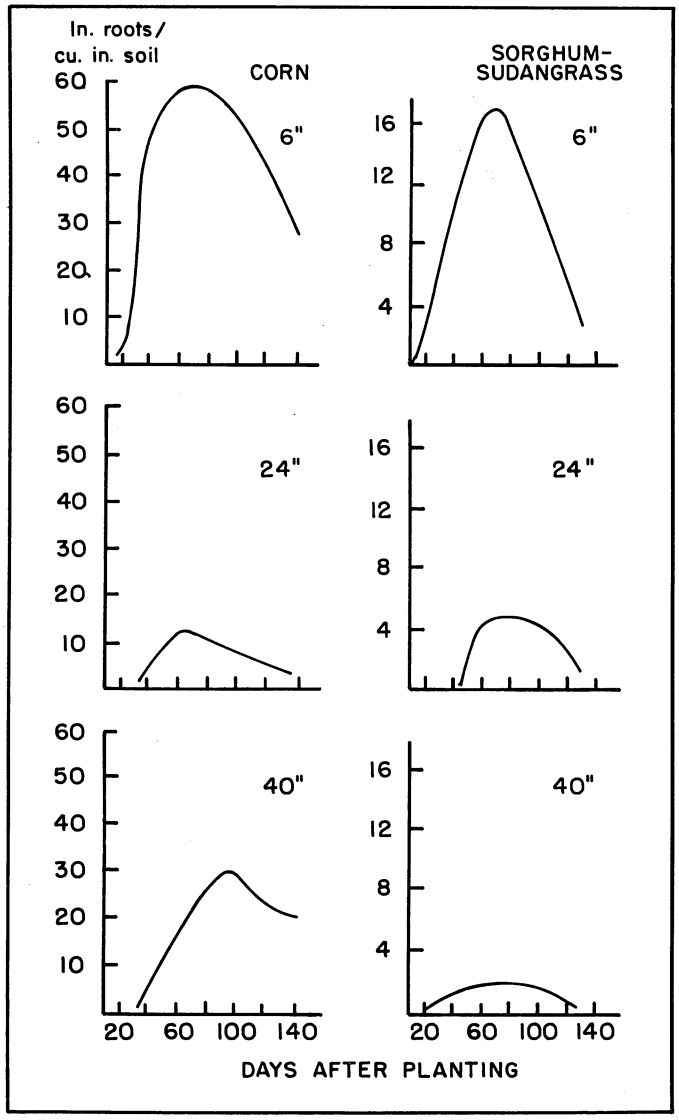
TABLE 1. TRANS-FATTY ACIDS (t-F.A.) IN THE MATERNAL DIET AND HUMAN MILK DURING EXPERIMENTAL PERIODS

Day of experimental period	Period of nonhydrogenated fat consumption		Period of hydrogenated fat consumption	
	t-F.A. in maternal diet	t-F.A. in human milk	t-F.A. in maternal diet	t-F.A. in human milk
	*Pct.**	*Pct.*	*Pct.*	*Pct.*
1	0.7	3.9	12.3	4.2
2	0.9	2.3	13.1	6.1
3	1.0	1.8	7.6	6.7
4	1.3	1.7	8.8	5.0
5	1.1	1.6	17.1	5.6
6	--	1.7	--	9.0
Mean:	1.0	2.2	11.8	6.1

*Trans-fatty acids given as percent of the total fatty acids in diet or milk.

The prostaglandins $PGF_{2\alpha}$ and PGE_1 were found in detectable quantities in the samples of human milk, table 2. No differences were found between the levels of either of these prostaglandins in relationship to the type of fat (hydrogenated vs. nonhydrogenated) in the maternal diet. Thus, *trans*-fatty acids in the amount normally consumed by nursing mothers do not appear to exert an influence on the level of prostaglandins in human milk.

Prostaglandins in human milk may play an important role in the gastrointestinal tract of the infant. Studies in which animal models were used indicate that prostaglandins can affect gastric secretions, gastrointestinal motility, and the absorption of certain nutrients. Thus, the presence of these active compounds in human milk may be another way in which nature provides for the proper nourishment of the breast-fed infant.



Root density of corn and sorghum-sudangrass at 6, 24, and 40 in. deep.

Roots Prevent Leaching

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MOST SOUTH ALABAMA SOILS of the Coastal Plain are coarse textured and low in organic matter and water-holding capacity—factors that favor leaching. The soils are also low in natural fertility, and high rates of fertilization are required for most crops to achieve economic yields. These factors combine to create a high potential for nutrient leaching. Furthermore, the subsoils are often sufficiently acid to be toxic to root growth or so dense as to physically prevent root penetration, or both. Consequently, rooting is often limited to the plow layer. As a result, the plow layer is soon depleted of most available water, and nutrient uptake is limited unless frequent rains occur or irrigation is applied.

Fortunately, an active deep root system can reduce leaching and increase fertilizer-use efficiency by taking up water and nutrients from deep in the soil and transporting them to the aboveground portion of plants. In fact, USDA-Alabama Agricultural Experiment Station studies indicate that maintaining an active deep root system can virtually eliminate nutrient leaching on soils like those used in the test. The results also indicate that adding needed fertilizer actually reduced leaching loss because root growth is stimulated and this increases uptake of nutrients.

Research in recent years has shown progress in increasing rooting depth, but little is known about the amount of roots necessary to prevent leaching. This question has been studied in the Auburn rhizotron where roots of plants growing outside can be observed through a vertical glass wall in the underground portion of the facility.

The soil used in these studies was a Marvin loamy sand (Ap—0 to 12 in., A2—12 to 28 in., and B—28 in. or more). Nutrient movement was monitored by analysis of successive soil solution samples taken at several depths every 48 to 72 hours during the growing season. Supplemental irrigation was applied as needed to maintain the soil near field capacity. Root measurements were made three times a week at depths of 6, 10, 16, 24, 32, and 40 in. Corn was the test crop in one study and sorghum-sudangrass in another.

When nitrogen was applied at 220 lb. per acre, corn roots took up nitrate before it reached 32 in. With 440 lb. of N used, the nitrate was removed before it reached the 40-in. depth.

Sorghum-sudangrass roots removed nitrate from the soil solution similarly to corn—before it reached the 40-in. depth at the rate of 440 lb. N per acre. There was one important difference, however, as shown in the graphs: The root density of sorghum-sudangrass was only about 30% as much as with corn. It is not known if a corn root density as low as that of the sorghum-sudan would have been as effective.

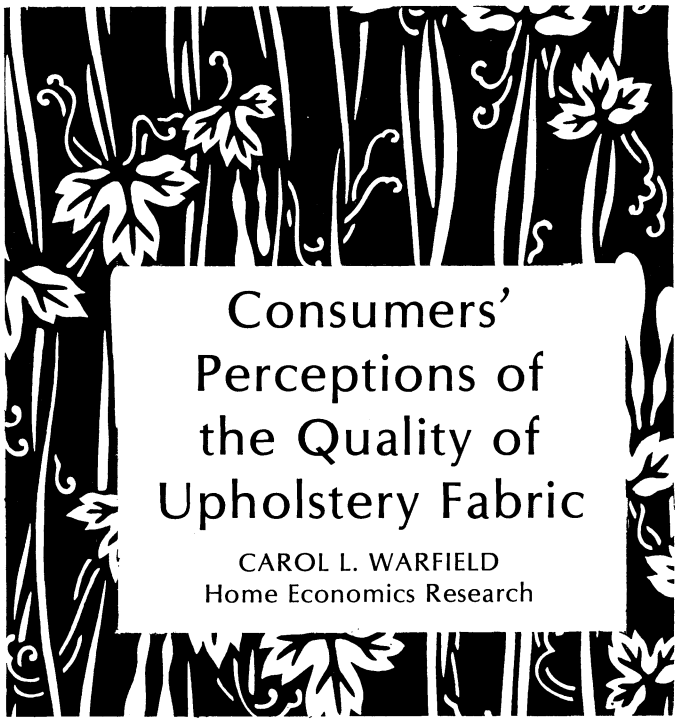
Root density differences between the two crops are believed to be due, at least in part, to the "turn over" time of sorghum-sudangrass roots in comparison with corn roots. Sorghum-sudan roots die and new ones form much quicker than do corn roots. Consequently, for the same number of roots at any given time, a greater volume of soil is exploited. The maximum density of roots 60 days after planting was 60 in. length per cubic inch of soil for corn, but only 16 in. per cubic inch with sorghum-sudan.

The corn roots did not do well in the A2 soil horizon, which had a pH of 5.0. This soil appeared to be slightly toxic to the corn roots and the maximum density was only about 10. Roots that got through the A2 increased in the B horizon. Sorghum-sudan roots were less affected by the A2 horizon and reached a maximum density of about 4.

When harvested at maturity, the aboveground portion of corn contained about 20% more N than was applied at the 220 lb. per acre rate, and about 75% as much as was applied at the 440 lb. rate. With sorghum-sudangrass, the aboveground portion contained about twice as much N as was applied at the 220 lb. rate and about the same as was applied at the 440 lb. per acre rate.

Uptake of potassium by sorghum-sudan roots was sufficient to prevent any appreciable accumulation of K at any depth. Uptake of calcium and magnesium was sufficient to virtually eliminate any leaching below 32 in. Under fallow conditions, increasing the N rate caused an increase in leaching of K.

Results of the Auburn studies indicate that nutrient leaching can be virtually eliminated on such soils by maintaining an active deep root system. Furthermore, crop fertilization does not necessarily increase leaching.



Consumers' Perceptions of the Quality of Upholstery Fabric

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Home Economics Research

A 1978-79 SURVEY of 235 homemakers in Montgomery and Elmore counties was conducted by the Alabama Agricultural Experiment Station in an attempt to find the answers to these questions. What is quality in upholstery fabrics? What clues can you use to evaluate upholstery fabric quality?

Personal interviews were used to determine whether consumers did perceive differences in quality among six cotton or cotton blend print upholstery fabrics. The fabrics differed in color and design, type of weave, thread count, weight, finish, and fiber content, table 1. Sample swatches of each fabric were mounted on white cardboard. These swatches were examined by each respondent. Labels on each contained information which would have been available to the consumer in a retail store. The respondents were asked for their perception of the quality of each fabric. They were then asked what clues or characteristics were used in making their judgments of quality.

Findings and Discussion

Respondents did perceive differences in quality among the six fabrics, table 2. All but one were rated as good or excellent in quality by 60-70% of the respondents. Fabric C, a plain weave 100% cotton, received a higher number of excellent and a lower number of poor ratings than did other fabrics. In contrast, the quality of Fabric E, a 50% polyester/50% cotton plain weave fabric, was rated as good or excellent by only 33% of the respondents.

The respondents were also asked, "what clues or characteristics did you use in making this judgment of quality?" Color and design-related clues to judging fabric quality centered primarily around whether or not respondents liked the fabric. The fact that few people liked the looks of Fabric E seemed to be the main reason for the low quality rating.

Many consumers indicated that fabric weight was a characteristic used in evaluating quality, with a heavier weight denoting higher quality. However, their perception of fabric weight does not appear to be very accurate. For example, 23 respondents indicated Fabric F was heavy while only 16 said Fabric B was heavy. Though Fabric F was firm and tightly woven, it was actually the lightest weight fabric while Fabric B was the second heaviest. Respondents may have thought of weight as primarily an indication of either closeness of the yarns in the fabric or fabric firmness, or both.

The information-related clues included label information about fiber content, finishes, care, and durability. In general, the respondents seemed to associate cotton with good quality. For those who took note of label information, Scotchgard, a stain repellent finish, was considered desirable. The terms vat dyed and preshrunk were also felt to be indications of quality. It must be noted, however, that approximately one-third of the respondents failed to mention any label-related information as indicators of fabric quality.

TABLE 1. PHYSICAL CHARACTERISTICS OF SIX UPHOLSTERY FABRICS

Physical characteristic	Fabrics					
	A	B	C	D	E	F
Fiber content	100% Cotton	50% Polyester/50% cotton	100% Cotton	100% Cotton	50% Polyester/50% cotton	100% Cotton
Thread count (yarns/inch)						
Warp	42	104	40	94	60	76
Filling	58	54	47	51	50	71
Type of weave	Plain	Sateen	Plain	Sateen	Plain	Plain (chintz)
Fabric weight (oz./yd.^{2})	6.5	7.1	5.9	7.3	5.8	5.0
Background color	Beige	White	Off-white	Green	Wine	Blues/-browns
Finish		Scotch-gard	Scotch-gard	Scotch-gard		Glazed, Scotch-gard

TABLE 2. FREQUENCY OF RESPONSES AND MEAN QUALITY RATINGS FOR CONSUMER EVALUATIONS OF SIX UPHOLSTERY FABRICS[1]

Fabric	Excellent	Good	Fair	Poor	Mean quality rating[2]
A	25	109	66	26	2.9
B	31	128	54	13	2.8
C	56	109	52	12	2.9
D	35	111	48	32	2.6
E	15	58	88	64	2.1
F	45	112	49	23	2.8

[1]The question was "How would you rate the overall quality of this fabric?"

[2]Quality was evaluated on the following scale: 4 = Excellent; 3 = Good; 2 = Fair; 1 = Poor.

Summary

This study points to some of the criteria people use in making judgments of quality and in differentiating among similar, but not identical, upholstery fabrics. Some people apparently did not use even the limited amount of readily available information on the label. This points to a need for increased effort in consumer education concerning quality features in upholstery fabric.

Residual Nitrogen from Alfalfa Adequate for Following Cotton Crop

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WHEN AN ALFALFA stand plays out, it still has a payoff left. It can be turned under to provide all the nitrogen needed for a cotton crop that follows.

That was a major finding in a rotation test by the Alabama Agricultural Experiment Station at the Tennessee Valley Substation. The test to measure the residual effect of nitrogen fixed by alfalfa was undertaken because of Alabama farmers' resurging interest in producing alfalfa. Cotton was chosen as the test crop because (1) it is a major crop in the Tennessee Valley, and (2) it is a non-legume and could therefore benefit from the residual nitrogen.

Test Following Alfalfa

An alfalfa field that had been harvested for hay the previous 3 years was turned in fall 1978. The following spring (1979) an experiment was begun consisting of three main treatments:

1. Cotton was planted the first, second, and third springs after the alfalfa was turned —1979, 1980, and 1981. Nitrogen rates of 0, 30, 60, and 90 lb. of N per acre were applied each year shortly after the cotton was up to a stand.
2. Corn was planted the first season after the alfalfa was turned, followed by cotton the second and third years. No nitrogen was applied to the corn, but rates of 0, 30, 60, and 90 lb. of N were tried with the cotton each year.
3. Corn was planted the first 2 years, followed by cotton in 1981. Rates of nitrogen were the same as for treatments one and two.

In the test, one-third of the area was planted to cotton in 1979, two-thirds in 1980, and the entire area in 1981. Plots not planted in cotton during 1979 and 1980 were planted to corn. The areas in corn were cropped uniformly each year, and no commercial nitrogen was applied.

Lime, phosphorus, potassium, and sulfur were broadcast prior to planting each spring, according to soil test recommendations. In addition, boron (B) was applied to the cotton each season at the rate of 0.3 lb. B per acre.

In mid-April of each year, acid delinted seed of Stoneville 213 variety were planted at the rate of 15 lb. per acre in 40-in. rows on the cotton plots. Corn plots were planted in early April to Pioneer 3369A at a spacing of one kernel every 6 in. in 40-in. rows.

Herbicides used for cotton each season were Treflan® at 1 pt. per acre applied preplant incorporated and Cotoran® 80W at 2 lb. per acre at planting. In 1981, cotton was treated with a post directed application of a tank mix of 1 lb. Caparol® plus 2 lb. of MSMA® per acre. The herbicide for corn was a broadcast application of AAtrex® 80W at 2.5 lb. per acre at planting. Cotton and corn were cultivated as needed each year. Five to 12 applications of insecticides were used each year for insect control, primarily lygus bugs and bollworms.

Effectiveness of residual nitrogen for 3 years after turning alfalfa is illustrated by the graphs showing results for 1979, 1980, and 1981. In 1979, the first year after alfalfa, any commercial nitrogen applied resulted in a decrease in seed cotton yields. Each higher rate of N caused a progressive yield decrease, so that the 90-lb. per acre rate produced almost 600 lb. less seed cotton than where no nitrogen was used. Thus, for the first year the residual nitrogen supplied sufficient nitrogen for cotton.

In 1980 there was a yield response to 30- and 60-lb. N rates. The 60-lb. per acre rate increased yield approximately 450 lb. of seed cotton. Obviously the residual nitrogen was not adequate for maximum yields of cotton by the second year following alfalfa.

Rotation Showed Advantages

The advantage of rotating cotton with corn is evident in the 1980 results. Cotton that followed corn consistently produced 130 to 220 lb. more seed cotton than where cotton was grown in 1979.

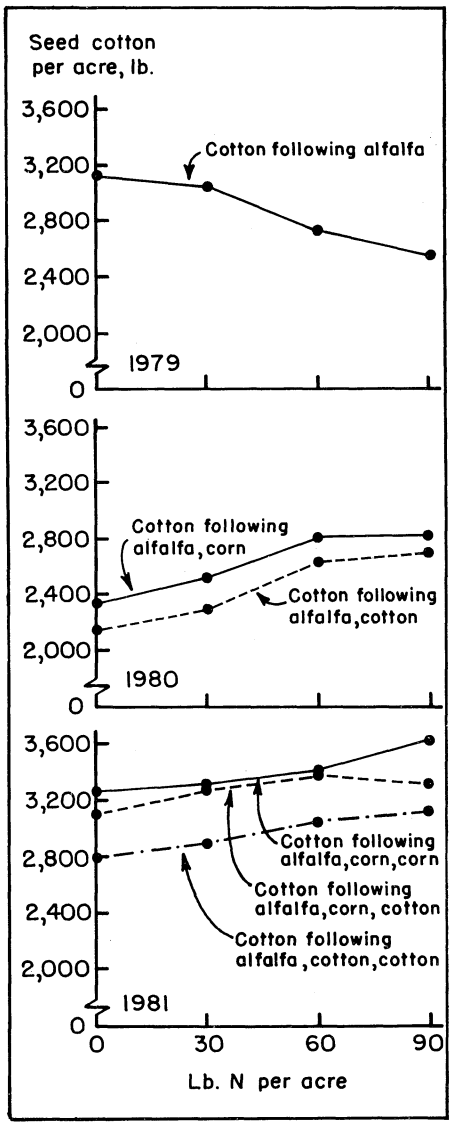
The same trends showed up in 1981, with one exception: Cotton that followed 2 years of corn and received 90 lb. of N per acre yielded almost 3,650 lb. of seed cotton per acre. This was 230 lb. more than from 60 lb. of N. Again, the benefit of rotating cotton with corn was evident. The third year of continuous cotton yielded 340 to 510 lb. less seed cotton per acre than cotton following 2 years of corn.

Corn yields without any commercial nitrogen were 96 bu. and 52 bu. per acre, respectively, in 1979 and 1980. The test was not designed to measure the effects of nitrogen fertilization of corn following alfalfa, but some general observations seem appropriate. Although the 96-bu. per acre yield is respectable, the corn exhibited nitrogen deficiency symptoms and probably would have responded to nitrogen fertilization the first year. By the second year, normal corn nitrogen rates are probably needed.

Results Summarized

Results of the tests can be summarized by the following conclusions:

1. In the clay loam soils of the Tennessee Valley, no commercial nitrogen should be applied to cotton the first year after turning an old alfalfa stand.
2. Most residual nitrogen from alfalfa is gone by the second year; consequently, normal nitrogen rates should be used for cotton.
3. Rotating cotton with corn results in increased yields over that of continuous cotton.



Farm Real Estate Values in Alabama

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MUCH INTEREST has been expressed in rural real estate value and the rate of appreciation in that value. Established farmers are interested because appreciation of real estate affects the costs of expanding farm units as well as making available finances for operation of the farm or purchase of additional land. Young farmers are interested because appreciation influences ability to purchase land. Investors are interested because it affects value of real estate holdings plus relative feasibility of alternative uses for their investment capital.

Average per acre farm real estate values in Alabama, as estimated by USDA, increased 291% during the last decade, from $239 per acre in 1972 to $935 per acre in 1981, figure 1. This change more than doubled appreciation experienced in the prior decade, 128%. Since 1960, value and rates of appreciation in value for Alabama closely approximated those noted for the U.S. However, they were generally higher during the latter decade. Relative to the neighboring states of Georgia, Mississippi, and Tennessee, rates of appreciation for Alabama during the last decade exceeded rates for Georgia (208%) and Tennessee (229%), but below Mississippi (333%). A similar relationship existed among the states for the last 5 years. Average real estate values for these states in 1981 were $915, $1,047, and $1,024 for Georgia, Mississippi, and Tennessee, respectively.

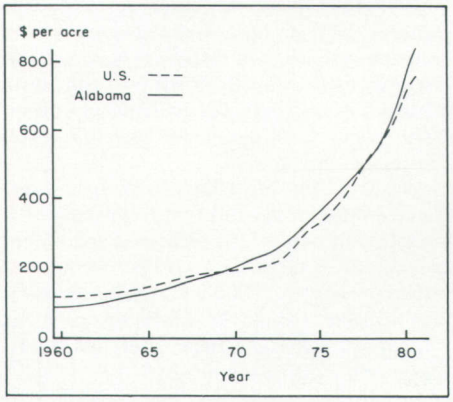


FIG. 1. Average value per acre of U.S. and Alabama farm real estate, 1960-1981.

Using the data presented in figure 1, rates of change in real estate values from the previous year were calculated, figure 2. Nominal or dollar rates of change in value were generally highest during the 1970's with 1973-74 evidencing the largest change of 30%. However, an analysis of appreciation in real estate values would not be complete without evaluating the impact of inflation. That is, did values increase more rapidly than the general price level or, alternatively, was farm real estate a viable hedge against inflation?

Assuming the Consumer Price Index (CPI) is an adequate measure of the general price level, it can be used to calculate real values of farm real estate. Appreciation in value of Alabama farm real estate exceeded the rate of inflation in all years since 1960 except 1974-75 when the real change in value was -3.8%, figure 2. While nominal changes in value were largest in the 1970's, real changes differed little between the two decades. Simple averages for the nominal rates of change were 9.1% and 15.5% while average real rates of change were 5.8% and 6.8% for the 1962-71 and 1972-81 periods, respectively. In absolute terms, real values increased 71% for 1962-71 and 86% for 1972-81. These percentages compare to the 128% and 291% changes in dollar values mentioned previously. Thus, appreciation in the value of farm real estate in Alabama has been sufficient to offset the effects of the general rise in prices plus provide a moderate real increase in asset value.

The changes in real estate values experienced in Alabama plus increases in the average size of farms operated in the State have resulted in substantially higher values for land and buildings per operating unit. Average values per operating unit increased to $203,000 in 1981, a 344% increase from the $45,700 estimate for 1972. This compared with a 293% increase for units in the U.S., from $87,000 to $342,000 per operating unit.

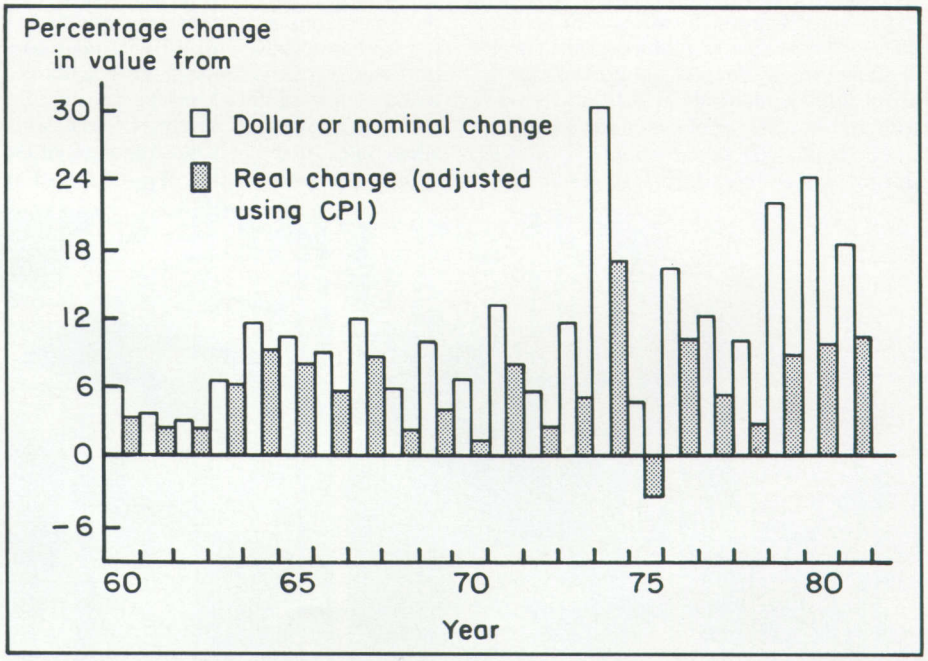
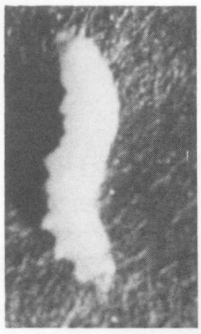
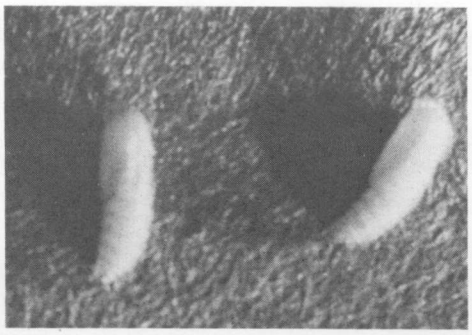


FIG. 2. Real and nominal changes in Alabama farm real estate values from previous year, 1960-1981.





FIGS. 1, 2, and 4. Attractive, marketable Virginia pine trees; the tip moth larva tunnels in and kills buds, tips, and twigs; the pine tip moth overwinters as a pupa inside twigs attacked the previous season.

Pine Tip Moth A Pest of Virginia Pine Christmas Tree Plantations

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PRODUCTION OF CHRISTMAS TREES for local and national markets is an industry of increasing interest and importance in Alabama and the South.

Attractive, marketable trees, figure 1, can be produced through intensive plantation culture of Virginia pine, a native southern species. Intensive culture includes planting, shearing/pruning to obtain desirable form, and controlling weeds, diseases, and insects. Among the insect pests, the common Nantucket pine tip moth represents a major ever-present problem for growers. The tip moth larva, figure 2, tunnels in and kills buds, tips, and twigs. This causes undesirable branching, figure 3, poor form, and discolored foliage at dead tips, resulting overall in unacceptable trees. Success in preventing tip moth damage depends greatly on recognition and knowledge of the insect's habits.

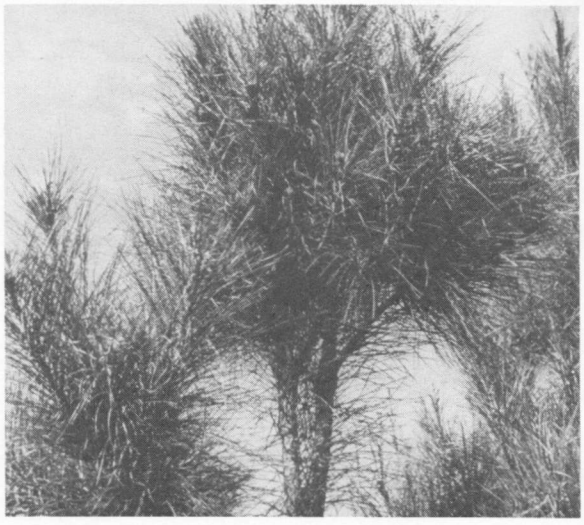
The Nantucket pine tip moth is inactive during winter, spending this period as a pupa, figure 4, inside of twigs attacked the previous season. The spring moth flight spans about 2 weeks, March 8-20 at the Auburn latitude, but may be 1 to 2 weeks earlier in south Alabama and correspondingly later in north Alabama. In the Auburn vicinity, 3 subsequent moth flights occur; late May - early June, late July - early August, and a light one in early September. This indicates that 4 generations per season are possible at the Auburn latitude.

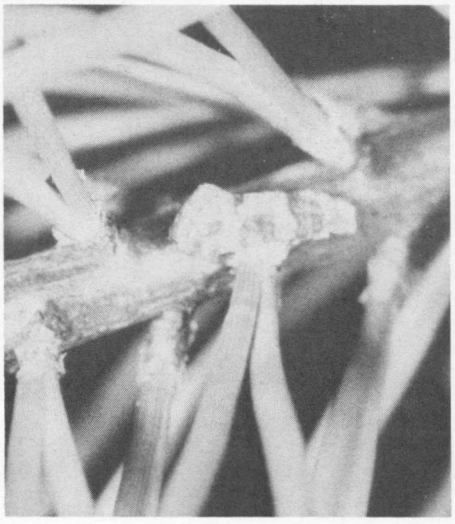
The adult moth, figure 5, is small, 0.2-0.3 in. long, with copper-red wings marked with irregular gray bands. Females lay small, flattened, oval eggs, primarily on needles near the needle sheath. In research conducted by the Alabama Agricultural Experiment Station, eggs were first found in the field about 2 weeks following initial moth emergence for the first flight and about 1 week after appearance of the first moth in each of the subsequent moth flights. Eggs hatched in about 14 days in the spring and in 7-12 days thereafter.

Newly hatched larvae often first mine in needles then tunnel into buds and twig stems where they complete development and pupate. At points of larval entry, usually at base of buds, whitish crusts of resin form, figure 6, giving external evidence of infestation. Length of the larval developmental periods is 4-6 weeks.

Much of the life cycle of the tip moth is passed inside buds and twigs, consequently, developing stages are protected from conventional insecticidal sprays. To obtain effective control with contact insecticides, applications should be timed to reach the vulnerable stages, i.e., newly hatched larvae, eggs, and ovipositing adults.

FIGS. 3, 5, and 6. Damage from the tip moth larva causes undesirable branching, poor form, and discolored foliage at dead tips resulting in undesirable trees; the adult moth is 0.2 to 0.3 in. long with copper-red wings marked with irregular gray bands; at points of larval entry, usually at base of buds, whitish crusts of resin form, giving external evidence of infestation.





Food Purchasing Practices and Dietary Adequacy of Single, Professional Women

ROBERT E. KEITH
SANDRA B. FOSS
Department of Home Economics Research

SINGLE-PERSON HOUSEHOLDS in the U.S. have increased in the last 20 years and will continue to increase. Single-person households spend a greater percentage of their incomes on food purchases. Food purchases made by these households have shown to differ from those of multiperson households. Food habits of females employed outside the home have also been studied. Employed females use more convenience foods, have a greater tendency to purchase time- and labor-saving devices, and have different preferences for certain food items than unemployed females. Previous studies have assessed the dietary adequacy of single, female college students. Investigators have reported low intakes of kilocalories, thiamin, calcium, and iron.

While knowledge does exist concerning food habits and dietary adequacy of single-person households, employed females, and single, female college students, it is not known whether this information applies to single, professional women. Investigators at the Alabama Agricultural Experiment Station have recently studied the food habits and nutrient adequacy of a group of 50 single, professional women from Anderson, South Carolina and Auburn and Opelika, Alabama. Forty-eight of the women held college degrees. Occupations included teachers, lawyers, pharmacists, and businesswomen. Each woman answered a food practices questionnaire and was given a 24-hour food recall used to estimate nutrient adequacy.

The average age was 26.5 years; height, 65.6 in.; weight, 124.5 lb. Years of formal education averaged 16.7 and annual income was $13,400. Ninety-four percent of the women were of normal/below normal body weight, yet 22% reported they were on diets to lose weight. Eighty-four percent of the females had daily physical activity patterns classified as light or moderate.

The food practices questionnaire revealed that most of the women purchased a major supply of groceries for at-home use 1-2 times per month. All major grocery purchases were made in a supermarket. These single, professional women made infrequent use of convenience stores.

The use of consumer aids while making major grocery purchases was surveyed, table 1. A majority of the women frequently used five of the possible eight aids. Making a food list was the aid most often used. Infrequent use of convenience stores and regular use of many shopping aids tended to indicate a high level of consumer awareness for this group of females. The level of consumer awareness was generally higher than for single-person households.

Away-from-home food practices were also studied. Subjects ate a total of 20% of their meals outside the home. Lunch was the meal most frequently consumed away from home (32% of the time) and breakfast the least (5% of the time). Most meals eaten outside the home were consumed in a sit-down/service restaurant. Fast-food restaurants and vending machines were infrequently used. When asked why they ate away from home, table 2, the subjects indicated they most often ate out because it was easier than cooking.

The estimated kilocalorie and nutrient intake and percentage of the 1980 Recommended Dietary Allowances (RDA) for the women are summarized in table 3. The average intake approximated or exceeded the RDA for all nutrients and kilocalories except iron and calcium. However, many of the subjects failed to consume two-thirds of the RDA for calcium, iron, vitamin A, thiamin, and kilocalories. Except for vitamin A, these are the same problem nutrients reported for single, college women.

Statistical correlations performed between the questionnaire and diet intake data revealed a negative association between eating lunch away from home and quality of the diet (as lunches increased, diet quality decreased). Poor food selection during lunch may be a possible explanation for the decreased quality of the diet.

The infrequent use of convenience stores and regular use of shopping aids indicated a high level of consumer awareness in this group of women. Approximately one-fifth of the meals eaten by these females were consumed away from home; lunch being most frequently eaten out. Most women patronized a sit-down/service restaurant for these meals. Diets of some of the women were found to be low in kilocalories, calcium, iron, vitamin A, and thiamin. Thus, while being good shoppers, food choices for this group of single, professional women may not have been appropriate for their nutritional needs.

TABLE 1. USE OF CONSUMER AIDS BY SINGLE, PROFESSIONAL WOMEN WHEN PURCHASING FOOD FOR AT-HOME CONSUMPTION

Consumer aid	Response	
	Frequently	Seldom
	Pct.	*Pct.*
Make food lists ...	88	12
Compare prices ...	82	18
Read labels	64	36
Purchase extra food on sale	60	40
Plan menus	56	44
Use food coupons .	50	50
Use newspaper ads	32	68
Shop multiple stores	28	72

TABLE 2. REASONS FOR AWAY-FROM-HOME PURCHASE OF FOOD BY SINGLE, PROFESSIONAL WOMEN

Reason	Frequently	Seldom
	Pct.	*Pct.*
Easier than cooking	52	48
Recreational activity	46	54
Change of routine .	46	54
Saves time	38	62
Eat out while shopping	36	64
Cheaper	8	92

TABLE 3. AVERAGE ESTIMATED DAILY ENERGY AND NUTRIENT INTAKES, AVERAGE PERCENT RECOMMENDED DIETARY ALLOWANCE (RDA) AND PERCENT FAILING TO MEET TWO-THIRDS RDA FOR SINGLE, PROFESSIONAL WOMEN

Item	Average intake	RDA	Respondents below 2/3 RDA
	Amt.	*Pct.*	*Pct.*
Energy	1,985 kcal.	99	44
Protein	72 g.	164	0
Calcium	644 mg.	81	48
Iron	12.1 mg.	67	46
Vitamin A ..	6,284 I.U.	157	44
Thiamin	1.0 mg.	101	36
Riboflavin ..	1.3 mg.	101	18
Niacin	17.5 mg.	135	6
Vitamin C ..	109 mg.	181	24

Auburn southernpea breeding research is aimed at developing varieties with resistance to blackeye cowpea mosaic virus disease.

Breeding Southernpeas for Resistance to Blackeye Cowpea Mosaic Virus Disease

CHARLES A. WALKER and OYETTE L. CHAMBLISS, Department of Horticulture

VIRUS DISEASES are a serious limitation to the production of southernpeas. Some varieties are so susceptible to viruses that complete crop failures may occur. Later plantings are more subject to attack than earlier ones. A major objective of the southernpea breeding program of the Alabama Agricultural Experiment Station has been the development of varieties resistant to one or more viruses.

Southernpea plants are often found infected with more than one virus. Some of these double infections are not serious, but there is a serious one that produces a disease called "cowpea stunt" that can cause severe yield reduction in certain varieties. This important double infection is caused by a mixture of cucumber mosaic virus (CMV) and blackeye cowpea mosaic virus (BlMV). The latter has been described as the most serious seedborne southernpea virus in the Southeastern United States.

No known southernpea variety is resistant to CMV. Therefore, resistance to cowpea stunt can only be found in varieties which are resistant to BlMV. In the Auburn tests, Worthmore, a variety that is resistant or tolerant to several viruses, was found to also be resistant to BlMV. Thus, it was used in subsequent breeding research.

To best utilize this BlMV resistance in developing new varieties, it was necessary to determine how the resistance is inherited. A cross was made between Worthmore and the susceptible variety California Blackeye (No. 5). Resulting F_1, F_2, and backcross progeny were screened for resistance in a controlled environmental chamber.

Leaf tissue of the susceptible variety California Blackeye infected with BlMV was used as the inoculum source. Infected trifoliate leaves were ground for making the inoculum, which was applied to primary leaves of seedlings being screened.

Inoculated progeny which developed virus symptoms were classified as susceptible. Those which showed no symptoms were tested further to determine if they were "carriers" of the disease. Leaf tissue from these progeny was then used to inoculate known susceptible seedlings. If these seedlings developed BlMV symptoms, the symptomless plants were rated as susceptible. Inoculated plants that remained symptomless and were not carriers were classified as resistant. The table summarizes the numbers of susceptible and resistant plants in the various generations derived from the cross between Worthmore and California Blackeye.

All of the California Blackeye plants showed symptoms of mosaic virus infection following inoculation. None of the inoculated Worthmore plants showed virus symptoms and none of the symptomless plants proved to be carriers. Thus, the parents used in the inheritance study were consistent in disease reaction.

Since all the F_1 plants and all backcrosses to the susceptible parent California Blackeye were susceptible, it was concluded that the BlMV resistance of Worthmore is recessive to susceptibility. The F_2 plants segregated in a ratio of 3 susceptible to 1 resistant, and the backcross of F_1 plants to Worthmore segregated in a ratio of 1 susceptible to 1 resistant. Thus, the resistance of Worthmore is controlled by a single recessive gene. Statistical analysis of data in the F_2 and backcross generations indicated that the ratios obtained were not different from those expected.

Auburn's southernpea breeding program is seeking to incorporate this resistance gene into varieties under development. The second cycle has been completed in the backcross program to transfer resistance from Worthmore to susceptible varieties Knuckle Purple Hull and Freezegreen. Resistant selections grown in field plots last summer exhibited good virus resistance, but additional backcrosses will be made to recover desired horticultural types.

SEGREGATION OF BLACKEYE COWPEA MOSAIC VIRUS REACTION IN SEEDLING PROGENY OF A CROSS BETWEEN CALIFORNIA BLACKEYE NO. 5 AND WORTHMORE

Variety and progeny	Number of plants observed		Ratio, susceptible to resistant[1]
	Susceptible	Resistant	
California Blackeye No. 5	29	0	1:0
Worthmore	0	29	0:1
F_1 progeny	59	0	1:0
F_2 progeny	333	97	3:1
F_1 X California Blackeye No. 5	80	0	1:0
F_1 X Worthmore	68	87	1:1

[1]Not significantly different from expected ratio.

Breeding Low-Tannin Sericea *for Resistance to* Foliar Disease

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Department of Agronomy and Soils

Dead leaves on sericea line at right is one symptom of disease caused by *Rhizoctonia* sp. apparent in comparison with plants at left that show no symptoms of the disease.

A FOLIAR DISEASE that showed up on low-tannin sericea plants several years ago added a new problem to research efforts to develop desirable low-tannin varieties. But the finding of genetic resistance among low-tannin plants shows that resistant varieties can be developed.

A severe buildup of the disease, caused by *Rhizoctonia* sp., occurred during 1969 on low-tannin nursery plants of sericea lespedeza (*Lespedeza cuneata*). The affected plants were being grown in the Alabama Agricultural Experiment Station project that is devoted to breeding low-tannin sericeas that would produce more palatable and more nutritious forage.

Normal, high-tannin sericea is resistant to the disease. But because of its high tannin content it is not readily eaten by livestock and supports poor animal performance.

Fungus Appeared on Foliage

The fungus causing the disease was first noticed just above the soil line on foliage of mature plants during flowering and on through full maturity stages. When there was high temperature and humidity, optimum conditions for disease development, the fungus grew up the stems, killing leaves and flowers but not the entire plant. Plants appeared to grow normally during spring following a severe disease buildup the previous summer and fall.

Resistance of low-tannin sericea to *Rhizoctonia* sp. was studied from 1969 through 1972. From 6,000 low-tannin nursery plants, 82 were selected that remained free of disease symptoms following the 1969 epidemic. Self-pollinated progenies of these 82 low-tannin plants and of 6 high-tannin entries (including Serala) were established in an experiment at the Plant Breeding Unit, Tallassee, in the spring of 1970.

The disease appeared on susceptible lines in August 1970. Lines that were susceptible in 1970 also were susceptible in 1971. High-tannin entries were always resistant to the disease. Serala had twice as much tannin as the mean of the low-tannin lines.

Rainfall, Humidity Involved

High rainfall and humidity occurred during July, August, and September 1969 and 1971 and during July, August, and October 1970. The disease was severe then, but in 1972 conditions were relatively dry during most of the summer and fall and there was little disease.

Disease severity varied widely among the 82 low-tannin lines during the 2 years, 1970-71, table 1. Some lines apparently had high levels of resistance, but most were susceptible. Since these 82 lines were developed from the 82 plants that were rated resistant in the 1969 nursery, the parent plants of the susceptible lines apparently escaped the disease in 1969.

When the 82 low-tannin lines were analyzed as three families (based on parentage), there were also differences in resistance among the families, table 2. These data indicate genetic differences among low-tannin lines and families for resistance to *Rhizoctonia* sp.

Since high-tannin sericea is resistant to the disease organism, the tannin apparently protects against the fungus. These results indicate that the genetic resistance among low-tannin plants is caused by a mechanism separate from tannin-induced resistance.

TABLE 1. DISEASE REACTION OF 82 LOW-TANNIN AND 6 HIGH-TANNIN SERICEA LINES FOR SUSCEPTIBILITY TO A DISEASE CAUSED BY *RHIZOCTONIA* SP., 1970-71 MEAN

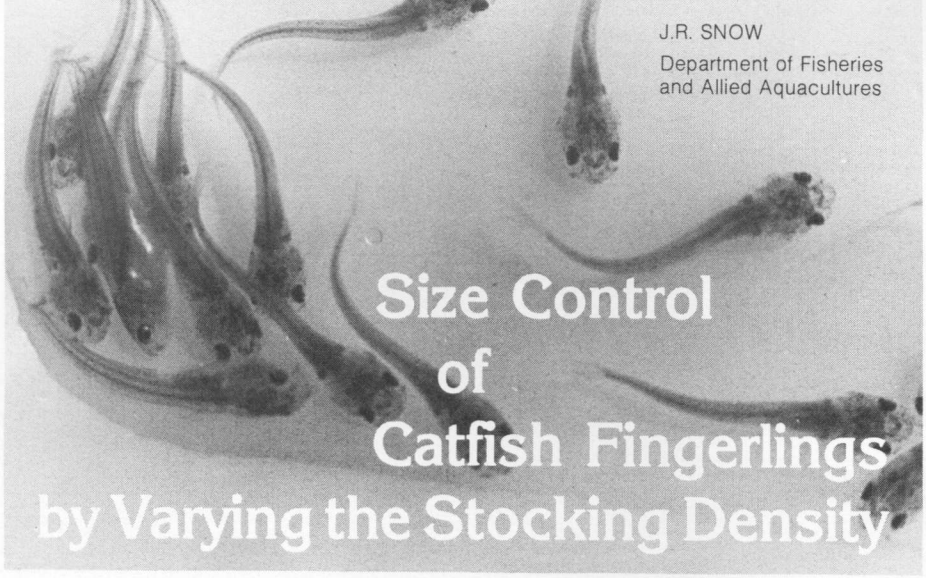
Two-year mean reaction[1]	Number of lines with same mean
High-tannin lines	
1.0	6
Low-tannin lines	
1.2	1
1.7	1
2.0	5
2.2	2
2.3	4
2.5	2
2.7	4
2.8	1
3.0	3
3.2	5
3.3	3
3.5	9
3.7	7
3.8	10
4.0	6
4.2	3
4.3	9
4.5	6
4.7	1

[1]Scale of 1.0 to 5.0, where 1.0 = no disease symptoms and 5.0 = severe symptoms.

TABLE 2. DISEASE RATINGS FOR THREE LOW-TANNIN SERICEA FAMILIES, 1970-71

Families	Lines per family	Disease rating[1]		
		1970	1971	1970-71 mean
1	17	2.9	2.6	2.8
2	55	3.7	3.4	3.6
3	10	3.6	4.4	4.0

[1]Scale of 1.0 to 5.0, where 1.0 = no disease symptoms and 5.0 = severe symptoms.



Size Control of Catfish Fingerlings by Varying the Stocking Density

J.R. SNOW
Department of Fisheries and Allied Aquacultures

AVAILABILITY OF A RANGE of sizes of channel catfish fingerlings permits a producer of market-size fish greater flexibility in the management of grow-out ponds. Small fingerlings (4-in. total length) require a full growing season (March-November) to reach market size when stocked at about 3,000 per acre and fed an adequate ration. Stocking with medium-size (6-in.) fish can shorten the grow-out period by 2 months while use of large (8-in.) fingerlings may reduce it another 60 days.

To have the desired size seed stock on hand when the grow-out pond is ready for stocking requires the producer to regulate growth so a specified size fingerling is ready according to a predetermined schedule.

Catfish fry grow rapidly when temperatures are in the favorable range and food is abundant. Figure 1 illustrates the rate of growth made by catfish in fertilized ponds on the Auburn Fisheries Research Station at a rate of 60,000 per acre and fed supplementally. At this light rate of stocking, some swim-up fry reached a total length of almost 3.7 in. in 6 weeks during June and July.

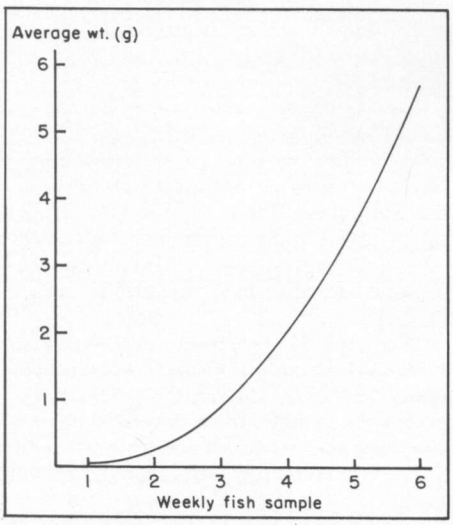


FIG. 1. Average growth rate of channel catfish fry stocked at a rate of 60,000 per acre and fed supplementally. Weekly sample was collected by seining and numbered 60 specimens.

Even at this low stocking rate, density had a noticeable effect on the rate of growth. Figure 2 depicts the size-density relationship in ponds stocked with 12-day-old fry. Differential survival of the stocked fry, which was related to management of the rearing ponds, enabled a picture of the effect of fish density to be obtained. The smallest fingerlings, 2.7 in. in length and 2.59 grams average weight, came from the pond with the highest numerical yield, 56,800 fingerlings per acre. The largest fish, 3.7 in. TL and 5.76 grams were obtained at a density of 7,200 per acre.

Stocking density for small fingerlings can be as high as 200,000 fry per acre to obtain a 4-in. fingerling in 90 days of feeding if rates as high as 40 lb. per acre per day can safely be used. Since individual fish growth rate decreases as density of stocking increases, more time is required at this density for fish to reach the desired size.

A substantial reduction in stocking density is needed to rear medium or large fingerlings. In a late summer-fall stocking trial at Auburn lasting 100 days, 3-in. fish showed a similar growth pattern to that in figure 2 when stocked at rates of 10,000, 25,000, and 50,000 per acre. Results of this trial are shown in table 1. Density of the 50,000 rate was reduced about 50% halfway through the 100-day period. At that time the fingerlings had grown to an average size of 5 in.

Catfish fingerlings make slow growth during the winter months at Auburn. The same ponds listed in table 1 were restocked in mid-November at rates of 10,000, 20,000, and 30,000 6-in. fingerlings per acre. Feeding was done at a rate of 1% of their body weight when water temperature was above 50° F. After 120 days the ponds were drained and the yields measured. Weight gain averaged 11.1% for the the lowest rate, 18.8% for the middle rate and 11.8% for the highest one. Feed conversion (S-value) averaged 4.9, 3.8, and 3.8 for the respective densities.

While these results show in a general way the relationship between density and size reached over time, some refinement in the rate of stocking along with a predictable rate of survival, comparable feeding rates and water temperatures will be needed to enable the producer to accurately schedule a specified size of fingerling to meet grow-out pond stocking needs.

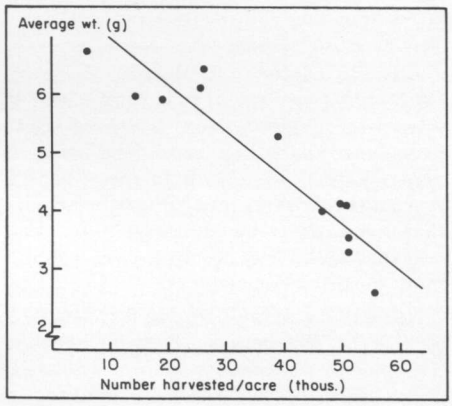


FIG. 2. Relationship between average harvest weight and the number of small channel catfish fingerlings harvested after 42-45 days growth from first feeding.

RESULTS OF STOCKING 3-INCH CATFISH AT 3 DENSITIES FOR GROWTH TO MEDIUM STOCKING SIZE DURING LATE SUMMER AND FALL OF 1980

Pond no.	Stocking/acre		Recovery/acre		Av. size lb./1000	Length, in.	Gain in wt. per acre per day (lb.)	Percent survival	Feed conversion (S-value)
	Number	Weight (lb.)	Number	Weight (lb.)					
15	10,000	91.1	9,190	1,267	137.9	7.9	11.9	91.9	1.47
25	10,000	80.0	9,260	1,104	119.1	7.6	10.2	92.6	1.72
29	10,000	81.1	8,860	1,051	121.1	7.6	9.7	86.8	1.82
13	25,000	202.2	23,420	1,944	77.3	7.0	17.4	93.7	1.62
17	25,000	201.1	22,460	2,210	98.4	7.1	20.1	93.8	1.37
27	25,000	199.1	22,960	2,063	89.8	6.9	18.6	91.8	1.21
16	50,000[1]	429.1	45,115	2,490	55.2	5.8	20.6	90.3	1.74
26	50,000	404.2	48,760	2,616	53.8	5.7	22.1	97.5	1.54
30	50,000	406.2	43,670	2,342	53.8	5.7	19.4	87.3	1.79

[1]Approximately 50% of the fish stocked were removed by seining after 50 days of growth. The number and weight removed are included in the totals.

Opportunities for Exporting Wood Products from Alabama

E.J. BIBLIS, Department of Forestry

INTERNATIONAL TRADE has become a powerful force in shaping the welfare and destiny of the United States. As recently as 10 years ago, exports and imports amounted to only 7% of the nation's gross national product (GNP). By 1975, trade had quadrupled and equaled 14% of the GNP. Current patterns of world trade, including trade in wood products, are the result of a complex interaction of country and regional cost advantages, tariffs, quotas, and transportation costs.

There has been a great demand for forest products in the world market. In 1979, the value of world exports of wood products was $45.6 billion (FAO, 1981). During the same year the U.S. exported forest products including pulp, paper, and paper products valued at $7.5 billion while at the same time imported forest products valued at $10 billion. Europe and Japan are the major foreign markets for U.S. wood and wood products.

It is an economic advantage to the U.S. industry that foreign markets seek out the higher grades, larger sizes, and thus high-value U.S. timber production. The United States imports average-value softwood lumber from Canada and low-value hardwood logs, veneer, and plywood from the Far East and South America. The benefits of foreign trade for the U.S. can be demonstrated by comparing the value-to-volume ratios between imports and exports. In 1979, the value-to-volume ratio for export sawnwood was 200, while for imports the ratio was only 100 (FAO, 1981). The export values of lumber are constantly higher than the import values by 48¢ per cubic foot (Bethel, 1975; Zivnuska, 1976).

The United States is a major net exporter of raw forest products (logs and chips) and also a major exporter of the more highly processed forest products, such as paper and paperboard. It is a major net importer of intermediately processed forest products, such as sawnwood, pulp, and newsprint. In addition, the United States is a net aggregate importer of hardwood products, particularly hardwood panels, while it exports similar softwood products.

In terms of wood imports value, Europe in 1979 was the world's largest importer market with 53% of the world's forest products imports. The European Common Market countries account for 37% of the world's imports, followed by Japan with 18% (FAO, 1981). Western Europe is also the U.S. South's best forest products export market, absorbing over 60% of total exports; the central American Caribbean region is the second most important forest product market for the U.S. South, consuming 18% of the total exports. The Common Market countries account for over 50 percent of southern pine lumber exports. Central and South America are the next most important market areas.

According to Wisdom (1978), the Southern United States has the potential of becoming a major supplier of the world's wood demands, especially to Europe and the Central America-Caribbean region. According to Darr (1978), Europe holds the most potential for expanded exports of Southern pine lumber and plywood.

In 1976, the South exported $472 million worth of woodpulp and $431 million of paper and paper products (Western Europe imported $90 million worth of paper and paper products while Mexico imported $29 million of paper products). In 1976, the South exported $70 million worth of softwood lumber (W. Germany, Spain, Italy); $11 million of hardwood lumber (Scandinavia, United Kingdom, and Italy); $14 million of hardwood logs (W. Germany, Italy); and $20 million in other wood products such as softwood logs, wood veneer, plywood, fiberboard, and pulpwood chips (Sedjo and Radcliffe, 1980).

The Southern United States has the opportunity to expand significantly its share of the rapidly expanding European and Caribbean markets.

Western Europe needs affordable substitutes for the fine exotic hardwoods (teak, rosewood, mahogany) it has become accustomed to for the last 25 years in manufacturing fine furniture and interior paneling. Their supplies of fine grain white oak are diminishing and European manufacturers welcome something different than their available species of beech and birch. Western Europeans have suddenly discovered the "beauty" of high quality (fine grain and clear) southern yellow pine for furniture and interior paneling.

It appears the opportunity exists for Alabama manufacturers of forest products (other than pulp and paper products and treated poles for which a good export market already exists) to increase sales through exports to Western Europe in the following: (a) high quality southern yellow pine lumber for fine furniture, interior paneling, decking, and railing, (b) high quality sweetgum, yellow poplar, and red oak lumber and veneer, (c) panel products, particularly southern pine sanded plywood with B faces for interior paneling; also southern pine plywood for concrete forms and roof decking, and medium density fiberboard (MDF) as core for furniture and doors, and (d) furniture that combines woods and fabrics.

Since cost of transportation constitutes a large percentage of the end price of wood product exports, the central American-Caribbean markets are of great potential importance to the South's exports. Presently, Venezuela has the largest market potential followed by Mexico in the future. Generally, Mexico's present demand for wood products is small. Venezuela with more expendable income and shortage of housing requires prefabricated wood houses, structural wood components for housing, structural plywood (particularly for concrete forms), treated lumber, and treated transmission and utility poles. Although Mexico has greater needs for housing, its expendable income is limited and it has high tariffs.

Alabama manufacturers of the described products, with an interest to explore opportunities for export, can obtain information and assistance from the following organizations: U.S. Dept. of Commerce, Washington, D.C.; U.S. Small Business Administration, Birmingham, Ala.; Alabama Office of International Development, Montgomery, Ala.; Southern U.S. Trade Association, New Orleans, La.; Southern Lumber Exporters Association, New Orleans, La.; and Alabama banks with an export department.

Kudzu control with three soil active herbicides compared in Auburn trials: left—Tordon 10K, 5 lb. active per acre; center—Banvel XP, 6 lb. active per acre; and Velpar 20G, 6 lb. active per acre.

Soil Active Herbicides for Kudzu Control Report Of A Screening Study

RICHARD MARTIN, Department of Forestry
JAMES H. MILLER, USFS George Andrews Lab

THE STANDARD TREATMENT for kudzu control, Tordon® 10K pellets, gives excellent control. But high cost of the material precludes its use on marginal agricultural land and for forestry purposes. Since a more economical control method is needed, the Alabama Agricultural Experiment Station is participating in a screening study to compare various herbicidal treatments.

Four Herbicides Tried

Four herbicides—two at single rates and two at two rates each—were applied in April 1980 to a site where kudzu had been growing more than 5 years. The six treatments (all given in active ingredients per acre) were:

1. Tordon® 10K pellets, 5 lb. (the standard control)
2. Banvel® XP pellets, 6 lb.
3. Velpar® 20G granules, 4 lb.
4. Velpar® 20G granules, 2 lb.
5. Spike® 20P pellets, 2 lb.
6. Spike® 20P pellets, 1 lb.

Kudzu Growth Measured

Effectiveness of the control treatments was determined by comparing the oven-dry weight of above ground kudzu growth. The measurements were taken in October 1980 on two 1-sq.-meter plots in each treatment plot.

Although some growth occurred when Banvel was used, results were almost as good as with Tordon. In fact, a statistical comparison showed no significant difference between Tordon and Banvel treatments. Banvel is of particular interest because regrowth was prevented until late summer, and it may prove to be an alternative to Tordon. With the pelletized formulation used, however, Banvel may be nearly as expensive as Tordon.

Velpar has been inconsistent in control of kudzu in other trials but results here indicate that higher rates may provide more consistent results. Pine has a high tolerance to Velpar so it may prove valuable for treatment of kudzu growing under pine stands.

KUDZU GROWTH DURING THE FIRST GROWING SEASON AFTER TREATMENT

Treatment, lb. active per acre	Oven-dry weight per acre	
	Range	Mean
	Lb.	*Lb.*
Tordon 10K, 5 lb.	0	0
Banvel XP, 6 lb.	431- 916	626
Velpar 20G, 6 lb.	244-3,098	1,421
Velpar 20G, 4 lb.	2,870-4,201	3,453
Spike 20P, 2 lb.	1,671-2,928	2,792
Spike 20P, 1 lb.	2,299-3,871	2,977

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