1947

Research in agriculture 1945-1946: annual report.

W G. Taggart

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Research in Agriculture

1945-1946

ANNUAL REPORT

AGRICULTURAL EXPERIMENT STATION
LOUISIANA STATE UNIVERSITY

AND

AGRICULTURAL AND MECHANICAL COLLEGE
BATON ROUGE, LOUISIANA

W. G. Taggart, Director

Compiled by I. L. Forbes from Reports of Heads of Departments and Project Leaders

Year Ended June 30, 1946
The Louisiana 468 hybrid corn developed by Hugo Stoneberg of the U.S.D.A. in cooperation with the Louisiana Agricultural Experiment Station is a bountiful producer, as evidenced by this picture made on a north Louisiana farm. See page 36 for general adaptation of hybrids in Louisiana.
Letter of Transmittal

Baton Rouge, Louisiana
May 1, 1947

Governor James Houston Davis
Baton Rouge, Louisiana

My Dear Sir:

I have the honor to transmit herewith, through the Dean of the College of Agriculture and the President of the Louisiana State University and Agricultural and Mechanical College, the report of the work, receipts, and expenditures of the Louisiana Agricultural Experiment Station for the year 1946, as required by the Hatch Act, which provided for the establishment of agricultural experiment stations in the several states.

Copies of this report will be sent to the United States Department of Agriculture in Washington, D. C., and to the other experiment stations, as required by the Hatch Act, and a sufficient number will be printed to enable us to supply members of the Legislature, Public Boards, libraries, and leading agriculturists.

Very respectfully,

W. G. Taggart, Director
Louisiana Agricultural Experiment Station
Plasma Ascorbic Acid, Plasma Protein and Hemoglobin Values of High School Girls

Plasma ascorbic acid determinations were made on venous blood from 52 high school girls. Three tests were made on each girl: one in December, 1945 and January, 1946; one in April, 1946; and one in October, 1946. In the winter 54 per cent, in April 52 per cent, and in October 69 per cent of these girls had low plasma ascorbic acid values (below .4 mg. per cent).

Average hemoglobin values were slightly higher in spring and fall (14.6 and 14.8 gm. per cent) than in winter (13.9 gm. per cent). For plasma protein, average values were high in all tests (7.6-7.8 gm. per cent).

This study was made in cooperation with the Nutrition Education Research Project of the Department of Home Economics.

—Janis Gibbens, Martha E. Hollinger, Maud Purdy, Leona Johns Littlefield, and Harvye Lewis.

A Study of the Diets and of Plasma Ascorbic Acid of Pregnant Women in South Central Louisiana

Diets

Dietary histories were recorded by a total of 159 women—90 white and 69 Negro—between December, 1944 and June, 1946. The nutritive value of these dietaries was calculated in terms of nine nutrients, and the average daily intake compared with recommended daily allowances of the National Research Council for the latter half of pregnancy.

Both white and Negro women consumed markedly less than the recommended daily allowance of calcium, thiamine, niacin, riboflavin, and ascorbic acid. Iron, phosphorus, and protein were consumed in amounts which more nearly approached the recommendations. Although the total consumption of vitamin A exceeded the recommended allowance, this figure is misleading because a number of women, both white and Negro, consumed less than 50 per cent of the recommended allowance (Table 1).
TABLE 1. AVERAGE CALCULATED DIETARY INTAKE OF CERTAIN NUTRIENTS BY PREGNANT WOMEN, IN PERCENTAGE OF THE DIETARY ALLOWANCE AS RECOMMENDED BY THE NATIONAL RESEARCH COUNCIL, REVISED 1945

<table>
<thead>
<tr>
<th>Race</th>
<th>No of Women</th>
<th>Protein %</th>
<th>Calcium %</th>
<th>Phosphorus %</th>
<th>Iron %</th>
<th>Vitamin A %</th>
<th>Thiamine %</th>
<th>Riboflavin %</th>
<th>Niacin %</th>
<th>Vitamin C %</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>90</td>
<td>84</td>
<td>62</td>
<td>88</td>
<td>87</td>
<td>123</td>
<td>64</td>
<td>73</td>
<td>54</td>
<td>73</td>
</tr>
<tr>
<td>Negro</td>
<td>69</td>
<td>71</td>
<td>46</td>
<td>68</td>
<td>70</td>
<td>109</td>
<td>51</td>
<td>61</td>
<td>54</td>
<td>49</td>
</tr>
</tbody>
</table>

Both white and Negro women had a very low intake of whole grain cereals. The average daily intake of whole wheat bread was less than one-fourth gram for white women and less than one-tenth gram for the Negroes. Polished rice contributed 33 per cent of the total weight of bread and cereals eaten, corn bread and grits 17 per cent, and oatmeal 6 per cent.

The amount of whole grains that entered into these diets was so little that the importance of enrichment is apparent. The large rice consumption indicates what enrichment of rice would do toward improving the diets in this area. The large consumption of corn bread, especially by Negroes, indicates the need for consideration of enrichment of corn meal.

In view of these findings, it would seem that persons charged with maternal welfare should make a concerted effort to inquire into the dietary habits of each pregnant woman, to evaluate these habits, and to recommend such changes as are needed to bring the diet into line with patterns that have been shown to result in good maternal health and robust babies.

Plasma Ascorbic Acid

A study of the plasma ascorbic acid of pregnant women revealed a large percentage of low values (below .40 mg. per cent). These low values were more prevalent in Negro women than in white.

TABLE 2. PERCENTAGE OF WHITE AND NEGRO PREGNANT WOMEN HAVING PLASMA ASCORBIC ACID VALUES IN VARIOUS RANGES

<table>
<thead>
<tr>
<th>Race</th>
<th>No of Women</th>
<th>.00-.39 mg. %</th>
<th>.40-.59 mg. %</th>
<th>.6 or above mg. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>84</td>
<td>55</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>Negro</td>
<td>52</td>
<td>75</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>
The dietary intake of ascorbic acid was correspondingly low among the Negro women. The average dietary intake of ascorbic acid was 49 per cent of the recommended daily allowance for the Negro women and 73 per cent for the white women.

This investigation was conducted in cooperation with the Louisiana Department of Public Health. Both the General Education Board and the Louisiana Department of Public Health contributed toward the financial support of this project.

—Maud Purdy, Janis Gibbens, and Martha E. Hollinger.

Utilization by Human Beings of Ascorbic Acid From Mustard Greens

In 1945, four young women on a controlled intake of ascorbic acid maintained as high plasma levels of this vitamin when cooked mustard greens were the main source of ascorbic acid as when the synthetic vitamin was the main source. One young woman maintained a higher plasma level when taking the synthetic vitamin.

In 1946 three young women and three young men maintained approximately the same plasma ascorbic acid level when mustard greens were the main source of the vitamin as when the synthetic vitamin was taken. A fourth young woman maintained a higher plasma level when taking the synthetic vitamin. This latter subject was the same one who maintained a higher plasma level on the synthetic vitamin in the previous year.

Financial support for this project was supplied by the General Education Board.—Martha E. Hollinger.

Oleic Acid as a Growth Stimulant for L. casei

The growth of certain species of bacteria has been shown by a number of workers to be either stimulated or inhibited by fatty substances unessential in the nutrition of the organism. In the case of Lactobacillus casei, a number of fatty substances, including rice oil, will stimulate growth, and one such substance, oleic acid, has been studied in detail in this laboratory.

The amount of stimulation observable has been found to depend upon the acidity of the growth medium, the temperature of incubation of organisms, the length of the incubation period, and the concentration of oleic acid included in the medium.

Measurements of stimulated growth made by titrating acid produced by the bacteria did not agree with measurements made by measuring the turbidity of a cell suspension.

—Virginia R. Williams and E. A. Fieger.
Experimental Lathyism

Rations containing a high percentage of ground Singletary peas produce a characteristic paralysis (lathyism) in young rats. The causative agent is definitely not lipoxidase. It is slowly inactivated by moist heat at 100° C. or by prolonged exposure to 95 per cent ethanol. The factor cannot be removed from the peas by prolonged extraction with acetone, diethyl ether, ethyl acetate, petroleum ether A, or petroleum ether B. The most potent and easily prepared extract is made by extracting with 50 per cent ethanol and concentrating this extract in vacuo. Concentration at atmospheric pressure is not feasible. The factor is not absorbed on Norit from aqueous solutions. It is not extracted from aqueous solutions of pH 7 or 9.5 by diethyl ether. Fractional precipitation with acetone is of little value as a means of concentrating the factor.—Jordan G. Lee.

Further Studies of the Toxic Principles of the Tung Nut

As previously reported, experiments with chicks indicate that there are at least two toxic factors in tung nut. One of these can be destroyed by heat, whereas the other is very resistant to heat. The former can be rendered harmless in the meal by treating the meal with various chemical agents, but no method so far tried has yielded a concentrate of this factor. The latter factor can be extracted by ethyl alcohol and by many other organic solvents. Although to date the many attempts made to isolate the heat resistant toxic factor from the alcohol extract have proved unsuccessful, recent and current experiments point towards the accomplishment of this isolation in the near future.

Preliminary experiments have established the toxicity of tung leaves and, furthermore, have indicated that this toxicity is somewhat different from that of the nuts.

A study of the blood of chicks poisoned by tung meal has been undertaken and will be reported in detail when complete. It has been found that the red cells of poisoned chicks do not differ significantly in number or appearance from those of normal chicks.

—James A. Watson, Jr., and Jordan G. Lee.

Food Preservation Division

Okra Studies

(1) Method of Scalding in Preparation for Freezing

The use of an improvised steamer of the type commonly recommended for home blanching of vegetables in preparation for either freezing or canning resulted in the retention of slightly more ascorbic acid (vitamin C) than did hot water scalding. The improvised steamer resulted in uneven blanching of the okra as the pods in the center of
the steamer required five minutes of steaming to inactivate enzymes while those at the top and bottom required only two minutes. Hot water blanching required only two minutes and live steam one and a half minutes. Considering the uneven blanching and the very slight advantage in ascorbic acid retention there seems little to recommend the use of an improvised steamer in preference to water blanching for home use.

(2) Dry Pack vs. Brine Pack

A. Effect of Twelve Months of Frozen Storage

During a period of twelve months in a freezer locker at a temperature of 0° F. dry-packed whole and sliced okra lost 17 and 15 per cent, respectively, of the ascorbic acid present in the fresh product. During the same period the loss of ascorbic acid in brine-packed whole and sliced okra (calculated on dry weight, salt free basis) was 38 and 39 per cent, respectively.

B. Effect of Cooking

Frozen dry-packed whole okra steamed in a pressure saucepan at 115° C. lost an average of 18 per cent of the ascorbic acid present in the stored uncooked vegetable. Boiling the whole pods in an open saucepan in sufficient water to prevent scorching resulted in a loss of 18 per cent.

The average loss of ascorbic acid in cooking brine-packed okra was 24 per cent when steamed in a pressure saucepan and 41 per cent when boiled in an open saucepan.

Dry-packed okra had a brighter color and fresher flavor than the brine-packed product.

The inferiority in ascorbic acid content of brine-packed okra, both before and after cooking, as well as the inferiority in color and flavor, indicates a need for re-evaluation of recommended methods of packing vegetables for frozen storage.

—Leona Johns Littlefield and Martha E. Hollinger.

Frozen Storage of Unbaked Biscuits and Cakes

Plain layer cake batter and gingerbread stored in a farm freezer at 0° F. produced good freshly baked products after six months of frozen storage (Fig. 1). Samples baked at intervals of one month showed a slight gradual decrease in volume.

Freshly baked cakes from a rich white cake batter showed a large decrease in volume after two months frozen storage, and a rich chocolate cake showed a large decrease at the end of one month.

Cakes thawed in the oven at 300° F. for 10 minutes and baked at 365° F. until done had a larger volume and better shape than those baked at 365° F. without preliminary thawing (Fig. 2). Thawing cake batter at room temperature just previous to baking produced a somewhat more compact texture and smaller volume than oven thawing.

Standard baking powder biscuits rolled and cut before freezing
Figure 1.—Effect of six months of frozen storage of plain cake batter on the texture and volume of cup cakes. A. Baked immediately after mixing; B. Baked after six months frozen storage.

showed considerable decrease in volume and a somewhat compact texture at the end of six weeks.

Thawing in the oven at low temperature (300°F.) for 10 minutes,

Figure 2.—Effect of method of baking on shape and volume of white cake. Top, frozen batter baked at 365°F. without previous thawing; bottom, frozen batter thawed in oven at 300°F. before baking at 365°F.
followed by baking at 425° F. produced biscuits of a larger volume and better shape than baking at 425° F. without preliminary thawing or thawing at room temperature (Fig. 3).

The flavor of all cakes, gingerbread, and biscuits remained good throughout the experimental period.

—Gladys McCartney and Martha E. Hollinger.

**Preservation of Color and Flavor of Apples and Peaches in Frozen Pies**

Raw sliced apples or peaches, coated with 80 per cent sugar syrup containing 200 milligrams of ascorbic acid per quart of syrup, retained excellent color and flavor when made into pies and stored three months at 0° F. before baking. At the end of four months, slight darkening of the top layer of fruit was noticeable. Apples and peaches in pies baked before freezing retained excellent color but the pies were judged to have a "warmed over" flavor and a greater tendency to staleness of the crust than pies frozen before baking. Lemon juice had little effect in preserving the color of uncooked apples and peaches in frozen pies after the first month.—Gladys McCartney and Martha E. Hollinger.
Shrimp Studies¹

Cooked Shrimp

Shrimp, peeled and unpeeled, were cooked with varied amounts of salt and spices, packed in various types of containers, and frozen. Cooked shrimp, in addition, were packaged in two kinds of cocktail sauce and as shrimp creole. One sample of shrimp representing each treatment and type of package was tested after 7 weeks, 3½, 6, 9, and 12 months frozen storage. These were examined organoleptically and tested for tenderness by means of the Warner-Bratler shearing device.

Shrimp packed in cocktail sauce were slightly tougher after 3½ months storage than those packed without sauce. After 6 months storage the samples cooked with 15 per cent salt had become slightly rancid and had developed a fishy odor. There was no increase in toughness in the samples packed without sauce. After 12 months storage all samples were acceptable, although of poorer quality than the fresh shrimp. No differences attributable to type of package were observed, and all types were considered excellent.—E. A. Fieger and Harvye Lewis.

Comparison of Air Freezing with Immersion Freezing Methods

Shrimp frozen in still air at 0° F., by immersion in brine at 0° F., and in alcohol-dry ice mixture at -85° F. were compared organoleptically and by various chemical tests after 3, 6, 9, and 12 months storage at 0° F. During the first 6 months of storage no appreciable difference existed between the product frozen in air and that frozen by rapid immersion process. The advantage of quicker freezing was more appreciable after longer storage time.—S. Kalogereas and E. A. Fieger.

Bacteriological and Chemical Studies

Members of the staff of the department made two trips aboard the shrimp trawler “Ethel H.” where bacteriological and chemical studies were made on fresh-caught and stored shrimp. All fishing was confined to Louisiana waters within 35-50 miles of shore and within the area west of Barataria Bay and east of Sabine Pass.

Fresh-caught, whole shrimp samples examined as soon as the trawl net was emptied on deck varied widely in the total number of bacteria present. This variation, to be expected with biological products, occurred within a single catch as well as in different fishing areas. The slime on the shrimp shell contained approximately ten times as many bacteria as an equal weight of shrimp.

Fourteen different samples of fresh-caught shrimp sampled within 30 minutes after the net was emptied ranged in pH values from 7.30 through 7.56, with an average of 7.44. Eight hours standing on deck did not cause appreciable increases in pH values. Storage in ice for a period of six days caused a marked increase in pH. The formol titration

¹These investigations on shrimp were financed in part by a grant from the Refrigeration Research Foundation.
of fresh and iced shrimp indicated that only slight hydrolysis of protein occurred during the storage time. The titration values by the Stansby and Lemon method gave high values for the B titration and normal values for the A titration in both fresh and stored product.

Washing shrimp with sea water reduced the total bacterial count. Shrimp that had been handled, headed, and washed by fishermen were cleaner bacteriologically than shrimp examined as soon as caught.

Fresh, headless, washed shrimp stored in crushed ice in bins on the boat were plated daily for bacterial counts. Within one day the increase was tremendous and rose steadily throughout the storage period. Though the shrimp were still an edible market product and of good appearance at the end of nine days, the bacterial counts had reached very high levels. The use of No-Bac ice containing sodium benzoate and chloramine-T did not retard this steady rise in bacterial numbers.

Representative samples were frozen in the laboratory for further study. Samples that were 7-9 days old (storage age) before freezing, when sampled at monthly intervals, contained higher numbers of bacteria than younger samples. The reduction in count which might be expected by freezing and frozen storage was not as marked in such older samples.

The use of dry refrigeration in two different experiments markedly decreased the usual rise in bacterial counts during storage. Headed shrimp were stored in heavily-waxed, two-piece cardboard cartons which were packed in crushed ice. At the end of 7 days storage, the bacterial count was as low as in the fresh product. At no time during storage did the count rise above three times the fresh sample count.

Market samples of shrimp purchased from retail and wholesale dealers have been examined bacteriologically. The count on a retail sample was considerably higher than on a composite sample taken at the time of unloading the boat. This suggests that further work is needed on the refrigeration and storage of shrimp in transit from fisherman to consumer. Samples from a wholesale house more closely approached the fresh product.

—E. A. Fieger, Harvye Lewis, and Margaret Green.

Drip as a Constant for the Quality Control
Of Frozen Foods

A new method for determining drip of frozen products has been developed using petroleum ether or Skellysolve B, previously saturated with water, as the thawing medium. The physical and chemical properties of the drip obtained by the new method were stable and reproducible. Such values can therefore be used for the quality control of

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2 A staff member of the Department of Bacteriology, Louisiana State University, collaborating with the Department of Agricultural Chemistry and Biochemistry.
various frozen foods. Rapid freezing decreased the quantity of drip and gave a better frozen pack for many products. Products containing high percentages of bound water yield smaller amounts of drip than products having low amounts of bound water. For products with high bound water content, very rapid freezing was not so beneficial as with products of low bound water content.

The amount of drip obtained from frozen peaches proved to be a good index of the suitability of different varieties for freezing. Those varieties that yielded the largest amount of drip produced the poorest frozen product. Increasing length of storage increased the amount of drip of strawberries.—S. Kalogereas.

Studies on the Freezing of Louisiana Fruits

Experiments on Freezing Strawberries and Strawberry Juice

In order to study the conditions under which the color and the flavor of strawberries and strawberry juice are best preserved, experiments were conducted using ascorbic acid, glutathione, and pectin. Other experiments involved freezing under vacuum and under CO₂ gas, and various methods of quick freezing. Tests after 3 and 6 months storage showed the following results: The use of pectin and calcium chloride improved the texture of the frozen strawberries but did not decrease drip appreciably. Quick freezing in alcohol-dry ice mixture resulted in a firm product and reduced drip one half. When strawberries were frozen in cans an excellent product was obtained, but when frozen by direct immersion in alcohol-dry ice mixture a slight bitter taste developed and the color was slightly impaired. With strawberry juice, sealing under vacuum aided in preserving color. The addition of glutathione preserved flavor and color but was less effective than vacuum packing in preventing loss of color. The use of ascorbic acid had a slight beneficial effect in preserving color and flavor.—E. A. Fieger and S. Kalogereas.

Figs

Preliminary studies on the preparation and freezing of figs have shown that an undesirable flavor develops in frozen storage unless there is good penetration of sugar into the fruit. This penetration may be facilitated by peeling or slicing the figs and allowing them to stand in the syrup for several hours before freezing. Sixty per cent cane sugar syrup in the proportion of one part of syrup to three parts of fruit gave a product that was satisfactory. As with other fruits, figs must be picked at the most desirable stage of maturity.—Harveye Lewis.

Peach Variety Studies

Peaches from the North Louisiana Experiment Station were steam peeled, sliced and packed with 60 per cent cane sugar syrup containing 0.2 per cent ascorbic acid in the proportion of three parts of fruit to one of syrup. Eight judges ranked the varieties, after six months frozen
storage, in the following order of preference: J. H. Hale, Early Elberta, Hiley Belle, Elberta, Golden Jubilee, Georgia Belle, and Mayflower.

—Harvye Lewis.

Strawberry Variety Studies

Sliced strawberries were mixed with sugar in 4:1 ratio and frozen. After 6 months storage 12 judges ranked the varieties and seedlings, grown in Baton Rouge, in the following order of preference: Konvoy, 122-3 x 669-42-4, U. S. 2183, 630 x 669-42-2, 630 x 669-42-4, 117-1, 669 x 119-8-42-3, Klonmore, Marion Bell, Klondyke, 167-1, 119-4 x 630-42-6, and Creole. Strawberries grown in Hammond were ranked as follows: Klondyke, 117-1-45-3, L39, Klonmore, 630 x 45-L.—Harvye Lewis.
Agricultural Economics

Consumer Preferences in Sweet Potatoes

Tests to determine consumer preferences for the different qualities in sweet potatoes were conducted in five Louisiana cities and in Chicago in 1946. Eighty-five per cent of the customers were housewives, 10 per cent husbands, and 5 per cent children, servants, or friends of the family. The average size of the family was 3.3 persons. The principal consumers of sweet potatoes are adults. Sweet potatoes are served to the family an average of 2.2 days a week. The average size purchase at the grocery stores was 3.4 pounds. Fifty-five per cent of the customers said they oven-baked the sweet potatoes, 22 per cent candied them, 10 per cent fried them, 6 per cent cooked them with meat, and 7 per cent made them into pies, puddings, and the like.

Appearance in the sweet potatoes is very important. Color, shape, size, and smoothness have much to do with the price the consumer is willing to pay and with the amount purchased. The use to be made of the sweet potatoes is an important factor in grading for the retail stores. The ideal potato for baking is well-shaped and weighs one-half pound. The popular range is from 7 to 12 ounces. Careful grading of sweet potatoes will help maintain a good price and increase consumption. In the long run, it should mean greater returns for the producers.

—J. M. Baker.

Marketing North Louisiana Peaches

This is a preliminary report on an initial step to improve the marketing of peaches in north Louisiana with special reference to methods of handling, packaging, bruising, temperature relationships and consumer reactions to tree-ripened peaches of the Golden Jubilee and Elberta varieties. The peaches were transported from Bastrop, Louisiana, to food stores in New Orleans. It was found that 14.2 per cent sustained bruises on the trees, 23.0 per cent in picking, 5.5 per cent in delivery to shed, 7.2 per cent in sizing, and 16.0 per cent in transit to market. As to containers, the ventilated 96-cell box was superior to half-bushel and bushel baskets. A still more versatile container is needed. The high percentage of peaches affected by brown rot was attributed to failure to keep the temperature of the fruit below 50° F., and it affected the late varieties more than it did the early varieties.

Consumer reaction to tree-ripened peaches was decidedly favorable. The demand was good and the purchases rapid. The average size purchase of the Golden Jubilee was 2.3 pounds and of the Elberta 2.4 pounds.—D. C. Alderman and J. M. Baker.
Prices and Statistics

The level of prices received by Louisiana farmers for farm products rose materially during 1946. The composite index of prices received by farmers rose from 213 \((1935-39=100)\) in December, 1945 to 276 in December, 1946. The volume of production of basic agricultural commodities was high for products other than cotton and cottonseed. The general level of prices paid by farmers rose slowly but steadily throughout the year. This index stood at 147 \((1935-39=100)\) in January, 1946 as compared with 182 in January, 1947. The index of purchasing power of Louisiana farm products increased slightly during the year from 145 in December, 1945 to 153 in December, 1946.

Total cash receipts from farm marketings in Louisiana were approximately $245,488,000 in 1946, or four per cent more than the $236,543,000 received in 1945.—J. P. Montgomery.

Cotton Marketing

Free cotton classing and market news service, furnished cotton farmers under the Smith-Doxey Act, has been available to Louisiana growers for the past eight years. The uses made of the service vary with the individual needs and existing conditions of the growers in the various localities within the state. The service has been beneficial to growers in aiding them to sell their cotton for what it is worth and in encouraging the production of improved varieties of cotton.

Membership in Smith-Doxey cotton improvement groups increased from 1,444 in 1939 to 22,334 in 1946, and the cotton acreage represented by groups increased from 3.2 to 55.6 per cent of the total state acreage. These increases have resulted from the consolidation of many small and scattered groups into parish-wide organizations. The percentage of the total state production classed for eligible groups increased from 0.1 per cent in 1939 to a high of 16.8 per cent in 1945. The percentage classed dropped to 12.1 per cent in 1946, owing to a short crop and a very favorable price situation during the picking season.

Twenty-nine one-variety communities in 26 parishes participated in the Smith-Doxey program during 1946. Twenty parishes had single parish-wide groups, 3 parishes had parish-wide groups consisting of two groups and 3 parishes had small community groups. No samples were received for classification during 1946 from 9 of the eligible groups. Before group members can submit samples for classification, they must make arrangements for bonded sampling agents to cut and handle the samples. Seven of the 9 groups failed to obtain bonded sampling agents and 2 of the groups had only one. Several of the other groups submitted

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1 Basic data are obtained through a cooperative agreement between the Louisiana Office of the Division of Agricultural Statistics, Bureau of Agricultural Economics, U. S. Department of Agriculture, and the Agricultural Experiment Station, Louisiana State University.
only a small percentage of their cotton for classification because of inability to arrange for satisfactory sampling agents. Well established and organized groups in Concordia, Bossier, Rapides, Caddo, Tensas, and Natchitoches parishes submitted 64.8, 59.8, 40.9, 35.4, 22.0, and 21.7 per cent, respectively, of their total production for classification. As groups become better organized and are able to make more satisfactory arrangements for sampling agents, the use made of the service and the percentage of cotton classed for groups should increase materially.

—James F. Hudson.

Commercial Fruit and Vegetable Canners in Louisiana

Twenty-two commercial canneries packed fruits and vegetables in Louisiana during the 1946-47 season. The pack amounted to 911,000 cases in 1945 and has been increasing. More than 15,000 tons of farm produce were purchased by canneries in 1945, for which growers received more than $670,000. The value of the finished pack to canneries was $2,437,000.

One of the most important developments in recent years in the commercial canning industry of Louisiana has been the large increase in the size and relative importance of the sweet potato pack. More than 551,000 cases of sweet potatoes were packed in 1945. Sweet potatoes comprised 61 per cent of the total fruit and vegetable pack, as compared with only 28 per cent in 1941.

In order for the canning industry to enjoy greater prosperity and become a more stable and profitable market for locally-grown produce, several handicaps need to be overcome. One important problem is the short and interrupted canning season resulting from the inability of canneries to obtain a continuous supply of raw products in sufficient volume. Greater emphasis on sweet potato canning is helping to alleviate this handicap.

The ability to acquire and keep a full, well-trained labor force is a second problem faced by canneries which would become less acute with a larger volume of processing during a longer season. A problem of some canneries is the uncertainty of deliveries of produce because of failure to comply with provisions of grower-canner contracts. Relatively low yields on some vegetables are not conducive to low-cost produce for canning; consequently most canneries are centering their operations around products in which Louisiana growers have a comparative advantage, such as sweet potatoes, okra, snap beans, peppers, and sugar-cane syrup. Other vegetables, particularly the off-season ones, such as beets, winter greens, and tomatoes, will serve to supplement the major canning crops and provide a longer, better-balanced canning season.

—M. D. Woodin and K. E. Ford.
Crop Production Costs May Be Reduced Through Farm Mechanization

During periods of high industrial activity, mechanical power on farms is more economical than animal power. Less costly labor is required and the high priced feed saved may be fed to productive livestock rather than workstock. Representative farmers estimated that one medium sized 25-horsepower tractor will accomplish as much work as 6 mules throughout the year. At 1944 prices the cost of mule work averaged 21 cents an hour when full use was made of them, and the cost of operating a medium size tractor was 56 cents an hour.

Cotton production costs in the Mississippi and Red River Delta Cotton Areas were reduced $10.89 an acre through the adoption of tractor power, at 1944 price-cost relationships. Additional economies are foreseen through further mechanization in the hoeing and harvesting operations. Corn production costs in the delta cotton areas were reduced $7.17 an acre through use of tractor power. The production of oats is definitely adaptable to complete mechanization. Research results show that oats may be produced for $5.48 an acre less when fully mechanized than when old-style, mule methods of production are employed.

The relative reduction in costs depends largely upon the extent to which crop production can be completely mechanized. In periods of depression, when the wages of farm labor and feed costs are lower, the relative advantages of mechanizing farm operations would be less than in periods of high prices.—Frank D. Barlow, Jr.

Economic Studies of the Sugar Cane Industry

1. Large Sugar Cane Farms

Total costs of producing sugar cane on large farms varied from $4.29 per ton in 1941 to $5.93 in 1944 and $6.31 in 1945. Receipts increased from $4.21 in 1941 to $6.05 per ton in 1944 and $7.00 in 1945. Increased costs during the war were due to higher labor and machinery expenses, but because of higher prices received for sugar cane, including government payments of various types, net incomes per farm and per ton of cane were higher during the war years of 1942-45 than in any of the preceding pre-war years and the average net income per ton of cane of $1.18 in 1945 was the highest of any of the 9 years (1937-45) in which these studies have been conducted.

These returns, however, probably will not continue at current levels. In four of the nine years in the 1937-45 period, average net losses resulted (including a loss of more than $1.50 per ton in 1940) and in only one year has the net profit been more than $0.80 per ton.

2. Small Family-Type Sugar Cane Farms

The costs for growing and harvesting a ton of sugar cane on family-
type sugar cane farms in Louisiana varied from $3.78 per ton in 1938 to $4.38 in 1942, $4.69 in 1943, $6.14 in 1944, and $6.01 in 1945. These data include all the direct and indirect costs of producing the sugar cane crop except a charge for the value of the operator's labor.

The rapid increase in costs from 1943 to 1944 was due to increased costs for input items, mostly hired labor and machinery, and to lower than average yields obtained in 1944. The slight reduction in unit costs from 1944 to 1945 was due to increased yields per acre, which more than offset the increased costs in 1945.

In pre-war years, with relatively low labor costs, the small family-type sugar cane farms in Louisiana produced cane cheaper than the large farms. In 1944 and 1945, however, with high labor costs and the difficulty of mechanizing on the small farms because of high costs for equipment on limited acreages, the large farms produced cane at a lower cost than the family-type units.

—J. Norman Efferson, Mildred Cobb, and F. E. Stanley.

Rice Costs and Prices

The average return per hour of labor from rice production on the usual family-sized farm in Southwestern Louisiana varied from 25 cents in 1941, to 31 cents in 1942, 24 cents in 1943, 29 cents in 1944, and 28 cents in 1945. Although costs per acre increased from $51 in 1941 to $80 in 1945, prices per barrel increased at about the same rate; thus, earnings were relatively stable during the period. In 1945, a comparison of combining with the usual binder-thresher method of harvesting rice indicated a saving of 80 per cent in the hours of man labor required and 43 per cent in the cash costs of harvesting in favor of combining.

The varieties of rice produced in Louisiana have changed greatly in the past five years. The acreage of long-grain varieties increased from 14 per cent of the total crop planted in 1941 to about one-half of the total acreage in 1946. At the same time, the acreage of the Blue Rose variety decreased from 71 per cent to only 25 per cent in 1946. Rexoro and Fortuna are the principal long-grain varieties that have increased to the greatest extent, while Zenith in the medium-grain class appears to be rapidly replacing some of the other medium-grain types. As a result of this shift in varieties, any comparison of base-period prices (1910-14) with current prices for the purpose of determining parity is meaningless because of the change in the quality of the product produced in 1945 and 1946 (long-grain and improved medium-grain rices) from the quality of the product produced in the base period.—J. Norman Efferson.

Milk Costs and Prices, Florida Parishes

Total costs of milk production in the Southeast Louisiana, or Florida Parishes, dairy area averaged $2.18 per hundred pounds in 1938, $2.91 in 1942, $4.65 in 1944, $5.41 in February, 1946, $6.70 in November,
1946, and $6.35 per hundred pounds in December, 1946. Although costs of producing milk were almost three times as great in late 1946 as in 1938 and increased 20 per cent from early to late 1946, costs decreased slightly from November to December, 1946, for the first time since the beginning of the war. This cost decrease of about 5 per cent was due to a decline in feed prices.

Prices received for fluid milk by producers in the New Orleans area were lower in the fall months of 1946 than prices received in other comparable areas because the New Orleans price remained stable while prices in other areas increased. From the standpoint of comparative prices in other areas, a flexible pricing policy appears needed for the New Orleans region in order that prices will react with increasing costs and/or increasing demands, or decreasing costs and/or declining demands, in the same manner as milk prices in other areas.


Production Adjustments Needed to Raise Farm Incomes In the Cotton Areas of Louisiana

During 1945 and 1946, research on production adjustments in the cotton farming areas of Louisiana was coordinated with the work of ten other Agricultural Experiment Stations located in the principal cotton states. The general framework for analysis agreed upon was based upon prosperity conditions and a high national level of economic activity.

The desirable pattern of production adjustments in Louisiana under prosperity conditions would give less emphasis to intertilled crops and more emphasis to sod crops, pasture, and livestock enterprises. If the government continues a parity policy, the acreage of cotton would be limited only by production restrictions, because cotton would be more profitable than competing enterprises. With competitive cotton prices, the cotton enterprise would occupy a less favorable position and cotton acreage would most probably be less than under parity prices and production control. Continuation of the parity concept and production controls would freeze cotton production on an inefficient scale on most farms in the cotton areas, while a competitive cotton-price policy would achieve greater freedom in the selection of enterprises and in the combination of productive resources.

Equally as important as production adjustments for the area as a whole is the recombination of productive resources—land, labor, capital, and management. The first step in the achievement of an efficient agriculture hinges upon the recombination of human and physical resources into well balanced farming systems. To achieve efficiently sized farm units, the data indicate that cropland in upland areas should be increased from approximately 27 to about 44 acres per farm family and the total land area per farm should be increased from 70 to 144 acres. In the delta cotton areas, the cropland per farm family should be
increased from approximately 25 acres to 50 acres and the total land area per farm increased from 50 acres to about 115 acres.

Increasing the land area per farm and per farm family has far-reaching social and economic implications. The number of farms would be reduced considerably and the farm population required on full-time farms reduced from 97,100 in the upland cotton areas to approximately 45,000. In the delta cotton areas, the farm population on full-time farms would have to be reduced from 268,400 to 128,000. To achieve an efficiently organized agriculture on the land now in farms means that only about one out of every two farm families should remain in agriculture on a full-time basis. This reduction in the number of farms and the corresponding increase in size of farms is necessary if farming units are to be large enough to achieve economies in production and obtain incomes more nearly comparable with those in other farming areas of the United States.—Frank D. Barlow, Jr., and Leo J. Fenske.

The Mechanization of Small Delta Farms

In order to appraise the feasibility of substituting mechanical for animal power on small units, a financial summary of the farm business based on 1944 price-cost relationships was made of a typical 40-acre delta cotton farm when tractors provided the power and when workstock were used. A summary of mechanized versus non-mechanized power systems on this farm is as follows:

1. Mechanization resulted in a reduction in the cost of power on a 40-acre delta cotton farm at a relatively high price level, despite the fact that mechanical power and equipment was not used efficiently. When tractors were used, the total cost of power for the year was $233, as compared with $450 when mules furnished the power.

2. The cost of mechanical equipment was higher when tractors were used, amounting to $117 as compared with $58 for workstock equipment. The economy achieved by using tractor power offset higher equipment costs, however.

3. Labor required to perform farm tasks was reduced through mechanization. Consequently, the cost of labor based on prevailing rates was less when tractor power was used, $1,106 as compared with $1,415. The value of output per hour of man labor was also greater when operations were mechanized.

4. Capital requirements were greater when mechanical power was substituted for animal power. Total capital requirements amounted to $7,527 when a mechanical power system was used on a 40-acre delta cotton farm, and $6,249 when old-style, mule methods were employed.

5. Although the possibilities of expanding the farm business are not as great on 40-acre farms as on larger units, when mechanical power is substituted for workstock, some opportunities are afforded. From 3 to 5 acres of land are released with the elimination of each head of workstock. This land may be used for producing crops or for pasture.
6. Managerial responsibilities are greater where mechanical power is used because of the greater capital investment and the necessity of using the power unit as efficiently as possible. Under competent management fuller utilization may be made of the power unit by doing work for other small farm operators on a custom basis.

An appraisal of farm family earnings indicates that with mechanized conditions and good yields a good living can be obtained from a 40-acre delta cotton farm during periods of high prices. Mechanization of the farm operations provides more freedom for the operator to obtain part-time work off the farm. During periods of low prices, it is doubtful that a 40-acre delta cotton farm will provide enough income to support a satisfactory standard of living.—Frank D. Barlow, Jr.

Tabac de Perique in Louisiana

Tabac de Perique is Louisiana's unique contribution to the pleasure of smokers, as this kind of tobacco is not grown anywhere else. Known as Type No. 72, this dark, strong, aromatic tobacco is grown and processed by about 100 Acadian farmers in St. James Parish. Known in America only by a few devotees, it is prized in Europe as a rare blending tobacco and used in the manufacture of many fine products for pipe and cigar smokers.

The acreage and production of perique in Louisiana has never been large. In 1945, about 400 acres were grown and produced about 350,000 to 400,000 pounds. The farmers received about 65 cents a pound. The 1946 acreage was about the same but heavy rains and high winds resulted in heavy losses during the growing season. The 1946 crop is estimated at 160,000 pounds, and about 400 men, women and children were employed in its production.

Most of the perique crop is exported, mainly to England, Canada, Norway, and Sweden, in paraffin-lined barrels containing about 500 pounds of tobacco. The two or three principal factors control the industry. They engage in storing and selling the crop, and also finance most of the farm producers. Each factor has his own group of producers with whom he contracts at the beginning of the season for the amount of tobacco which he believes he can sell. This close personal contact and long association between the producers and their factors make it possible to vary the annual production of perique in accordance with what the world market will absorb or what the factor can afford to store. This arrangement has eliminated the need for government-sponsored acreage control programs common to other tobacco areas of the United States.—Robert Harrison.

Milk Transportation From Farms in Louisiana

The major problem in milk transportation during the war centered around efficiency in the use and conservation of equipment and
milk, both critical factors in total war. In peacetime, efficiency in milk transportation is still important but the motivating factor is changed. Emphasis has shifted to the need for lower costs in marketing rather than the conservation of materials and manpower.

The average rate charged for hauling milk during 1945 was 22.22 cents per 100 pounds in the New Orleans area, 20 cents in the Shreveport and Monroe areas. Little relationship was found between the distance the milk was hauled and the rate charged. In the fourth area milk was largely transported by dealers for which no direct charge was made to the farmer.

It was found that the milk assembly system used in Louisiana could be made more efficient by the following means: (1) a more extended use of commercial routes, (2) re-organization of milk collection routes in such a manner as to reduce overlapping travel and the amount of idle truck capacity, (3) adjustment of transportation charges to provide lower rates for farmers living near the points of concentration.

The economies achieved in marketing milk during wartime should continue to receive the attention of dairymen because if the high level of incomes that consumers are now receiving should decline, marginal buyers would be forced to seek cheaper sources of food. This would result in a reduction in the volume of milk consumed, unless the price of milk declines along with purchasing power. In view of this possibility, greater consideration should be given to reducing the cost of transportation to help offset a possible future decrease in returns from milk sold.—William H. Alexander.

Costs of Producing Milk in the Shreveport Area, 1945-46

The data indicate that dairymen selling milk in the Shreveport market received approximately 60 cents less per hundredweight than did the producers living in the New Orleans milk market area during the spring months of 1946. The retail price of milk at Shreveport was about the same as in New Orleans.

Average total returns per cow for the year were $175.73, or $4.30 per hundredweight milk produced. Comparing returns with expenses showed a loss of 78 cents per cwt. milk produced, or $31.99 per cow for the year. The average herd consisted of 62 cows valued at $104 per cow, 13 heifers one year and older valued at $56 per heifer, 15 heifers and calves less than one year valued at $25, and 2 herd bulls valued at $159 each. The average investment in dairy herds was $6,434, farm buildings $2,690, dairy equipment $1,068, and land used by the dairy enterprise $10,112. Farmers' estimates of the total value of investment in the dairy enterprise averaged $20,304.07 per herd.

The dairy industry of the Shreveport area took cognizance of the findings in this study when on December 20 the price paid producers for fluid milk was increased from approximately $3.60 to $5.25 per hundredweight.—Reid M. Grigsby and Carl B. Danielson.
Agricultural Engineering

Flame Cultivation

Butane and propane two-row flame cultivators were operated successfully during the 1946 season without a vaporizer. A simple self-generating burner has been developed that gives a good flame pattern when burning butane or propane.

L. S. U. flame cultivator that burns butane or propane with self-generating burners.

Cotton fields that would have been abandoned under ordinary conditions, because of heavy crab grass and weeds, were saved by flame cultivation and at a cost much cheaper than would have been possible with hand labor, had the latter been available.—Harold T. Barr.

Rice Drying and Storage

Rice dried by the drier developed by this department, and stored in steel bins has proved entirely satisfactory. As a result of this work, two commercial companies are now building farm driers and storage bins based on data from this station.—Harold T. Barr.

Drainage Research for Sugar Cane Land
In Southern Louisiana

This project is a joint undertaking of the Louisiana Experiment Station and the U.S. Department of Agriculture Soil Conservation Service Research. The primary purpose of this project is to develop new meth-
ods and machinery to effect and maintain drainage improvements on sugar cane land. The testing and adapting of present methods and available machinery is also included.

The yield on cuts graded to the center with approximately one-foot crown on the test area at St. Delphine Plantation, Addis, Louisiana, was increased 3.9 tons of cane and 922.7 pounds of sugar per acre.

A test area was worked on the Smithfield Plantation, Chamberlain, Louisiana. Various types of equipment and methods for grading cuts with a crown were tested. The following types of equipment were used: bulldozer, heavy grader and tractor, plow, and Parsons Whirlwind terracer. Various methods were tried for each piece of equipment. The costs of grading on this particular area ranged from $16.59 per acre to $38.89 per acre. The Parsons Whirlwind terracer had the lowest cost but required more time per acre.—Irwin L. Saveson.

Sweet Potato Machinery and Equipment

Studies conducted during the past two years on the proper design of hotbeds for sweet potatoes indicate that plants can be raised in the hotbeds for as low as 21 kilowatt-hours per 1000 plants, using electricity as a source of heat. This reduction in electric consumption is attributed to an insulating layer of farm waste such as chopped up corn stalks, old hay or leaves placed between the ground and the hotbed proper.

Experiments also indicate that cloth cover is as satisfactory as glass sash covers from a heating standpoint, and cloth covers can be made to fit any size and shape hotbed.

Digging sweet potatoes on a large scale has been successfully accomplished by using a standard 26-inch rod-link chain elevating digger modified to include two large disks to bar off the row ahead of the digger shovel. The vines are first shaved from the top of the row with a regular corn stalk shaver. Tests of several seasons indicate that the mechanical digger increases the quantity of marketable potatoes harvested by 20 per cent when compared to the mold board plow. A decrease of 40 per cent in time required for gathering potatoes after digging can be expected when using the mechanical digger. A smaller tractor-mounted sweet potato digger and a mule-drawn digger were developed and tried for the first time this past season. These show up favorably as machines for the small farmer, since they have a low first-cost and are easily handled in small fields. Additional developmental work is being carried out on these machines for the 1947 season.—Wiley D. Poole.
Animal Industry

Dehydrated Sweet Potato Feed for Fattening Swine

For two winters experiments have been conducted in feeding sweet potato meal at different levels to fattening swine. In 1946-47 an excellent grade of potato meal was fed, made entirely from washed dehydrated cull potatoes; this meal had an apparent value of 88.7% the value of corn. The gains were as follows: Lot 1, corn, 1.93 pounds gain per day; Lot 2, corn 2 parts, sweet potato meal 1 part, 1.81 pounds per day; and Lot 3, corn 1 part, sweet potato meal 2 parts, 1.56 pounds per day. The results of the two experiments would indicate that it does not pay to feed dehydrated sweet potatoes to swine in greater amounts than one-half the ration. When it was fed at the rate of 1/3 of the concentrate ration the pigs fed sweet potato meal put on a satisfactory finish.

In 1945-1946 the sweet potato meal was made principally from the trimmings of potatoes processed for canning or for dehydration for human use. The gains made were as follows: Lot 1, corn, 2.24 pounds gain per day; Lot 2, corn 2 parts, sweet potato meal 1 part, 1.93 pounds per day; and Lot 3, corn 1 part, sweet potato meal 2 parts, 1.67 pounds per day. The feed required per 100 pounds gain on the heavier potato meal ration was 27 per cent higher than the corn ration and the potato meal was apparently worth 66 per cent as much as corn.

The protein supplement used this year consisted of soybean oil meal, tankage, and a small amount of alfalfa meal. The amount of supplement eaten per day was 1.1 pounds per head for Lot 1; 1.5 pounds for Lot 2; and 1.8 pounds for Lot 3 (the heavy potato ration), showing the need for more protein supplement in balancing a sweet potato ration.

—C. B. Singletary and C. I. Bray.

Breeding and Selection of Duroc Swine
For Increased Production

Work is being continued on this project as in previous years. Three more sows met Production Registry requirements on spring litters. L. E. S. Marquita, daughter of a Production Registry sow and granddaughter of two others, made the best record with a litter of 10 pigs weighing 366 pounds at 56 days. L. E. S. Pamela, a granddaughter of a three-star Production Registry sow, produced a 351-pound litter with 11 pigs; and a gilt, L. E. S. Top Actress, whose dam and grand dam both had Production Registry rating, produced 10 pigs weighing 284 pounds. The requirement for gilts is 275 pounds.

1 See page 100 for report on Animal Industry project at the North Louisiana Experiment Station.
As line-breeding had continued long enough to make advisable the introduction of new blood, two new boars were purchased. L. E. S. Admiration, 263495, was purchased from the Ohio Experiment Station, out of a four-star P. R. sow. L. E. S. Invincible, 263713, bought from a leading Illinois breeder, is by Invincible, 174463, the 6th Production Registry sire of the breed and the leading ton-litter sire of the breed in 1944 and 1945.—Chas. I Bray.

**Crossbreeding Swine**

To determine the extent to which crossbreeding can be continued with satisfactory results, the Louisiana Station has experimented with a three-breed cross using Duroc, Hampshire, and Poland China sires in rotation. The litter of pigs shown above is the sixth generation from the original cross.

Crossbred pigs appear to be uniformly strong at birth, that is, there are rarely any runts, and they show the same uniformity up to market weight. For three successive seasons crossbred litters at weaning time (8 weeks) have easily reached the weights required of purebred litters on production registry, namely 320 pounds for sow litters and 275 pounds for gilt litters at 8 weeks.

The crossbred litter shown below was fed out to market weight in comparison with selected purebreds. They made higher gains than purebreds on the same ration, with a feed requirement of 383 pounds feed per 100 pounds gain. They gained over 1.25 pounds per day from 28...
birth and made over 2 pounds per day on feed. The average weight of the litter was 225.7 pounds at 178 days of age.

Continuous crossbreeding gives excellent results in producing market hogs, where good purebred sires are used and intelligent selection is followed in choosing the breeding females. In this litter the pigs were of uniformly good market type, the only apparent difference being in color.—C. I. Bray and C. B. Singletary.

**Hill Land Pasture Investigations**

At Ringgold better results were obtained than in any previous year. Field 1, which was limed and fertilized, continued to improve and produced 418 pounds gain per acre. Field 3, fertilized but not limed, made 409 pounds per acre, and an unfertilized field, No. 2, made 271 pounds. Field 4, originally fertilized with basic slag only, was fertilized in 1946 with 300 pounds of 5-10-5 fertilizer and produced 390 pounds per acre.

At Calhoun, on much poorer soil, a limed and fertilized field of 15 acres produced 272 pounds of gain per acre and a seeded but unfertilized 10-acre field produced only 76 pounds per acre. These results are not comparable to the Ringgold results as the cattle at Ringgold had 7 weeks longer grazing and were principally thin yearlings, while the cattle on pasture at Calhoun were mixed cows and calves.

On the Donaldson farm at Dry Prong, cows, calves, and young cattle on limed and fertilized pasture made 250 pounds gain per acre, while cattle lost weight during one short period on unfertilized pasture. On open forest land mixed cattle averaged 90 pounds gain during the grazing period while cattle on limed and fertilized pastures averaged 171 pounds gain.

Cattle on improved hill land pasture make twice as much gain as those grazed on unlimited, unimproved pasture and produce an 85 per cent calf crop.

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*In cooperation with E. C. Parker, D. V. Donaldson, M. Bankston, R. Fuller, and M. Gunter.*
During 1946 a calf record was kept at Dry Prong on all cows that had been on test in 1945. Out of 41 cows pastured on limed and fertilized land in 1945, 33 cows dropped calves in 1946, an 80 per cent calf crop. Twenty-six cows grazed principally on fertilized woodland produced 17 calves, a 65 per cent calf crop, while 18 cows grazed on unfertilized land produced 9 calves, a 50 per cent calf crop. These cows were all producers, but the intervals between calving dates varied from 10 months to 18 or 20 months. A 50 per cent calf crop is considered normal on unimproved phosphate-deficient grazing land.

The annual or biannual application of 300 to 400 pounds of fertilizer, costing $6.00 to $8.00 per application, results generally in gains of 150 to 200 pounds or more extra beef per acre, which at 12 cents per pound is worth 3 times the cost of fertilizer, not considering the improved health and breeding ability of the cattle.

—Chas. I. Bray and C. B. Singletary.

Fertilized Pastures on Old Rice Land

The season of 1946 completed the third year of grazing on unbroken rice land pastures seeded to lespedeza and a small amount of clover. The highest gains were made on land that had been limed with an addition of 100 pounds of calcium metaphosphate per year. Calcium metaphosphate alone made the second greatest gains, with superphosphate slightly below calcium metaphosphate. Unfertilized land produced about two-thirds as much gain as the fertilized pastures.

Two lots of 15 steers each were grazed on two 20-acre pastures that had been plowed, limed, and seeded with white clover, Dallis grass and lespedeza. These pastures were fertilized in 1944 only. Cattle grazed from

Steers on improved pasture with shade put on 385 pounds gain per head in 192 days grazing.

3 In cooperation with Swift and Co., Lake Charles, La.
March 19 to October 17, a period of 212 days. One lot had artificial shade while one had no shade. The gains were 385 pounds for the lot with shade and 336 pounds per head for the other group, or 289 pounds and 251 pounds gain per acre, respectively, for the two pastures. The greatest difference in rate of gain was from June to August, when the lot without shade made materially lower gains.
—Chas. I. Bray and C. B. Singletary.

Winter Feeding of Creep Fed Calves and Calves off Grass Alone

Creep fed calves weighed 71 pounds more at the beginning of the winter feeding period and 83 pounds more at the end of feeding, making slightly greater gains per day. The creep fed calves took to feed more readily at the start of the experiment. The feed cost was $22.41 per 100 pounds gain for the creep fed calves as compared to $21.40 feed cost for the calves raised on pasture alone. The sale price per 100 pounds was $16.88 for creep fed calves and $16.22 for the calves not creep fed. The creep fed calves sold for $99.23 per head as compared to $81.87 for the other lot. Owing to cost of creep feeding, the net gain was only $1.52 per head in favor of creep feeding, not considering labor.

There is little profit in creep feeding calves that are to be fattened in dry lot in winter if the labor cost of creep feeding is considered. If it is desired to finish creep fed calves in dry lot, the feeding period should be relatively short compared to the feeding period necessary for grass calves.—S. E. McCraine and Chas. I. Bray.

Feeding Dehydrated Sweet Potatoes to Fattening Calves

To determine the value of dehydrated sweet potato meal in comparison with corn for fattening calves, two lots of nine calves were fed, averaging 418 pounds per head. Lot 1 was fed corn, cottonseed meal, and grass hay with one feeding per week of pea-green alfalfa. Lot 2 was fed dehydrated sweet potatoes, cottonseed meal, grass hay and the same quantity of alfalfa. The calves getting the sweet potato feed required longer time to get on full feed, but after the first month both lots were fed the same amounts. The sweet-potato-fed cattle were fed one pound per day more cottonseed meal than the corn-fed steers.

At the end of 58 days of feeding the corn-fed lot had gained 1.95 pounds per day compared to 1.83 pounds per day for the sweet-potato-fed lot, and the feed eaten per 100 pounds gain was practically the same. During the third month of feeding, however, the sweet-potato-fed steers made considerably less gain, and the final gains were 1.94 pounds per day for the corn lot and 1.61 pounds for the sweet potato lot. The sweet potato feed showed an apparent feeding value of 80 per cent that of corn.
The dehydrated sweet potato meal used in this test was of excellent quality, from whole washed cull potatoes.

Wintering Grade Cows and Young Cattle on Forest Range

Three groups of cattle of mixed ages, including cows and yearlings, were wintered near Dry Prong on different amounts of cottonseed cake on range on which there was a considerable amount of dry grass of low quality. Owing to unusually cold weather during January and part of February there was no green grass during the test. Electric fences separated the three herds. The amounts of cottonseed cake fed were $3\frac{1}{2}$ pounds, $2\frac{3}{4}$ pounds and 2 pounds, respectively, during January and February. These amounts were reduced on March 1. It was originally planned to feed smaller amounts of cake but because of unavoidable delay in completing the electric fencing, feeding did not begin until January 1 and owing to bad weather the cattle had already lost some weight.

On March 14, when the experiment ended, Lot 1, receiving the heavy ration, had gained approximately 5 pounds per head, Lot 2 had lost around 15 pounds per head, and Lot 3 on the low ration had lost 27 pounds. On February 18, 8 yearlings had to be removed from the lowest-fed group for extra feeding, and 2 yearlings were taken from Lot 2 for the same reason. The young cattle in Lot 1 stayed in good condition.

It is planned to continue this investigation for three years, the same cattle to be given the same rations each winter to determine the effect of different rates of feeding on summer gains, breeding ability, and general health.—Chas. I. Bray, John T. Cassidy, and C. B. Singletary.

Singletary Pea Meal Unsatisfactory as Protein Supplement

To test the value of ground Singletary peas as a protein supplement for growing pigs, a small group of feeder pigs was fed Singletary pea meal as protein supplement in comparison with soybean oil meal. The pigs receiving the pea meal refused to eat more than a maintenance ration and made very low gains. At the end of six weeks 50 per cent tankage was added to both protein supplements, and the pea fed pigs made somewhat better gains but not as high gains as those in the soybean oil meal lot. The average daily gain was 1.2 pounds for the soybean oil

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4 Louisiana Experiment Station and Southern Forest Experiment Station, in cooperation with D. V. Donaldson and Mixon Bankston, Dry Prong, La.
meal and .68 pound for the Singletary pea meal. No lameness or any other undesirable effects were noted in feeding Singletary peas as have been reported by some other experiment stations. The Singletary pea evidently contains some substance which is unpalatable to swine.

—C. B. Singletary.

Special Pasture Investigations

Pasture fertilizer tests on N. L. Moore's farm, at Winnsboro, and H. Mitchiner's farm, at Epps, seem to indicate that profitable beef cattle production can be maintained by using calcium, phosphorus, and lime. On these plots, an average increase of 178 pounds of beef per acre was produced over plots receiving no lime or fertilizer. This is a two-year average. One plot on Mr. Mitchiner's farm produced a two-year average of 592 pounds of beef per acre. This plot was seeded to Dallis grass, lespedeza and white Dutch clover; it was treated with 3,000 pounds of lime and 400 pounds of 0-14-7. The check plot produced 359 pounds of beef per acre.

Results from Beauregard Parish on H. Lyles' farms show that on unimproved native pastures 11 pounds of beef were produced per acre. The two-year average beef production on plots receiving lime and a complete fertilizer was 258 pounds. Both types of plots were seeded with Dallis grass, carpet grass, lespedeza, and white Dutch clover.

—W. E. Monroe.
Crops and Soils

Fertilizers and Methods of Applying Fertilizers To Rice in Louisiana

Previous to 1937 fertilizer experiments with rice conducted by the Louisiana Agricultural Experiment Station had failed to show definitely that consistent and profitable results could be expected from the use of fertilizers. This lack of success was due to not recognizing that the soils had become as deficient in nitrogen as in phosphorus, that a high level of available nitrogen in the soil throughout the growing period is a requirement for a good yield of rice, that weeds must be controlled, and that the fertilizers must be applied in a position which will tend to keep them in close contact with the rice roots and away from the weeds. Nitrogen may diffuse from the soil and be lost through the irrigation water. Nitrogen losses are highest at alkaline reactions, during very hot weather and, particularly, where the fertilizers have been applied very close to the top of the soil.

The results from 15 fertilizer tests conducted during 1938 to 1943 at different locations on the Coastal Prairie soils show that, when nitrogen was applied at rates of 8 to 16 pounds per acre, P₂O₅ at 16 to 24, and K₂O at 12, the increases in the yields of rice due to fertilizers were about 2.6 barrels per acre. The best adapted grades were 8-10-6, 6-12-6, and 4-10-7 drilled with the seed at the rate of 200 pounds per acre. It was obvious from these experiments that the crop needed more nitrogen.

Since 1944, experiments have been conducted in which higher amounts of plant food were applied, the fertilizers being drilled with the seed, being drilled 2.5 inches below the seed, and being applied as top-dressings to the rice just before the booting stage.

The results show that, when nitrogen is applied at rates of 24 to 36 pounds per acre, P₂O₅ at 24 to 36, and K₂O at 24 to 36, the increases in the yields of rice due to fertilizers are approximately 7 barrels per acre. The best adapted commercial grades are 8-8-8 and 6-9-6 used at the rate of 400 pounds per acre and applied below or with the seed. The experiments show also that top-dressings are not as consistently effective as complete fertilizers drilled directly below the seed. However, good results from top-dressing with nitrogen are being secured where 200 pounds per acre of 4-12-8 are drilled below or with the seed and this is followed by a top-dressing of 24 pounds of nitrogen applied before the booting period.

Drilling the fertilizer 2.5 inches below the seed at planting is proving to be a very effective placement and in comparison with drilling the fertilizers with the seed has been found to increase the effectiveness of
the fertilizer as much as 2 to 6 barrels per acre. This is probably due to the case of getting better weed control and to a tendency for the deeper application to hold the fertilizer, especially the nitrogen, in closer contact with the rice roots. — R. K. Walker and M. B. Sturgis.

**Fertilizers for Sugar Cane**

Six experiments were conducted in 1946 on very fine sandy loam, silt loam, and silty clay loam soils. The 1946 growing season was very wet and both plant and stubble cane responded profitably to nitrogen at the 60-pound-per-acre level. Generally the best adapted treatment was 60 pounds of nitrogen, 25 pounds of $P_2O_5$, and 40 pounds of $K_2O$ per acre, and the average increase in the yield of sugar from the combination of these amounts of plant food was approximately 1,800 pounds of sugar per acre. The increases in yields of sugar varied from 1,600 to 3,500 pounds per acre. The percentage of purity and the sucrose content were not depressed by fertilizers.

The 1946 results show that more nitrogen could be used on the very fine sandy loam, silt loam, and silty clay loam soils of the sugar cane area. The results also indicate that at a high level of nitrogen fertilization phosphate and potash could be added profitably.

— R. K. Walker and M. B. Sturgis.

**Cotton Investigations in 1946**

**Varietal Trials**

Cotton variety tests were conducted at the Baton Rouge, St. Joseph, and Calhoun stations. These tests consisted of the principal commercial varieties and the more promising new varieties and strains. The purpose of conducting such tests is to determine the performance of varieties and strains at these locations in the state and to make this information available to growers and agricultural workers. Detailed reports on each of these tests at each of the three locations may be obtained upon request from the Louisiana Agricultural Experiment Station, Baton Rouge; the Northeast Louisiana Agricultural Experiment Station, St. Joseph, or the North Louisiana Agricultural Experiment Station, Calhoun.

To summarize briefly, these reports show that the varieties that gave the highest yield of lint per acre are as follows for each location: Baton Rouge—the Deltapine and Coker strains; St. Joseph—the Deltapine, Delfos, Stoneville, and Coker strains; Calhoun—the Deltapine, Delfos, and Stoneville strains.

**Breeding**

The cotton breeding work of the Louisiana Agricultural Experiment Station is carried on at Baton Rouge and at the stations at St. Joseph and Calhoun. Briefly, the breeding work consists of hybridization, selec-
tion, backcrossing and progeny testing, the purpose of which is to produce varieties and strains particularly well suited to the different areas of Louisiana. This work will be materially expanded beginning in 1947. A modern cotton fiber laboratory equipped with the latest scientific instruments is being provided for the testing of breeding material. The cotton breeding program is being conducted in close cooperation with the Division of Cotton and Other Fiber Crops and Diseases of the U.S.D.A.—C. C. Murray.

Test of Corn Varieties and Hybrids

Tests of corn varieties and hybrids were conducted at the following locations: (1) Baton Rouge, East Baton Rouge Parish, Louisiana Agricultural Experiment Station, on Olivier silt loam soil; (2) St. Joseph, Tensas Parish, Northeast Louisiana Experiment Station, on a Sharkey clay loam soil; (3) Calhoun, Ouachita Parish, North Louisiana Experiment Station, on Orangeburg sandy loam soil; and (4) Monroe, Ouachita Parish, on J. I. Simmon's farm.

The purpose of these tests was to obtain additional data on the performance of Louisiana commercial hybrids and the more promising experimental hybrids. Results of three tests conducted at Calhoun, three conducted at Baton Rouge and one at Monroe are presented in the Preliminary Report of the Crops and Soils Department. The results at St. Joseph are not presented because the yields are not typical of a normal season. At St. Joseph irregular stands were obtained owing to very wet weather.

The data presented show that the Louisiana commercial hybrids, 468, 502, 518, 1030, 1031 and 2909, continue to produce substantially higher yields than the open-pollinated varieties. Seed of these hybrids, which are adapted to different areas of the state, are available for planting in 1947. The general adaptations are: 468 for all northern Louisiana; 518 for northern and central Louisiana; 502 for the central area and the bottom soils of northern Louisiana; 1030 for all fertile soils; 1031 for all fertile soils except in the coastal area; 731, a new large-eared yellow dent, for all of the state except the coastal area; and 2909, a yellow flint, for all southern Louisiana.

In choosing a hybrid its performance over a period of years should be taken into consideration. In addition to yielding capacity a hybrid should have other characteristics, such as lodging resistance and insect resistance.

Although good hybrids are now in production, the study and testing of new breeding materials are in progress in order to determine better hybrids than those now available.—Hugo Stoneberg.  

1 Associate Agronomist, Division of Cereal Crops and Diseases, U. S. Department of Agriculture.
Hybrid Seed Corn Increase

In 1945 there were 50 acres planted to single crosses from which approximately 6,000 pounds of single-cross seed were produced. The average yield per acre in 1945 was only 120 pounds of usable single-cross hybrid seed.

Double-Cross Production

This seed was sold to the Louisiana Hybrid Seed Corn Association, Inc., in 1945, whose members planted 850 acres in double-crossing plots. These seed were allotted to 29 different producers, with production plots being planted in eleven different parishes. Even though the season started badly, the plots surviving gave very satisfactory seed yields, with an average yield of 15 bushels of cleaned seed per acre. There were instances where the yield of seed per acre was 40 bushels, which will compare favorably with 80 bushels of feed corn per acre.

About 750 acres in double-cross seed production were finally harvested in 1946, resulting in a production of 10,000 bushels of cleaned seed of Louisiana hybrids. This seed will be available to the farmers for planting in 1947, which means there is only enough seed of Louisiana hybrid corn to plant 60,000 to 70,000 acres, or 5 to 6 per cent of our total corn acreage. However, this can mean an increase of well over 250,000 bushels of feed corn in 1947.

Seed was produced for the following hybrids: Louisiana 468, 502 and 518, which are prolific, white dent types; Louisiana 1030 and 1031, which are mixed yellow, semi-flinty types; Louisiana 731, which was released for seed production in 1946 and is a large-eared, yellow dent type; and Louisiana 2909, a yellow flint of the Creole type.

Single-Cross Production

In 1946 there were 55 acres in 18 single-crossing plots planted in five different parishes. Finally, 33 acres were harvested with a total production of over 5,000 pounds of single-cross hybrid seed, an average of about 151 pounds per acre.

Production of single-cross seed requires careful and exacting work. It must be remembered that the inbred lines are, in general, weak plants of inherently low productive ability. Inbred plants do not withstand attacks of insects and diseases, or adverse weather very well. In general, their inability to pollinate in crossing plots, without artificial measures, usually leads to low seed yields. It is therefore necessary to use various measures to promote pollination. All these practices must be done at exactly the right time, or they would be of no value.—J. B. Holley.

Louisiana Soybean Varieties

The results of 18 years of testing at the Baton Rouge station indicate that the late maturing soybean varieties are more dependable than
the earlier maturing, so-called seed type varieties when grown under
the usual planting and cultural methods obtaining on a plantation. Late
maturing varieties usually yield more green matter for forage or for
turning under. They provide sufficient cover to hold other vegetation
in check during the entire summer and until the approach of maturity
in October and leave the soil in excellent tilth and with less weed seed
for the next crop. In tests at Baton Rouge some of the late maturing
types produced satisfactory seed yields as well.

Typical of the later maturing varieties are the Acadian, L. Z., and
Pelican—recently released by the Louisiana Agricultural Experiment
Station—and the Avoyelles, which has been the leading variety in Louisi-
a for the past several years. While the three newer Louisiana soy-
bean varieties originated from different strains, they are similar from a
practical standpoint in producing an abundance of yellow seed high
in oil and protein and in the production of high yields of forage suit-
able for hay or for turning under. The glossy seed does not shatter and
is normally of good quality and viable for planting the following spring.
They mature by November 1. If used for hay, they should be cut
during the first half of August. They may be planted at corn-planting
time or following it and can be planted immediately following the har-
vesting of oats if ample moisture is present in the soil. The highest
forage growth is associated with the earlier planting, while satisfactory
seed yields have been obtained from plantings made during April, May
and early June in date-of-planting tests.

In comparing the new Louisiana soybeans with the popular Avoy-
elles variety in tests at Baton Rouge, the Acadian, L.Z., and Pelican
varieties produced as much (or more) seed and forage as did the
Avoyelles for the same years.

The soybean research at Baton Rouge has been primarily a breeding
program involving the development and observation of promising strains
over a period of several years. Promising strains are grown and com-
pared with commercial varieties in variety tests before being grown in
field blocks for final observation and possible release to farmers. A
Louisiana selection of 85897 showing considerable promise was increased
in 1946, as were the Louisiana Green, which was developed as a forage
variety, and another selection made at the Baton Rouge station several
years ago from 104,881, which has been named Nanksey from the name
under which the original introduction was grown at Nanking, China.
The Louisiana Green equalled other late maturing soybeans in seed
production the past year and surpassed them in the production of forage.
The La. Sel. 85897 and the Nanksey appear promising as medium early
seed producers. They also produce sufficient forage growth to hold other
vegetation in check during the summer.

Much of the soybean seed crop is being destroyed each year by the
velvet-bean caterpillar. This insect is apparently the greatest hazard
to soybean production in south Louisiana although it can be controlled
by dusting.—John Gray.
Results of Source-of-Nitrogen Test
Show Need of Soil for Lime

The results of a source-of-nitrogen test for cotton conducted on Olivier silt loam since 1938 show that lime is needed to maintain the yields of cotton when the fertilizers used contain nitrogen in the ammonium form. Seven different sources of nitrogen were used. The rate of application was sufficient to supply 30 pounds of N, 48 pounds of \( \text{P}_2\text{O}_5 \), and 48 pounds of \( \text{K}_2\text{O} \) per acre per year. The fertilizers were applied to the same plot each year with the exception of 1943. Because some of the sources of nitrogen were not available in 1943, none of them was used, but instead a crop of Austrian winter peas was grown and turned under on all plots that year. A green manure crop of Austrian winter peas was also turned under in the spring of 1946. The yields of both the cotton and the winter legumes reflect the cumulative effect upon soil fertility of the continued use of the different sources of nitrogen on acid upland soils.

The five-year average (1938-1942, inclusive) yields of seed cotton produced by the different sources of nitrogen were as follows: nitrate of soda-potash, 1173 pounds; nitrate of soda, 1139 pounds; cyanamid, 1083 pounds; calcium nitrate, 1065 pounds; cottonseed meal-neutral, 1059 pounds; calnitro, 1027 pounds; ureamon-neutral, 1025 pounds; cottonseed meal, 1023 pounds; 16-20-0 ammonophos-neutral, 987 pounds; sulfate of ammonia-neutral, 973 pounds; 16-20-0 ammonophos, 819 pounds; sulfate of ammonia, 816 pounds; no nitrogen-check, 831 pounds; and no fertilizer-check, 503 pounds.

Ammonium nitrate, containing 32.5 per cent N, has been used since 1943 on the plot previously receiving 16-20-0 ammonophos. The nine-year average (1938-1946, inclusive) yields of seed cotton produced by the different sources of nitrogen have been as follows: nitrate of soda-potash, 1255 pounds; nitrate of soda, 1161 pounds; cyanamid, 1095 pounds; calcium nitrate, 1073 pounds; cottonseed meal-neutral, 1073 pounds; ammonium nitrate-neutral, 1067 pounds; cottonseed meal, 1063 pounds; ureamon-neutral, 1030 pounds; sulfate of ammonia-neutral, 1024 pounds; calnitro, 1018 pounds; ureamon, 956 pounds; ammonium nitrate, 863 pounds; sulfate of ammonia, 794 pounds; no nitrogen-check, 819 pounds; and no fertilizer-check, 433 pounds.

The nine-year average yields show that the fertilizers which contained nitrogen in the ammonium form and which also had sufficient lime mixed with them to neutralize the acid-forming effects of the ammonia, produced yields of cotton comparable to the highest yields obtained from any of the sources of nitrogen used. For the nine-year period, the average increase in yields from the plots receiving ammonium form of nitrogen in a neutral fertilizer over the yields obtained from the plots fertilized with the same nitrogen fertilizers amounts to 217 pounds of seed cotton per acre. The value of this amount of cotton at the prices
prevailing during the period of time in which this test has been con-
ducted is somewhat more than the cost of the fertilizer used.
—Franklin L. Davis.

Soil Analysis: An Aid to Farmers and
Agricultural Workers

The analysis of soils for fertility studies is being continued with
increasing interest from some sections of the state as more farmers and
agricultural workers become familiar with the services rendered by the
Soils Laboratory. During the past year about 2,000 soil samples were
received and analyzed and recommendations made for the various pas-
ture and field crops which the farmers were interested in growing.
An increasing number of samples is being taken from cultivated fields
for recommendations for row crops, in addition to those for recommenda-
tions for pasture improvement.

The analyses of the soils sent in by farmers and those taken from
the experimental plots over the state show clearly that most farmers
are not using sufficient amounts of fertilizer for most profitable crop
production and in many instances the fertilizers used do not carry the
proper balance of plant food elements. Only relatively small areas of
the Coastal Plain, Coastal Plain flatwoods, Coastal Prairie and Mississippi
River terrace soils are being properly fertilized with phosphorus and
potassium, which are generally very deficient in these soils. Most of the
soils in these areas are moderately to strongly acid and only about one-
tenth of the estimated annual requirement of lime is being used. There
are increasing symptoms of magnesium deficiencies in these soils, and
it is recommended that at least part of the lime applied be in the form
of dolomitic limestone, or that basic slag be used alternately with super-
phosphate as a source of phosphorus.
—W. J. Peevy, R. H. Brupbacher, and Willie K. O'Quin.

Seed and Forage Production of New Strains
of Dallis Grass

In the work with Dallis grass improvement, the primary objective of
the program has been to isolate strains that produce better quality seed,
without perceptibly altering the forage characteristics of the species. In
previous years it has been shown by experiments that sufficient variation
in seed production was present in native stocks for improvement by
selection. With only a few exceptions, strains have been relatively con-
stant from year to year in the yield and quality of seed produced.

While the better seed-producing strains should excel in any season,
it has been shown that even the best seed producers have much better
quality seed when harvested before July and after August. Often the
ergot content of August seed is about twice that for June or September
seed, and consequently the pure seed content is cut in half. Unless better
 cultural practices are adopted the yield of the summer crop will far
 exceed either the fall or spring crop. By better cultural practices is
 meant using fertilizer when needed and applying it at the right time,
 keeping livestock off the field after seeding begins, and harvesting the
 seed when they are ready for harvesting. Fertilizer should be applied not
 later than six weeks to two months prior to anticipated seed harvesting
 dates. The seed are harvested when three-fourths of the seed heads are
 found to shed the seed readily when the racemes are pulled between the
 thumb and forefinger.

 The better seed strains were planted in a forage yield test in 1946.
 The range in yield was from 10,875 to 7,004 pounds per acre green weight.
 It appears that although seed yield may be an indication of vigor in
 Dallis grass, it should not suffice as a final measure of the forage produc-
 ing ability. Obviously, the poorer forage types may be eliminated early
 in the program by observation of the space-planted progeny rows.
 —C. R. Owen.

 Major and Minor Element Studies in the Greenhouse

 Greenhouse pot studies have been made on soils shown by chemical
 laboratory methods to be deficient in the nutrient elements. An effort
 has been made to more definitely establish these deficiencies and to collect
 data on the response of indicator plants to major and minor elements. The
 results have been obtained this year from two types of soil, Bowie fine
 sandy loam and Oberlin silt loam. Soybeans, red clover and cotton were
 used as indicator plants.

 The plants responded to the use of the major elements as expected.
 Soybeans on Bowie fine sandy loam showed a response to both zinc and
 copper when used in combination with a complete fertilizer and dolom-
 itic lime. A response was shown from the use of zinc and copper in
 combination, but the yields were no larger than with zinc or copper
 used separately. Boron gave some increased yield of soybeans but was
 toxic and burned the foliage.

 Cotton gave a high response to the major elements, but the benefits
 from minor elements were of no significance.

 Red clover on Oberlin silt loam responded to zinc, copper and
 boron in additions with the major elements. Highly significant increases
 in yield were obtained when copper and zinc, zinc and boron, or copper
 and boron were added with 600 pounds of a 3-12-12 per acre and 2500
 pounds of dolomitic lime. A highly significant and greater increase
 was obtained from the use of copper, boron and zinc in combination with
 the 3-12-12 fertilizer and dolomitic lime. When manganese was added,
 a depression in yield resulted. Nitrogen, phosphorus, and potassium
 gave small increases without liming, but in combination with either calcic
 or dolomitic lime marked increases were shown.—C. W. McMichael.
Pasture-Rice Rotation Experiments

Experiments conducted on different soil types of the prairie rice area of Louisiana continue to show that a twelve-month grazing program can be developed (Louisiana Agricultural Experiment Station Bulletin 407). The rotation of improved pastures of Dallis grass, Bermuda grass, white clover, and lespedeza with rice is the surest means for increasing the yields of rice and for improving the soil productivity. Supplementary oat and lespedeza pastures have been used to complete the year-round grazing period and to furnish hay which has further supplemented the winter grazing.

BEEF PRODUCTION ON IMPROVED PASTURES ON OBERLIN SILT LOAM AT A.M. MOORE’S, OBERLIN, LOUISIANA—1946

<table>
<thead>
<tr>
<th>Pasture and treatments</th>
<th>Days of grazing</th>
<th>Animal units per acre</th>
<th>Beef production, lbs. per acre</th>
<th>Increases from treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Check—weeds and grasses following rice, moved twice</td>
<td>220 May 2–Dec. 12</td>
<td>0.45</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>2. Seeded to Bermuda, Dallis, white clover, lespedeza, 400 lbs. 3-12-12, 1.75 tons dolomitic limestone per acre (1945); 200 lbs. 0-12-12 (1946)</td>
<td>220</td>
<td>1.00</td>
<td>367</td>
<td>315</td>
</tr>
<tr>
<td>3. Seeded to Kobe lespedeza; 400 lbs. per acre 3-12-12 (1945); 200 lbs. 0-12-12 (1946)</td>
<td></td>
<td></td>
<td>1.92 tons of hay per acre cut August 20 and used as winter feed for cattle grazed on treatment 4</td>
<td></td>
</tr>
<tr>
<td>4. Seeded to oats Sept. 2; fertilized with 300 lbs. per acre 4-12-8 (1946). The oats followed lespedeza in treatment 3.</td>
<td></td>
<td></td>
<td>Grazed from December 12 to March 1. The animals grazing the oats are the same that were on No. 2 during spring, summer and fall. They are being fed the lespedeza from No. 3 which was harvested on the same land now occupied by oats.</td>
<td></td>
</tr>
</tbody>
</table>

RICE YIELDS AFTER PASTURES ON CROWLEY SILTY CLAY LOAM AT LOZEN LEGER’S, RAYNE, LOUISIANA

<table>
<thead>
<tr>
<th>Pasture treatment before the rice crop</th>
<th>Fertilizer treatment at planting</th>
<th>Yield of rice, bbls. per acre</th>
<th>Increase from fertilizer</th>
<th>Increase due to sod and fertilizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 400 lbs. 3-12-12, seeded (1943)</td>
<td>No fertilizer</td>
<td>17.36</td>
<td>.38</td>
<td>2.48 sod</td>
</tr>
<tr>
<td></td>
<td>200 lbs. 4-12-8</td>
<td>17.74</td>
<td></td>
<td>2.85 sod and fertilizer</td>
</tr>
<tr>
<td>2. 400 lbs. 3-12-12, 1 ton ground limestone per acre, seeded (1943)</td>
<td>No fertilizer</td>
<td>18.40</td>
<td>1.86</td>
<td>3.52 sod</td>
</tr>
<tr>
<td></td>
<td>200 lbs. 4-12-8</td>
<td>20.26</td>
<td></td>
<td>5.38 sod and fertilizer</td>
</tr>
<tr>
<td>3. Seeded only (1943)</td>
<td>No fertilizer</td>
<td>16.80</td>
<td>1.76</td>
<td>1.92 sod</td>
</tr>
<tr>
<td></td>
<td>200 lbs. 4-12-8</td>
<td>18.56</td>
<td></td>
<td>3.68 sod and fertilizer</td>
</tr>
<tr>
<td>4. Check—no fertilizer, no seeding</td>
<td>No fertilizer</td>
<td>14.88</td>
<td>2.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 lbs. 4-12-8</td>
<td>17.42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

—D. A. de la Houssaye and R. K. Walker.
Clover and Lespedeza Breeding

A breeding program was begun in 1945 for the purpose of improving legume crops used for pasture and for hay in the different areas of Louisiana. For the present the crops included are white clover, red clover and annual lespedeza. These species have been growing in Louisiana over a long period of time and they have become widely disseminated. Red clover is confined almost entirely to the river bottom land and its general use is expected to be limited to this area. Lespedeza, especially *L. striata*, is grown almost entirely on the upland soils, while white clover is grown rather extensively in both regions.

The experiments conducted in 1946 were planned as a preliminary survey of the germ plasms of these species. Seed collected from native stocks were planted on the experiment station farm for the purpose of making plant selections. Variations within each of the species are evidently sufficient to furnish ample opportunity for improvement by selection of individual plants. Variation in vegetative vigor was most noticeable, especially among different plants of white clover and red clover. Considerable differences were found in white clover plants in their ability to continue growing during the summer months. About 50 per cent of the plants set out in April were alive in October, and no more than 2 per cent appeared to have made any appreciable growth. Selections were made from those found to be vigorous in late summer and early fall. A few outstanding progenies were found among the lespedeza. They are being further tested in 1947.—C. R. Owen.

Nitrogen Changes in Flooded Soil Planted to Rice

A study of the influence of temperature and reaction on the loss of nitrogen from flooded soil has been continued. Since results from pot experiments in the open indicated that the losses of nitrogen from flooded soil were not as large in the presence of a rice crop as from uncropped soil, a greenhouse experiment has been conducted to determine the magnitude of the nitrogen loss from the soil and water system during the production of a rice crop.

The results indicate in some cases a net gain in nitrogen in the soil and water system rather than a loss. Some gains in total nitrogen were found where the rice was grown, even where sufficient copper sulphate was added to the flood water to prevent the growth of algae. No significant gains were obtained where large quantities of nitrogen had been added to the soil before planting and where algal growth was prohibited by addition of copper sulphate. The reaction of the flood water varied from pH 6.7 to 8.1 and the ammonium nitrogen in the water during the growing season varied from 18 p.p.m. to 0. Flooding for a four-month period raised the pH of the soil from 4.8 to 5.8. If the nitrogen fixation by microorganisms was responsible for the increase in nitrogen,
it was probably due to anaerobic nitrogen-fixing bacteria, since no relationship between the growth of algae and an increase in total nitrogen was apparent. A study of the algae showed that Anabena, Bumillaria and Cylindrospermum were the predominating genera.

—W. H. Willis and M. B. Sturgis.

The Rates of Sulfofication and the Effects of Grades of Agricultural Sulphur in Soils

A study has been made of the effects of different grades of sulphur on changes in pH, on available phosphorus, on available potassium, and on the colloidal aggregation in Clio silty clay loam. The effects of sulphur and fertilizer on the growth of soybeans under field conditions were also studied.

A laboratory study was conducted in the greenhouse using alkaline Clio silty clay loam soil which was placed in three-gallon stoneware jars and kept at optimum moisture and a temperature of 28-30° C. A field test was made on an alkaline plot of Clio silty clay loam soil on the Louisiana State University Agricultural Experiment Station farm located on Perkins Road, Baton Rouge, Louisiana. Treatments were made on .021 acre size plots and were replicated three times in randomized blocks.

The applications of black sulphur were almost, within the limits of experimental error, as effective as regular agricultural sulphur in lowering the pH of alkaline soil. Available phosphorus increased as sulfofication increased, while the available potassium decreased as sulfates accumulated. The oxidation of the sulphur had a marked beneficial effect upon the colloidal aggregation. The soybean yields were increased by additions of sulphur and the yields were also further increased by additions of 600 pounds per acre of 3-12-12 or 3-0-12 fertilizer with sulphur. The field yields were in accordance with the results obtained under controlled conditions and showed that more response was obtained from additions of potassium with sulphur than from phosphorus with sulphur.—Odis F. Haymon and M. B. Sturgis.
Excellent Pasture Resulted with Manure and Good Seedbed

An extension in the pasture experiments through the use of replicated small plots was inaugurated this past year on the B. P. Alford farm in Washington Parish. The application of barnyard manure produced striking increases in yields of permanent pasture herbage in this test. Where manure was used in combination with lime, phosphate, and potash, the yield averaged 7.38 tons of air-dry herbage per acre. This, when compared to areas receiving similar treatment without manure (which averaged 3.16 tons per acre), represented an increase of 134 per cent.

Manure, which was applied at the rate of five tons per acre, also resulted in better stands of white Dutch clover and Dallis grass on the experimental areas. This greatly improved the quality of the pasture, for these plants have been shown to be more palatable and higher in feeding value than are plants found on areas not treated with manure.

Prepared Seedbed Proves Best

Proper fertilization without proper seedbed preparation failed to produce a good pasture in the small-plot test during 1945-46 on the B. P. Alford farm. Seedings of white Dutch clover and Dallis grass made in the fall of 1945 resulted in poor stands where no preparation of the soil was made. As a result, the yields of air-dry herbage on such areas averaged only 3.2 tons per acre. As compared to this, yields from areas having good stands of clover and Dallis grass as a result of good seedbeds averaged 7.38 tons of air-dry herbage per acre.

Both areas received as fertilizer liberal applications of lime, phosphate, potash, and barnyard manure. Areas with no seedbed preparation produced almost as much herbage with lime treatment alone as where all fertilizers were used. As contrasted to this, the yields on areas receiving good seedbed preparation (plowing, disk ing, harrowing, packing) showed an increase of 4.68 tons per acre where all fertilizers were used as compared to lime alone.

Checks were made on how seedbed and fertilizer treatment affected the protein, calcium, and phosphorus content of the herbage. In every case the plots receiving manure in combination with lime, phosphate, and potash ranked highest. This was especially true on the areas having a well-prepared seedbed. The plots that fell into this classification averaged 7.38 tons of air-dry herbage, with the analyses of dry matter averaging for the season 14.79 per cent protein, 1.14 per cent calcium, and 0.39 per cent phosphorus. When considered from a nutritional standpoint
this is an extremely high yield of an almost ideal feed for producing dairy cows.

—D. M. Seath and L. L. Rusoff, with assistance of Feed and Fertilizer Control Laboratory.

How to Secure Good Dairy Pasture Demonstrated At Mt. Hermon

Records for 1946 on an experiment at Mt. Hermon, Louisiana, showed that a pasture renovated every second year ranked highest in yield among practices tested. Milk produced per acre by cows grazing areas averaged 6,230 pounds from the area renovated on a two-year schedule, 4,930 pounds from that renovated every fourth year, and 4,528 pounds per acre from that not broken and reseeded since the test started in 1941. Yields of air-dry herbage averaged 5.12 tons per acre under the two-year program, 2.82 tons on a four-year schedule, and only 2.68 tons where the sod hasn’t been broken since this phase of the experiment started five years ago. All test areas received the fertilizers lime, phosphate, and potash every second year.

The renovation program used was to completely break the sod, disk thoroughly, harrow, pack, and then reseed with white Dutch clover and Dallis grass. Areas so treated every two years have excelled in stands of clover and Dallis grass, with those renovated every fourth year second, while the unrenovated areas ranked last. The latter areas, on the other hand, have produced the highest percentage of the unpalatable grasses such as smut grass and broom sedge grass.

Jersey cows grazing clover and Dallis grass pasture improved by frequent renovation on B. P. Alford experiment near Mt. Hermon.
The experimental results showed an advantage for protein, calcium, and phosphorus content of dry matter secured from herbage in areas renovated, with a distinct advantage in favor of the two-year renovation program. This was most probably caused by the greater abundance of clovers in the areas thus treated. It appears probable that many pastures can best be either renovated periodically as in this experiment or be kept at a high productive stage by heavy fertilization or by a combination of both practices.

—D. M. Seath and L. L. Rusoff, with assistance of Feed and Fertilizer Control Laboratory.

Artificial Cooling of Cows Given Test

Can cows be artificially cooled during warm days, and how can it best be done? To secure partial answers to these questions four grade Jersey cows were observed during 10 relatively warm days and observations made to determine how shade alone or sprinkling with water followed by shade affected their comfort. Air temperatures during periods of observation varied from 83 to 90° F. and relative humidity between 61 and 80 per cent.

Body temperatures of cows after exposure to mid-day sunshine for two hours averaged 102.66° F., and when removed to shade (dry) were reduced by 0.34° and 0.74° F. after being in shade one-half hour and one hour, respectively.

Sprinkling of cows (with original body temperatures of 102.53° F. after in sun) reduced body temperatures by 0.54° F. after one-half hour in shade, and by 1.08° F. after one hour in shade. In this latter case cows had temperatures which are considered normal.

Respiration rates reduced to levels which averaged lower after one-half hour than after one hour in shade. Non-sprinkled cows that showed a respiration of 83 times per minute in the sun had an average decrease in rate of breathing of 27.2 at end of one-half hour and 25.2 after one hour. Cows sprinkled prior to shade had much greater reductions than did non-sprinkled cows in rate of breathing, i.e., 49.4 less after one-half hour and 41.6 less after one hour. Reductions in rate of breathing for non-sprinkled cows vs. those sprinkled favored the latter group by 81 per cent at end of one-half hour and by 65 per cent after one hour in shade.

Average reductions in pulse rates for non-sprinkled cows after in shade one-half hour were insignificant (0.8 times per min.) but were significant (3.6) after one hour. Cows when sprinkled showed decreases in pulse rate that averaged 6.1 after one-half hour and 6.6 after one hour.

Either shade alone, or sprinkling followed by shade was found effective in reducing body temperature, respiration rate, and pulse rate of dairy cows, with the latter procedure more rapid and also more effective in causing animals to approach readings that are considered normal.

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Whether or not the sprinkling method has a practical application for Louisiana dairy farms must await results of further experimentation.


**Hay Feeding on Pasture Given Trial**

A 60-day feeding trial was conducted with 20 cows to determine the advisability of feeding hay during warm summer months while cows are on pasture. This was inaugurated as a direct result of a previous experiment which showed that cows on hot days often spend less than two hours grazing between morning and evening milkings. In the present trial mixed white Dutch clover and canary grass hay was fed in racks located in the shade to cows at around 11 o’clock daily. Two levels of hay feeding were tested, i.e., in one case the cows were limited to 0.5 per cent of body weight daily, and in the other they were fed all they would clean up. Hay consumption averaged 4.69 pounds per cow daily under the first plan, and 5.54 pounds daily for the second.

Milk production data showed that the full hay-feeding plan produced significantly more milk than where no hay was fed (increases averaging 0.1 and 1.0 pound milk per day per cow for the two respective test groups), but the increase would not be economically profitable. On the limited hay the average increase was slightly less, again making the practice unprofitable under the conditions prevailing, which included excellent permanent pastures stimulated by abundant rainfall.


![A view of pasture and part of Holstein herd used in summer supplemental hay feeding trial.](image)

**Heat Tolerance of Jerseys Greater Than for Holsteins**

Evidence gathered from a two-year test at Baton Rouge, Louisiana, gave information indicating that Jersey cows are slightly more tolerant to hot weather than are Holstein cows. The greatest difference found be-
tween the two breeds was in body temperature, with Holsteins showing 0.7° F. higher in average temperature for one year and 0.8° F. higher the other. Hot weather caused a greatly accelerated respiration rate; but there was no significant difference detected between breeds. For both breeds nature apparently provided that the breathing rate should speed up in step with air temperature increases above 70° F., and it appeared that the rate of increase was about the same for both breeds. Pulse rate changes, while much less, showed some increase due to hot weather, but no breed difference could be detected.

Holstein cows showed a marked tendency to lie or wallow in mud and water during the heat of the day. This resulted in very dirty cows, necessitating much washing prior to milking. They appeared to do this more on the warmer days in an effort to keep cool. Jersey cows showed much less tendency in this direction.—D. M. Seath and G. D. Miller.

**Seasonal Comparison of Nutritive Content of Carpet and Dallis Grasses**

A study was made of the seasonal trends of some of the nutritionally important constituents of two species of pasture grasses, with particular reference to carotene content and its relation to the other constituents. The species chosen were two which occur commonly and show abundant growth on improved pastures of Louisiana, namely, carpet (*Axonopus affinis*) and Dallis (*Paspalum dilatatum*) grasses.

Samples of carpet and Dallis grasses from four plots located in Washington Parish were collected in a manner intended to simulate the grazing of a cow on a typical South Louisiana improved pasture. The collections were made at three- to four-week intervals, from late March, 1946 to early November, 1946, and analyzed for crude carotene, crude protein, lignin, cellulose, calcium, phosphorus, and moisture.

On an average and over the greater portion of the nine months growing season of 1946, Dallis grass had a higher content of carotene, protein, lignin, cellulose, calcium, phosphorus, ash, and moisture than had carpet grass. However, during the hot months of August and September carpet grass was as good or better as a source of carotene, protein, calcium, and phosphorus. Less seasonal variation in composition was observed for carpet grass than for Dallis.

In so far as carotene, protein, and calcium are concerned, Dallis grass had maximum values in the early spring, and carpet grass in the early summer.

The carotene, protein, phosphorus, and ash values for both species were comparatively lower in the late summer when the highest temperatures were recorded, but during which there was no apparent drought. The values for these constituents rose appreciably with the advent of the cooler fall weather.

The moisture content of the two species was the only constituent which responded in a consistent manner to increasing rainfall.

Mineral Deficiency Not the Primary Cause of Malnutrition of Dairy Cows

In one phase of an experiment recently completed, it was concluded that a low content of calcium or phosphorus in the feed is not the primary cause of malnutrition among dairy cows during the winter months.

Field studies of malnutrition among dairy animals in Tangipahoa Parish, milkshed area for New Orleans, gave some indication from soil, forage, and blood analyses that a deficiency of calcium or phosphorus, or both of these minerals might be the primary cause.

However, a controlled feeding experiment at L.S.U. with ten grade Jersey heifers and four cows over a two-year period on a basal ration of poor quality native grass hay, low in calcium and phosphorus content, and cottonseed meal or blood meal, corn, and salt failed to produce any definite mineral deficiency. Supplementing this basal ration with calcium (oyster shell flour) or phosphorus (sodium dihydrogen phosphate) or calcium and phosphorus (bone meal) failed to produce any detectable advantage over the basal ration when growth records, blood levels, reproduction and lactation records were considered.

The practice of allowing dairy animals to forage for themselves in the upland piney woods areas without receiving any grain mixture or hay of any kind, or having access to improved fertilized pasture most probably results in malnutrition associated with protein starvation, calcium and phosphorus starvation, and lack of total digestible nutrients.

—L. L. Rusoff and D. M. Seath.

"Normal" Blood Values of Louisiana Dairy Cattle

Average blood plasma calcium and inorganic phosphorus values of dairy cows were found to be in line with "normal" values reported elsewhere. Monthly or bimonthly studies were made of dairy cows in two herds fed and managed better than average and of an experimental herd fed low quality hay over a two-year period. Much variation was found in the values during this period.

The plasma calcium values for the animals in one of the well-fed herds located at L.S.U. ranged from 9.00 to 15.28 milligrams for 100 c.c. of plasma (mg.%), with a mean of 10.89± 0.21; for the U.S.D.A. herd at Jeanerette the range was 9.35 to 13.87 mg. %, with a mean of 11.36± 0.15; and for the experimental herd fed low quality hay the range was 7.22 to 12.73 mg. %, with a mean of 9.95 mg. %.

The plasma inorganic phosphorus values for the animals in the L.S.U. herd ranged from 4.00 to 8.80 mg. %, with a mean of 5.77± 0.13; for the Jeanerette herd the range was 3.50 to 9.00 mg. %, with a mean of 5.03± 0.07; and for the experimental herd the range was 3.07 to 9.44 mg. %, with a mean of 6.14.
A study was also made of the erythrocyte (red blood cell) count, leucocyte (white blood cell) count, and differential leucocyte percentages.

In general, the erythrocyte counts of Louisiana dairy cows are lower while the leucocyte counts are higher than “normal” values reported elsewhere.—L. L. Rusoff and P. L. Piercy.

**High Quality and Early-cut Hay Best Feed for Dairy Cattle**

Three digestion trials using Kobe lespedeza hay, a variety of common lespedeza, showed that the high quality, early-cut hay was highest in percentages of protein and total digestible nutrients.

The digestion trials, involving four dairy steers, determined the feeding value of Kobe lespedeza hay at three stages of maturity.

The hay, approximately 90 per cent pure, was obtained from a farm near Baskin in Franklin Parish. The first cutting of the hay was made slightly earlier than the full-bloom stage, the second cutting was made during early-seed stage, and the third in the full-seed stage. This last cutting produced very poor quality hay.

The early-cut, high quality Kobe lespedeza proved more valuable than the late-cut hay because of its higher nutritive value. The percentages of crude protein (dry basis) for the bloom, early-seed, and late-seed stages of Kobe lespedeza hay were 10.48 per cent, 8.21 per cent, and 6.15 per cent respectively; percentages of digestible protein 4.98, 2.65, and 0.22; and the total digestible nutrients were 50.06, 49.22, and 40.70. These values are very similar to those of common lespedeza hay at the same stages of maturity.

Entomology

Cotton Insect Studies

Benzene Hexachloride Shows Promise in Controlling Several Major Cotton Insects

Benzene hexachloride was tested extensively against cotton insects in 1946. The results indicate that the chemical may be useful in controlling the following: boll weevil, cotton aphid, cotton leafworm, cotton fleahopper, tarnished and rapid plant bugs, and thrips. Benzene hexachloride failed to control the bollworm and red spider, and in some experiments caused an increase in their numbers. Benzene hexachloride killed many beneficial insects.

The results indicated that a minimum dosage of one-half pound of the gamma isomer (example, 10 pounds of benzene hexachloride containing 5 per cent of the gamma isomer) per acre was required to give a satisfactory control of the above insects; that the intervals between applications for the control of the cotton boll weevil should be not more than four or five days; and that benzene hexachloride should not be mixed with regular calcium arsenate. The following materials were used as diluents with satisfactory results: sulphur, pyrophyllite, clay, and talc. When sulphur was used as the diluent with benzene hexachloride, no serious red spider infestations developed. Heavy dosages of the chemical burned young tender leaves of cotton under certain conditions. Laboratory examination of seed from cotton dusted with benzene hexachloride showed no evidence of taste or odor of the material.

Benzene hexachloride should be handled and used with care because little is known about its toxicity to man, animals, birds, and fish. It has a persistent, pungent, disagreeable odor, and cases of nausea, headache and skin, eye, nose and throat irritations have been reported.

Although benzene hexachloride appears to possess outstanding insecticidal properties, much additional information is needed in regard to its use before recommendations are made.

Timely Applications of DDT Controlled the Bollworm

The results of 1946 experiments and practical field applications showed that DDT is more toxic to the bollworm than any other material tested to date. Cryolite and calcium arsenate also gave economical control when properly applied. Best results were obtained when the insecticides were applied at five-day intervals, starting soon after the worms appeared and were still small.

2,4-D Shows Promise as a Herbicide in Eradicating Field Hosts of the Sweetpotato Weevil

The results of experiments testing chemical compounds in destroying field hosts of the sweetpotato weevil indicate an effective and practical value for several, especially 2,4-D. Sodium fluoride and calcium fluosilicate applied as dusts killed the vines of the morning-glories Ipomoea hederacea, I. trichocarpa, and I. pandurata to about the ground level. Sodium fluoride killed the roots of some of two small-rooted morning-glories, I. hederacea and I. trichocarpa, but appeared to have no effect on the large tuberous root of I. pandurata. 2,4-D killed the tops of all three species and all of the roots of I. hederacea and I. trichocarpa, and a high percentage of I. pandurata.

In experiments on sweetpotatoes, Dinitro-o-secondary butyl phenol, ammonium sulfamate, sodium fluoride, calcium fluosilicate, oil (50 per cent aromatic), and sodium pentachlorophenate killed a high percentage of the vines down to the crown, their apparent effectiveness being in the order named. All of these chemicals appeared to have little or no effect on the underground roots, including the potatoes.

As in the case of the morning-glories, 2,4-D was highly effective in destroying the vines of sweetpotatoes, and destroyed a high percentage of the underground roots, including the potatoes. However, 2,4-D had very little effect on the underground parts when the crowns were cut just below the ground surface immediately before or immediately after the application. The effects of 2,4-D on the underground parts when the crowns were cut one day after application was about 80 per cent, and when cut three days after application, 100 per cent, compared to non-cut crowns. There was very little difference in the effectiveness of different forms of 2,4-D and the dust and spray applications.


Sugarcane Insect Control

Three New Insecticides—Benzene Hexachloride, “3956” and Ryanex—Compare Favorably with Cryolite for Sugarcane Borer Control

In eleven experiments designed to compare cryolite with various new and promising insecticides for control of first and second generation borers and fall generations in summer-planted cane, it was found that benzene hexachloride, 2.88 per cent gamma isomer; “3956,” 5 and 10 per cent; Ryanex, 50 per cent; and sodium fluosilicate, 50 per cent, were equal to undiluted cryolite in effectiveness. Both the benzene hexachloride and “3956” effected a near perfect control of the yellow sugarcane aphid, which sometimes builds up in large numbers following extensive dusting of cryolite.

The time of starting applications of cryolite and sodium fluosilicate was studied in three experiments. In only one of the tests did a significant difference occur between the different starting dates—cryolite at the
latest date effected a much lower control than at the earlier starting dates. It would appear that in most instances there is about a two weeks period from the time of the first hatching of young borers until they commence to bore into the plants. Sodium fluosilicate has been more effective than cryolite when dust applications were started beyond the optimum time.

Third generation control does not appear to be profitable. Four applications of cryolite for third generation control in two large plane tests did not result in a significant reduction of joints bored. Furthermore, heavily infested cane is usually too severely damaged by the second generation to show much improvement from control of the third.

It may be economical to dust summer-planted Co. 290 for control of fall generations. Co. 290 summer-plant dusted in the fall of 1945 showed an increase of about 400 pounds of sugar per acre over the untreated checks at harvest time in 1946.

A four-year study of the practical application of cryolite dusting for borer control on several plantations was terminated in 1946, with the conclusion that the efficacy of this practice is thoroughly proved.

For many years we have realized the need of detailed data on the losses resulting from different levels of borer infestation. From a study made this past year, it is possible to estimate the losses in weight of cane, sucrose, yield of sugar, length of stalk, and number of joints resulting from different levels of borer infestation in six of the commercial varieties of cane. These data should be of tremendous value in determining the areas which justify expenditures for dusting.

Approximately 7,000 acres of the heaviest borer infested cane in Louisiana were dusted in 1946 with cryolite, with an estimated saving to the growers of approximately $300,000. Even with the protection of 7,000 acres by dusting, the annual borer injury survey, in cooperation with the Federal Station, revealed that there was an average of 10.3 per cent of the joints bored throughout the cane belt, which amounts to an estimated three million dollar loss from borer damage.


**Velvetbean Caterpillar Control on Soybeans**

The velvetbean caterpillar appeared in limited numbers in the southern part of the state from July 6 to 13. A light to medium infestation developed about August 2, and by August 15 soybeans were being severely stripped in the lower sugarcane section. Around Baton Rouge and in the seed producing area, devastating infestations appeared the last week of August.

Three insecticidal experiments were conducted to compare cryolite, DDT, benzene hexachloride and "1068." Three per cent DDT proved to be considerably more effective than cryolite, especially when rain fell shortly after dust applications were made. DDT also exhibited outstanding residual properties, protecting the leaves throughout the season from attack by the caterpillar and various leaf-feeding beetles. Cryolite
treatments were later stripped by the caterpillar and would have needed an additional application. Low concentrations of benzene hexachloride and "1068" showed some promise for the control of this insect.

In 1946, approximately 25,000 acres of peanuts, 300,000 acres of soybeans, 9,000 acres of Crotalaria, and 5,000 acres of velvetbeans were infested by the velvetbean caterpillar in Louisiana. About 57,000 pounds of insecticides were used against the caterpillar, which averted a large part of the potential loss from this insect.


Production of Summer-Planted Squash Possible Through Use of Cryolite

The production of summer or "off-season" squash is possible, provided the crop is kept dusted with cryolite. The use of 15 to 25 pounds of cryolite per acre on summer squash in experiments in 1946 gave fair control of nearly all the various species of insects which normally destroy this crop at this time of the year. Weekly applications are necessary, beginning when the plants are about 6 inches high and continuing until harvest is complete. The use of DDT on squash in the same experiment proved detrimental, causing a dwarfing of the plant and a failure to set fruit.

Summer-planted squash promises to be an excellent "catch crop" during the summer months for truck growers. This problem needs further investigation.—E. H. Floyd.

A More Desirable Form of Nicotine Found for Use In Cucumber Dust Formula

Experiments conducted in 1946 using Black Leaf Dry Concentrate as the source of nicotine in the cucumber dust formula proved successful. This form of nicotine was found to be compatible with cryolite and copper, and cryolite and Fermate. Equally as good control of aphids was obtained from the use of this nicotine as compared to that of nicotine secured from Black Leaf 10. Dry Concentrate is a form of nicotine that is only slightly volatile, and highly soluble in water, that can be stored in loose containers over long periods of time with little if any loss of nicotine. Its action on aphids is somewhat slower than that of Black Leaf 10; however, indications are that it is a surer kill over a period of time.—E. H. Floyd.

DDT and Cryolite Successful in Controlling the Tomato Fruitworm

Experiments in the control of the tomato fruitworm on fall-grown tomatoes were continued in 1946. DDT and cryolite gave best results. Calcium arsenate and "1068" (2 per cent) gave only partial control.
It was found that cryolite or 3 per cent DDT applied at weekly intervals for four or five applications beginning when the first fruit began to form and continuing until the first fruit matured gave practically a 100 per cent control of the fruitworm. Untreated tomatoes in the same experiment suffered more than a 20 per cent loss of fruit due to the fruitworms. Both DDT and cryolite gave a residual action which lasted well over a month.—E. H. Floyd.

**Insects on Summer-Planted Corn Controlled With Benzene Hexachloride**

Experiments have been in progress for a number of years in an effort to control the insects responsible for the total destruction of summer-planted corn in Louisiana. In the summer of 1946, a preliminary test was made using approximately a 7 per cent gamma isomer benzene hexachloride dust on late summer-planted corn. Five applications were made beginning when the corn was 6 inches in height. This treatment was effective in controlling all species of insects attacking the crop with the exception of the corn earworm.

Among the more important insects infesting summer corn are the fall armyworm, a Fulgorid hopper, corn earworm, cane borer, aphids, cotton sharpshooter, and wasps which rasp the leaves. Further experimentation is needed on this problem.—E. H. Floyd.
Fertilizer and Feedstuffs Laboratory

Activities of the Laboratory

The primary function of the laboratory is performing analyses of official samples of feedstuffs, fertilizers, and insecticides submitted by the inspectors of the State Department of Agriculture. These analyses are carried out in accordance with the procedures of the Association of Official Agricultural Chemists. These analyses are reported to the State Department of Agriculture and serve as a basis for enforcement of the laws pertaining to the sale and distribution of these materials.

During the past year about 1,000 samples of feedstuffs, 1,000 samples of fertilizers and 50 samples of insecticides, representing at least one sample from each brand sold in the state, were analyzed.

A second and important phase of the work of the laboratory consists of assisting the research program of other departments of the Experiment Station by providing analyses of feedstuffs, local matter, spray residues on plants, agricultural limestone, and range forage grasses. Approximately 300 samples of this kind were analyzed during the year.

In addition to these activities the laboratory analyzes various materials of agricultural interest for farmers and for business concerns whose activities are related to agriculture. About 200 such analyses were made on such substances as feedstuffs, fertilizers, insecticides, peat, tung nuts, limestone, and water. A number of samples of feeds and viscera of animals were examined in cases of suspected poisoning of farm animals.

—E. A. Epps, Jr.
Home Economics Research

Nutrition Education

Studies in Nutrition Education Research, initiated in October, 1944, were tentatively planned for a two-year period with a grant from the General Education Board. State funds were available in July, 1946 for continuation of the studies for at least another two years.

Figure 1.—Physical examinations of Ascension Parish high school girls made by staff members of the Nutrition Research Division of the Department of Internal Medicine, Tulane University Medical School, 1946.

Figure 2.—Ascension Parish high school girls learn to take tests of general motor ability under supervision of instructor from Louisiana State University, Department of Health and Physical Education, 1946.
The first year's work included surveys of food habits and dental conditions. On the basis of those survey findings, programs of nutrition-health education were developed which provided three specific opportunities for experimental work in 1945-1946. They were: (1) Methods of teaching nutrition used by four high school teachers. (2) Organizing teacher-committees to work on problems of nutrition and health. (3) Interpreting nutrition education materials for elementary teachers.¹

(1) Methods used by four high school teachers have been studied during the past year. In general the study was designed with emphasis upon a selected pre-testing, teaching, and re-testing procedure concerned with nutritional status, nutritional education and nutritional opportunity. Data collected are being studied by the several groups responsible for specific phases of the study.² The analyses are not complete. (See Figure 1 and Figure 2 illustrating selected phases of the testing program.)

While there are only four teachers whose methods are considered in this experiment, and whereas the effectiveness of their methods was measured in terms of group increments, it is believed that a careful study of their methods which were most productive should yield several procedures to be tested under more carefully controlled conditions.

(2) Organizing teacher-committees to work on problems of nutrition and health.

An account of how the teacher-committee's work was planned as an integral part of the Third Ascension Parish School Work Conference is given in Bulletin No. 598, Louisiana State Department of Education, pp. 26-36 (February 1946).

A review of committee work as revealed by secretarial reports supplemented by frequent visits to schools shows that at least five different kinds of nutrition education activities were promoted by the committees during the 1945-1946 year. They were:

1. Instructional activities with pupils in classrooms and lunch-rooms. (Reported by all schools.) (Figures 3, 4, 5 and 6.)
2. Periodic meetings with school lunch personnel. (Reported by three schools.) (See Figure 7.)
3. Community-leader meeting. (Reported by one school.) (See Figure 8.)
4. Held meeting as planned with teachers and community leaders participating in program and in discussion. (Reported by one school.)
5. Committee sent invitations to parents to attend meeting at school. Teachers were responsible for the program. Little discussion followed. (Reported by one school.)

¹ See Annual Report, Agricultural Experiment Station, Louisiana State University, 1944-1945.
² Ibid.
Figure 3.—Teacher points to charts showing children ratings of their own food habits based on research findings.

Figure 4.—Teacher supervises children scoring their food habits records in terms of "protective" foods. ("Protective" foods are those rich in proteins, minerals and vitamins.)
Figure 5.—Teacher and pupils pose with their exhibit of nutritional materials collected and arranged by them as culminating activity in their nutrition unit.

Figure 6.—High school English teachers supervise pupils during lunch, recognizing nutrition as part of total school program with lunchroom serving as laboratory where knowledge is applied to experience.
Figure 7.—Teacher-committee, lunchroom personnel, principal and supervisor "score" lunches served in terms of protective foods, Ascension Parish, Louisiana, 1946.

Figure 8.—Community leaders, teacher-committee, and principal meet to study results of food habits and dental survey and make plans for improvement, Ascension Parish, Louisiana, 1945.
A study of methods used by teacher-committees showed wide variation as may be expected when teachers without special preparation carried out the work. However, the teacher-committee (St. Amant) whose work resulted in the greatest improvement of food habits (see Table 1) followed methods which promoted a community-leader meeting followed by a larger community meeting as well as periodic meetings with school lunch personnel to "score" lunches served in terms of protective foods. Teacher-committees plan to continue working for several years and report annual summaries of the work to be compiled for study.

**TABLE 1.** Percentage Rating of Food Habits of Children in Ascension Parish, Louisiana, by Schools, December, 1944 and 1945 (White only)

<table>
<thead>
<tr>
<th>School</th>
<th>Good 1944</th>
<th>Good 1945</th>
<th>Fair 1944</th>
<th>Fair 1945</th>
<th>Poor 1944</th>
<th>Poor 1945</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Amant</td>
<td>0.5</td>
<td>22.4</td>
<td>49.8</td>
<td>70.3</td>
<td>49.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Dutchtown</td>
<td>2.0</td>
<td>24.0</td>
<td>61.4</td>
<td>71.4</td>
<td>36.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Donaldsonville</td>
<td>2.3</td>
<td>0.8</td>
<td>56.5</td>
<td>65.4</td>
<td>41.2</td>
<td>33.8</td>
</tr>
<tr>
<td>Gonzales</td>
<td>1.8</td>
<td>5.8</td>
<td>57.7</td>
<td>66.9</td>
<td>40.5</td>
<td>27.3</td>
</tr>
<tr>
<td>Galvez</td>
<td>0.0</td>
<td>9.1</td>
<td>66.7</td>
<td>71.2</td>
<td>33.3</td>
<td>19.7</td>
</tr>
<tr>
<td>Total</td>
<td>1.5</td>
<td>11.7</td>
<td>57.0</td>
<td>68.4</td>
<td>41.5</td>
<td>19.9</td>
</tr>
</tbody>
</table>

**TABLE 2.** Variations in Group Scores Made on Tests of Nutrition Information and Nutrition Practice at the (a) Beginning and (b) End of the Experimental Period, 1946 (Scores expressed in percentage.)

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.</th>
<th>Information</th>
<th></th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Beginning</td>
<td>End</td>
<td>Beginning</td>
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<tr>
<td>I</td>
<td>12</td>
<td>77</td>
<td>81</td>
<td>62</td>
</tr>
<tr>
<td>II</td>
<td>15</td>
<td>71</td>
<td>75</td>
<td>56</td>
</tr>
<tr>
<td>III†</td>
<td>17</td>
<td>76</td>
<td>85</td>
<td>64</td>
</tr>
<tr>
<td>IV†</td>
<td>11</td>
<td>80</td>
<td>81</td>
<td>57</td>
</tr>
</tbody>
</table>

*Interpretations were made for Group III only.
†Group IV and V combined as Group IV since only three test records were complete in Group V.

(3) **Interpreting nutrition education materials for elementary teachers.**

An experiment with teaching materials showed that personal interpretation by a nutritionist yielded higher levels of both nutrition information and practice.
The differences between test and re-test scores both for nutrition information and practices were in all cases small. Therefore, it seems quite probable that chance rather than control factors may be accountable for the differences. However, the fact that in every case the re-test score is higher than the test score suggests that experiences with selected nutrition education materials was a determining factor in the differences between first and second scores. The quality of those experiences, however, cannot be held as significant by the small differences in scores between the groups unless highest re-test score is considered a valid criterion. (See Table 2.) If that criterion is accepted then it is permissible to conclude that nutrition education materials are used more effectively when personally interpreted by a nutritionist than they are without such interpretation.

It may be that an experimental period of longer duration would afford opportunity for a more meaningful approach to this problem. It is recommended that the use of other measuring devices, as well as improvement of the ones used here, be considered and tried under similar conditions so that the effectiveness of personal interpretations of nutrition education materials might be more critically evaluated. Perhaps it would be well to hold the discussion periods at a time other than the last hour of the school day.—Floy Eugenia Whitehead.
Horticulture Research

Breeding New Members of the Cabbage Family
For the South

The collard is the only member of the cabbage family that can be planted in the spring of the year and that will stand the heat and drought of the midsouth and still produce an edible plant during the fall and winter. It is for this reason that crosses have been made between collards and cauliflower and collards and broccoli. The object in making these crosses is to obtain a plant that will produce a cauliflower type head or a broccoli type head that would have all the heat and cold resistance of the collard. The first generation lines from these crosses have been selected. The first generation crosses between collards and cauliflower resemble the plant characters of cauliflower. The crosses between broccoli and collards show largely the characteristics of broccoli but are somewhat intermediate. It is interesting to observe that the first generation crosses show a 50 per cent increase in hybrid vigor over either parent. The first generation selection will be backcrossed to each of the parents as well as intercrossed and selfed. The first generation is much more hardy than broccoli or cauliflower and has stood the cold weather of winter and produced good, edible broccoli type sprouts. The heads of the cauliflower crosses were more compact and many of the heads or sprouts were enclosed in the sheath or wrapper leaves somewhat like those of a head of cabbage. Pure lines will be selected eventually from the better types with the hope of breeding a new member of the cabbage family for the home and market gardener of the midsouth, thus allowing gardeners to grow more than one member of the cabbage family, which will supply a more varied and a wholesome diet.—Julian C. Miller.

Dewberry Breeding Work

Last spring 30 wild selections of dewberry and blackberry and dewberry-blackberry hybrids were collected and planted in an experimental block. Seed of the selected plants was saved and later planted in a cold frame. Approximately 2,000 seedlings were obtained but owing to lack of suitable land to put them on only about 800 were set in the field. In addition to the wild selections and seedlings, the planting includes the Boysenberry from Iowa, the Rossberry (a thornless Boysenberry type of plant from Texas), and four varieties selected from a raspberry-dewberry cross made in Texas. None has fruited to date.—D. C. Alderman.

Tree Fruit Varieties at Baton Rouge

Two years ago a small block of pear, plum, and fig varieties was
planted at Baton Rouge. The purpose of this project is to study varietal adaptation before making plantings to a permanent orchard.

Pears—Seven Tennessee selections and two Minnesota varieties are now entering their third growing season. All are too young to pass judgment on except that all of them are susceptible to leaf spot. Pear No. 46 (3781D) appears to have very little rest period requirements.

Figs—There are seven varieties, nearly all of which fruited lightly in 1946. Of those that fruited, none was equal in quality to Celeste although all were larger.

Plums—There are 19 plum varieties now in their third growing season. Twelve are Minnesota selections and seven are southern varieties. The interesting observation about the plums is the difference in rate of growth between the northern and southern varieties. The latter are about twice the size of the former.—D. C. Alderman.

Production of Okra Seed for Oil

Reduction of the cotton acreage in many areas of the South and reduction of imported fats, oils, and their by-products has brought about an acute shortage of edible oils and protein feeds. With better mechanized equipment now on the market it is possible to produce oil bearing crops that heretofore it was not practical to grow. This applies particularly to the production of okra seed for oil and also opens new possibilities of utilizing one of our well-adapted crops for a new agricultural and industrial purpose. Okra will grow throughout the South, and farther north than cotton. It will grow in many rich alluvial areas, particularly in the lower Mississippi Valley, where it is not practical to grow cotton owing to excessive moisture. Okra grows well on a wide range of soils and can be planted over a long period of time—from April to the middle of June. On hill soils, yields of dry seed have been produced ranging from 300 to 600 pounds per acre, on Red River soils from 600 to 1,000 pounds per acre, and on Mississippi alluvial soils from 1,200 to 2,000 pounds per acre. Like cotton and many other crops, the earlier okra is planted, the higher the yields. Many growers have found it profitable to plant okra following an oat crop. This would give two money crops on the same land each year. It is recommended that we not plant okra after the 15th of June because of the difficulty of getting a good stand as a result of possible dry weather and also because the shorter growing season results in lower yields. It is recommended that okra be planted in rows 3\(\frac{1}{2}\) to 4 feet apart and spaced 12 inches apart in the row and that a complete fertilizer analyzing 4-12-4 be used at the rate of 300 to 400 pounds per acre. If planted early the crop will require very little culture, probably not over two to three cultivations. Plants are allowed to grow all summer and to be killed by frost and should remain in the field a month or until the stalks are thoroughly dried and the weather is ideal for harvesting with a combine. The pods will remain in a sound condition until late March, thus allowing plenty of time for harvesting.
Experiments conducted this year demonstrated conclusively that only the round-podded varieties, Louisiana Green Velvet, Dwarf Green Velvet, and French Market, would be recommended, due primarily to the fact that the angle-podded varieties crack open and seed shatter from them, while the round-podded varieties remain sound throughout the season without damage to the seed. Seedling 1 H. S. is a dwarf selection of Louisiana Green Velvet and will probably be recommended when seed of this variety is increased in volume. At the present time the Louisiana Green Velvet is recommended to anyone wishing to grow okra for oil.

Experimental tests have shown that okra seed oil can be processed and put into commercial use similar to that of cottonseed oil. Several large users of oil have agreed to purchase okra seed at a similar price paid for cottonseed. Growers producing 800 to 1,000 pounds per acre should realize around $50 to the acre, which is in line with many of our agricultural crops.

Considering the facts that okra grows on a wide range of soil types throughout the South, that it is practically immune to disease and insects, except nematodes, and that more high quality oils and more protein feeds are needed, it is believed that production of okra seed for oil has a place in Southern agriculture, particularly in certain areas where now it is not profitable to grow cotton.


Cover Crop and Fertilizer Experiments with Peaches

This project, consisting of six cover crop plantings and four fertilizer rates, was initiated in the spring of 1946. The experiment was arranged in such a manner that all cover crop plantings received all four fertilizer rates, making a total of 24 treatments. Each treatment was replicated three times, and the experiment was set up at three different locations.

The results of one season’s records on yield, terminal growth and trunk circumference when analyzed revealed more variations between trees of a single plot than between treatments. This was due largely to variation in tree size between trees in a single plot. In view of such negative findings it was felt that a revision of the entire experiment was necessary, and the project has been drastically changed.

—D. C. Alderman.

Breeding Studies in Sweet Potatoes

Preliminary studies were made to try to determine the inheritance of certain characteristics in the sweet potato, and to force into blooming certain varieties that do not flower readily.

In selecting a good table stock sweet potato that is high in carotene, invariably one runs into a potato that is also high in moisture. This indicates that there is a linkage between genes for high carotene and
those for high moisture. The industrial type sweet potatoes, the whites, average around 65 per cent moisture, many reaching as low as 60 per cent moisture, while the table stock potatoes, the carotene types, average around 71 per cent moisture. There are a few instances where high carotene potatoes are found that have comparatively low moisture, indicating that perhaps crossing over has taken place.

In an effort to make certain varieties, such as the Yellow Jersey, bloom, grafts were made on seedlings that bloom readily. The reciprocal was also tried. It was thought that perhaps there was a growth substance that influenced flowering and that it may be transmitted from a flowering plant to a non-flowering plant. Grafts were made on the main stems of plants and on the ends of the vines. Of the 15 grafts made, 14 took and made normal growth. Those from flowering seedlings produced flowers and set seed; however there was no effect on the rest of the plant.—J. J. Mikell and Julian C. Miller.

Study of the Carotene Content of Sweet Potato Leaves

In addition to the protein and carbohydrate content, the amount of carotene in any feed is often an important consideration in so far as its feed value is concerned. This experiment was conducted to get information on the carotene content of sweet potato leaves. It was found that the younger, more succulent leaves contained a significantly smaller amount of carotene than the medium or old leaves. For example, young leaves contained 195.70 micrograms of carotene dry weight per gram, while the medium leaves contained 494.9 and the older leaves 425.50. The more mature leaves also contained about twice the carotene on a unit basis than does the sweet potato root itself, which usually analyzes around 179.66 micrograms per gram dry weight. Sweet potato leaves therefore are an excellent source of carotene, or pro-vitamin A, when used for livestock feed.—Julian C. Miller and Rex Johnson.

Protein Content of Sweet Potato Leaves and Vines

This study was made on four varieties of sweet potatoes, namely Porto Rico, Pelican Processor, B-196, and Ranger, to determine the protein content of the leaves and vines with the object of using this material as another source of feed. Nitrogen determinations, from which protein content was calculated, were made on young, medium, and old leaves with the Porto Rico variety. The average protein content on a dry weight basis of the leaves, which included the petioles, of the four varieties averaged 14.98 per cent, and the vines, stripped of the leaves, averaged 4.36 per cent. The protein content of the leaves of Porto Rico averaged 15.48 per cent and of the vines 4.70 per cent for the five sampling dates. The protein content of the young leaves of the Porto Rico averaged 18.58 per cent, which was highly significant over that of the medium and old age leaves. That of medium age leaves was highly
significant over that of the old leaves. The protein content of young vines of Porto Rico averaged 6.08 per cent and was significant but not highly so over that of medium and old age vines.

—Julian C. Miller and Walter A. Hills.

Tomato Breeding

The work with tomatoes for the past year has consisted of yield trials, breeding varieties resistant to wilt, and making individual plant selections that show promise both from the standpoint of plant habit of growth and fruit production.

Observational trials were conducted in cooperation with the U. S. Regional Vegetable Breeding Laboratory. Several lines showed promise, one being very resistant to Cladisporium.

Results of the yield trial are shown in the following table.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yield in pounds per acre</th>
<th>Baton Rouge</th>
<th>Calhoun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dixie</td>
<td></td>
<td>20,617</td>
<td></td>
</tr>
<tr>
<td>Gulf State Market</td>
<td></td>
<td>25,838</td>
<td></td>
</tr>
<tr>
<td>6-1-1</td>
<td></td>
<td>24,727</td>
<td>23,032</td>
</tr>
<tr>
<td>9-1-1</td>
<td></td>
<td>24,742</td>
<td></td>
</tr>
<tr>
<td>Dixie x Marglobe</td>
<td></td>
<td>24,481</td>
<td>19,669</td>
</tr>
<tr>
<td>Dixie x Gulf State (Red)</td>
<td></td>
<td>24,538</td>
<td>17,781</td>
</tr>
<tr>
<td>Dixie x Gulf State (Pink)</td>
<td></td>
<td>21,481</td>
<td>17,596</td>
</tr>
<tr>
<td>D. R. R.</td>
<td></td>
<td>24,734</td>
<td></td>
</tr>
<tr>
<td>Marglobe</td>
<td></td>
<td>23,108</td>
<td>19,899</td>
</tr>
<tr>
<td>Rutgers</td>
<td></td>
<td>21,169</td>
<td>16,314</td>
</tr>
<tr>
<td>Marglobe x Louisiana Slicer No. 2.</td>
<td></td>
<td>23,696</td>
<td>19,066</td>
</tr>
<tr>
<td>Marglobe x Louisiana Slicer (Pink)</td>
<td></td>
<td>26,499</td>
<td>21,910</td>
</tr>
<tr>
<td>Hybrid 170</td>
<td></td>
<td>22,403</td>
<td>15,457</td>
</tr>
<tr>
<td>Hybrid 187</td>
<td></td>
<td>30,711</td>
<td></td>
</tr>
<tr>
<td>Garden State.</td>
<td></td>
<td>21,096</td>
<td></td>
</tr>
<tr>
<td>CS x G3</td>
<td></td>
<td>17,247</td>
<td></td>
</tr>
<tr>
<td>Stemless</td>
<td></td>
<td>15,816</td>
<td></td>
</tr>
</tbody>
</table>

The Louisiana Gulf State Market is a good early tomato. Dixie is a pink tomato that bears fruit over a long period both in the spring and fall. The 6-1-1, a seedling, has a solid pink flesh and shows considerable promise. It sets fruit at higher temperatures than any other variety tested. Hybrid 170 and Hybrid 187 are canning type tomatoes that are solid and have red flesh. The Marglobe-Louisiana Slicer cross (pink) gave the highest yield at Baton Rouge.

—F. D. Cochran, J. J. Mikell, and R. E. Webb.

Vegetable Seed Increase Work

New varieties of vegetables bred by the Louisiana Agricultural Experiment Station are becoming increasingly important in the state's
agriculture as a result of the program of assisting farmers in increasing seed of these varieties. During the year, assistance was given seed and plant growers in the production and selling of 396,550 pounds of improved seed, 20,600,000 plants, and 13,600 bushels of seed potatoes, all with a total value of $175,255. These were produced by 74 Louisiana growers and the Louisiana state penitentiary under the specialist’s supervision. The $175,255 value compares with $73,529 for 1945 and $37,649 for 1944. The increased monetary value has been due to increased production, since the price of these improved varieties has remained fairly constant.

The following table presents a summary and value of seed and plants produced and sold under inspection in 1946:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collards (La. Sweet)</td>
<td>1,600 lbs.</td>
<td>$.30</td>
<td>$480.00</td>
</tr>
<tr>
<td>Corn (La. Bayou)</td>
<td>14,000 lbs.</td>
<td>$.20</td>
<td>2,800.00</td>
</tr>
<tr>
<td>Okra (Green Velvet)</td>
<td>65,000 lbs.</td>
<td>$.20</td>
<td>13,000.00</td>
</tr>
<tr>
<td>Okra (La. Market)</td>
<td>500 lbs.</td>
<td>$.30</td>
<td>150.00</td>
</tr>
<tr>
<td>Cabbage (Allyear)</td>
<td>350 lbs.</td>
<td>2.00</td>
<td>700.00</td>
</tr>
<tr>
<td>Onion (C-5 Creole) (White Creole)</td>
<td>4,600 lbs.</td>
<td>3.00</td>
<td>13,800.00</td>
</tr>
<tr>
<td>Shallots (La. Pearl)</td>
<td>310,000 lbs.</td>
<td>.10</td>
<td>31,000.00</td>
</tr>
<tr>
<td>Watermelon</td>
<td>175 lbs.</td>
<td>2.00</td>
<td>350.00</td>
</tr>
<tr>
<td>Strawberry plants (Konvoy, Klonmore, Klondyke)</td>
<td>350,000 plants</td>
<td>10.00 per M</td>
<td>3,500.00</td>
</tr>
<tr>
<td>Onion Plants (C-5 Creole)</td>
<td>250,000 plants</td>
<td>2.00 per M</td>
<td>500.00</td>
</tr>
<tr>
<td>Sweet Potato (Unit 1)</td>
<td>13,000 bushels</td>
<td>3.50 per bu.</td>
<td>45,500.00</td>
</tr>
<tr>
<td>Sweet Potato (L-138 and other new seedlings)</td>
<td>800 bushels</td>
<td>4.00 per bu.</td>
<td>2,400.00</td>
</tr>
<tr>
<td>Sweet Potato Plants</td>
<td>20,000,000 plants</td>
<td>3.00 per M</td>
<td>60,000.00</td>
</tr>
<tr>
<td>Peppers (Dixie Wonder)</td>
<td>250 pounds</td>
<td>4.00</td>
<td>1,000.00</td>
</tr>
<tr>
<td>Pumpkins (Longellow)</td>
<td>75 pounds</td>
<td>1.00</td>
<td>75.00</td>
</tr>
</tbody>
</table>

—Joseph Montelaro.
Controlling Alligator Weed in Sugarcane with 2,4-D

Some 75 acres of sugarcane infested with alligator weed were sprayed or dusted with 2,4-D compounds for the control of this weed. The objectives of these experiments were to determine the relative toxicity of the various formulations on alligator weed and to see what effect killing this plant might have on the yield of sugarcane. The disintegration of alligator weed after spraying takes three to four weeks, during which time the plants wilt, then turn yellow, become leafless and finally the stems break at the nodes. Regrowth of the alligator weed is retarded from 2 to 3 months. Thus only one application of the spray or dust is needed for good control in the growing season. The best control was obtained when the dilute sprays were used at a concentration of 2,000 parts per million and a volume of approximately 100 gallons per acre. This is equal to 2 pounds of an 80 per cent or \(2\frac{1}{2}\) pounds of a 70 per cent acid content formulation per acre. There were no out-

Showing the small amount of alligator weed in 1946, in a row sprayed in 1945 with 2,4 Dow Weed Killer at a concentration of 2,000 ppm at the rate of 100 gallons per acre. The row on the right was not treated.
standing differences in the toxicity of the various formulations or brands tested. Increases in yield of 2 to 4 tons per acre were secured from most of the test fields.

2,4-D dusts were also tried and were found very effective. Twelve pounds of a 15 per cent acid content dust per acre is equal to a dilute spray of 2,000 ppm concentration applied at the rate of 100 gallons per acre. Dusts can be applied quicker and with less cost than sprays because the volume of water necessary for the dilute spray reduces the acreage that can be covered in a day.

A complete account of this work is given in La. Bulletin No. 410, which may be secured from the Mailing Room, Agricultural Experiment Station, Baton Rouge 3, Louisiana.—Clair A. Brown.

Spurweed or "Bur-Grass" (Soliva Sessilis) Control

Many lawns in Louisiana are infested with a plant that is locally called “bur-grass” and “sand bur.” It is not a true grass but a relative of the asters and goldenrods. The name “spurweed” is more appropriate. The plant is an annual, starting growth in November and reaching its peak of development in March and April and dying out as the weather becomes warm. The leaves are finely cut, carrot-like, 1-3 inches long. The inconspicuous flower clusters occur at the bases of the leaves. As the flowers mature the style becomes a rigid spine which can penetrate the flesh and clothing. It spreads by means of these sharp-pointed fruits. The spurweed is rapidly becoming a serious lawn pest and is spreading into pastures, where the sharp spines can injure the soft muzzles of grazing animals.

This weed can be killed by the use of chemicals. Ferrous sulphate (iron sulphate or green vitrol) used at the rate of one pound to one gallon of water to 100 square feet of lawn has given a good kill. Iron sulphate turns the grasses blackish, which lasts for 2 to 3 weeks, but recovery later is rapid.

Varsol used at the rate of one gallon to 200 to 300 square feet of lawn has also killed this weed. The oil turns the lawn grasses yellowish and several weeks elapse before they grow back.

The 2,4-D compounds have killed the spurweed, but these must be used with care as they not only kill carpet grass, one of our major lawn grasses, but also may injure valuable ornamentals nearby.

Spurweed can be killed any time from December until fruiting. Treatments in February and March should be early enough to prevent the majority of the flowers from forming seed.—Clair A. Brown.
Oils as Weed Killers

While the toxic action of oils on plants has long been known, they have not been widely used as herbicides. Recently however, owing to great interest in weed control, they have received some attention. Oils are contact poisons and with a few exceptions do not exhibit a differential or selective toxicity.

Oils are being successfully used in some states to weed seedling carrots at a cost of $15 to $20 an acre, whereas hand weeding costs range from $35 to $60. Some of these oils are now being tested in Louisiana.

Limited tests have shown that Varsol has possibilities for the home gardener in killing seedling grasses and annual weeds. It can be used as a pre-planting spray. The Varsol is sprayed as a fine mist on seedlings 1 and 2 inches tall. The wetting of the tops is sufficient to kill the small seedlings. One gallon will cover from 200 to 300 square feet. The killing action is more rapid in bright sun, and can be noticed in about an hour after spraying. As the oil kills most crop plants, it should be applied only to the weeds. Varsol has killed seedlings of crabgrass, crowfoot grass, and many winter annuals such as chickweeds, corn spurry, daisy fleabane, henbit, speedwell, pepper-grass, penny wort, blue toad-flax, swine-cress, button weed, spurweed, bedstraw, spiny thistle, sow thistle, wild lettuce, and wild geranium.

One of the oils being tested, which is not as yet generally available, has a 50 per cent aromatics content. This oil is more toxic to plants than Varsol. It has killed dock, and has possibilities for spot treatments for this and other perennials. It has killed coco grass down to the first "nut" below the leaves. It has likewise killed the leaves of carpet and Bermuda grasses and has retarded the growth of these grasses for several weeks.

—Clair A. Brown.

Rice Weeds and Their Control

Weeds in rice fields take a large toll each year in Louisiana. While flooding rice normally controls most weeds and grasses, in many instances it is not sufficient. Hand pulling and mowing are used to remove indigo and curly indigo, but this is not practical for the Mexican weed or bird-eye. A cheap means of chemical control would be very desirable. For this reason tests were made in 1946 with Sinox and 2,4-D to determine their possibilities for weed control. The results showed that 2,4-D, when applied before or shortly after flooding controlled all of the major broad leaf weeds without appreciably injuring the rice plants. Increases of 2 to 12 barrels per acre occurred in fields heavily infested with Mexican weed following treatment with 2,4-D. The cost of the treatment was $3.00 to $4.00 per acre for the chemical. Cost of applying the chemical as a dust by airplane was approximately 60¢ an acre.

—T. C. Ryker and C. A. Brown.
Controlling rice weeds with 2,4-D.
Top picture, area on left dusted; bottom picture, area on right dusted.
Soil Rot of Sweet Potatoes and Its Control with Sulphur

Experiments have shown that the soil rot disease of sweet potatoes is more serious in seasons of low rainfall, especially when the moisture deficiency occurs soon after and up to five or six weeks following planting. It has been shown that under such conditions an application of 600 to 700 pounds of sulphur per acre will give practical control of the disease. The studies using sulphur as a control measure have been continued over a period of years to determine the length of time that the original sulphur application will give adequate control of the disease. In the course of these studies yield data and pH determinations of the soil were the criteria used in determining the lasting effects of the sulphur. It has been shown that after 5 to 6 years the pH of the soil begins to rise, and before another crop of sweet potatoes is planted, an additional application of 200 to 300 pounds of sulphur per acre will be required to lower the pH of the soil to about 5.0, which is the desired pH for control of this disease.


Internal Cork of Sweet Potatoes

The disease known as internal cork is a relatively new disease of the sweet potato. It was first reported from South Carolina in 1944, and has been shown to be caused by a virus. Reports from the Atlantic Coast States indicate that the disease may be serious.

This disease was observed for the first time in Louisiana in 1946, being found in potatoes being grown in the variety and seedling experimental test plots. A preliminary survey has since been made in the com-

Internal cork of sweet potatoes.
mercial and certified seed growing areas. The disease is at present known to occur in a very light form in several parts of the state.
—L. H. Person.

Black Rot of Sweet Potatoes

The black rot disease is becoming more widespread and serious in both the certified seed producing and the commercial growing areas. While it is known that by careful seed selection, seed treatment, and rotation this disease can be effectively controlled, it is spreading at an alarming rate.

This disease is serious not only in the field, but also on potatoes being shipped to market. Practically all potatoes are now washed by mechanical washing machines in preparation for shipment to northern markets. The disease is spread during the washing process. If diseased potatoes are present the washing machine will spread the disease organism to the healthy potatoes. Losses from this disease following infection at time of washing, often reach 25 to 35 per cent or more by the time the potatoes reach the destination point.

The only immediate control measures to prevent these serious losses appear to be the use of some material in which the potatoes can be dipped after the washing is completed. A number of materials have been tested in the laboratory in an attempt to find a suitable material to use as a dip to control the spread of this disease. Borax and Dithane have shown some promise in controlling the spread of the disease. These materials should be further tested.

Analyses of sweet potatoes treated with borax have shown less boron than is found in many of the leafy and root crops that are ordinarily consumed. These analyses were made by Dr. E. A. Fieger of the Chemistry Department.—L. H. Person.

Control of the Black Scale Disease of Easter Lilies

It was reported last year that soaking lily bulbs affected with the black scale disease in a solution of the organic chemical “Puratized N5E” for 24 to 48 hours cured the infection, and that when the treated bulbs were planted on non-infested soil they produced healthy bulbs at harvest. Work on this problem was continued in 1946 in an effort to improve the methods of treatment and with the hope of finding some means of controlling the soil-borne infection.

The addition of detergents (I.N. 181P and I.N. 3622, sodium lauryl sulphates) at the rate of 1-4000 to the Puratized N5E had no appreciable effect on control. Treating under reduced pressure, in order to insure better penetration by the chemical, also had no appreciable effect and caused some injury to the bulbs. Other fungicides (Fermate, Arasan, Phygon, Cuprocide) were added to the Puratized solution to see if they

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would increase its effectiveness. The first two of these were inhibitory to the action of Puratized; the other two had no effect, either inhibitory or beneficial. A period of 24 hours of soaking appears to be the minimum for effective control. With dilute solutions, the volume of the solution is important. An excess of the solution—more than enough to cover the bulblets—is necessary. The same solution should not be used to treat a second lot of bulbs because most of the toxicant will have been absorbed by the first lot.

Effective control against soil-borne infection was obtained by dusting with Arasan either healthy seed bulbs, or diseased bulbs that had been previously disinfected by soaking in Puratized N5E. The Arasan treatment reduced soil-borne infection to about 10 per cent under extremely severe conditions in which over 80 per cent of the untreated bulbs were very severely diseased. Arasan alone was not effective when diseased bulbs not previously disinfected with Puratized were planted on infested soil.

The following procedures are therefore recommended in most of the lily areas in the state: (1) If the seed bulbs are diseased, soak in Puratized N5E solution 1-1000 for 24 hours, dry, then dust with Arasan; (2) if the seed bulbs are healthy, dust with Arasan, and omit the Puratized soak.—F. J. LeBeau.

**Shallot and Onion Disease Studies**

**Yellow Dwarf, a Serious Disease of Shallot**

Yellow dwarf, a virus disease, has been spreading in shallot fields over the state for the past several years. The disease is transmitted from diseased to healthy plants by certain insects. It may spread rapidly when these insects are prevalent. In some places, yellow dwarf has caused serious losses. Two tests were conducted in which yields from yellow dwarf infected plants were compared with those from healthy plants. In all cases the healthy plants outyielded the diseased ones by 30 to 40 per cent. Plants showing yellow dwarf symptoms should not be used for transplanting.

**Onion Mildew, Difficult to Control**

The worst epidemic of mildew in recent years developed in the spring of 1946. It was widespread in the southern part of the state on onions being grown for bulbs as well as for seed. The unusually warm, wet weather in March was especially favorable for mildew development. During April, in addition to heavy rains, there were many cloudy, foggy days. The disease spread most rapidly following heavy rains accompanied by blustery winds.

In 1946, a spray test was conducted in the worst mildew infected area of the state. When the spraying was started (March 15) there was only an occasional infected plant in the test plots. Sprays were applied at weekly intervals, except when heavy rains interfered, until April 23.
At this time the plants were so badly injured as to make further applications useless. The following spray mixtures were used: Zerlate (3-100); COCS spray (3-100); Dithane; Bordeaux mixture (4-4-50) ready prepared; Lime-sulphur, 2 per cent; Bordeaux mixture plus DDT (2-100); and Tennessee copper dust A. The Zerlate, Bordeaux, and DDT plots looked greener than the others all through the tests, but the yields were disappointing. None of the sprays controlled mildew to any appreciable extent.

**Pink Root on Shallot and Onion Transplants**

Many of the onion and shallot plants used for transplanting to the field are infected with pink root. This is especially true in certain of the older producing areas where these crops have been grown continuously for many years. These infected plants invariably give much reduced yields when compared with healthy planting material. A number of chemical treatments have been applied to pink root infected shallot and onion plants before setting in the field. Most of these chemicals either injured the plants or failed to control the disease. However, tests are being continued in which new chemicals are being used.

—E. C. Tims.
Hot Water Treatment of Sugarcane

The hot water treatment of sugarcane (52°C. for 20 minutes) has been shown to increase yields from 3 to 5 tons per acre. Newer varieties and promising selections are tested each year at the Experiment Station to determine their response to this treatment. In 1945-46, the average increase for nine varieties was 4.6 tons per acre with plant cane. C. P. 34/120 and C. P. 36/13, two recently released varieties, responded well to the treatment.—S. J. P. Chilton and P. J. Mills.

Sugarcane Varieties and Red Rot

Each year planting tests are made using uninoculated seed cane and seed cane inoculated with red rot to determine the reaction of the varieties of sugarcane to red rot. This is important since stand failures are in great part due to this disease. The disease ratings and results of inoculation tests for the past three years are given below.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Red Rot Rating</th>
<th>Yields, in tons per acre</th>
<th>Per cent decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Check</td>
<td>Inoculated</td>
</tr>
<tr>
<td>C. P. 36/13</td>
<td>Very resistant</td>
<td>28.0</td>
<td>27.7</td>
</tr>
<tr>
<td>C. P. 36/105</td>
<td>Resistant</td>
<td>32.6</td>
<td>29.5</td>
</tr>
<tr>
<td>C. P. 29/116</td>
<td>Resistant</td>
<td>42.1</td>
<td>40.5</td>
</tr>
<tr>
<td>C. P. 29/120</td>
<td>Resistant</td>
<td>29.6</td>
<td>26.0</td>
</tr>
<tr>
<td>C. P. 29/103</td>
<td>Resistant</td>
<td>34.3</td>
<td>30.9</td>
</tr>
<tr>
<td>C. P. 33/310</td>
<td>Moderately resistant</td>
<td>38.4</td>
<td>31.3</td>
</tr>
<tr>
<td>C. P. 29/320</td>
<td>Moderately susceptible</td>
<td>26.7</td>
<td>20.5</td>
</tr>
<tr>
<td>C. P. 34/120</td>
<td>Moderately susceptible</td>
<td>33.0</td>
<td>22.1</td>
</tr>
<tr>
<td>C. P. 33/243</td>
<td>Susceptible</td>
<td>31.8</td>
<td>12.4</td>
</tr>
<tr>
<td>Co. 290</td>
<td>Susceptible</td>
<td>41.9</td>
<td>14.8</td>
</tr>
</tbody>
</table>


Infection of Sugarcane by Red Rot

It has been known for many years that sugarcane can become infected with red rot through wounds and especially through borer channels. Infection of the stalk in any other way has not been proved. During the past year it has been shown that apparently healthy canes have red rot present on or in the root bands, bud scales, buds, and leaf scars at the time of planting. When canes of susceptible and moderately susceptible varieties are planted under conditions favorable for the development of red rot, infection from the presumably latent red rot organism develops and goes through the leaf scars and buds into the nodes and internodes. This apparently explains the severe rotting of seed cane when soil conditions are unfavorable during the winter months.

—S. J. P. Chilton and R. J. Steib.

Root Rot of Sugarcane and Antibiosis

While most of the varieties of sugarcane now grown in Louisiana
have some resistance to root rot, there is still loss caused by this disease, particularly in heavy soils. Certain organisms living naturally in the soils of Louisiana are known to be antibiotic or capable of holding the Pythium root rot fungus in check. A survey to determine the occurrence and number of these antibiotic organisms was made in 1946. Certain of the more antibiotic organisms are being used in field tests, and tests are being made to determine what soil conditions are most favorable for these organisms.—S. J. P. Chilton and W. E. Cooper.

Seed Treatment of Rice

Reasonably good stands of rice are usually secured in years when growing conditions are satisfactory. However, in years when temperatures are unseasonably low, stands in early plantings have often been poor, and in some cases it has been necessary to replant. A seed treatment that would improve stands is needed. Several fungicides have been tested for the past four years. Arasan has given consistent stand increases each year in April and May plantings, with small but rather consistent increases in yield. This increase in stand has averaged approximately 25 per cent. Since the cost of seed treatment is relatively small, 25 to 30 cents per acre, it seems desirable to include it as one of the standard cultural practices of the area.

A power seed-treating machine has been made available at Crowley for those desiring to treat seed rice.—T. C. Ryker and S. J. P. Chilton.

New Races of Cercospora Oryzae on Rice

Resistance to Cercospora leaf spot has been one of the desirable features of new varieties of rice. However, it has been found that after these new varieties are grown for a time, new races of the fungus develop to which they are susceptible. The variety Rexoro has become severely diseased during the last three years owing to the development of the new Race 6. Hardly a field escaped in 1946. The same seems to be becoming true of Fortuna owing to the development of Race 7. Nira remained relatively disease-free until 1946, when several diseased fields were observed. This was due to the development of a new strain of the fungus, Race 8. In spite of the fact that all commercial varieties are susceptible to at least one race of the fungus, progress has been made in the development of new resistant strains of rice. Work in cooperation with the plant breeder at the Rice Experiment Station has resulted in the development of several strains of rice of the Rexoro type that are resistant to all known races, including the Race 6 that affects Rexoro. These strains are being increased for possible release.

—T. C. Ryker and S. J. P. Chilton.

Control of Downy Mildew of Cucumbers

The work of testing various fungicides as sprays and dusts in an effort to find a fungicide which would control the downy mildew of
cucumbers as well as or better than Bordeaux mixture and which, at the same time, would be non-injurious, or at least less injurious to the plant than Bordeaux, was continued. The following two dusts were used in comparison with Bordeaux spray in two separate trials, in Hammond and Baton Rouge: (1) Fermate, 10 per cent; Cryolite, 20 per cent; Black Leaf 10, 10 per cent; Pyrax clay, 60 per cent; (2) Copper Compound A, 12 per cent; Cryolite, 20 per cent; Black Leaf 10, 10 per cent; Pyrax clay, 58 per cent. These were compared with 4-4-50 Bordeaux spray to which were added four pounds of lead arsenate and one pint of Black Leaf 40 per 100 gallons. Both dusts gave approximately the same degree of mildew control as the Bordeaux spray. Bordeaux, however, caused considerable injury to the plants in the form of stunting of growth and burning of foliage. The Copper Compound A dust also caused injury similar to that caused by Bordeaux but it was less pronounced. The Fermate dust caused no injury, and the plots receiving the Fermate dust outyielded the others in both tests.

Yields, in bushels per acre, of No. 1 cucumbers in the plots receiving different treatments are shown in the table.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Baton Rouge</th>
<th>Hammond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bordeaux spray</td>
<td>94</td>
<td>177</td>
</tr>
<tr>
<td>Copper Compound A dust</td>
<td>130</td>
<td>180</td>
</tr>
<tr>
<td>Fermate dust</td>
<td>150</td>
<td>217</td>
</tr>
</tbody>
</table>

—F. J. LeBeau.

Control of Azalea Flower Blight

Azaleas were sprayed during the blooming season with the following materials: (1) Zerlate, 1 pound per 100 gallons of water plus Puratized N5E 1-5000; (2) Fermate, saturated solution in carbon bisulphid diluted with water to 1-1000; (3) Zerlate, saturated solution in carbon bisulphid diluted with water to 1-100; (4) Dithane-zinc sulphate-lime, 1½ - 1½ - 100 plus B1956 spreader, 20 drops per gallon. Eight spray applications were made on February 28, March 6, 8, 10, 14, 16, 19, and 23, on three varieties of azaleas—Pride of Mobile, Formosa, and President Clay.

In one test, in which the plants were in a lathhouse, treatment No. 1 gave the best control, almost completely controlling the disease to the end of the experiment; treatments No. 2 and 4 gave almost as good control as No. 1; treatment No. 3 gave the least control and left the most visible residue. None of the treatments caused injury. In a second test, in which the plants were located outdoors, the Dithane-zinc sulphate-lime spray was slightly better than the Zerlate sprays. The spray containing Puratized N5E caused considerable fading of color of flowers exposed to direct sunlight.—F. J. LeBeau.
Holding Eggs on the Farm

Perhaps the best advice concerning holding eggs on the farm would be—don’t. At any rate, don’t hold them any longer than is absolutely necessary. This is advisable since few farms have sufficient refrigeration space available to make it possible to keep the eggs refrigerated. Four years’ results indicate that unless eggs are held in a refrigerator they must be marketed in Louisiana at least twice per week if quality is to be maintained. Even with refrigeration the sooner they are marketed, the better. Two types of farm egg coolers have proved their value by maintaining the quality of market eggs appreciably better than the quality of eggs treated similarly but held at “room temperature,” whether they are marketed once per week or twice per week. The two types of coolers are (1) above-ground cave—these can be built below ground or

\[\text{This farm egg cooler is made by placing concrete tile or well curbing vertically in the ground. It has an insulated lid.}\]

\[\text{For a report of turkey work at the North Louisiana Experiment Station, see page 101.}\]
on a hillside in hill country—and (2) a sunken or "vertical tile" cooler. (See accompanying pictures.) They are discussed in detail in Louisiana Circular No. 32.

The possibility of holding eggs on the farm from the period of flush production (March and April) until eggs become more scarce and higher in price (June and July) has long been of interest. Many methods, not involving refrigeration, have been tried, some of them with success, e.g., the water glass method. This past season four methods were used in which the eggs were held at room temperature (about 81° F.) for two months. The eggs were graded weekly and some eggs used each week. Two of the methods, (1) oil treatment and (2) use of a face-cream-like preparation known as S-100, preserved the quality to a surprising degree. The tests are to be repeated using larger samples of eggs and other treatments in addition to those tried last year. Because of the appearance of the shells such eggs should be used at home while the higher priced, summer produced eggs may be sold.


Okra Seed Meal in Chick Rations

In preliminary experiments hydraulic processed okra seed meal gave satisfactory results in chick rations as compared to other vegetable proteins. However, a combination of shrimp meal and hydraulic processed okra seed meal gave poor results owing to the high mortality of the
chicks on this ration. Solvent extracted okra seed meal did not give good results. Further tests are planned with these products.


Laying Rations with Single Vegetable Protein Ingredients Plus Adequate Green Feed Are Fairly Satisfactory

Experiments have been conducted for four years in which soybean meal, cottonseed meal, or peanut meal have been used as the only protein ingredient in the mash. As compared to hens given a laying mash with several protein ingredients (complex) and otherwise fed and managed the same, relative egg productions of the several pens for ten months (at Baton Rouge) were as follows: 19 eggs less per hen for the peanut meal ration and 32 eggs less per hen for the cottonseed meal ration. At the Calhoun station for three years the soybean meal ration averaged one egg per hen less than the complex mash and the cottonseed meal ration averaged six eggs less than the complex mash pen. The average production of the hens fed the single vegetable protein mashes was by no means phenomenal, but with good pasture even simple rations yielded an average production several dozens higher than the present average for the state as a whole.—C. W. Upp, B. A. Tower, and J. L. Heath.

Hormonal Substances Improve the Quality of Market Birds

Tests have been conducted in which broilers were fed a material, thiouracil, which produces a hypothyroid condition. The object was to improve the “finish,” hence the market grade, of broilers. The results have been most promising as indicated by the grades of birds in the several lots as given below. Of the control (no thiouracil) group none graded AA and 69.6 per cent A. When thiouracil was fed for 6 weeks, 50.0 per cent graded AA and 45.8 per cent A. It is not recommended that thiouracil be fed for such a long period because the long bones of the leg (tibia and femur) were shortened appreciably, 13 to 14 per cent. Thiouracil fed for four weeks produced 37.5 per cent AA and 62.5 per cent A. Thiouracil fed for two weeks produced 48.0 per cent AA and 52.0 per cent A.

A group fed an estrogen material, dianisylhexene, for two weeks graded 8.0 per cent AA and 76.0 per cent A. A combination of dianisylhexene and thiouracil fed for two weeks produced 31.9 per cent AA and 58.9 per cent grade A birds. Two other trials did not produce birds of as high quality but with quality decidedly better in the thiouracil groups. The use of such materials is permitted only for experimental purposes to date. When experiments have proved the value more completely and the resulting carcasses are known to be harmless to consumers, the restrictions likely will be removed.

Rural Sociology

The Educational Status of Louisiana’s Farm Population

Among the final conclusions from our study of the educational status of Louisiana’s population are the following:

1. Whether gauged by the average number of years of schooling, the proportion of persons with no formal education, or the percentages of the population completing high school, the educational status of Louisiana’s population is the lowest in the nation.

2. The state’s poor educational showing is not merely, or even mainly, due to the high percentage of Negroes in its population, although this factor does reduce the averages. If the comparisons are based on data for the white population alone, Louisiana still ranks at the bottom of the list.

3. The state’s poor educational showing is due mostly to the inadequate schooling that has been afforded our white rural population. The educational status of the white inhabitants of Louisiana’s towns and cities compares not very unfavorably with that of their fellow urbanites elsewhere in the nation. But among the white farm populations of the various states, that of Louisiana ranks at the bottom. This category of our population has received an average of only 6.3 years of schooling, almost a year less than the corresponding figure (7.1 years) for Alabama, our closest rival for the cellar position, and 2.7 years below the national average for the white rural-farm population.

4. Louisiana’s farm population not only ranks at the bottom of the nation’s educational scale, but our farm people are more disadvantaged educationally, in comparison with the inhabitants of towns and cities, than is the case in any other state. In other words, in comparison with the amount of schooling provided our urban people the degree to which the training of our rural-farm population has been neglected is unequalled anywhere else in the United States.

5. The people living in the northwestern part of Louisiana have by far the highest average amount of schooling and those living in the French-speaking sections of south Louisiana the lowest.

—T. Lynn Smith and Louise Kemp.

The Mechanization of Agriculture in Louisiana

Louisiana’s agriculture has always been characterized by a relatively great use of human labor in the production process. As late as 1940 the ratio of draft animals to men employed in agriculture was among the lowest in the United States, only the trucking areas of New England, New Jersey, Florida, and California having ratios that were significantly
below that for our state. The number of acres per man engaged in farming is also small in Louisiana in comparison with the amount of land used by farmers elsewhere in the nation. Again, the number of workers for each unit of agricultural machinery, such as a tractor, is extremely large. All of these indexes are reflections of the fundamental fact that the system of agriculture prevailing in Louisiana is one in which human labor is used generously in combination with the other elements of production.

The abrupt rise in farm wages and the inability of the farmer to secure labor at any price during World War II set the scene for tremendous changes in the technological aspects of agricultural production in Louisiana and the neighboring states. Planters who had not mechanized their farming operations to any great extent by 1941 were caught in a dilemma in the years that followed. They saw their labor force migrate to industrial areas by the thousands just at a time that they were unable to secure adequate machinery to substitute for labor in the process of production. Louisiana's farm population fell off by 30 per

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**Figure 1.** Increase in the number of tractors in Louisiana, by parish, 1940-1945.
cent between 1940 and 1945; and the number of agricultural laborers, including croppers, decreased in exactly the same proportion. As a result, not a few farm operators determined to free themselves at any cost from the excessive dependence upon labor and set about doing so just as rapidly as tractors and other labor-saving machines could be secured. Hence, the number of tractors in Louisiana increased from 9,476 in 1940 to 17,630 in 1945, a gain of 86 per cent. This rate of change is far more rapid than that prevailing throughout most of the nation, although it is equalled and even excelled in some other parts of the South and in New England, areas in which the mechanization of agriculture also was tardy in getting underway. The increase in tractors is going on all over the state. (See Figure 1.) However, the greatest rates of change are found in the rice area, the sugar bowl, and in the delta cotton producing sections along the Macon Ridge and in the upper part of the Red River Valley.—T. Lynn Smith.

Population Composition and Changes

Improved techniques have been developed for mapping the distribution of population in Louisiana which permit the more flexible and meaningful treatment of demographic materials in the analysis of some serious social problems. The illustration on the back of this volume shows how this basic population map has been utilized in the study of the adequacy of Louisiana's hospital facilities.

In much the same way detailed analyses of the age make-up of Louisiana's population have been completed and mapped so as to show at a glance the areas which have disproportionately large shares of the very young and the aged. Also, additional analysis of the racial make-up of the population and the degree of rurality or urbanity showed both of these factors to be closely related to the prevailing levels of health.

—Homer L. Hitt and T. Lynn Smith.

Rural Health in Louisiana

The disproportionate concentration of medical personnel of all types—doctors, dentists, and nurses—in the larger centers of population of the state places the rural population at a relative physical and financial disadvantage in obtaining medical assistance. That the more complete hospital plants also cluster in the urban districts of the state may be noted in the figure appearing on the back of this volume. Moreover, a clear-cut tendency has been disclosed for the ages of doctors to vary inversely with the population of their places of residence. Thus, rural doctors not only have more patients, less adequate hospital facilities, a larger geographical area, and poorer roads to cope with as compared with their urban colleagues but they are more frequently handicapped by the infirmities of advancing age.

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Distance of place of residence was found to exercise a decisive influence on the extent to which state-supported hospitals are utilized. The maximum use of these facilities was made by the residents of the parishes containing the hospitals. The rates of admission from the other parishes diminished rapidly as the distance to one of the hospitals increased. The presence among both races of this negative association between the proportionate number of residents of a parish admitted to state general hospitals and the proximity of that parish to a hospital is apparent in Figure 2.

In 1940 the level of living, as measured by several reliable indexes, was lowest among the farm families of the state. Urban residents enjoyed the highest material living while rural-nonfarm people maintained an intermediate rank.

The peculiarly disadvantaged position of Louisiana's farm people is demonstrated by the extremely wide gap setting their material living off from that of farm people in the nation as a whole.

—Homer L. Hitt.
Sugar Cane

Varieties

Seven new sugar cane varieties were sent to each of the eight experiment station test fields during the fall of 1946: C. P. 43-13, C. P. 44-51, C. P. 44-69, C. P. 44-72, C. P. 44-101, C. P. 44-153, and C. P. 44-155.

Twenty-two new sugar cane varieties were sent to our primary increase station, Smithfield plantation, for seed increase purposes. Included were the seven varieties sent to the test fields and fifteen other promising new sugar canes not yet introduced onto the test fields.

C. P. 36-105, released for commercial cultivation in the fall of 1945, is rapidly becoming one of the important commercial varieties in the southern and central parts of the Louisiana sugar district. The variety is proving an excellent supplemental sugar cane to the heavy-yielding, widely-grown C. P. 34-120. It is proving to be better adapted to mechanical harvesting than C. P. 34-120.

C. P. 36-13 was released for commercial cultivation during the fall of 1946. The variety should prove a good field yielder on the most fertile soil types. The sucrose content has been satisfactory, the variety mills satisfactorily, and it is one of the most disease resistant sugar canes released to date.—E. C. Simon and F. W. Berthelot, Jr.

Test Field Work

1946 Fall Planting

Fall plantings were made at the eight test fields, during the interval of September 13 through October 15.

Main Plot Tests: An average of four commercial canes and nine promising unreleased varieties were planted at each of the test fields.

IntroducTory Plots: The following new varieties were planted at the eight test fields: C. P. Nos. 43-13, 44-51, 44-69, 44-72, 44-101, 44-153, and 44-155. Small lots of seed cane of these seven seedlings were grown at the L.S.U. Sugar Experiment Station, and were taken in cooperators' trucks to the test fields.

Season of 1946

In the season of 1946, very heavy rainfall occurred during the months of May, June, and July in all sections of the cane belt. This excessive precipitation, particularly in the month of May, prevented the performance of the necessary cultivation operations in the critical early stage of cane growth, interfered seriously with the normal development of roots and suckers, and caused water-logging, packing of soils and considerable losses of available nitrogen by leaching. These were the con-
tributing factors to the reduction of field yields that occurred throughout the cane belt.

Summarized Averages of Results of Commercial Canes

(1) RED RIVER SECTION: Averages of results on Yahola very fine sandy loam of the Meeker and Shirley test fields show that C.P. 34-120 gave the best response. C.P. 36-13, C.P. 36-105, and C.P. 29-320 ranked second, third, and fourth, respectively.

(2) UPPER MISSISSIPPI RIVER SECTION: Averages on Yazoo soil indicate that C.P. 34-120 made the best showing, followed by C.P. 36-13 and C.P. 36-105. On Sharkey soil, C.P. 29-116 slightly exceeded C.P. 34-120 and C.P. 36-105.

(3) LOWER MISSISSIPPI RIVER SECTION: In the average results of Glenwood and Reserve test fields on Yazoo soil, C.P. 34-120 was the leading variety, followed by C.P. 36-105, C.P. 36-13, and C.P. 29-120.

(4) TECHE SECTION: C.P. 34-120 was the leading commercial cane in the averages of plant cane and first stubble on Franklin clay loam, while C.P. 36-105 and C.P. 36-13 ranked second and third. C.P. 29-116 and Co. 290 ranked fourth and fifth.

(5) WESTERN SECTION: In the commercial varieties on trial in this area, averages of Billeaud and Youngsville test fields indicate that C.P. 33-310 gave best response, followed by C.P. 29-116 and C.P. 34-120. C.P. 36-13, C.P. 36-105, and Co. 290 were fourth, fifth, and sixth, respectively.

New Varieties

The large-barrel, F. 36-819 variety made a fine showing as plant cane at Cinclare, Reserve, Meeker, and Caffery test fields with two first places and two second places in yield of sugar per acre. From a stubble standpoint, F. 36-819 has made a comparatively poor showing.

C.P. 36-183 has made a rather impressive record at most of the test fields, performing extremely well in the western area. This variety is subject to lodging, which is very undesirable for mechanical harvesters.

Other unreleased varieties, such as C.P. Nos. 34-92, 36-160, and 36-191, have made favorable showings at some of the test fields. C.P. 34-92 has been on the increase basis for several years, giving best response in the lower Mississippi river area. C.P. 36-160 has given its best performance at Glenwood and has a fairly good record at Reserve, indicating a possible adaptability to the soils of the lower Mississippi river section.

Other new varieties that are showing some promise at the test fields are as follows: C.P. Nos. 36-178, 36-197, 36-203, 37-5, 43-47, 43-3, 43-9, and 43-28.

On Sharkey soil at Cinclare, C.P. 34-139 outranked the standard C.P. 29-116.—C. B. Gouaux.
Johne's Disease in Cattle

Johne's disease is an infectious disease generally described as being chronic. From the standpoint of the unobserved course (while lesions are pyramiding) leading up to, and being responsible for, the visible symptoms, this is definitely true; but the course after symptoms have finally appeared may be either acute or chronic. Most cases are chronic, that is, the animal will have several recurrent attacks of diarrhea and after several weeks or months finally die or never have further attacks but remain thin and definitely an economic liability. In some herds the course after symptoms start is relatively short, in that the animal goes down very fast and succumbs in 2-4 weeks. (See picture.)

The animal suffering from clinical Johne's disease may be easily mistaken for one suffering from a very heavy load of gastro-intestinal parasites, liver flukes, or other chronic diseases. (See picture.) In a herd where the disease is known to be present certain symptoms can surely be viewed with suspicion, but an accurate differential diagnosis can be made only by use of the intradermal johnin test. Our activities the past three years have been, in the main, a testing of johnin developed at the

Clinical Johne's disease of an acute nature. This animal had been a reactor to the intradermal johnin test for about two years. Suddenly about two weeks after calving she developed severe clinical symptoms and died in about four weeks. Post-mortem lesions typical of Johne's disease were very extensive.
Regional Laboratory, on animals in a herd that has been affected with this disease for many years. This work is supplemented by clinical and post-mortem observations when material is available.

Skin sensitivity tests were run on naturally infected animals and one control animal. Results show that local areas injected with johnin are desensitized and remain that way for at least twelve weeks. This work must be projected further.

During the past year johnin tests on the herd under observation revealed essentially the same rate of infection as before. Response in new (previously unused) areas was always greater than in areas (the caudal fold) previously injected several times.

Clinical cases in the herd were studied and followed, then observed closely by post-mortem at death. The number of clinical cases during 1946 as compared to 1945, was materially reduced. No explanation for this observation is attempted.—*Dennis Sikes and W. T. Oglesby.*

**Anaplasmosis in Cattle**

Anaplasmosis in cattle was both extensive and of high economic importance to Louisiana cattlemen during 1946. Summer weather conditions were excellent for excessive populations of mosquitoes and blood-sucking “horseflies,” several kinds of which are capable of transmitting the disease. High populations of these animal pests for an unusually long period closely corresponded with the widespread, lengthy occurrence of anaplasmosis during the summer and fall seasons.

Cattle death losses from anaplasmosis varied from 75 per cent of all affected cattle in some herds to no deaths in other herds. Losses other than those from death included (1) marked reduction in body weight, (2) recovery of mild and unrecognized cases, thus establishing unknown “carriers” of the disease, (3) decreased milk production, and (4) abortion by acutely infected, pregnant cows.

Specific treatment and practical prevention of anaplasmosis remain unrecognized. Limited experimental treatment of field cases during 1946 was accompanied by apparent good results from simultaneous high sodium cacodylate dosage in the blood stream and liver-vitamin B complex beneath the skin. The causative agent was not destroyed in this way but the treatment probably had beneficial effect on the blood and blood-forming organs. Best response followed treatment early in the course of the disease.

Various tissue sections from acute and recovered “carrier” cases of anaplasmosis and from non-infected cattle are being prepared for comparative microscopic study. Numerous techniques are being studied in this connection in an effort to gain needed knowledge about the nature of the causative agent and its cycle of existence in the animal body.—*P. L. Piercy, Eva S. Krug, Anita D. Stone.*
Photomicrograph of blood from cow with acute anaplasmosis. The small dots (anaplasma bodies) marginally located in varying numbers of the red blood cells are of diagnostic importance. When the animal recovers, these bodies disappear. Practical methods of detection of recovered "carrier" animals are unrecognized.

Gastro-Intestinal Parasites of Cattle

Experiments during the past year on the life-cycle of the hookworm show that infection takes place very readily through the skin as well as by mouth. Severe symptoms of infection develop within 25 to 40 days after inoculation, while the larval period within the calf requires about 60 days as indicated by the appearance of eggs in the manure. Calves develop a severe diarrhea, often the discharge contains blood and has a very disagreeable odor. They begin to lose weight as early as 3 weeks after inoculation and become very weak and emaciated; one calf died 62 days after inoculation. These results indicate that this parasite is definitely the cause of much economic loss to cattle owners.

The fact that severe symptoms and death have occurred in experiments in which the larvae penetrated the skin indicates the importance of barn sanitation and attention to the shade where stock, especially young, lie down. Prevention against infective forms of the hookworm as well as other parasites is a most powerful weapon. Barns should be cleaned at least once a week because it requires about a week for the larvae to hatch and grow to the infective stage. The fact that the damage
is done by the *larvae* of the hookworm rather than the adult stage and that animals begin to improve in condition after the larvae reach maturity indicates that the use of treatment for the removal of the adults is of little benefit insofar as the infection in *that particular individual* is concerned. Effective treatment for the removal of the adults, however, does reduce the accumulation of larvae about the barn and pasture and thus reduce the potential danger of heavy infections.

Additional study has been carried out on the nodular worm during the past year in a study of microscopic sections of the intestinal wall of calves killed during the larval period. These show that abscesses are formed, severe hemorrhages are produced, walls are thickened, and much destruction of tissues takes place while the larvae are developing within the intestinal wall. These observations indicate that much of the improvement following treatment is due to the natural process of recovery from the infection rather than to the removal of the adults. The important benefit to be derived from treatment is the removal of adults that are producing large numbers of eggs from which larvae will hatch and develop into the infective stage to be picked up by other animals in the herd.

The fact that damage is done by the larvae, against which we at present have no effective treatment, and that some infections can take place through the skin emphasizes the *very* great importance of barn, paddock, and pasture sanitation as control measures.

—R. L. Mayhew.

From a section of small intestine of calf infected with nodular worms 5 days after inoculation. At *A* is shown the destruction of the normal tissue and hemorrhagic spots (the dark areas) in the inner layers of the intestinal wall. At *B* is shown the abscess containing the sections of the small larva.
Gastro-Intestinal Parasites of Horses and Mules

All of the gastro-intestinal parasites that are of major importance in horses and mules are to be found in Louisiana. There may be some slight difference in the rate of occurrence in the far northern as compared to the southernmost parts of the state but the difference is not great enough to suggest one treatment program for one place and a different one for another section.

Phenothiazine is the most effective single drug for the removal of intestinal worms, while carbon bisulfide remains the drug of choice for the removal of bots.

Phenothiazine is not a drug that can be administered promiscuously to horses and mules. Animals that are in poor condition from sickness, poor feed and care; or those on a ration such as white corn and low grade hay are likely to suffer from the treatment. Before treatment, supply yellow corn and good legume hay. The drug destroys erythrocytes (red blood corpuscles) especially in animals such as those mentioned above. This most efficient drug can do much harm when not administered with judgment.

Observations on teams doing the same work (some treated and some untreated) show that treatment of animals for the removal of parasites is very worth-while to the owner. This is borne out by the fact that fewer work days are lost, less feed is necessary to keep the animal going, and fewer cases of verminous (worm) colic develop in the treated animals.

Animals should be treated late in the winter for removal of bots. For best results phenothiazine should be administered in the spring and fall for removal of intestinal worms. At one of these periods the veterinarian should be asked to examine the teeth and correct irregularities found.—W. T. Oglesby.
Agronomy

Fertilizers Lower Unit Cost of Producing Corn

The results of a corn fertilizer experiment that has been in progress five years show that an application of 60 pounds of nitrogen per acre gives a profitable increase in yield and that an application of a complete fertilizer before planting also lowers the cost of cultivating the crop. The experiment was located on a sandy loam soil which, according to a soil analysis, had a fertility level of 30 p.p.m. of available phosphorus and 50 p.p.m. of available potassium and a pH reading of 6.2 in the surface soil. Early growth and plant development was stimulated by an application before planting of a complete fertilizer containing nitrogen, phosphorus, and potassium. Consequently, the time required to do the first and second cultivations was reduced materially and the total number of cultivations required on the plots receiving fertilizer before planting was one less than the number required for the plots receiving no fertilizer or only nitrogen as a side-dressing. The yield increase resulting from the use of 60 pounds of nitrogen per acre was a little over 30 bushels. Fertilization improved the quality of corn in all cases.

Corn Varieties and Hybrids

The results of the variety and hybrid tests showed that the Louisiana hybrids continue to produce higher yields of good quality grain than open-pollinated varieties and other hybrids included in the tests. The average production was 66.7 bushels per acre for the five highest producing Louisiana hybrids as compared with 53.3 bushels for the five highest yielding open-pollinated varieties. The increase in yield was 25.1 per cent in favor of the Louisiana hybrids.

The variety and hybrid tests were conducted on 40-inch rows with a space of 24 inches between plants. An application of 400 pounds of an 8-8-8 fertilizer per acre was made before planting and a side-dressing application of 250 pounds of nitrate of soda per acre was made when the plants were 45 days old.

Cotton

The results of the variety and new strains tests show that large yields of cotton may be produced in the hill area in seasons of relatively high rainfall and heavy weevil infestation where the generally recommended cultural, fertilizer, and insect control practices are followed. All of the
varieties, except one, in the variety test produced over a bale per acre. Strains of the Deltapine, Delfos, Stoneville, and Miller produced the highest yields. Excellent stands were obtained. Frequent shallow cultivations were given. The tests received an application of 400 pounds per acre of an 8-8-8 fertilizer before planting and 150 pounds per acre of a 16 per cent nitrogen fertilizer as a side-dressing soon after chopp. Approximately seven applications of calcium arsenate were made for control of the boll weevil. Alternate applications of the calcium arsenate, beginning with the first, contained two per cent nicotine sulphate for aphid control.

**Scarifying Singletary Peas Improves Germination**

In a germination test conducted under field conditions, scarified Singletary pea seed germinated 72.0 per cent and unscarified seed germinated 25.9 per cent. Soil, moisture, and temperature conditions following planting were favorable for germination. Stand counts were made three weeks after planting, and later counts showed no further improvement in the stand from either lot of seed.

**Blue Lupine**

A field planting of Blue Lupine was made October 17, 1946. About 15 inches of growth had been obtained when on December 30 the temperature dropped to 21° F. and killed all the plants. The plants were in a rather advanced stage of growth and development and this may partially account for their susceptibility to cold at that time.

**Dixie Wonder Austrian Winter Pea**

The stage of growth and development apparently has a lot to do with the susceptibility of the Dixie Wonder pea to cold. A field planting of Dixie Wonder peas made early in October had grown to a height of 24 to 30 inches when on December 30 the temperature dropped to 21° F. and killed all the plants down to the crown buds. The plants had a recovery growth of two to four inches February 10 at which time a temperature of 17° F. caused practically no damage.

—Dawson M. Johns.

**Devon Cattle Project**

The herd was composed of five cows and one bull. Three bull calves and one heifer calf were raised. The three bull calves were sold at $125 to farmers who were interested either in breeding them to grade Jersey cows to improve the beef quality of their calves or in breeding them to cows of a beef breed for the purpose of raising female stock capable of producing more milk, the idea being that females produced from such a cross would raise better calves in this area for the beef market than purebreds or high-grade cows of a standard beef breed.

—Dawson M. Johns and J. L. Heath, Jr.
Horticulture

Sweet Potato Variety Test

The recommended sweet potato varieties and better seedlings from the Experiment Station at the University were grown at the North Louisiana Experiment Station and on the Macon Ridge area near Oak Grove to determine their adaptability to north Louisiana conditions. Of the copper skin varieties, the Unit I Porto Rico outyielded all others, followed by the Queen Mary. The seedling L-138 gave highest yields of the flesh colored types. This potato, if given a long growing season, will produce many jumbos in the hill area, although no jumbos were present in the Lintonia soils.

Pelican Processor of the white fleshed or stock varieties led in production in the hill and Macon Ridge area. However, the yield was over 100 bushels more per acre in the hill area than on the Macon Ridge. This difference is the result of one year’s work and must not be considered conclusive.

Sweet Potato Fertilizer Test

Sweet potato fertilizer tests were continued in various localities of north Louisiana and the results show, as in previous years, that the most profitable yield responses were obtained from a heavy application of a high-grade fertilizer. The following amounts of plant food per acre are recommended: 20-30 pounds of nitrogen, 40-60 pounds of P₂O₅, and 40-60 pounds of potash, all of which may be supplied by 400-600 pounds of 5-10-10.

Watermelon Breeding

Ninety-six strains of watermelons carried over from the 1945 growing season were grown on wilt-infested plots in order that further selections as to resistance, quality, and productiveness could be made. Several strains showed complete resistance under 1946 growing conditions. From the most promising strains selections were made to be carried over for additional testing and purification. Three selections were made that merit increase on acre size basis to determine further their resistance to wilt and their marketable qualities.

Peach Variety Report

The results of the variety test indicated, as in the past, that the high quality white peach Georgia Belle was a much heavier producer than any of the other varieties, averaging 4.3 bushels per tree. Hiley Belle, another white free stone peach, was second with 3.6 bushels per tree. The Elberta averaged 1.8 bushels per tree. This variety, although it averages lower in production, is in much greater demand than any of our other varieties owing to its quality, color, size, and canning and shipping qualities.
The young variety orchard produced a few peaches during its second growing season. Very good growth was made this year, 18 to 24 inches. None of the two-year-old trees died because of nematode infestation although several of the replants did. This orchard should bear a small crop of peaches in 1947, giving an opportunity to a limited extent to study and compare varieties recently released with the old standard varieties grown in the past.

**Field or Cow Peas**

Selection for wilt and nematode resistance was continued among the crosses made in 1941. Several selections have shown desirable characteristics but are not completely purified.

A variety test is being conducted to determine the productiveness of some of the better selections in relation to the leading edible varieties now being grown in this area. A selection from the cross Early Clay X Speckle Crowder, known as the L-35, showed promise as to wilt resistance, resistance to nematodes, earliness, quality, and production.

**Apple Variety Project**

The 1946 seasonal conditions were very unfavorable for fruit production. However, by following a rigid spray schedule about 60 per cent of the crop of apples was salvaged at the North Louisiana Experiment Station. Hail damaged a large number of the apples, and rainfall interfered with the spraying schedule. Of the early apples, Early Harvest led in production with an average of 132 pounds of marketable apples per tree. The quality is slightly inferior to such early varieties as Wilson Red June and Early Red Bird. However, of the six trees set out in 1931, four are still growing vigorously and the others have not stood the conditions as well.

The Brilliant is the leading mid-summer variety, being more blight tolerant than any other variety grown on the station. The fruit is large, attractive, and of superior quality.

The Delicious and Jonathan apples set a large crop of fruit and required additional thinning. However, our spray program ceased June 15 and a heavy infestation of bitter rot set in. As a result, only about 90 pounds per tree were salvaged.—*Raymon E. Webb.*

**Dairy Projects**

**Johnson Grass Pasture Increased Milk Yield by One-Sixth**

Nine Jersey cows turned onto Johnson grass pasture during July of this year increased in milk yield by 16.6 per cent. On improved permanent pasture the cows had averaged for five days prior to test 14.6 pounds of milk daily per cow. During the first five days on Johnson grass the production averaged 15.8 pounds, or 8.2 per cent more than before the change. During the second five-day period the average yield
increased to 17 pounds per cow daily, or 16.6 per cent more than on permanent pasture.

This is the second year's growth for the experimental Johnson grass pasture. During 1945 it was planted in combination with Sudan grass. Prior to 1945 Sudan grass had each year been planted alone as the summer supplementary pasture and, on an average, gave excellent results. The present trial with Johnson grass is being made to determine whether it will fill the same place as Sudan grass in the pasture program and to remove the necessity of planting the crop each year. The Johnson grass pasture is strategically located between a pasture and a meadow, so should not be a source of spreading this grass into cultivated fields.

Small Increase Secured from Kudzu Pasture

A small increase in milk production was shown by cows changed from permanent pasture onto an excellent growth of Kudzu in mid-August. The average milk production for five days on permanent pasture prior to the test was 13.3 pounds of milk daily. For the first five days on Kudzu (with free access also to permanent pasture) it was 13.5 pounds per day. The production for the second five-day period on Kudzu increased to an average of 14 pounds per day.

—D. M. Seath and D. M. Johns.

Swine Production—Hogging Off Corn and Sweet Potatoes

Work has continued on hogging off corn and sweet potatoes at the North Louisiana Experiment Station. Two acres of corn made 65 bushels
per acre, which produced 1,673 pounds gain in live weight of pork, or 836.5 pounds per acre. It required 4.35 pounds of corn and .44 pounds of cottonseed meal to make one pound of gain. Each bushel of corn produced close to 13 pounds of live pork at 22 cents per pound, a gross return per acre of $184.08, or $.83 per bushel. While such prices for live hogs are extremely high and may not be realized again, it is certain that good returns can be made from hogging off corn in this area.

Two lots of pigs were finished on sweet potatoes. Three-fourths of an acre of starchy potatoes produced 234 pounds gain, or 312 pounds gain per acre. A second lot finished on a different variety of potatoes made 290 pounds gain per acre.

—C. I. Bray, Dawson Johns, and J. L. Heath, Jr.

**Turkeys Can Be Grown Profitably in Louisiana**

When turkey production is mentioned the farmer naturally asks, "Can I make any money growing turkeys?" This question cannot be answered positively for all farmers, but what has been done by some may serve as a good indication of what can be done by others. Four turkey flocks were visited on a tour last fall that compared favorably with flocks that might be seen in any state. These growers produced turkeys profitably. Accurate records are available for broad breasted bronze turkeys grown experimentally at this station for the past two seasons.

**Are Turkeys Hard to Grow?**

It is commonly said that "Turkeys are so hard to grow." It is true that care must be taken to teach pouls to eat and it is necessary to provide good brooding and growing conditions, but if these conditions are met the task is not difficult. Evidence of this is the mortality experienced at Calhoun the past two years. The man who grew the turkeys had not grown turkeys in any quantity previously, although he had grown many chicks. In 1945, 14.3 per cent of the pouls died or were culled and in 1946 the figure was 19.3 per cent. In both cases most of the pouls died the first week or so. Accidental deaths were included. How do these figures compare with the U. S. as a whole? The six-year average mortality for turkeys for the United States is 26.8 per cent.

**Margin Over Cost of Feed and Pouls**

The figures for feed costs, poult costs and income from the turkeys at Calhoun for two years indicate that money can be made with turkeys. The pouls were fed a commercial all-mash turkey starter for eight weeks, then fed three different mashes in separate pens, with all of the corn, oats and pasture (except in the case of the confined lots in 1945) that they would eat. All feed was purchased, and amounts and costs of feed were recorded. The value of the turkeys was based on conservative wholesale prices, not top local prices. The average feed cost per turkey in 1945 was $4.15 and income per turkey was $6.90. In 1946 the feed cost per
turkey was $4.54 and the income $7.04. For the three groups grown on pasture in 1945 the income over feed cost was $3.33 per turkey, while for the two groups grown in confinement the margin was $2.02. The income over feed cost in 1946 was $2.50 per turkey. Considering the poult cost at 75 cents each—approximately the cost of eggs plus hatching costs—the average income over feed and poult cost was $2.00 per turkey in 1945 and $1.75 per turkey in 1946.

**Feed Consumption and Average Weights**

What weights were attained and how much feed did the turkeys eat? In 1945 the toms averaged 25.8 pounds at 28 weeks of age and in 1946, 25.6 pounds. The females averaged (at 28 weeks) 16 pounds in 1945 and 15.3 pounds in 1946. The feed consumption was not kept separately for toms and hens but the average feed consumption per turkey to 28 weeks of age was, in 1945, 118 pounds, or 105.4 pounds for pasture-grown and 136.9 pounds for confinement-grown, while in 1946 the average feed consumption was 91.7 pounds. For the range-grown turkeys in 1945, 5.5 pounds of feed were required per pound of market turkey, whereas 4.5 pounds were required in 1946.

**Quality of Turkeys Grown**

What about the quality of the turkeys? Will they finish out under Louisiana conditions? Each year a U.S. D.A. licensed turkey grader graded the turkeys alive, and subsequently ten males and ten females

![Turkeys on pasture at the Calhoun Experiment Station. This is the type of rolling, open pasture suitable for turkey range. The same range should be used only every third year. Note range shelter, feeders, and waterers in background.](Image)
from each group were graded after being dressed. Ninety per cent of the live toms graded No. 1 in 1945 and 86 per cent in 1946. The females graded higher—97 per cent were No. 1 in 1945 and 92 per cent in 1946. The fleshing and finish grade of dressed birds likewise was good, 76 per cent of the males and 82 per cent of the females grading A or AA in 1945, and 80 per cent of the males and 93 per cent of the females grading A or AA in 1946. The answer definitely is yes, turkeys can be finished under Louisiana conditions.

A common belief is that turkeys lose one-third of their weight in dressing and drawing. This is not so for good turkeys. One hundred turkeys, 50 toms and 50 hens, were dressed and drawn in 1945 and 60, half of each sex, were drawn in 1946. Careful weights were taken of each turkey alive, crop empty, and subsequently, warm dressed, dressed and chilled, and full drawn. The giblets and neck were weighed separately also. The dressed weight (head, feet, and viscera included) averaged approximately 93 per cent of the live weight, while the full-dressed weight (including giblets and neck) averaged 81 to 84 per cent of the live weight. Good turkeys certainly do not lose one-third of their weight in dressing and drawing.

**Cooking Tests**

Limited cooking tests were made by housewives, not necessarily under uniform conditions. The roasted weight of the turkeys averaged about 75 per cent of the full-dressed weight or about 57 per cent of the live weight. The considerable variation obtained in loss in weight during roasting gives an indication of what happens in different households.

—C. W. Upp and J. L. Heath, Jr.

*Northeast Louisiana Experiment Station, St. Joseph*

C. B. Haddon, Superintendent  
John A. Hendrix, Asst. Agronomist  
William Oehmig, Research Associate

**Cotton Varieties**

Cotton variety tests have been continued at this station, three tests being conducted each year. The first test included standard varieties, the second, new varieties and strains from commercial breeders and experiment stations, and the third test, new strains and selections from this station. The leading varieties, based on yield of lint per acre, have been Delta Pine 14, Coker, Stoneville 2B, and Delfos 444. The five-year average lint production from these varieties has been as follows: Delta Pine 14, 830 pounds; Coker, 792 pounds; Stoneville 2B, 740 pounds; Delfos 444, 725 pounds. Based on these results the above varieties are recommended for the delta soils.

**Corn Varieties**

The corn variety tests have included practically all the commonly grown open-pollinated varieties, Louisiana hybrids produced at the
Baton Rouge station, and several hybrids produced by commercial breeders. The four most widely grown open-pollinated varieties—Cocke’s Prolific, Calhoun Red Cob, Tuxpan Yellow, and Jarvis’ Prolific—have a four-year average yield of 41.8 bushels per acre. The four leading hybrid strains—Louisiana Hybrid 1031, Louisiana Hybrid 468, Louisiana Hybrid 731, and Funk’s 714—have a four-year average yield of 56.2 bushels per acre, an increase over the open-pollinated varieties of 34.4 per cent.

**Cotton Fertilizers**

Tests have been continued, using all the available sources of nitrogen for cotton applied two weeks before planting and as a side-dressing after the first hoeing. Very little difference has been found in the efficiency of the fertilizers when applied before planting, but when used as a side-dressing the more quickly available forms of nitrogen have proved superior. Owing to the increased interest in mechanical production of cotton many farmers are interested in making fertilizer applications at the time of seedbed preparation instead of side-dressing as has been customary for many years. When a quickly available form of nitrogen fertilizer is used, it has been found that there is practically no difference in the yield of cotton from the two methods of application. The 14-year average increase over check from 30 pounds of nitrogen from nitrate of soda applied before planting has been 540 pounds of seed cotton per acre. The same years, the same fertilizer applied as a side-dressing gave an increase over check of 522 pounds of seed cotton per acre. Based on these results cotton farmers are advised to use either method of application if fertilizer of the quickly available form is used.

**Date of Planting Soybeans**

Results based on two-year tests at this station show very little difference in yield, due to dates of planting, of either early or late maturing type when planted 1st of April or 1st of May. When planted as late as June 1, however, yields of both types decreased, the early maturing variety 61.7 per cent and the late variety 34.5 per cent.

**Oat Variety Tests**

The three-year average yields for the leading varieties were as follows: Fulgrain 74.2, Victorgrain 61.1, Nortex 70.0, De Soto 66.7, Traveler 67.6, Camelia 53.7.

**Cotton Dusting Tests**

Dusting tests during 1945 and 1946, two years of unusually heavy infestation of boll weevil, indicate that the addition of nicotine to control the cotton aphid is very profitable. The dust containing 2 per cent nicotine was used for the first treatment, straight calcium arsenate for the second, and in this order throughout the dusting season. This treatment was compared to plots receiving straight calcium arsenate and check plots not dusted. The two-year average increase over check
for the straight calcium arsenate was 364 pounds seed cotton and the increase for nicotine-mixed dust was 794 pounds, or 430 pounds more than straight calcium arsenate.

Hogging Off Corn and Beans

One of the major problems in hogging off corn and beans is to select varieties of corn and beans for March planting that will be at a mature stage in July, when hogging off will begin, so as to have hogs ready for September, when the hog market is usually at its peak. To stimulate early maturity of corn a high fertility program is recommended, not less than 30 pounds of nitrogen bedded on and the same applied as a side-dressing when the corn is 8 to 15 inches high. Several varieties of hybrid corn have been found particularly suitable to the alluvial land area of north Louisiana. Most important of these are Louisiana 1031, Louisiana 468, Louisiana 731, and Funk’s G-714, as shown by station records. The early maturing varieties of soybeans found adaptable to hogging off are Odgen, Ralsoy, and Arksoy. Where later finishing off of hogs is desirable, later maturing varieties of beans may be used, such as Nela, Tensas, Mamotan 6680, Mamloxi, Acadian, and Nanda. The same varieties of corn mentioned above may be used. Good quality feeder pigs weighing from 75 pounds to 100 pounds have been found to give most economical gains. It is very important that hogs be supplied with ample shade, fresh water, and mineral supplement.

A test conducted at this station using Funk’s G-714 corn and Odgen soybeans gave a gain of 760 pounds of pork per acre. The corn was planted March 12, 1946, and 100 pounds of nitrate of soda was bedded on at seedbed preparation, with 150 pounds of soda applied as a side-dressing when the corn was 12 inches high. Hogs were put on test on July 16 and were sold on September 1. More hogs were added on September 2 to clean up corn and beans. These hogs reached market weight on October 26.

Soil Improvement

Studies have been made, comparing the relative merits of soybeans interplanted with corn, winter cover crops, and a high rate of nitrogen fertilizer for increasing the yield of cotton. The soybeans are grown in corn and turned under in the fall immediately after corn is harvested. The cover crops are planted in cotton rows in the fall and turned under in the spring. The fertilizer was used at a rate to give 80 pounds of nitrogen per acre and applied at the time of seedbed preparation. The five-year average increases over check have been as follows: from soybeans, 870 pounds seed cotton per acre; from winter cover crops, 916 pounds seed cotton per acre; from 80 pounds of nitrogen, 796 pounds seed cotton per acre.
Fertilizer Experiments

Rates of Application after Pasture Sod

A 6-8-8 fertilizer at the rates of 200, 300, and 400 pounds per acre was drilled with Blue Rose 41 rice on land following five years of improved pasture. Yields of 85.5, 84.3, and 81.5 bushels per acre were obtained from 300, 400, and 200 pounds per acre, respectively, while 43.0 bushels per acre were obtained from the check. These results show the ever-increasing need for fertilizer and the rate of application needed to produce high yields of rice. The results are also consistent with those obtained in outfield fertilizer experiments conducted in other parts of the rice growing areas of Louisiana.

Methods of Applying Fertilizer

In this experiment six different methods of applying fertilizer were tested. The treatments and yields are shown in the following table.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield, bu. per acre</th>
<th>Increase over check, bu/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check—No treatment</td>
<td>32.1</td>
<td></td>
</tr>
<tr>
<td>300 lbs. 6-8-8 with seed</td>
<td>47.1</td>
<td>15.0</td>
</tr>
<tr>
<td>300 lbs. 6-8-8 below seed</td>
<td>45.8</td>
<td>13.7</td>
</tr>
<tr>
<td>300 lbs. 6-8-8, 100 lbs. with seed and 200 lbs. on water 8 weeks after emergence</td>
<td>51.4</td>
<td>19.3</td>
</tr>
<tr>
<td>300 lbs. 6-8-8, 100 lbs. under seed and 200 lbs. on water</td>
<td>53.3</td>
<td>21.2</td>
</tr>
<tr>
<td>300 lbs. 6-8-8 on water 8 weeks after emergence</td>
<td>45.2</td>
<td>13.1</td>
</tr>
<tr>
<td>300 lbs. 6-8-8 after removing water</td>
<td>49.0</td>
<td>16.9</td>
</tr>
<tr>
<td>300 lbs. 6-8-8, 100 lbs. with seed, 100 lbs. at submergence, and 100 lbs. on water 8 weeks after submergence</td>
<td>44.9</td>
<td>12.8</td>
</tr>
</tbody>
</table>

Large increases in yields were obtained from all methods of application where 300 pounds per acre of 6-8-8 fertilizer were applied.

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¹ Cooperative experiments with the Louisiana Agricultural Experiment Station and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.
² Retired from active duty January 1, 1947.
The Effects of Applying 1.75 Tons of Rice Straw to the Land in Alternate Years on the Yields of Rice

Two hundred pounds per acre of 6-8-8 fertilizer were applied to check plots receiving no straw and to plots receiving 1.75 tons of straw per acre under three different conditions. Two years of results show no practical difference in yields from the different treatments.

Effects on the Yields of Rice from Adding 3 Tons of Rice Straw with and without 400 Pounds per Acre of 8-10-6

The effects of adding 3 tons of rice straw with and without 400 pounds of 8-10-6 per acre in split applications are shown in the results of an experiment conducted for nine years on land that was planted to rice in alternate years. Half of the fertilizer was applied with the straw and the other half with the rice. An average yield of 60.2 bushels per acre was obtained where 3 tons of straw and split applications of 400 pounds per acre of 8-10-6 were applied, and 51 bushels per acre were obtained where 3 tons of straw only were turned under. The average yield of the check was 44.9 bushels per acre.

On land seeded to rice every year, a yield of 51.5 bushels per acre was obtained by turning under 3 tons of straw and applying 400 pounds per acre of 8-10-6 fertilizer in split applications; 41.3 bushels per acre were made where 3 tons of straw only were turned under. The check produced 37.0 bushels per acre.

These experiments indicate the advisability of planting in alternate years and using a high rate of a well-balanced fertilizer where large quantities of rice straw are turned under.

Residual Effects of Calcium Arsenate

A rotation experiment with cotton and rice in alternate years was begun in 1935 to determine the effect of dusting and not dusting cotton with calcium arsenate on rice yields. This procedure was carried out through 1941, resulting in a six-year average yield of 46.9 bushels per acre of Fortuna rice following cotton not dusted, 32.9 bushels per acre following cotton that had been dusted, and 39.9 bushels per acre following native pasture. After 1941 no calcium arsenate was added and cotton was discontinued but rice was planted in alternate years to determine the residual effect of calcium arsenate that had been applied to the cotton from 1935 through 1941. The five-year average (1942-1946) yields of rice were 30.7 bushels per acre on the plots that had been dusted; 36.0 bushels per acre where cotton had never been dusted; and 40.8 bushels per acre following native pasture.

Large differences in the yields of rice between that planted on the dusted and that on the undusted areas were noticed from 1935 through 1941, but after the discontinuation of dusting with calcium arsenate the differences became smaller.—Rufus K. Walker.
Rice Varieties

The object of the rice improvement program of the Rice Experiment Station is to develop and make available to growers better early, midseason, and late-maturing medium- and long-grain rice varieties. Numerous selections are made and tested. Disease resistance, suitability for combining and drying, high yields, and good quality are the most important characteristics desired. For example, Rexoro-type selections resistant to the Cercospora leaf spot disease are being tested and increased. As a result of backcrossing work done earlier, resistant selections otherwise very similar to Rexoro were at hand when a new race of Cercospora appeared on Rexoro in 1945.

In 1946, the field plot tests of varieties at the Station were increased from three to four, and the number of varieties and selections grown in replicated tests was increased to 45. Outfield work with varieties was limited to farm observation tests. Six selections were grown by farmers who were supplied with seed enough to sow one or two acres. The better selections may be grown on a larger scale in 1947.

New rice varieties developed from crosses are beginning to take their places among the commercial varieties. Magnolia, an early medium-grain rice, and Bluebonnet, a midseason long-grain variety, probably will be grown on an increased acreage in 1947. Magnolia was selected at

<table>
<thead>
<tr>
<th>Variety</th>
<th>6-year average (field plots), Bbl. per A</th>
<th>Per cent of total rice acreage in Louisiana in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1941</td>
<td>1945</td>
</tr>
<tr>
<td>EARLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zenith</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>Early Prolific</td>
<td>12.3</td>
<td>16</td>
</tr>
<tr>
<td>*Magnolia</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>MIDSEASON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bluebonnet</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>*Fortuna</td>
<td>12.1</td>
<td>3</td>
</tr>
<tr>
<td>*Nira</td>
<td>11.2</td>
<td>1</td>
</tr>
<tr>
<td>Improved Blue Rose</td>
<td>11.6</td>
<td>70</td>
</tr>
<tr>
<td>*Blue Rose 41</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>LATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas Patna</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>*Rexoro</td>
<td>11.1</td>
<td></td>
</tr>
</tbody>
</table>

*Released from the Rice Experiment Station, Crowley.
†Probably some 2,000 acres

2 Cooperative experiments with the Louisiana Agricultural Experiment Station and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.
Crowley from the cross Improved Blue Rose x Fortuna, while Bluebonnet was selected at Beaumont from the cross Rexoro x Fortuna. Advantages of Magnolia include disease resistance, ease of combining, and high milling quality. Bluebonnet is earlier than Fortuna and Nira, has shorter straw, and hence is better suited for combining. The grain type is similar to Rexoro.

The varieties listed in the table above, with the exception of Early Prolific, are the varieties recommended for general production in Louisiana in 1947. Farmers considering planting varieties not on the recommended list should consult the Rice Experiment Station.

The changes from 1941 to 1946 in varieties being grown in Louisiana are shown in the preceding table. The shift was brought about by the availability of improved varieties, the established price schedule, and the introduction of the combine-drier method of harvesting. The six-year average yields of the new varieties grown in field plots at the Station are given in the table above.—N. E. Jodon.

Southeast Louisiana Experiment Station, Franklinton
Sam H. Smith, Superintendent

The Southeast Louisiana Livestock Experiment Station is a new sub-station located six miles from Franklinton on the Amite-Franklinton highway.

This station is located in the cutover pine land of the Florida Parishes on representative soil types of this area. It consists of 840 acres of land acquired from the Gaylord Container Corporation, part by donation and part by purchase.

The development of this land has been under process since March, 1946. Up to this time stumps have been removed from 800 acres, and 300 acres have been cleared of brush trees and the holes filled. Of these 300 acres, 175 acres have been terraced, broken, disced, and put in shape for use.

This 175-acre block has been set aside for an experimental dairy unit. In cooperation with the Agronomy and Dairy Departments of the University, twenty plots, 4 acres each, have been laid out for experimental pasture. On these 20 plots five treatments have been used, each being duplicated 4 times. Two duplications of each will be used for renovation studies and two will be used for costs, returns, and duration studies.

The treatments are as follows:
No. 1—No treatment;
No. 2—Treated with lime and fertilizer, no seed;
No. 3—Treated with lime, fertilizer, white Dutch clover, Dallis grass and lespedeza;
No. 4—Treated with lime and fertilizer and seeded to oats, which are to be followed by Sudan grass;
No. 5—Treated with lime and fertilizer, seeded to oats and lespedeza.

In accordance with soil analysis made by the soils laboratory, lime was used at the rate of 2½ tons per acre and fertilizer with an analysis of 3-12-12 was used at the rate of 600 pounds per acre on the above plots that are designated as being treated with lime and fertilizer.

Other land, to be used in connection with the dairy, is being prepared for pasture and hay at the present time.

It is planned to place a dairy herd on the station this summer (1947).

In cooperation with the Federal Experiment Station at Bogalusa, it is planned to set up a project with tung trees during the next year.

At the time this land was acquired by Louisiana State University there were no buildings. There have been two buildings for storage space and a shop constructed and a contract has been let for construction of a superintendent’s home, foreman’s home, 4 laborers’ cottages, dairy barn, and hay storage building.

Constructing terraces on cutover land in Washington Parish where the Southeast Louisiana Livestock Experiment Station is being established.

_Fruit and Truck Experiment Station, Hammond_

W. F. Wilson, Jr., Superintendent

_Strawberry Studies_

Varieties

At the end of the 1946 season, the seedling L-39 was named “Marion Bell” and a number of plants were distributed over the strawberry area
for widespread testing during 1947. This variety, developed by Dr. Julian C. Miller, has a very attractive fruit, as each berry develops a very high degree of gloss or luster and is well shaped and uniformly colored. A comparison of average yields for the past two seasons with the standard varieties, Klonmore and Klondike, shows the Marion Bell to be equally as productive as these varieties. During the first thirty days of the season the average yields per acre were: Klondike 88 crates, Klonmore 80 crates, and Marion Bell 100 crates, while the total yields per acre, including the cold-pack harvest, were 259, 243, and 278 crates, respectively.

**Fertilizer Application**

Averages of yields for two seasons show the application of 1500 pounds per acre of a 4-12-4 fertilizer under the crop to have produced 294 crates per acre, while splitting the applications (half under the crop and half as a top-dressing at time of scraping and mulching) of 1500 pounds and 1000 pounds per acre of a 4-12-4 fertilizer produced 289 crates per acre.

The application of additional nitrogen as a top-dressing after applying the complete fertilizer in the drill at the recommended rates has not proved of any value.

**Blueberries**

In cooperation with Dr. G. M. Darrow, of the U. S. Department of Agriculture, the best selections from a large population of seedlings of controlled crosses are being propagated for increase and testing. Several of these selections are definitely an improvement over any of the named varieties of the Rabbit-eye blueberries tested at this station.

Varieties, recently named, and the promising selections from other cooperators of this project are being added to the planting for observation in this area and for comparison with the better strains and varieties in this planting.

**Peppers**

Trials by growers continued to show increased yields and high quality of fruit from the Dixie Wonder variety, which was developed at this station. Commercial seed stocks of this variety are now available to the growers.

Other promising strains are being increased for testing with the standard varieties.
Insecticide Studies During 1946 Show Promise of Controlling the Sweetpotato Weevil

In field experiments during 1946 calcium arsenate applied at 14-day intervals reduced the quantity of weevil-infested potatoes 94 per cent, or 19 bushels per acre, below that of the undusted check. Calcium arsenate showed the greatest reduction of any of the treatments, but was not statistically better than 5-percent DDT, 2.88-percent gamma benzene hexachloride, or a cultural treatment consisting in high hilling of the plants at the last cultivation. The reduction of 19 bushels of infested potatoes per acre is the greatest shown by any insecticide so far in our field investigations, but the corresponding increase in yield of uninfested potatoes was only 7.6 per cent, which is not significant. The high hilling of plants at harvest deserves further testing, since this would be a simple treatment and very practical, especially on small farms, should it continue to prove effective.

In a weevil-resistance test using new sweetpotato seedlings, the seedling 32-10-5 showed the lowest infestation in crowns and potatoes. The same seedling had lower infestation in 1945 than others grown in the test with it. Data were obtained on the percentage of moisture, dry matter, starch, and carotene in various seedlings in the tests. This information may throw some light on the type of potatoes that are least attractive to weevils.

DDT continued to show excellent results as a residual treatment for storage houses, for killing adults around refuse dumps, and for protecting seed potatoes against infestation. The treatment of storage houses with 5 or 10 per cent DDT dust appears to be as satisfactory as treatment with liquid sprays, and the dust is much more rapidly and easily applied.

As little as 0.25 per cent of DDT in liquid sprays was found to be as effective against adults as were higher strengths, and to remain effective for a comparable length of time. DDT sprays were also found to be

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1 In cooperation with the Louisiana Agricultural Experiment Station and the Louisiana State Department of Agriculture and Immigration.
New Insecticides Show Promise for Cabbage Caterpillar and Turnip Aphid Control

Among the insecticides tested during 1946, DDT again showed excellent results against cabbage caterpillars. A dust containing 3 per cent of DDT, applied at intervals of 10 to 14 days until plants began heading, appears to be the most satisfactory treatment under normal conditions.

In fall experiments directed against various species of caterpillars attacking young plants, the 3-per cent DDT dust mixture was superior to 1 per cent of DDT, undiluted cryolite, and a mixture of 19 parts of calcium arsenate and 1 part of Paris green. The 3-per cent DDT, applied until the cabbage began heading, afforded very good protection until harvest. During this period comparatively little rain fell. During 1945 the same treatment was not satisfactory in the presence of unusual rainfall during the treatment period. In spring experiments a dust mixture containing 3 per cent of the gamma isomer of benzene hexachloride appeared to be about as toxic to cabbage caterpillars as a comparable dosage of DDT. In preliminary fall experiments a dust mixture containing 15 per cent of chlorinated camphene (technical) showed promise in killing cabbage caterpillars and protecting the plants over a relatively long period.

Experiments conducted during the year revealed several promising substitutes for rotenone for controlling the turnip aphid. The addition of sulfur or oil to rotenone dust mixtures increased their effectiveness against this insect. Dosages of nicotine dust mixtures containing less than 3 per cent were generally unsatisfactory, but the so-called free nicotine tended to be superior to the regular forms of nicotine. Dust mixtures containing 3 per cent of the gamma isomer of benzene hexachloride or 15 per cent of a commercial chlorinated camphene showed great promise, both of these materials being equal to or better than dust mixtures containing 1 per cent rotenone or 3 per cent of nicotine. The best formulations and additional data upon the residue hazard of benzene hexachloride and the chlorinated camphene are still to be determined.


2 In cooperation with the Louisiana Agricultural Experiment Station.
Bee Culture Investigations
[Report of the Southern States Bee Culture Laboratory]

The Southern States Bee Culture Laboratory, a field station of the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture, was established cooperatively with the Louisiana State University in 1928 and is concerned with beekeeping problems common to the Southern States.

Pollen-Trap Yields and Flight Records Indicate Reason for Slow Development of Colonies of Bees

During the active seasons of 1944, 1945, and 1946 pollen traps have been maintained on colonies at Baton Rouge, La., in order to determine pollen resources in the area and the amounts brought into the hives. Although pollen-trap records are not so reliable for this purpose as are scale-colony records for measuring nectar resources and income, they do give some idea of the relation between pollen and colony development. Pollen-trap yields depend on the efficiency of the trap, the size of the pellets brought in, and the need of the colony for pollen, as well as on the fitness of the weather for flight and the pollen resources.

The average daily pollen yields for eleven colonies, four in 1944, four in 1945, and three in 1946, during 10-day periods are shown in Figure 1. Both the average yields for the 3 years and the highest average yields for any single year are shown. A comparison of the two lines indi-
cates that factors other than availability of pollen in the field limit the amount of pollen gathered by the colony. In general the solid line indicates what the colony will bring in under average conditions, and the broken line shows what is available in the field if the bees are able to gather it.

Studies were made of weather records from the University weather station for the period 1931-1942, in order to determine the percentage of days on which bees were able to fly. As in the pollen-yield tests, these data were averaged for 10-day periods. The results are shown in Figure 2. Factors such as rainfall, wind direction and velocity, temperature, and sunshine were considered, and if, during the daylight hours, bees were able to fly for a 2-hour period during any day it was considered a flight day. Figure 2 therefore gives a more optimistic picture than the actual hours of flight during any 10-day period would justify. It is shown, however, that before the middle of March bees can fly on less than 50 per cent of the days. It is evident, therefore, that although nectar or pollen may be plentiful in the field, bees cannot gather much, and colony development must depend on the reserves of honey and pollen within the hive.

![Figure 1](Image1.png)

**Figure 1.**—Amounts of pollen trapped per colony in 10-day periods, averages for 1944, 1945, and 1946. The solid line shows the average amounts trapped during each period. The broken line shows the greatest amount trapped in any 1 day during each period.

![Figure 2](Image2.png)

**Figure 2.**—The average number of flight days per 10-day period expressed as per cent of the total number of days for the 12-year period 1931-42.

During January and February, according to Figure 1, the average pollen yield from traps is less than 50 grams per day, which is the pollen estimated to be necessary for rearing about 500 bees per day. Furthermore, the maximum yield of pollen which could be expected would be less than 80 grams per day for the same period, or enough to rear about
900 bees per day. Since a queen may lay from 1000 to 2000 eggs per day, the pollen available is much less than is required for the brood production necessary for a strong colony.

In March and April pollen resources in the field and flight weather are generally favorable, and bees can usually bring in enough pollen to maintain heavy brood production. Occasionally, however, cold, wet, or windy weather prevents flight. A flightless period of 4 to 6 days will often deplete the pollen reserves in the colony and decrease brood production. Two or three weeks later there will often be a decided drop in population, as bees, worn out from feeding brood without adequate pollen, die off rapidly. Beekeepers often refer to this condition as spring dwindling, but the cause appears to be a shortage of pollen during periods of high brood production and poor flight weather. Careful attention to pollen reserves within the colony and the supplying of pollen and pollen supplements in January, February, and March will do much toward insuring good colony development during the critical spring period.

—Warren Whitcomb, Jr.

Sugar Concentration of Some Louisiana Honey Plants

The percentage of sugar in the nectar of some Louisiana honey plants has been determined. Honeybees were caught on the blossoms, the contents of the honey stomachs were emptied on the prism of an Abbé refractometer, and a reading was made. A wide range in the sugar concentration of some Louisiana honey plants has been determined.
concentration of nectar from plants of the same species is common. One cause of the variation is the relative humidity at the time the bee gathered the nectar. Nectar samples should be obtained at intervals during a plant's blossoming period, if the average reading is to be representative. The accompanying table gives the average sugar concentration of nectar from some Louisiana honey plants.—Everett Oertel.

Bee Breeding

The honeybee has been found to be better adapted to hybridization after severe inbreeding than to any other method of breeding. The work that is being done can be divided into two main phases: (1) Breeding mainly for honey production with testing at the North Central States Bee Culture Laboratory, at Madison, Wis., and (2) breeding mainly for disease resistance with testing at the Intermountain States Bee Culture Laboratory, at Laramie, Wyo. No hybrids have yet been found that produce more honey than the best strain now available, but three lines have been developed that are resistant to American foulbrood, and colonies of the three-way hybrid between these lines for the third consecutive season either have not taken the disease or have overcome it quickly. In 1946 all matings were made by artificial insemination. Of 330 queens inseminated in the honey-production group, 62 per cent started laying and 56 per cent remained after culling, or elimination of inferior individuals. In the resistance project 260 queens were inseminated, of which 63 per cent started laying and 60 per cent remained after culling.

—Otto Mackensen.

Bureau of Plant Industry, Soils, and Agricultural Engineering

Irish Potato Improvement Program

The investigations of the Federal Irish potato program were conducted in cooperation with the Department of Horticultural Research of the Louisiana Agricultural Experiment Station, and with the Plateau Experiment Station at Crossville, Tennessee, where most of the seedlings are grown for increase.

All the experiments mentioned in this report were originally planned and started by E. L. LeClerg, whom the author succeeded in May, 1946.

Disease Resistance

A total of 200 seedling varieties were tested for scab resistance. The plot had been used to test potatoes for scab resistance during the last five years. To increase soil infestation a layer of crushed scabby potatoes mixed with stable manure and lime is placed in the furrow previous to
planting. The soil in the plot is now thoroughly infested with the scab organism, and susceptible varieties become readily covered with scab lesions. Fourteen seedling varieties were found to be highly resistant to scab.

A total of 313 seedling varieties were tested for resistance to early blight. After the plants emerged, dried leaves, collected from infected plants in 1945, were crushed and the small leaf fragments were scattered over the plants. In the evening a sprinkling system was turned on for about an hour, in order to provide ideal conditions for infection. Although not any of these varieties was immune, a large number of these showed a high degree of resistance.

Each year promising seedlings are being sent to other cooperating Southern States where they are tested for adaptability and for resistance to other diseases. Some of these seedling varieties have shown resistance to Sclerotium rot in Mississippi.

Further breeding work is in progress in an attempt to combine resistance to scab, early blight and other diseases with high yield and good cooking quality.—T. P. Dykstra.

Cotton Disease Investigations

Seed Treatment

This project was continued during the past season and represents part of a regional study being conducted by the Division of Cotton and Other Fiber Crops and Diseases, U. S. Department of Agriculture, in cooperation with the various states of the main cotton belt. The objectives are to determine the effects of seed processing (reginning, delinting and matting) and chemical treatment of seed on seedling disease control and stand improvement. The tests in Louisiana in 1946 were made at the Main Station near Baton Rouge. In one test (Test C) three differently processed lots of seed were employed, namely, fuzzy (regular ginned), reginned and acid-delinted and five chemical dust treatments. The treatments included Dow 9-B, DuBay 1452F, Dow 9-B plus Dow 5, Gcc 668 and Fermate plus 1452F. In another test (Test B), DuBay 1452F and Dow 9-B were compared at approximately the same rate of treatment on six processed lots of seed, the lots being fuzzy and fuzzy matted, reginned (light) and reginned (light) matted, reginned (heavy) and acid delinted. In matting the kind of seed is treated with the chemical dust and then the fuzz is pasted down with a matting substance—methyl cellulose. Such seed are very easily handled and do not rope together when planted. The seedstock employed in both tests was Stoneville 2B grown at Stoneville, Mississippi, in 1945 and was infested with the anthracnose fungus.

The effects on seedling stand of the various treatments on the three lots of seed employed at Baton Rouge were determined by calculating the per cent emergence 20 days after planting. Among the lots tested,
the acid-delinted seed gave the best emergence of seedlings at final stand, the difference being highly significant over fuzzy and reginned. The three best treatments were DuBay 1452F, Dow 9-B plus Dow 5, and Dow 9-B. The results obtained from Test B indicate that DuBay 1452F and Dow 9-B are about equally effective when used for treatment of cottonseed. The number of surviving seedlings was about the same for all kinds of seed in this test except the delinted, which was higher but not significantly so. Matting, while giving good emergence in the fuzzy seed, lowered emergence in the case of the reginned, indicating that the matting substance may have been applied too heavily in this lot.

**Fusarium Wilt**

_The relationship of rainfall to the incidence of the disease in Louisiana._—A study of the rainfall and wilt development from May through August in 1945 and 1946 at Baton Rouge indicates that this disease is favored best by alternately wet and dry periods during the optimum period for infection—June to August—slightly in excess of the 20-year average rainfall. In contrast, an extended period of excessive precipitation at this time is unfavorable for the disease. In 1945, the rainfall was only slightly above the 20-year average for the months of June and August with wilt appearing early, June 12, and becoming progressively worse as the season advanced and causing crop failures in the case of susceptible varieties. In 1946, the rainfall was much higher than this average for May and July and slightly higher for June, with the result that only a scattering amount of wilt developed before the middle of August. These observations on environmental relationships may explain no doubt the fluctuations in the incidence of the disease in other localities and the frequent failure to reproduce the disease in the field by artificial inoculations. The data may be helpful when studying resistance of plant selections under controlled temperature and moisture and may serve as a guide for producing optimum conditions for infection by the fungus.

_Breeding for wilt resistance._—The over-all objective of this work is to develop by backcrossing and selection wilt resistant lines that are productive and possess the desired fiber properties of strength and uniformity together with good staple length and good gin turnout. During the past season outstanding plants of several wilt resistant and susceptible lines were selfed and carried for future breeding work. These lines include Coker 100 (Georgia and North Carolina), Deltapine 6 (Louisiana), Delfos 425 and 6102 (Louisiana), Stoneville 2B (Mississippi), Dixie Triumph 366 (Louisiana), and Half and Half and Cook (Alabama). The F₁ crosses of some of these lines were backcrossed with the resistant parent. Selections also were made of open-pollinated plants showing good wilt resistance, boll size and productiveness. The fiber of these selections, selfed plants and crosses was analyzed and the most promising material maintained for subsequent study and improvement.

—D. C. Neal.
Financial Statement---Agricultural Research Funds
July 1, 1945 to July 1, 1946

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*Includes appropriations for substations and special Legislative appropriations.
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Rufus K. Walker, M.S., Superintendent
N. E. Jodon, M.S., Associate Agronomist, U.S.D.A.
W. A. Douglas, M.S., Assistant Entomologist, U.S.D.A.
D. A. de la Houssaye, M.S., Assistant Agronomist

SOUTHEAST LOUISIANA STATION, FRANKLINTON

Sam Harrell Smith, M.S., Superintendent

UNITED STATES DEPARTMENT OF AGRICULTURE

D. C. Neal, Ph.D., Senior Pathologist
T. P. Dykstra, Ph.D., Senior Pathologist
Warren Whitcomb, Jr., Ph.D., Apiculturist, in Charge
T. T. Ayers, Ph.D., Associate Pathologist
John Cotton, M.S., Associate Agronomist
Everett Oertel, Ph.D., Associate Apiculturist
Hugo Stoneberg, M.S., Associate Agronomist
P. K. Harrison, M.S., Entomologist
Otto Mackensen, Ph.D., Assistant Apiculturist
K. L. Cockerham, M.S., Entomologist
Oliver T. Deen, B.S., Entomologist
Irwin L. Saveson, B.S., Drainage Engineer

1 Resigned.
2 Transferred.
3 Appointed on or after July 1, 1946.
4 Part-time teaching.
5 Returned from military leave after July 1, 1946.
6 Retired.
7 Deceased July 9, 1946.
8 On leave of absence.
Distribution of Population, 1940, in Relation to Hospitals Having 100 or More Beds, 1945. (See