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REPORT OF THE RICE EXPERIMENT STATION FOR THE YEARS 1928-1929

BY

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C. T. DOWELL, Dean and Director
FOREWORD

I have asked each of the Superintendents of the substations to write a narrative report of the work done at his station during the last two years. You will notice that no tables are given. The details in regard to the different experiments will be reported later in bulletin form, at the time of the completion of the project or at definite stages in the progress of the project.

I think the farmers are more interested in the purpose of the project and the results obtained than they are in the details. It is for that reason that I have had the reports written in this form,

C. T. DOWELL,
Dean and Director.
REPORT OF THE RICE EXPERIMENT STATION FOR
THE YEARS 1928—1929

WEATHER OBSERVATIONS

The uncertainty of the weather in southwestern Louisiana is indicated in comparing certain phases recorded for the years 1928 and 1929. In the first place, the year 1928 was one of the driest on record at the Station, with a total precipitation of only 43.21 inches; while the year 1929 with a total precipitation of 66.99 inches approached very closely the highest annual precipitation so far recorded at this Station. The 20-year average annual precipitation is 56.33 inches. It is also interesting to note that some years those months usually thought to be rather dry, became the record wet months of the year. For instance, take the months of May and November. In 1928 the total for May was 1.06 inches and for November 3.13 inches; while in 1929 these were by far the wettest months of the year with a total precipitation of 13.35 inches for May and 14.92 inches for November; the latter approaching within 2.12 inches the record precipitation recorded for any one month in the 20 years in which records have been kept. The 19-year average precipitation on record for these two months is 4.40 inches and 3.84 inches respectively.

Another interesting comparison is that of temperatures. While there is not very much variation in the extremes and means there is a decided range in the days with a temperature of freezing or below, and the dates on which they occur. In 1928 for instance freezing temperatures occurred on 19 days with none for March; while in 1929, freezing temperatures were recorded on 24 days, one of which was in March. The year 1929 had more freezing days than any other year since 1918.

THE EFFECT OF THE WEATHER
ON THE RICE CROP

Both years the weather was favorable for plowing during the winter months. This was especially true in
1928, during the month of January. The spring work was delayed in March of 1929, but favorable weather in April enabled seeding operations to go forward to completion with few interruptions. In 1928 there was very little rain in May, making conditions rather unfavorable for germination of rice. In many instances it was necessary to flood the seedbed to cause germination. In 1929 very heavy rains occurred from May 14-18 inclusive, flooding many fields to a depth of 18 to 20 inches. Fields that had not long been sown, were injured by the weeds that emerged along with the rice, as a result of the constant rains. This condition resulted in greatly reduced yields in certain areas. This was especially true of some of the station plots.

Excellent harvest weather obtained both years. This was especially true in 1929, as late as the last few days of October, when heavy rains started and continued with rather short intervals to the end of the year. Seldom before in the history of this Section has such excellent harvest weather obtained as during the fall of 1929. This excellent weather however had a tendency to force down rice prices as practically the entire crop was ready for market at one time.

THE RICE MARKET

At no time during the fall months of both 1928 and 1929, was the price of rough rice entirely satisfactory to all concerned. The general situation was about the same as in previous years. From time to time effort has been put forth by one group after another toward making some provision for advertising rice, or in some other way strengthening the activities of the industry, but so far it seems that no method has been found that is satisfactory to a sufficient number of those interested in the crop. From all indications it seems that there must be more effort exercised toward increasing the output of popular table rices, and a closer cooperation of all persons interested in the growing and marketing of rice.
STATION RESULTS

All experiments that were conducted in 1928, were repeated in 1929, save certain fertilizer tests which were discontinued, after being conducted for a period of ten years.

These fertilizer experiments were conducted in duplicate, and on the same land each year. Each plot being inclosed by a levee and irrigated and drained independently, the fertilizers could not be conveyed from one plot to another. Every fifth plot was used as a check and received no fertilizer.

The fertilizers were used singly and in several combinations. Sulphate of Ammonia, Nitrate of Soda, Dried Blood, and Cotton Seed Meal, were used as sources of nitrogen. Sulphate of Potash as a source of Potassium and 16% Acid Phosphate as a source of Phosphoric acid. Lime was applied in the form of ground limestone. Stable manure was used also.

In all there were 15 different applications of fertilizer used in this set of experiments. Taking the ten-year average of the six check plots, and the ten-year average of the different fertilizer applications, only five produced more than the check, and the remaining ten produced less. In no case was the difference sufficient to meet the extra expense incident to the purchase and handling of the fertilizer. From this set of tests it is very evident that commercial fertilizers cannot be depended upon to increase rice yields when applied each year to the same land at the rates and to the kind of soil used in this experiment. The greatest increase was from an application of 200 pounds composed of equal parts of sulphate of potash and sulphate of ammonia. Slight increase in yield was noted from the following in the order given: Sulphate of Potash, Dried Blood, Stable Manure and Cotton Seed Meal. In every instance where acid phosphate was applied alone, or in combination the yield was below the check. Limestone alone did not increase the yield and in relatively large quantities was injurious as long as 8 years after the last application.
Another set of fertilizer experiments that has been under way for the past eight years including 1929, is to be discontinued to give way for other experiments including the same fertilizers as the set discussed above, save that Limestone and manure were not included. This experiment was not conducted in duplicate but in rotation with Biloxi soybeans. The bean seed was harvested, leaving the remaining portions of the plant which was plowed under.

In comparing the results for the eight years, it is noted that sulphate of ammonia with sulphate of Potash, 100 pounds each per acre, gave an increase, over the check plot of sufficient size to be profitable. Others gave an increase but not sufficiently large to be profitable. Acid Phosphate alone and in combination save when combined with the other two elements (nitrogen and Potash), reduced the yield. There was an increase also from some of the other fertilizers in the order named: Dried Blood, Cotton Seed Meal, and Sulphate of Potash.

All yields from this experiment were much larger than those secured in the fertilizer experiments in which rice was seeded on the same land each year. In fact the average yield from the check plots was higher by 368 pounds than the highest yield from the fertilizer plots seeded continuously to rice. This would indicate that one might expect much higher yields from rice when grown in rotation with soybeans than when grown with commercial fertilizers; also that the application of Sulphate of Ammonia and Sulphate of Potash will give profitable returns when applied to rice that is grown in rotation with soybeans.

Another set of fertilizer experiments conducted continuously on the same land over a period of ten years, using three sources of Phosphoric Acid; while not giving profitable results indicate that Raw Rock Phosphate is to be preferred to Acid Phosphate or Duplex Basic Phosphate. Acid Phosphate appeared injurious to plant growth after the plants were submerged and encouraged weed growth. Raw Rock Phosphate did not seem
to do either of these things. Duplex Basic Phosphate at times appeared injurious.

In summing up the whole matter of fertilizers for rice, it would seem: 1st., that their advantage is somewhat doubtful, and that there is much more to learn regarding this subject, 2nd., with the information at hand it appears that if results are to be secured from commercial fertilizers they must be applied to rice that is grown in rotation with some crop, especially with soybeans; 3rd., that rice needs an abundance of nitrogen and potash, and very little phosphoric acid. Also that these can be best applied in the form of sulphate of ammonia, sulphate of potash, and Raw Rock Phosphate; the latter to be applied probably in rather large quantities with intervals of several years between applications.

**RICE VARIETIES**

The same studies pertaining to rice varieties have been continued from year to year. Usually new ones are added to the collection each season, and promising ones are increased. During the past two seasons special attention has been given to early maturing varieties, as there is great need for an early maturing rice of good table and milling qualities. Several promising ones have been increased and their table qualities are being determined. If a rice has not culinary properties that are attractive, it is unwise to place such a rice on the market, even if its behaviour in the field and in the mill is entirely satisfactory. This is being recognized more and more by the rice trade as indicated by inquiries and the readiness displayed each year by a larger number of persons in the different phases of the rice industry to test new rices, with a view to finding merits lacking in the present commercial varieties.

**CULTURAL EXPERIMENTS**

Beginning with 1928, several new cultural experiments were begun, and some of the older ones continued. There has scarcely been time to accumulate sufficient data on the new ones, upon which to base conclusions.
These include rice grown in rotations as follows: With different soybean varieties; with soybeans cut for hay and soybeans harvested for seed; with soybeans grown in close drills and not cultivated; with soybeans cultivated in wide rows; with soybeans grown two years; with summer fallow one year and summer fallow two years; with pasture one year and pasture two years; and various other rotations. Some including cotton and soybeans in a three-year rotation; others including rice in rotation with fertilized cotton and rice in rotation with unfertilized cotton.

In comparing the yields of some of the rotations that have been underway for several years it was found that the average yield for the past two years following soybeans was 500 pounds more than the average yield following pasture. The same difference was found in the average yield over the entire 9-year period. In addition to the increased yield of rice there was an average yield of 8 bushels of soybean seed per acre. No soybeans were harvested in 1929, due to damage from the velvet bean caterpillar.

In the rotations including cotton, the highest average yield of rice for the ten years was from those plots in which soybeans were included in a 3-year rotation and the lowest from the plots conducted in rotation with fertilized cotton. The best yield of cotton was obtained from the plots that were fertilized. The fertilizer that remained in the soil seemed to have a bad effect on the rice following; due it appears to the large quantity of superphosphate used on the cotton, as this fertilizer in liberal quantities in all the fertilizer experiments had a tendency to reduce rather than increase yields.

In comparing the yields of rice following soybeans harvested for hay, harvested for seed, and grown in close drills and turned under after after maturity; we have only two years' results. This is true of other rotations discussed below. It is however noted that the average is decidedly higher when only the seed was harvested, and much lower when rice followed uncultivated soy-
beans, grown in close drills, and turned under after maturity.

In growing rice in rotation with Biloxi, Otootan and Barchet soybeans cultivated in 4 1/2-foot rows, the 2-year average yield of rice was much greater following Barchet beans than when it followed the other two varieties. The lowest yield was from the plots grown in rotation with Biloxi beans. This land before beginning this rotation had been devoted continuously to rice for the past eight years. When grown on such land Biloxi beans make a rather poor growth. This might account in part for the difference of 580 pounds per acre less in the 2-year average yield of rice, following these beans, than where rice followed Barchet beans.

**DISKING VS. PLOWING IN PREPARATION FOR SEEDING RICE FOLLOWING SOYBEANS**

For the past four years an experiment has been conducted to determine whether or not there is any necessity for plowing land in preparation for seeding rice which is to follow a crop of cultivated soybeans. The results so far indicate that plowing is unnecessary. In two out of the four years land that was only disked produced more rice than that that was plowed as well, and the four-year average yields show practically no difference. Grass and other weeds are also more easily controlled by not plowing, especially if the beans have been thoroughly cultivated.

**SEEDING RICE ON DIFFERENT DATES IN WATER OF DIFFERENT DEPTHS**

From a study of two years, results in seeding rice in water it is noted that a better stand resulted when seeded at a depth of 4 inches than when seeded at depths of 2 or 6 inches; however, the difference is not very great. A better average germination was secured from seedings made the middle of March than from those made the middle of April and the middle of May. Four varieties of rice were used. The highest germination was secured from Blue Rose and from the other varieties in the order given: Early Prolific, Fortuna and Honduras.
In all cases the germination was rather low, indicating that in using this method the rate of seeding should be high.

RESTRICTED SEED DISTRIBUTION

It has been the custom of this station to distribute to rice farmers in the State of Louisiana, seed rice of promising new varieties. This has been for the purpose of increasing the seed, and at the same time obtaining information relative to the behavior of these rices under general farm conditions. This is very necessary in that the station is not large enough to have land available for this purpose.

Farmers take such seed, in quantities sufficient to plant one or two acres, agree to dispose of all seed produced in accordance with some plan approved by the station. The main requirement is that all seed produced shall be used for planting, after a portion that might be required is used for milling tests.

The outcome of one such arrangement is the commercial acreage devoted to the Fortuna variety. Some have estimated that as much as 30,000 acres were grown to this rice in 1929, an increase of about 10,000 acres over 1928. The greater portion of this acreage was in the state of Louisiana. Fortuna usually produces much heavier yields than other commercial rices. On the station over a long period of years, the average yield has been about 3 barrels more than that secured from one of the commercial varieties that is most extensively grown.

Another variety introduced in this manner two years ago, known as Rexoro, is receiving considerable attention, because of its yielding ability, and its ability to withstand dry conditions, if required to at time of heading and maturity. Another very attractive feature is its excellent table qualities. Its close resemblance to certain imported varieties gives promise that it will eliminate the necessity of importing such rices.

Delitus rice was distributed several years ago, and gained considerable popularity with those desiring a specially flavored rice. Due to lack of interest on the
part of growers and millers the acreage devoted to this variety has been very small. Recently the trade has been asking for it and if given the attention it deserves it will no doubt become one of the most popular rices; for it is an excellent table rice, having a distinct flavor, and excellent cooking qualities. The field yield is not extreme, but of a high average.

**COOPERATIVE COTTON EXPERIMENTS**

These results will appear in another publication.

**ENTOMOLOGICAL INVESTIGATIONS**

The representative of the Bureau of Entomology of the United States Department of Agriculture continued his investigations pertaining to Rice and Soybean insects. Under date of December 1929, he published the following relative to the velvet bean caterpillar, an insect attacking soybeans for the first time in southwestern Louisiana:

"The soybean is a valuable legume on the rice plantation. A blister beetle, or Spanish fly, is ordinarily the only serious pest of the crop in Louisiana, but in 1929 considerable damage was done by an insect known as the velvet bean caterpillar.

"The adult of this pest is a moth which is not definitely known to pass the winter in the United States. It is supposed to fly north in the summer from Cuba or possibly from southern Florida. It deposits eggs on the leaves of bean plants. These eggs hatch into small larvae, or caterpillars, which soon begin to feed on the most tender leaves, but as they increase in number they attack all parts of the plant, even the stems themselves and the bean pods.

"The caterpillar is a black, or dark green striped larva, reaching a length of one and one half inches. It jumps violently off the plant when disturbed. When holes are noticed in the top leaves of the soybean plants the presence of the caterpillars can be suspected. These caterpillars, when few in number, are difficult to see against the green leaves, but when the plant is shaken they suddenly fling themselves to the ground.

"On becoming full grown, the caterpillars burrow in
to the ground, forming earthen cells from one-fourth of an inch to an inch and a half below the surface. In these cells they pass the pupa, or cocoon, stage. In the course of a week or less in summer a new generation of moths will emerge from these pupae. It is the second generation of this insect which was found to do the greatest damage.

"It will immediately occur to the rice planter that flooding the fields might kill these pupae, but flooding has been tried and has proved unsatisfactory. A shallow cultivation will destroy many pupae. They are usually close to the bean plants, and cultivation therefore should be carried as near the plants as possible.

"Several insecticides have been tried, including calcium arsenate mixed with hydrated lime. While calcium arsenate and lead arsenate kill the caterpillars, they also kill the soybean plants, and their use therefore cannot be recommended.

"Sodium fluosilicate dust, however, has been found to be entirely satisfactory. This is the same chemical which rice planters are already using against the blister beetle. The light grade of dust is to be recommended as it is more economical, being cheaper and spreading better. The dust should be applied on dry plants at the rate of from ten to twelve pounds per acre. A heavier application may slightly injure the plants, and moisture on the plants may cause burning. For fields of less than one hundred acres hand dusters may be used unless a cart duster is readily available. The plants should be dusted as soon as any sign of injury is noticed. Sometimes a second application may be necessary if a new generation appears or in case caterpillars should march in from a neighboring field.

"Several fields of soybeans in southern Louisiana and Texas were saved during 1929 by the timely application of sodium fluosilicate.

"The caterpillar may not appear during the coming year, but since the blister beetle is an annual visitor it would be advisable to have at least a small supply of sodium fluosilicate on hand."