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# MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

AGRICULTURAL AND MECHANICAL  
COLLEGE OF MISSISSIPPI

FORTY-FIRST ANNUAL REPORT

FOR THE FISCAL YEAR ENDING

JUNE 30, 1928



J. R. RICKS, DIRECTOR

A. & M. COLLEGE, MISSISSIPPI

is being continued. The new type of storage house has proved very satisfactory both for curing and storing sweet potatoes. This house is built with the heat placed below the floor and allowed to go up through the beams.

Respectfully submitted,

J. C. C. PRICE, Horticulturist.

## ANNUAL REPORT OF PLANT PATHOLOGY DEPARTMENT

To the Director.

Dear Sir:

In compliance with your request for a synopsis of the experimental work being conducted by the Experiment Station and State Plant Board, we beg to submit the following:

### TOMATO DISEASES

**Wilt**—The tomato wilt project has been enlarged to include nineteen standardized varieties and nine new selections at the Main Station and fifteen standardized varieties at the Raymond Branch Experiment Station in cooperation with Mr. H. F. Wallace, Assistant Director in Charge of that Station. Each variety is being grown on soil apparently free of the wilt organism and on soil artificially infested with the wilt organism. The result of the studies on the wilt-resistant varieties of tomatoes from 1924 to 1927 have been published in Mississippi Agr. Exp. Sta. Bul. 247, 1-18, fig. 1-4, 1927.

**Blossom-End Rot.** Notes are being kept on the amount of blossom-end rot prevalent in the different varieties of tomatoes used in the wilt-resistant variety test. Plans are also being made to keep records on the prevalence of this disease on the tomatoes in the various fertilizer experiments at the Raymond Branch Station in cooperation with Mr. H. F. Wallace during the coming season. Records will also be kept on other factors which cause cull tomatoes.

### IRISH POTATO DISEASE

**Virus Diseases.** Studies are being made of the effect of rugose mosaic, mild mosaic, spindle tuber, and leaf-roll, upon the yield of the Irish potato under Mississippi conditions. The results from the test conducted during the spring of 1927 using Green Mountain potatoes are given below:

|                     | Bushels per acre |
|---------------------|------------------|
| Heatly .....        | 89.2             |
| Mild mosaic .....   | 63.6             |
| Rugose mosaic ..... | 27.0             |
| Leaf-roll .....     | 18.7             |
| Spindle tuber ..... | 40.0             |

**Certified Irish Potato Seed Tests.** The certified Irish potato seed project is being continued in cooperation with Mr. W. S. Ander-

son, of the Poplarville Branch Experiment Station, and with Mr. H. F. Wallace, of the Raymond Branch Experiment Station. It has been enlarged to include samples of seed from about 90 sources. The results from previous years indicate that there is a wide difference in the amount of disease and yielding ability in samples of seed from a given state. This makes it desirable to test the seed stock being grown by each seed grower who ships seed potatoes into this state. We hope therefore to greatly enlarge this project and to obtain federal aid for establishing an Irish Potato Seed Testing Station to be located in South Mississippi. Such a station could render valuable assistance in the improvement of the quality of Irish potato seed and in giving the growers of the South an index of the value of the seed being produced in the northern and western states. Results obtained during 1927 on this project have been published in Mississippi Agr. Exp. Sta. Circ. 75; 1-8, fig. 1-3. 1927.

**Seed Treatment Experiments.** Several disinfectants, including hot formaldehyde, bichloride of mercury, and various organic mercuries are being tested for the control of common scab and black scurf of the Irish potato.

**Dusting and Spraying Experiments.** Copper-line dust, Bordeaux mixture, and colloidal copper are being compared for the control of hopper-burn and early blight.

### SWEET POTATO DISEASES

**Seed Treatment for the Control of Black-Rot.** The sweet potato seed treatment experiment inaugurated in 1927 is being continued. Nancy Hall seed potatoes were inoculated with a suspension of ascospores, conidia, etc., of the black-rot fungus and then treated with various disinfectants, including some of the organic mercuries, bichloride of mercury, and formalin. The treatments were replicated three times and checks (untreated potatoes) were placed every fourth plat.

**Stem-Rot.** Samples of the Nancy Hall and Porto Rican varieties from 46 different sources have been collected and planted this spring in an effort to find a strain that is resistant to stem-rot. Ten varieties are also being tested for their susceptibility to stem-rot.

**Effect of Mosaic of Sweet Potato on Yields.** A comparison of the yields from selections made in 1926 of mosaic-diseased Nancy Hall sweet potatoes is being made. These selections varied in total yield during 1927 from 30 to 70 per cent of the yield of an apparently healthy lot of seed.

### CORN ROOT, STALK, AND EAR ROTS

**Seed Treatment Experiments.** Corn seed treatment experiments using Improved Semesan, Jr., Bayer Dust, and Merko are being conducted at the Main Station and also at the Poplarville, Delta, and

Raymond Branch Experiment Stations in cooperation with Messrs. E. B. Ferris, W. E. Ayers, and H. F. Wallace, Assistant Directors in Charge of the above mentioned stations respectively.

**Fertilizer Experiment.** An experiment has also been inaugurated to determine the effect of potassium and of phosphorus upon the development of corn root, stalk, and ear rots. Varying amounts and combinations of these two elements are being used on soil which is badly infested with *Fusarium moniliforme*. *Diplodia zeae* is also present in the soil. The treatments have been replicated four times requiring a total of 52 plats.

### CABBAGE DISEASES

**Black-Leg.** Studies are being made on the effect of treating infected cabbage with HgCl<sub>2</sub> and hot water. In the spring of 1927, one lot of infected cabbage seed of the Charleston Wakefield variety was treated for ten minutes in a 1-1000 solution of bichloride of mercury, another for 25 minutes in water heated to 50 degrees C. and a third was left untreated. The result from this experiment are given below:

| Treatment         | Per Cent Black-Leg | Average Wt. of Heads<br>in pounds | Tons per<br>acre |
|-------------------|--------------------|-----------------------------------|------------------|
| Untreated         | 13.7               | 1.73                              | 7.98             |
| HgCl <sub>2</sub> | 6.3                | 1.67                              | 8.36             |
| Hot Water         | 2.1                | 1.58                              | 8.25             |

**Yellows.** In cooperation with Dr. J. C. Walker, of the University of Wisconsin, recent selections of Jersey Wakefield cabbage which are homozygous for resistance to yellows, homozygous for susceptibility to yellows, and various crosses are being tested under Mississippi field conditions. Several other varieties of cabbage which have been selected for resistance to yellows are also being tested.

### BEAN DISEASES

**Mosaic.**—Preliminary experiments are being conducted to determine the prevalence of mosaic in bean seed of the Burpee's Stringless Green-Pod variety from various sources. Twenty-four varieties are also being tested for the presence of mosaic in the seed for the relative susceptibility of each variety to the disease.

**Root and Stem Rots.** Experiments conducted during 1927 indicate that bean seedlings may be protected from *Rhizoctonia* sp. and *Macrophoma phaseoli* by dusting the seed thoroughly with some of the organic mercuries provided the seed are not covered too deeply. Further studies on this problem will be made during the coming season.

### ORNAMENTAL DISEASES

**Gladiolus Scab.**—The gladiolus corn treatment project is being continued and has been greatly enlarged this season using several dis-

infectants for varying periods of time. The results of the 1927 experiment have been published in Mississippi State Plant Board Quar. Bul. 7: 6-10, fig. 3-4. 1927.

**Narcissus Root-Rot.** Experiments have been inaugurated this season for studying the cause and control of narcissus root-rot. A species of *Fusarium* has been consistently isolated from rotting roots and inoculation experiments are being conducted. Experiments are also being conducted to determine the effect of various disinfectants upon the control of this disease.

**Rose Mildew.** A preliminary experiment is being conducted to determine the effect of potassium upon the development of powdery mildew of roses.

**Wilt.** (Adams Fund) The cotton wilt investigations have been continued along somewhat the same lines as previously reported. These have included studies of the relation of nutrition and the development of the disease mostly under field conditions; studies of resistant and susceptible staple and short cottons; studies of filtrates and extracts of the fungus for nitrate and other possible toxic substances; and chemical studies on the presence of iron and aluminum compounds in diseased and healthy cotton tissues. The more recent contributions on these studies have been published as Technical Bulletin No. 16 and Bulletin No. 248 of the Mississippi Experiment Station. It has been established that adequate nutrition and the use of resistant varieties of cotton are both important in reducing cotton wilt. Fertilizers high in nitrates and potassium have uniformly given a lesser amount of infection on inoculated soil. Chemical analysis of diseased and healthy portions of cotton plants do not suggest an accumulation of iron or aluminum in the tissues as being a predisposing factor in producing infection. Preliminary experiments yielded nitrates in extracts of the fungus when grown on a nutrient solution, but not in as high a concentration as has been reported by one other investigator. Four suitable short cottons and three long staple varieties have exhibited high resistance and have produced well on soil artificially inoculated with the wilt fungus.

**Anthracnose.** (Adams Fund) This project has been continued very much as in the past in cooperation with the Department of Plant Breeding and Agronomy. Inoculations have been made with a number of selections of Miller and Lone Star cottons with the hope of finding ones which might serve as a basis for further hybridization and selection for resistance to boll-rot. Resistance to anthracnose, however, has been found to be only relative with these and many other varieties judging from the results of the inoculations which have been made for two years; and it appears that undoubtedly a large number of additional selections and doubtless other cottons must be studied before immune or semi-immune strains can be found to serve as foundation breeding stocks.

**Seed Treatment Studies—**(State Fund) Cotton seed treatment experiments with organic mercuries and iodine disinfectants for the control of angular leaf-spot, damping off, and wilt and their effect on yields were conducted last season. An enlarged program of similar experimentations is under way this season at the Central Station and at all of the branch stations. A preliminary test at the Holly Springs Branch Station last season gave a marked increase in yield of seed cotton for some of the dust and liquid disinfectants over untreated plats.

**Rust—**(State Fund) Experiments have been conducted at the Central Station and at the South Mississippi Branch Station with sources and rates of potassium for the control of rust. Organic soil treatments have also been given attention in this connection. A decrease in defoliation of the plants and increased yields have generally resulted, particularly in the coastal plain area of the State.

### ALFALFA DISEASES

**Anthrachnose** (Adams Fund) This project was on the inactive list during 1926, but further study was begun on it in July, 1927. These studies have included greenhouse inoculations on twenty-five selections and varieties of alfalfa for resistance and susceptibility to the anthrachnose fungus. Most of the varieties tested are susceptible to this disease, although six were found to possess some resistance. Inoculations are in progress also under field conditions.

### SUGAR CANE DISEASE

**Mosaic and Root-Rots—**(State Fund) A study is being made in cooperation with the Office of Sugar Plant Investigations at the South Mississippi Branch Experiment Station of about eighty-odd cane selections and varieties for the purpose of obtaining information as to their resistance to the Mosaic disease and to root-rots. Cayana-10 and Canal Point 81 are exhibiting marked resistance to mosaic and the former variety is now looked upon with favor by growers of sugar cane in the mosaic area of the State. This project is being enlarged and is progressing satisfactorily.

### PECAN DISEASE

**Scab—**(State Fund) Experiments were inaugurated last season at Ocean Springs, Mississippi, to test the efficacy of copper dusts for the control of scab versus sprays. This project is being continued.

### PEACH DISEASE

**Brown Rot and Scab—**(State Fund) Dusting and spraying experiments for the control of brown-rot and scab are in progress. These tests are for the purpose of comparing the merits of the so-called sulphur-hydrated lime dust combinations as compared to dritomic sulphur, atomic sulphur, and self-boiled lime sulphur sprays. The freeze last spring destroyed a large portion of the crop, but the work is again in progress and the prospects for obtaining satisfactory data are good.

**BEAN DISEASE**

**Root-Rot**—(State Fund) An apparently new bean root-rot was very prevalent in the trucking section of South Mississippi last season and preliminary experiments and inoculations point to the fact that the casual organism was doubtless a *Fusarium* fungus. The pathogenicity of the fungus isolated is being further studied preliminary to inaugurating further work on this disease.

**OAT DISEASE**

**Crown Rust**—(State Fund) A study of crown rust of oats with emphasis being given to susceptible and resistant selections and varieties is being continued in cooperation with the Office of Cereal Crops and Diseases. Over one hundred selections are under test in our cereal nursery here at this station. Owing to the freeze in January, reseeding was necessary but some valuable information was obtained on winter hardiness of certain varieties.

Respectfully submitted,

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Plant Pathologist.

H. H. WEDGWORTH,  
Associate Plant Pathologist