

MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

A. & M. COLLEGE, MISSISSIPPI

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Value of Certified Irish Potato Seed in Mississippi

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Growers of Irish potatoes in Mississippi are often at a loss to explain why their yields are so small, even when the crop is planted on good soil, fertilized highly, cultivated properly, and has seemingly suffered no injury from climatic causes. This reduction in yield is due to several potato diseases, chief of which is mosaic. The only practical method of preventing this loss is the use of disease-free seed each year. Since practically all Irish potatoes for seed purposes are produced in the northern and western states, several of these states have provided for the certification of seed potatoes that are so nearly free of disease as to meet the requirements of

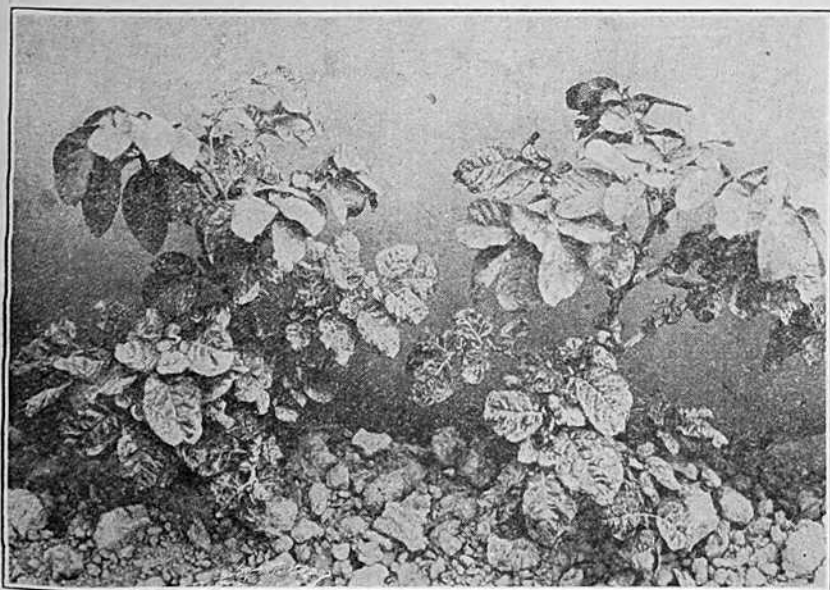


Fig. 1—Plants showing typical mosaic symptoms on the lower leaves and much less distinct on the upper leaves.

the inspection officials. Usually two or more field inspections and one or more storage inspections are made, and to be eligible for certification the amount of disease present must not exceed a certain limit. Such certified seed potatoes have given splendid results wherever used. In the South, Louisiana has been a leader in the use of certified seed, planting 22 cars in 1922, 85 cars in 1923, and 255 cars in 1924.

In order to stimulate a more general interest in Mississippi in the use of certified seed potatoes, as well as to test the value of such seed under Mississippi conditions, the writer conducted an experiment this spring on the Raymond Branch Experiment Station, with the cooperation and help of Assistant Director, C. B. Anders, in charge of the Station.

One lot of certified seed was secured from Nebraska and another from Wisconsin, and two lots of field run stock (uncertified) from seedmen in Jackson and Vicksburg. In cutting these lots of seed, care was taken to have the seed pieces the same size, in order to eliminate differences that might arise from seed pieces of different weights. The soil used in this experiment was of a medium heavy sandy loam type. One thousand pounds of a 10-4-4 (P-N-K) fertilizer per acre was applied in the drill at the time of planting, March 7. The rows were three and one-half feet wide and 124½ feet long, (1/100 acre). The potatoes were planted one foot apart in the drill and 1½ inches deep. The different lots were planted in the order given in Table 1, and each was repeated three times.

On May 1, readings were made to determine the amount of leaf diseases in the different lots. Measurements were also made of the heights of the plants in order to illustrate the relative vigor of the plants from each lot of seed. At the time of the reading of the vine diseases, only a trace

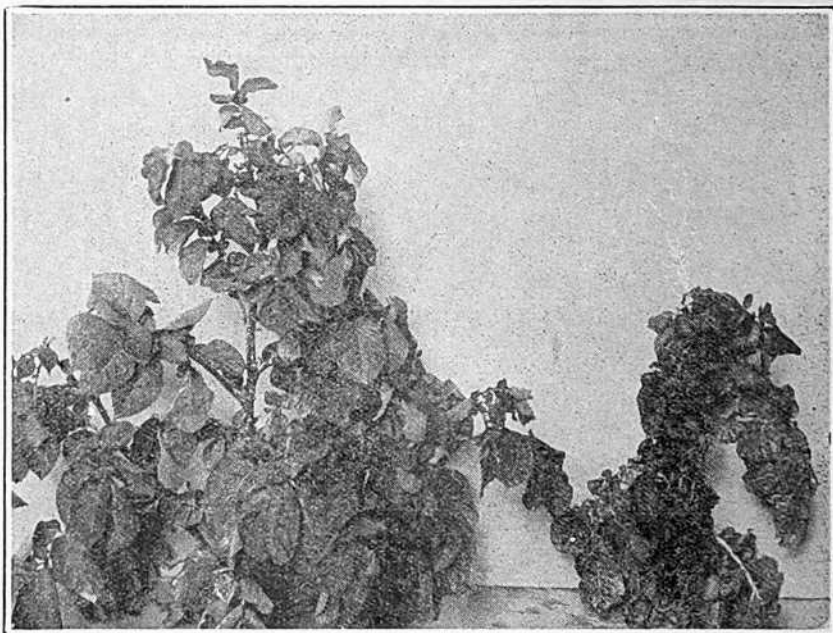


Fig. 2—Comparison of a healthy plant with a mosaic plant. See table 1 for relative heights.

of spindling-tuber could be found and the amount was not recorded. After harvesting the potatoes, however, a somewhat larger percentage of this disease was found in the tubers. The predominating disease, and very likely the most important limiting factor in potato production in Mississippi, was mosaic. The amounts of this disease for the various lots of seed are given in Table 1, and a brief description of the disease is given in the following paragraph:

Plants infected with mosaic show a mottling, puckering or corrugating effect upon the leaflets when grown in cool or cloudy parts of the season. The diseased leaflets are mottled with patches of light green or yellowish green that gradually shades into the normal dark green tissue adjacent to the spots. When such leaves are held between the eye and the light, the varying degrees of color densities may be observed. This mottling and puckering may be masked in diseased plants grown in the bright sunlight or in high temperatures, but are very striking on those plants partly shaded. For the same reasons, mosaic may not be visible on the upper leaves but may be distinct on the lower leaves that were developed during the cooler and cloudy parts of the season. (See fig. 1). Although environmental conditions play an important role in the appearance of the symptoms of the disease, they do not seem to have much effect upon the amount or severity of the disease. Badly affected plants may be dwarfed, as shown in Table 1 and in fig. 2. The yield may be decreased from a trace to 50 or 75 per cent, depending upon the amount and severity of the disease, but the size and appearance of the tubers may be as perfect as those from healthy plants, thus making tuber selection for disease-free seed impossible.

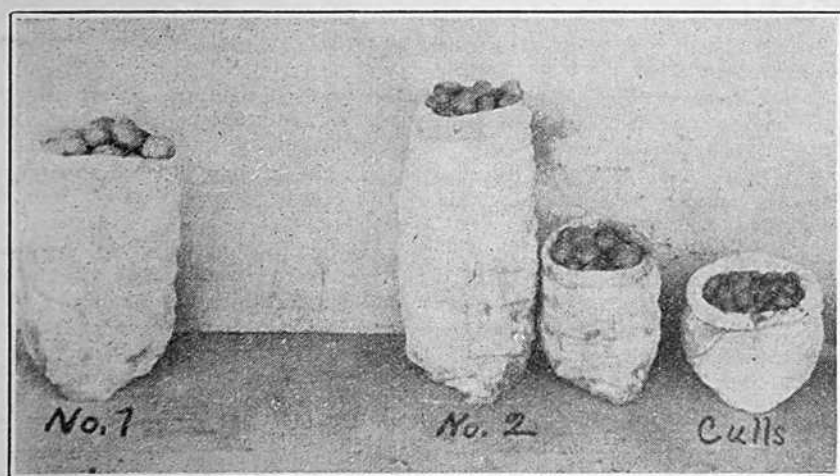


Fig. 3—Grown from uncertified seed—yield, 110.7 bushels per acre.

The cause of the disease has not been determined, but it is known to be infectious, transmitted by bruising the diseased leaves and then rubbing the sap into the healthy plant, or by certain aphids that have fed upon diseased plants and transferred to healthy plants, and possibly by some other insects. Tubers produced on infected plants, are usually infected and carry the inoculum over to another season. Certain aphids may also carry the inoculum over the winter to the following season.

On June 1, the potatoes were harvested and sorted into the various classes. These results are given in Table 1. The relatively large yield of tubers from 1½ to 2 inches in diameter is undoubtedly due to the extended drought in April. When the rains finally came, the potatoes set a "second crop" which did not reach full size before the plants matured.

TABLE 1

Relation of Certified and Uncertified Irish Potato Seed on the Per Cent of Germination, Average Height of Plants, Per Cent of Mosaic Plants, and Yield Per Acre.*

KIND AND SOURCE OF SEED	Per Cent of Germination	Average Height of Plants inches	Mosaic Plants per cent	Yield per Acre		
				Tubers 2 or More Inches in Diameter bushels	Tubers 1½ to 2 Inches in Diameter bushels	Total bushels
Uncertified Lot No. 1						
Vicksburg, Miss.....	90.56	10.01	68.07	36.81	58.98	110.70
Certified Wisconsin						
Eagle River, Wis.....	99.72	13.18	2.78	83.84	86.11	186.37
Uncertified Lot No. 2						
Jackson, Miss.....	93.61	9.74	32.24	33.34	80.14	136.33
Certified Nebraska						
Alliance, Nebr.....	99.17	14.49	2.52	91.51	96.88	204.62

* Average of three rows.

SUMMARY

1. Two lots of certified Irish potato seed were tested in comparison with two lots of uncertified Irish potato seed.
2. Certified Nebraska seed gave the highest yield and was closely followed by certified Wisconsin seed.
3. Both uncertified lots of seed had a high percentage of mosaic, lot No. 1 having the highest percentage of disease and yielding the least amount of tubers.
4. Data given in Table 1 indicate that the higher the percentage of mosaic the smaller the average size of the plants, thus showing that the disease tends to dwarf plants.
5. The certified lots of seed gave a much better stand of potatoes which is probably due to the fact that they were from plants that were sprayed for diseases and contained less late-blight and other rots.
6. New seed should be bought each year, and anyone interested in buying certified Irish potato seed may secure a list of certified growers in northern and western states by writing the State Plant Board, A. & M. College, Miss.

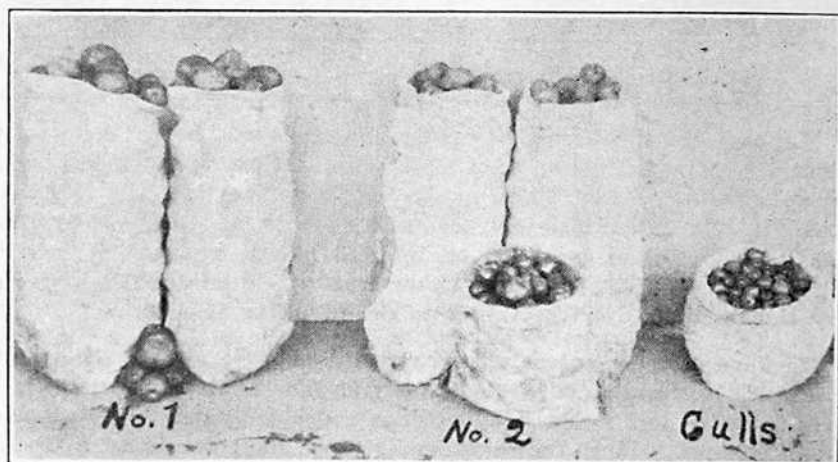


Fig. 4—Grown from certified Nebraska seed—yield, 204.62 bushels per acre.