

The effect of preceding crops on the amount of beet-seedling diseases was also studied under field conditions. Potatoes, beans, beets, and alfalfa had been grown for 5 years on four 1/8-acre plots with a uniform soil. In 1941 sugar beets were planted on all these plots to study the effect of these preceding crops. Seedling diseases of beets were the lowest (11.1 percent) following potatoes and the highest following beets (74.2 percent) and alfalfa (61.2 percent). Beets planted after beans had an intermediate amount of diseases (27.7 percent). Two hundred and fifty sugar-beet seedlings grown on each of these plots were analyzed for nitrogen (N) and phosphorus (P_2O_5). The amounts of nitrogen and P_2O_5 in the beets gradually decreased as the amount of beet-seedling diseases increased. The highest amounts of nitrogen and P_2O_5 were found in the beet crop which grew on the potato plot and the lowest amounts on the beet plot.

Black Root Diseases of Sugar Beet in 1941¹

G. H. COONS, J. E. KOTILA, AND H. W. BOCKSTAHLER²

Experiments on the control of seedling diseases of sugar beet were conducted in 1941 at Beltsville, Maryland; East Lansing, Michigan; and Holgate, Ohio. The test at Beltsville was planted late and disease incidence was minor; at East Lansing, a seed-treatment test was planted early, but the field experienced severe flooding and needed to be replanted. Loss of seedlings from damping-off in the second planting was considerable. At Holgate, dry weather during the first weeks of growth made seedling diseases less serious than usual, so that all treatments and the check plots had acceptable stands.

In the seed-treatment experiment at Beltsville, significant differences among various treatments and the untreated were not found. At East Lansing, seed treatments involving commonly used mercury and copper disinfectants were significantly better than the check with respect to initial stands, but enough plants still could be saved at thinning time so that the untreated plots gave acre-yields of roots not significantly below those from plots in which the seed used was treated.

¹Investigations conducted in cooperation with Michigan and Ohio Agricultural Experiment Stations.

²Division of Sugar Plant Investigations, Bureau of Plant Industry, U. S. Department of Agriculture.

In a crop-sequence experiment at Holgate (table 1), in which sugar beets followed sweet clover, soybeans, or corn, the stands following a previous crop of soybeans or of corn were significantly better than those obtained when sugar beets followed sweet clover. The stand in the last-named sequence, however, was adequate to give a reasonably full coverage of the plots. No significant differences in acre-yields of indicated-available sugar were found in favor of any particular sequence in this test. Acre-yields of roots when sugar beets followed sweet clover or soybeans were better than for sugar beets following corn, but the quality of the roots in the last-named sequence was enough better to compensate for the reduced root yields. The experiment demonstrated again the sanitative effect of a preceding corn crop in repressing pathogenic organisms which attack young sugar-beet plants, but emphasized that fertility conditions, especially the nitrogen factor, must also be taken into consideration if root yields are to be maintained.

Table 1.—Results obtained with sugar beets in the crop-sequence experiment at Northwestern Experimental Farm, Holgate, Ohio.* (In 1940, sweet clover, corn and soybeans were grown in a series of replicated plots, each 60 by 65 feet. Plot arrangement in the experiment was a 3 by 4 randomized block. In 1941, sugar beets were grown on all plots. Light application of manure was given in the fall of 1940; prior to planting sugar beets, 100 pounds of ammonium sulfate per acre were broadcast in the spring of 1941.)

Previous crop (All growth turned under)	Acre-yield			Apparent purity coefficient	Number of sugar beets per plot
	Indicated- available Sugar	Roots	Sucrose		
	pounds	tons	percentage		
Sweet clover	3851	15.61	14.81	82.83	1298
Corn	3398	12.58	15.80	85.46	1015
Soybeans	3933	14.02	15.71	89.94	1562
General mean	3725	14.39	15.44	84.08	1492
Difference required for significance—Odds 10:1	N.S.	1.98	.31	.87	211

*Results given as 4-plot averages.