The Effect of Temperature and Moisture on the Amount of Seedling Diseases of Sugar Beets

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Abstract

A study was made of the effect of temperature (5°, 10°, 15°, 20°, and 25° C.) and moisture (50, 65, and 85 percent of saturation) on the amount of seedling diseases of sugar beets in a soil potentially high in these diseases. The plants were grown in a temperature-control chamber supplied with artificial light. The moisture of the soil was restored every day. The sugar-beet seedlings were grown until they were in the third pair of leaves, when they were harvested. Readings of healthy and diseased seedlings were made at frequent intervals during their growth.

No germination was obtained at 5° C. which indicates that this temperature is too low for germination of sugar-beet seeds. Normal germination occurred at higher temperatures. At 10° 0., the amount of seedling diseases was comparatively low, viz, 31.6 and 31.2 percent, for the maximum and optimum of soil moisture and especially low, viz, 17.3 percent, for the minimum of soil moisture. At temperatures of 15°, 20°, and 25° C, seedling diseases were very high, viz, 88.5 to 99.0 percent, and were about the same for the optimum and maximum of soil moisture. At low-soil moisture, the amount of seedling diseases was moderate but, with an increase in temperature, progressively decreased from 49.5 percent of diseased seedlings at 15° C. to 36.7 percent at 25° C. These results show that low temperature and low moistiire are more favorable to sugar beets, from the standpoint of freedom from seedling diseases, than high temperature and abundant moisture.

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