GROWTH RELATIONSHIPS AS AFFECTING ROOT ROTTING AND PREMATURE DEATH OF SWEET CLOVER

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Severe rotting of roots and crowns of second-year sweet clover plants has occurred annually for several years in space-planted breeding nurseries at Lincoln, Nebr. Similar difficulties have been experienced at several other agricultural experiment stations. This condition is seldom found in fields of sweet clover.

While the end-result is a rotting of the roots and crown, the studies reported in this paper indicate that the primary cause is a physiological disturbance due to excessive first-year growth. Many of the second-year nursery plants die and most of the remaining ones are so malformed that observations on growth characteristics are of little value. Seed production is greatly impaired. These studies are concerned with the cause and control of the trouble.

SYMPTOMS

The first noticeable above-ground symptoms of the diseased condition appear on second-year plants in early spring when the overwintering crown buds begin their development. Many of these buds fail to grow; others start normally, but subsequent growth may show symptoms at any time up to seed production. One or more shoots of the same plant may wilt, turn yellowish, and die. Usually several days elapse between the wilting and the death of the shoot. Plants may die at all stages of growth from early spring through the flowering period and even during seed setting. Examination of the roots, crowns, and basal sections of shoots upon removal from the soil reveals varying degrees of rotting (Fig. 1). The roots and crowns of such nursery-grown plants are abnormally enlarged and the tissue is soft and flaccid. Cracks and necrotic areas of various sizes are frequently found in the fall on these overgrown roots. Small lateral roots arising from the main tap roots of normal plants are conspicuously absent on the diseased roots.

EXTENT OF LOSSES

During 1940 and 1941 the second-year plant nurseries were surveyed and the plants were classified according to the extent of injury.

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3 The practice herefore at Lincoln has been to start the seedlings in asphalt paper bands in the greenhouse in early March and then to transplant these into the 3 X 3 foot spaced plant nursery in the field in April.