Rough Root: A Heritable Character in Alfalfa

Fred Reuel Jones

Heritable rough root of alfalfa was first recognized in plants from a sample of seed numbered 49-1347 produced at Lincoln, Nebr. About 5% of the plants from this sample grown in the greenhouse had rough and slightly discolored roots when transplanted to the field in a wilt test. The transplanted plants which survived until autumn were found with roots much roughened and deeply discolored as though they had suffered winter injury as described earlier by the writer (1), (Fig. 1, B) and studied by Weimer (3). Moreover, winter injury in some plants was found to result in dwarfing of the tops (2) somewhat similar to that which was soon found to occur in some of the surviving plants with rough root. From cursory examination of rough roots it appeared that the abnormality arose in the periderm which the root then failed to replace effectively. Inasmuch as the roughening of roots in winter injury is due to more or less ineffective replacement of the periderm which has been destroyed by freezing, it appeared that this genetic rough root had not only a superficial resemblance to the rough roots ascribed to winter injury, but a similar structural origin. While it seemed unlikely that this specific character was widely distributed, nevertheless the fact that it operates in a region where superficially similar root abnormalities result from winter injury seemed sufficient reason for its identification. Thus all of these plants and others found subsequently have been saved. Most of such plants have not thrived after transplanting. Only three of the six original selections produced seed when selfed. By crossing to vigorous plants small populations of vigorous plants with this root character have been produced.

Description

Rough root, as first recognized in large seedlings or after growth for a summer in the field, can be described as a roughened condition in the entire root system superficially similar to the roughened condition which has been ascribed to winter injury. However, whereas winter injury is most severe at the crown and rarely extends far down the taproot, rough root is usually least severe at the crown, and the branch roots are in worse condition out to the feeding roots, which are sometimes more severely discolored.