DETERMINATION OF SOIL DROUGHT RESISTANCE IN GRASS SEEDLINGS

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LOW available water supply is the chief limiting factor in the establishment and maintenance of stands of perennial grasses in many parts of the western United States. If a plant is to survive under conditions of limited water supply, it must either possess some degree of drought resistance, i.e., ability to withstand permanent wilting without serious injury; be able to escape drought by completing its life cycle before drought sets in, as in winter annuals and desert ephemerals; or possess morphological adaptations which make it efficient in the absorption and/or use of a limited water supply. Well-established plants of native and introduced grass species that are adapted to arid conditions are usually capable of withstanding to some extent even severe and prolonged droughts. Death to seedlings, however, may result from minor droughts which may cause only a temporary loss of growth to mature plants. Schultz and Hayes (15), Mueller and Weaver (10), and Glendening (5) have all stressed the fact that the seedling year is the critical period in the life-cycle of perennial grasses so far as drought is concerned.

There is a need for studies of factors affecting the establishment and development of various grass species in view of the large amount of natural or artificial reseeding which must be accomplished to restore grass lands depleted by drought, improper management, and erosion. A quantitative method for determining drought resistance of grasses under controlled environmental conditions to supplement field tests may aid in selection of suitable native and introduced species for current range reseeding programs, as well as in the testing of new strains being developed for areas affected by drought. This paper presents a direct technic for determining soil drought resistance of grass seedlings under controlled conditions and gives the results of some preliminary trials.

REVIEW OF LITERATURE

Many attempts have been made to measure the drought resistance of plants artificially. These studies may be divided into two groups, first, the indirect determinations of morphological, physiological, or physico-chemical phenomena...