GERMINATION AND EMERGENCE OF SOME NATIVE GRASSES IN RELATION TO LITTER COVER AND SOIL MOISTURE

GEORGE E. GLENDENING

UNDER the warm, arid conditions which prevail on the grazing ranges of southern Arizona, the establishment of seedlings of perennial forage grasses appears to be controlled mainly by soil moisture (3). Early artificial reseeding trials in southern Arizona were, without exception, reported to be largely unsuccessful, and in every case (4, 7, 8) unfavorable moisture conditions were cited as the primary cause of failure. Subsequent tests have shown that in this region the chances for germination of perennial grass seeds on bare exposed soils are extremely poor; but where the seed was covered with litter in the form of straw or hay, germination and emergence was markedly increased.

During the summer of 1938, experiments were conducted on the Santa Rita Experimental Range to determine the effect of various kinds of litter cover upon soil moisture and germination and emergence of seedlings of 10 native grasses.

THE STUDY AREA

The study area lies at an elevation of 3,000 feet on one of the many ridges that slope gently to the northwest from the Santa Rita Mountains. The vegetation, although once comprised mainly of perennial grasses, now consists largely of woody plants, such as burroweed (Aplopappus fruticosus), false-mesquite (Calliandra eriophylla), mesquite (Prosopis velutina), and cacti (Opuntia spp.). Scattered remnants of perennial forage grasses may still be found on the most favorable sites.

The soil on the study area is of alluvial origin and is classified as Continental gravelly loam (9). Much of the friable topsoil has been washed away and in many places a layer of small pebbles or “erosion pavement” covers the soil surface. This, together with the sparsity of vegetation, has resulted in conditions that are very unfavorable to moisture penetration and retention.

The climate of the area is typical of southwestern semidesert regions, and has been reported in detail by McGinnies and Arnold (6). Total yearly rainfall at the specific site of the study, based on 8 years’ records, is approximately 12.5 inches. Soil and air temperatures are characteristically high during the summer season, and together with low relative humidities result in excessively high evaporation and rapid drying of the exposed surface soils.

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2Associate Forest Ecologist.
3Figures in parenthesis refer to “Literature Cited”, p. 803.
4Mimeographed Research Notes Nos. 7 and 19, Southwestern Forest and Range Experiment Station, Tucson, Ariz.
5A branch station of the Southwestern Forest and Range Experiment Station located 35 miles southeast of Tucson, Ariz.