THE EVALUATION OF INDIVIDUAL PLANT SELECTIONS FROM A NATURAL POPULATION OF GUAYULE, PARTHENIUM ARGENTATUM GRAY

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In establishing a plant breeding program on any crop, the need for a wide range of genetically diverse material has been repeatedly emphasized (4). When a breeding program on guayule was initiated in 1942, recognition of these facts led to the collection of seed from many locations where guayule was indigenous. In addition, an appreciation of the probable heterogeneity of these populations led to a system of sampling designed to provide material for comparative studies of the principal types of plants present. The sampling procedure included (a) collecting seed from individually selected plants, (b) bulking seed collected from a number of phenotypically similar plants (mass selection), and (c) collecting seed from all plants in a given location or from a large random sample of plants from the location (nonselected collections). Through the use of the latter procedure, a fairly complete assortment of genotypes from the location was obtained.

The purpose of this paper is to present the data obtained on a number of characters from 2-year-old progenies, the seeds for which came from one such location in Texas.

MATERIAL AND METHODS

The selections and collections used in the present study were made by Dr. LeRoy Powers and Mr. W. T. Federer on the 02 Ranch in Texas from an area at least 15 miles wide by 20 miles long. The portion of this area crossing Texas state highway 118 is 53 miles south of Alpine.

Seeds were grown from 42 individual plant selections, from a mass selection of 100 phenotypically similar plants, and from the nonselected collection which includes at least 5,000 plants. In addition, one individual plant selection of mariola and three nonselected collections from nearby locations were included. However, only the collections made on the 02 Ranch, together with the check, are reported in this paper. Seed of the commercial strain 593, developed by Dr. W. B. McCallum and obtained from the Forest Service, U. S. Dept. of Agriculture, was used as a check. This strain is at present the most widely grown of those available for commercial planting.

The 49 entries were seeded in greenhouse flats in January, 1943. On March 8, 9, and 10, the seedlings were “spotted out” in flats with six plots of 12 plants each per flat. The design of the experiment in greenhouse flats and in the field was the same, being a 7 × 7 lattice square (13) with eight replications. The experiment was transplanted to the field on June 9. The 12 plants in the individual plots were planted in four rows with three plants per row and the spacing between plants was 4 feet in each direction.