Genetic Variability and Interrelationship of Characters in Teff, *Eragrostis tef* (Zucc.) Trotter¹

Melak H. Mengesha, R. C. Pickett, and R. L. Davis²

TEFF is one of the major cereal crops in Ethiopia. According to Vavilov (3), Ethiopia is the center of origin for teff. The best quality of “injera”³ is made from teff seeds. Rouk and Mengesha (2) published a preliminary report on the culture, types, and nutrition of teff. Through the centuries of teff culture in Ethiopia, the farmers have recognized the various types of teff and have traditionally grown the better types. However, no program for improvement by selection and breeding has been undertaken.

The several purposes of this research were (a) to study the major agronomic characters of teff, (b) to estimate the range and magnitude of variation of the major characters, (c) to determine the nature of character association in teff, and (d) to determine the characteristics associated with yield.

MATERIALS AND METHODS

Over 300 head selections were collected from the major teff producing areas of Ethiopia as shown in Figure 1. All the collection and plant explorations were conducted in 1959–1960, at which time the senior author was stationed at the Agricultural and Technical School, Jimma, Ethiopia. Of the 300 head selections only 124 had sufficient seed for the present study. These 124 selections were from diverse sources. Each of the 124 head selections was treated as an independent entry and was planted June 5, 1962, at the Purdue University Agronomy Farm in randomized complete blocks. Each entry (head selection) was planted in a 30-foot row replicated 4 times. The rows were 3 feet apart and the plants within each row were thinned to 30 plants 1 foot apart.

The characters studied and their unit of measurements were (a) early vigor in inches, (b) maturity in number of days from planting to heading, (c) leafiness in 1 (best) to 9 rating, (d) lodging resistance in 1 (best) to 9 rating, (e) plant height in inches, (f) panicle length in inches, (g) seed yield in grams per plant, (h) test weight in grams per unit sampler that had a 2.3 cc. volume, and (i) type of panicle.

Phenotypic correlation coefficients were computed from entry means. Genotypic components of variance and covariance estimated from the analysis of variance were used to compute genotypic correlation. Path coefficients, as applied by Dewey and Lu (1) were utilized to partition the phenotypic correlation coefficients into direct and indirect effects of (1) test weight, (2) panicle length, (3) plant height, and (4) maturity on (5) seed yield.

In another experiment, the panicles of 12 selections were mutually bagged in all combinations. Also panicles were bagged individually to allow selfing. Other parent were left unbagged to allow open-pollination.

The progenies from mutual pollinations with each of the parents were bagged in all combinations. Also panicles were bagged individually to allow selfing. Other parents were left unbagged to allow open-pollination. The progenies from mutual pollinations with each of the parents were bagged in all combinations. Also panicles were bagged individually to allow selfing. Other parents were left unbagged to allow open-pollination.

The variation among the various characters is shown in Table 1. Seed yield among entries (head selections) ranged from 3.63 to 15.25 grams per plant. A wide range of...