ANALYSIS OF NONHERITABLE VARIATIONS IN SEED SET UNDER BAG AMONG PLANTS OF ORCHARD GRASS, DACTYLIS GLOMERATA L.¹

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In studies of ability to set seed under bag among plants of Dactylis glomerata L., a large amount of variation has been encountered. A knowledge of the magnitude of that variation and of the factors contributing to it is essential for interpreting data that already have been obtained. Such information is even more necessary for intelligently designing further experiments dealing with this character.

The literature dealing with heritable variations in self-fertility in orchard grass has been reviewed in another paper (8). Little information is available in the literature on the extent of nonheritable variations in seed set under bag or on the factors influencing that variation. Walle (Stapledon, 13) found large variations in self-fertility for individual plants from year to year. One plant set over five times as much seed in 1922 as in 1924. Similar interannual variations were reported by Stapledon (13), Schultz (11), and Smith. Schultz (11) found that the correlation coefficient determined between years (r = .30) only approached the 5% point. In the absence of a valid estimate of error in these cases, it is difficult to judge whether the variation between years was statistically significant.

It is the purpose of this paper to present analyses of the magnitude and nature of variations both between and within years in number of seeds per panicle set under bag among clonal lines of Dactylis glomerata.

MATERIALS AND METHODS

Data on number of seeds per panicle set under bag were obtained from 497 spaced plants during the summer of 1938. From these, 60 plants were selected which ranged from the highest seed set to the lowest from which an adequate inbred progeny could be obtained. The parent plants were increased vegetatively and during the fall of 1938 the parental clones and first-inbred generation (I₁) progenies were planted in the field in adjacent rows distributed at random in three replications. The methods of planting has been described in detail by Myers and Chilton (9).

The data presented in this paper were obtained from the parental clones. In 1939, four to six panicles were enclosed in a single bag on one plant in each replication of the clones. In 1940, four panicles per bag were enclosed in three bags on

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*Figures in parenthesis refer to “Literature Cited”, p. 1123.

⁴SMITH, D. C. Controlled pollination studies in grasses. In manuscript.