Preliminary Studies on Breeding Alfalfa for Seed Production in Utah

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Scarcity of alfalfa seed during World War II demonstrated the need for a concentrated research program to study the fundamental nature of the seed production problem. Although seed production has been listed as an objective of alfalfa breeders for the past 50 years, few of the present commonly planted varieties possess much superiority in this respect. At Logan, Utah, Lodak, an introduction, is a better seed producer than the average variety, and Ranger is superior in seed production to the Turkistan from which it was partly derived. It is the opinion of the writer that failure to obtain more advance

Several workers have studied self-fertility in alfalfa, the viewpoint of whether it was wise to use self-fertilized seed. In a group of 12 parent clones, Dann (4) reported the six plants with the higher self-fertility (4.36 grams of seed per plant compared to the six plants with the lower self-fertility (22.1%) which produced 1.78 grams of seed per plant. Bolton (2) concluded that self-fertilization is to be expected in a program for improving seed production in alfalfa.

The conclusion was reached by Stevenson and Bolton (12) that self-tripping, self-fertile alfalfa plants were desirable, but they believed that the self-tripping character could be utilized if the plants were also self-sterile and self-incompatible. Wilsie (10) concluded that self-fertility may not be undesirable in alfalfa and that the level of heterozygosity in normal alfalfa populations was not likely to be affected by considerable self-fertility.

Self- and cross-fertility were found to be correlated in a positive manner (r = +0.288) by Bolton (1). With few exceptions, the progenies of reciprocal crosses between plants with high self-fertility were not significantly different. This indicates that the proportion of selfed seed from reciprocal crosses was not different or was not important.

METHODS

A collection of 18 alfalfa clones was increased and planted in the spring of 1947 in a randomized complete block design with 4 replications. Fertility determinations were made in both 1947 and 1948. For cross-fertility, 5 racemes from each plant in the field were trimmed to 10 flowers and tagged for a "go-round" fashion. One flower from each plant raceme was tagged flat end of a toothpick, the investigator going to the next in a random order until all of the tagged racemes in a replication had been triplications were done in this way. In from 10 days, the number of flowers forming pods was recorded. Differences between plants were not significant in the 1947 test and are not shown. In 1947, the test was made after the plants were "seeded" in contrast to the 1948 test that was made the season.

The self-fertility test was conducted in 1950. Seed from 10 flowers each per plant on 1 replication were used. Clean 2.5- by 4.5-inch muslin bags over the flowering racemes. The bags were opened from the flat end of a toothpick, the investigator going from one plant to the next in a random order until all of the flowers on the tagged racemes in a replication had been triplications were done in this way. In from 10 days, the number of flowers forming pods was recorded. Differences between plants were not significant in the 1950 test and are not shown.

LITERATURE

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