Self-Fertility of Erect and Pasture-Type Alfalfa Clones as Related to the Vigor and Fertility of Their Inbred and Outcrossed Progenies

C. P. Wilsie and John Skory

ALFALFA is largely cross-fertilized under natural conditions, pollination being effected primarily by insects, especially those of the Hymenopterous group. Under conditions of artificial selfing, fertility varies over a wide range from almost complete self-sterility in some plants to practically complete self-fertility in others. The degree of self-fertility may have an important bearing on the methods used in the development of improved varieties. Tysdal, Kiesselbach, and Westover (5) have pointed out the desirability of low self-fertility and high cross-fertility in maintaining vigor and high yield of synthetics and other multiple strain crosses.

Earlier, Brink and Cooper (1) had indicated that a considerable amount of self-fertility might not be a serious disadvantage because of the greater vigor, better survival, and better seed setting of hybrid plants. Cooper and Brink (2) showed also that partial self-incompatibility, low ovule fertility, and embryo abortion all were causes of reduced fertility associated with inbreeding. If foreign pollen was present on the stigma, even though an abundance of self pollen was available, cross fertilization was likely to occur. In a recent test at Saskatoon, Canada, reported by Stevenson and Bolton (4), it was found that cross-fertilization occurred in alfalfa if foreign pollen was applied 1 hour and possibly longer after tripping where flowers had not been emasculated. Also, Stevenson and Bolton pointed out the undesirability of using highly self-fertile, self-tripping lines in developing synthetics, because the seed yields from open progenies from such lines were similar to the seed yields from their selfed progenies.

Because of the importance of fertility relationships in any breeding program, further studies of self-fertility have been made at the Iowa State College. Two quite unrelated and different kinds of breeding material were used, including (a) several clones selected out of a collection of low-crown or pasture-type plants obtained from an old golf course fairway near Des Moines, Iowa; and (b) a number of clones originating as single plant selections from a 7-year-old nursery at Ames. Five clones of the low-crown type were selected because of their good setting ability under field conditions, as well as their deep-set crown and spreading habit of growth. Three clones of the erect plant type were selected because of their vigor, relative freedom from insect and disease injuries, and finally differences in their self-fertility.


2Research Professor and formerly Research Fellow, respectively. The authors are indebted to P. C. Sandal, formerly Research Fellow, for some of the 1946 data.

3Figures in parenthesis refer to “Literature Cited”, p. 794.