FERTILITY AND POD DEVELOPMENT OF SELF-FERTILE CLONES OF BIRDSFOOT TREFOIL WITH SELFING AND OUTCROSSING

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THE amount of natural inbreeding which occurs in the development of synthetic or hybrid varieties of cross-fertilized forage crops is of considerable interest, especially if the material utilized possesses a substantial degree of self-fertility. Although artificial pollination data cannot be interpreted in terms of the natural pollination behavior of plants, a significant difference between self and cross seed set with artificial pollination would suggest that under natural conditions a considerable advantage exists in favor of cross-pollination. The objective of this experiment was to measure seed set and rate of pod development for several relatively self-fertile clones of birdsfoot trefoil (Lotus corniculatus L.) following selfing and outcrossing.

In the spring of 1958 a greenhouse study was conducted to measure seed set and rate of pod development for six relatively self-fertile clones following self- and cross-pollination. These clones were sister plants derived from the variety Mandan. A selection from the Granger variety provided pollen for outcrossing. The same number of umbels was selfed and outcrossed on a given plant during any one day. In both selfing and outcrossing, the corolla was removed and pollen was applied to the stigma with a toothpick. The pollinated flowers were observed daily to note wilting of floral parts, ovary enlargement, dropping of flowers or pods, and any other significant changes. Pod length was used as an index of pod development, and the pods were measured periodically, beginning on the 5th day after pollination. Fertility indices were based on the percentage of the pollinated flowers which produced pods and the average number of seed per pod.

The developmental rate (as measured by length) of pods from selfing and outcrossing is presented graphically in Figure 1. By the 5th day all pods resulting from cross-fertilization had made noticeable longitudinal development; a few self pods, however, were not yet evident. The earlier appearance of the crossbred pods might be due to earlier fertilization following cross-pollination and/or to more rapid development of pods following hybridization. It is also clear from Figure 1 that pod length increased rapidly until the 9th day and then progressed at a greatly reduced