Development of Pods and Seeds of Birdsfoot Trefoil, *Lotus corniculatus* L., as Related to Maturity and to Seed Yields

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EXPERIMENTAL trials and farmers' experiences have shown that the primary factors limiting the value of birdsfoot trefoil, *Lotus corniculatus* L., as a forage legume are low seed yields and lack of seedling vigor. Birdsfoot trefoil is known to have a high potential seed yield but seed pods dehisce freely upon ripening. In addition, indefinite flowering habit makes it difficult to judge the proper time for seed harvest. Flower formation, immature and ripening pods, and dehiscing of pods have been observed (1, 5, 6, 7) on an individual plant.

There is a lack of agreement (1, 4, 8) on the proper stage of maturity to harvest for seed. Recommendations were for the most part, vague in regard to what specifically determined a ripe pod. MacDonald (6) found that further development of seed viability, size, and weight was not appreciable after pods were greenish white, or sprinkled with brown. At this time the seeds were in the late dough stage. Hickel (3), Schribaux (9), and Bussard (2) indicate that normally dehisced seeds of birdsfoot trefoil have a high percentage of hard seeds, but that threshed seeds were lower in hard seed content due to scarification by the thresher. MacDonald (6) recognized hard seed as a problem of major consequence. Hughes *et al.* (5) found that maximum germination could be attained by scarifying the seed once and that additional scarification injured seed.

Difficulties in seed production have resulted in very high seed costs of domestic seed and have been a primary obstacle to more rapid use of this forage legume. The purpose of this investigation was to study basic factors in seed and pod development as related to the proper stage of maturity to harvest birdsfoot trefoil for maximum seed yields.

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MATERIALS AND METHODS

All investigations reported in this study were domestic type (Empire strain) of broadleaf birdsfoot trefoil plantings made in the spring of 1951 on the experiment farm at Ames, Iowa. A nursery of clonally propagated single plants was established in an adjacent area and used for critical measurements of pod and seed development. The procedures outlined by Tukey (10) were followed to measure differences in treatment means.

Studies were conducted in 1952 and 1953 to determine the number of days required to produce morphologically mature seed. Budding umbels were tagged at two dates, June 14 and 18, the umbels were in full bloom and considered as the date of pollination. Thirty umbels on successive 3-day intervals after full bloom and the length of ninth day, in each group, seed was recovered after drying the initial pod from each umbel was measured and recorded. On the ninth day, in each group, seed was recovered after drying the initial pod from each umbel was measured and recorded. Two hundred seeds from each harvest were initially dried at 100° F. and later dried to a constant weight to determine moisture percentages.

Studies were conducted in 1952 and 1953 to determine relationships between stage of maturity and seed yield, and the quantity and quality of seed produced in umbels at different stages of maturity. In 1952, pods were harvested at four stages of ripeness. Samples of immature pods, ranging from green in color, were harvested 18 days after full bloom; later light brown pods were harvested. Samples of immature pods, ranging from green in color, were harvested 18 days after full bloom; later light brown pods were harvested. Samples and black colored pods were harvested each on successive 3-day intervals following the light brown stage. One