

## Observations on the Mating System of Basin Wildrye<sup>1</sup>

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### Highlight

**Basin wildrye appears to be an obligate cross pollinator. Under forced self-pollination seed set is less than 2%.**

Before an effective plant breeding program can be initiated, certain basic information about the species to be improved is essential. In order to utilize genetic variation effectively and to select desirable genotypes efficiently, some knowledge of the mating system of the species is required. In addition knowledge of the relative levels of self- and cross-pollination are of value in determining isolation requirements for the production of foundation and certified seed of improved crop varieties, in accordance with the regulations set forth by the Association of Official Seed Certifying Agencies.

Basin wildrye (*Elymus cinereus*) is a

relatively unstudied species with significant potential as a native, perennial forage grass in the western United States. Currently, selection programs are in progress at Montana State University to increase yield and palatability in this species. In the summer 1968, levels of self- and cross-pollination were determined by scoring seed set on open pollinated heads, on single bagged heads, and on groups of heads from the same plant under a common bag. As the tip of the head emerged from the boot, it was placed in a glycine bag and the base of the bag was sealed without pinching the culm. The tillers with bagged heads were supported with twine loosely fastened to bamboo poles to allow normal culm elongation and to avoid wind damage to the culm and bag; however, bags were freely agitated by wind throughout the flowering period. Groups of from two to five heads from the same plant were treated in a similar manner. All observations were made on plants grown at Bozeman from a seed collection, Wy 107, obtained through the Soil Conservation Service Plant Materials Center, Bridger, Montana. Studies are currently in progress to determine the chromosome number and meiotic behavior in this population.

At maturity all bagged heads were harvested separately and a random collection of 100 heads from 87 plants was made. Seed set from single bagged heads reflects a minimum level of self-pollination. The difference in seed set

**Table 1. Mean seed set per 100 florets and standard deviation of mean for three systems of mating in Basin wildrye.**

Sample type	Number of samples	Mean seed set	S $\bar{x}$
Single			
bagged heads	66	1.08	3.41
Groups of heads	12	1.79	2.96
Random open			
pollinated heads	17	82.00	6.54

between single bagged heads and groups of heads from the same plant in a common bag (Table 1) reflects possible difference in self-pollination due to differences in maturity of stamens and pistils within a head, or structural differences which inhibit self-pollination.

The difference between single bagged heads and groups of heads is non-significant. Mean seed set under open pollination is significantly greater than mean seed set under either method of forced self-pollination. Thus, it is apparent basin wildrye is not apomictic. This is further verified by the magnitude of within progeny variation for several quantitative traits (Kushnak and Chapman, in preparation). The cause of the low level of self-pollination cannot be determined with the present data. Based on the uniformly high seed set under open-pollination breeding stocks of basin wildrye will be treated as randomly mating and maximum isolation will be enforced.

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