

Reproductive Ecology of Native Legumes in the Northern Great Plains

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Native legumes, in addition to being important forage-producing and nitrogen-fixing species of plant communities in North American steppe, are highly desirable as components of seed mixtures for revegetation of disturbed soils, establishment of wildlife habitats, and beautification of parks and recreation areas. Currently, native legumes are being evaluated in mixtures with native warm-season grasses for feedstock for biofuel production. Attempts to increase natural reseeding in grasslands and other areas may not be successful due to seed predation by bruchid (Bruchidae) beetles and phytophagous chalcid (Chalcidoidea) wasps, and experimental evaluation of native legumes in forage and biomass, conservation, and other plantings is dependent upon adequate seed supplies. Also, little is known about breeding systems and response to phenotypic selection for reproductive traits in native legumes. Some research objectives at SDSU include: 1) identification of seed predators and their parasitoids, quantification of seed loss to predation, and behavior of seed predators in several genera of native legumes; 2) phenotypic selection for increased 100-seed weight in Canada milk-vetch (*Astragalus canadensis*) and foxtail dalea (*Dalea leporina*); 3) controlled pollination effects on seed weight and yield in Canada milk-vetch. Results to date include: 1) description of new species of phytophagous chalcid (7) collected from seeds of American licorice from natural populations in ND and SD, estimates of seed predation rates by bruchid beetles for species in *Astragalus* (in press), *Glycyrrhiza* (3, 5), and *Amorpha* (in press); identification of several new host-parasitoid associations (2, 4, in press); 2) progress from selection for 100-seed weight (1, 6); and 3) similar seed weight and yield for S₁ and OP progenies of Canada milk-vetch (1). Five species of *Acanthoscelides* and the snout weevil *Tychius liljebladi* (Curculionidae) were significant seed predators (up to 75% seed predation) on native legumes in South Dakota, but predation rates varied across years and environments. Two exotic chalcids (*Dinarmus acutus* and *Eupelmus vesicularis*), introduced for biological control of agricultural pests, parasitized *Acanthoscelides perforatus* in seed pods of Canada milk-vetch. There is potential for large-scale plantings of native legumes for seed production to support the use of legumes in mixtures with perennial grasses to increase biological diversity and reduce the need for nitrogen fertilizer in cellulosic feedstock systems.

References

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