

January 1979

GERMINATION OF COW PARSNIP SEEDS FROM GRIZZLY BEAR FECES

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Recommended Citation

Novak, James M.; Applegate, Roger D.; Rogers, Lynn L.; and Casteel, David A., "GERMINATION OF COW PARSNIP SEEDS FROM GRIZZLY BEAR FECES" (1979). *Faculty Research & Creative Activity*. 214.

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GERMINATION OF COW PARSNIP SEEDS FROM GRIZZLY BEAR FECES

This is a report on the germinability of seeds retrieved from feces of grizzly bears (*Ursus arctos*). Impetus for this work was our observations of plants growing from grizzly feces on moraines in Glacier National Park and of seeds germinating in droppings of birds, raccoons (*Procyon lotor*), and opossums (*Didelphis virginiana*). Additionally, Krefting and Roe (Ecol. Monogr., 19:270-286, 1949) noted that seeds of blueberries (*Vaccinium* spp.) sometimes germinated from bear feces and that seeds of wild sarsaparilla (*Aralia nudicaulis*) from black bear feces germinated better than controls. No tests of statistical significance were associated with the latter observation, however. The objective of this study was to determine if germination rates of seeds from bear feces were different from those of seeds from fruit picked when ripe. This information may help to evaluate the importance of bears as dispersers of plants.

Germination trials were conducted for 150 seeds of cow parsnip (*Heracleum lanatum*) collected from six grizzly bear fecal droppings in Glacier National Park, Montana, and for 150 seeds picked as controls. Half of the seeds from each group were frozen overwinter; the remainder were not frozen. All seeds were placed in a growth chamber in moist sand using temperature and light regimes simulating those of spring in Glacier National Park. Of the seeds from bear scats, 49 (65%) of those unfrozen and 64 (85%) of those frozen germinated. Of the control treatments, only 38 (51%) of the unfrozen and 52 (69%) of the frozen seeds germinated. Differences in germination rates for seeds in all treatments were significant at the 5% level using Chi-square. The higher rates of germination of cow parsnip seeds passed through the digestive tracts of bears, and the long distances traveled by grizzly bears (Craighead, Natl. Geogr. Soc. Res. Repts., 1963 projects:59-67, 1968), suggest that bears may be important dispersers of seeds.

ROGER D. APPLGATE, LYNN L. ROGERS, DAVID A. CASTEEL, AND JAMES M. NOVAK, *University of Illinois, Urbana, IL 61801, USDA Forest Service, North Central Forest Experiment Station, 1992 Folwell Avenue, St. Paul, MN 55108, USDI National Park Service, Glacier National Park, Babb, MT 59411, and Department of Forestry, University of Illinois, Urbana, IL 61801 (present address of Applegate: Tennessee Valley Authority, Division of Forestry, Norris, TN 37828). Submitted 15 November 1978. Accepted 29 December 1978.*