

EFFECTS OF PREDATION BY BUMBLEBEE WOLVES (*PHILANTHUS BICINCTUS*, *SPHECIDAE*, *HYMENOPTERA*) ON BUMBLEBEES AND PLANTS



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The interactions between flowers and their pollinators have been extensively studied in ecology, evolution and conservation biology. Although predators can dramatically influence insect-flower interactions, this issue has been mostly ignored until recently. One of the best systems for quantifying the effect of predators on pollinators is that of bumblebee wolves (*Philanthus bicinctus*), which are sphecids wasps endemic to the American Rockies, who prey almost exclusively on bumblebees. (see photos at <http://psych.mcmaster.ca/dukas/pred&poll.htm>). Relaying on research from 45 years ago, I located a large aggregation of bumblebee wolves at Yellowstone National Park and commenced research in summer 2003.

Overall, my objective is to quantify the effects of bumblebee wolves on the diversity, density and behavior of bumblebees, and on bumblebee pollinated plants. Specifically, I test the following hypotheses:

Hypothesis 1. The number of bumblebees at flowers patches within 1 km of a bumblebee-wolf aggregation is lower than those farther than 4 km from the aggregation.

Hypothesis 2. Seed production of plants specialized for large-bee pollination is lower within 1 km of a bumblebee-wolf aggregation than farther than 4 km from the aggregation.

♦ PRELIMINARY RESULTS

I counted the number of bumblebees visiting patches of Western rayless coneflower (*Rudbeckia occidentalis*), which was the most common plant in bloom at numerous natural forest-clearings. On average, the number of bumblebees observed within 4 km from the bumblebee wolf colony was 14 times lower than farther than 5 km from the colony. Similar dramatic differences in bumblebee abundance were also observed on Canada goldenrod (*Solidago canadensis*).

Preliminary data also indicated approximately half as much seed production by the bumblebee pollinated Columbian monkshood (*Aconitum columbianum*) within 4 km than farther than 5 km from the bumblebee wolf colony.

A series of experiments planned for summer 2004 will complete the data set from 2003 and test whether the bumblebee wolves are responsible for the observed lower bumblebee abundance and monkshood seed set close to than far from the bumblebee wolf aggregation.