

## II.17 Efficacy of an Extended Swath With Carbaryl–Bran Bait

K. Christian Reuter, R. Nelson Foster, and Wendal J. Cushing

---

During 1992 and 1993, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS) conducted two separate studies each year, aerially treating separate rangeland areas with 2 percent carbaryl–bran bait at the rate of 1.5 lb/acre. In each study, a 45-ft application swath was compared to a 90-ft swath. APHIS attempted to create a 90-ft swath by increasing the aircraft’s application height from 75 ft to 150 ft. Accordingly, the bait flow rate was increased to a level that maintained an application rate of 1.5 lb/acre. In theory, these adjustments would result in an increased swath (of the drifting bran bait), reducing the number of passes required by the aircraft to treat the acreage.

In 1992, APHIS applied bran bait at two sites in the Grasshopper Integrated Pest Management Project demonstration area in McKenzie County, ND. The treatment areas were approximately 1,085 acres with the 45-ft swath and 1,500 acres with the planned 90-ft swath in a location designated as the “Mead area.” APHIS also treated about 1,740 acres with the 45-ft swath and about 1,753 acres with the planned 90-ft swath in a location designated as the “Crighton area.” Ring counts and sweep-net samples at 10 sites in each of the treated and untreated areas were used to find grasshopper densities and species composition (see chapter II.2).

Mortalities resulting from the two swaths were not statistically different in the Mead area except at 4 days after treatment, where the 90-ft swath was superior. Results in the Crighton area showed that the 90-ft swath was statistically superior each time.

Upon examining the grasshopper species composition in the treatment areas, we noted that with the 45-ft swath in the Crighton area the dominant species was *Phliostrota quadrimaculatum* at 24 percent of the pretreatment population. In the area treated with the 90-ft swath, this species accounted for only 9 percent of the pretreatment

population. *P. quadrimaculatum* generally is a poor candidate for bran bait treatment as mortality is usually less than 25 percent (see chapter II.12 on bait acceptance). The higher proportion of a grasshopper species that does not readily eat bait in the 45-ft swath area may explain why the 90-ft swath consistently looked superior in the Crighton area.

In 1993, APHIS again applied bran bait at two sites in the demonstration area in McKenzie County. We treated 401 acres with the 45-ft swath and 408 acres with the 90-ft swath in a location designated as the “Corral Creek area.” Also, we treated 422 acres and 425 acres with the 45-ft and 90-ft swaths, respectively, in a location designated as the “Wolf Coulee area.”

Field personnel used ring counts and sweep-net samples at 10 sites in each of the treated and untreated areas to figure grasshopper densities and species composition. In both study areas, we found no statistical differences between the 45-ft and 90-ft swath at any time. In these studies, grasshopper species composition was very consistent between the treatment areas, containing dominant species that are susceptible to bait treatments.

These studies suggest the possibility to reduce aerial application costs with carbaryl–bran bait by increasing the application height and the bait flow rate to achieve an extended swath. It is certain that we did not get uniform coverage over the entire 90-ft swath. Visual observations in 1992 and 1993 showed the increased flight height only slightly widened the swath, and the bait did not cover the entire 90 ft. The data imply that, although the coverage was not uniform, the untreated gaps between swaths were compensated for by movement of grasshoppers to find sufficient particles of bait. Under different circumstances, gaps in bait coverage may or may not result in mortality equivalent to a uniformly covered application.