Banking on Beetles for Biological Pest Management

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Abstract

Predacious ground beetles are known to feed on crop pests and attribute to lower pest abundances. In fact, predacious ground beetles are top predators in the in-field ecological niche they occupy, the bottom of the crop plant to the first 4-6 inches of the soil. They play an important role in limiting crop pest outbreaks by concentrating their feeding activities to areas of high pest abundance. They can also reduce the amount of weed seeds in the soil and work synergistically with other beneficial species to reduce pest populations.

There are many different species of predacious ground beetles and they came in various size and shapes and preferences for prey. Some have the ability to inhabit and disperse across wide areas like a medium-sized field of 15-30 acres whereas others will only move out into the field 50 – 200 feet depending on food sources. Field and gut studies have shown that predacious ground beetles readily prey upon many crop pests including aphids, weevils, mollusk (slug and snail) adults and eggs, numerous fly larvae and pupae—including cabbage maggot—and various caterpillars such as codling moth larvae, cutworms, corn earworms, wireworms and Colorado potato beetle.

Beetle banks are perennial, in-field, insectary plantings that provide shelter and over-wintering habitat for generalist predators such as predacious ground beetles, spiders and centipedes. Predacious ground beetles do not perform well in fields where disturbances such as plowing, tilling, or spading the soil, cultivating or mowing weeds or spraying pesticides occurs on a regular basis so beetle banks are formed to provide in-field refuges from these activities. Research in the United Kingdom demonstrates that predacious ground beetles seek out and benefit from the microclimates of beetle banks. Our studies in Oregon's Willamette Valley showed that beetle banks had the highest population of predacious ground beetles than any other farm habitats studied. The poster presented results and how these studies were done on commercial organic farms as well as how we worked with farmers to develop beetle bank technology using participatory outreach methods. Also presented was the most common predacious ground beetles on western farms and their importance in providing biological pest management.

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