

VEGETABLE RESEARCH PROJECTS

UMass Research Farm Field Day, August 13, 2003

Flea Beetle Research in Brassicas Spring/Summer 2003

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Our flea beetle research for this year was focused on two topics: 1) gaining a better understanding of the basic biology of cruciferous flea beetles in Massachusetts, and 2) evaluating methods used to control flea beetles on crops. The two species of flea beetles that are pests of cruciferous crops throughout the eastern US and Canada are the Crucifer flea beetle and the Striped flea beetle. Both species were introduced to North America. As adults, the beetles feed on the leaves of brassicas, creating numerous small holes (shot-hole effect) in the leaves. In the past, the majority of research on flea beetles has come from Canada, where flea beetles are a pest in canola. However, due to differences in climate and habitat, flea beetle life cycle and biology in Massachusetts may differ from Canada. For example, literature from Canada indicates that the crucifer flea beetle has one generation per year. It was unknown, however, how many generations were present in MA.

Beginning as soon as beetles were active in the spring, we sampled field populations of flea beetles, and dissected them in order to determine the reproductive status of the females. We found beetles with mature eggs from May 15th onward. Our preliminary findings indicate that there is at least a partial second generation in MA. Beetles of the new generation that emerge as adults early in the summer appear to mate and develop mature eggs, while those that emerge later in the summer feed for a short period of time, and then move to overwintering sites without reproducing.

Another area we are currently investigating is changes in feeding behavior throughout the season. Data we have collected indicate that there are changes in the intensity of feeding, with the level peaking in June and again in August. Also, we are currently developing techniques that will allow us to keep flea beetles in a colony in the lab, so that we can continue doing research during the winter months. A colony will enable us to run experiments in controlled laboratory settings that would not be possible in a field setting. One goal is to use our colony to research how root feeding by flea beetle larvae affects plant growth. We would also like to evaluate flea beetle preference among the brassicas, especially in terms of egg-laying and larval survivorship.

In the spring and again in early August, flea beetle populations are often high enough to cause a large amount of damage to brassicas. This year, we evaluated 8 different treatments to control flea beetle damage on komatsuna (a leafy Japanese brassica): spinosad (Entrust- organic), spinosad (Spintor 2SC- conventional), spinosad (Tracer-seed treatment), carbaryl (Sevin XLRPlus), pyrethrin (Pyganic EC 5.0), thiamethoxam

(Platinum*- furrow drench), thiamethoxam (Cruiser 5FS-C*), and row cover [** items are not yet labeled for use on brassicas*]. With the exception of the seed treatments and furrow drench, the pesticides were applied as foliar sprays on a weekly basis. Each treatment was replicated four times. On a weekly basis, we evaluated the effectiveness of each treatment by removing 10 plants at random from each plot, weighing them, and counting the number of holes in the leaves of each plant. We found that row cover is the most effective way to reduce damage. However, carbaryl, Entrust and Spintor all significantly reduced damage in comparison to the control. Spinosad, in either organic or conventional formulation, seems to be a promising new compound for flea beetle control. It is registered for use in brassicas and can also be used against a number of other pests.