Improving the management of strawberry sap beetle in small fruit

Gerald Brust, IPM Vegetable Specialist, Univ. Maryland,
jbrust@umd.edu

Introduction
The strawberry sap beetle (SSB) is probably one of the most significant insect pests in small fruit in the mid-Atlantic. The small, brown adults are approximately 1/16 inch in length and appear in strawberry fields as berries ripen. The adults and larvae prefer to feed on over-ripe fruit but will also damage marketable berries. The beetles are widespread and present on most fruit producing farms, but seem to be a significant problem only in certain locations. Likely contributing to SSB abundance is the trend to produce an increasing diversity of fruits and vegetables on a farm to support lucrative farm stands and U-pick operations, where sanitation is difficult to maintain when customers harvest the product. Understanding SSB movement from suitable overwintering habitat into strawberry fields and the extent of subsequent colonization of alternate crops is critical in developing new management strategies. At the present time there are only moderate or poor control strategies for management of this pest. Current recommendations include applications of pyrethroids, field sanitation, and renovating very soon after harvest. Labeled pyrethroids have not provided sufficient control and are broad spectrum, potentially disrupting predator populations that provide pest control. SSBs are not resistant to pyrethroids, but have a tendency to feed underneath fruit where they are unlikely to come into contact with the insecticide. The focus of this research is to improve SSB management through a better understanding of beetle movement. The second year will take the results obtained from this study and develop new management tactics for SSB.

Methods
1. Overwintering location and colonization of strawberry fields in early spring
   Problem: Beetles are thought to overwinter as adults in wooded areas, but how much they overwinter in fields of strawberry or other crops is still unclear.

   Experiment 1: Adult SSB can be sampled in the field by using traps baited with whole wheat bread dough (food-odor traps). Traps will be placed along the edges of wooded areas near strawberry fields and along the border and in the strawberry field in early spring. Beetle activity is influenced by temperature with little movement of SSB when the minimum temperature is below 60°F, therefore when the traps go out will depend on temperatures. Traps will be run for a 24 hr period when temperatures are conducive for beetle movement and will be run every 5-7 days over the course of the spring. When traps are placed in the field, strawberry fruit also will be monitored to see when the beetles are first detected in the field. Traps and field monitoring will be done at two commercial farms that have strawberries and other small fruit as well as vegetable crops and at 2 research stations located at the Wye, and in Keedysville, MD. By monitoring which traps in a strawberry field are most heavily inundated it should be possible to determine where beetles moved from and whether traps can detect beetles before they are found in the field.

2. Beetle movement after strawberry harvest
   Problem: Where do beetles go after strawberry harvest?
Adults emerging from strawberry fields should move out and search for other food sources such as raspberries, blackberries, blueberries, cherries, pumpkins, melons, and various vegetables. In Maryland SSB is a major pest later in the season as it moves out of strawberry and into small fruits, especially raspberry. Therefore it is important to know when and in what numbers they move from strawberry fields in late spring into other crops.

**Experiment 2:** Traps will be placed around the edge of strawberry fields and along edges of raspberry, blackberry and peach fields near the end of strawberry harvest. Traps will be baited and checked for SSB every 5 days over the course of two months. The other fruit crops also will be monitored for SSB. Weather conditions will be recorded at each site to determine if temperature can be used to predict beetle movement.

**Problem:** Sap beetles also have a male-produced aggregation pheromone, which is attractive to both male and female SSB and could be included in a trap along with a food odor. This pheromone has not been reliable (consistent in attracting SSB) up to this point in time, but should be tested to determine if it is worth using.

**Experiment 3:** The aggregation pheromone will be tested on two of the farms in half the traps in a field. Farms that have several strawberry fields with sufficient distance between fields so that the pheromone will not interfere with the food-odor baited traps will be used in this study. Trapping procedures will be conducted as discussed in experiment 1 and 2 above.

There also may be other sap beetle species that are important as pests in these farm systems. This study will also monitor these other species in the food-odor traps.

**Other directions for controlling SSB**

The strawberry sap beetle is very mobile across a farm scale, able to use a wide range of crops as food sources, and is not easily contacted by commonly used insecticides. The most promising option is development of a trap-and-kill technique where attractive traps with insecticide could be set up in the early spring before strawberry ripening with the idea of reducing the numbers of beetles entering strawberry fields. This method can then be used again at the end of strawberry season as other fruit ripens on the farm and beetles move out of the strawberry field into these other crops. What is needed first is information about the movement of the SSB across the farm landscape over the course of a season and how efficacious the traps are in attracting the beetles compared with the crop. The trap-n-kill method will be experimented with on a limited basis this first season and on a much larger scale next season.