

Attract-and-Kill and Pheromone-Baited Traps for Management of Brown Marmorated Stink Bug

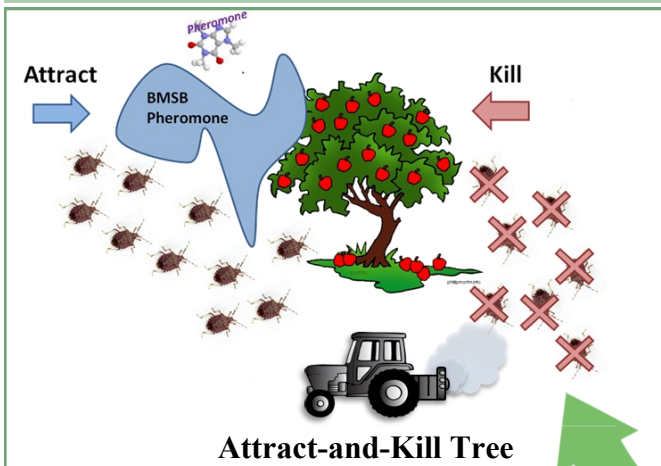
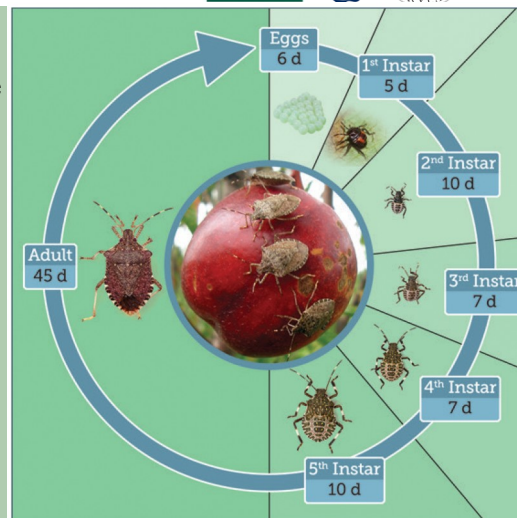
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Background

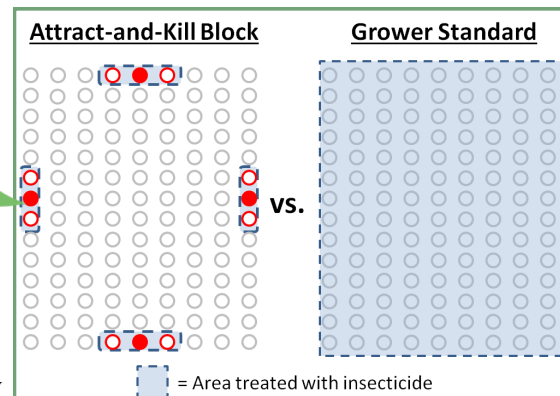
The brown marmorated stink bug (BMSB) is an invasive species that was accidentally introduced into the United States from China in the 1990s. It is a significant nuisance pest for homeowners and causes severe agricultural problems in the mid-Atlantic region. Nymphs take 45 days to mature to adults (see right). More extensive information on its basic biology and host range can be found at www.stopBMSB.org. We conducted tests of an **attract-and-kill (AK)** strategy to manage BMSB in apple. The concept entails attracting BMSB adults and nymphs to a specific area with attractive pheromones, and regularly spraying that site with insecticides to remove the bugs from the population (below).



AK vs. Standard Practice

In AK blocks, AK sites are spaced every 164 ft around the perimeter of the orchard and baited with high doses of attractive pheromone. On a weekly basis, growers will apply insecticide to only the baited AK trees and the two adjacent trees on either side. This

reduces the number of trees receiving insecticide by up to 97%, while maintaining equivalent control to standard practices (right). The reduced insecticide input may help conserve beneficial insects such as pollinators and natural enemies. The use of a trap-based cumulative threshold to trigger an alternate row middle (ARM) spray is a backup (over).



Thresholds

Work is being done on developing thresholds using pheromone-baited traps to help guide management in various crops. Research has shown that the use of threshold-based sprays can provide control equivalent to weekly ARM insecticide applications, while reducing insecticide use by 40%. A provisional threshold of ~10 cumulative adults per trap has been used with great success in apple (below), but this number will be different for other crops.

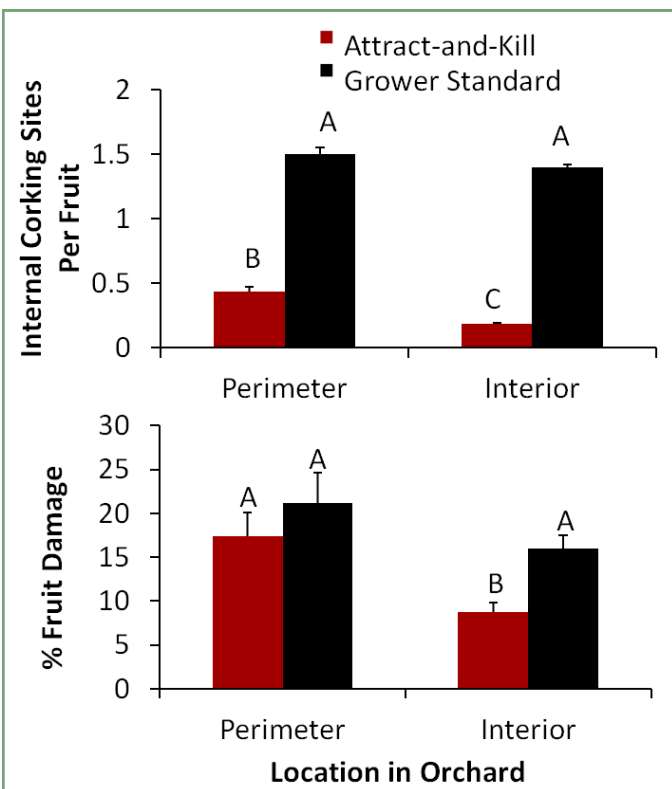


Experimental AK Trials

- Over a week during the fall in 2013, **over 60,000 bugs were killed at 7 trees.**
- In 2014 there was an average of **110 adults killed** per AK tree per week during the growing season.
- Adult BMSB will remain on baited AK trees **>24 hours** and move **less than 3 ft. away**

Commercial AK Trials

Trials in commercial orchards were run in several mid-Atlantic states (right) comparing AK against grower standard management practices in 2015. Fruit were harvested from perimeter and interior trees to assess BMSB damage and the protective capacity of the AK strategy. The mean number of internal corking sites (feeding injury) per fruit and incidence of fruit damage per tree was measured (lower left). Feeding injury and damage incidence were significantly less in the AK treatment compared with the grower standard. BMSB were also reliably monitored using pheromone-baited traps. At season's end in some orchards, these traps indicated additional sprays were needed in AK and grower standard blocks.



Take-Home Messages

Attract-and-kill and monitoring with pheromone-baited traps are **promising techniques** that may be able to provide effective control of BMSB while significantly reducing insecticide usage. Commercial trials were done in a low population pressure year, so it is important to document how these systems will perform under higher bug pressure. The pheromone lures are still expensive, but is expected to decrease further with more companies getting involved in production. Future work will evaluate whether we can space AK sites and pheromone-baited traps farther apart, and if we can extend the duration between sprays.

More Information about attract-and-kill at the following website, with regular updates throughout the growing season: <http://williammorrison.wix.com/sare-blog>