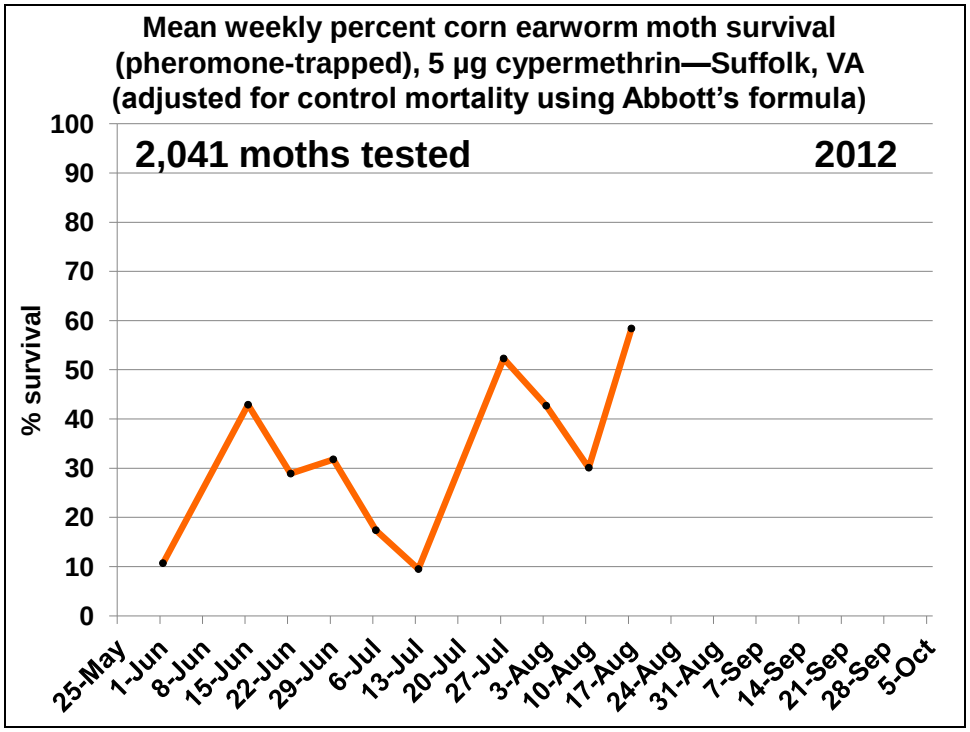
Results of our corn earworm moth vial tests are showing high numbers of moths surviving a 24-hour exposure to the 5 microgram rate of cypermethrin (a pyrethroid insecticide). This week, we tested 225 moths, with 58.4% survival.




The current season average is 40% survival (a total of 2,041 moths have been tested). As a general rule, anything above 30% means that resistance problems are likely to occur in certain fields. Today, Scott Reiter brought to my attention a possible pyrethroid failure in a soybean field in Prince George County. This field had high numbers of large, medium, and small worms (in the range of 5-7 per 15 sweeps). They were still picking up about 5 worms per 15 sweeps two days after a pyrethroid application. We'll want to verify the species to see if tobacco budworms were in the mix. Budworms are visually similar to corn earworm larvae, but budworms are not effectively managed with pyrethroids. To tell the difference between species, we have to dissect the larva's mouthparts. The farmer applied a 2$^{nd}$ spray containing indoxacarb today.

Back to the topic of interpreting the vial test results: our season average of 40% survival in the vials does NOT mean that 40% of our corn earworm population is resistant to pyrethroids. The vial tests should be considered an "indicator" of possible problems. The values obtained with a pyrethroid other than cypermethrin (e.g., beta-cyfluthrin, bifenthrin, lambda-cyhalothrin, gamma-cyhalothrin, esfenvalerate) would likely differ. Also, we are testing adults (moths) under laboratory conditions in an enclosed glass vial. Soybean field conditions are entirely different, and it is the larval stage that is targeted by farmers (please don't target the adults with field sprays—they are strong fliers and can easily fly into and out of your field; wait until their eggs hatch and base treatments on threshold numbers of larvae).

(continued)

If you decide to apply a pyrethroid, you may not have any problems controlling corn earworm larvae, and pyrethroids will also help manage stink bugs. Remember, please do not apply pyrethroids (or any other pesticide) at rates higher than the label permits. It is illegal to do so, and would really only work as a "resistance management" technique if absolutely no survivors remained after the application. What would likely happen is that the high, off-label rate would kill off the susceptible larvae, leaving some resistant ones to grow up and mate with other resistant individuals, leading to greater resistance problems down the road. On the other hand, too low of a rate may not kill enough pests, creating the need for additional applications, thereby increasing selection for resistance. For better resistance management, you'll want to use the lowest effective rate, and avoid repeat applications of the same chemical class. You may want to consider:

1. Non-pyrethroid chemistries (e.g., indoxacarb, *Bacillus thuringiensis*, flubendiamide, spinosad, carbamate)
2. Products containing dual modes of action (e.g., a pyrethroid plus an organophosphate; a pyrethroid plus a spinosad)
3. Tank mixing products to achieve dual modes of action (remember to consider other pests—acephate would be good to add to a pyrethroid if you have both worms and stink bugs).

Please see the tables that follow, they should help. There should be more options available for soybean in 2013, such as anthranilic diamides.

Here are some resources that you may want to check out:

To learn more about the classification of pesticide modes of action, please see the Insecticide Resistance Action Committee's website, www.irac-online.org.

For more details on sampling and decision making, refer to Dr. Herbert's soybean insect chapter in the 2012 Virginia Cooperative Extension Field Crops Pest Management Guide (www.pubs.ext.vt.edu/456/456-016/Section_4_Insects-8.pdf).

Dr. Herbert also has a customizable Corn Earworm Threshold Calculator (www.ipm.vt.edu/cew/) it lets you input multiple variables for your scenario.

Of course, check for more Ag Pest Advisories by Extension Specialists, and be sure to communicate with your Virginia Cooperative Extension Agriculture and Natural Resource Agent. Attending local field days and production meetings is also worthwhile.

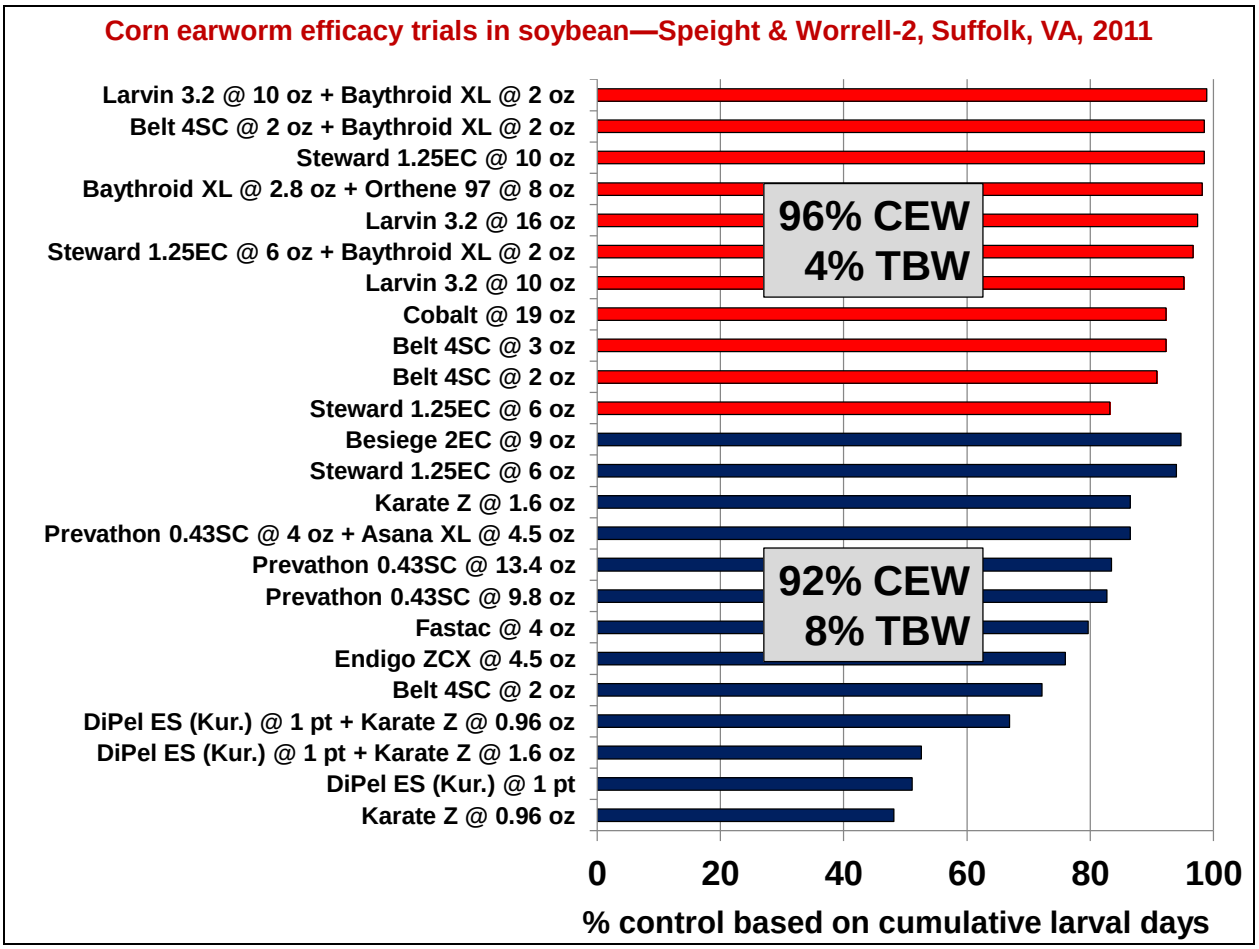
The following pages contain insecticides registered for use in soybean (this list contains materials, their mode(s) of action, and their primary target pest). Also, the bar chart at the end summarizes the results from Dr. Herbert's 2011 corn earworm efficacy trials in soybean.

(continued)

| Insecticides registered for soybean—2012 (red=not labeled) | | |
|---|---|---|
| **Material** | **Class** | **Target species** |
| Asana XL | Pyrethroid | Broad-spectrum |
| Karate Z/Warrior | Pyrethroid | Broad-spectrum |
| Baythroid XL | Pyrethroid | Broad-spectrum |
| Proaxis | Pyrethroid | Broad-spectrum |
| Hero | Pyrethroid | Broad-spectrum |
| Brigade 2EC | Pyrethroid | Spider mite |
| Bifenthrin | Pyrethroid | Broad-spectrum |
| Mustang Max | Pyrethroid | Broad-spectrum |
| Belt | Flubendiamide | Lepidoptera |
| Prevathon (2013) | Anthranilic diamide | Lepidoptera |
| Besiege (2013) | Anthranilic diamide + Pyrethroid | Lepidoptera, stink bug |

| Insecticides registered for soybean—2012 | | |
|---|---|---|
| **Material** | **Class** | **Primary target species (other species also on label)** |
| Orthene 97 | Organophosphate | Thrips, stink bug |
| Lorsban | Organophosphate | Spider mite, grasshoppers |
| Dimethoate | Organophosphate | Spider mite |
| Belay | Neonicotinoid | Aphid, stink bug |
| Steward EC | Indoxacarb | Lepidoptera |
| Blackhawk | Spinosad | Lepidoptera |
| Radiant SC | Spinosad | Lepidoptera |
| Lannate LV | Carbamate | Lepidoptera |
| Intrepid 2F | Diacylhydrazine | Lepidoptera |
| Endigo (Karate + Centric) | Pyrethroid + Neonicotinoid | Leps, aphid |
| Leverage 360 (Baythroid + Trimax Pro) | Pyrethroid + Neonicotinoid | Leps, aphid |
| Brigadier (Bifenthrin + imidacloprid) | Pyrethroid + Neonicotinoid | Leps, aphid |
| Cobalt (Proaxis + Lorsban) | Pyrethroid + Organophosphate | Leps, grasshoppers |
| Consero (Proaxis + Spinosad) | Pyrethroid + Spinosad | Lepidoptera |
| DiPel ES | *Bacillus thuringiensis* subsp. *kurstaki* | Lepidoptera |

(continued)




CEW = corn earworm; TBW = tobacco budworm.
Not all products evaluated are currently labeled for use in soybean; please check the label.

Remember to scout your fields, identify your pests and beneficials, use thresholds, choose your pesticides wisely, follow the pesticide label, and use proper application techniques. Continue scouting as necessary.