

GROWERTALKS

Columns

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An Exercise in Tongue Twisting

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Are you stumbling on words like “neonicotinoid”? Try pronouncing “phosphoramidothioate” or “benzoylphenylurea chitin synthesis inhibitor.” Both terms represent classes of pesticides, which were quite popular until very recently (Orthene and Novaluron are examples).

“Who cares?” you may ask, and I will tell you that it’s a worthwhile effort to learn about the different classes of pesticides available to us. Not only does it help you look smart when the topic comes up in conversation, but more importantly, the success of your pest control program might depend on how well you understand the differences. During the days of one-spray-kills-all products, these modes of action were little more than nerdy footnotes. But those times are gone for good.

The biggest hurdle to understanding pesticide classes is the forest of inaccessible science lingo that we have to cut through before we find the essence that’s important for the job. It’s imperative, however, that we read beyond the jargon. Before I incorporate any new chemical in my pest control strategy, I always research the chemical class to which the substance belongs. I look for explanations on how it kills insects and how a specific mode of action may limit or enhance its activity against specific pests under particular circumstances. I’m trying to understand how to gauge the efficacy of the product and how it may affect any of the beneficial insects that we’re integrating into our systems. Let me illustrate with the help of an example:

Spirotetramat (Kontos, Movento) is a tetrone acid derivative, which inhibits lipid biosynthesis in insects. It’s probably safe for you to ignore the “Sciencieese” until someone in the Label Writing Department takes the time to translate it into readable English. What are important are the practical aspects of this mode of action. Unlike classic pesticides, the insects won’t simply drop dead after an application and the effect isn’t instantly visible. Instead, the substance prevents the insects from making fatty acids, which are needed to develop cells. These fatty acids are relatives of the cholesterol that many middle age men are concerned about and the effect of Spirotetramat in insects is somewhat comparable to a massive overdose of cholesterol-lowering drugs in humans.

Direct effects on adult insects aren’t very pronounced. Immature insects, however, can no longer develop to

healthy maturity and exposed eggs won't hatch because the embryos stop growing. Mature aphids are known to die because they accumulate dead nymphs in their abdomen.

What does this mean for us? First, it indicates that the timing for applications is critical. If we wait until we see intolerable populations of adults, we're probably going to be too late for satisfactory results. We cannot expect quick knockdown two days before shipping. It requires early monitoring and a disciplined control strategy for this pesticide to be useful.

Secondly, complete exposure of an insect population is crucial. Some species of thrips lay their eggs inside the tissue of host plants. Spirotetramat is absorbed by treated leaf tissue and spray surfactants dramatically increase its uptake. Any eggs that were inserted into treated foliage are suspended in an insecticidal soup and won't develop. Thrips control can be excellent. However, if you apply a hydraulic spray without adjuvant, and if you miss covering a few leaves on each plant, then any eggs in untreated portions of tissue won't get killed. Those eggs will hatch into mobile thrips and move within the crop. This can give the false impression of an ineffective pesticide.

We should also be aware of beneficial insects that lay eggs in plant tissue such as *Orius*, the predatory pirate bug. These eggs would be affected in the same way as those of thrips and, therefore, this insecticide isn't going to be very compatible with beneficials like *Orius*.

Unlike many of the newer systemic insecticides, Spirotetramat is active in both phloem and xylem, so if you apply this product as a drench, the chances of distributing the active ingredient in all plant tissue are good—with the caveat that Spirotetramat is known to cause phytotoxicity in some ornamental crops and drench applications hold the potential for systemic damage. Known phytotoxicity makes a good case for reading the label before application and thoroughly testing the product on every crop before you apply it on a large scale.

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