What About Neem?

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As part of the NEON project, I've been researching the effectiveness of several organically-approved pesticide products. I've been surprised at how many of these have been used in recent university research trials. A variety of neem products have been fairly extensively tested, with good reason.

Neem Studies

Over 100 neem entries have been made into a database showing relative reduction of pest numbers or damage compared to untreated controls in these studies. They have included mostly field trials, but some greenhouse and lab ones too. Crops studied were vegetables and fruit species that are commonly grown in the Northeast.

Neem has been shown to be effective in several situations. In the greenhouse, neem sprays controlled aphids, flies, mealybugs, and mites. In field vegetable trials, neem worked well against aphids (not as well vs. green peach aphid) and beet armyworm. Less consistent but promising results were obtained in the field against squash bug, diamondback moth, Colorado potato beetle, flea beetles, and Southern armyworm. Any of these sound familiar? Neem was ineffective against pepper weevil, thrips, and whiteflies.

On fruit crops, neem controlled leafhoppers, leafminers, tarnished plant bug, and aphids. It was sometimes effective against the apple caterpillar complex.

Finally, for disease control, the product Trilogy, which is 70% neem oil, was effective against powdery mildew on cucurbits and grapes, but little else. Triact is a very similar product that is labeled for greenhouse and ornamental use.

Of the neem products on the OMRI list, AZA-direct, Neemix .25 and 4.5, Trilogy, and Triact showed success in the above trials. Agroneem was not effective against the pests it was tested against.

These trials are typically run under comparatively severe conditions, to see whether pesticides can withstand the heavy onslaught of pests that might occur in a commercial field. Results should be better where efforts have been made to foster natural enemies, use resistant varieties, intercrop, rotate, and create good conditions for crop health such as are found on most organic farms.

Neem products come from the neem tree, native to India and growing in many subtropical and tropical parts of the world. While over 70 chemicals have been extracted from neem, one called azadirachtin seems to have the strongest pesticidal effects. Neem has been fairly well-tested, and appears to be relatively safe for applicators, consumers, and the environment. Of course, any pesticide should be handled and applied with care and respect.

How to use neem

Neem does not directly kill many pests. Instead, it reduces feeding, repels egg-laying, and disrupts their molting from stage to stage. It has little effect on adult beneficials (though it may damage immature lady beetles, etc.), allowing them to fully contribute to control. So it does not have immediate knockdown effect in most cases. Key techniques are to apply neem on young immature stages of the pests, and make multiple applications as neem does not persist well. Good coverage is important because neem must be ingested to work.

One interesting aspect of neem that is under-explored, is that it can be taken up by the roots and moved systemically through the xylem system of the plant, which takes water and nutrients up to the leaves. Evidently, it does not move well through the phloem system, which goes the other way, so foliar sprays have little systemic effect.

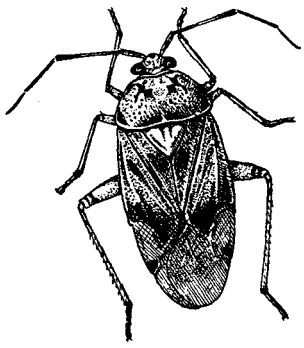
Inside the plant, neem persists much longer than when it is exposed to the elements, lasting for two weeks or more. However, the levels of neem in the tissues are diluted as the plant grows. Nonetheless, the possibilities here are intriguing. Drench applications to greenhouse seedlings or over rows of young plants could be effective against pests which attack them. It is probably too expensive to use neem drenches on large plants.

Speculations

Here are a few ideas, none of which have been tested as far as I know:

Applications on cucurbit transplants for early cucumber beetle protection are worth a trial. The same for brassicas for early protection against root maggots and flea beetles. Drench applications over emerging potatoes are also worth a try, against CPB. One university study used neem injected into a drip irrigation system on lettuce. This is another intriguing idea.

As another way of trying to get neem into the plant, using safe amounts of an approved fish oil in a spray application can help carry pesticides through the cell wall into the tissues. While the neem would not necessarily be moved systemically within the plant, it might persist longer.



Tarnished plant bug — a difficult pest to manage organically.

The tarnished plant bug, squash bug, and stink bug have been difficult pests to manage organically. Foliar sprays of neem products have been effective against TPB and squash bugs in some of these trials. This is another area worth exploring. I suggest that neem always be used with other, reinforcing means of lowering pest levels. For instance on brassicas, one Pennsylvania grower uses a repellant on the plants, and also stretches yellow sticky tape (Insect-A-Peel, from Arbico (800)827-2847, www.arbico.com) above them to catch the disgusted root maggot flies. Using trap crops, or adding other partially-effective sprays are other ideas.

So neem is worth looking at next season, especially if you are troubled by pests that it shows promise against. From what I have seen, the approved product AZA-Direct seems to be the most reasonably priced at full strength application rates. Look around. If you try it on your farm, please let me know of your results, both positive and negative.

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