

The Science of Fighting Flies

Lisa Haynes and Eric Thorsland, Mahomet, Illinois

Determination of an Economically Optimal Organic Control of Onion Maggots in Allium Crops

Coordinator: Lisa Haynes

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Lisa and Eric Haynes tested three organic methods for controlling onion flies—parasitic nematodes, ground organic cinnamon, and kaolin clay. They found the nematodes to be the most useful method.

Lisa Haynes, a nuclear engineer by training, has made something of a science out of controlling onion flies.

In 2005, Lisa and her husband, Eric Thorsland, received a SARE grant to look into methods of controlling an onion fly infestation, which was damaging anywhere between 10 to 50 percent of her onion crops yearly on their 17-acre farm.

"The onion fly maggots will just bore into the onion and either kill it or damage it," says Haynes, who became attracted to organic farming as a nuclear engineering graduate student while working on the Blue Moon farm in Urbana. Haynes does most of the hands-on work on the farm, while Thorsland tends to the mechanical needs in addition to his off-farm job.

Their 2 acres of vegetable production is split into four fields, where she rotates (1) allium crops, (2) sweet corn and squash, (3) beans and peas, and (4) other vegetables and annual flowers. But the flies primarily target the allium crops—leeks, garlics, and onions.

With the SARE grant support, Haynes tried out the three most promising organic methods for controlling the flies—parasitic nematodes, ground organic cinnamon, and kaolin clay.



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Currently, she has found the parasitic nematodes to be the most useful method to control the onion fly problem. After applying the nematodes, about 15 percent of her crop was damaged in 2007, but only 2 percent was severely injured. Severe damage is defined as damage that impacts marketing.

She sprays her crops with parasitic nematodes just as the onion fly eggs reach the hatching stage. The nematodes then bore into the eggs and kill the larvae, she says. Typically, there are three generations of onion flies in a year, and she says you have to hit each generation.

While the nematodes target the pests in the maggot stage, the other two methods—cinnamon and clay—target them in the fly stage. Haynes applied the cinnamon as an olfactory disruptor. In other words, it masked the scent of the onions, so the flies would not be attracted to the crops.

The main drawback to this method was efficiency, she says. Haynes tried to mix the cinnamon into a suspension so she could

spray it on the crops, but it just dispersed and floated on the top. It also took longer to clean out the sprayers after every application than it actually took to spray the crops. In the end, she found that the easiest way to apply cinnamon on the crops was by sprinkling it.

The clay, meanwhile, was effective because the onion flies do not like landing on the abrasive surface created by the clay and stay away from the crops when they are covered in it. The clay also tastes bad to the flies, which consume the clay while trying to clean themselves.

The clay had to be washed off of the produce before it was sold at the market. But the drawback was that it would leave behind a white residue on the leaves, which customers might think was mold. But Haynes still likes the idea of using clay on crops like apples and plums, because it washes off easily from them.

A couple of less successful methods that Haynes experimented with were row covers and heritage turkeys. The plastic row covers tore easily and didn't do a good job covering the leeks and garlic, which reach several feet in height. The turkeys helped control some of the flies; but despite being kept in a moveable coop, many of them were killed by "a particularly nasty predator."

However, Haynes did have success in combining the parasitic nematodes with one other control method—trap crops. She planted giant onions between the old onion field and the new field with the goal of intercepting the onion flies on their way to the new field. Haynes likes this method because she prefers to spray as little of the crop as possible, even with organic products.

"But if I use trap crops again, I would go with elephant garlic, which they go for more than anything. It would be a more effective trap crop than a big, old onion."

By Jason Peterson