

An OSU Extension Newsletter about Cabbage Maggot Management Summer 2003-Issue 2

MagNet Kicks off the 2003 Field Season

e are now in our third summer of monitoring Brassica crops and are busier than ever! This summer, we plan to continue monitoring belowground Brassicas for eggs, flight, and damage levels.

We have also added three farms of broccoli to our monitoring routine, and will test whether or not the tools we are developing in belowground crops will hold true for aboveground crops.

Cooperating growers set up a trial on their farm to test at-planting treatment practices.

In addition to monitoring fields for infestation levels, we are also conducting the following experiments:

- Treated seed on radish, turnips, and rutabagas
- Placement of yellow water traps
- Fall cultivation techniques
- Alternative chemistries studies
- Pesticide application techniques at

"The PEST Plan": Coming Soon

N ext month, a question and a called "The PEST Plan" will arrive in your mailbox. It will ask you to rate your IPM practices in various categories. Results from the PEST Plan will be useful in many ways:

- To show growers where their farms rate on an IPM continuum scale.
- To inform growers of various pest management techniques that they may or may not already know about.
- To help us evaluate the success of the MagNet program.
- To help us determine where grow-

ers are at in adopting new IPM practices, and to measure their progress over time.

We will compile the results from all of the questionnaires once they are returned, and will publish the average score in our next newsletter.

Don't be discouraged if your score is low this year. We are simply creating a starting point, so that improvement can be measured over time.

After you receive your PEST Plan, please return it as soon as possible. Hearing from your farm is very important to us!

planting, including granular, foliar, and in-furrow treatments

- · Biocontrol of cabbage maggots
- Dates of fly emergence (Degree-day modeling)

Four new researchers have joined the MagNet team this summer:

Dr. Dan McGrath and Russell Wymore are joining us from the Marion County Extension Service. They will be monitoring eight farms in the Willamette Valley for cabbage maggot flight.

Dr. Denny Bruck and Jane Snelling of the USDA-ARS are testing Metarhizium, a fungus, as a possible method for controlling cabbage magaots.

For more information on what's new with MagNet, check out our website:

http://oregonstate.edu/magnet/



Watch out for wild Brassicas! This Corvallis field of wild mustard was loaded with cabbage maggot larvae.





hen air temperatures drop in the this theory yet. fall, maggots turn into pupae and will not emerge as adult flies until spring. The spring emergence often leads to the worst infestation of the vear! The question is, how can we destroy the fall pupae in order to reduce spring flight?

Many growers disk their fields in order to chop up the roots housing the pupae. Some plow the roots under, hoping that the flies can't emerge if they're buried deep enough. Others leave the disked roots on the surface, hoping that the larvae and pupae will dry out.

Hughes & Mitchell (1960) speculated that plowing would increase maggot emergence, since it breaks up the hard crust of soil at the surface. Experiments, however, have so far shown the opposite results.

University of Minnesota and Arizona State University web publications suggest that plowing up soil attracts maggot flies by bringing odors of organic matter to the surface. As far as we know, no one has experimented with

The Literature says:

According to a British study, most cabbage maggot pupae are found 2-3 inches below the soil surface. When researchers buried pupae 1.5-6 inches deep, 70% of emerging flies were able to surface, but when pupae were buried 1 foot deep, only 20% made it to the surface as flies (Finch and Skinner 1980).

In a Canadian study on canola (Dosdall 1998), untilled plots experienced greater maggot damage than tilled plots. Although the untilled plots had greater damage levels, they had greater seed yields than tilled plots. Therefore, tilling reduced maggot loads, but had a negative effect on crop yields.

Our Experiment:

Fall 2002, MagNet set up a trial at NWREC to test different field cultivation methods. In our heavily infested



field plot (over 75% of plants had maggots), we included the following treatments:

- 1. No cultivation practice applied
- Double-disked soil 2.
- 3. Double-disked and deep-plowed soil

We placed emergent cages (see above photo) over the different field plots, and Chris Cornwell, research assistant at NWREC, has been checking fly counts weekly. Look for results from this trial in the next issue of Maggot Mania.





Mike Halbleib and Shannon Heuberger map a Brassica field using GPS.

ver the past year, we have been mapping Brassica fields in the Willamette Valley using GPS technology. We are creating a database where cabbage maggot monitoring information can be viewed in a visual map form.

We believe that observing data in this format will help us to see spatial patterns in the movement of cabbage maggots.

The GIS Map that we are creating will have the following features:

Displays a field's risk of getting maggots.

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- Shows seasonal flight, egg, and damage severity levels.
- Allows us to conduct queries. For example: "Which fields have high damage levels and planting dates prior to August first?"
- Stores field data year after year.
- Downloads from the Internet. •
- Viewable in Excel.

An experimental version of the database will be

ready this fall. The fully operational, userfriendly version will be available to you in 2004.





Eggs:

- White
- 1 mm long Narrow
- Oblona
- Adult flies lay an average of 113 eggs in a 5-week period.
- Eggs are laid in cracks in the soil within a 2 in, radius of the base of the plant.
- Eggs hatch within 3-10 days depending on temperature and other factors.

Maggots:

- Circular arrangement of double spines around blunt end
- Feed for 2-4 weeks on Brassica roots before pupating
- White color
- No legs
- Blunt at one end



Pupae:

Brownishred



- Remain in the soil for
 - ~2 weeks if they pupate in the spring or summer
- Remain in the soil all winter if they pupate in the fall
- About 8mm long

Adult flies:

- Dark stripes on thorax
- Covered in bristles
- 1/2 the size of a housefly
- Dark gray color
- Long, thin abdomen
- Females larger than males
- Antennae bare, not plumose
- Feed on nectar, then mate and lay eggs for 2-5 weeks
- Live 11/2 months



preliminary* findings:

- Lorsban treated seeds showed promise in 2002. Protection lasted 3 weeks-possibly a good idea for radish farming.
- 4-5 peak flights occurred throughout the growing season, beginning in April, and ending in November 2002.
- Risk of infestation is greatly increased by planting within 1/4 mile of a field that was infested within the past 3 months.
- Serial plantings (planting brassicas side-by-side) may increase the risk of infestation.
- Monitoring the crop weekly for eggs serves as a predictive tool for potential damage.

- Rutabagas and turnips appear most vulnerable to infestation between the four leaf growth stage and the closing of the foliar canopies (about 1 month after planting)
- Lorsban, when applied in the seed furrow, appears to offer more protection than an over-the row application.
- Certain wild Brassica species in the Willamette Valley act as hosts for the cabbage maggot.
- The first spring flight begins at 275 degree-days. After the first flight, there are flights every accumulation of approximately 580 degreedays.

*Further replication is required before these results can be verified.



Your Theories
Since many of you have been dealing with the cabbage maggot even longer than we have, you probably have noticed pathers in their behavior. Ideas for many of our experiments have come from your suggestions.
That's why we are starting up a column in Maggot Mania that is written by you! We want you to write us with your observations, your theories and your questions. In each issue of Maggot Mania, we will include grower contributions. It will be interesting to see whether there are trends that several of you have observed.
Here are some questions, just to get you started:
1. Which of your fields get most infested each year? What do those fields have in common?
2. Are there more maggots during certain months?
3. Have you ever treated a field differently than the others, and found that its maggot damage was better or worse than other fields?

Send your contributions by email or fax. We look forward to hearing from vou!

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