

Seedcorn maggot and wireworm in seeds and seedlings 2012 update

The emergence of maggot flies from the soil is one of the earliest pest events of the vegetable season. In the field if you find wilting, stunted plants or poor emergence and no clues of insect feeding or diseases on the above-ground parts, then dig up the plant and check for maggots and wireworms inside the seeds and stems. For spring 2012, factors that may influence the severity of this pest include the mild winter temperatures (favoring survival) and early progression of growing degree days (favoring early emergence), and the dry soil conditions this spring, which are less favorable than last year's cold wet spring soils. However, dry soil conditions may favor attraction to recently incorporated cover crops or compost.

Seed corn maggot attacks seeds -- especially larger seeds like corn, beans and peas -- as well as seedlings of a wide variety of plants. The fly is nearly identical to cabbage and onion maggot flies, but it becomes active somewhat earlier in the season. Flies spend the winter as pupae in the soil and adults emerge in spring. Swarms of flies may be seen over freshly plowed fields. Female flies lay eggs on soil surface near sprouting or decaying seeds, organic plant residue, or organic soil amendments such as manure or seed meals. Eggs hatch in 2-9 days depending on temperature, and maggots burrow down to find food. The maggot is yellowish-white, legless, with a pointed head and is about ¼ inch long when fully grown. Damage may be to the seed itself or to roots, stems or cotyledons

Maggot flies (including also cabbage and onion maggot) are well adapted for early season success! They have a 'base temperature' -- that is, the threshold at which they become active -- of just under 40 degrees F (3.9 C). This is 10 degrees cooler than most insects and plants which have a base temperature of 50 F.

Degree days are calculated on a daily basis by using the formula:
(Max temp – Min temp)/2 – base temperature.

The same formula is used for calculating degree days in Celsius. GDD are expressed in Fahrenheit (FGD) or Celsius (CGD). It is important to be consistent in the units used for temperature and degree day calculations. In Minnesota and Wisconsin, research has shown that peak emergence of the first three generations of seedcorn maggot fly occur when 200, 600 and 1000 Celsius degree days (equivalent to 360, 1,080, and 1,800 Fahrenheit degree days) have accumulated. To change Fahrenheit growing degree days to Celsius, multiply by 5/9.

A good online reference on seedcorn maggot is at University of Wisconsin
http://www.soils.wisc.edu/uwex_agwx/thermal_models/scm

The **wireworm** is slender, jointed, usually hard-shelled, with three pairs of legs, and tan brown in color. This is the immature stage of the **click beetle**, which deposit eggs on soil during May and June. Grasses, sod and sorghum-sudangrass are favorite egg-laying sites. Eggs hatch to become wireworms that feed below-ground on seeds, roots, tubers and other plant tissue. Wireworms feed for several years before pupating and emerging as

adults. Thus, a wireworm problem in the spring probably means there was an attractive grass crop present sometime in the past 3-5 years. Wireworms also prefer wet soils and moderate temperatures; they migrate up to reach warmer soils, but down to avoid excessive cold, heat, or drought.

Organic matter to feed.....maggots and wireworms. Unfortunately, practices that enhance organic matter in the soil may actually worsen seedcorn maggot and wireworm problems. Lush, thick cover crop growth that is tilled under in spring attracts seedcorn maggot. Reduced tillage systems may also enhance these pests. Where possible, delay planting for 3-4 weeks after a cover crop is incorporated to give it time to break down and make it less attractive to the flies.

Row Covers. Row covers exclude maggot flies, but only if they don't emerge from the soil right underneath the cover. Both pests overwinter in soil, especially where there is a lush cover crop, and they will seek out food and egg-laying sites as soon as they become active in spring. That includes your prized transplants!

Replanting. If you discover after planting that a field is infested with seedcorn maggot or wireworm, not much can be done to cure the problem except to wait until the maggots have past their active stage, then replant. If the maggots are not fully grown (smaller than ¼ inch long), wait 10 days to replant; if they are fully grown, it should be safe to replant after 5 days. If wireworms are found, wait to replant until soil temperatures are above 70 degrees F, which forces them deeper into the soil.

Insecticides. Soil insecticides for control of seedcorn maggot and wireworm are most effective when made prior to planting or laying plastic. Registered active ingredients include chlorpyrifos (eg, Lorsban 4E), phorate (Thimet 20-G), and clove + cinnamon + thyme oils (Ecotrol G) (OMRI listed). Thiamethoxam (Cruiser 5FS) is also labeled as a seed treatment and is available on commercial seed of some crops. See *2012 New England Vegetable Management Guide* for specific crops). Using transplants generally avoids these pests EXCEPT where plants are set under row cover or in areas that are already heavily infested. Note that the Guide gives a single product for each crop & pest as an example, but products with the same active ingredient are available. For example, chlorpyrifos products include Govern*, Lorsban*, Nufos*, Saurus*, Warhawk*, Whirlwind* and Yuma* (*= restricted use insecticide).

Ecotrol G is a relatively new product that is allowed in certified organic production and is labeled for cutworms, wireworms, symphylans, and maggot flies on onion, Brassicas, cucurbits, carrots, parsnips, sweet corn and other vegetables. It contains a mixture of botanical oils (clove + cinnamon + thyme oil). The G formulation is a granular to be applied as a band or with seeds at or after planting at depths of 2 to 6 inches depending on the target pest. Note that this is NOT the same active ingredients as Ecotrol EC or Ecotrol, which contains rosemary and peppermint oil and is labeled for various foliar pests. Note: these products are not registered as pesticides, because the botanical oils are exempt from registration requirements.

Don't have a new Vegetable Management Guide yet? Contact the UMass Extension Bookstore (1-877-UMASSXT (within Massachusetts) or 413-545-2717) or check online at www.nevegetable.org.

--R. Hazzard