

## Seedcorn maggot as a pest of vegetables

By Ben Werling and Zsofia Szendrei

**Appearance and life cycle:** Seedcorn maggot overwinters as a brown, wheat-seed size pupa 3-6” below the soil surface. Flies emerge from pupae during April and May. The housefly-like adults can be seen flying low over newly worked soil. Offspring of this spring flight are most damaging. Females prefer to lay eggs in freshly turned soil with decaying organic matter. Sites where cover crops or green manure were recently incorporated or manure was spread are highly attractive. Eggs hatch into tiny white, wedge-shaped, maggots with no noticeable head or legs, reaching ¼” in length. Larvae shed their skin three times before pupating. A next generation of flies emerges from these pupae in early summer. Development from egg to adult requires roughly 376 degree days (base 39°F). There are likely three generations per year in Michigan. Starting in August, offspring of the later generations pupate and enter diapause (overwintering stage).

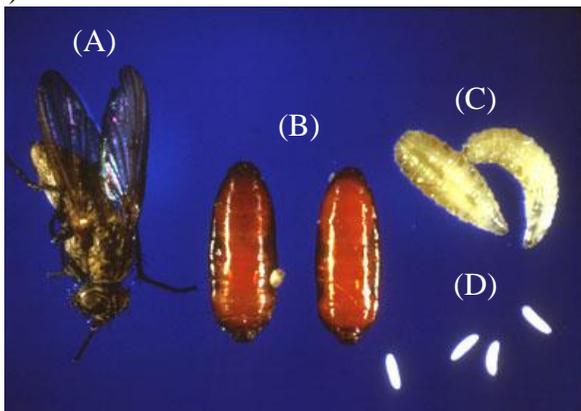


Figure 1. (A) Seedcorn maggot adults, (B) pupae, (C) larvae and (D) eggs. Photo credit: Extension Entomology, Purdue University, West Lafayette, IN.

**Damage:** This pest is typically detected by the damage it causes when maggots feed underground on seeds before and during germination. In beans, the effects of underground feeding are visible once plants emerge and include holes in the first true leaves, dark

areas on the cotyledons, and in severe cases a “snake-head” symptom when the growing point is completely destroyed and seedlings emerge leafless. Stand reduction in beans may be less common than in other crops, but damaged plants may be slow to develop and unproductive.



Figure 2. Seedcorn maggot damage in beans is often noticed once seedlings emerge. This seedling had its leaves removed before emergence. Photo credit: Howard F. Schwartz, Colorado State University, Bugwood.org

Unlike beans, damage in peas, sweet corn, and vine crops is typically not visible above ground, and is noticed as a stand reduction. Dig up seeds where there is a gap in the stand and split them open to look for maggots and tunnels.



Figure 3. Seedcorn maggot on a damaged corn seed. If you notice a stand reduction in corn or peas, dig up seeds to determine if seedcorn maggot is the culprit. Photo credit: Mariusz Sobieski, Bugwood.org.

To contact an expert in your area, visit [msue.anr.msu.edu/experts](http://msue.anr.msu.edu/experts), or call 888-MSUE4MI (888-678-3364).

Maggot tunneling in vine crop seeds is hard to detect. Damage can sometimes be detected on emerging vine crop seedlings as light feeding along the edges of cotyledons, or their complete destruction. Damage in onions and cole crops is noticeable when seedlings wilt and/or die from below-ground damage.

**Similar species:** In onions, the onion maggot—which only attacks plants in the onion family—causes very similar damage and is a consistent problem if not controlled. Similarly, cabbage maggot is a root feeding pest of cole crops. It is difficult to distinguish life stages of these species without a microscope. Wireworms—the larvae of click beetles—are another seed and root feeding pest but are larger and leathery brown. Stand reduction from soilborne pathogens can also be confused with seedcorn maggot damage as it often occurs under the same conditions (cool, wet planting seasons).

**Management:** Seedcorn maggot is a sporadic pest that is typically only a problem when planting time lines up with conditions attractive to egg-laying flies and poor for crop growth. Cultural controls involve timing field operations to avoid these conditions. The following tactics can be used singly or in combination to reduce your risk on your farm.

1. *Avoid making fields attractive to egg-laying flies near to planting time:*

- Spread manure the fall before
- Herbicide-kill cover crops before incorporation
- Delay planting for 2.5-3 weeks after incorporating vegetation like cover crops

2. *Avoid planting during peak egg-laying and/or when hatching larvae will be feeding*

- Use the seedcorn maggot Enviro-weather model to estimate peak emergence, avoid planting then
- Wait approximately 376 DD base 39°F after the predicted peak emergence.; at this time

larvae from eggs laid during peak should be reaching the non-damaging pupal stage

3. *Plant when environmental conditions favor rapid seedling emergence*

- Delay planting until maximum soil temperatures at 4” are consistently above 70°F, which will speed crop emergence and potentially make soils less attractive to flies
- Avoid planting into very wet soils

If high-risk planting situations cannot be avoided, seed treatments (Table 1) or soil applications of insecticides such as bifenthrin or chlorpyrifos can protect your plants. See MSU Extension bulletin E-312 for options.

**Table 1.** Insecticides available as seed treatments with seedcorn maggot activity. Note, Cruiser is included in the FarMore package for cucurbits and onions, and Regard is in the FarMore package for onions.

a.i.	Tradename	Beans	Corn	Cucurbits	Onions
thiomethoxam	Cruiser	X	X	X	X
spinosad	Regard				X
chlothianidin	Poncho		X		

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**Other resources**

Learn about the Enviroweather seedcorn maggot tool: [http://msue.anr.msu.edu/news/new\\_seed\\_corn\\_maggot\\_tool\\_available\\_on\\_enviro\\_weather](http://msue.anr.msu.edu/news/new_seed_corn_maggot_tool_available_on_enviro_weather)

Enviroweather – up to date soil temps and degree days:

<http://enviroweather.msu.edu/homeMap.php>

MSU vegetable entomology website:

<http://vegetable.ent.msu.edu/>