

Seedcorn Maggot: Prevention and Control

by Phil A. Phillips

Introduction

Growers in the coastal valleys will soon be preparing fields for planting of spring beans, cucurbits, and other direct-seeded crops which often follow in rotation with winter vegetables. Winter crop residues, which are not completely decomposed at the time of spring planting, can cause stand loss in spring crops due to seedcorn maggots (*Delia platura*). This problem can be avoided by: 1) anticipating the problem and planning strategies to avoid seedcorn maggot infestations; 2) soil fumigation prior to planting; 3) applying an insecticide as a seed treatment coat or as a seed row treatment to control the maggots prior to and during seed germination. The time to plan and implement a prevention or control strategy is now.

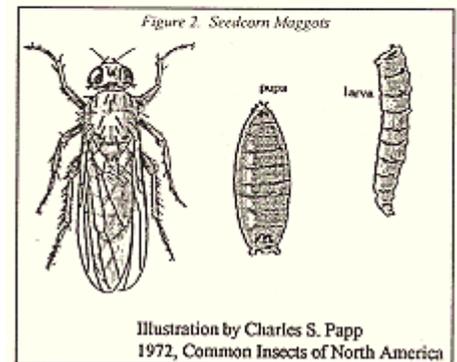
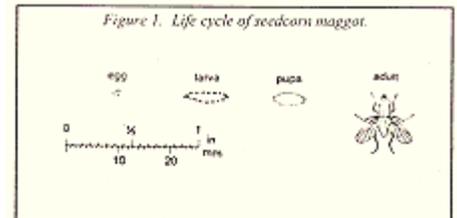
Description of Pest and Damage

Seedcorn maggot is a widely distributed insect pest in the temperate regions of the world.

The seedcorn maggot is the larva of a small, light gray fly that is about 0.15 inch (4 mm) long. The whitish, legless maggots are about 0.3 inch (8 mm) long and attack the planted seed of a number of crops during the winter and early spring months, particularly if there is a cold period that prevents quick germination of the seed. Maggots may overwinter in the soil or hatch from eggs laid in spring.

Abundant decaying crop residues, such as from cole crops in fields at spring planting, attract seedcorn maggot flies. Adult female flies are strongly attracted to moist soil and the decaying crop residue odors emitted from moist soil. Female flies live approximately 6 weeks and produce an average of 270 eggs. Eggs hatch in 1-9 days, depending on temperature of the soil. Larvae (maggots) develop rapidly with warm temperatures (70° to 75°F) and an abundance of decaying vegetation. In 1-3 weeks the maggots become full grown and pupate. Adults emerge from their puparia in approximately 9-26 days.

The larva of the seedcorn maggot attacks germinating seeds or transplants, but is only a pest early in the season before the soil warms up. Seedcorn maggot damage is generally most severe in cool wet periods of the year because seed germination is the slowest at this time. Little damage is likely to occur once favorable growing conditions set in. Seedcorn maggots are particularly damaging when crops are planted into soils infested with large populations of maggots, which have built up on residues of the previous crop, which have



not thoroughly decayed before planting. Injury to plants results mainly from maggots feeding on the sprouting seed or on seedlings. This pest attacks many spring planted vegetable crops including beans, peas, corn, curcubits, and onions. The maggots burrow into the seed, feed on the endosperm, and often leave only a hollow shell. Secondly, by breaking through seed coats, they allow disease organisms to enter, causing seeds to rot. Seeds which are attacked often fail to form true leaves after germination, and the cotyledons merely wither and the plant dies.

Prevention/Control

The best way to prevent seedcorn maggot problems, or problems from similar pests such as cabbage maggot, is to allow sufficient time for irrigation and plant residue decomposition prior to working the ground in which spring or early summer crops are to be planted (Table #1). This generally will take 6-8 weeks prior to further land preparation practices.

Fields with moist, heavy-textured soil usually have the worst problem with this pest. To reduce attractiveness of the field to egg-laying adults, disc or plow early in the season to incorporate residues from the previous crop and allow time for residues to completely decompose. Destroy weed growth. Avoid planting curcubits after root crops or cole crops, including cabbage, cauliflower, broccoli, and brussels sprouts, and after fall tomatoes. Assure rapid seed germination by planting in moist soil and not too deep (1.25 to 1.5 inch depth is ideal for most curcubits) when weather conditions are ideal. The longer the germination period, the greater the risk of infestation. Late season planting may avoid the early season infestation of this pest.

*Table 1.
Seedcorn Maggot Damage to Lima Bean Plantings: May, 1975*

Pre-plant conditions:	Damage Level			
	Moderate Damage	NL*	Severe Damage NE**	
Dry soil, fallow 8 weeks	15.3	3.0	1.5	a***
Moist soil*, fallow 4 weeks plus Dibrom**	54.0	26.5	7.0	b
Moist soil, fallow 4 weeks	45.0	33.0	15.0	b

* Spinach crop residue disced 4 weeks prior to planting.
 ** Dibrom 4E spray just prior to planting to knock down adult flies.
 * NL = Emerged cotyledons, but no true leaves developed.
 ** NE = No emergence, seed or germinated seed killed.
 *** Values with different letters are statistically significant from one another at p = 0.05.

In cases where there is not adequate time for crop residue decomposition following a vegetable crop, a granular insecticide incorporated into the soil can help control maggot infestations to allow establishment of a good stand. If planting into suspect soils, seed planter box treatment with insecticides such as lindane or chlorpyrifos is critical and requires thorough mixing for adequate coverage and good protection. Additionally, since the adult female flies are strongly attracted to the moisture gradient created by the planter equipment's shanks as they open up the soil, it is also very important to pull a drag chain behind each shank or a roller behind the planter to cover the seed row and confuse the attracted flies. In research conducted 20 years ago by the author, an attempt was made to decoy ovipositing female flies to "false" seed rows opened up 12 to 18" on either side of the actual seed row, which was covered behind the seeding shank by a drag chain. Unfortunately, this technique was not successful at preventing damage because the maggots can migrate over 18" through the soil to the seed.

Summary

The most successful and economic control of the seedcorn maggot would be a management system based on the following cultural practices:

1. Ground fallow after previous crop for 6-8 weeks to give a relatively dry layer 3-5 inches deep. This helps prevent moist soil from being thrown up in the seed row at planting, which could attract flies from adjacent fields.
2. Good soil tilth to help prevent cracks and crevices in the seed row at planting. This prevents egg laying flies from having direct access to the newly planted seeds.
3. Planting shallow and when soil temperatures and moisture are adequate for rapid seed germination and plant emergence.
4. Covering over the seed row directly behind the planter by means of chains and/or rolling; the latter being especially important where shallow (1-2") planting is desired.

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