

Seedcorn Maggot (*Delia platura*) and Neonicotinoid Treated Seed in Row Crops

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Pest Description

Seedcorn maggot (*Delia platura*), SCM, is an agronomic pest that can impact crops such as soybeans, corn, and a variety of other horticultural crops immediately after planting through germination. Adult SCM flies are similar to house flies, though gray in color. Larvae are white with brown heads and are generally less than ¼ inch long with pupae of equal size, though brown and cylindrical in shape. SCM overwinter as pupae in the soil and emerge as adult flies in the spring as the soil begins to warm. The adult flies are attracted to recently plowed fields and decaying organic matter. They lay their eggs at the soil surface around plant stems. Upon hatching, the maggots feed on the seed germ. There can be several generations of seed corn maggots over the course of a growing season, but it is typically the maggots from the overwintered pupae that cause the most crop damage.

High Risk Conditions

SCM prefer cool, wet springs and will typically emerge in late April or May, depending on conditions (around 360 (F) degree days). In addition to these weather conditions, ideal habitats for SCM include soils rich in organic matter, soil structure such as cracks and clods, and soils disturbed from tillage. These soil conditions result in favorable habitat for adults to lay eggs. As these eggs hatch, the larva will seek out food, including newly planted seeds, causing seed damage and a potential delay in crop growth or loss



Image 1. Plumule feeding damage on soybean.

With the current prevalence of corn crops, increasing acreage of soybeans, and the adoption of conservation practices that increase organic matter residue (e.g., cover cropping and conservation tillage) cover cropping and other conservation practices in our region, SCM could pose a threat to crop production in our region. Soybean seedling damage will often occur to the plumules (the portion of the seed that develops into the shoot, Image 1) and cotyledons (Image 2). The entirety of corn seedlings is generally susceptible as damage can occur to the coleoptile as well as the endosperm. Damage to these plant parts will often result in complete loss or seriously stunted plants, reducing stand counts and subsequent yield potential. Damage to seedlings primarily occurs pre-emergence, making reactive control measures largely ineffective.

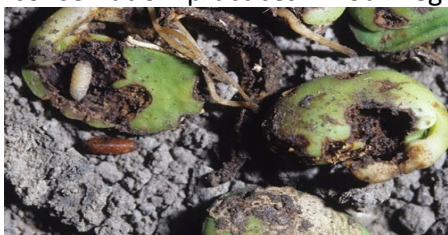


Image 2. SCM larvae and pupae on soybean cotyledons.

Scouting

Few methods are available for scouting for SCM and no economic thresholds are established for this pest. Throughout the growing season, 3-5 generations can be observed starting at the aforementioned 360 F degree day marker. However, the first and second generations can have the most economic impact.

Early season assessment for SCM populations. Scouting for adult populations in the early parts of the growing season can help to determine planting times to avoid pest damage. Used in conjunction with a degree day model to predict peak fly emergence, populations of SCM adults can be monitored using yellow plastic buckets or pans filled with soapy water. These can be placed at 100' intervals within a field and swapped out every 4-6 days to observe populations. Plantings can be timed to occur once adult populations begin to taper off in the spring.

Scouting

Early season assessment of pest damage. Destructive sampling in areas where plants did not emerge or where seedlings appear wilted or damaged will inform if the aboveground damage is due to early season pests. To determine if the source of damage is from belowground pests: 1) Dig a small area (2' long x 1' wide x 6" deep). 2) Remove soil and place soil on top of a sheet of black plastic or cloth. 3) Sort through the soil for seed and seedlings. 4) Examine seeds and seedlings for SCM damage, including injury to ungerminated seeds and damage to plumules. While this scouting method can help to identify the pest and source of damage, there are no rescue treatments available at this time. A new planting may be required depending on the severity of damage.

Management

A number of cultural control methods can be implemented to reduce potential for loss.

Delaying planting after tillage can be effective as SCM prefers recently disturbed soils. Waiting 2-3 weeks after tillage or manure applications to plant could reduce the risk of SCM damage by eliminating the window of contact between SCM larvae (resulting from first generation eggs) and crop seed. Furthermore, delaying planting until soil temperatures rise will increase germination rate of the crop and reduce the amount of time seeds remain intact and susceptible to SCM. In Vermont, conditions for soybean planting are often more favorable during the first weeks of June after soil temperatures have risen and rapid germination is likely. Variety selection is an important component of pest control as those from maturity groups 00-02 will be able to mature successfully with later planting dates. Similar to soy, corn variety selection can be equally important to ensure that a high yielding and high-quality crop can be grown to full maturity.

Insecticide treatments can be a viable option for growers, if planting into a field with high levels of SCM pressure and cultural control methods are not suitable.



Image 3. Corn seedling damage. (J. Obermeyer).

Often, soybean and corn are purchased with neonicotinoid seed treatment, such as clothianidin, thiamethoxam, and imidacloprid. In addition to protection from SCM damage, these insecticides will impact a wide array of both pests and beneficial species. For any pesticide, it is important to follow label directions and only use products registered for use in your given state. As with any pest control programs, it is important to consider potential implications of each method for control while reducing input costs and potential for crop loss. For more information on managing risks from neonicotinoid seed treatments please visit <http://www.uvm.edu/extension/nwcrops>.

References and Resources

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