Vegetable Crop Update

A newsletter for commercial potato and vegetable growers prepared by the University of Wisconsin-Madison vegetable research and extension specialists

Division of Extension
University of Wisconsin-Madison

No. 6 – May 15, 2021

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Vegetable Insect Update

Calendar of Events

July 21, 2021 – UW-Hancock Ag Research Station Field Day (1-4:30PM)
July 22, 2021 – UW-Extension Langlade Co. Airport Ag Research Station Field Day
November 30-December 2, 2021 – Midwest Food Producers Assoc. Processing Crops Conference, Kalahari Convention Center
February 8-10, 2022 – UW-Madison Div. of Extension & WPVGA Grower Education Conference, Holiday Inn, Stevens Point, WI

Vegetable Insect Update – Russell L. Groves, Professor and Department Chair, UW-Madison, Department of Entomology, 608-262-3229 (office), (608) 698-2434 (cell), e-mail: rgroves@wisc.edu

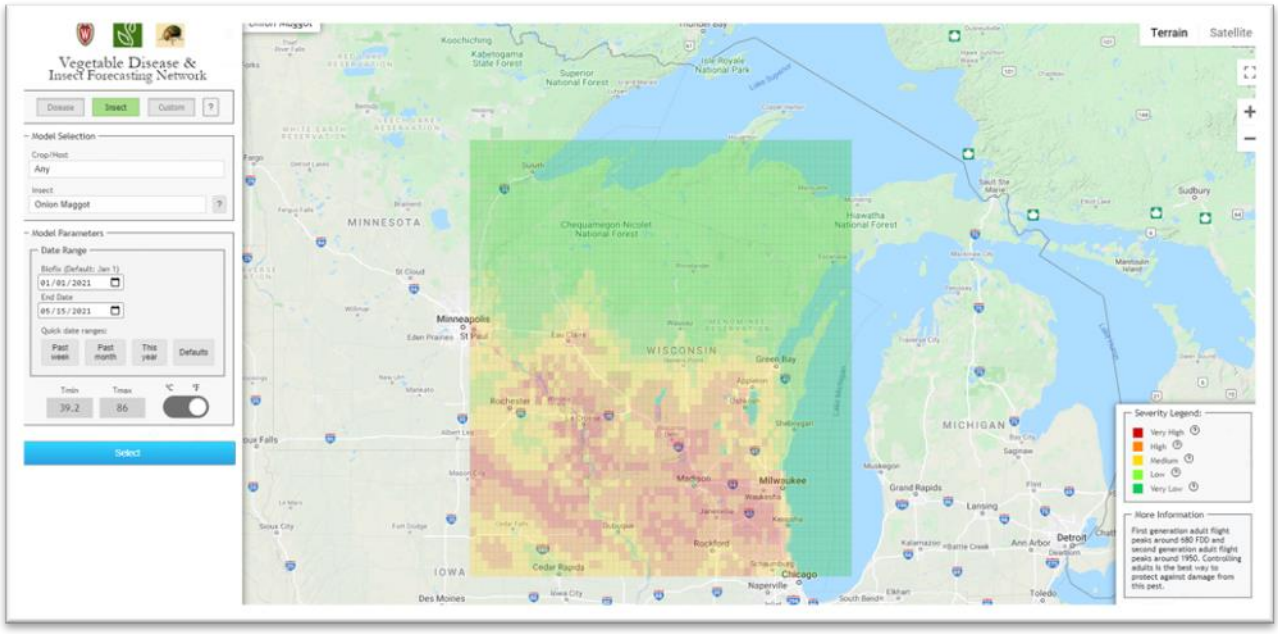
Vegetable Entomology Webpage: https://vegento.russell.wisc.edu/

Onion maggot 'peak' in southern Wisconsin – (https://vegento.russell.wisc.edu/pests/onion-maggot/). Onion maggots are tiny larvae that feed below ground on germinating onion seeds, and early transplants, making tunnels in the developing stems and potentially allowing disease organisms to enter. These maggots are often the most serious pests of onions, especially where continuous production occurs. Onion maggots are highly host-specific to plants in the onion family, including onions, leeks, shallots, garlic, and chives.

Larvae feed on the hypocotyl (below ground) tissue of seedlings, resulting in various types of damage. Damage appears as wilted and yellowed foliage, followed by collapsed leaves. Leaves can become rotten, and plants may die. Onion plants are most vulnerable during the seedling stage, and larval feeding may kill seedlings. Poor plant stands may indicate an onion maggot problem. Onion maggots can cause damage throughout the season, although they are often an early season pest during stand establishment. At the end of the season, maggot feeding can lead to storage rots. Onion types differ in susceptibility to onion maggot damage, with set onions most susceptible, followed by white varieties, yellow varieties, and finally red varieties which are least susceptible.

Onion maggot damage on leek stalk
Photo: 'Rasbak'

It is often too late to attempt control after damage has been detected. Therefore, action thresholds for foliar insecticide applications are based on the emergence of adults. Peak emergence can be forecasted using degree day models. Begin accumulating degree days when the ground thaws. Using a base temperature of 40° F, peak flight for the first three generations will occur at 680DD, 1950DD, and 3230DD, respectively. Adult peaks are now present throughout much of southern Wisconsin.



https://agweather.cals.wisc.edu/vdifn

There are several programs that can be practiced to reduce populations, avoid insecticide resistance and achieve control. Rotating onion crops at least 1 mile between seedlings and previous crops, and isolating onion fields by at least ¼ mile can reduce migration of maggot populations between fields. Avoid green manure, destroy crop debris, and remove culls from field to reduce field attractiveness to egg-laying adults. Planting onion sets one week before flies

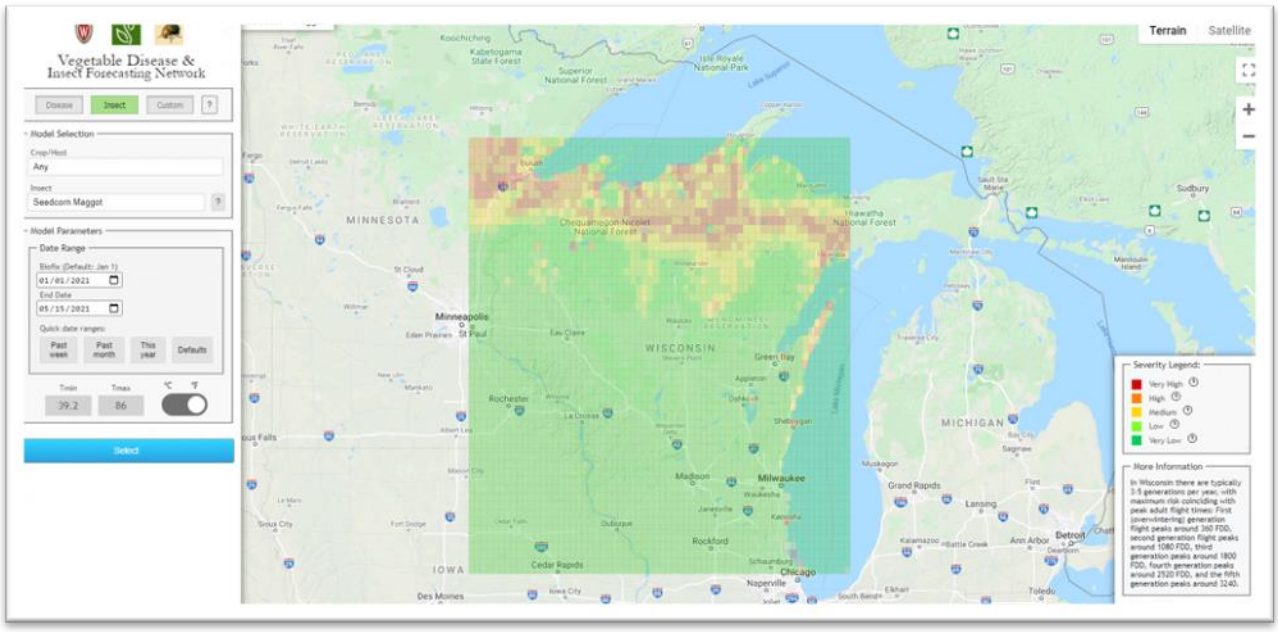
are expected to emerge can reduce damage. Preventative soil-applied (banded) insecticide applications (e.g. Lorsban, Trigard, Mustang Max, Warrior) are available to control the first generation larvae if damage from the previous year's crop exceeds 5-10%. Avoid foliar insecticides, since they are often ineffective on migratory adult populations. Resistance has been documented, and at-plant seed treatments (e.g. FarMore FI500) are currently available for control of this pest.

Seedcorn maggot 'peak' in northern Wisconsin – (https://vegento.russell.wisc.edu/pests/seedcorn-maggot/).

The seedcorn maggot is a perennial pest of the germinating seeds and young seedlings of a wide range of vegetable and agronomic crops. In addition to corn, seedcorn maggots (SCM) have a large host range including numerous common vegetable crops. SCM can cause economic damage to seeds of artichoke, beet, Brussels sprouts, cabbage, cantaloupe, carrot, cauliflower, cucumber, kale, lettuce, bean (lima, snap, red), onion, pea, pumpkin, tomato, and turnip. In high numbers SCM can decimate entire crop stands if left untreated. SCM can be an increasing problem when susceptible crop crops are planted in succession.

Injury to plants is caused exclusively by the larval stages of SCM. Larvae will feed in the cotyledons and below-ground hypocotyl (stem) tissue of seedling plants, resulting in a variety of damage symptoms. Feeding damage in germinating seeds will often kill seedlings before they emerge. Poor germination or poor stands of susceptible crops may indicate a SCM problem. In addition to SCM other issues may compromise stand counts and germination. In cool, wet soils common fungal pathogens such as Pythium may result in similar patterns of irregular crop emergence. To best diagnose SCM damage dig up un-emerged seedlings to look for feeding directly on the seed or sprout tissue. Often seedlings will survive below ground feeding but emerge with damage to the first true leaves or have no leaves at all (often called "snakehead" seedlings). Direct damage to the hypocotyl will often appear yellow and wilted.

Management for SCM is only effective when used in a preventative manner. Once direct larval damage is detected there is no control option for the pest. Therefore, there are no economic thresholds for this insect pest. SCM forecasting models to more generally predict peak flight windows are very effective for the majority of growers. Models calculate flights by calculating cumulative degree days beginning when the ground thaws in the spring. In Wisconsin, peak flights of SCM occur at 200, 600 and 1000 cumulative degree days. An adult peak is now present throughout much of (very) northern Wisconsin. The second generation of SCM will soon be developing across southern portions of the state-more to come!



Documenting peak flights can help to forecast subsequent generations of SCM. Adult flies are attracted to volatiles of decaying organisms. Accurate flight information can be monitored using cone traps baited with fermenting molasses, alcohol, bloodmeal, or bonemeal. Sticky traps have also been used successfully to keep track of adult flights at the local scale and are easily obtainable from garden stores.

Since adult SCM is attracted to decaying organic matter, do not plant susceptible crops in fields where animal or green manure has recently been incorporated. The faster planted seeds germinate and grow, the less opportunity the maggots have to damage the crop. There are a few strategies to hasten germination:

- Delay planting until soil temperatures are at least 50°F before planting most susceptible crops. Peas and radish may be planted when soil temperatures are above 40°F.
- Plant seeds as shallowly as agronomically possible to speed germination.
- Soak untreated pea and bean seeds in water for 2 hours before planting to soften the seed coat.

Two common chemical delivery techniques are available for SCM management: seed treatment or an at-plant soil application. Numerous combinations of insecticidal compound and fungicide are available as pre-plant seed treatments directly from the seed vendor. Several of these components for SCM management are reduced risk insecticides which have lower non-target impacts.

Colorado potato beetle – (https://vegento.russell.wisc.edu/pests/colorado-potato-beetle/). Begin checking for CPB adults now (in mid-May) after potato plants have emerged and during hilling operations. Initial emerging adults have been detected throughout much of southern and central Wisconsin this past week. Early detection of infestation is especially critical in newly transplanted, susceptible eggplant crops. Visual search patterns for CPB should be twofold early in the growing season. First, quickly scan plants and surrounding soil for the presence of live

adults. Often adult beetles will drop from small plants to the soil as a defensive tactic, typically observing the area surrounding plants will help for early detection. Second, carefully examine lower leaf surfaces of plants for clusters of bright yellow-orange, waxy eggs. Note the number of adults and egg masses in for a given number of plants. This number will help to track the overall trajectory of pest infestation. Additionally, focus early season scouting on border rows that are adjacent to either previous solanaceous crops or unmanaged non-crop areas. These have the greatest probability for early infestation by adult CPB and greater densities egg masses. Visit the Vegetable Disease and Insect Forecasting Network (VDIFN) website (https://agweather.cals.wisc.edu/vdifn), which features a convenient map-based interface, to view the Colorado potato beetle model and many other insect degree day models. You will see that the appearance of eggs or early larvae are not yet predicted.

After the first detection of either adults or egg masses begin strategically looking for small larvae (1st and 2nd instars) on the crop. To do this effectively, focus the majority of scouting for larvae on the tops of plants. In potato, small larvae will typically move to the newly expanding foliage at the crown of the plant. Larvae are very small at this stage and may not be directly apparent unless the emerging foliage is carefully parted. Careful inspection of the crop at this stage greatly enhances your chances for season long management of CPB. As the larvae grow larger general defoliation will first be apparent as small holes forming on upper leaves. Potato beetle larvae are typically very immobile and should be in close proximity to feeding damage.

Table 1. Rate of beetle development using degree days
See VDIFN (base: 52°F; max: none; biofix: 1st eggs)

Life stage	De-gree days	Accumulated degree days	Treatment
Egg	120	120	Not susceptible – do not treat
First instar	65	185	Most effective time to apply Btt
Second instar	55	240	Most effective time to apply con-ventional insecticides
Third instar	60	300	Most effective time to apply con-ventional insecticides
Fourth instar	100	400	Most effective time to apply con-ventional insecticides
Pupae	275	675	Not susceptible – do not treat

Secondary pests such as the highly mobile potato flea beetle (*Epitrix cucumeris*) may also cause feeding damage to both potato and eggplant foliage (https://vegento.russell.wisc.edu/pests/flea-beetles/). If potato beetle larvae are not present when scouting foliage there is a good chance the feeding may be caused by potato flea beetle adults. Flea beetle damage often appears in a shotgun pattern (several small holes in leaves) that differs from skeletonizing feeding patterns of CPB. Once CPB are large larvae (3rd and 4th instars) defoliation will be much more apparent. Entire leaves will be stripped of all foliage throughout the plant. CPB populations often become asynchronous as the season progresses. It is very important to continue searching for all life stages throughout the season. Careful and deliberate scouting season-long will go a long way to gain the upper hand on CPB.