Vegetable Crop Update

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

Extension UNIVERSITY OF WISCONSIN-MADISON

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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

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Potato Disease Modelling and Management of Early Blight and Late Blight: Current P-Day (Early Blight) and Disease Severity Value (Late Blight) Accumulations. Many thanks to Ben Bradford, UW-Madison Entomology; Stephen Jordan, UW-Madison Plant Pathology; and our grower collaborator weather station hosts for supporting this disease management effort. A Potato Physiological Day or P-Day value of ≥300 indicates the threshold for early blight risk and triggers preventative fungicide application. A Disease Severity Value or DSV of ≥18 indicates the threshold for late blight risk and triggers preventative fungicide application. Red text in table indicates threshold has been met or surpassed. Weather data used in these calculations comes from weather stations that are placed in potato fields in each of the four locations. Data are available in graphical and raw formats for each weather station at: https://vegpath.plantpath.wisc.edu/dsv/

Location	Planting Date		50% Emergence Date	Disease Severity Values (DSVs) 6/26	Potato Physiological Days (P-Days) 6/26
Grand Marsh	**Early**	April 2	May 10	**22**	**310**
	Mid	April 10	May 15	**22**	**300**
	Late	May 1	May 23	**19**	239
Hancock	**Early**	April 5	May 12	9	**307**
	Mid	April 15	May 15	9	299
	Late	May 5	May 23	3	236
Plover	**Early**	April 7	May 12	**23**	**300**
	Mid	April 20	May 20	**20**	256
	Late	May 7	May 30	15	194
Antigo	**Early**	April 26	May 28	7	211
	Mid	May 10	June 5	7	173
	Late	May 20	June 13	7	104

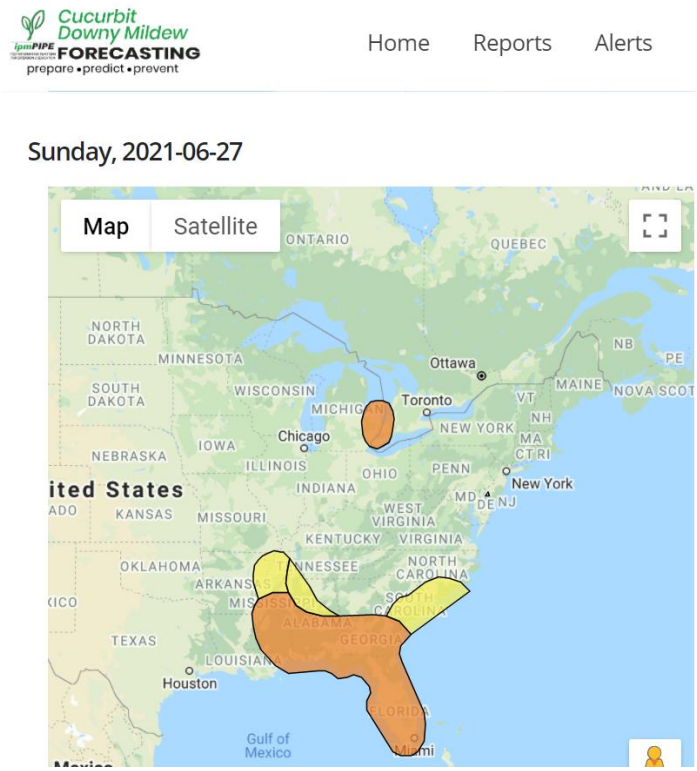
The early and mid- planted potato fields of the Grand Marsh and Plover areas have reached the threshold for Disease Severity Values (18) and should be preventatively treated for late blight management. The late-planted field in Grand Marsh has also now reached threshold. Disease Severity Value accumulation is driven by moisture in the crop. With great variability in rainfall over WI over the past week, these risk values could greatly vary by location**. Late blight** continues to emerge sporadically in Wisconsin with annual occurrence. The disease hasn't yet appeared in the US this season (usablight.org), however, when environmental conditions are favorable the pathogen can become active and quickly cause crop destruction. For more information on this disease: https://vegpath.plantpath.wisc.edu/resources/potato-late-blight/

The **early blight** P-Day threshold of 300 has been met/exceeded in early potato plantings for Grand Marsh, Hancock, and Plover areas. Early blight is active in central Wisconsin in the lower canopies. A few pictures from our foliar early blight disease control trials at the UW Hancock Agricultural Research Station are included below to demonstrate status. Fungicides for management of early blight span multiple chemical groupings and single-site mode of action chemistries typically require alternation for management of resistance. A listing of details of currently registered fungicides for early blight management can be found in our 2021 Wisconsin Vegetable Production guide: https://cdn.shopify.com/s/files/1/0145/8808/4272/files/A3422-2021.pdf

Performance of newer fungicides in our Hancock trials from recent years is provided at our website: https://vegpath.plantpath.wisc.edu/field-trials/

Cucurbit Downy Mildew Update: Cucurbit downy mildew was reported in Ontario Canada (Chatham-Kent County) this past week on cucumber this inoculum source creates risk for pathogen movement as seen on the map of the forecast model, below. Over the past week, new reports of cucurbit downy mildew were reported from: SC (cucumber), NJ (cantaloupe), NC (cucumber), and AL (butternut squash). This season, so far, the disease has been documentd in FL, GA, SC, NC, AL, MS, MD, NJ, and Ontario Canada.

Management recommendations: https://vegpath.plantpath.wisc.edu/2021/06/20/update-11-june-20-2021/



Moderate Risk in FL, south-central and southern GA, south-central and southern AL, central and southern MS, eastern MI, and far southern ON.
Low Risk for cucurbits in southeast NC, southern and eastern SC, northwest AL, northern MS, northeast AR, and western TN.

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/

Potato leafhoppers – (https://vegento.russell.wisc.edu/pests/potato-leafhopper/). Reproducing populations of potato leafhoppers (PLH) have begun to reach and exceed thresholds in many crops across southern and central Wisconsin following the 25 days of extreme temperatures. In Wisconsin, the potato leafhopper is a serious annual pest of snap beans and potatoes. Damage caused by leafhoppers includes stunted plants, brown (necrotic) leaves along margins and reduced plant vigor. A wide range of plants serve as hosts for PLH, and many are economically important crops. These include alfalfa, apples, and all types of beans, clover, dahlia, eggplant, hops, potatoes, rhubarb, soybeans, strawberries and other bedding plants.

The adult PLH is a highly mobile, small (1/8-inch), bright green, wedge-shaped insect (see inset). The body is widest at the head and tapers toward the wing tips. The front margin of the prothorax is usually marked with 6 white spots. Leafhoppers have piercing-sucking mouth parts and jump, fly or run sideways at a rapid pace when disturbed. The pale green to yellow nymphs which are smaller than the adults, are wingless, flightless and tend to move sideways very quickly when disturbed.

Hopperburn in potato
Photo: U New Hampshire

Both adults and nymphs feed by inserting their mouth parts into the plant's vascular tissue and extracting sap. Damage results when the insect injects saliva containing toxic substances which creates physical damage during feeding, plugging the vascular tissue and permanently reducing the plant's photosynthetic efficiency. The first signs of leafhopper feeding are the leaf veins turning pale and the leaf curling. Continued feeding results in a characteristic triangular yellowing or browning of the leaf tip known as "hopperburn". As symptoms develop, lesions spread backward and inward from the margin, eventually destroying the entire leaf. Plants become stunted and yellow leaves curl upward. Premature death of the plant may occur in severe infestations. Severe leaf damage and premature plant death is common in potato, whereas leaf discoloration and curling are more characteristic on bean.

Injury develops most rapidly during hot, dry weather. More damage is attributed to the nymphs than the adults. Leafhopper damage may take weeks before symptoms begin to show and it is typically older leaves that display the "hopperburn" symptomology. Yield loss generally occurs before symptoms are readily seen. Though plants may show little evidence of hopperburn, yield losses can be substantial.

Healthy, vigorously growing plants withstand damage more effectively than stressed plants. Irrigation and cultural practices that favor the crop are recommended. Leafhopper infestations are more likely to occur

in crops planted adjacent to alfalfa fields, especially after alfalfa has been harvested and the insects are forced out of the field. Monitor populations of adult leafhoppers beginning in mid-May.

Several predators, fungal pathogens and parasites attack PLH, though none have been shown to be effective in controlling the insect. There is very little information available on varietal tolerances to leafhopper damage. In snap bean, however, it has been demonstrated that Blue Lake cultivars are more susceptible to PLH damage than Tendercrop lines. Leaf hairiness has also been shown to deter leafhoppers.

Action threshold levels for vegetables

Crop	Nymphs	Adults
Seedling snap beans	1 every 10 leaves	1 adult per 2 sweeps
Larger snap beans	1 every 10 leaves	1 adult per sweep
Potatoes	2 ½ every 25 leaves	½-1 adult per sweep

Snap beans and potatoes should be scouted regularly for PLH activity. Leafhoppers tend to migrate into other crops in early summer after alfalfa is cut. This is a key time to watch for early migrants in vegetable plantings. With snap beans, the greatest amount of injury caused by PLH occurs during the seedling stage.

Commercial vegetable growers should use sweep nets and sticky cards at field edges to monitor adult populations in their fields. Take 25 sweeps with an insect sweep net per sample site. Use at least 5 sample sites per 30 acres. Nymph populations should be monitored by visual examination of the undersides of 25 leaves per sample site. Select leaves from the middle to lower half of the plant.

Caterpillar pests in Brassicas – (https://vegento.russell.wisc.edu/pests/caterpillar-pests-of-cole-crops/). Imported cabbageworms (ICW: also known as cabbage whites or small whites), cabbage loopers and diamondback moths (DBM) are the three most significant caterpillar pests of Wisconsin cole crops, with the ICW and DBM being the most significant. Diamondback moths are worldwide pests of cabbage and leafy greens, and have developed resistance to numerous insecticides and several products containing *Bacillus thuringiensis* (Bt). The cabbage looper has a broad host range and attacks beets, celery, lettuce, peas, potatoes, spinach and tomatoes, in addition to cole crops. Populations of both ICW and DBM are increasing in southern Brassica crops and care should be taken so thresholds are not exceeded.

Larvae of all three insects feed between the large veins and midribs on cole crop leaves. The imported cabbageworm will feed on all ages of leaves but prefers the younger leaves. They feed along the edges of the leaves, leaving only thick veins behind. The cabbage looper often feeds between veins on the underside of lower leaves. Large loopers will make larger holes in the foliage and can burrow through 3 to 6 layers of tightly wrapped head leaves in cabbage. A good indicator of the presence of loopers and imported cabbageworms is fresh frass (droppings) on leaves.

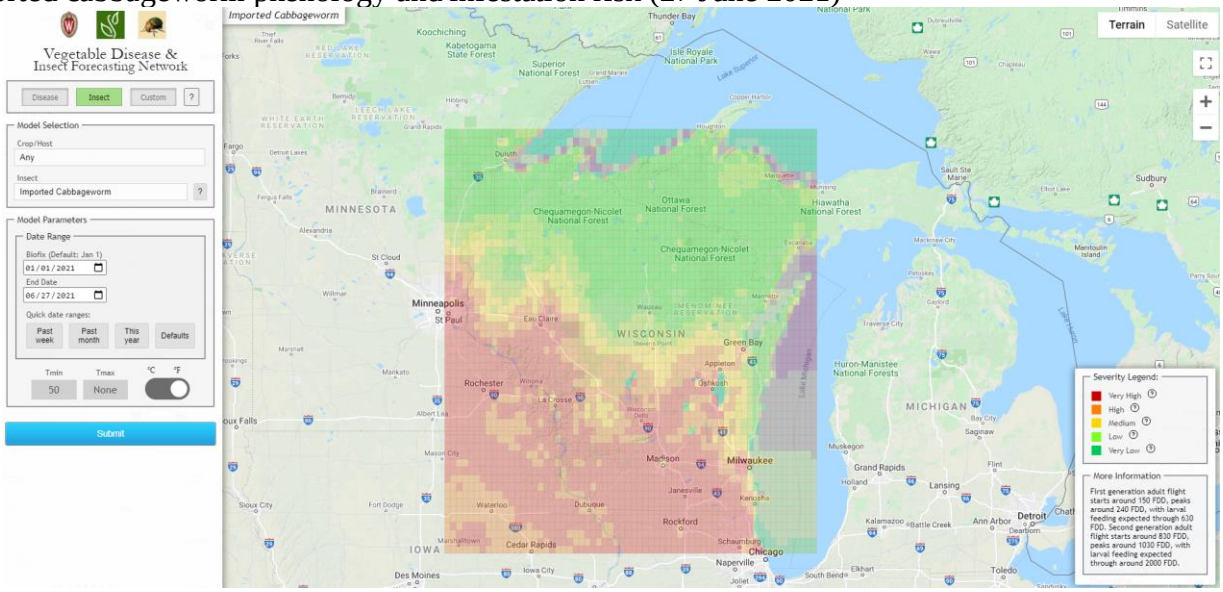
Diamondback moth larvae initially mine the plant tissue and consume only the middle layer of the leaves. As larvae grow, they exit the leaves and consume all tissues except the thin layer of transparent wax. This type of damage resembles windowpanes and is characteristic of this pest. Severe feeding damage stunts cabbage and cauliflower heads. Larval damage to the developing bud on young cabbage can cause the head to abort. Head boring by cabbage loopers is also common in early cabbage and can result in unmarketable heads. The copious quantity of greenish-brown frass, or excrement, produced by the larvae is problematic because it contaminates heads and foliage.

Pest	When to scout
Imported cabbageworm	Late June – late Sept.
Cabbage looper	Early July – late Sept.
Diamondback moth	Mid May – late Sept.

Scout fields weekly throughout the season for damage. Check plants carefully, even if no feeding damage is apparent, to look for eggs that will hatch into small caterpillars several days to a week later. Examine the lower leaves of the plant for the larvae of each pest. Although feeding damage and fecal material are signs of activity, it is better to rely on larvae counts to determine the level of infestation. Caterpillars cause varying amounts of damage depending on the plant's maturity, so the need for treatment changes as the crop grows. Keep a record of which insect is present, its life stage and the percentage of plants infested. This information will be useful for monitoring whether the population is increasing or decreasing.

Treatment thresholds are well established and based on the percent of infestation by any lepidopteran species. Economic thresholds (ETs) vary based on the stage of crop development. Cabbage, broccoli and cauliflower in the seedbed are particularly susceptible to damage. Therefore, control measures are warranted when 10% of the plants are affected. Between transplant and cupping, the ET is raised to 30%, from the time plants begin to cup until early heading, if more than 20% of plants are infested, treatment is warranted. From early heading until harvest, the threshold again drops to 10% to protect market quality of the produce. When you transplant broccoli or cauliflower and it produces flowers or curds, increase this threshold to 50%. When flowers or curds begin to develop, the threshold again drops to 10% to maintain marketable quality.

Imported cabbageworm phenology and infestation risk (27 June 2021)



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