

Using NEWA Weather Tools in Integrated Pest Management

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NEWA

- The Network for Environment and Weather Applications
- Developed by New York State IPM Program at Cornell University
- Collects data from weather stations on farms, airports, and research farms
- 30 IPM and crop production tools
- 13 degree-day tools
- Provides weather summaries, degree-day tables, plant disease forecasts, insect models, crop production models, and National Weather Service Forecasts

- <https://newa.cornell.edu/>



Create & Configure a Profile

1. Sign up with email and password
 2. Enter your personal information
 3. Select your favorite weather stations
 - 33 stations to choose from in Delaware
 4. Select which NEWA tools you want displayed on your dashboard
 - Other crop and IPM tools available as well
- Tutorial video: <https://newa.zendesk.com/hc/en-us/articles/4417360459799>





Sign Up

Log In

Sign Up

 jgjones@udel.edu



I agree to NEWA Data Use Policy.

SIGN UP >



Your Personal Information

Fill out your information, then click or tap Save.
To edit, click or tap Edit.

Next, click or tap on Favorite Stations.

*Full Name

Use your weather station owner name to create a favorite stations list

 Jake Jones

*Email

 jgjones@udel.edu

*State or Province

Delaware 

Edit



Your Favorite Weather Stations

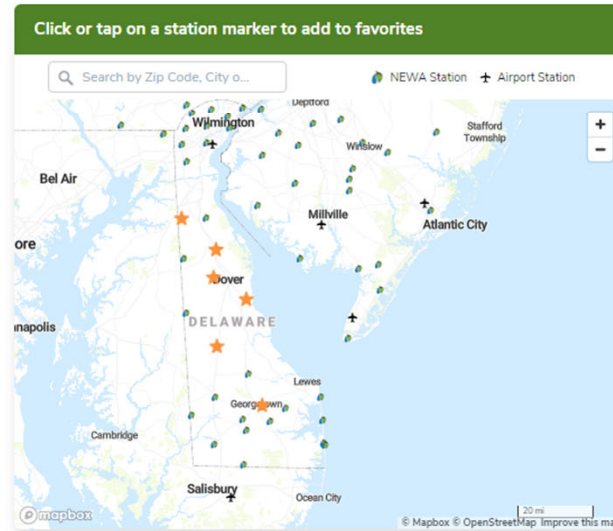
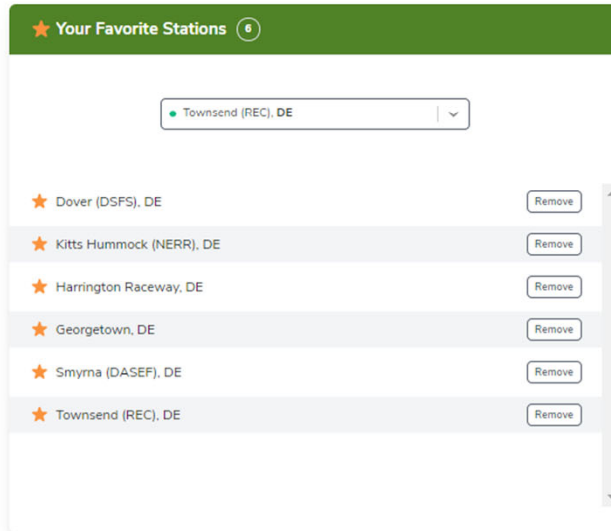
Choose or edit your favorite stations

Choose or edit your favorite stations from the dropdown list or type into the dropdown, then click or tap the station name. Or click or tap the station on the map. Use the Remove button to remove them. Choices and edits are saved immediately.

Next, click or tap on NEWA Tools or go to your Dashboard.

On your Dashboard, edit the Station Overview to display the weather data you want.

If you own a station(s), NEWA auto-generates a favorites list for you, if your name matches a weather station owner name.



Your NEWA Crop & IPM Tools

Choose or edit the NEWA tools you want. Open the crop's tool box by clicking or tapping the arrow. Switch the tools to 'On' or 'Off' by clicking or tapping the slider button. Tool results will display on your Dashboard for your favorite stations. Choices and edits are saved immediately.

NOTE: When accessing NEWA Tools from the Crop & IPM Tools landing page, biofix dates won't be saved, unless the NEWA Tool is already included on your Profile.

Next, click or tap on Other Tools or go to your Dashboard.

> Apple Tools

∨ Berry Tools

Switch the tools to 'On' or 'Off' by clicking or tapping the slider button.

Blueberry Maggot

DISPLAY



Strawberry Diseases



> Grape Tools

> Field Crop Tools

> Vegetable Tools



Dashboard View

- Can “Edit Weather Overview”
 - Add another degree day model (base 50°F shown automatically)
 - Add additional information such as wind direction, soil temperature, etc.
- Summary under each tool or can visit the individual tool webpage
- Tutorial video: <https://newa.zendesk.com/hc/en-us/articles/4417346595991>



Dashboard

★ My Favorite Stations: ▼


Results for Townsend (REC), DE

Courtesy of
Last download: 1/6/2022, 1:00 PM

Latitude: 39.39
Longitude: -75.75
Elevation: 69 ft

Townsend (REC) Overview Edit Weather Overview

At 1:00 PM today

 **39 °F**

Base 50°F Degree Days since January 1	6
Relative Humidity	50 %
Wind Speed	7 mph
Wind Direction	WNW
Soil Temperature	N/A
Soil Moisture	N/A


Yesterday

Precipitation: 0.07 in	High Temp: 43 °F	Low Temp: 21 °F
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Today as of 1:00 PM

Precipitation: 0 in	High Temp: 39 °F	Low Temp: 24 °F
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5-Day Weather Forecast

Thursday 1/6/2022	Friday 1/7/2022	Saturday 1/8/2022	Sunday 1/9/2022	Monday 1/10/2022	Tuesday 1/11/2022
 39 30	 33 21	 30 16	 42 21	 40 24	 27 20

NEWA Weather Tools

- [Degree Day Calculator](#)
- [Hourly Data](#)
- [Daily Summary](#)
- [Regional Radar](#)

- > [Plum Curculio](#) Go To Tool
- > [Fire Blight](#) Go To Tool
- > [Apple Scab](#) Go To Tool
- > [Strawberry Diseases](#) Go To Tool
- > [Grape Diseases](#) Go To Tool
- > [Spotted Lanternfly](#) Go To Tool
- > [Codling Moth](#) Go To Tool
- > [San Jose Scale](#) Go To Tool



Apple Scab

- Fungal disease caused by *Venturia inaequalis*
- 55-75°F and extended periods of leaf wetness (9+hrs) promote infection
- Inoculum source is infected leaves on the ground
 - Ascospores spread via wind or rain and cause infection
 - Secondary inoculum (conidia) are produced 8-17 days after primary infection
- Chlorotic leaf lesions turn olive colored
- Can cause flower, leaf, and fruit to drop
- Fruit develop scabby spots with sooty lesions with a red halo
 - Fruit become deformed and cracked
- Pruning for air flow, leaf removal to reduce inoculum, careful irrigation to reduce drying time all options
- Early season control with fungicides is crucial



Apple Scab Tool

- Green tip date is automatically calculated but can be changed
- Ascospore maturity summary and graph show discharge and maturity rates
- Wet and dry log and infection events tables available
- Management guide changes as the season progresses

The Ascospore Maturity degree day model begins at 50% green tip on McIntosh flower buds. To recalculate ascospore maturity for your orchard, enter your green tip date:

Green Tip Date

[Download CSV](#)

Daily Discharge Thresholds:

Date	Ascospore Maturity	Daily Ascospore Discharge	Cumulative Ascospore Discharge
Apr 22	92%	0%	89%
Apr 23	93%	0%	89%
Apr 24	95%	0%	89%
Apr 25	96%	4%	92%
Apr 26	97%	0%	92%
Apr 27	97%	0%	92%
Apr 28	98%	0%	92%
Apr 29	99%	0%	92%

Ascospores were essentially all released on Apr 24. Orchards may still be at risk for secondary, conidial infections.

[Download PNG](#)

The Ascospore Maturity model predicts that 95% of the spores are matured. At this point, essentially all ascospores will be released after a daytime rain of greater than 0.10 inch with temperatures above 50 deg F.



Fire Blight

- Bacterial disease caused by *Erwinia amylovora*
- Highest damage in warm, humid/wet weather
 - 75-82°F and >60% humidity
 - Wounding increases infection
- Open flowers are the most common infection sites
 - Wilt and turn black or brown giving scorched appearance
- Pathogen overwinters in cankers
 - Released in the spring
- Blossom sprays prevent new infections
- Pruning (summer or winter) removes wood infections



Fire Blight Tool

- Enter First Blossom Open Date or use the automatically calculated estimate
- Orchard Blight History is what the fire blight status was in previous year
- Results table- if using current date will forecast 5 days in the future
- Two types of Fire Blight risk assessments
 - Allows for more accurate assessment
- Can track streptomycin applications and will give you credits in the model
- Management guide changes as the season progresses
- Additional resources



Management Guide

CYCLE MANAGEMENT

Blossom blight risk predictions begin at [first blossom open](#). If bloom in your orchard has not yet occurred, continue to check fire blight risk predictions and monitor bloom daily. Infection cannot occur without open blossoms.

Most serious fire blight epidemics begin with infection during bloom. Certain antibiotics can effectively protect against blossom infections when applied shortly before or immediately after they occur. The Cougarblight and Infection Potential risk levels are based on the principle that

1. a certain number of heat units must accumulate during bloom for a threshold level of inoculum to be reached;
2. a wetting event is necessary after this point to wash the bacteria to their infection sites; and
3. the average temperature is above 60F.

Blossom blight

Low risk	If none of these conditions is met during bloom, risk is 'Low' and bactericides are not needed.
Caution or Moderate risk	If only the heat units are met during bloom, Cougarblight risk is 'Caution' and it is advisable to watch the forecast closely for continuing warm weather and rain. If only one of these conditions is met during bloom, Infection Potential risk is 'Moderate' and it is advisable to watch the forecast closely for continuing warm weather and rain.
High risk	If two conditions are met during bloom, risk is 'High' and forecasted wetting events should be carefully considered and a bactericide applied just before (or after) a rain.
Extreme or Infection risk	If all three conditions are met, risk is 'Extreme' or 'Infection' and an antibiotic should be applied just before (or after) a rain.

Orchard Blight History:

Select the fire blight history in your orchard block of interest and the tool will calculate risk. Toggle orchard blight history to recalculate risk.

First Blossom Open Date

The [first blossom open](#) above is estimated based on degree day accumulations. Enter the actual first blossom open date for your orchard block of interest and the tool will calculate the protection period during bloom more accurately.

Accumulated degree days (base 43°F BE) through 2021-04-27: **525**

[Download CSV](#)

Results Table

Forecast Details

Date (2021)	Cougar Blight 4-Day DH				Infection Potential EIP value			
	Low	Caution	High	Extreme	Low	Moderate	High	Infection
April 25	37				13			
April 26	39				8			
April 27	242				58			
April 28	581				167			
April 29	918				260			
April 30	996				219			
May 1	812				220			
May 2	751				197			

* Indicates incomplete accumulation of the 4-day DH total. The DH value may reach "Caution", "High" or "Extreme" levels before spanning the 4-day accumulation cut-off time of Cougarblight.



Strawberry Botrytis and Anthracnose

- Botrytis Fruit Rot (Gray Mold)

- Widespread fungal disease caused by *Botrytis cinerea*
- 65-75°F and wet weather favor development
- Can be dormant in green tissue
- Most infections start in blooms
- Lesions develop into velvety-gray mass of spores
- Spread by wind or rain



- Anthracnose

- Fungal disease caused by *Colletotrichum acutatum*
- 77-86°F and wet weather favor development
- Brown to black water-soaked spots on ripe and unripe fruit
- Can be dormant in green tissue
- Conidia are produced on petioles, runners, and fruit and spread via splashing
- Drip irrigation helps reduce splashing



Strawberry Diseases Tool

- Indicate whether bloom has begun or not
- Botrytis and Anthracnose Risk Levels shown by date (forecast and historical)
- Management guide changes as the season progresses

Has bloom begun?

Results Table [Download CSV](#)

[Forecast Details](#) Infection Risk Levels: Low Moderate High

DATE (2021) 13:00 to 12:00	BOTRYTIS		ANTHRACNOSE			
	< 0.50	≥ 0.50 and < 0.70	> 0.70	< 0.15	≥ 0.15 and < 0.50	≥ 0.50
May 25	0.02			0.03		
May 26	0.11			0.08		
May 27	0.24			0.19		
May 28	0			0		
May 29	0.56			0.08		
May 30	0.47			0.07		
May 31	0.19			0.05		
June 1	0.05			0.03		



Grape Diseases

- Phomopsis cane and leafspot
 - Fungal disease caused by *Diaporthe ampelina*
 - Optimal disease conditions are cool temperatures and leaf wetness
 - Symptoms appear 3-4 weeks after infection
 - Leaves exhibit small dark spots with yellow margins
 - Canes develop small spots with black centers and crack
 - Berries can shrivel and become mummified
 - Overwinters on diseased canes and spurs
 - Spores spread via rain, infections occurs most frequently early in the growing season



Grape Diseases

- Powdery mildew
 - Caused by *Erysiphe necator*
 - Symptoms appear on leaf surface as chlorotic lesion
 - Signs are the characteristic white mycelia and spores on leaves and fruit
 - Overwinters in dormant buds or cordons
 - Disease favored by 70-85°F and humidity, not free moisture
 - Spores are spread via wind



- Black rot
 - Caused by *Guignardia bidwellii*
 - Symptoms appear on leaf surface as small yellow spots
 - Lesions enlarge have a brown center and brownish red-margin, with black pycnidia forming a ring inside the lesion
 - Berries shrivel and become mummified
 - Overwinters in canes and mummified berries
 - Infection occurs between 60-85°F and leaf wetness
 - Spores are airborne



Grape Diseases Tool

- Grape disease infection events table show phomopsis, powdery mildew, and black rot risk assessment for each historical day and five-day forecast
- Management guide is based on the phenological stage of your grapes, which you can select from drop down menu
- Leaf wetness events log and grape infection events log show hours of leaf wetness, precipitation amount, and infection occurrence

Grape Disease Infection Events [Download CSV](#)

[Forecast Details](#)

DATE (2021)	PHOMOPSIS	POWDERY MILDEW	BLACK ROT
July 19	Yes	No	Yes
July 20	No	No	No
July 21	No	No	No
July 22	No	No	No
July 23	Yes	No	No
July 24	No	No	No
July 25	No	No	No
July 26	No	Yes	No

Phomopsis - calculates when weather conditions may allow spores to infect susceptible tissue.

Powdery Mildew - calculates primary infection when weather conditions may allow overwintered, primary spores (ascospores) to infect susceptible tissue; runs from bud break until pre-bloom. Once primary infections have occurred, secondary infections (disease spread) are possible every day. The threat is greatest when temperatures are between 65 to 90 degrees F and is particularly high when conditions are cloudy.

Black Rot - calculates when weather conditions may allow spores to infect susceptible tissue.



Plum Curculio

- *Conotrachelus nenuphar*
- Pest of apples, cherries, nectarines, peaches, and plums
- Adult beetles
 - ¼ inch long
 - 4 humps on their wing covers
 - Dark brown color with white or gray patches
 - Snout is ¼ length of the body
- Larvae
 - ¼ inch long
 - Yellowish white
 - Brown head
 - No legs
- Adults first appear during bloom and are present for the next 5-7 weeks
- Most activity during the first warm period after petal fall
- Feeding holes are round
- Oviposition scars are crescent shaped
- Larvae develop in mainly in dropped fruit
- Pupate in the soil and emerge as adults in August before overwintering
- Maintain sprays until 308 degree-days following petal fall



Plum Curculio Tool

- Petal fall date automatically calculated but can be changed
- Results table shows degree days
- Management guide is based on the pest stage, which you can select from drop down menu

Petal Fall

04/29/2021

Petal Fall date above is estimated based on degree day accumulations or user input. Enter the actual date for blocks of interest and the model will calculate the protection period after petal fall more accurately.

Accumulated degree days (base 50°F BE) petal fall through 5/23/2021: **321**



G. Krawczyk, UKY

Results Table [Download CSV](#)

[Forecast Details](#)

DATE (2021)	Degree Days (base 50°F BE)		
	DAILY	FROM JAN 1	FROM APR 29
May 21	15	555	266
May 22	25	580	291
May 23	30	610	321
May 24	18	627	339
May 25	16	644	355
May 26	27	671	382
May 27	22	693	404
May 28	11	704	415



Codling Moth

- *Cydia pomonella*
- Apple, pear, walnut pest
- Insecticide resistance is responsible for the increased significance of codling moth in orchards
- Adult moths
 - $\frac{1}{2}$ - $\frac{3}{4}$ inches long
 - Mottled gray wings held tentlike over body
 - Coppery brown band at the tip of their wings helps with identification
- Larva
 - $\frac{1}{2}$ - $\frac{5}{8}$ inches long
 - White to light pink Dark brown head
- Overwinter as full grown larvae in a cocoon under leaf litter, bark, etc.
- Damage is tunneling from the calyx or side to the core or stings (small holes surrounded by a small amount of dead tissue)
- Pheromone trapping with one trap per 5 acres is recommended, in the upper quarter of the canopy starting at pink stage
- Easier to manage before populations become well established



San Jose Scale

- Indirect pest of apple, pears, peaches, and plums
- Overwinter as immobile immature scales on the tree
- Winged males emerge in spring and fly to mate with wingless females
- Crawlers can be seen about one month later
- Secrete a waxy covering and feed
- Often go unnoticed until large populations have developed
- Red discoloration of bark (fruit can show red discoloration as well)
- Pheromone traps should be placed prior monitor for flying males around bloom
- Sticky tape should be used to monitor for crawlers (insecticide spray 600 – 700 degree-days after male flight)



Codling Moth Tool and San Jose Scale Tool

- Two separate tools but similar layout
- First trap catch of 1st generation
- First trap catch of 2nd generation
- Both can be estimated but your dates will provide more accurate results
- Results table show degree day calculations from January 1st, and trap catch dates
- Management guide is based on the first trap catch dates, but you can change the pest stage

Results Table

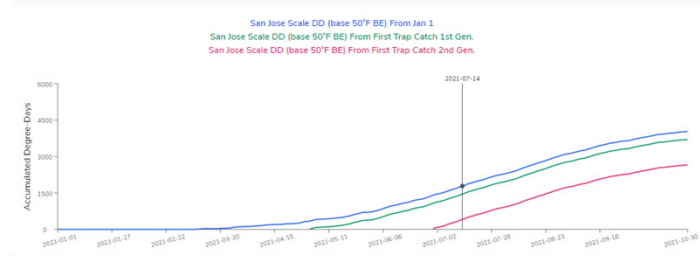
[Download CSV](#)

[Forecast Details](#)

DATE (2021)	Degree Days (base 50°F BE)			
	DAILY	FROM JAN 1	FROM MAY 5	FROM JUL 18
August 3	18	2283	1893	405
August 4	19	2301	1912	424
August 5	20	2322	1932	444
August 6	26	2348	1958	470
August 7	23	2372	1981	493
August 8	25	2396	2006	518
August 9	25	2421	2031	543
August 10	32	2453	2063	575

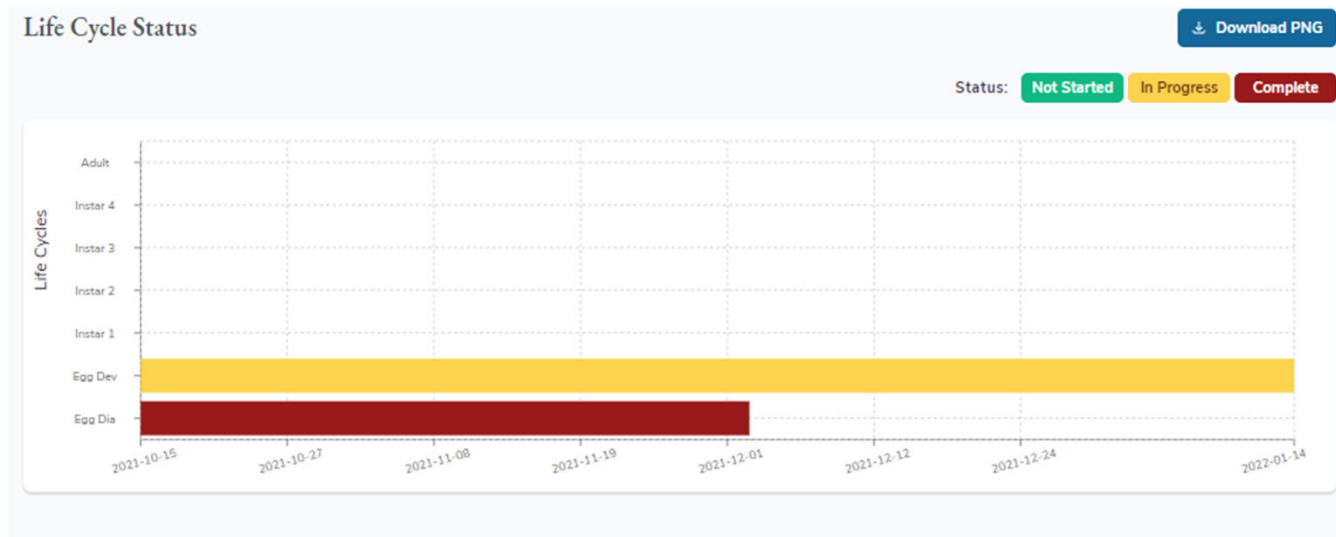
Results Graph

[Download PNG](#)



Spotted Lanternfly Tool

- Based on first egg mass detection when scouted daily
- Adult emergence summary, instar life stages summary and egg development summary all available
- Life cycle status is a visual representation of all the tables mentioned above



Other Tools

NEWA Vegetable Tools

[Beet Cercospora Leaf Spot](#)

Manage Cercospora leaf spot (*Cercospora beticola*) in table beet with this tool that predicts 2-day, 14-day, 21-day, and season-long infection risk.

[Cabbage Maggot](#)

Use base 40°F BE degree days to identify the critical treatment timing before cabbage maggot (*Delia radicum*) can infest your crucifer crops. Treatment guidelines include organic options.

[Onion Diseases](#)

These risk assessment tools forecast the infection potential for Botrytis leaf blight or blast (*Botrytis squamosa*), onion downy mildew (*Peronospora destructor*), and purple blotch (*Alternaria porri*).

[Onion Maggot](#)

Monitor base 40°F BE daily and accumulated degree days to track critical treatment timing for onion maggot (*Delia antiqua*) to protect your crop from this pest.

[Potato Diseases](#)

(Legacy resource) Ascertain infection risk using P-days for early blight (*Alternaria solani*) and Blitecast for late blight (*Phytophthora infestans*) to assess the need for targeted management.

[Tomato Diseases](#)

(Legacy resource) Manage tomato diseases more effectively using TOMCAST for early blight (*Alternaria solani*), Septoria leaf spot (*Septoria lycopersici*), and anthracnose (*Colletotrichum coccodes*) and using Blitecast for late blight (*Phytophthora infestans*) to identify infection risk.

Other Crop & IPM Tools

[Blueberry Phenology Tool](#)

Hosted by the Rutgers University Blueberry and Cranberry Research Station this tool calculates blueberry degree days and chilling units for selected sites in New Jersey.

[Climate Smart Farming Apple Freeze Risk](#)

Hosted by the Climate Smart Farming Program at Cornell University, this tool evaluates apple freeze damage risk for sites in the Northeast.

[Critical Temperatures for Frost Damage on Fruit Trees](#)

Hosted by Utah State University Extension, this PDF resource lists Fahrenheit temperatures for each stage of fruit development at which 10% and 90% bud kill occurs after 30 minutes of exposure for different tree fruit crops.

[Cucurbit Downy Mildew](#)

Hosted by the Cucurbit Downy Mildew ipmPIPE Forecasting Project, this tool provides regional and national forecasts of cucurbit downy mildew disease development from airborne transport of spores.

[Cucurbit Downy Mildew – Current Forecast](#)

Hosted by the Cucurbit Downy Mildew ipmPIPE Forecasting Project, this tool provides daily updates of regional and national forecasts of cucurbit downy mildew disease development from airborne transport of spores.

[Database of Apple Disease Susceptibility](#)

Hosted by the Khan Lab at Cornell University, this resource provides high quality disease images and detailed information about susceptibility levels of apple varieties and common cultivars.

[Fore Cast](#)

Hosted by the Northeast Regional Climate Center and Turf Team at Cornell University, this tool provides weather-based information and maps to manage diseases, irrigation, and weeds in managed turf systems in the Northeast.

[Fusarium Head Blight Prediction Center](#)

Hosted by the Center for Environmental Informatics at Penn State University, this tool provides regional and national map-based risk assessments of Fusarium head blight potential in wheat.

[NRCC Apple Frost Risk](#)

Hosted by the Northeast Regional Climate Center at Cornell University, this map-based tool provides an assessment of apple frost risk in the Northeast United States.

[Sweet Corn Stewart's Wilt Map](#)

Hosted by the Northeast Regional Climate Center at Cornell University, this map-based tool provides an assessment of sweet corn Stewart's wilt risk in the Northeast United States, using the Iowa State University model.



Summary

- Personalize your dashboard for only pest tools of interest to your operations
- Easy to use with tutorials!
- Fits in IPM by reducing guesswork on when to make pesticide applications
 - By using biofix dates, weather data, and modelling it can predict when infections/most vulnerable insect stage are going to occur
- Management guide is dynamic throughout the season
- Cultural controls such as sanitation and using resistant varieties when available are also important components of IPM



Questions?

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