# New Look for Illinois Pest Degree Calculator Provides More Options for Specialty Crop Growers

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## Pest Degree-Day Tools for Specialty Crop Growers

- Update target pest lists, focusing on specialty crops
- Improve current tools
  - Maintain historical and forecast degree-day information
- Integrate new tools
  - Maps
  - Graphs
  - Mobile-friendly

## Improving the Degree-Day Calculator

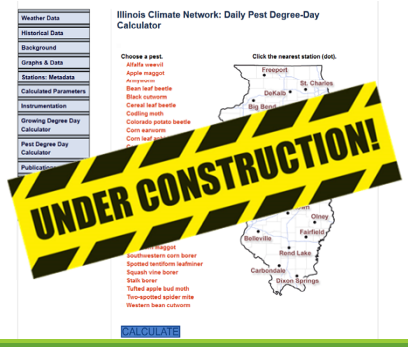
2019 Goals/Activities

- Surveys: face-to-face grower meetings, print & electronic media and well as social media outlets.
- Summaries
- Evaluation

## Improving the Degree-Day Calculator

2020

- Putting the feedback into action
- Website redevelop started
- Our goal was to have this ready to roll out for growers at the January 2021 conference…but COVID.




## Degree days aid in crop and pest management

- Forecast important life stages of insect pests
- Aid in timing activities such as scouting or pesticide applications

## What drives development of an organism?

The development rate of many biological organisms is controlled primarily by temperature

Models are used to calculate developmental units, known as **degree days**

Degree days can be used to measure (and predict) the development of an organism based on current and historical data

## Degree-day Refresher

Degree-days are measurements of heat units over time, calculated from daily minimum and maximum temperatures.

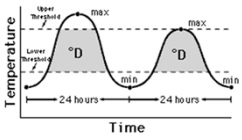
Used to predict insect life cycles and in turn, insecticide treatments to those life cycles.

## Insect Degree days

- Similar to plants, there are minimum and maximum temperatures at which development slows or stops
- Minimum and maximum temperatures for development vary by insect
  - Values developed based on controlled experiments in the laboratory

## Degree days - insects

$$DD = \frac{Tmax + Tmin}{2} - Tbase$$




Tmax – Daily Maximum Temperature

Tmin – Daily Minimum Temperature

Tbase – baseline or the lower developmental threshold (varies by insect)

## Example

For example, a day where the high is 72F and the low is 44F would accumulate 8 degree days using 50F as the baseline:

$$DD = \frac{72+44}{2} - 50 =$$ **8 DD**

## Example

For example, a day where the high is 98F and the low is 44F, but the upper developmental threshold for an insect is 90F, would accumulate 18 degree days using 50F as the baseline:

$$DD = \frac{90+44}{2} - 50 =$$ **18 DD**

## Degree days

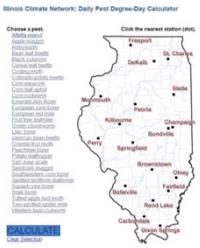
**When do they begin accumulating?**

Biofix
- An observable biological event that determines when DD accumulations begin for a particular insect
  - Often the capture of insects in a pheromone trap

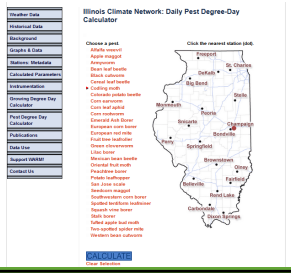
Calendar date
- Date varies by insect
  - Often January 1 or March 1

## Illinois Pest Degree Day Calculator

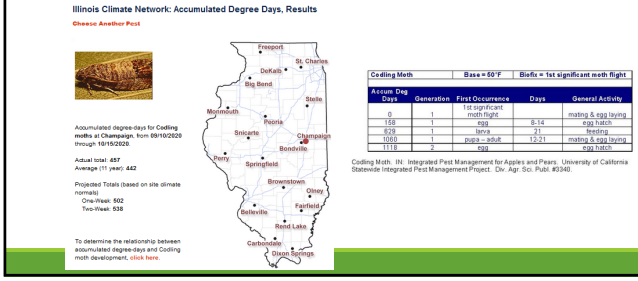
http://www.isws.illinois.edu/warm/pestdata/

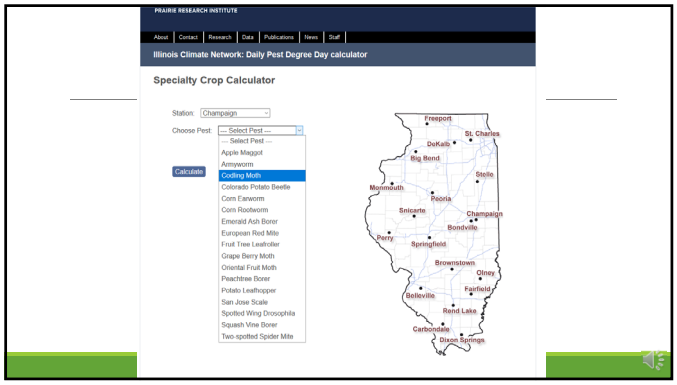



## Calculating Degree Days for Codling Moth



## Calculating Degree Days for Codling Moth

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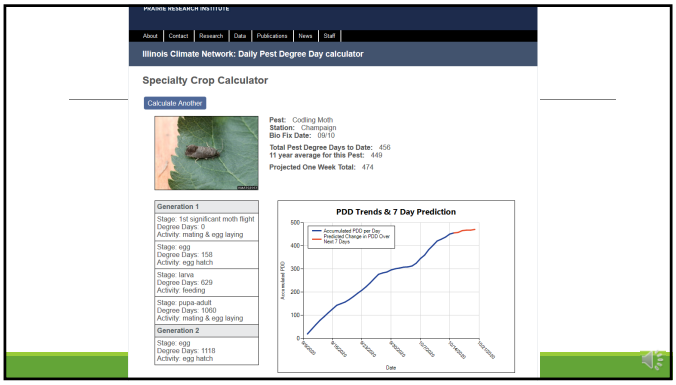
Illinois Climate Network: Daily Pest Degree Day calculator
Specialty Crop Calculator
Station: Champaign
Choose Pest: --- Select Pest ---
--- Select Pest ---
Apple Maggot
Armyworm
Codling Moth
Colorado Potato Beetle
Corn Earworm
Corn Rootworm
Emerald Ash Borer
European Red Mite
Fruit Tree Leafroller
Grape Berry Moth
Oriental Fruit Moth
Peachtree Borer
Potato Leafhopper
San Jose Scale
Spotted Wing Drosophila
Squash Vine Borer
Two-spotted Spider Mite
Calculate
Freeport
DeKalb
St. Charles
Big Bend
Stelle
Monmouth
Peoria
Snicarte
Champaign
Bondville
Perry
Springfield
Brownstown
Olney
Fairfield
Belleville
Rend Lake
Carbondale
Dixon Springs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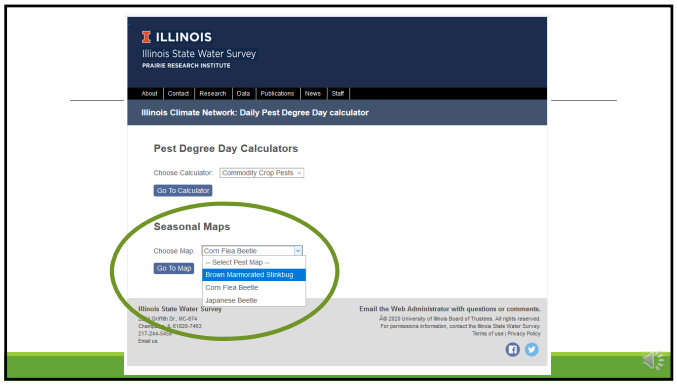
Illinois Climate Network: Daily Pest Degree Day calculator
Specialty Crop Calculator
Calculate Another
Pest: Codling Moth
Station: Champaign
Bio Fix Date: 09/10
Total Pest Degree Days to Date: 456
11 year average for this Pest: 449
Projected One Week Total: 474
Generation 1
Stage: 1st significant moth flight
Degree Days: 0
Activity: mating & egg laying
Stage: egg
Degree Days: 158
Activity: egg hatch
Stage: larva
Degree Days: 629
Activity: feeding
Stage: pupa-adult
Degree Days: 1060
Activity: mating & egg laying
Generation 2
Stage: egg
Degree Days: 1118
Activity: egg hatch
PDD Trends & 7 Day Prediction
Accumulated PDD per Day
Predicted Change in PDD Over Next 7 Days
Accumulated PDD
Date


ILLINOIS
Illinois State Water Survey
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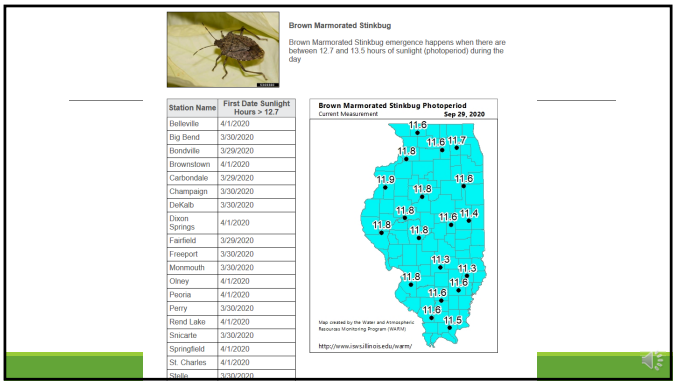
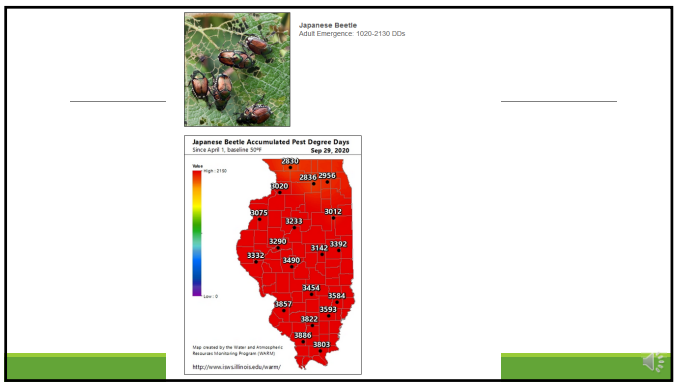
Illinois Climate Network: Daily Pest Degree Day calculator
Pest Degree Day Calculators
Choose Calculator: Commodity Crop Pests
Go To Calculator
Seasonal Maps
Choose Map: Corn Flea Beetle
Go To Map
-- Select Pest Map --
Brown Marmorated Stinkbug
Corn Flea Beetle
Japanese Beetle
Illinois State Water Survey
Email the Web Administrator with questions or comments.


Brown Marmorated Stinkbug
Brown Marmorated Stinkbug emergence happens when there are between 12.7 and 13.5 hours of sunlight (photoperiod) during the day
Station Name
First Date Sunlight Hours > 12.7
Belleville 4/1/2020
Big Bend 3/30/2020
Bondville 3/29/2020
Brownstown 4/1/2020
Carbondale 3/29/2020
Champaign 3/30/2020
DeKalb 3/30/2020
Dixon Springs 4/1/2020
Fairfield 3/29/2020
Freeport 3/30/2020
Monmouth 3/30/2020
Olney 4/1/2020
Peoria 4/1/2020
Perry 3/30/2020
Rend Lake 4/1/2020
Snicarte 3/30/2020
Springfield 4/1/2020
St. Charles 4/1/2020
Stelle 3/30/2020
Brown Marmorated Stinkbug Photoperiod
Current Measurement
Sep 29, 2020
Map created by the Water and Atmospheric Resources Monitoring Program (WARM)
http://www.isws.illinois.edu/warm/


Japanese Beetle
Adult Emergence: 1020-2130 DDs
Japanese Beetle Accumulated Pest Degree Days
Since April 1, baseline 50°F
Sep 29, 2020
Map created by the Water and Atmospheric Resources Monitoring Program (WARM)
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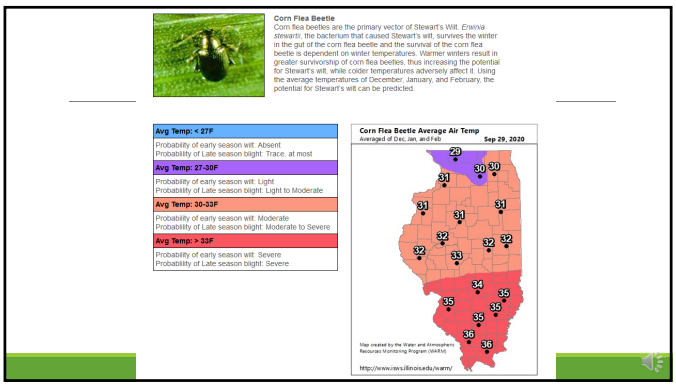
Corn Flea Beetle
Corn flea beetles are the primary vector of Stewart's Wilt. Erwinia stewartii, the bacterium that caused Stewart's wilt, survives the winter in the gut of the corn flea beetle and the survival of the corn flea beetle is dependent on winter temperatures. Warmer winters result in greater survivorship of corn flea beetles, thus increasing the potential for Stewart's wilt, while colder temperatures adversely affect it. Using the average temperatures of December, January, and February, the potential for Stewart's wilt can be predicted.
Avg Temp: < 27F
Probability of early season wilt: Absent
Probability of Late season blight: Trace, at most
Avg Temp: 27-30F
Probability of early season wilt: Light
Probability of Late season blight: Light to Moderate
Avg Temp: 30-33F
Probability of early season wilt: Moderate
Probability of Late season blight: Moderate to Severe
Avg Temp: > 33F
Probability of early season wilt: Severe
Probability of Late season blight: Severe
Corn Flea Beetle Average Air Temp
Averaged of Dec, Jan, and Feb
Sep 29, 2020
Map created by the Water and Atmospheric Resources Monitoring Program (WARM)
http://www.isws.illinois.edu/warm/

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