

Gestion phytosanitaire des insectes ravageurs du maïs sucré en Ontario

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OMAFRA

December 4, 2019

Corn Earworm

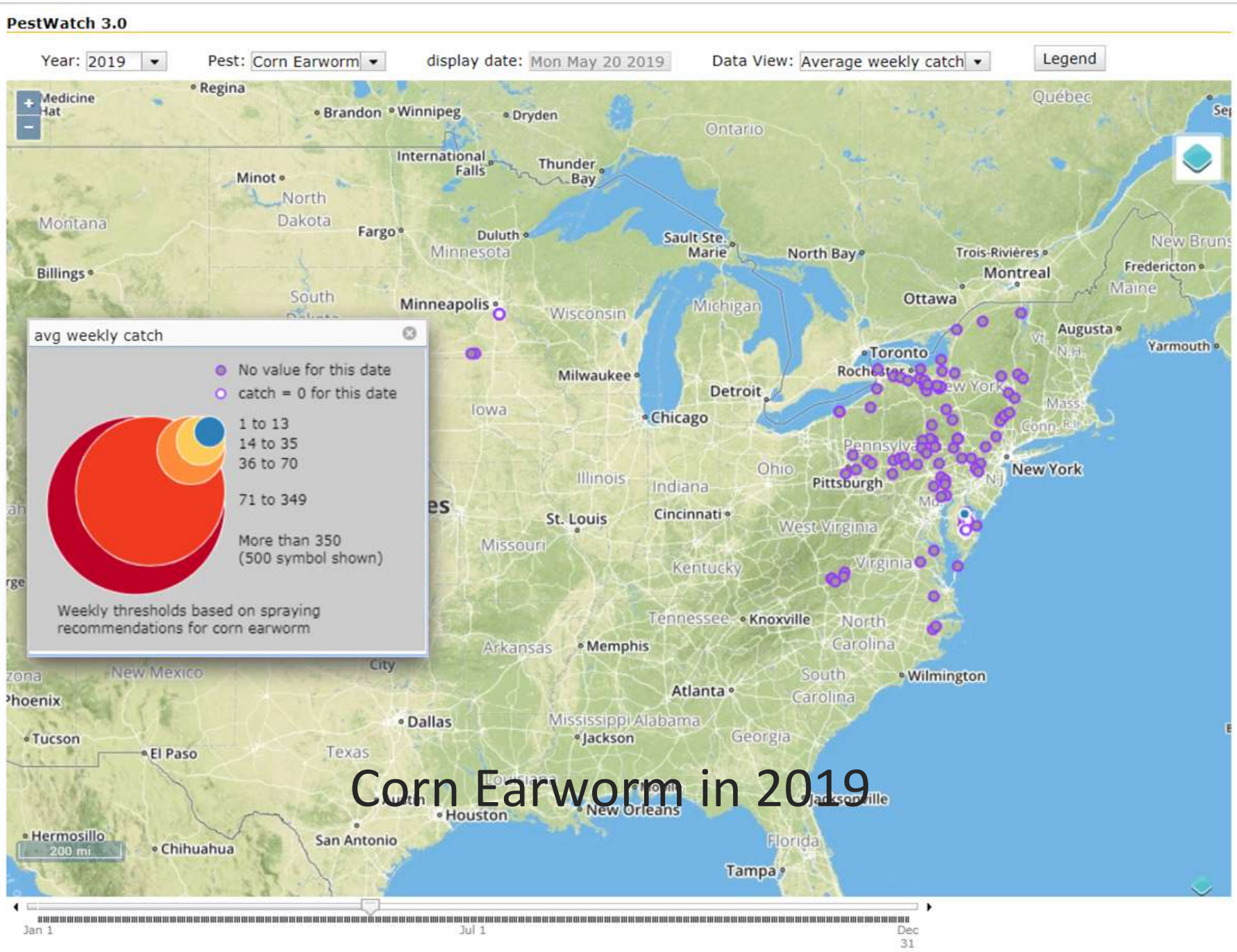
Corn Earworm Control Timing and Risk Assessment

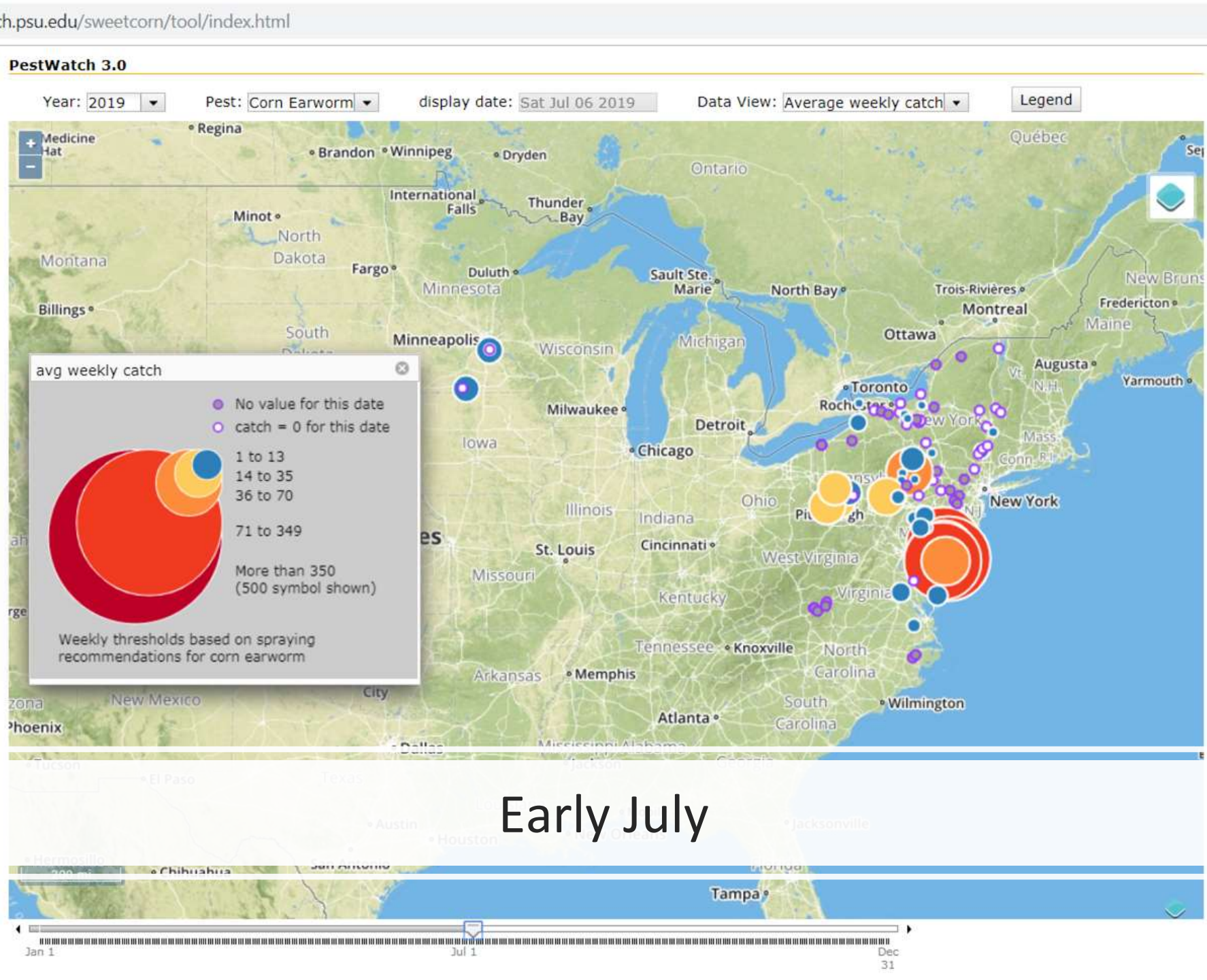
Overwintering Zones

- tropical storms in the Gulf of Mexico or other storm fronts moving northward from the South can suddenly bring large numbers of earworm moths to our fields

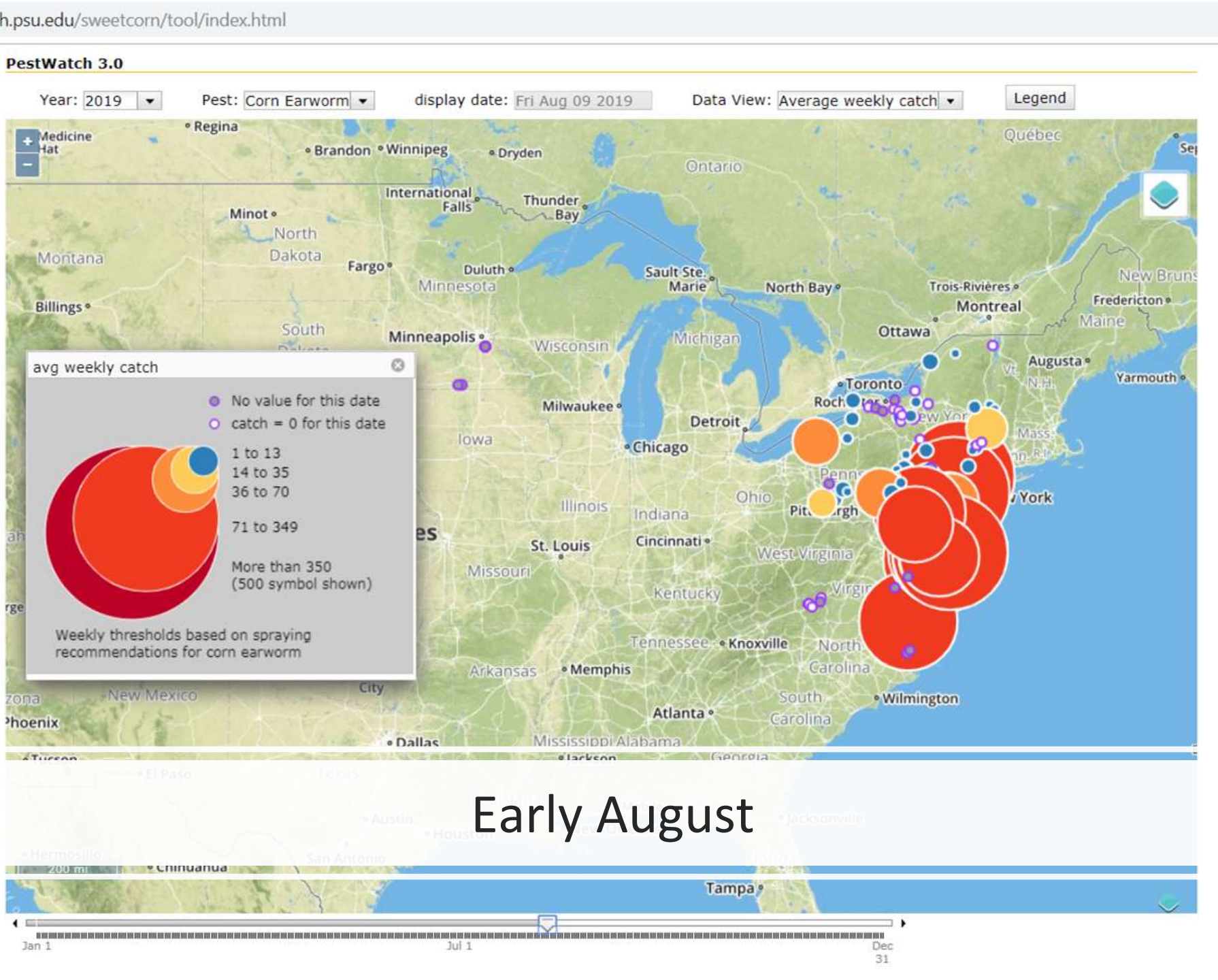
DuPont Pioneer

estwatch.psu.edu/sweetcorn/tool/index.html

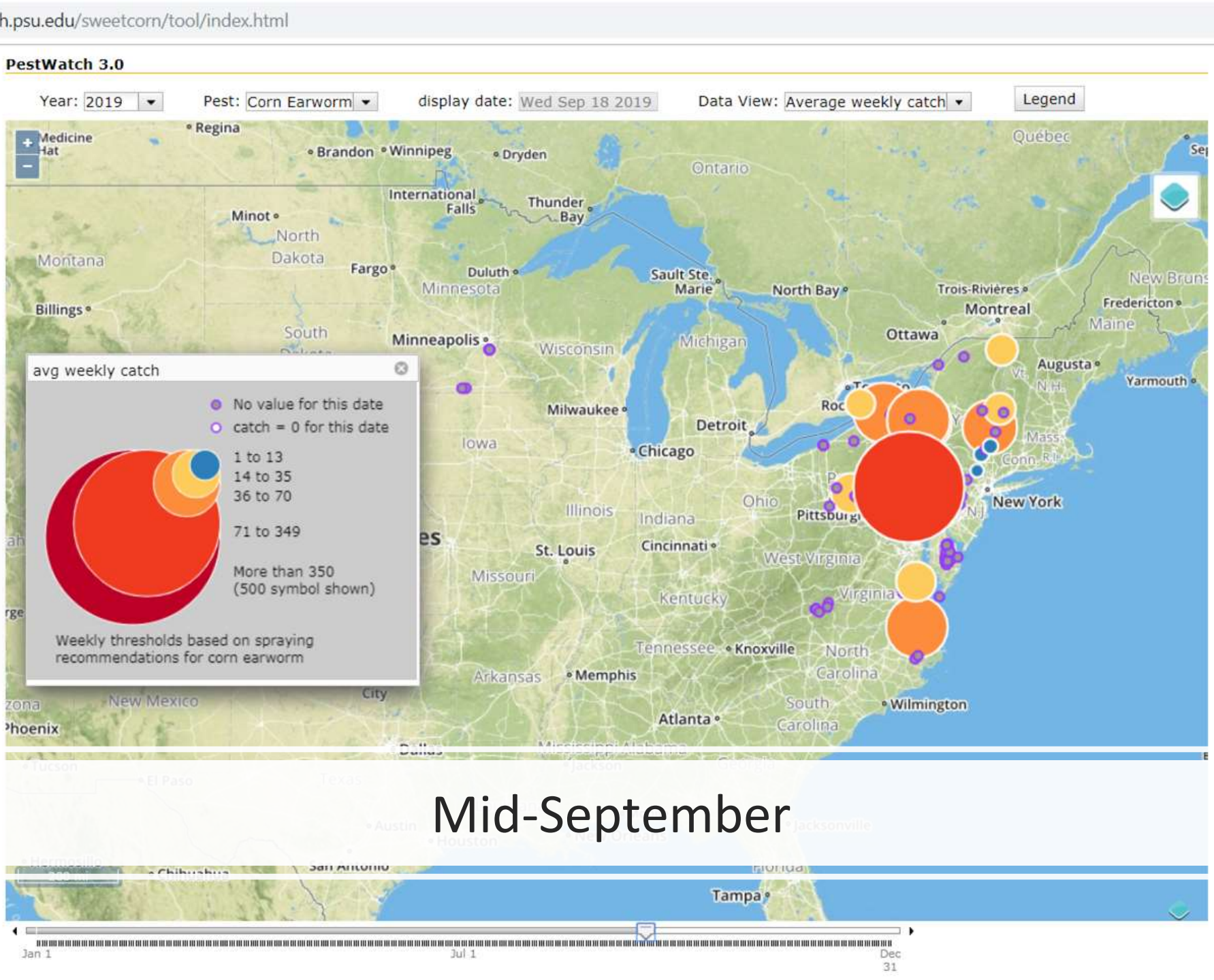



estwatch.psu.edu/sweetcorn/tool/index.html
PestWatch 3.0
Year: 2019
Pest: Corn Earworm
display date: Sat Jul 06 2019
Data View: Average weekly catch
Legend
avg weekly catch
No value for this date
catch = 0 for this date
1 to 13
14 to 35
36 to 70
71 to 349
More than 350
(500 symbol shown)
Weekly thresholds based on spraying recommendations for corn earworm
Regina
Brandon
Winnipeg
Dryden
Ontario
Québec
International Falls
Thunder Bay
Minot
North Dakota
Montana
Fargo
Duluth
Minnesota
Sault Ste. Marie
North Bay
Trois-Rivières
Montreal
Billings
Minneapolis
Wisconsin
Michigan
Ottawa
Augusta
Toronto
Yarmouth
Milwaukee
Detroit
Iowa
Chicago
New York
Illinois
Indiana
Ohio
St. Louis
Cincinnati
West Virginia
Missouri
Kentucky
Virginia
Tennessee
Knoxville
North Carolina
Arkansas
Memphis
New Mexico
Atlanta
South Carolina
Wilmington
Phoenix
Tampa
Jan 1
Jul 1
Dec 31

Early July

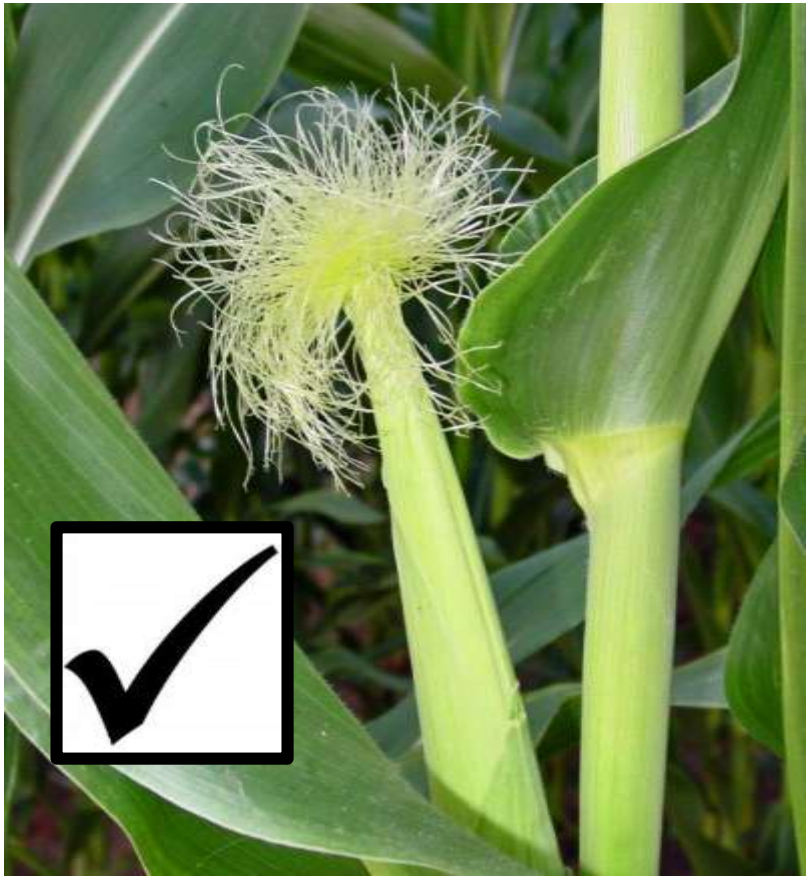


Early August



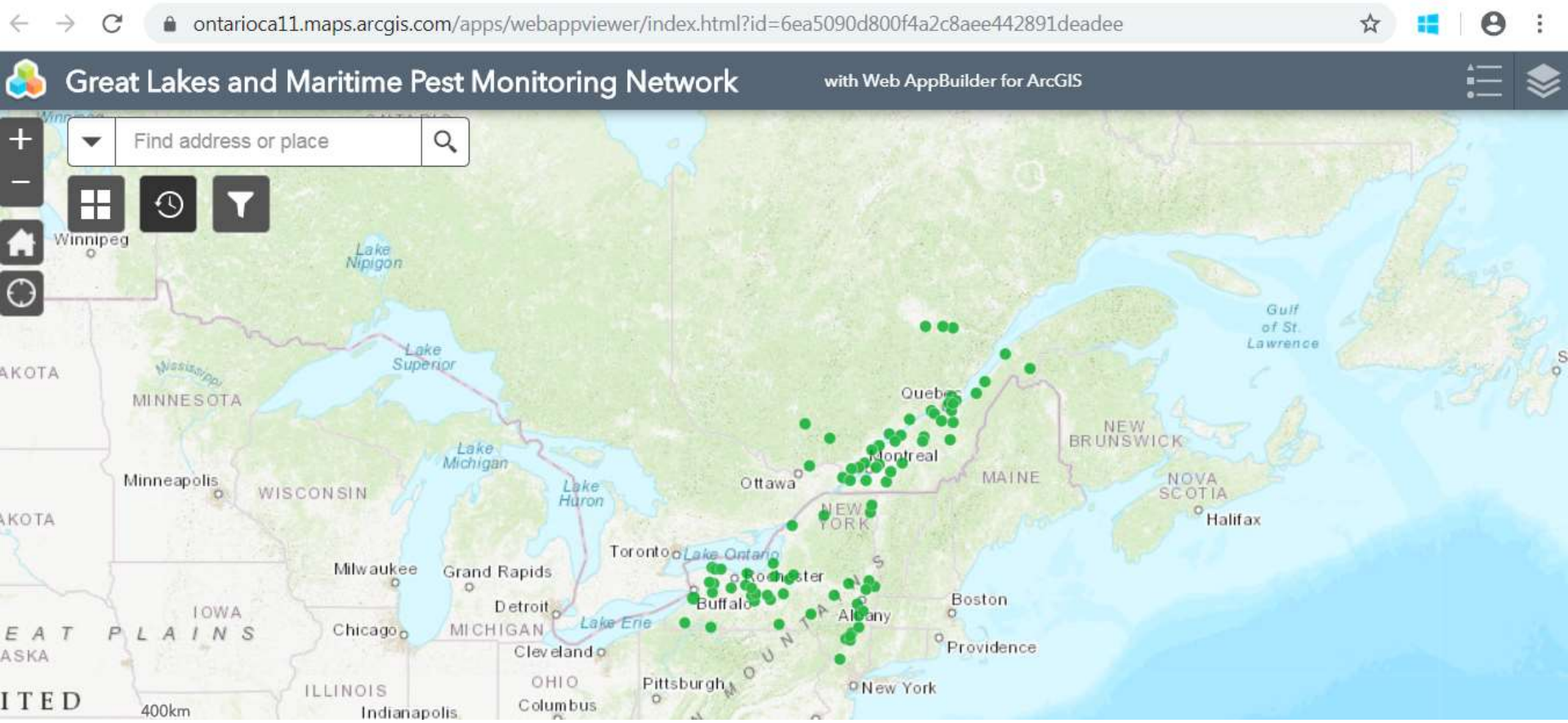
Mid-September

Fresh Silks



when 80-90% of the silks have turned, the field is no longer very attractive for egg laying

Great Lakes and Maritime Pest Monitoring Network



Monitoring and Thresholds

- Place traps in freshly silking corn with the lure at ear height.
- Two traps per field, at least 50 feet apart, are recommended.
- Replace pheromone every two weeks.
- Count the moths captured in each trap twice weekly.
- Spray at the first catch of any moths
- Damage will increase as trap captures rise

https://www.sare.org/Learning-Center/Fact-Sheets/Organic-Insect-Management-in-Sweet-Corn/Text-Version/Corn-Earworm

Kentucky

Weekly Trap Catch	Treatment Frequency
350 or more	Every 3 days
11 to 349	Every 4 days
5 to 10	Every 5 days
When corn earworm weekly counts are less than 5, there is no need to spray for corn earworm.	

Average corn earworm catch			
Per Day	Per Five Days	Per Week	Days Between Sprays
<0.2	<1.0	<1.4	No Spray(for CEW)
0.2-0.5	1.0-2.5	1.4-3.5	6 days
0.5-1.0	2.5-5.0	3.5-7.0	5 days
1-13	5-65	7-91	4 days
over 13	over 65	over 91	3 days
Add one day to the recommended spray interval if daily maximum temperatures are less than 80° F for the previous 2-3 days.			

Cornell, NY

Ontario

CEW Spray Schedule Based on Trap Counts & Temp

Moths/trap/week	Daily Maximum Temperature	
	Less than 27 C	More than 27 C
1-6	5-7 days	5 to 7 days
7-90	5 days	4 days
More than 90	4 days	3 days

Table 1. Harvest Assessment for St. Thomas Strip Trials		
Treatment	Cobs infested	Cobs with living larvae
untreated	100%	56%
1 spray during green silk	75%	13%
2 sprays during green silk	56% (32% had only a small amount of tip feeding)	6%

Control Methods

- Resistance Management
  - Pyrethroids inconsistent
  - Voliam (lambda-cyhalothrin + chlorantraniliprole)
  - Coragen (chlorantraniliprole)
  - Delegate (WBCW)
- Biological controls
  - Trichogramma sp.
  - Vegetable oil + spinosyn

Future Control Methods

CERTIS

The Biopesticide Company

Gemstar

BIOLOGICAL INSECTICIDE

For Use on Sweet Corn and Other Vegetable Crops

Gemstar® is an aqueous suspension concentrate biological insecticide from Certis USA, registered for use on a broad range of crops. It contains a naturally occurring virus that infects and kills larvae of *Heliothis* and *Helicoverpa* species.

Product Features

- Liquid suspension concentrate bioinsecticide
- Target pests: Corn earworm, tomato fruitworm, bollworm, and tobacco budworm
- Broad crop label: Sweet corn, tomatoes, peppers, leafy and other vegetables, cotton, tobacco, ornamental plants, and many other crops
- Application rates: 4 to 10 fl. oz. per acre

A larva must ingest OBs in order to become infected with the virus. The highly alkaline environment of the larval digestive tract (where pH can be as high as 10) dissolves the OBs and releases the virus, which penetrates the cells lining the midgut. Once inside, the viral DNA "hijacks" the nucleus of the cell, causing it to replicate numerous copies of the virus which rapidly spread the infection to other organs. Within a few days the

Helicovex

Helicovex is based on a naturally occurring insecticidal virus that specifically infects and kills larvae of African cotton bollworm, Corn earworm and other *Helicoverpa* species. The unique technology allows efficient and sustainable control of these pests.

Product facts

Target pest	African cotton bollworm (*Helicoverpa armigera*), Corn earworm (*H. zea*) and other *Helicoverpa* species such as *H. armigera*, *H. punctigera*
Active ingredient	*Helicoverpa armigera* nucleopolyhedrovirus (HearNPV)
Formulation	Suspension concentrate
Concentration	7.5×10^{12} NPV/liter
Standard rate	50-200 ml/ha, depending on the pest infestation and the crop

Benefits

BACULOVIRUS

- Capex
- Cryptex
- Helicovex
- Littovir
- Laspex
- Lymantria dispar MNPV
- Madex
- Madex Max
- Madex Plus
- Madex Top
- Madex Twin
- Neodiprion abietis NPV
- Spodi
- Tutavir

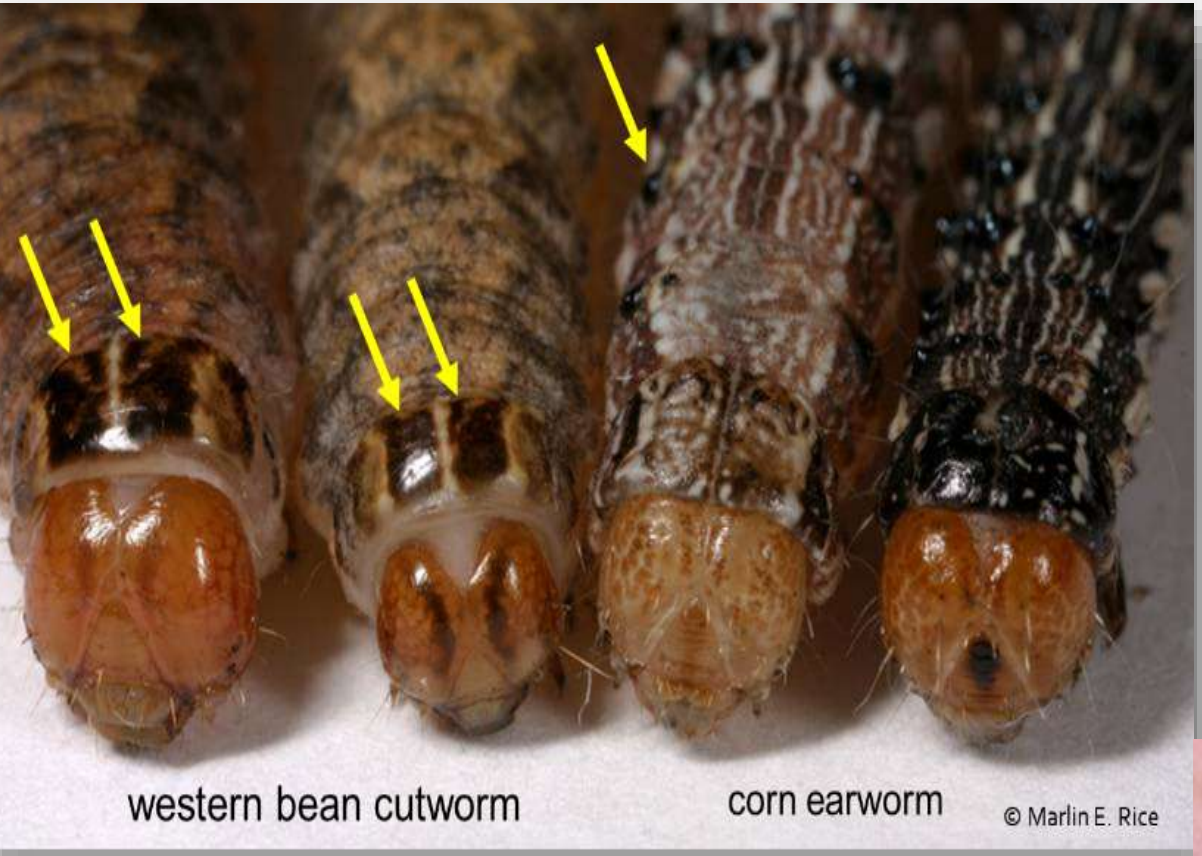
INFOBOX

Technical information

GDE

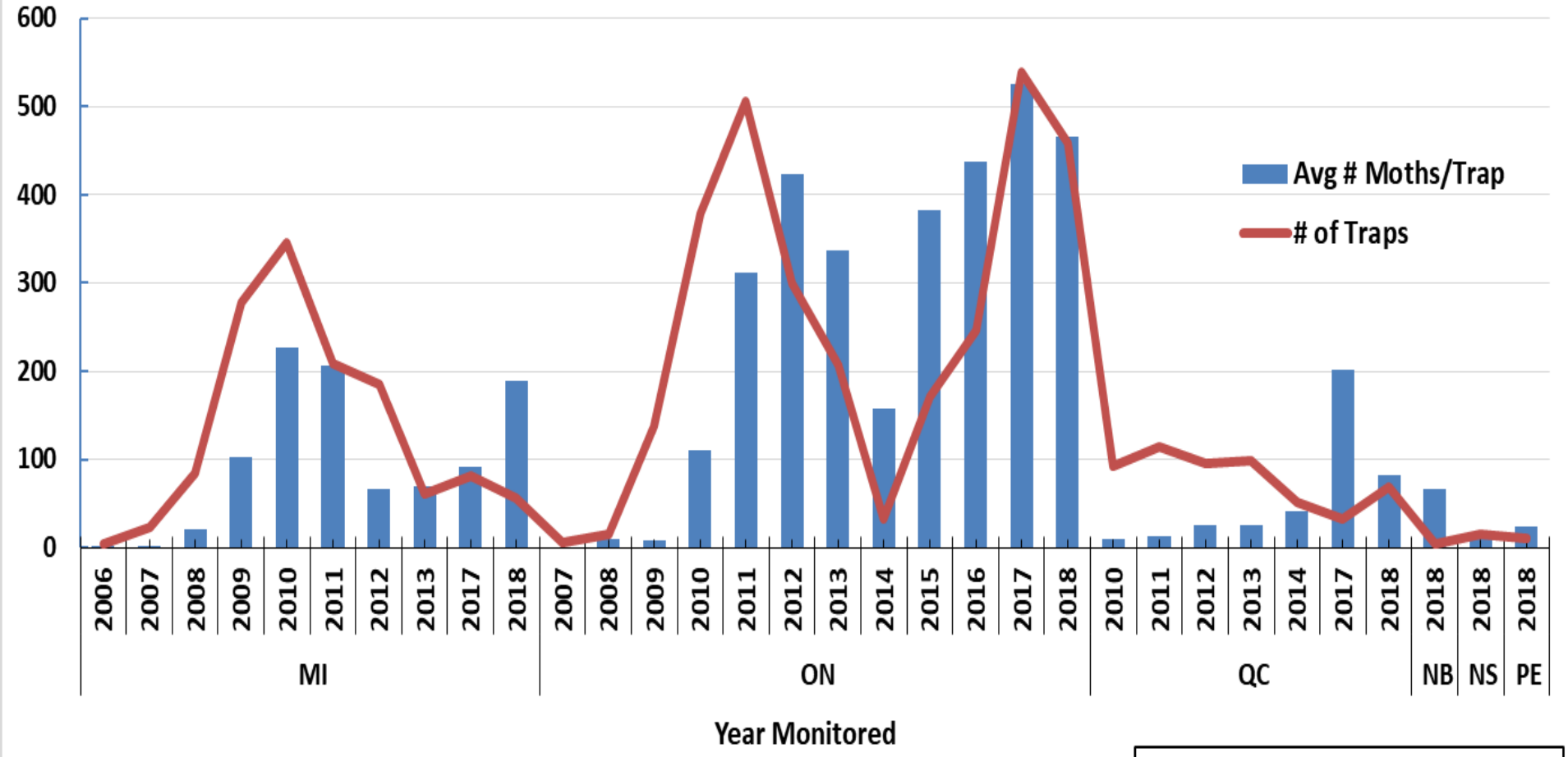
Pest information

WBC vs. CEW



Corn Earworm

Western Bean Cutworm Trap Network
Average # of Moths Per Trap and Total # of Traps per Year



Year	# of Traps	Network - Corn	Network - Dry Beans
2010	816	2,726,877 acres	145,000 acres
2018	614	4,893,613 acres	333,500 acres

12 Year Total:
4,909 Traps
Avg. of 358 Moths/Trap
1,280,656 Moths Captured

Transgenic Corn

- Commerical sweet corn hybrids include,
  - Cry1Ab
  - Cry1A.105
  - Cry2Ab2
  - Vip3A ☑

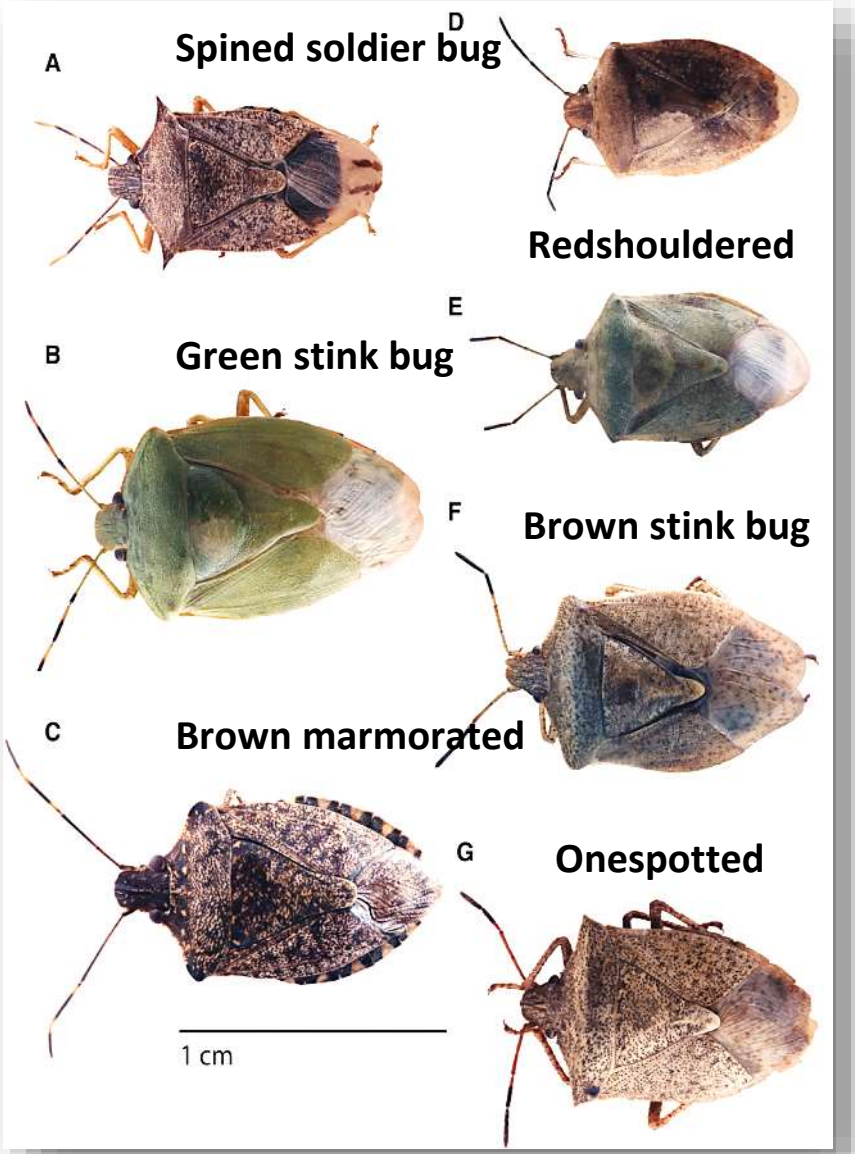

Natural Enemies

Stink Bugs Are Increasing

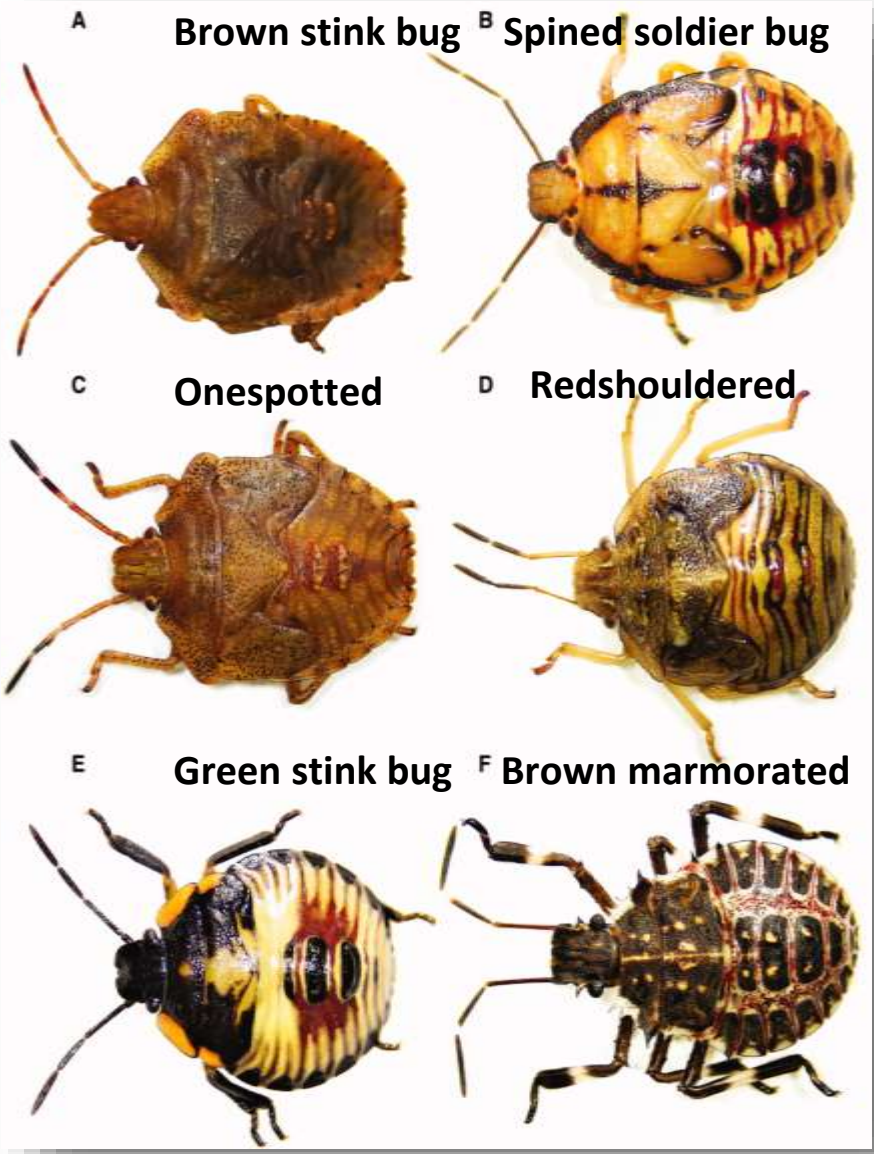
- Seeing more in later R stages of soybeans, dry beans and corn
- Most not at threshold levels but something to note in later season and potential for quality issues

BMSB nymph
Found on Ridgetown campus, Sept 2018

Common ADULTS found in corn and soys



Common NYMPHS found in corn and soys



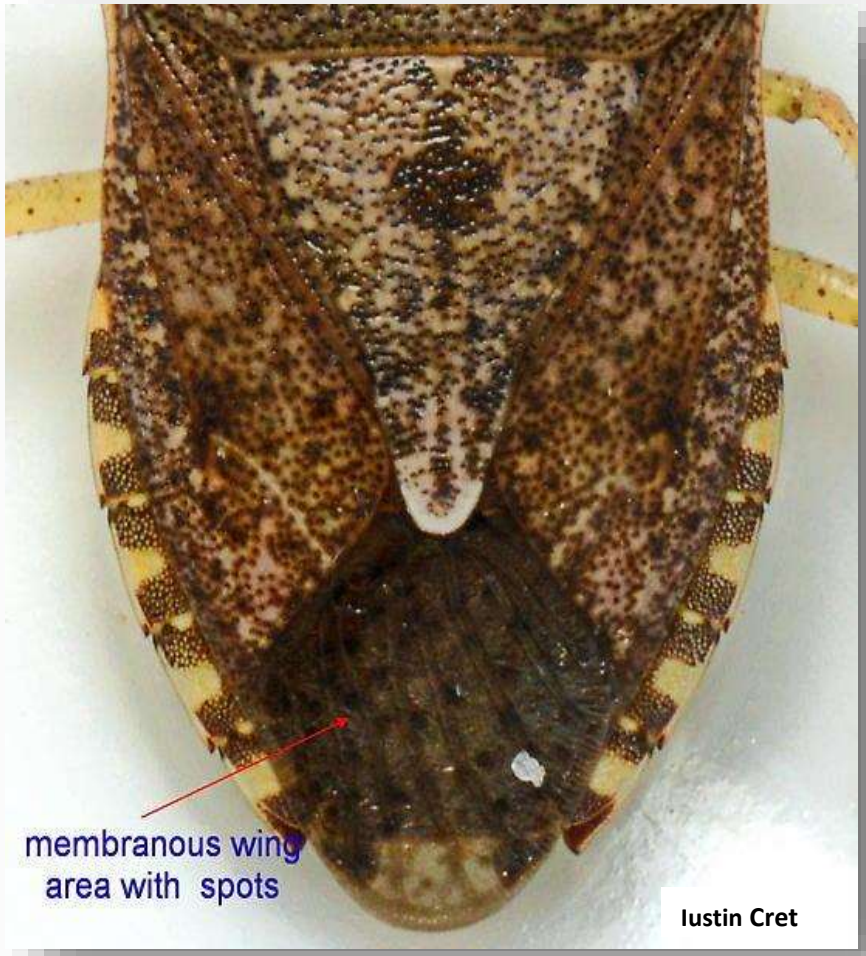
Koch et al. 2017.Identification, Biology, Impacts, and Management of Stink Bugs (Hemiptera: Heteroptera: Pentatomidae) of Soybean and Corn in the Midwestern United States, *Journal of Integrated Pest Management*, Volume 8, Issue 1, 1 January 2017, 11, https://doi.org/10.1093/jipm/pmx004

WBC Eggs Round with longitudinal lines like cantaloupe	Stink Bug Eggs Barrel-shaped with a small halo of thorns
	
Both types can be white to tan or even purple (depending on time before hatch)	

BMSB Damage

Ohio State University

Brown Stink Bug

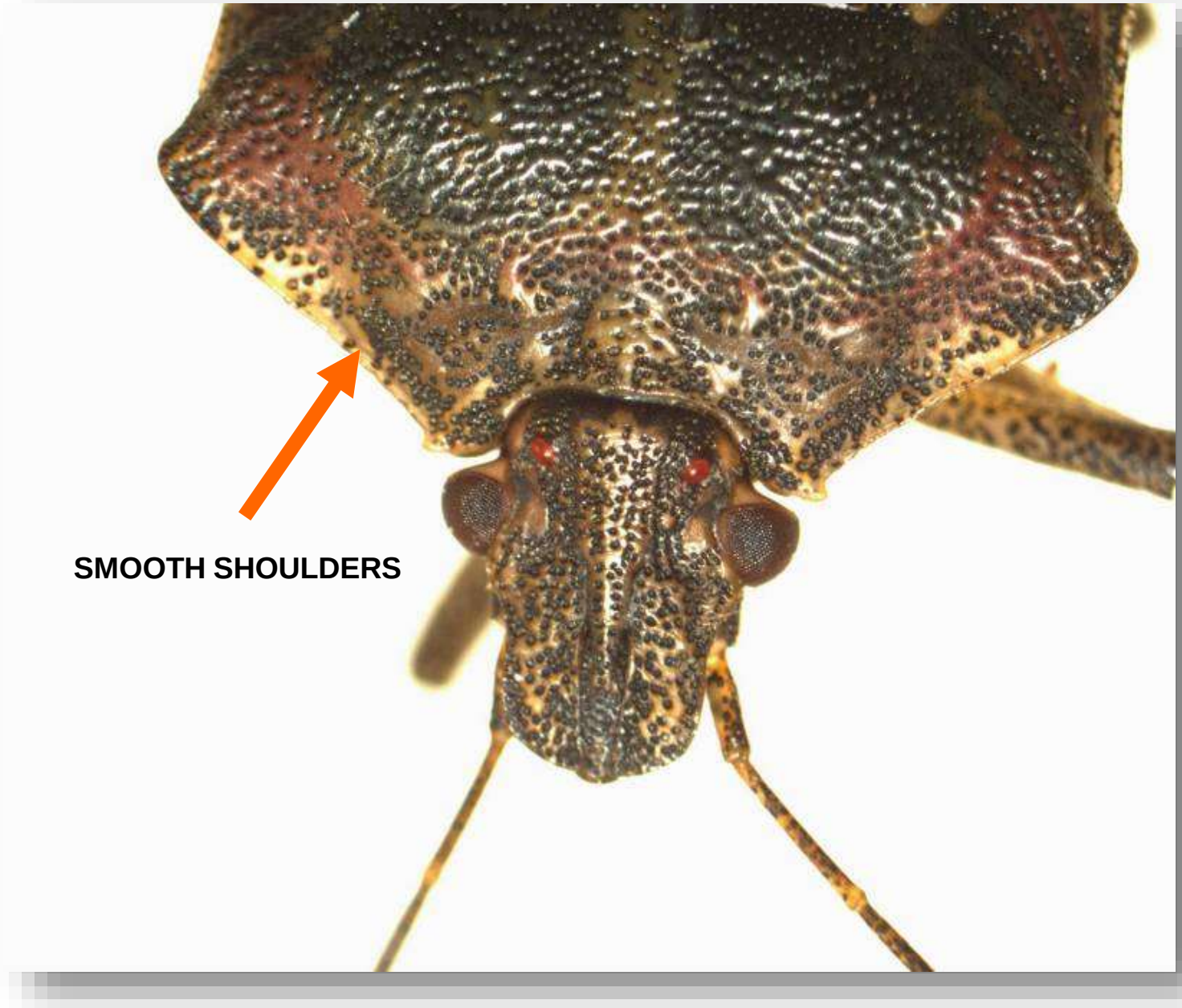


Iustin Cret

Brown Marmorated Stink Bug

Metrioptera, Bugguide.net

Brown Marmorated Stink Bug



Questions?