

Seedcorn Maggot. What can we do?



Tim Waters

WSU Regional Vegetable Specialist Franklin & Benton Co.

PNVA November 17, 2022, 8 am, 30 minutes

Outline

- Pest Introduction and Biology
- Scouting and Damage
- Degree Day Information
- Research Results
- Control Considerations



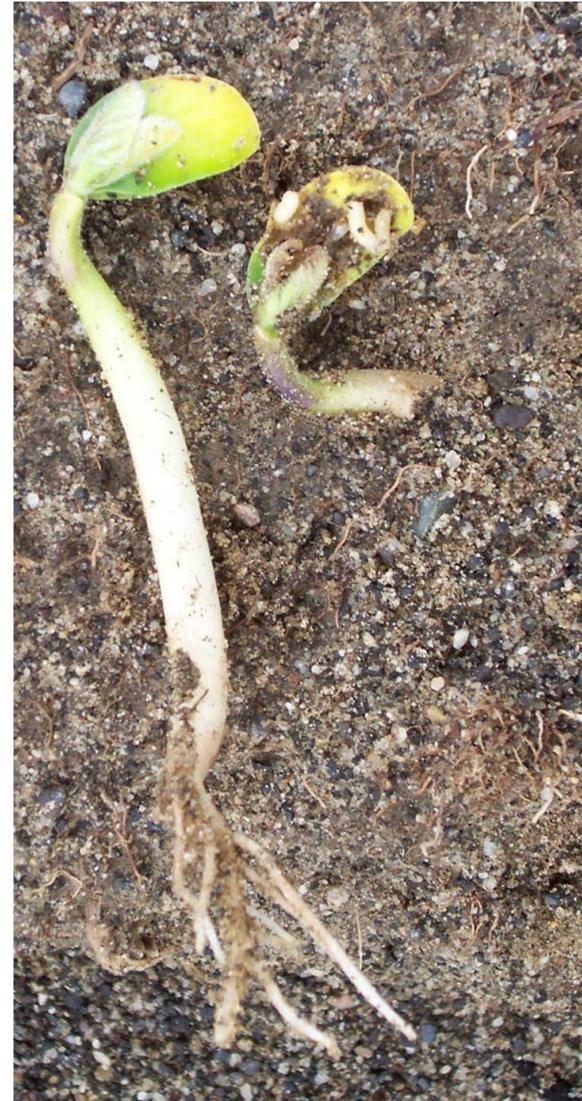
Biology

Seed corn maggot, *Delia platura* (Diptera: Anthomyiidae)



The seed corn maggot was identified in North America in 1855. It has been identified in all arable portions of North America from southern Canada into Mexico.

- **Seed corn maggot can infest the germinating seeds and roots of over 47 plant species.**
- **Beans, soybeans, corn and peas are the most seriously damaged hosts.**
- **To a lesser extent, crucifers, cereals, potato seed pieces, cucurbits, tobacco, onions, pepper, buckwheat, and alfalfa are also injured by this pest.**
- **Stand loss and damage is greatest during the cool, (and wet) springs period.**
- **Decaying plant material attracts the adult flies where the females lay egg**



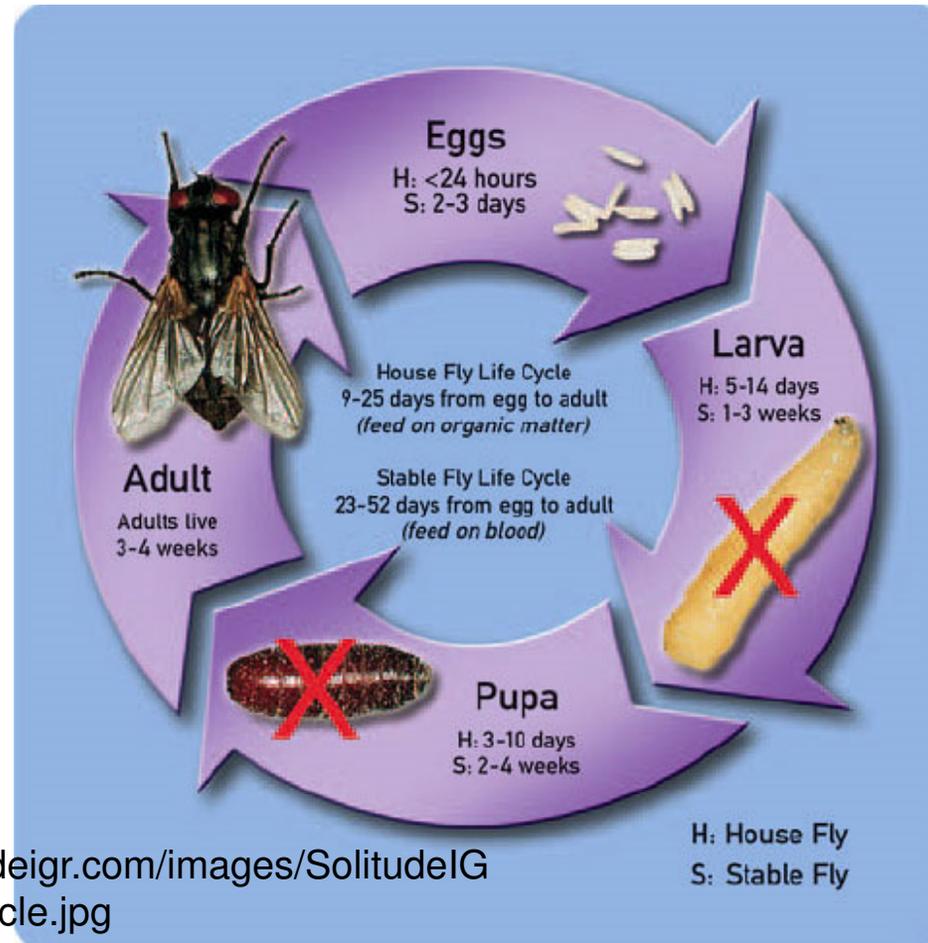
- **The first-generation adult flies emerge in early spring (OW as Pupa)**
- **These flies are grayish-brown to slightly greenish in color and about 1/5 inch long. The flies deposit their eggs in the soil where there is an abundance of decaying organic matter.**





- **Each fertilized female lays an average of 270 eggs, singly or in small clusters. Moist, freshly disturbed soil, fields with decaying seed or crop remnants, and/or organically fertilized soils are all attractive to ovipositing female flies.**

Fly Life Cycle: Complete Metamorphosis



http://www.solitudeigr.com/images/SolitudeIGR/img_fly_life_cycle.jpg

Scouting and Damage

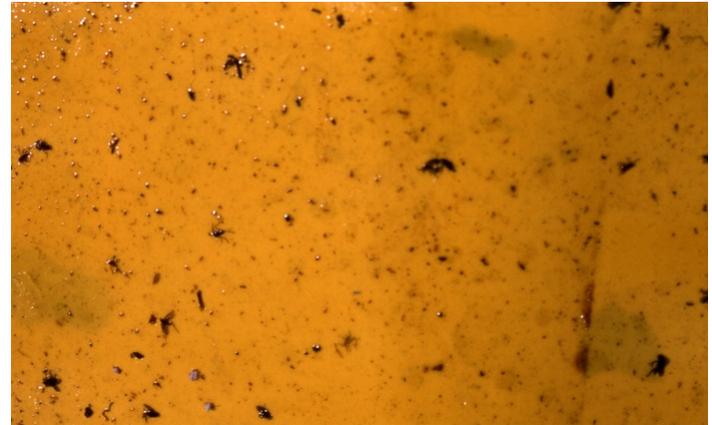
Seedcorn Maggot Recipe

- Double cropping beans after peas or sweet corn after peas
- High residue
- Slow germination conditions
- Sometimes, it doesn't matter



Monitoring

- Sticky traps
- Yellow water pan
- Cut fruit or vegetable
- Open pickup cab (not red)
- Not easy to find in wind





Damage

- **Maggots make their way to the sprouting seeds where they bore into, feed on, and often destroy the cotyledons and growing point of the seed of young plants. The eggs hatch readily at temperatures as low as 50° F. Larval and pupal development may continue at temperatures from the mid-50s on up. 39 degree base temp**







Stand loss= Reduced yield and quality

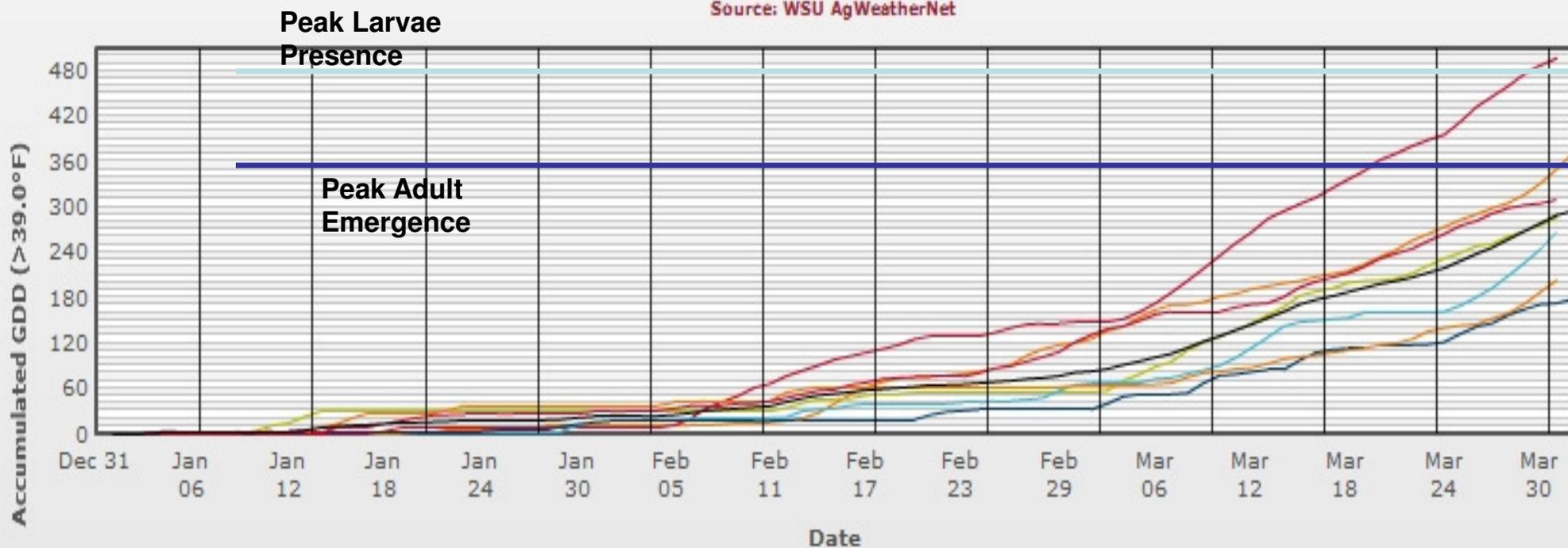


Growing Degree Days

- 39° F base growing temp.
- 360 GDD for peak adult emergence from overwintering pupa
- 65 GDD Egg laying
- 54 GDD Egg development
- ...480 GDD days for larvae to be present
- +367 GDD larvae development
- When does this occur? Use Jan 1 as biofix

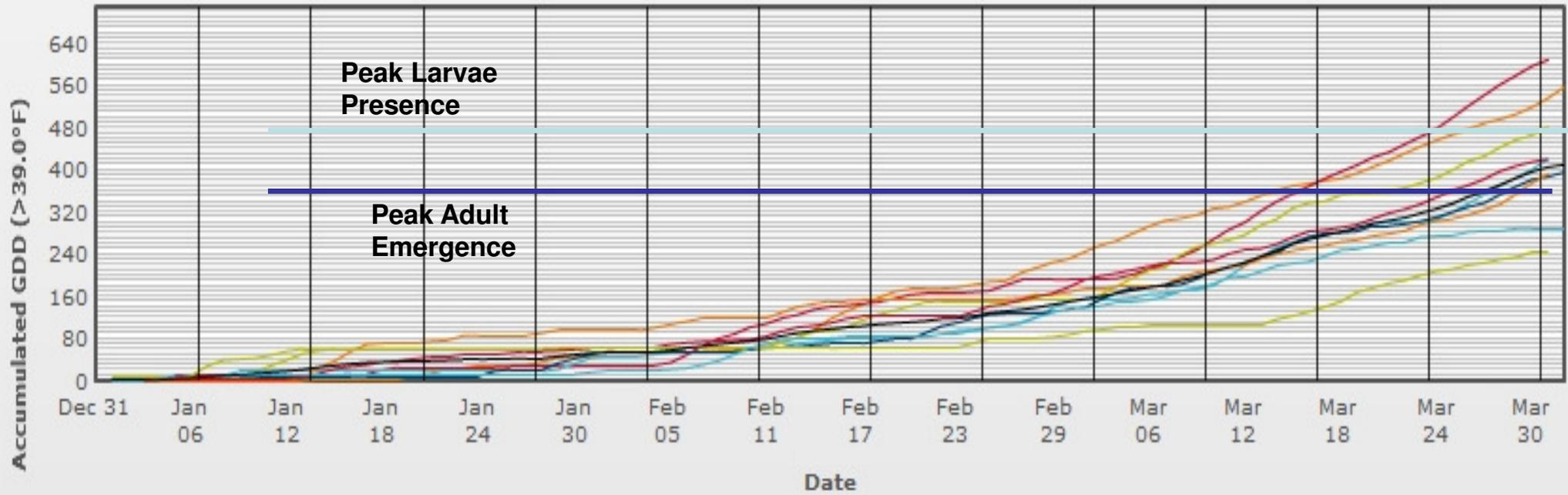
Growing Degree Days
Royal Slope East, Grant county
Jan 01 - Apr 01; Temperature Base: 39.0°F

Source: WSU AgWeatherNet



2016 (371 GDD)	2015 (497 GDD)	2014 (286 GDD)	2013 (267 GDD)	2012 (178 GDD)	2011 (203 GDD)	2010 (309 GDD)
Average of 2010-2015 (294 GDD)						
Adults: March 30 Larvae: April 15						

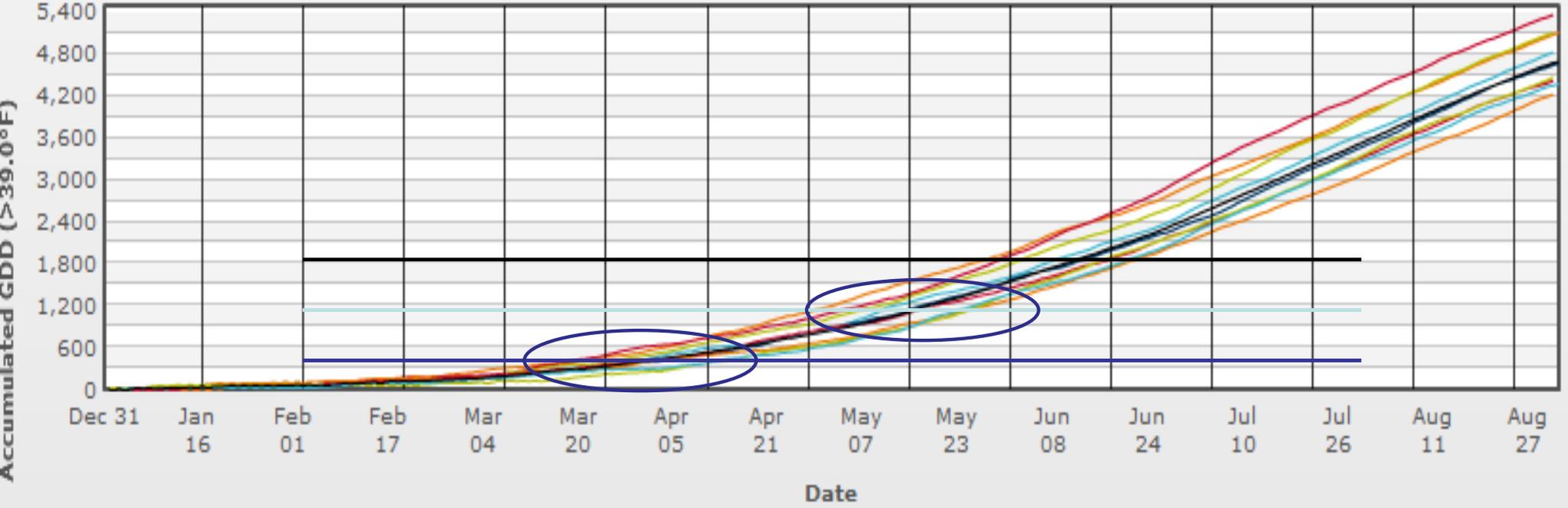
Growing Degree Days
Pasco (CBC Pasco), Pasco, Franklin county
Jan 01 - Apr 01; Temperature Base: 39.0°F
 Source: WSU AgWeatherNet



2016 (557 GDD)	2015 (610 GDD)	2014 (482 GDD)	2013 (420 GDD)	2012 (396 GDD)	2011 (393 GDD)	2010 (421 GDD)	2009 (245 GDD)
2008 (290 GDD)	Average of 2008-2015 (410 GDD)		Adults: March 14 Larvae: March 25 ~2 weeks before N. Basin				

Growing Degree Days
Pasco (CBC Pasco), Pasco, Franklin county
Jan 01 - Sep 01; Temperature Base: 39.0°F

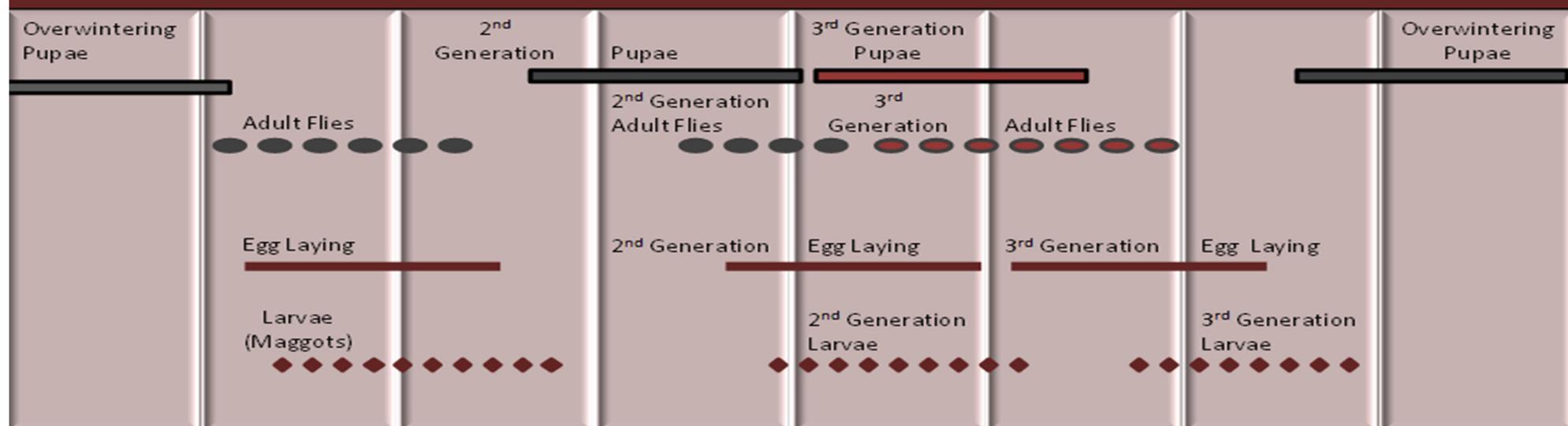
Source: WSU AgWeatherNet



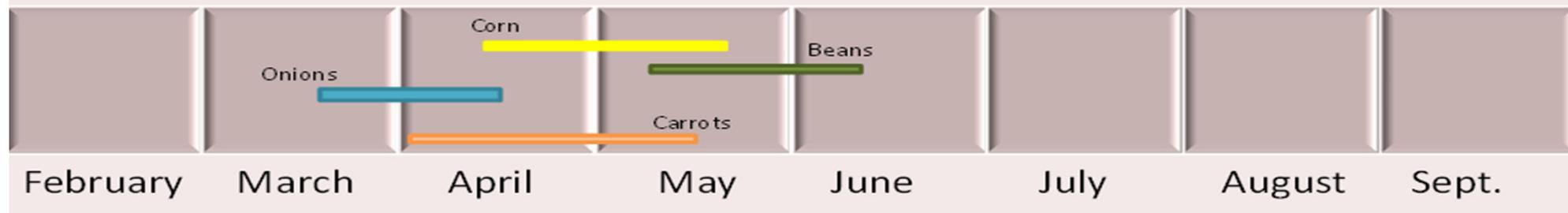
2016 (5111 GDD)	2015 (5369 GDD)	2014 (5104 GDD)	2010 (4415 GDD)
2009 (4467 GDD)	2008 (4372 GDD)	Average of 2008-2015 (4698 GDD)	

Adult peak activity
Gen 1: March 14
Gen 2: April 20
Gen 3: May 20, Remember add 120 GDD for larvae presence

Life Cycle of Seedcorn Maggot in Eastern Washington



Time of Attack on Various Crops



Materials and Methods 2007:

Planted 30 April 2007 near Alderdale, Washington. Seeds were planted by the grower in a RCBD design using a commercial vacuum planter.

The number of carrot seedlings in ten 1 meter segments per plot was counted on 23 May and 8 June 2007 to evaluate efficacy

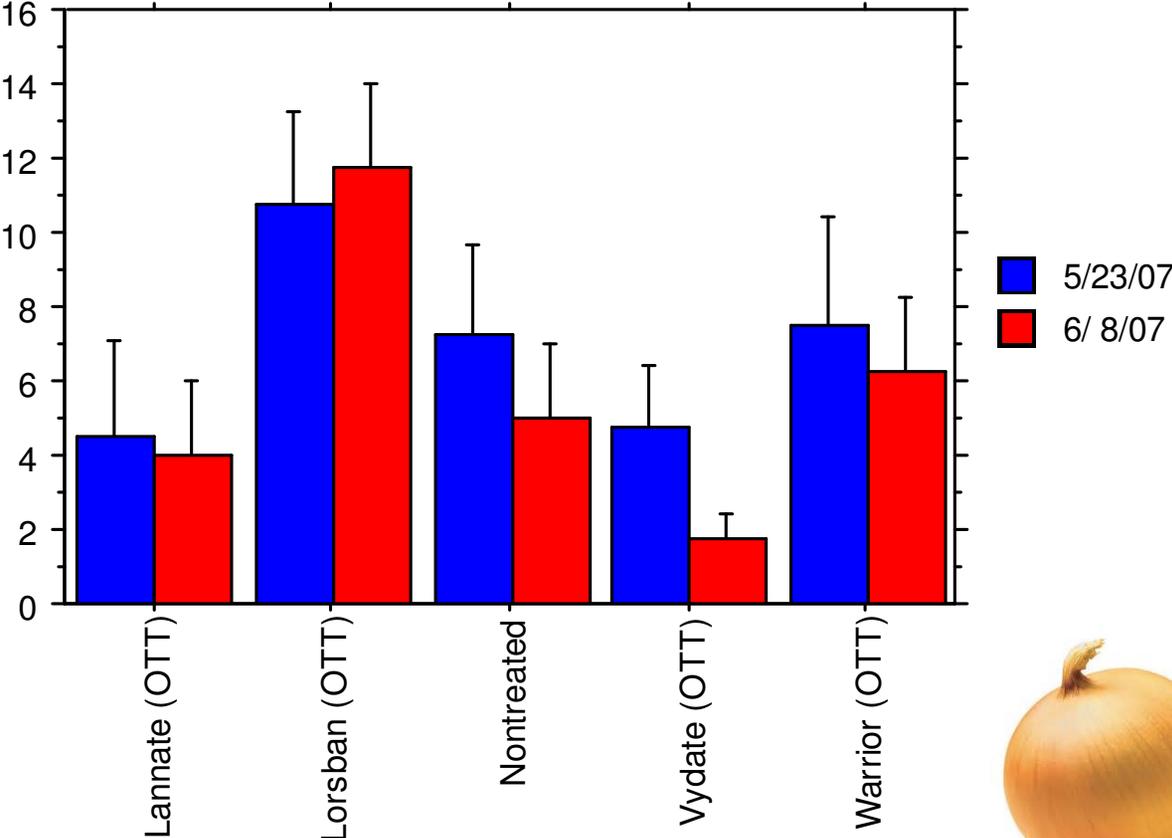


RESULTS 2007 Trial :

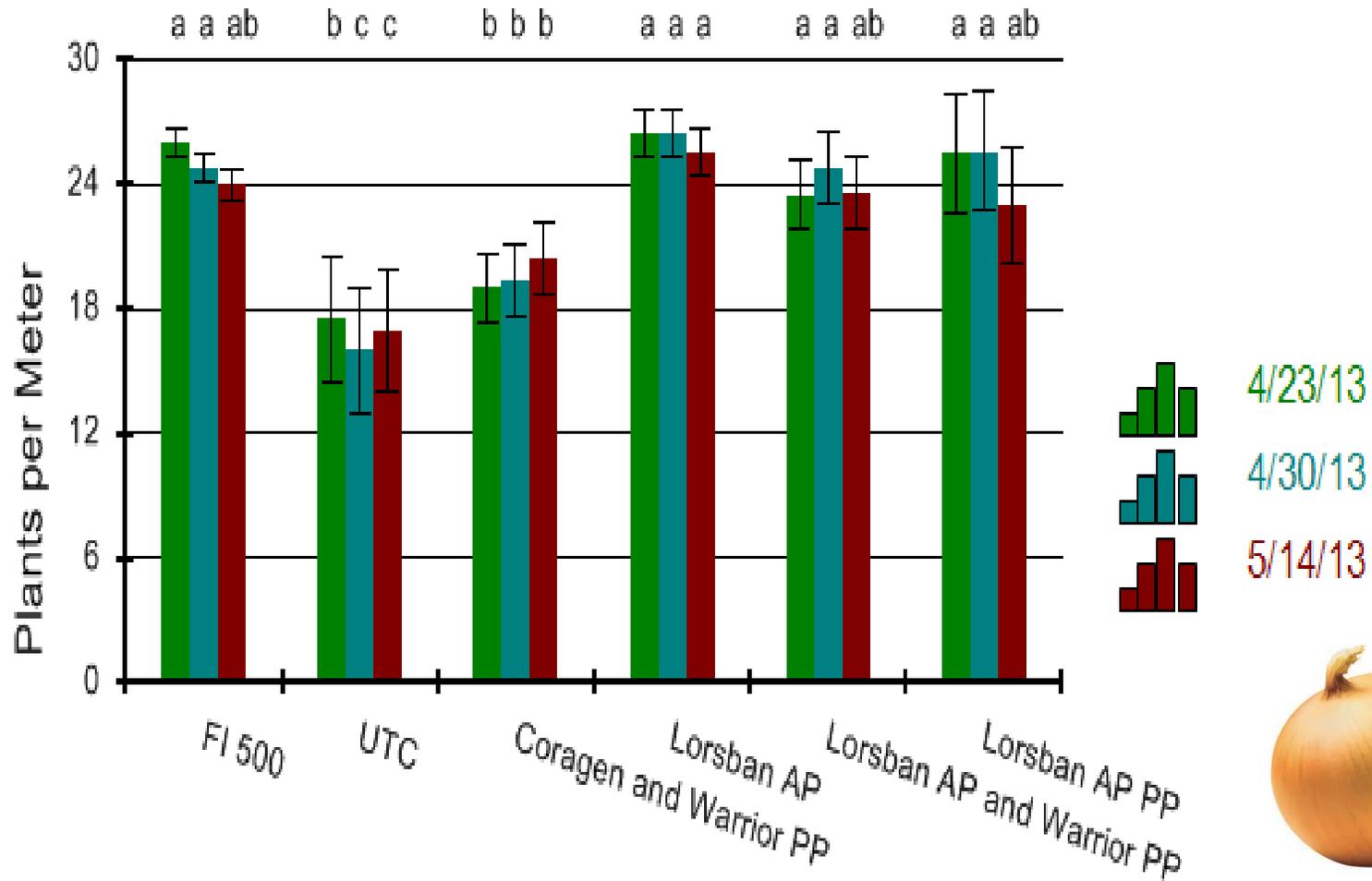
Treatment/ Formulation	Rate or amt/ acre	Seedlings per meter +/- SE	
		24 May	8 June
Entrust	50 g. AI/ acre	61.6 +/- 2.4a	63.3 +/- 1.6a
Diazinon	3 pints/ acre	60.3 +/- 2.8a	65.6 +/- 1.6a
Untreated Check	NA	50.5 +/- 3.9b	50.0 +/- 2.4b

Carrot seed stand establishment with different treatments. Means within columns not followed by the same letter are significantly different from one another. (Fisher's PLSD, $P < 0.05$).

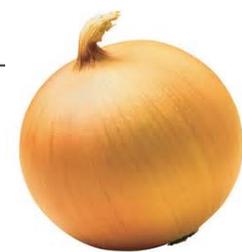
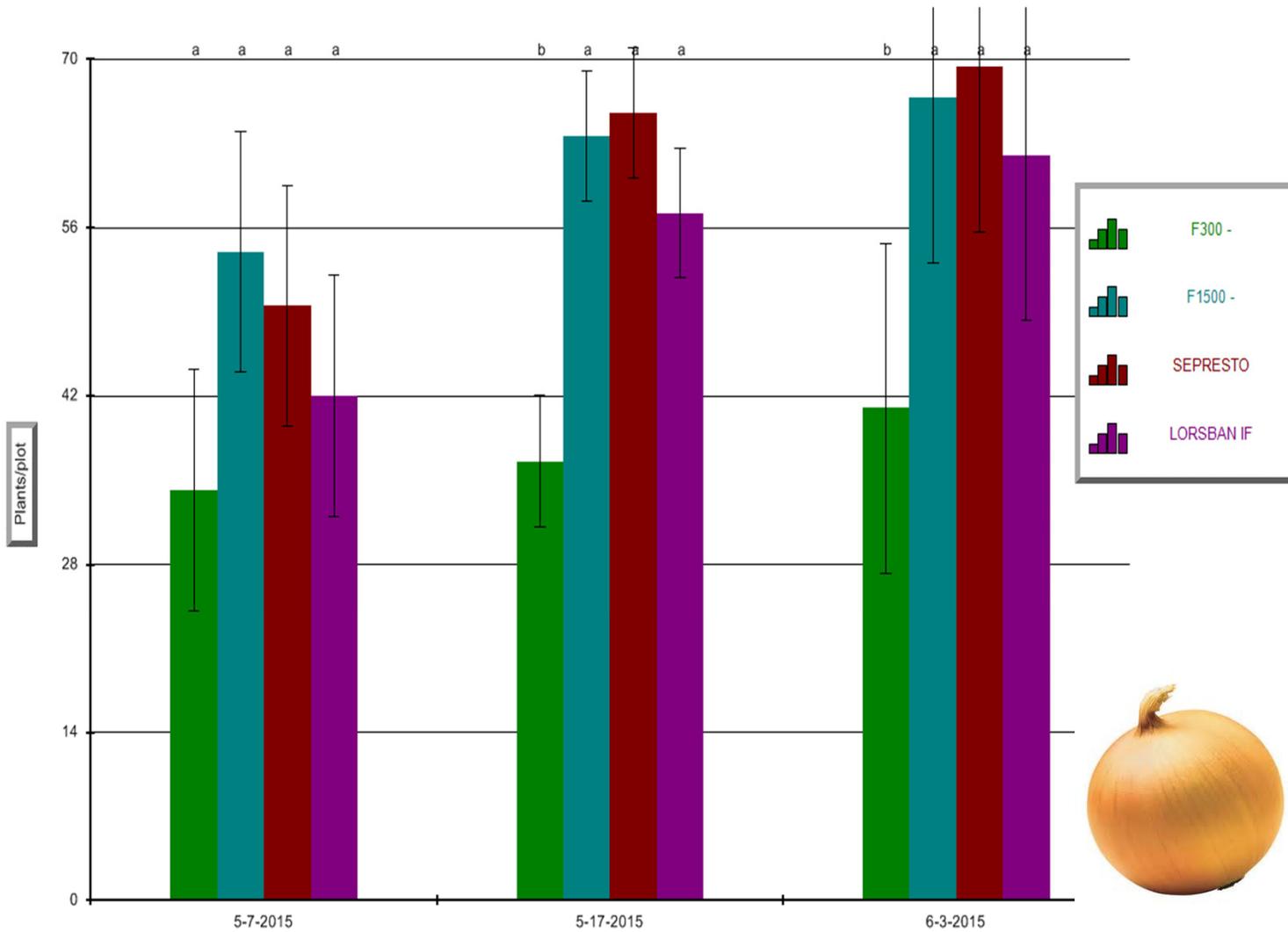
Seedlings per meter±SE



Boardman SCM 2013

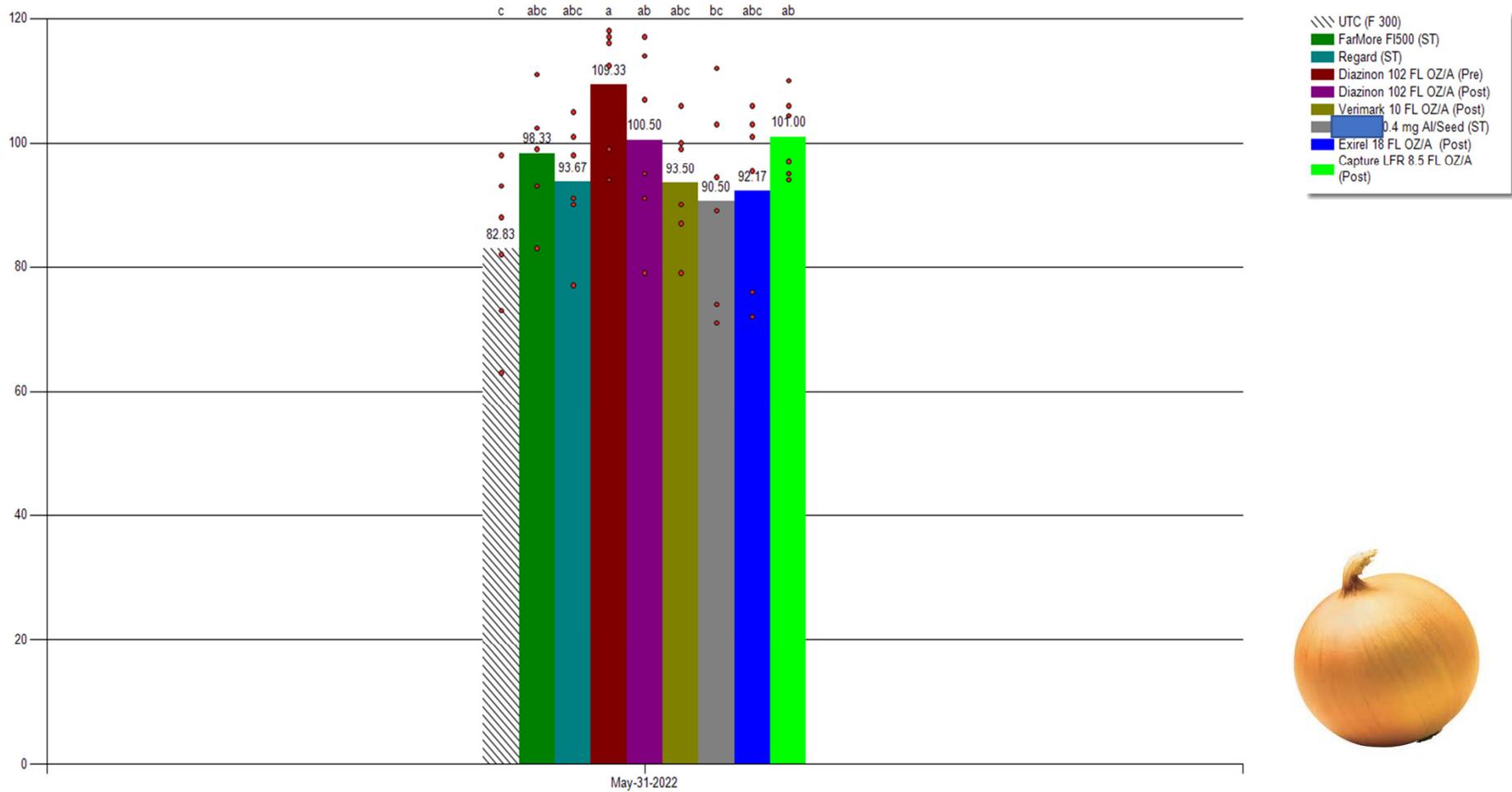


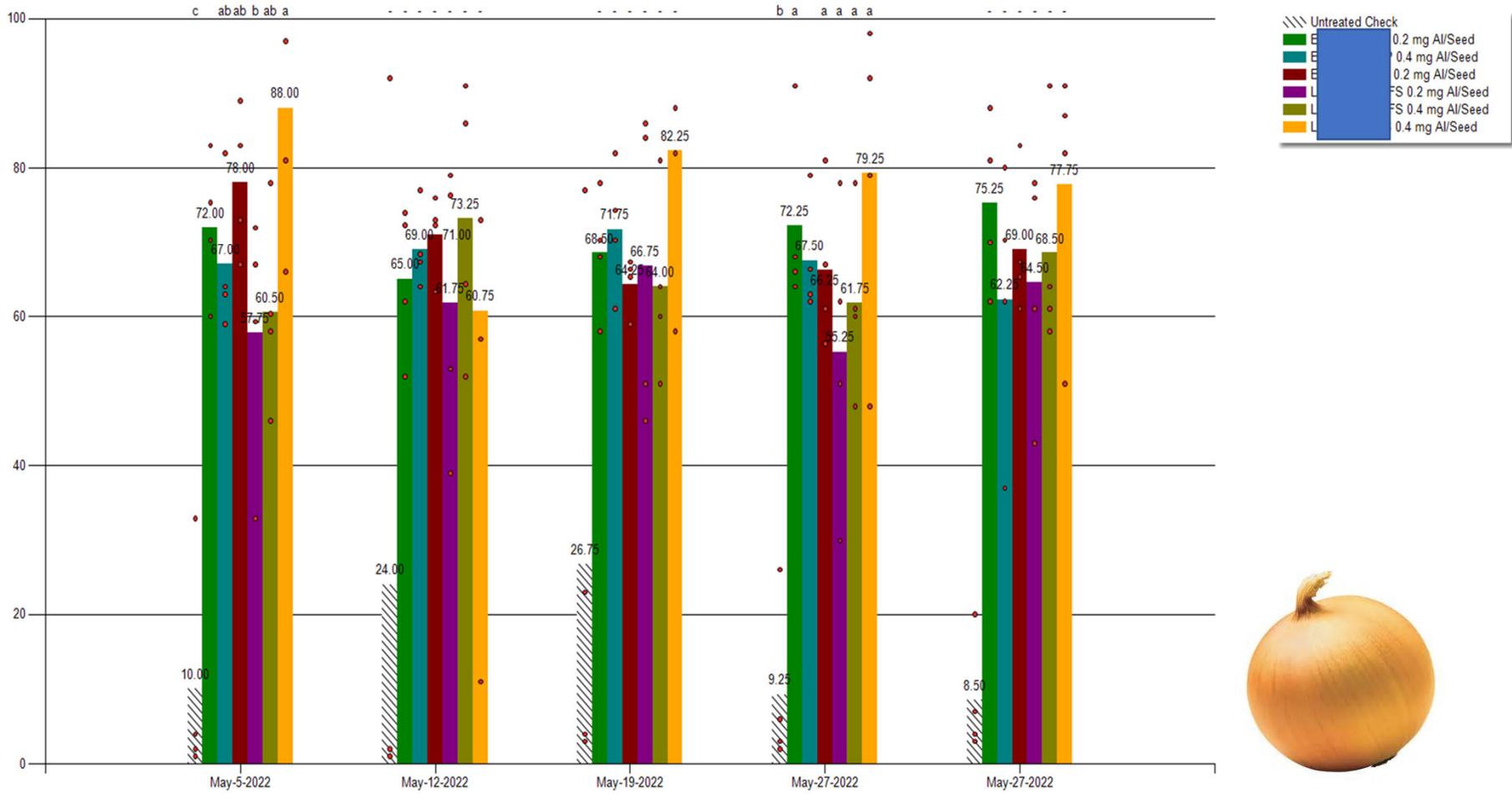
Onion Seed Maggot Syngenta 2015



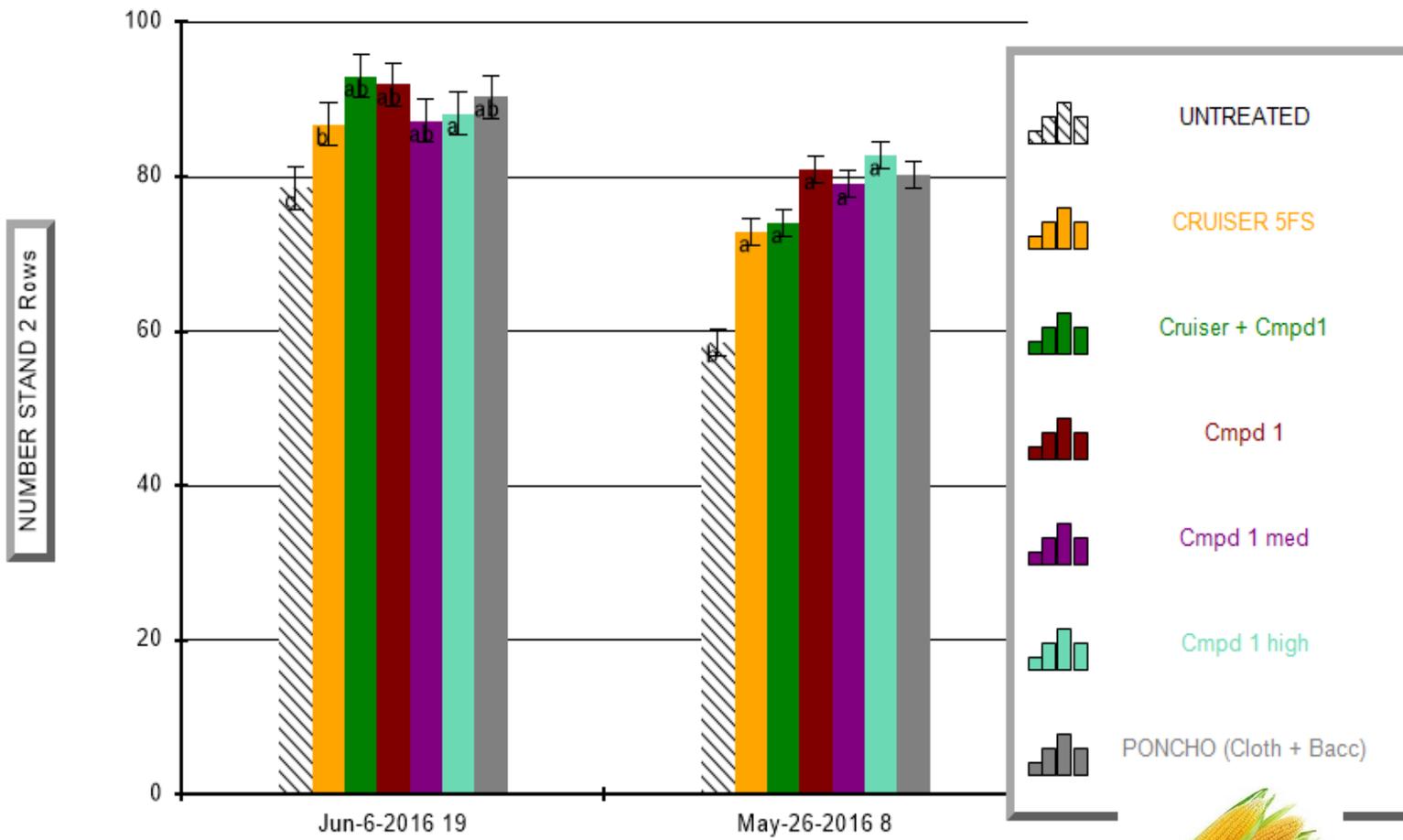
Seedcorn Maggot Onion

NUMBER STACON

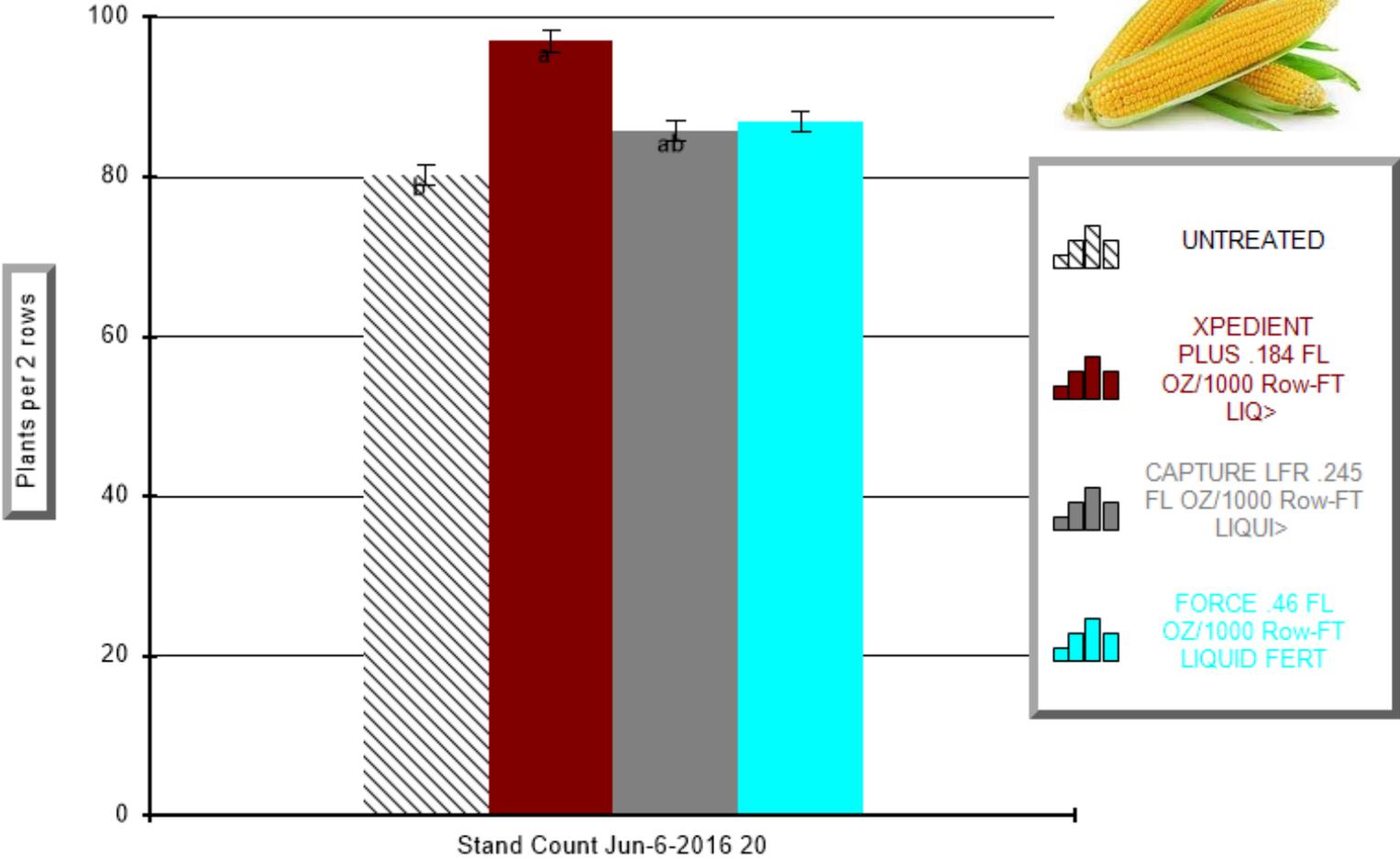




Corn-Seed Corn Maggot-Pasco-2016



Corn-Seed Corn Maggot-Pasco-2016



Control Considerations

- Monitor for Seedcorn maggot prior to planting
- Avoid double cropping with susceptible crops...
- If present consider in furrow, topical or seed treatment
- Timing of planting
- Planting Depth





Walmart U.S. Pollinator Health Position

In 2020, Walmart committed to becoming a regenerative company. As part of this commitment, Walmart and the Walmart Foundation aim to help protect, manage, or restore at least 50 million acres of land and one million square miles of ocean by 2030.

1. Walmart U.S. will source 100% of the fresh produce and floral we sell in our in-store Produce department from suppliers that adopt integrated pest management practices, as verified by a third-party, by 2025. We also encourage fresh produce suppliers to report their pesticide application and biodiversity management annually, through Walmart's annual sustainability surveys.

Third-party certifications that verify IPM adoption or that are protective of pollinator health and include robust IPM criteria include:

As part of this initiative, **we will also encourage fresh produce suppliers to phase out use of chlorpyrifos and nitroguanidine neonicotinoids** (imidacloprid, thiamethoxam, clothianidin, dinotefuran) where applicable unless mandated otherwise by law, and to avoid replacing them with other products with a level I [bee precaution rating](#).

2. To help improve and expand pollinator habitats, Walmart U.S. will:

a. Encourage fresh produce suppliers to protect, restore, or establish pollinator habitats by 2025 on at least 3% of land they own, operate, and/or invest in (e.g., community gardens, pollinator-friendly solar³, sustainable landscapes⁴).



For Immediate Release, January 6, 2022

Lawsuit Launched Challenging EPA's Failure to Protect Endangered Species From Hundreds of Harmful Pyrethroid Pesticides

WASHINGTON— The Center for Biological Diversity filed a [formal notice](#) today of its intent to sue the Environmental Protection Agency for approving more than 300 pyrethroid insecticide products without considering their harm to endangered plants and animals.

The pyrethroid class of insecticides is one of the most harmful groups of pesticides for freshwater wildlife and can injure or kill many other plants and animals, including endangered species. But the EPA has failed to take a single on-the-ground conservation action to protect any endangered species from these toxic chemicals, completely ignoring the clear legal requirements of the Endangered Species Act.

“The EPA admits pyrethroids’ wide-ranging harm to wildlife but still rubberstamps hundreds of pesticide products containing them without assessing their risks to endangered species,” said Lori Ann Burd, environmental health director at the Center. “The EPA needs to get serious and come up with a comprehensive plan to address the havoc these pesticides are wreaking on the environment.”

The EPA has acknowledged the toxicity of pyrethroids to nearly all taxa, including birds, mammals, reptiles, amphibians, aquatic vertebrates and aquatic and terrestrial invertebrates. The harm extends to endangered species like California tiger salamanders, California red-legged frogs and Bay checkerspot butterflies.

In addition, the EPA has characterized pyrethroids as “highly to very highly acutely toxic to honeybees.”

“The EPA has registered pesticide products containing pyrethroids for use in a wide variety of settings, including residential properties, roadsides and public recreation areas. Pyrethroid products have also been authorized for use on crops, including alfalfa, bushberries, citrus, corn, cotton, soybeans, wheat, vegetables, rice, nut and fruit trees, leafy greens, sunflowers, peanuts, tobacco, herbs and spices and stone fruits.

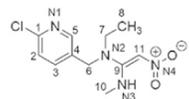
The Center for Biological Diversity is a national, nonprofit conservation organization with more than 1.7 million members and online activists dedicated to the protection of endangered species and wild places.

What we used to do

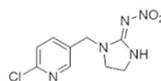
- RIP Lorsban....



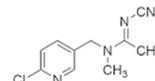
- In Danger are all other things that work reasonably well



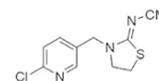
Nitenpyram



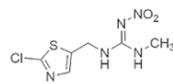
Imidacloprid



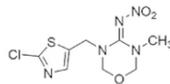
Acetamiprid



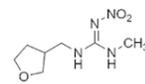
Thiacloprid



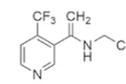
Clothianidin



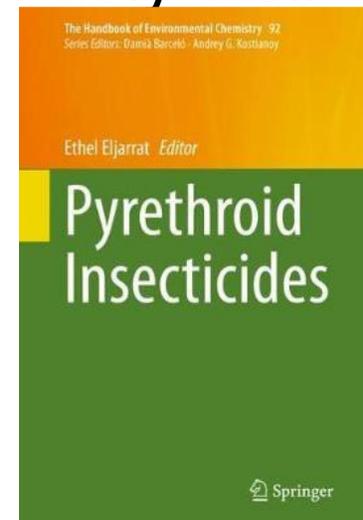
Thiomethoxam



Dinotefuran



Flonicamid



Public Perception

- Most people are not involved in agriculture
- Most people perceive all pesticides to be bad
- Walmart sells countless products that contain neonicotinoids
- Have they ever tried to control fleas on their animals or bed bugs or lice
 - Pyrethroids, neonicotinoids

**Sometimes
you have to
accept the fact
that certain
things will
never go back
to how they
use to be.**

Control

- Crop dependent but...
- Diazinon (typically applied pre-plant and incorporated, not always labeled for SCM) (Carrot, onion, bean, pea)
 - Effective if germination is rapid.
- Lorsban (chemigation, banded after planting or row)
 - Quite effective
- Pyrethroid post plant
 - Only effective on adults, not best strategy
- Verimark/Exirel (cyantraniliprole)
- Pyrethroids banded at plant (Xpedient, Capture, Force etc)
 - Marginally effective for larva



Control Continued

- Seed treatments (Crop dependent too)
- Usually best approach
 - Lorsban*
 - Regard**
 - Lumiverd
 - Cruiser*
 - Gaucho*
 - Poncho
 - Thimet



Products without regulatory or social hurdles??

Control Options	Carrot	Onion	Pea	Bean	Sweet Corn	Cucurbits
Lorsban <i>chlorpyrifos</i>	No	No	No	No	No	
Cruiser <i>thiamethoxam</i>	Yes	Yes	Yes	Yes	Yes	Yes
Poncho <i>clothianidin</i>					Yes	
Gaucho <i>imidacloprid</i>	Yes		Yes	Yes	Yes	
<i>pyrethroids</i>	Yes	Yes	Yes	Yes	yes	Yes
Lumiverd <i>spinosad</i>		Yes				

According to what I could find on 11/7/2022. Please be sure to read labels and follow them. See liability statement at end of presentation.



Disclaimer



- Not all compounds tested are currently registered for use on Onions in Washington State.
- Do not use unregistered compounds
- Consult your local Extension office and read and follow label directions.
- Oregon and Washington labels (PICOL):
<http://cru66.cahe.wsu.edu/LabelTolerance.html>

Acknowledgements

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Tim Waters, Ph. D.
Area Extension Educator Franklin & Benton Co.
Commercial Vegetables
1016 N. 4th.
Pasco, WA 99301
509 545-3511 Phone
509 545-2130 Fax
twaters@wsu.edu
<http://benton-franklin.wsu.edu/agriculture/commerveg.htm>

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