



Japanese beetle

Constant vigilance, accurate identification

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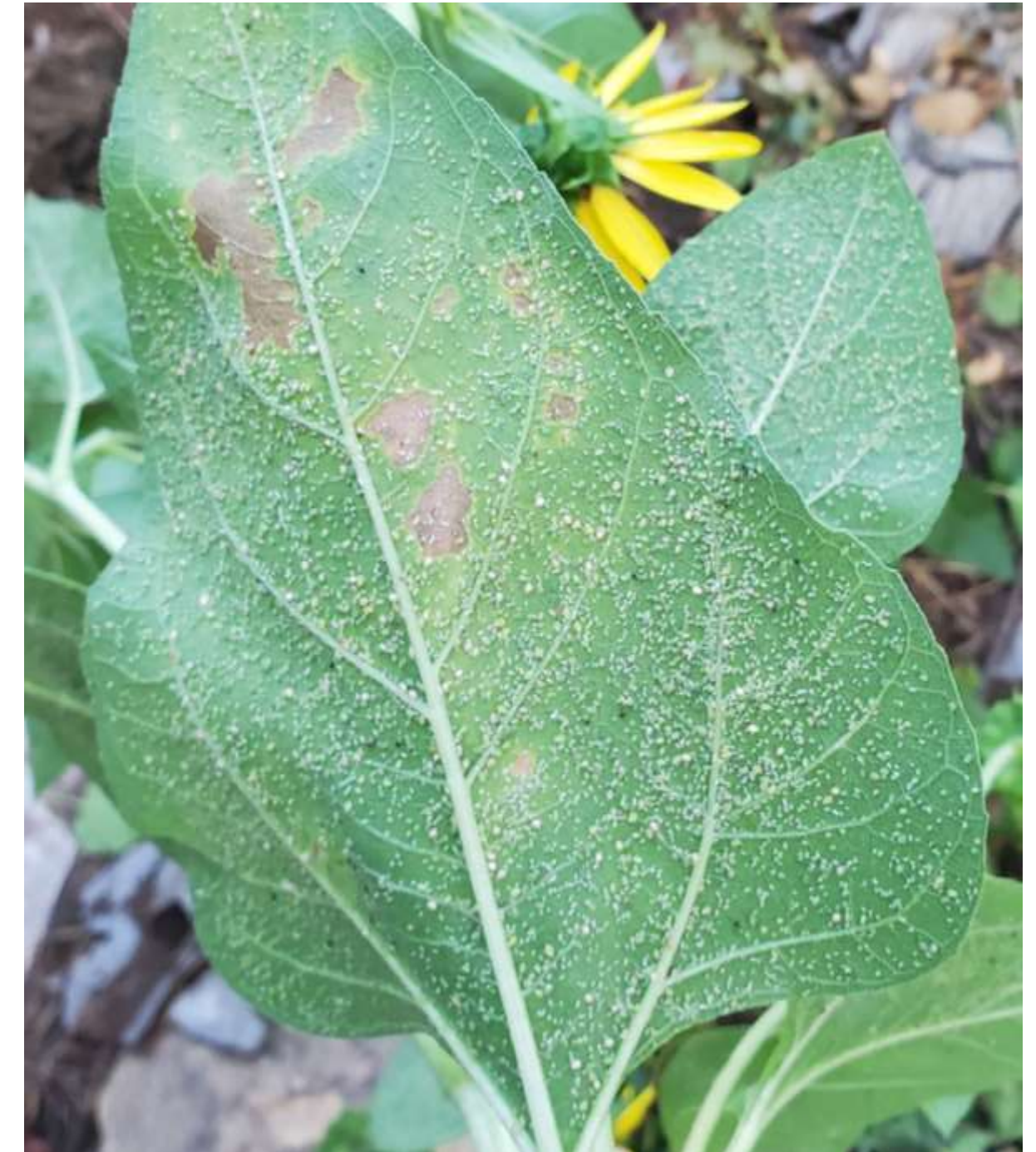
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Objectives

- Identification
- Avoid accidental introductions
- Think like an inspector

The Plant-Insect-Human Relationship



Photos by Bethany Abrahamson

Learning from history...



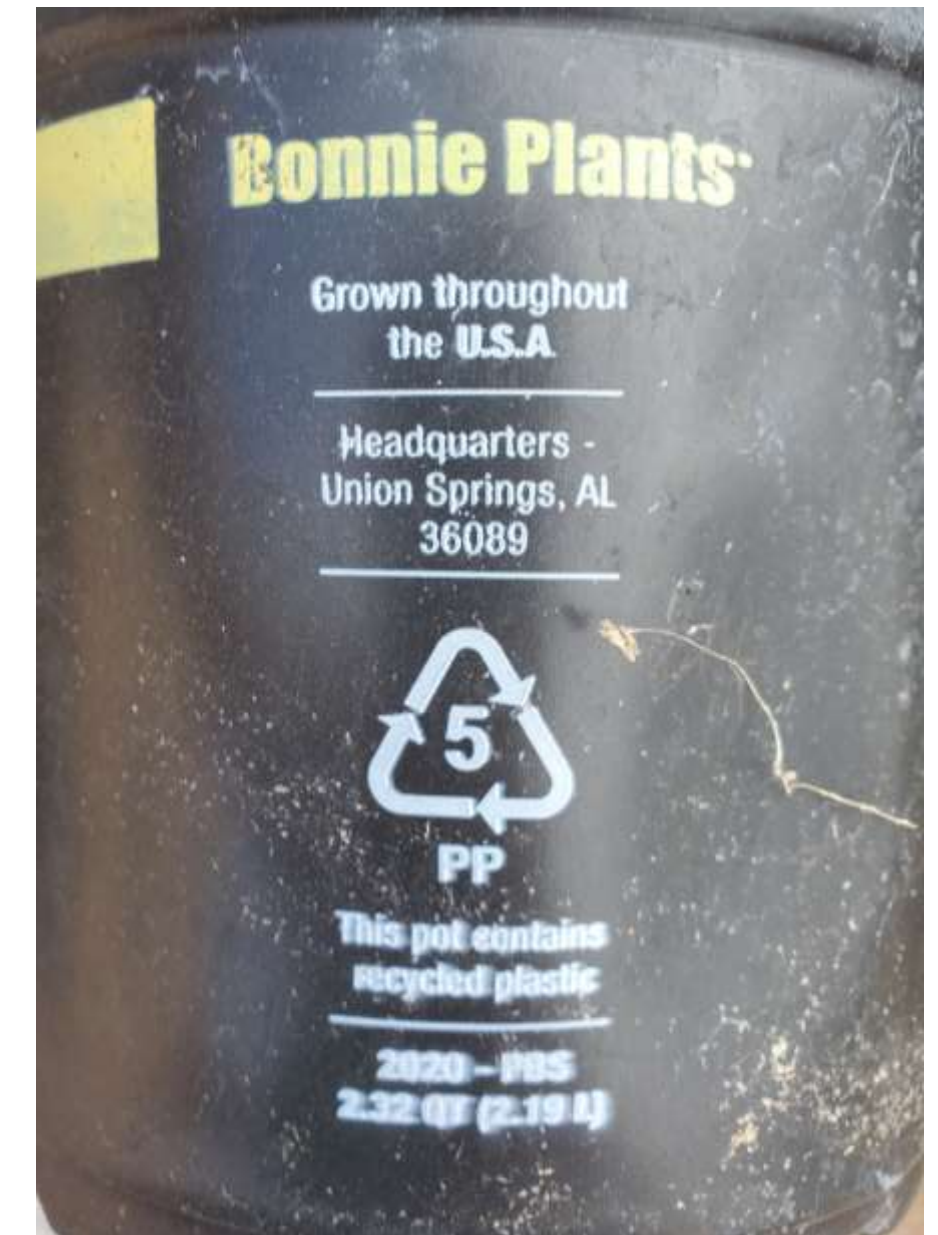
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Photos by Bethany Abrahamson

IPM for invasive pests

Cultural

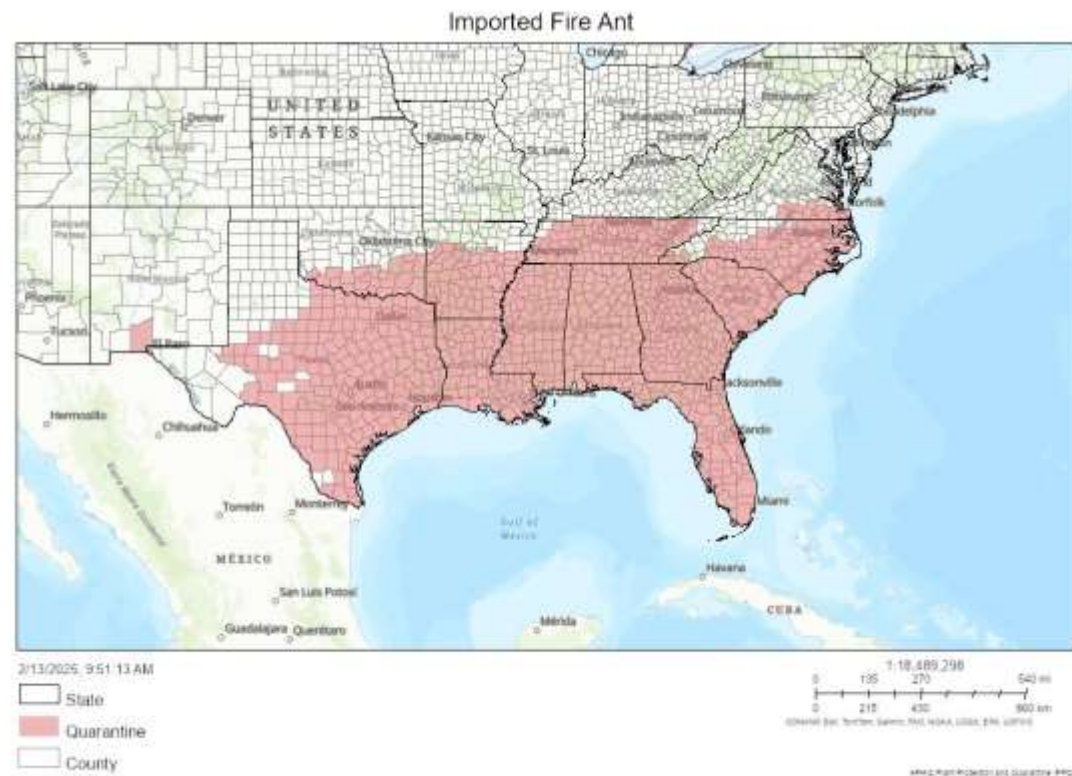


Photo credit: [USDA APHIS PPQ Imported Fire Ant Quarantine](#)

Biological



Photo credit: [Bill McNee, Wisconsin Dept. of Natural Resources, Bugwood.org](#), [CC BY-NC 3.0](#)

Mechanical

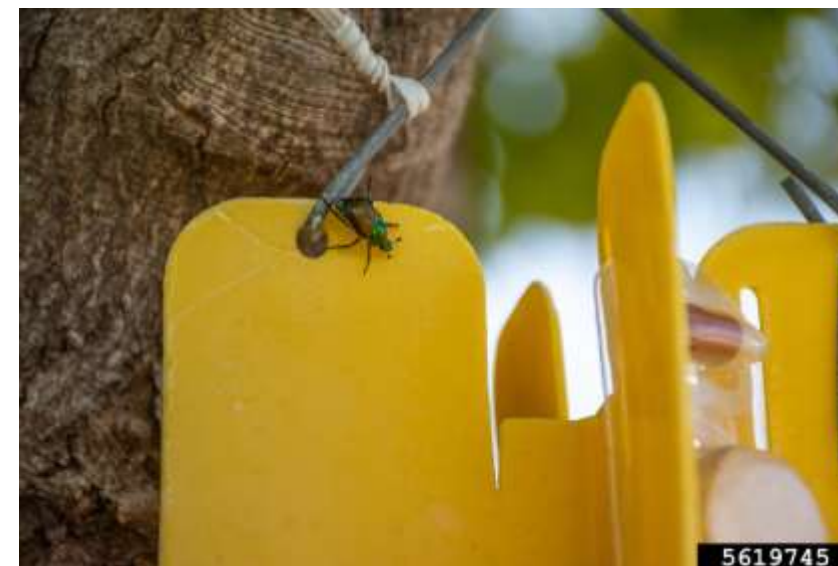


Photo credit: [Kara Salp. Washington State Department of Agriculture, Bugwood.org, CCA](#)
3.0

Chemical



Photo credit: [USFS Northeastern Area, State & Private Forestry Archives, Bugwood.org](#), CC BY 3.0 US

Quarantines, inspection, and outreach



Photo credit: [Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org](#) . CC BY-NC 3.0 US



Unknown. undated. "Cazador, screwworm detector dog, at work with Dr. John B. Welch." Special Collections, USDA National Agricultural Library. Accessed June 12, 2025, <https://www.nal.usda.gov/exhibits/speccoll/items/show/12287>.

‘Murder hornets in the U.S.’: The Rush to Stop the Asian Giant Hornet

(Mike Baker, *The New York Times* May 2020)

- Impacts (Skvarla et al. 2022)
 - Sparked identification requests within two days
 - More than doubled identification requests in May 2020 at PSU
 - Labs can be overloaded with identifications



Photo credit: [David Cappaert, Bugwood.org](https://bugwood.org/), [CC BY-NC 3.0 US](https://creativecommons.org/licenses/by-nc/3.0/us/)

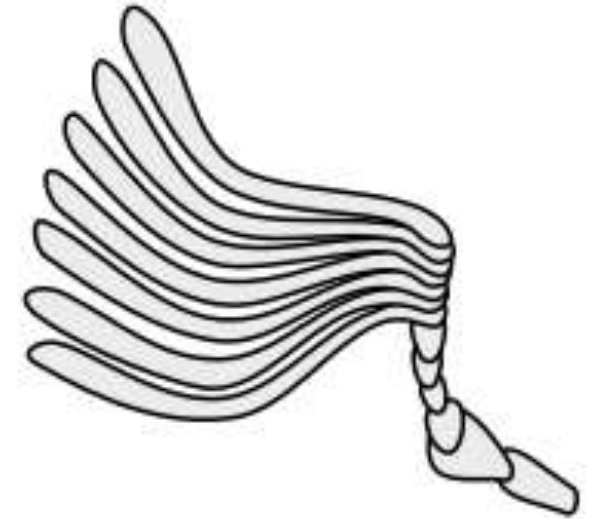
Japanese beetle

Popillia japonica

Family: Scarabaeidae

Native to Japan

New Jersey nursery- 1916



[MA Broussard via Wikimedia Commons](#), [CC BY-SA 4.0](#)

Japanese beetle ID

Adults:

- 1/2 inch
- Copper wing covers (elytra)
- Emerald body
- White tufts / stripes

Larvae:

- “White grub” (not billbug)
- C-shaped
- Legs
- GrubID (Cornell University CALS)



Photo credit: [Leslie J. Mehrhoff, University of Connecticut, Bugwood.org, CCA 3.0](#)



Photo credit: [David Cappaert, Bugwood.org, CCA-N 3.0](#)

Photos by Marisa Thompson



[Whitney Cranshaw, Colorado State University, Bugwood.org](https://bugwood.org)



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Lookalikes



Photo by Miranda Kersten, NMSU

Cucumber beetle

- Spotted (*Diabrotica undecimpunctata*) or striped (*Acalymma trivittatum*)
- $\frac{1}{4}$ inch long
- Chew undersides of leaves, larval damage is minimal
- Vector bacterial wilt
- Management
 - Remove infested material
 - Row covers
 - Kaolin clay



Photo credit: [David Cappaert, Bugwood.org](#), [CC BY-NC 3.0 US](#)

Lookalikes

False Japanese beetle/ Spring rose beetle



Photo credit: cropped from image 1243049, [Whitney Cranshaw, Colorado State University, Bugwood.org](#), [CCA 3.0](#)

False Japanese beetle (*Strigoderma arbicola*)

- Spring rose beetle
- Brown/black, no white tufts
- Emerges earlier than JB, similar life cycle
- Adults chew on flowers, larvae chew on roots of some crops
- Management
 - Netting
 - Nematodes
 - No pesticides



Photo credit: [David Cappaert](#),
[Bugwood.org](#), [CC BY-NC 3.0 US](#)

Lookalikes

Hairy bear beetle

- *Paracotalpa* spp. (*granicollis* or *puncticollis*)
- Fuzzy, different coloration
- *Paracotalpa granicollis*: ½ - ¾ inch
- Juniper woodlands



Photo credit: Checkermallow, [Public Domain image](#), [Flickr.com](#)



Photo credit: [David Cappaert](#),
[Bugwood.org](#), [CC BY-NC 3.0 US](#)

Lookalikes



Photo credit: [Emmy Engasser](#), [Hawaiian Scarab ID](#), [USDA APHIS PPQ](#), [Bugwood.org](#), [CCA-N 3.0](#)

Figeater beetle

Green June beetle

- Cultural
 - Clean up organic matter
 - Compost with screened bins
- Chemical
 - Not recommended

Look-alikes

Sphenophorus Bill bugs/weevils



No legs

Photo credit: [Whitney Cranshaw, Colorado State University, Bugwood.org, CC BY 3.0 US](#)

Photo credit: [David Cappaert, Bugwood.org, CCA-N 3.0](#)



Masked chafer



[Michael Reding, USDA Agricultural Research Service, Bugwood.org](#)

Look-alikes

Look at the raster!



Photo credit: [Michael Reding, USDA Agricultural Research Service, Bugwood.org, CC BY 3.0](#)



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aces.nmsu.edu

UGA5171044

White grub management

- Cultural
 - Sod replacement
 - Healthy, long
 - Watering?
- Biological
 - ~~Milky spore~~
 - Bt
 - Nematodes
 - Scoliid, tephritid wasps, bee flies, robber flies
- Chemical
 - Preventive
 - Eggs/young grubs



Northern masked chafer. Photo credit: [Michael Reding, USDA Agricultural Research Service, Bugwood.org, CC BY 3.0 US](#)

Billbug

Management



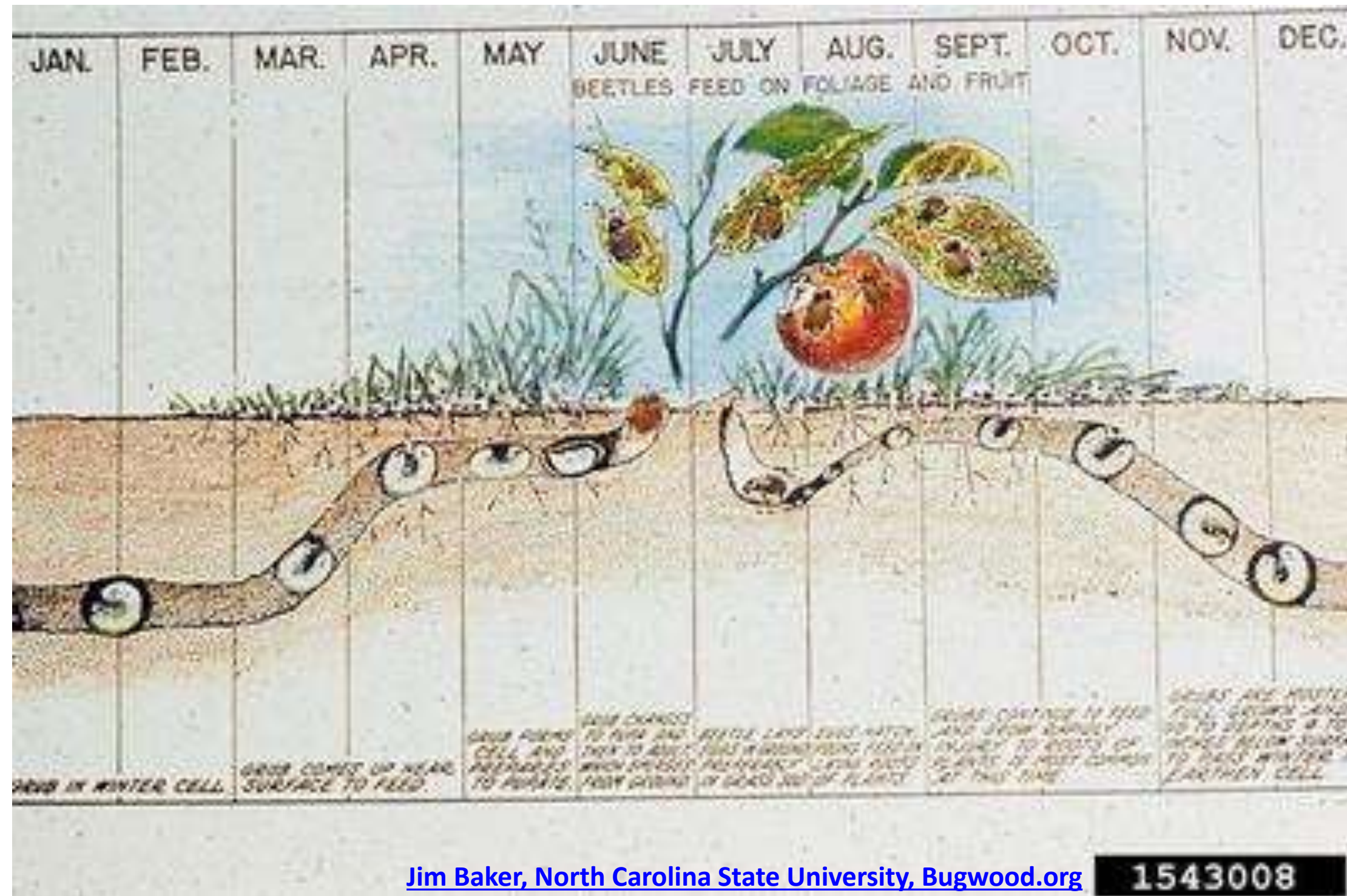
Photo credit: [David Shetlar, The Ohio State University, Bugwood.org](#), [CC BY-NC 3.0 US](#)

- Cultural
 - Resistant grasses
- Biological
 - ~~Milky spore~~
 - Bt
 - Nematodes
- Chemical
 - Target adults (**ID is Key**)

Back to Japanese beetle..



Life Cycle

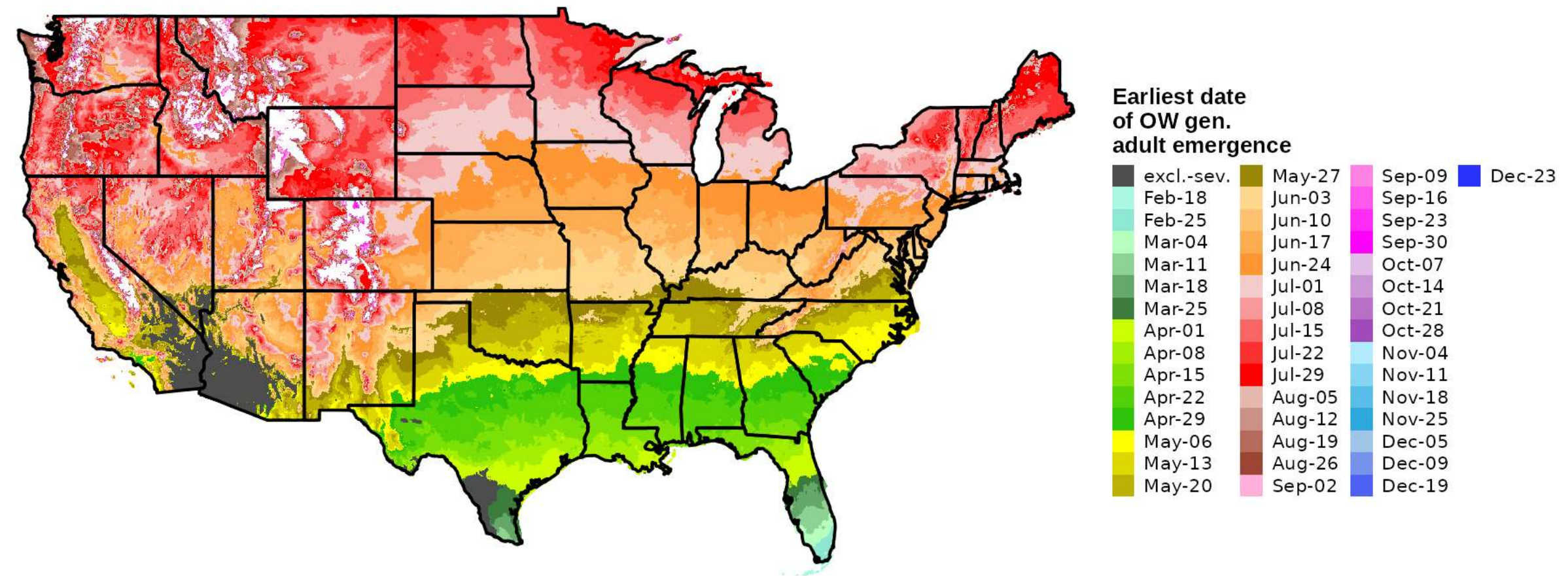


Emergence

- Adult flight period
 - “June-September”
 - May occur as early as April and as late as July
- 572-1195 GDD (USDA)
- Cool, moist soil (Cloyd 2020)
- Males emerge first
- Highest numbers emerge around 1 mo. after initial emergence
- Adult lifespan: 9-105 days
 - Sex
 - Temperature
 - Typically 30-45 days

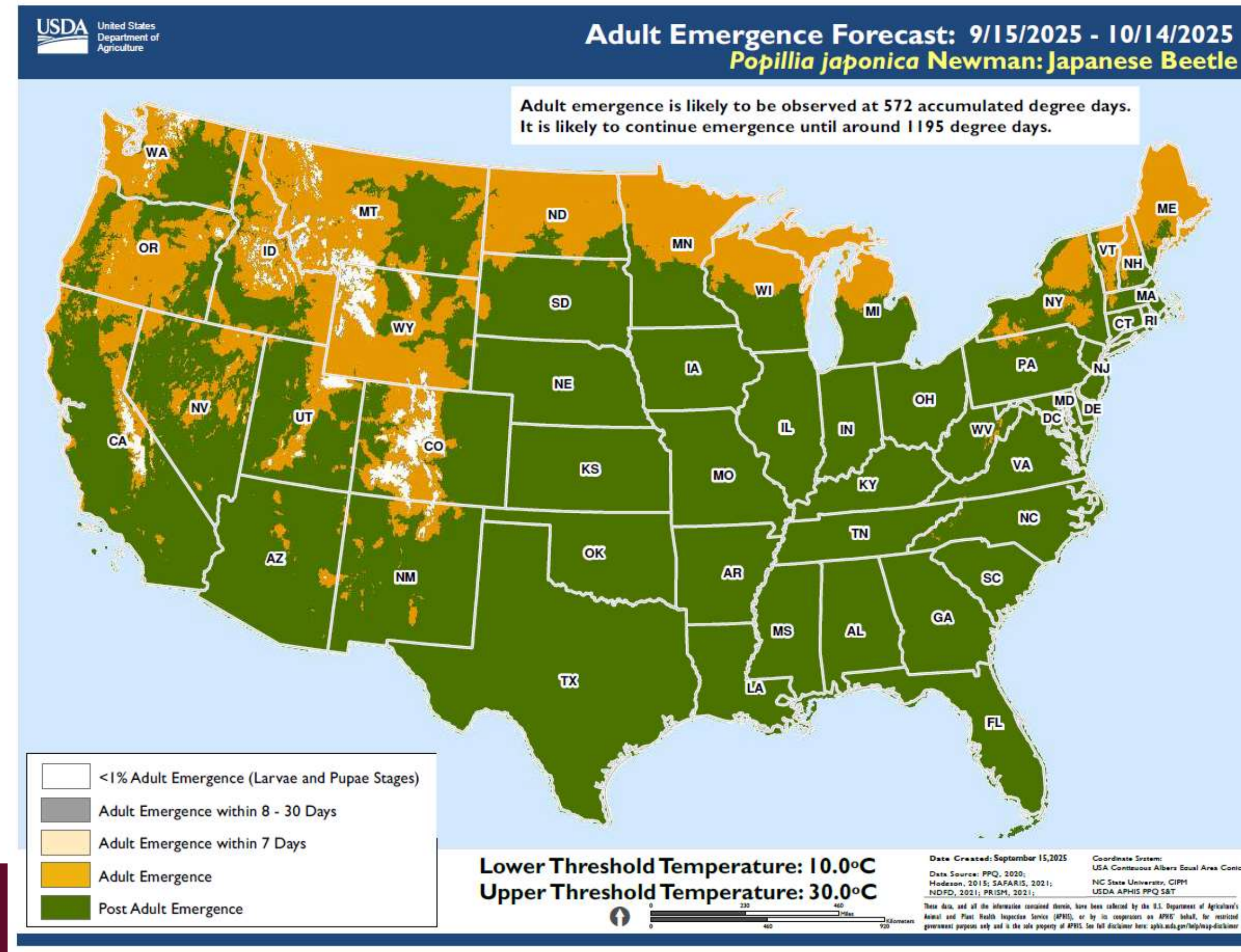
Japanese beetle: Earliest date of OW gen. adult emergence w/ climate stress exclusion 2025

Maps and modeling 09/15/2025 by Oregon State University IPPC USPEST.ORG and
USDA-APHIS-PPQ; climate data from OSU PRISM Climate Group



https://uspest.org/CAPS/JPB_cohorts/JPB_Earliest_PEMp0Excl1_20251231.png

Emergence



Dispersal

- Natural Dispersal
 - Dispersal models: ~4.9-9.3 miles/year (Zhu et al. 2023)
 - Buffer zone: 1 mile (JB Harmonization Plan)
- Human-assisted dispersal
 - Movement of soil
 - Businesses
 - Individuals
 - Online purchases
 - Quarantines



[Karla Salp, Washington State Department of Agriculture, Bugwood.org](https://www.bugwood.org/bugwood/photos/5619754)

Adult Feeding

- Foliage and flowers
 - Upper leaf surface
- Active during the day
- Skeletonize leaves
- Usually only affects appearance (Hahn et al. 2025)



[Steven Katovich, Bugwood.org](#)



Photo credit: [Leslie J. Mehrhoff, University of Connecticut, Bugwood.org, CCA 3.0](#)

Food Sources

300+ native and introduced species, weeds and specialty plants

Trees	Ornamentals	Crops	Grasses
Apple, Apricot, Birches, Cherry, Crabapple, Crepe myrtle, Elms, Maples, Oaks, Peach, Willows, Wisteria	Calendula, Dahlia, Evening Primrose, Geranium, Hollyhocks, Houseplants, Peony, Roses, Sunflower, Zinnia	Alfalfa, Asparagus, Beans, Beet, Berries, Corn, Cotton, Grapes, Orange, Strawberry, Quince	Any Poaceae (not Juncus, Dracaena, etc.)

Oviposition

- Mate many times throughout adult life
- Site selection
 - Proximity to host, ground cover, soil condition
 - Pastures, lawns, turf near host plants, loose and moist soil
- 2-4 in. burrow
- 1-3 eggs per burrow every 1-4 days, interspersed with feeding
- 40-60 eggs per female



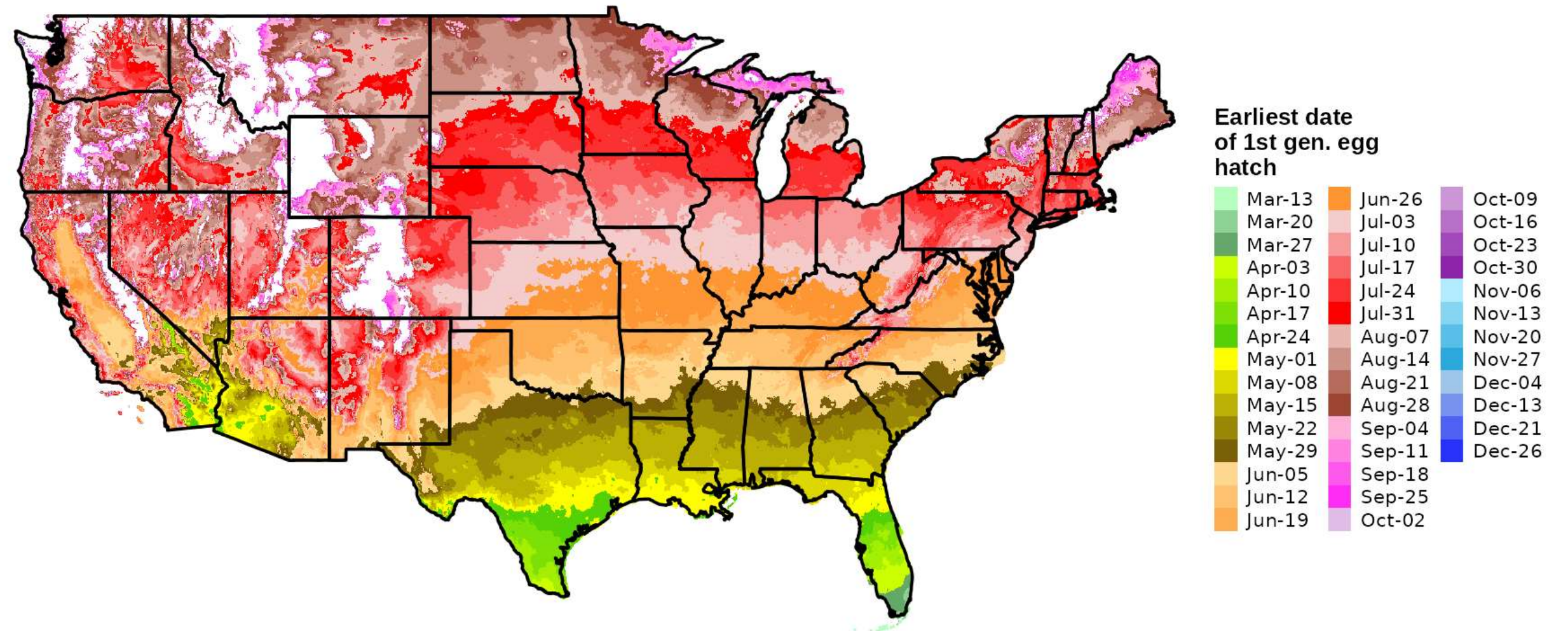
[Karla Salp, Washington State Department of Agriculture, Bugwood.org](http://Bugwood.org)

Egg Hatch

- 10-14 days

Japanese beetle: Earliest date of 1st gen. egg hatch 2025

Maps and modeling 09/15/2025 by Oregon State University IPPC USPEST.ORG and
USDA-APHIS-PPQ; climate data from OSU PRISM Climate Group



Larval Feeding

- Root chewing causes drought symptoms
- 1st instar: 2-3 wks
- 2nd instar: 3-4 wks
- Overwinter as 3rd instar



Photo credit: [MG Klein](#), [USDA Agricultural Research Service](#), [Bugwood.org](#), [CCA-N 3.0](#)

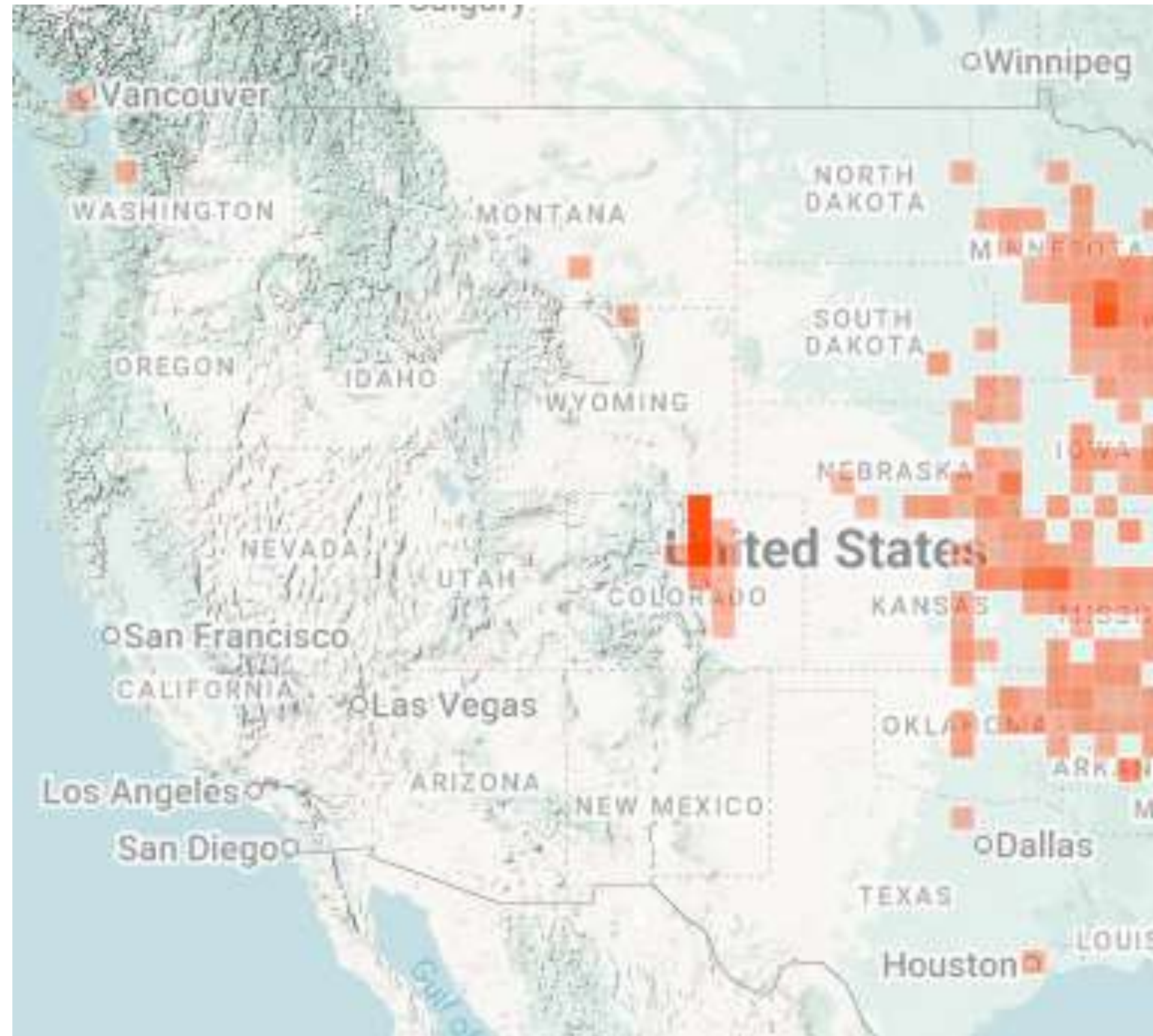
Overwintering

- Cessation of activity at 50 degrees F
- Overwinter 2-6 inches underground
- Survive to 9 degrees F (soil, snow insulates)
- Move back upward to feed for 4-6 weeks, pupate
- Pupation 1-3 weeks

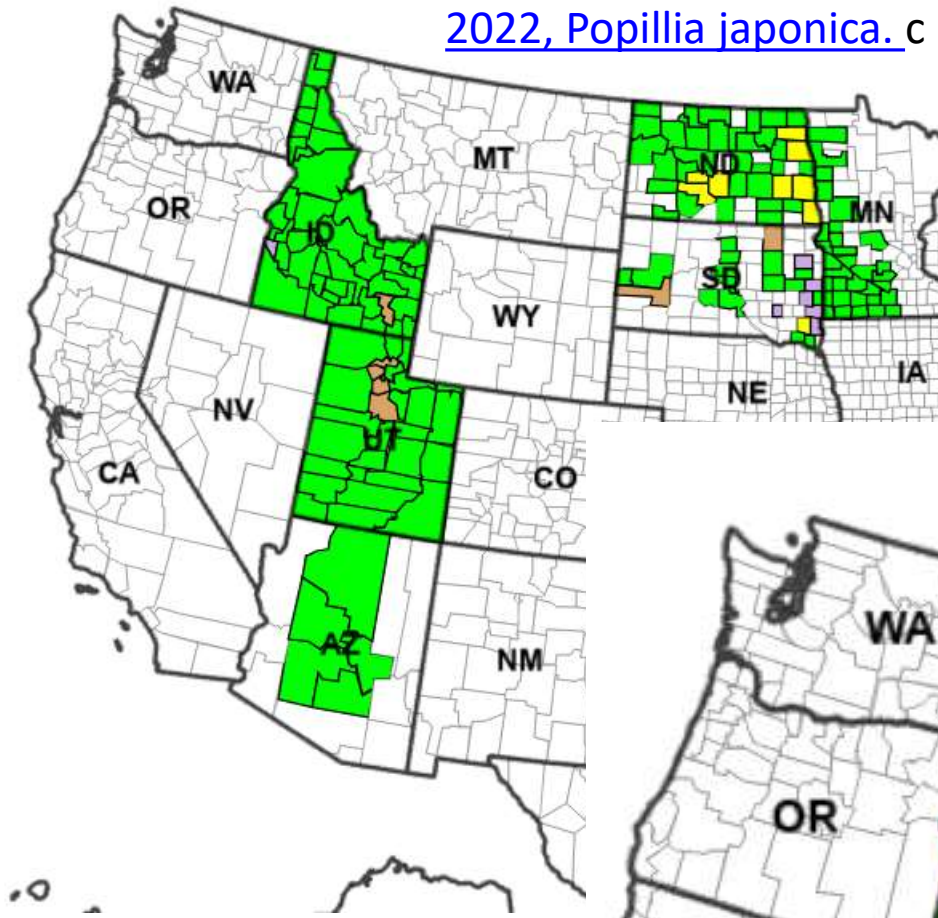


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Where is it now?

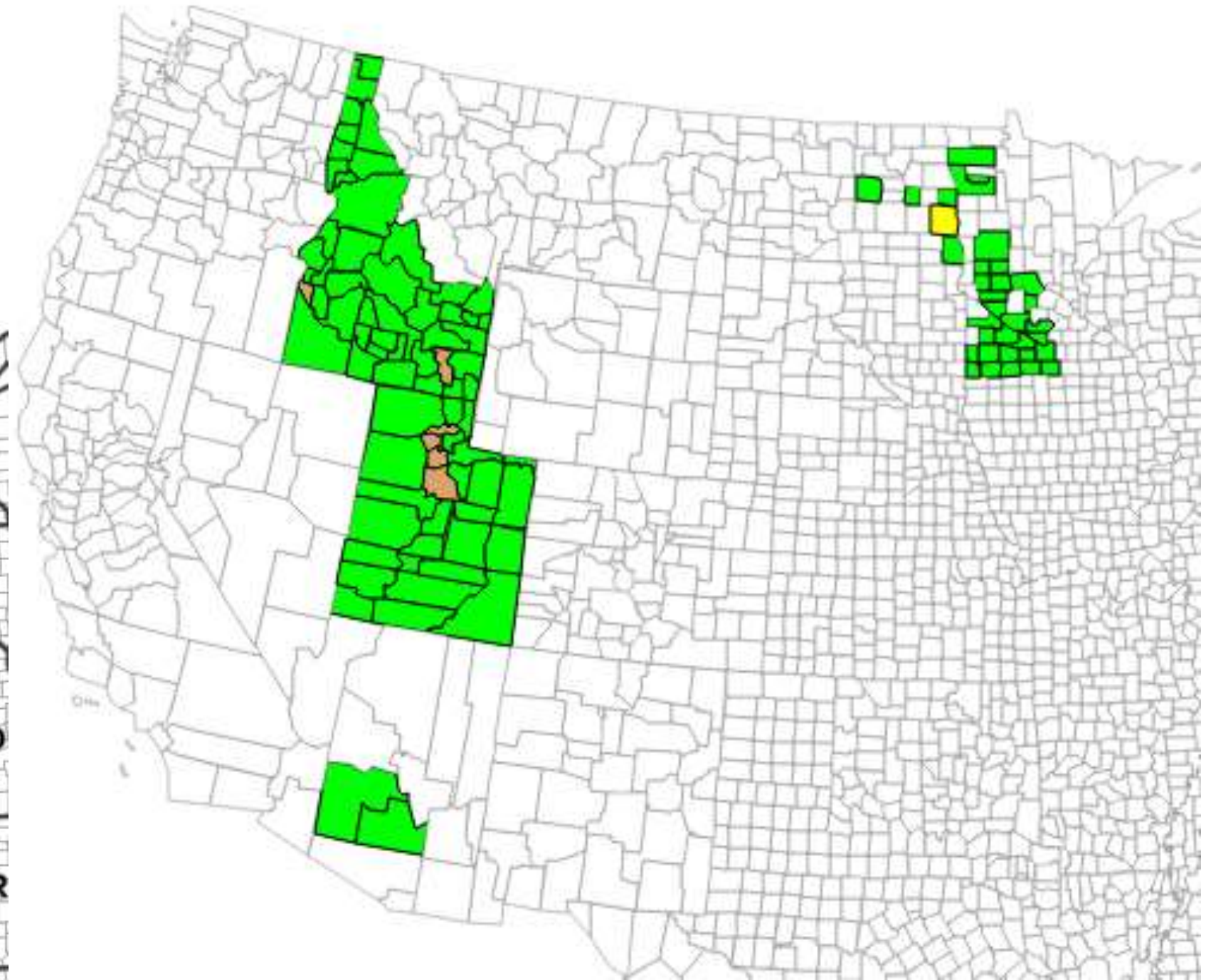
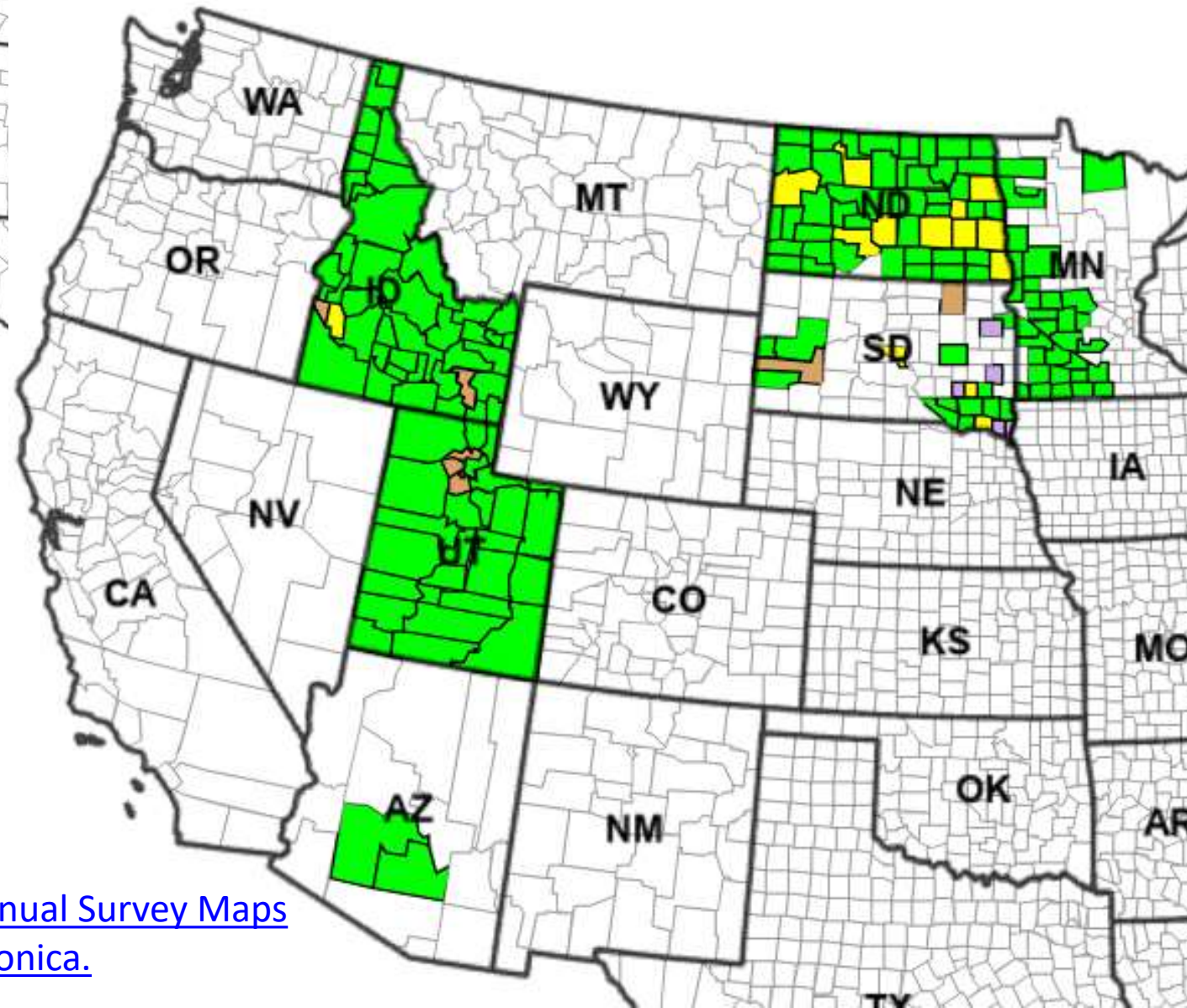


[iNaturalist sightings of *Popillia japonica*, 1 Jan-10 Oct 2025](#). Map data 2025 Google.
Accessed 10 Oct. 2025



Where is it now?

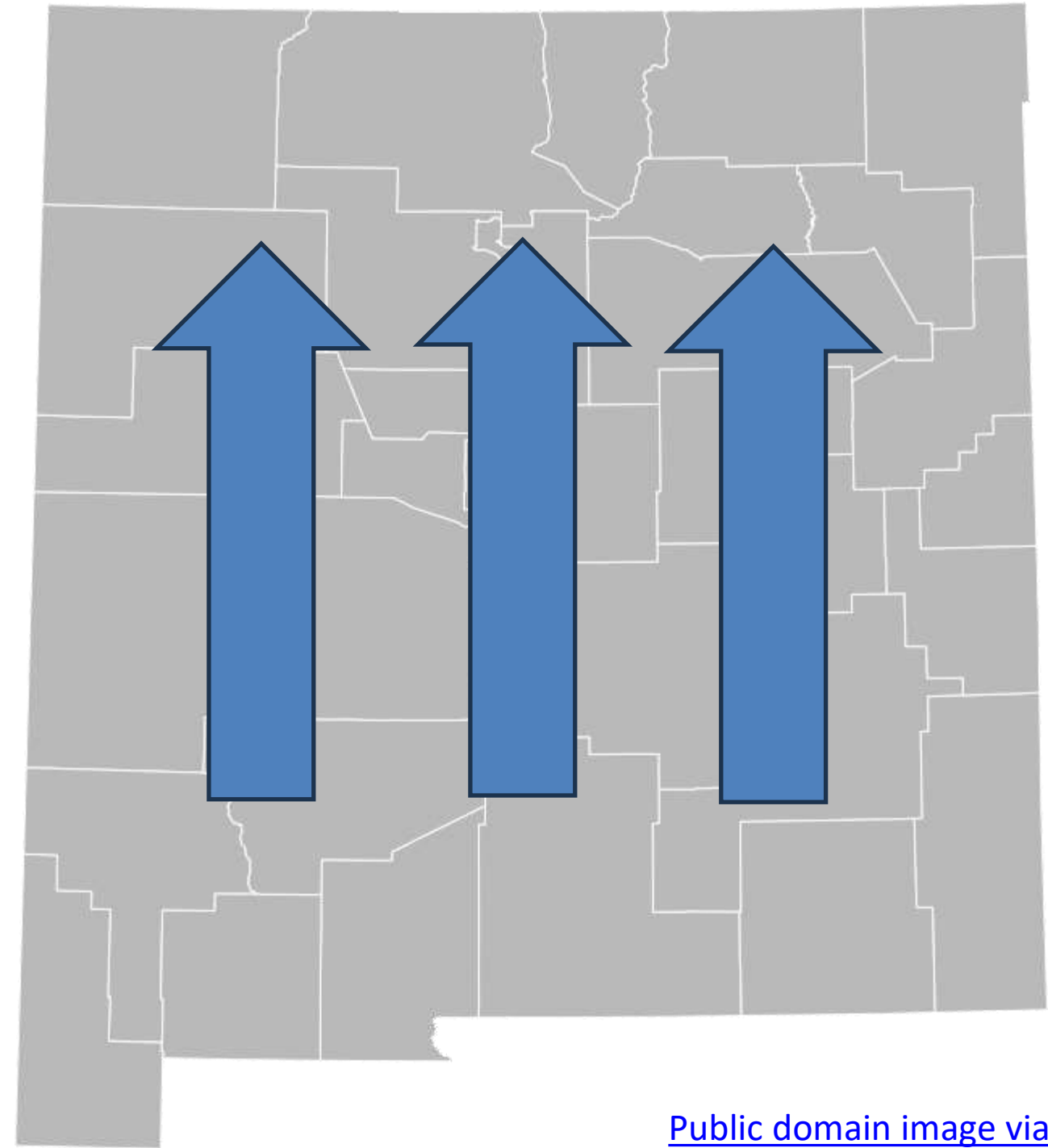
[Pesttracker.org](https://pestracker.org) Annual Survey Maps
2023, *Popillia japonica*.



[Pesttracker.org](https://pestracker.org) Annual Survey Maps
2024, *Popillia japonica*.

Projected Range and Climate Change

- Currently bound by humid and hot conditions South, cold winters North'
- Hotspots: urban areas, agricultural areas
- Increased winter temps = Northern colonization
- Increased overall temperature + decreased moisture = Southern habitat less suitable
- Irrigated areas still at risk
- Declines in JB populations in Arkansas
- Range expected to move northward by 2050



[Public domain image via Wikimedia Commons](#)

Management

- Monitoring
 - Trapping
- Cultural
 - Quarantine, compliance agreements
- Physical/Mechanical
 - Hand-removal in early morning
- Biological (USDA APHIS 2020)
 - Natural enemies
 - *Ovavesicula popilliae*-Microsporidian
 - Winsome fly (*Istocheta aldrichi*)
 - Spring tiphia (*Tiphia vernalis*)
 - *Tiphia popilliavora*

[Michael Reding, USDA Agricultural Research Service, Bugwood.org](#), [CC BY NC 3.0 US](#)



[Whitney Cranshaw, Colorado State University, Bugwood.org](#), [CC BY NC 3.0 US](#)

Chemical Management

- Depends on mode of application and life stage to be targeted
- Japanese Beetle Harmonization Plan
 - Bifenthrin
 - Chlorpyrifos
 - Imidacloprid
 - Others
- Always follow the label



Spraying for Japanese beetle.

[Unknown author, Public domain image via Wikimedia Commons](#)

Cost

- Infested areas:
 - Turf and ornamental: \$450 million/year in management (2002)
 - \$460 million/year in losses due to infestation (2015)
- Case Study: Oregon
 - 2016, 369 beetles → 2017, 24k beetles
 - on 8th year of JB treatments
 - Estimated \$45.5 million in total economic impact (2017)
 - Unknown environmental impact (many native hosts)
 - Recently lost funding for the program ([ODA](#))
- Increased pesticide use, damaged landscapes, damaged commerce



Photo credit: [Kara Salp. Washington State Department of Agriculture, Bugwood.org, CCA 3.0](#)

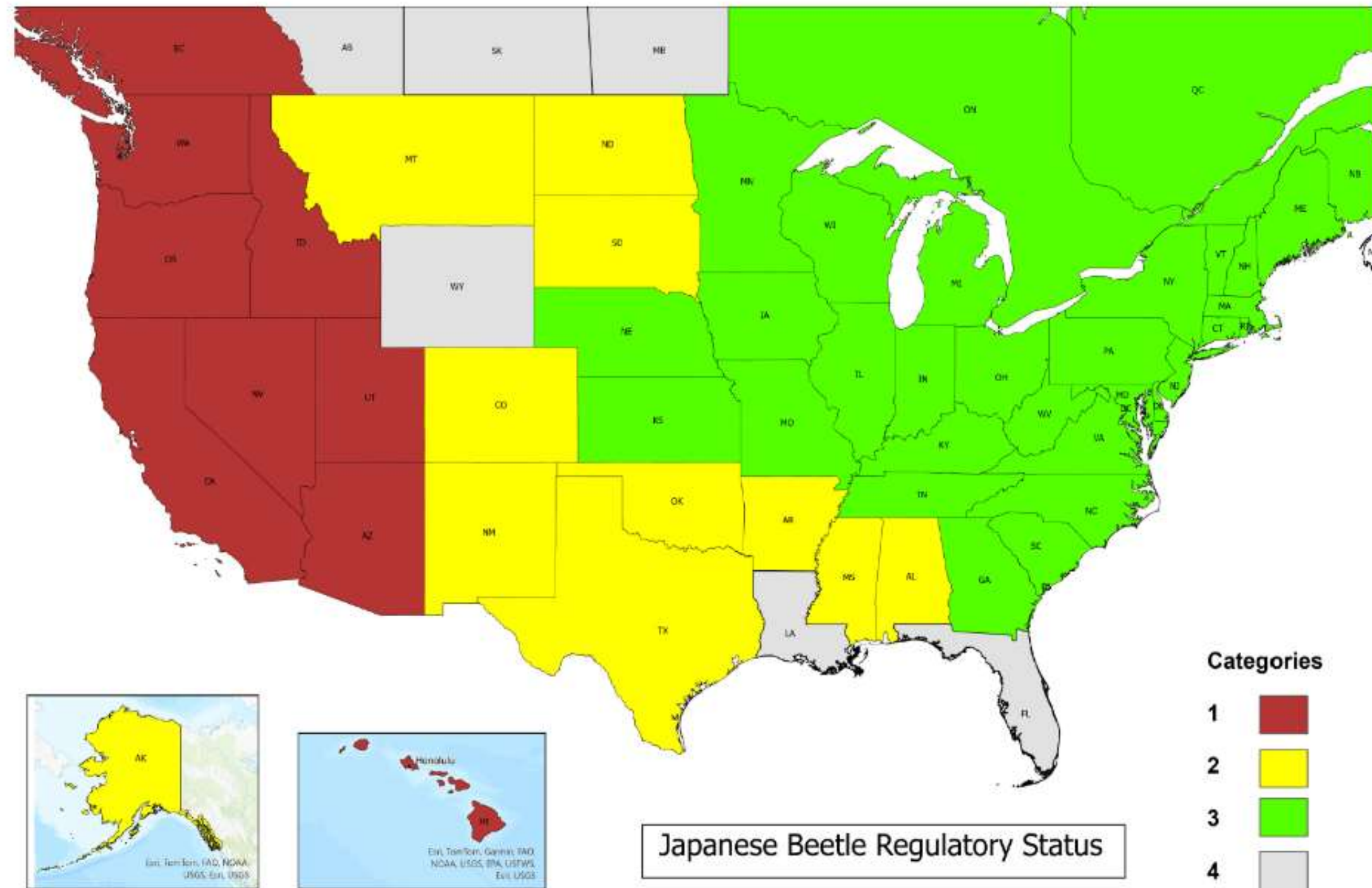
JB Harmonization Plan

- National Plant Board
- Categorized states
 - 1- Uninfested
 - 2- Uninfested/Partially Infested
 - 3- Partially or Generally Infested
 - 4- Historically Not Known To Be Infested/Unlikely to Become Infested
- Established parameters for compliance agreements, trapping protocols, treatment (dip, drench, media incorporation, fumigation, adult mitigation)



[Darren Blackford, USDA Forest Service, Bugwood.org](#) . [CC BY-NC 3.0 US](#)

**Map of the United States and
Canada** *as of December 12, 2024



Japanese Beetle Harmonization
Plan, National Plant Board, p. 31

JB in NM

JBHP: “Category 2”

At risk: Homes, parks/recreation,
farmland/crops

Detection survey and negative detection
trapping at nurseries for export

Various introductions and eradications

Eradication efforts

- Trace-backs
- Stop sales/quarantine
- Treatments
- Removal



Photo credit: [Kara Salp, Washington State Department of Agriculture, Bugwood.org](#),
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JB survey (They're everywhere!)

Lure

Wind direction

43% captured if attracted (Guignard et al. 2025)

Photo by Bethany Abrahamson

JB

Quarantine

NMDA: [NMAC 21.17.21](#)

USDA: regulates airports, works with states

Federal vs. state quarantines



Photo credit: [Raysonho @ Open Grid Scheduler / Grid Engine, Wikimedia Commons, CC0 1.0](#)

21.17.27.8 JAPANESE BEETLE EXTERIOR QUARANTINE:

A. **Pest:** Japanese beetle, *Popillia japonica*.

B. **Areas under quarantine:** States of Alabama, Arkansas, Colorado, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, West Virginia, and Wisconsin.

C. Any areas not listed in Subsection B of 21.17.27.8 NMAC where Japanese beetle has been found or areas where Japanese beetle is believed to occur shall be included as an area under quarantine.

D. **Regulated articles:**

(1) Japanese beetle in any living state of development.

(2) Grass and grass sod, regardless of container size.

(3) Nongramineous plants with roots and soil or soilless medium attached and growing in containers that have a horizontal surface area equal to or greater than 113 square inches (i.e. 12 inch diameter pot) or shipped as “ball and burlap” with rootballs equal to or greater than 12 inches in diameter; houseplants grown in the home and not for sale are exempt.

(4) Bulbs, corms, tubers, and rhizomes, unless free of soil.

(5) Any other product, articles, or means of conveyance of any character whatsoever, not covered by this subsection, are regulated articles when it is determined by the department that they present a risk of spreading Japanese beetle and the person in possession thereof has been so notified.

[21.17.27.8 NMAC - N, 06/30/11]

21.17.27.9 RESTRICTIONS:

A. All regulated articles are prohibited entry into New Mexico from areas under quarantine unless they have the required certificate. A phytosanitary certificate or compliance agreement issued by an authorized state agricultural official of the origin state must accompany regulated articles moved from the quarantined area into New Mexico. Compliance agreements must be preapproved by the New Mexico state plant regulatory official prior to shipment. The certificate must state that the regulated article is certified free of Japanese beetle based on one of the following options.



Photo credit: [Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org](#) . CC BY-NC 3.0 US

What Can You Do?

NMDA

<https://nmdeptag.nmsu.edu/>

**Entomology and Nursery
Industries**

575-646-3207

Understand the quarantine

Spend time in your garden and
natural spaces

Let traps do their job

Identify JB correctly



Emerald ash borer



Photo credit: [Daniel Herms, The Ohio State University, Bugwood.org, CC BY 3.0 US](#)



Photo credit: [Kenneth R. Law, USDA APHIS PPQ, Bugwood.org, CC BY 3.0 US](#)



Photo credit: [Debbie Miller, USDA Forest Service, Bugwood.org, CC BY-NC 3.0](#)

Pecan weevil



UGA1235221

Photo credit: [Clemson University- USDA Cooperative Extension Slide Series](#), [Bugwood.org](#), CC BY 3.0 US

- BB-shaped holes in nuts
- Traps
- [Life Cycle](#)

Photo credit: [H C Ellis, University of Georgia, Bugwood.org](#), CC BY 3.0 US



UGA2666043

Spotted lanternfly



Photo credit: [USDAgov via Flickr](#), [PDM 1.0](#)



Photo credit: [USDAgov via Flickr](#), [PDM 1.0](#)



Photo credit: [USDAgov via Flickr](#), [PDM 1.0](#)

Cactus moth

Photo credit: [Ignacio Baez, USDA Agricultural Research Service, Bugwood.org](#),
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Photo credit: [Ignacio Baez, USDA Agricultural Research Service, Bugwood.org](#), [CC BY-NC 3.0](#)

Box tree moth



Photo credit: [USDAgov via Flickr, PDM 1.0](#)



Photo credit: [USDAgov via Flickr, PDM 1.0](#)



Photo credit: [USDAgov via Flickr, PDM 1.0](#)

Northern giant hornet



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NMDA

<https://nmdeptag.nmsu.edu/>

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**USDA APHIS's Plant Pests
and Diseases Website:**

[https://www.aphis.usda.gov/
plant-pests-diseases](https://www.aphis.usda.gov/plant-pests-diseases)

Pestalerts.org



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