



# **Invasive Insect Pests**

**Winter Pesticide Recertification Meetings**

## **Virginia Forest Pest Management Update**

**Presented by**

**K. Jason Fisher**

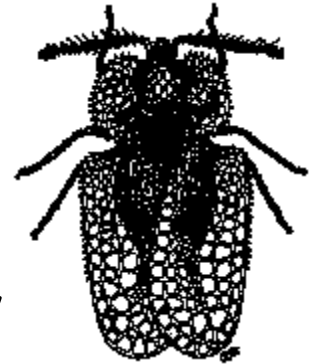
**Extension Agent/ANR**

**Forestry and Natural Resources**



<http://www.idlab.ento.vt.edu/>

**Welcome to the  
Insect Identification Laboratory  
at Virginia Tech**



**A Service for Extension Agents and Citizens of Virginia**



[HTTP://WWW.FORESTPESTS.ORG/](http://www.forestpests.org/)

## “BUGWOOD”



### Insects

[Foliage Feeding](#)

[Bark Beetles and Phloem Boring](#)

[Wood Boring](#)

[Terminal, Shoot, Twig and Root](#)

[Seed, Cone, Flower and Fruit](#)

[Sapsucking Insects and Mites](#)

[Gall Makers](#)

[Other Important Insects](#)

<http://www.hungrypests.com/>

Also visit:

<http://www.hungrypests.com/>





# Emerald Ash Borer Update

## Emerald Ash Borer - *Agrilus planipennis* Fairmaire, 1888



Adult emerald ash borer  
Photo by: David Cappaert,  
Michigan State University



Michigan Department of Agriculture

### Quarantine Information

All movement of hardwood firewood, ash wood and wood products in Virginia and other quarantined areas is regulated. The following items may not be moved from quarantined areas without a compliance agreement:

- all hardwood firewood
- ash nursery stock
- ash green lumber

[http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/emerald\\_ash\\_b/background.shtml](http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/background.shtml)

- ash waste
- ash compost
- ash chips



# Emerald Ash Borer

## History FACTS

- First identified in Michigan in 2002
- Detected in Ohio in 2003
- Northern Indiana in 2004
- Northern Illinois and Maryland in 2006
- Western Pennsylvania and West Virginia in 2007
- **Wisconsin, Missouri, and Virginia in 2008**
- Minnesota and New York in 2009







# Cooperative Emerald Ash Borer Project

## Federal EAB Quarantine & Authorized Transit

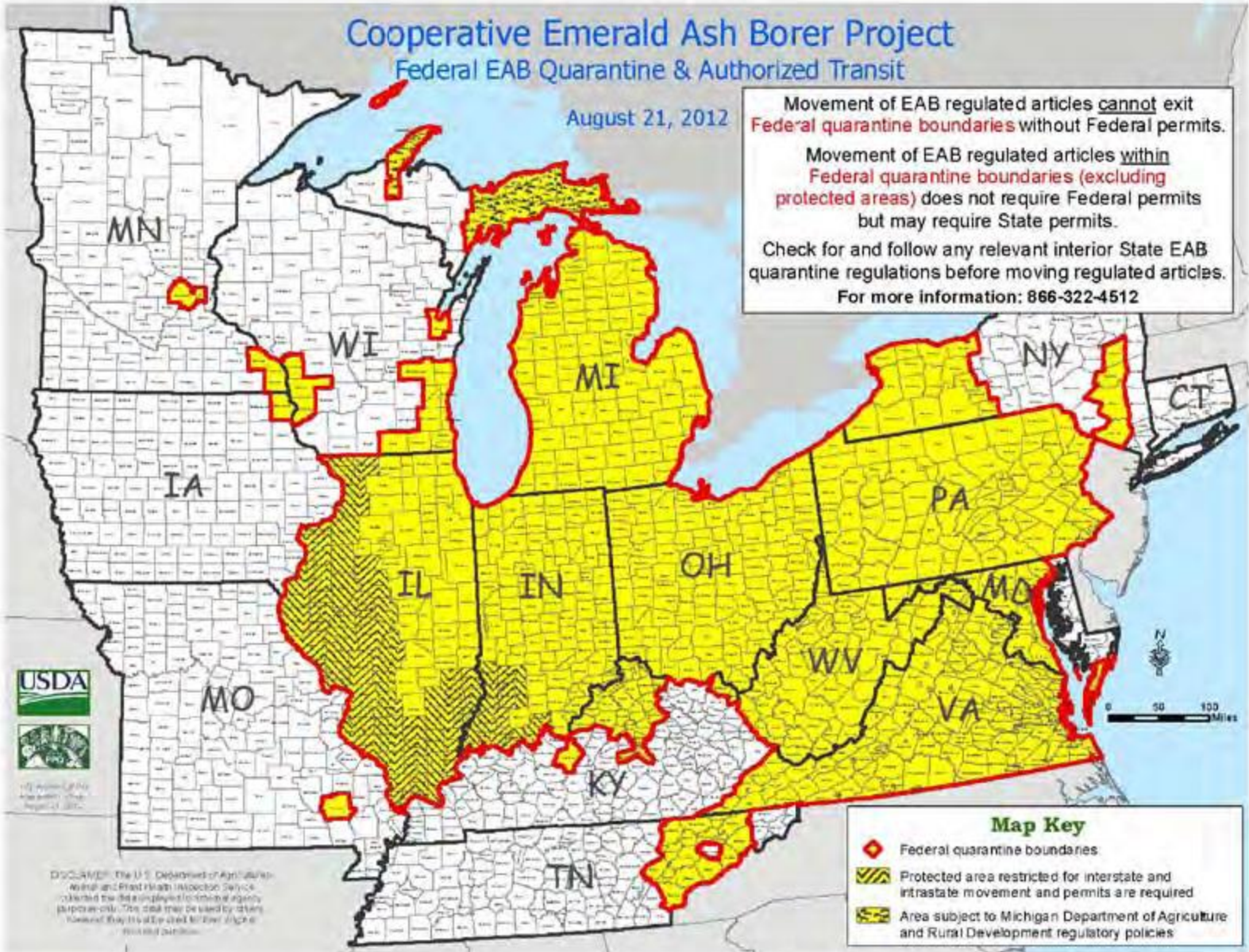
August 21, 2012

Movement of EAB regulated articles cannot exit Federal quarantine boundaries without Federal permits.

Movement of EAB regulated articles within Federal quarantine boundaries (excluding protected areas) does not require Federal permits but may require State permits.

Check for and follow any relevant interior State EAB quarantine regulations before moving regulated articles.




For more information: 866-322-4512



U.S. Department of Agriculture  
Forest Health Protection Service

DISCLAIMER: The U.S. Department of Agriculture Forest Health Protection Service compiled the data displayed on this map for informational purposes only. The data may be used by others without liability to the United States Department of Agriculture.

### Map Key

-  Federal quarantine boundaries
-  Protected area restricted for interstate and intrastate movement and permits are required
-  Area subject to Michigan Department of Agriculture and Rural Development regulatory policies







# EAB Control



- Systemic options for parks and public areas

## **Research options with variable to little success have included: (USFS)**

1. Imicide using Mauget capsules (has 10% imidacloprid)
2. Trunk injection with emamectin benzoate
3. A non-invasive trunk spray of Macho 2F (imidacloprid) + Pentra Bark (disease efficacy)

Biological Control – mainly parasitic wasps

[http://www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/emerald\\_ash\\_b/downloads/eab-biocontrol.pdf](http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/downloads/eab-biocontrol.pdf)



# Halifax Initial EAB find







# Dead and dying Ash





# D-shaped exit holes









# EAB Recommendations

- Do not move firewood – buy it and burn it locally!
- Historical and “sensitive” sites may be treated with imidacloprid as a soil drench in late March – caution of toxicity to pollinating insects and upland game birds if used in pelletized form
- Conduct a salvage cut before infestation occurs; recommend chipping within 18 months of infestation
- Visit <http://www.hungrypests.com/the-threat/emerald-ash-borer.php>





<http://www.dontmovefirewood.org/videos/lifecycle-emerald-ash-borer.html>



# EAB Contacts

- **Virginia:** [Quarantine Information](#)
- Contact The Virginia Department of Agriculture and Consumer Services: 804-786-3515 for permits or quarantine questions.
- Or District Extension Agent Jason Fisher at 434-476-2147 – [jasonf@vt.edu](mailto:jasonf@vt.edu)
- Local VA Department of Forestry State Forester – see [www.vdof.virginia.gov](http://www.vdof.virginia.gov)



# GYPSY MOTH UPDATE

by Jason Fisher  
Extension Forester, VA Cooperative Extension



# GYPSY MOTHS







# Identification



pupae, female on left



Caterpillars on white oak



Egg  
masses



female is white

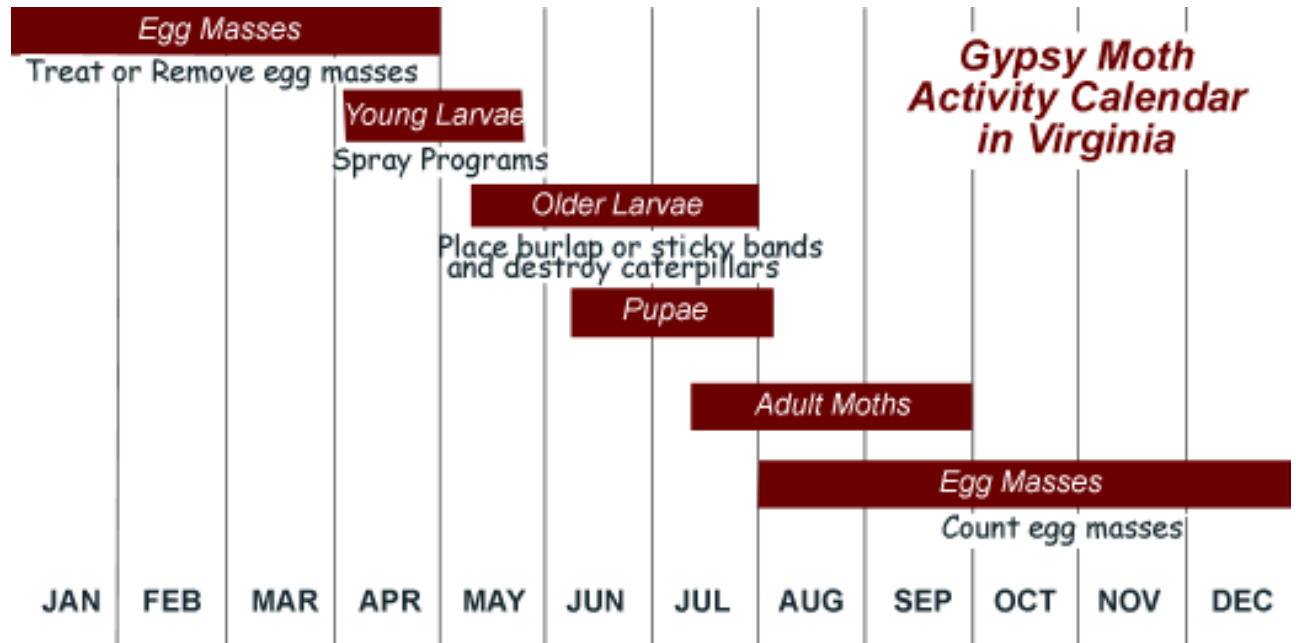
# Identification contd.



## Calendar

The image below shows when the various gypsy moth life stages occur in Virginia. It also notes the corresponding control activities.

female laying egg mass  
Petr Kapitola,  
State Phytosanitary Administration,  
Bugwood.org







# Caterpillar is hard to mistake



Is this one?



UGA1178070



# What will they eat

Preferred	Tolerated	Avoided
<ul style="list-style-type: none"><li>•apple</li><li>•alder</li><li>•bigtooth &amp; quaking aspen</li><li>•basswood</li><li>•gray, paper &amp; river birch</li><li>•boxelder</li><li>•hawthorn</li><li>•hazelnut</li><li>•larch</li><li>•American mountain ash</li><li>•all oaks</li><li>•lombardy poplar</li><li>•serviceberry</li><li>•sumac</li><li>•sweetgum</li><li>•willow</li><li>•witch hazel</li></ul>	<ul style="list-style-type: none"><li>•American beech</li><li>•yellow birch</li><li>•blackgum</li><li>•blueberry</li><li>•yellow buckeye</li><li>•butternut</li><li>•black, choke, pin &amp; sweet cherry</li><li>•chestnut</li><li>•eastern cottonwood</li><li>•cucumber-tree</li><li>•American &amp; slippery elm</li><li>•hackberry</li><li>•eastern hemlock</li><li>•all hickories</li><li>•American hornbeam</li><li>•Norway, red, silver &amp; sugar maple</li><li>•paw paw</li><li>•pear</li><li>•persimmon</li><li>•all pines</li><li>•white poplar</li><li>•redbud</li><li>•sassafras</li><li>•sourwood</li><li>•all spruces</li><li>•sweetfern</li><li>•black walnut</li></ul>	<ul style="list-style-type: none"><li>•all ashes</li><li>•all azaleas</li><li>•bald cypress</li><li>•catalpa</li><li>•eastern red cedar</li><li>•flowering dogwood</li><li>•elderberry</li><li>•balsam &amp; fraser fir</li><li>•American holly</li><li>•horse chestnut</li><li>•Kentucky coffeetree</li><li>•juniper</li><li>•sheep &amp; mountain laurel</li><li>•black &amp; honey locust</li><li>•mountain &amp; striped maple</li><li>•mulberry</li><li>•rhododendron</li><li>•all brambles (Rubus sp.)</li><li>•spicebush</li><li>•sycamore</li><li>•tuliptree</li><li>•all viburnums</li></ul>

## Exceptions?





# Control Options

- For the homeowner  
– use of burlap wraps



- - and sticky bands



- Saturate egg masses with soy bean oil mixed with water
- Most are simply “feel good” remedies







## Common Insecticides Approved for Gypsy Moth Control

<b>Compound</b>	<b>Trade name(s)</b>	<b>Restricted use?</b>	<b>Mode of action</b>	<b>Comments</b>
<i>Bacillus thuringiensis</i> var <i>kurstaki</i>	Dipel, Thuricide, others	No	Bacterial stomach poison	Widely used in suppression; non-target effects limited to Lepidoptera (moths & butterflies). Timing is important.
Diflubenzuron	Dimilin	Yes	Growth regulator	Widely used in suppression; non-target effects on other arthropods, especially aquatic organisms.
Tebufenozide	Mimic, Confirm	Yes	Growth regulator	Possibly less environmentally toxic replacement for Dimilin.
Carbaryl	Sevin	No	Stomach & contact poison	Broad spectrum carbamate; <b>toxic to bees.</b>
Phosmet	Imidan	No	Neurotoxin	Organophosphate; <b>highly toxic to fish and bees.</b>
Chlorpyrifos	Lorsban, Dursban	Yes	Stomach poison	Broad spectrum organophosphate. <b>Toxic to fish, other aquatics, &amp; honey bees.</b>
Methoxychlor		No	Stomach & contact poison	Chlorinated hydrocarbon.
Cyfluthrin	Tempo	Yes	Pyrethroid	<b>Highly toxic to fish and bees.</b>
Acephate	Orthene, Ace Caps	No	Stomach & contact poison	<b>Highly toxic to honey bees.</b> Ace Caps (systemic) may be effective.
Soybean oil	Golden Oil	No	Suffocant	Used as spray drench for egg masses. Good homeowner tactic.
Nucleopolyhedrosis virus	Gypcheck	not available commercially Produced in small quantities by USFS	Viral disease	Produced in small quantities by the USFS.
Mating disruptant	Disrupt II, SPLAT	not available commercially	Mating disruptant	Synthetic copy of gypsy moth mating attractant used to disrupt normal mating behavior.



# Control Options contd.



Gypsy Moth  
Slow the Spread  
Foundation, Inc.

<http://www.gmsts.org/>

- Aerial applications include:



- ***Bacillus thuringiensis var kurstaki*** (Btk) (Dipel<sup>®</sup>, Foray<sup>®</sup>, huricide<sup>®</sup>)
- **Diflubenzuron** (Dimilin<sup>®</sup>)
- **Tebufenozide** (Mimic<sup>®</sup>, Confirm<sup>®</sup>)
- **Nucleopolyhedrosis virus (NPV)** (Gypcheck)
- **Mating disruption** (Disrupt II<sup>®</sup>, SPLAT<sup>®</sup>)

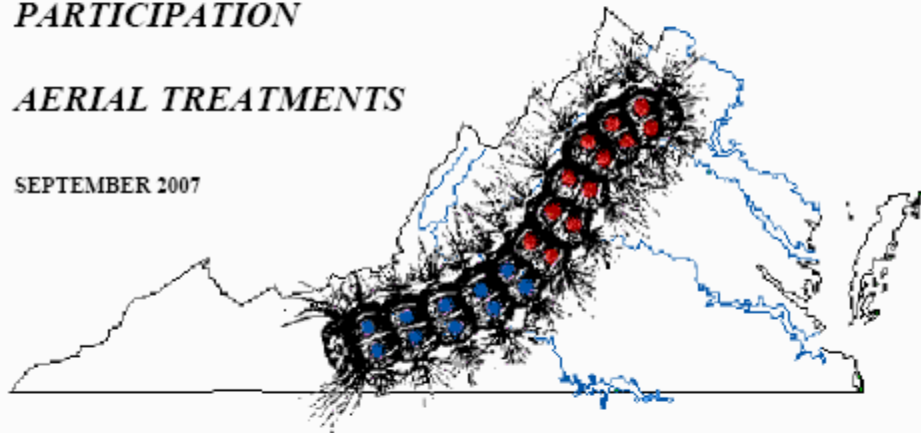


*VIRGINIA COOPERATIVE GYPSY MOTH  
SUPPRESSION PROGRAM*

*2008 GUIDELINES FOR  
PARTICIPATION*

*AERIAL TREATMENTS*

SEPTEMBER 2007







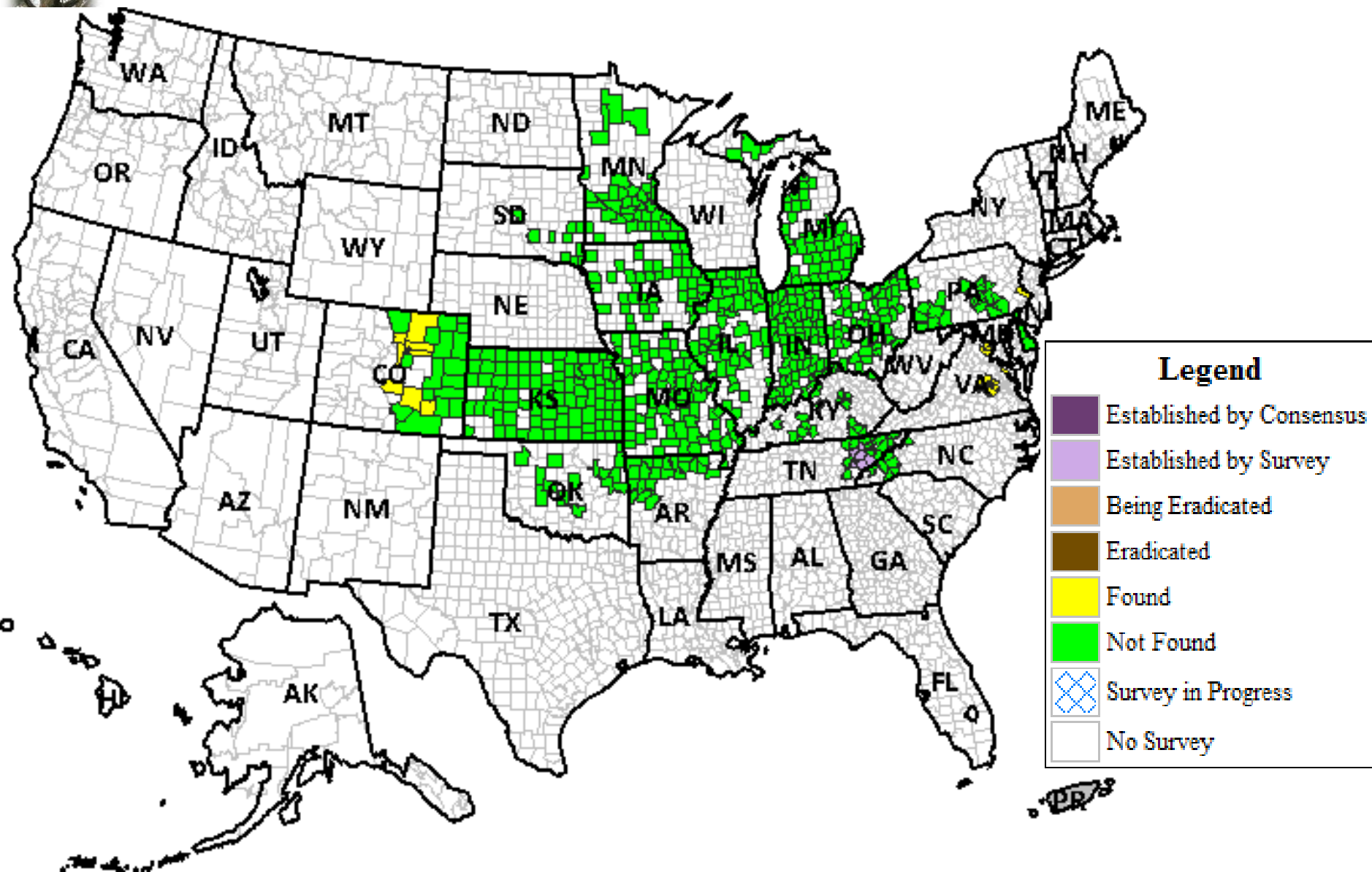
# Thousand Cankers Disease

*Geosmithia morbida* (Proposed name)

- Associated with walnut  
Twig beetle



# TCD Distribution



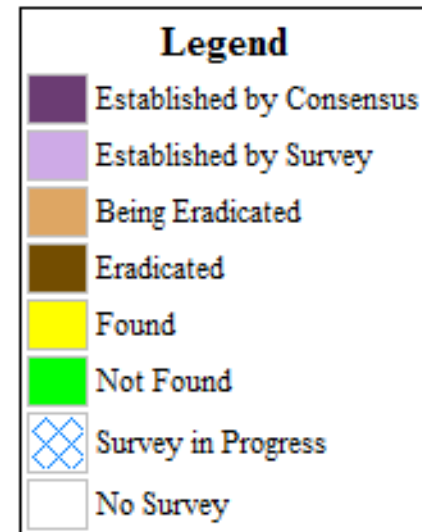
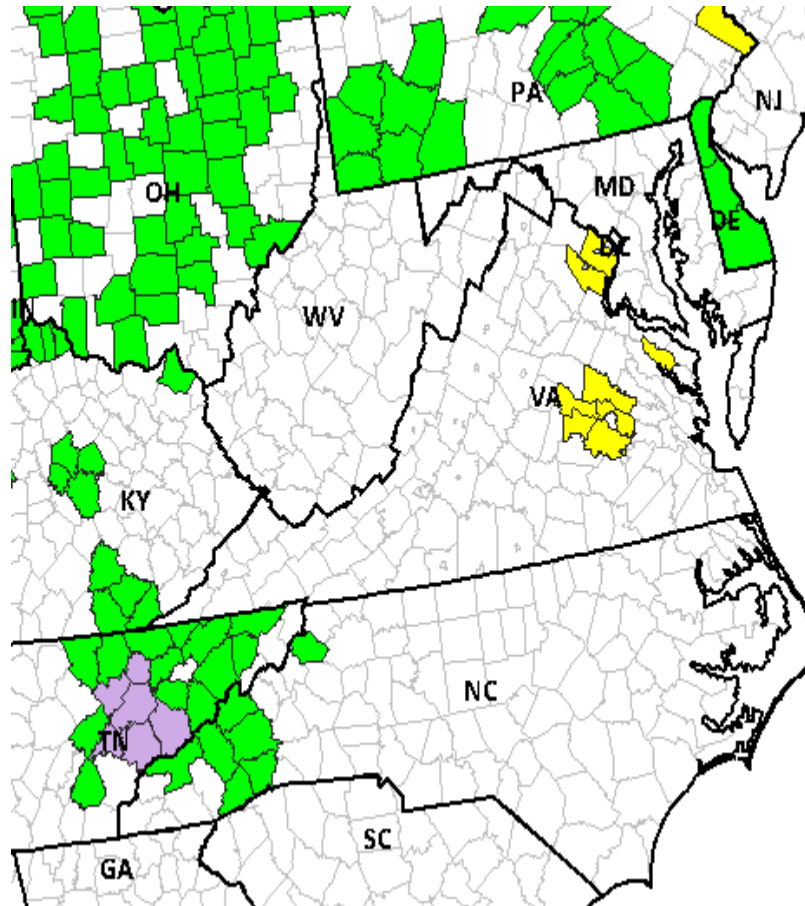
National Agricultural Pest Information System (NAPIS). Purdue University. "Survey Status of Thousand Cankers Disease - *Geosmithia morbida* (2011 to present)." Published: 12/31/2013. Accessed: 01/06/2014.



# TCD Map

2011 to present

source: <http://pest.ceris.purdue.edu/map.php?code=FDAAGFL>





# Walnut Twig Beetle



5406064



UGA5024090



# TCD Control

<http://thousandcankerdisease.com/index.html>

- Currently there are no known insecticide sprays that reliably control this disease.
- Treatments made after symptoms begin to appear are ineffective.
- [Trunk injected](#) fungicides combined with insecticides may be the most effective way to eliminate the [beetle](#) and the fungus. Additionally, [injected fertilizers](#) will assist in restoring the nutrients to the tree.



# USDA APHIS Contacts for VA

- To report an **animal** pest or disease, contact:  
[Dr. Terry L. Taylor](#) Area Veterinarian-in-Charge Federal Building 400 North 8th Street, Room 726 Richmond, VA 23219-4824 Phone: (804) 343-2560 Fax: (804) 343-2599
- To report a **plant** pest or disease, contact:  
[Bernetta Barco](#) State Plant Health Director 5657 South Laburnum Avenue Richmond, VA 23231-4536 Phone: (804) 771-2042 Fax: (804) 771-2185



# Asian Longhorn Beetle

New York 1988  
Chicago 1991



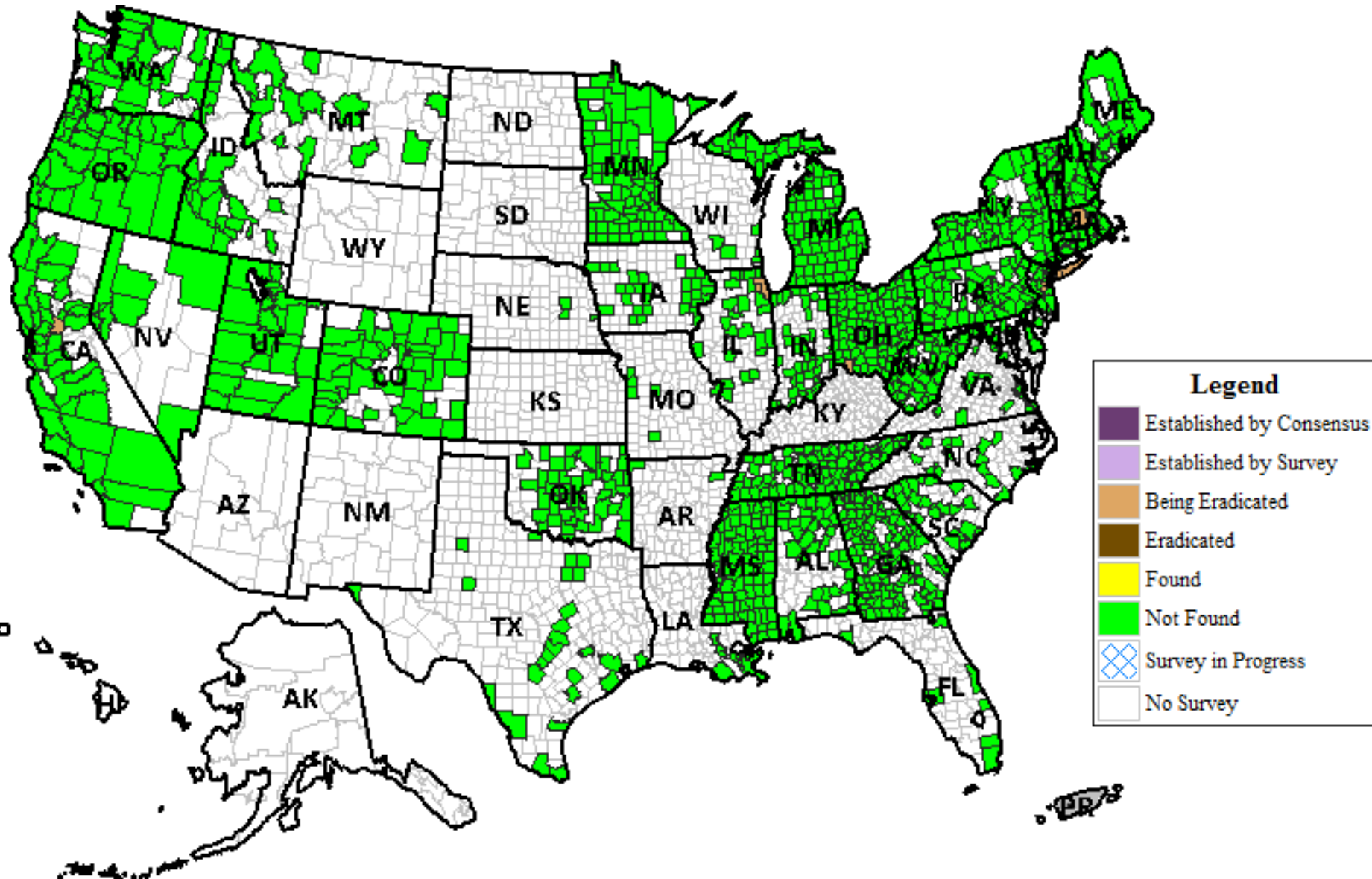
UGA1262001



UGA4798041

# 2011 to present

source <http://pest.ceris.purdue.edu/map.php?code=INALQCA#>





# Host tree species for ALB

Male



Female

**Good Hosts** – Maple family, Elm family, Birch and Sycamore

**Occasional hosts** – Mimosa, hackberry, ash, poplar,

**Questionable hosts** – fruit trees, oak, black locust, basswood, alder

**Unlikely** – chinaberry, tree of heaven



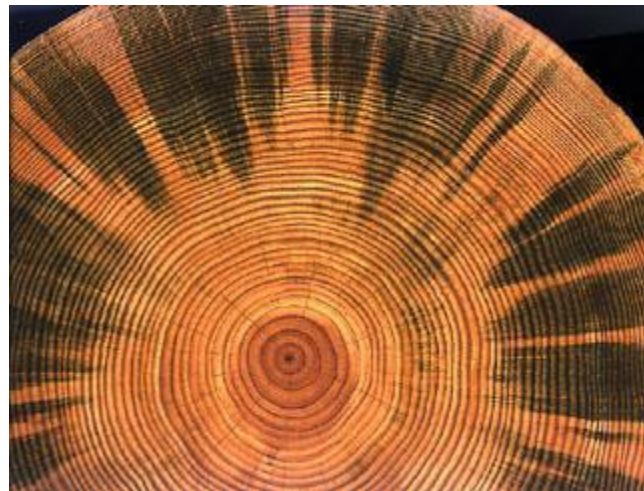


*Dendroctonus frontalis*

Zimmermann, 1868

English Common Name: southern pine beetle

Taxonomic Rank: Coleoptera: Scolytidae: Scolytinae: Hylesinini: Tomicina





# SPBB



2516004





**Insect**

--	--	--

**Description**

**Mode of Attack**

**Sign of Attack**

**Southern pine beetle**

Brown-black beetle 1/8 inch long, rounded posterior, with minute notch in front of head when viewed from above.

Bores under bark and girdles southern pines. Attacks middle and upper stem in fall and winter, and lower stem in spring and summer.

Small white pitch tubes on bark or just boring dust. S-shaped and criss-crossed tunnels under bark.



**Turpentine beetles**

Light reddish brown or black beetles from 1/4 to 1/3 inch long with rounded posterior.

Girdles inner bark of stumps and butts of larger pines. Larvae feed in groups. Usually found after fires, logging, or other disturbance.

Large pitch tubes on bark surface at tree base. Tunnels in inner bark are rather shapeless cavities.



**Engraver beetles**

Reddish dark-brown or black beetles less than 1/4 inch long with a posterior that looks cut off and scoop-shaped.

Bores under the bark and girdles small commercial trees.

Small reddish pitch tubes on bark surface or just boring dust in cracks of bark or on ground. Y- or H-shaped tunnels parallel with wood grain on inside bark.



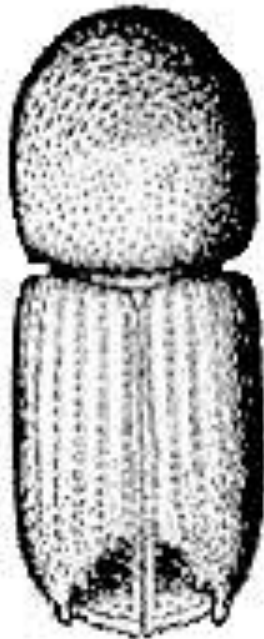




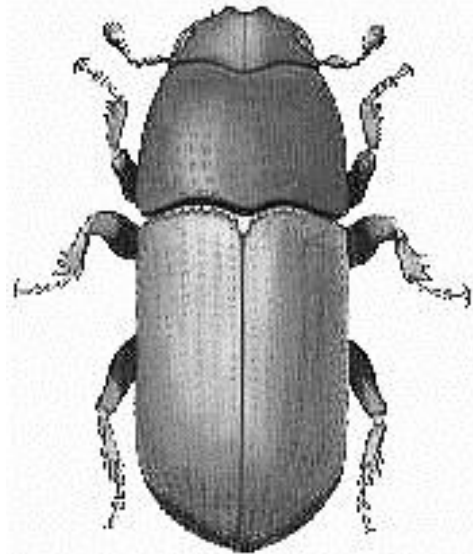
# Comparison of IPS engraver and Southern Pine Bark Beetle

(note concave rear abdomen of IPS)

*Ips*



SPB





# Ips and Turpentine Beetles



- Field edges particularly showed indication of individual pine tree mortality in parts of VA.
- Drought-induced and “spotty” in nature



# Resources Review

- <http://www.idlab.ento.vt.edu/>
- <http://www.hungrypests.com/>
- <http://www.forestpests.org/>

## AND SEE

- <http://pest.ceris.purdue.edu/index.php> for distribution maps on insects and plants





**THANK YOU FOR YOUR ATTENDANCE**



**For questions or more information contact:**

**K. Jason Fisher  
Extension Agent/ANR Natural Resources  
Virginia Cooperative Extension  
Central District**

**434-476-2147  
jasonf@vt.edu**

