

# FOREST PESTS IN NORTHERN CALIFORNIA

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UC COOPERATIVE EXTENSION – MENDOCINO, LAKE, & SONOMA COUNTIES

# OUTLINE

- Abiotic Factors
- Forest Insects
  - of conifers
  - of oaks
- Forest Diseases
  - Native
  - Invasive
- Pests/Diseases on the horizon

# ABIOTIC FACTORS

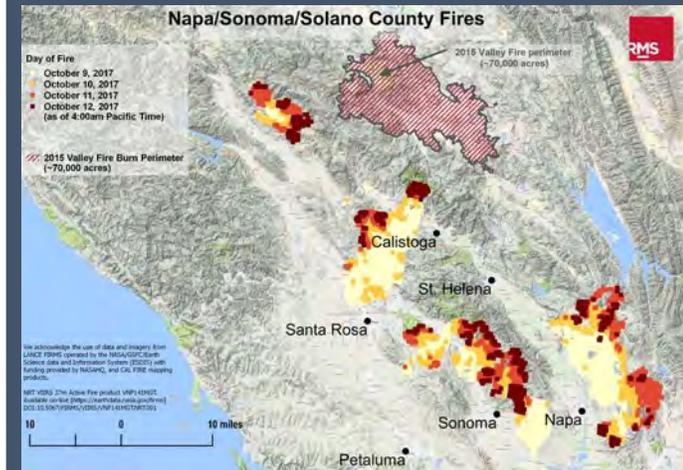
- Environmental factors can stress trees, making them more susceptible to insects/disease
  - Drought
  - Fire



N. Stepherson, USGS



K. Greer, USFS



# NATIVE PESTS OF CONIFERS

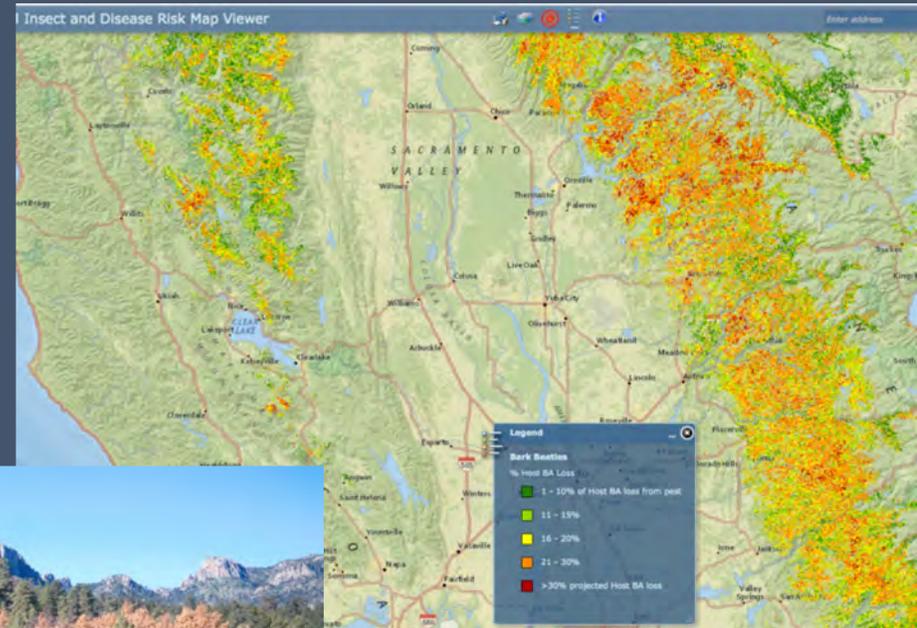
The Bark Beetles

# WESTERN PINE BEETLE (WPPB)

(*DENDROCTONUS BREVICOMIS*)



- Hosts:
  - Ponderosa pine (*P. ponderosae*)
- Typically attacks stressed trees
  - Mass attacks can kill healthy trees

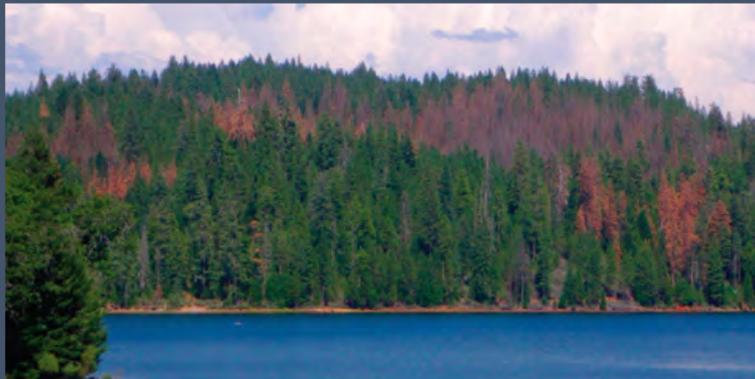


# WESTERN PINE BEETLE (WPB)

(*DENDROCTONUS BREVICOMIS*)

- Identification:

- Pitch tubes
- Radom galleries
- Canopy decline
- Blue stain



# MOUNTAIN PINE BEETLE (MPB)

(*DENDROCTONUS PONDEROSAE*)

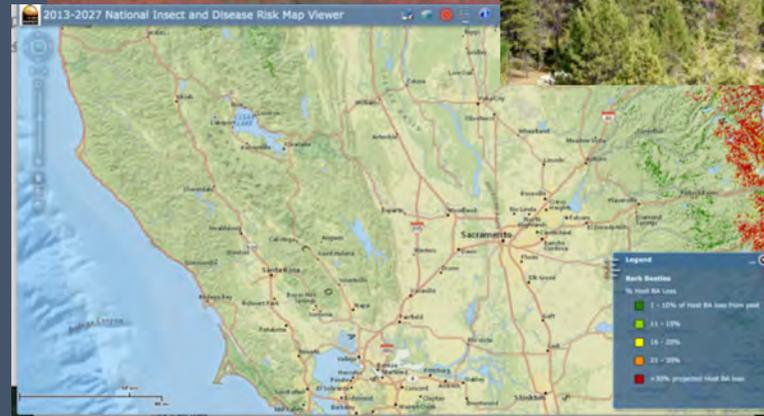


K. Greer, USFS



USFS

- Hosts:
  - Lodgepole pine (*Pinus contorta*)
  - Sugar pine (*P. lambertiana*)
  - Ponderosa pine (*P. ponderosae*)
- Typically attacks stressed trees,
  - Mass attacks can kill healthy trees



K. buxton, BC Ministry of FLNR

# MOUNTAIN PINE BEETLE (MPB)

(*DENDROCTONUS PONDEROSAE*)

- Identification:

- Pitch tubes
- "J"-shaped galleries
- Canopy decline
- Blue stain



USFS



# RED TURPENTINE BEETLE

(*DENDROCTONUS VALENS*)



USFS

- Host:
  - Pines (*Pinus* spp.)
- Identification:
  - Found in lower stem, close to ground
  - Large pitch tubes
  - Galleries fan shaped, gregarious feeders
- Commonly found in fire injured ponderosa pine



UGA1241452

# CALIFORNIA FLATHEADED BORER (*PHAENOPS CALIFORNICA*)



- Host:
  - Pines (*Pinus* spp.)
    - Ponderosa and Jeffrey
    - Also sugar, grey, and knobcone
- Identification
  - Galleries with frass (crescent shaped packing)
- Secondary pest in old-growth ponderosa
- Common in damaged tree (fire, mechanical, root diseases)



# FLATHEADED FIR BORER

(*PHAENOPS DRUMMONDI*)

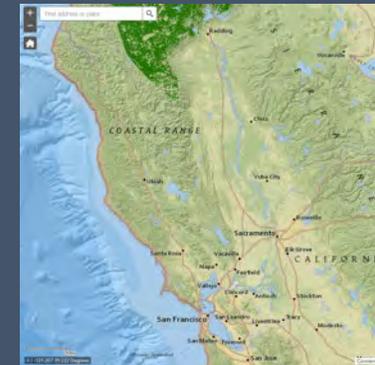


- Host:
  - fir (*Abies* spp.)
  - Douglas fir (*Pseudotsuga menziesii*)
- Identification
  - Galleries with frass (crescent shaped packing)
- Common secondary pest in stressed firs



# DOUGLAS-FIR BEETLE AND FIR ENGRAVER

- *Dendroctonus pseudotsugae*
- Host: Douglas-fir
- *Scolytus ventralis* (fir engraver)
- Host: true firs and Douglas-fir
- Identification: pitch tubes and reddish-brown boring dust on lower bole
- Commonly attack stressed trees

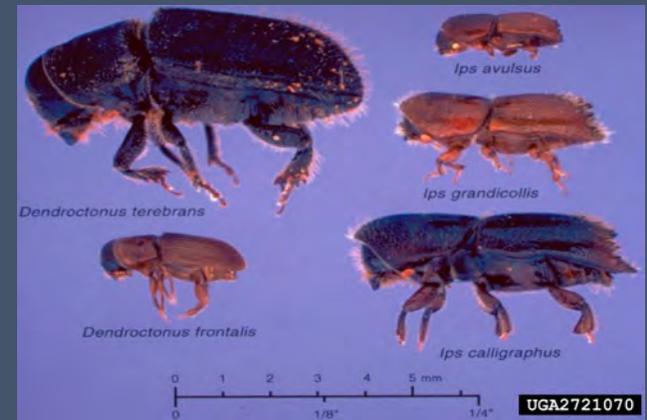


# IPS

- Many western species, notable CA species
  - California fivespined ips (*Ips paraconfusus*)
  - Monterey pine ips (*Pseudips mexicanus*)
- Hosts: western pine species
- Identification:
  - Pitch tubes, top kill, frass
- Secondary pest, often est. in slash



Figure 8—Ponderosa pine killed by California fivespined ips population that built up in the slash piles in the foreground.



# MANAGING BARK BEETLES

- Stand thinning
  - Improve vigor and health
  - Must remove/destroy slash
- Anti-aggregation pheromones
  - Prevent mass attacks & mating disruption
- Insecticides
  - Before infested to prevent beetles from attacking trees



Forestpolicypub.com



USFS



Monture Creek Land Management

# NATIVE PESTS OF OAKS

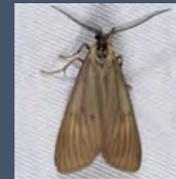
(THERE ARE MANY, ONLY A FEW CURRENTLY CAUSING NOTABLE DAMAGE)

- Black oak leaf miner (*Eriocraniella aurosparsella*)
  - Host: Ca black oak (*Quercus kelloggii*)

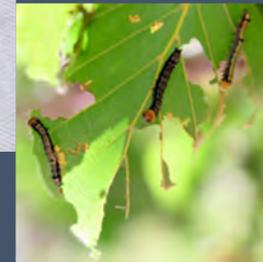


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- California oakworm (*Phryganidia californica*)
  - Host: *Quercus* spp., tan oak (*Notholithocarpus densiflorus*)



Discoverlife.org



Tree Solutions

- Oak twig girdler (*Agrilus angelicus*)
  - Host: *Quercus* spp., coast live oak predominant



P. Bryant



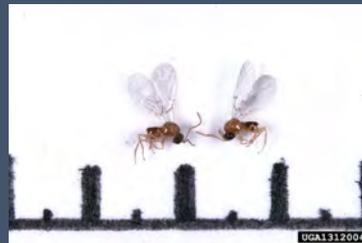
T. Swiecki



S. Browning

# OAK GALLS

- Tissue growth induced by oviposition of tiny Cynipid wasps
- Home for developing offspring



# NATIVE DISEASES

of Conifers

# HETEROBASIDION ROOT DISEASE

(*HETEROBASIDION* SPP.)

- Hosts:
  - pines, firs, manzanita, madrone, etc.
- Spreads by wind, infects fresh wounds and cut stumps
  - Attacks healthy roots; spreads to neighboring trees
- Symptoms
  - Fruiting bodies (conks), rotted stumps with conks, laminated root tissue, decayed root ball
- Management
  - Treat stumps (borate)
  - Reduce incidents of injury



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CFS

# DWARF MISTLETOE

(*ARCEUTHOBIMUM* SPP.)

- Hosts:
  - conifers (ponderosa, Douglas fir)
- Parasitic, impact growth and health
- Spreads by hydrostatic, sticky seeds; small mammals
- Management
  - Pruning, sanitation, prescribed fire
  - Removing heavily infested trees
  - Planting more resistant species



D. Cronklin

# WESTERN GALL RUST

(*ENDOCRONARTIUM HARKNESSII*)

- Hosts
  - most 2 and 3-needle western pine species (Monterey, bishop, shore, lodgepole, ponderosa, etc)
- Spread by spores germinating on wet bark surfaces
- Infects vigorous trees
- Symptoms:
  - Galls form on branches, stems of small trees
  - Cankers can form on stems
  - Can kill smaller trees
- Management
  - prune infested branches
  - Remove heavily infested trees (i.e. cankers)



Soper-wheeler

UC IPM

# NATIVE DISEASES

Of Oaks/Hardwoods

# ARMILLARIA ROOT DISEASE (OAK ROOT ROT) (*ARMILLARIA MELLAE*)

- Hosts:
  - oaks (*Quercus* spp.); spreads to other hardwoods, and conifers
- Weak pathogen; occurs in stressed stands; overwatered trees; common in urban areas; orchards and vineyards in recently forested areas
- Management
  - Avoid cutting, injuring, or overwatering oaks
  - Improve vigor



P. Anguin, USFS

# BROADLEAF MISTLETOE

(*PHORANDENDRON* AND *VISCUM* SPP.)

- Hosts: many species of hardwoods
  - Some highly susceptible (Modesto ash)
  - Some resistant (liquidamber, sycamore, redwoods, conifers, etc.)
- Spreads by birds
- Parasitic plant
  - can impact health, particularly if stressed by drought
- Management
  - Pruning
  - Removing heavily infested trees
  - Planting more resistant species



Baynature.com

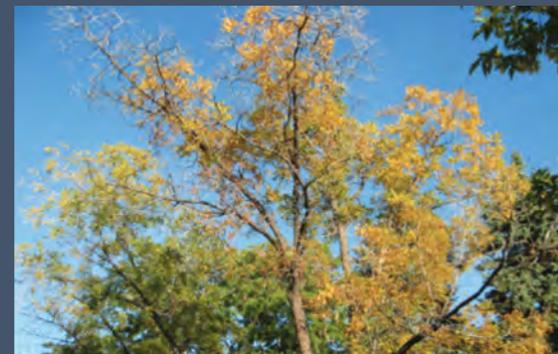


UC Statewide IPM Project  
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# THOUSAND CANKERS DISEASE

(*GEOSMITHIA MORBIDA*)

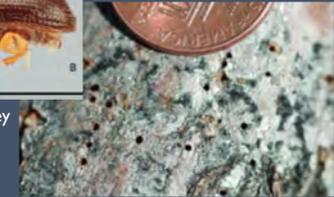
- Fungus vectored by walnut twig beetle (*Pityophthorus juglandis*)
- Hosts:
  - black walnut (*Juglans nigra*), Paradox (*J. hindsii* x *J. regia*), and English (*J. regia*)
- Symptoms:
  - Canopy decline
  - Bleeding cankers
  - Many small lesions beneath outer bark
- Management:
  - Currently no chemical control
  - Improve tree vigor
  - Remove and destroy infested material
  - Don't move infested material



M. Mielke



S. Valley



W. Cranshaw

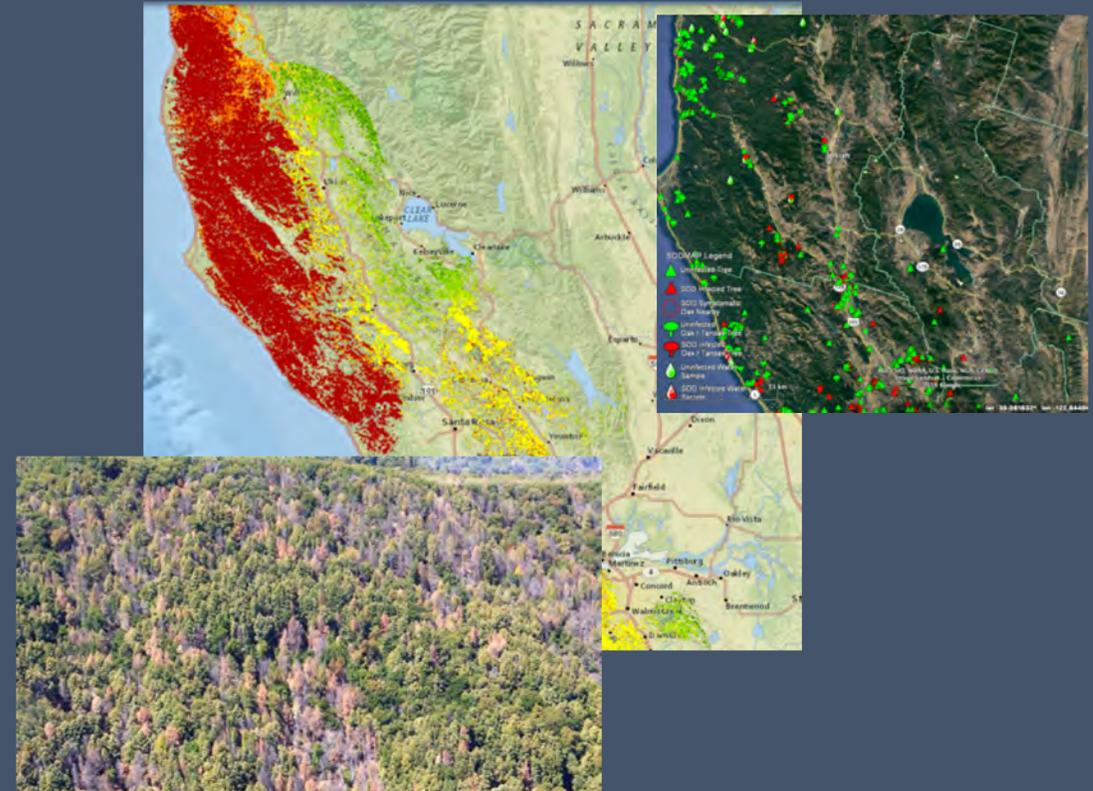


# INVASIVE DISEASES

# SUDDEN OAK DEATH (SOD)

(*PYTOPHTHORA RAMORUM*)

- Detected mid-1990's
- Hosts: >100 species
  - Notables: oaks (*Quercus* spp.) tanoak (*Notholithocarpus densiflorus*), CA bay laurel (*Umbellularia californica*), *Rhododendron* spp.
- Water mold which thrives in cool, moist climates
- Kills tanoak and many oaks
- Causes twig/leaf dieback in many other spp.



COMTF

# SUDDEN OAK DEATH (SOD)

(*PYTOPHTHORA RAMORUM*)

- Symptoms:

- Trunk cankers (weeping cracks)
- Leaf spots/dieback (irregular margins)
- Canopy decline

- Confirmation by tissue cultures



UC Berkeley

- Management

- No cure, phosphonates might protect trees
- Thin/remove CA bay laurel (pepperwood)
- Thin tanoak understory
- Sanitation to prevent spread



UGA5028037

COMTF



COMTF



F. Campbell



E. Peterson

# WHITE PINE BLISTER RUST

(*CRONARTIUM RIBICOLA*)

- Introduced ~1900
- Hosts:
  - White pines (five-needle)
  - Secondary host *Ribes* spp.
- Symptoms:
  - Swollen, rough textured cankers
  - Sap-like ooze flowing out of canker cracks forms pustules
  - Branch flagging
- Management
  - Pruning (lower branches, and infected branches)
  - *Ribes* thinning
  - Planting more resistant five-needle stock



USFS



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USFS

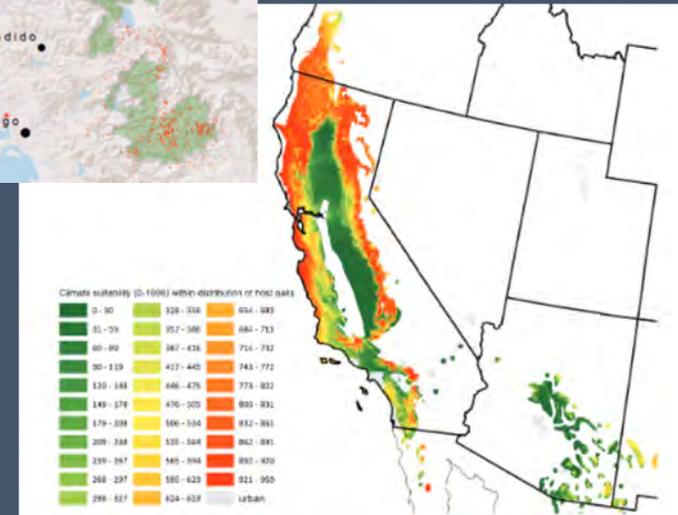
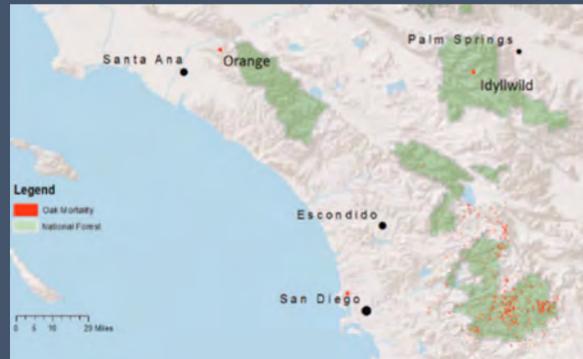
# PESTS/DISEASES ON THE HORIZON

# GOLDSPOTTED OAK BORER

(*AGRILUS AUROGUTTATUS*)



- Detected in 2002; native to AZ
- Introduced in firewood
- Hosts:
  - Coast live oak (*Quercus agrifolia*), Ca black (*Q. kelloggii*), Canyon live (*Q. chrysolepis*)
- Infestation limited to southern California
- However, hosts occur throughout Ca



# GOLDSPOTTED OAK BORER

(*AGRILUS AUROGUTTATUS*)

- Identification

- Canopy decline/dieback
- "D"-shaped exit holes
- Bark stains, woodpeckering
- Galleries with frass beneath the bark

- Management

- Insecticides (topical, systemic)
- Mechanical (removing infested trees, grinding/chipping waste material)
- Don't move firewood, tarping cut wood
- Natural enemies (limited impact)

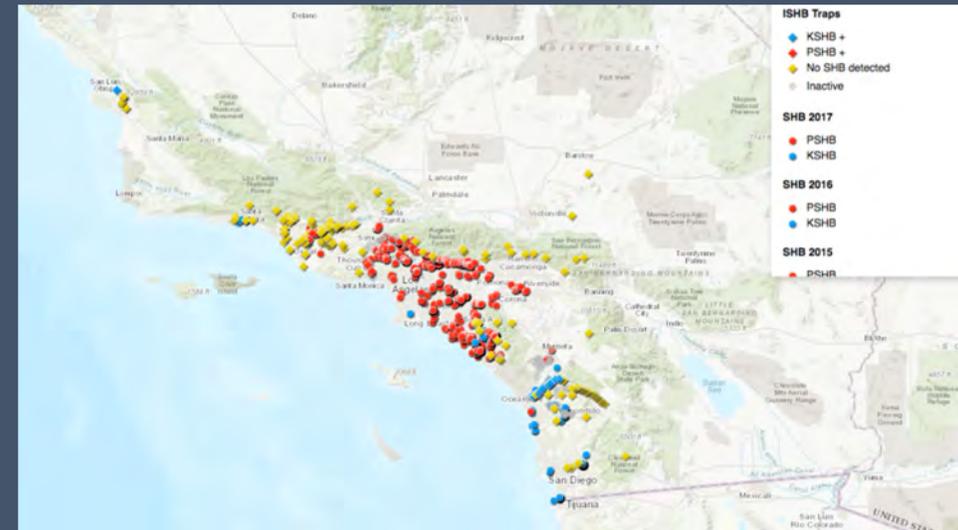


# INVASIVE SHOT HOLE BORERS (*EUWALLACAE SPP.*)



A. Eskalen

- Detected 2003; assoc. mortality detected 2012; native to Asian
- Transmit *Fusarium* dieback (*Fusarium* spp.)
- Hosts:
  - Many wildland, urban, landscape, and commercial species (>100 species)
  - Oak, sycamore, alder, willow, maple, box elder, liquidamber, avocado, olive, etc



# INVASIVE SHOT HOLE BORERS (*EUWALLACAE SPP.*)

- Identification:
  - Canopy wilting, decline
  - Weeping wounds, sugar volcanoes, exudate
  - Entry holes
  - Galleries penetrating into wood
- Management
  - Prune infested branches
  - Treat (fungicide and insecticide)
  - Remove heavily infested trees and sanitize material



A. Eskalen



D. Grosman



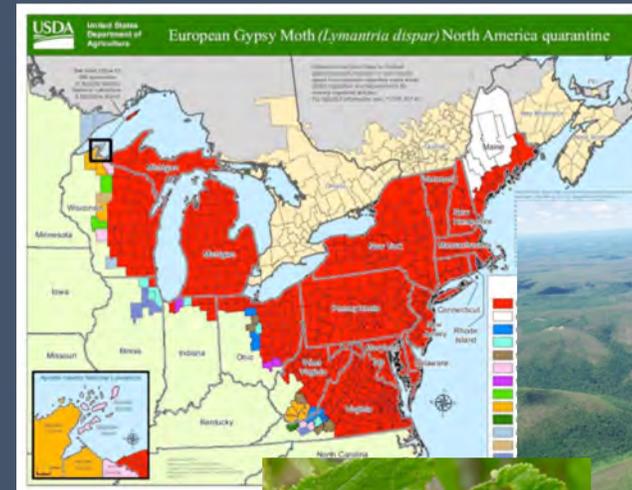
A. Eskalen

# GYPSY MOTH

(*LYMANTRIA DISPAR*)



- European gypsy moth (EGM) Introduced 1896; Asian gypsy moth (AGM) 1991
  - AGM in WA, OR, GA, OK, SC
  - Several individuals of both species detected in Ca in 2017
- Hosts:
  - >300 species; EGM prefers oaks and aspen; AGM prefers oak, poplar, alder, willow, larch, some evergreens, apple
- Management:
  - Integrated pest management (STS program)
    - Insecticides (including aerial application of Bt); Biocontrol; mating disruption



PA DNR

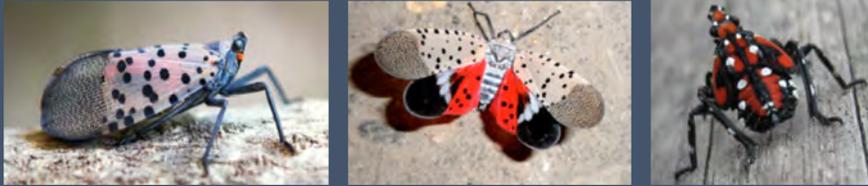


Integritytreecare.org



# SPOTTED LANTERNFLY

(*LYCORMA DELICULATA*)



PA DNR

- Detected in 2014; native to China
- Hosts:
  - ~70 plant species (fruit, ornamental, and woody tree species, vegetable, herbs, and vines)
- Management
  - Destroy egg masses, sticky bands on tree to trap crawlers
  - Treat susceptible hosts, remove tree-of-heaven, trap trees



- Almonds
- Apples
- Apricots
- Cherries
- Grapes
- Hops
- Maple Trees
- Nectarines
- Oak Trees
- Peaches
- Pine Trees
- Plums
- Poplar Trees
- Sycamore Trees
- Walnut Trees
- Willow Trees

# THANK YOU

If you have further questions:

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<http://ucanr.edu/sites/forestry/>

