

Emerald Ash Borer: Management Options for Municipalities



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Management Tools

**Targeted Ash
Removal**



**Biological
Control**



**Insecticide
Treatment**



**Girdled Ash
Trees**



SLowing A.sh M.ortality (SLAM)

- Integrate the available tools and tactics as appropriate at a given site to slow EAB population growth & delay the onset of ash mortality.
- Prevents catastrophic ash mortality & reduces the associated ecological, economic & social impacts.



Targeted Ash Removal



- EAB mgmt. in urban areas is a cost balance of ash insecticide treatment & removal-replacement of infested trees.
- Potential targets include ash trees with hazards, poor form, poor location, etc.; or to reduce ash density in a given area.
- Goal is to start to transition the ash component of the urban canopy to what you want it to be after the EAB invasion.
- Targeted ash removal could start immediately & continue over multiple years depending on resources.

Biological Control



- No evidence that biocontrol alone has protected ash trees in urban areas.
- Biological control releases may be considered in the future to augment mgmt.; consider identifying optimal release sites in the next 2-3 years.
- Forested corridors or natural areas may be ideal areas to focus biological control efforts; some disperse well.
- Woodpecker activity however remains a useful visual survey tool for detecting EAB infestations, especially Nov–May.



Girdled Ash Trees



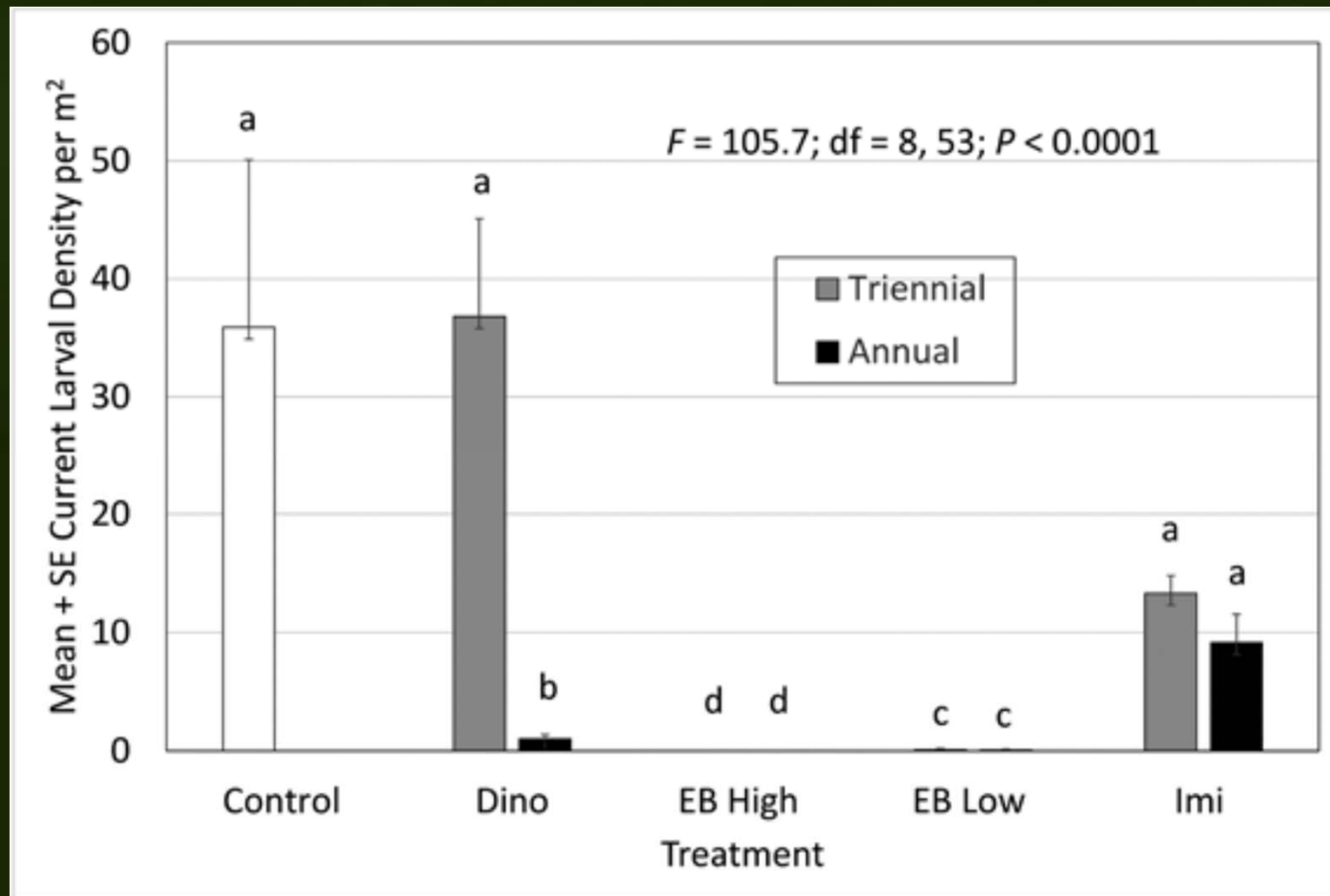
- Girdled trees are highly attractive to dispersing EAB adults during summer.
- May be used as detection tools and management tools to reduce population growth & influence spread & dispersal.
- Exposed sapwood darkens after a couple weeks & EAB density data may be collected from felled trees after summer.
- Girdled ash trees could be implemented as soon as next spring as detection tools in areas without known EAB infestations & as population sinks in areas with EAB.

Insecticide Treatment



- We have the ability to protect individual high-value landscape ash trees throughout the course of the EAB invasion in municipal areas.
- Protecting individual ash trees provides area-wide benefits in suppressing EAB populations & lessens beetle pressure on untreated ash trees.
- There are no aerial applications for treating large areas currently available.
- Numerous formulations & application methods available but efficacy varies.

Insecticide Treatment



MCCULLOUGH ET AL. (2019) EMERALD ASH BORER (COLEOPTERA: BUPRESTIDAE) DENSITIES OVER A 6-YR PERIOD ON UNTREATED TREES AND TREES TREATED WITH SYSTEMIC INSECTICIDES AT 1-, 2-, AND 3-YR INTERVALS IN A CENTRAL MICHIGAN FOREST. *JOURNAL OF ECONOMIC ENTOMOLOGY*, 112: 201-212.

THIRD EDITION

Insecticide Options for Protecting Ash Trees from Emerald Ash Borer

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The background of the slide is a photograph of a forest with trees in autumn. The leaves are in various shades of green, yellow, and red. The sky is a pale, overcast grey. The overall tone is somewhat muted and naturalistic.

Next Steps

- **Municipalities should conduct an ash inventory & assess your need for an EAB management plan.**



Next Steps

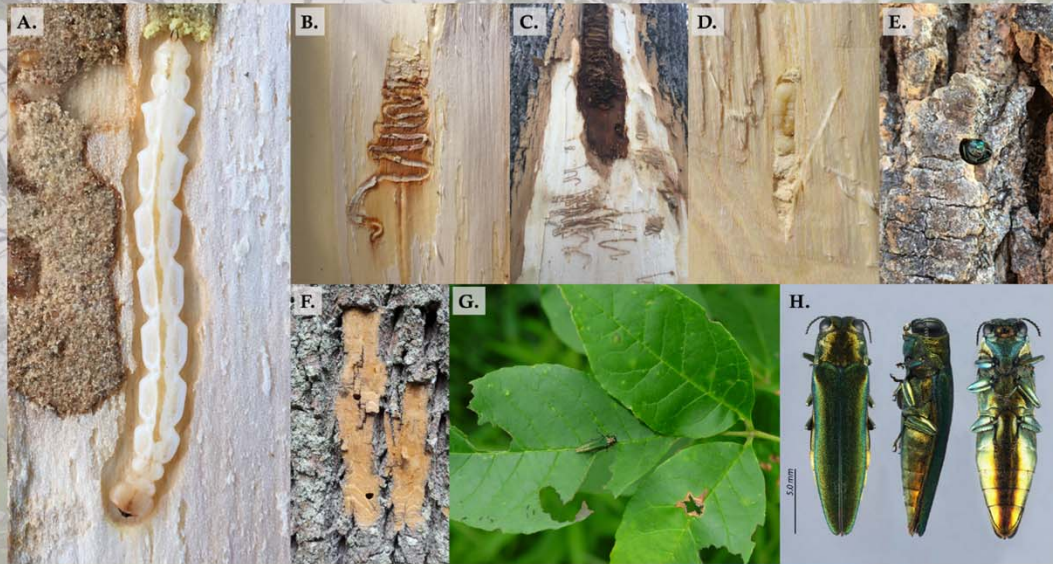
- **Municipalities should conduct an ash inventory & assess your need for an EAB management plan.**
- **Ideally, the plan should be cost-effective with a clear, realistic vision of what you want your urban canopy to look like with & after the EAB invasion.**



Next Steps

- **Municipalities should conduct an ash inventory & assess your need for an EAB management plan.**
- **Ideally, the plan should be cost-effective with a clear, realistic vision of what you want your urban canopy to look like with & after the EAB invasion.**
- **A solid EAB management plan helps ensure that you transition through the EAB invasion on your terms (& budget) & reduces the likelihood of simply reacting to the EAB infestation without clear direction.**

Emerald Ash Borer (*Agrilus planipennis*)



- A. Late-instar emerald ash borer (EAB) larvae
- B. Characteristic serpentine EAB larval gallery
- C. Multiple stages of larval development are commonly present
- D. EAB larvae in sapwood prior to developing into an adult beetle
- E. Emerging EAB adult beetle
- F. D-shaped exit holes from emerged EAB adults
- G. Adult EAB on ash leaf with feeding along leaf margins
- H. Adult EAB (dorsal, lateral, & ventral views)
- I. EAB-infested ash trees with thinning crowns



Photo Credits: Photo II by M. DiGiovanna (USFS); all other images by N.W. Siegert (USFS)

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Visual Survey

Pros:

- Fast; immediate data collection
- Minimal impact

Cons:

- Survey based on signs & symptoms which can be misleading
- Difficult to confirm positives
- Native borers or decline may lead to false positives
- Will NOT provide quality info on leading edge of the EAB infestation



Trapping

Pros:

- Fairly easily deployed
- Minimal impact

Cons:

- Limited effectiveness, increasing likelihood of false negatives
- Costs associated with lures and adequate number of traps to cover survey area
- Traps must be checked periodically
- Need to sort collected insects
- Lag time between collection and IDs
- Will NOT provide quality info on leading edge of the EAB infestation



Sampling Non-Girdled Ash

Pros:

- Provides EAB density data for improved management decisions
- Provides quality info on the leading edge of the EAB infestation (i.e., early instars)
- Data collection immediate
- Teaching opportunity with workshops

Cons:

- Labor and time intensive; sawyers, etc.
- Requires additional permissions and logistics
- Need peeling facility and disposal protocol
- Need to sample 3-5 trees per location to find low-density EAB infestations



Sampling Girdled Ash Trees

Pros:

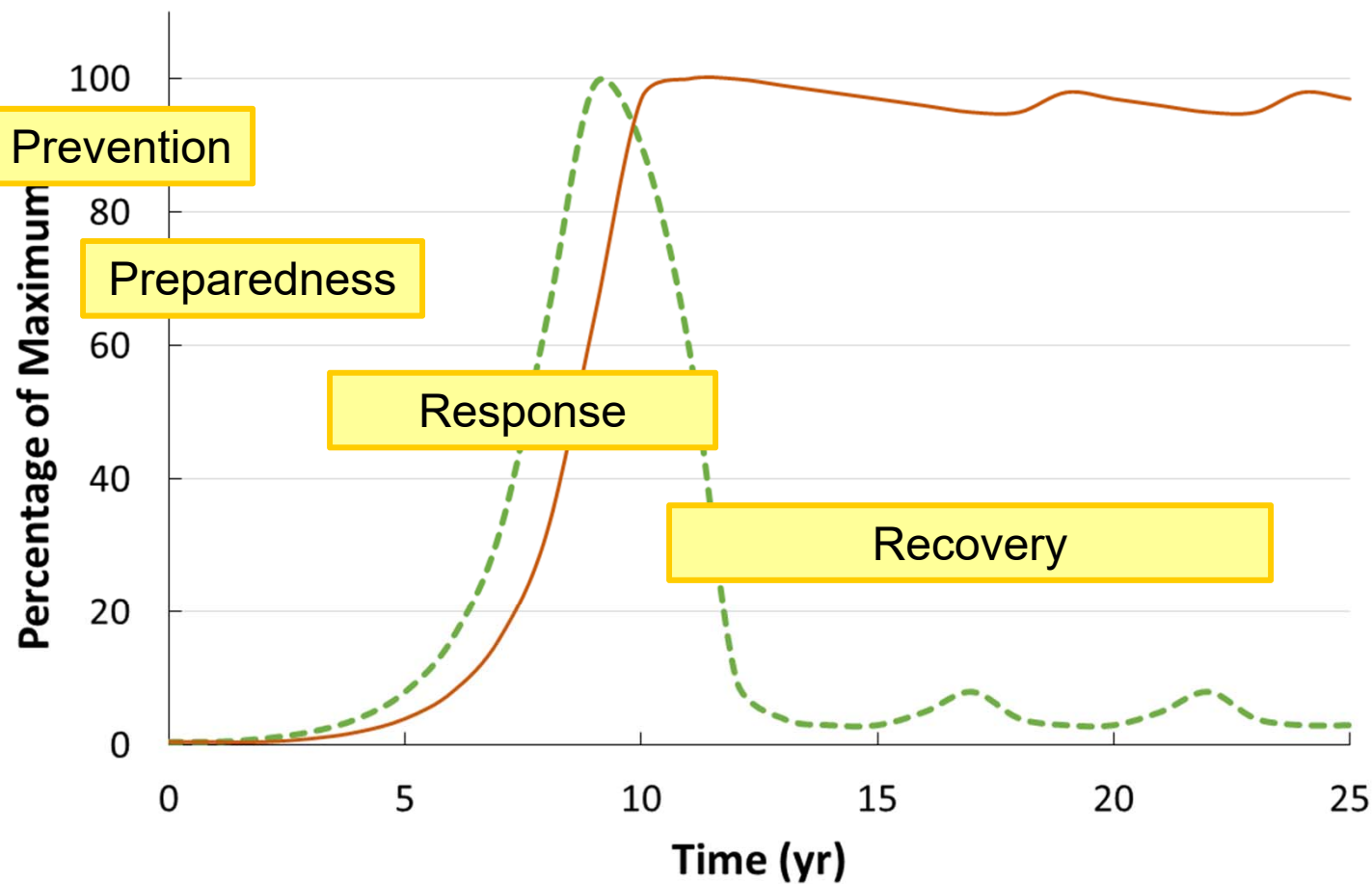
- Highly attractive to dispersing EAB adults
- Provides the highest quality info on the leading edge of the EAB infestation
- Provides EAB density data for improved management decisions
- Only 1-2 trees sampled per location
- Teaching opportunity with workshops

Cons:

- Labor and time intensive; sawyers, etc.
- Requires additional permissions and logistics
- Need peeling facility and disposal protocol
- Data collection delayed until next winter



Management Approach Varies by Stage of EAB Invasion



--- EAB density
— Ash mortality

