City of Carroll

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MEMO TO: Mike Pogge-Weaver, *City Manager* MJP-W

FROM: Jack Wardell, *Director of Parks and Recreation* JW

DATE: May 24, 2018

SUBJECT: Emerald Ash Borer (EAB)

Emerald Ash Borer (EAB), an ash tree-killing insect introduced from Asia, was discovered for the first time Carroll County on April 13, 2018. EAB has now been detected in 57 Iowa counties since first being found in Iowa in 2010.

The recent discovery was in a rural area west of Carroll in Carroll County. A tree service alerted the Iowa Department of Agriculture and Land Stewardship after recognizing potentially EAB infested ash trees. The presence of EAB was later confirmed after insect specimens were collected.

Since its initial discovery in the U.S. in the Detroit area in 2002, this pest is responsible for killing tens of millions of ash trees. At this time EAB has been found in 32 states. Since the beetle only travels short distances on its own, people serve as the primary mode for transporting EAB to new areas. In the larval stage beneath the bark of a tree it can unknowingly be transported in firewood or other wood products. Iowans are encouraged to use only locally sourced firewood, burning it in the same county where it was purchased.

EAB-infested ash trees can include branch dieback in the upper crown, water sprouts along the trunk and main branches, vertical bark splits, D-shaped emergence holes, S-shaped tunneling under loose bark, as well as woodpecker damage. EAB larvae kill ash trees by tunneling under the bark and feeding on the part of the tree that moves nutrients up and down the trunk. Ash trees usually die within 2-4 years.

If a landowner is interested in protecting a valuable and healthy ash tree within 15 miles of a known infestation, the treatment window for protecting an ash tree begins very soon. Soil treatments should be made from mid-April to mid-May. Basal trunk sprays should be applied mid-May to mid-June. Trunk injections begin once the tree has a full canopy.

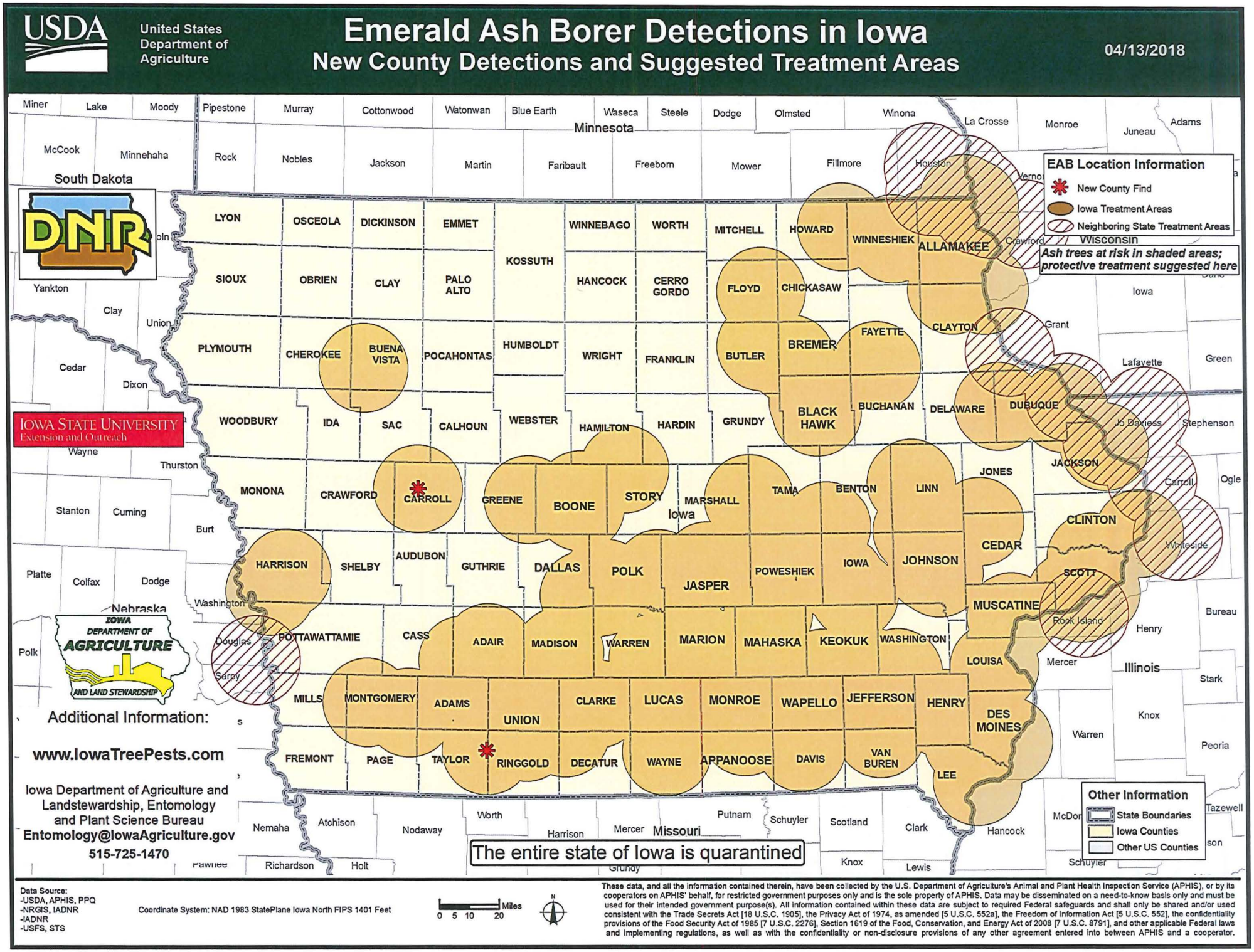
Several years ago the City took any inventory of the ash trees on all City property. The number of trees are as follows:

- 126 in City Parks
- 67 in the Carroll Cemetery
- 65 at the Carroll Golf Course
- 313 in City right-of-way

The City of Carroll has been setting funds aside, $150,000.00, to prepare for the eventual arrival of the Emerald Ash Borer to Carroll. However we do not believe this amount will cover the removal of all the trees. Ash trees that are currently in decline (30% dead) we will begin removing them. Also, as trees are infested by the Emerald Ash Borer and begin to die those too will be removed. It could take as long as 6 to 8 years to fully impact every tree in the City of Carroll.

Homeowners, at their expense, could treat the trees on their property if desired. If a landowner is interested in protecting a valuable and healthy ash tree within 15 miles of a known infestation, the treatment window for protecting an ash tree has begun. Soil treatments should be made from mid-April to mid-May. Basal trunk sprays should be applied mid-May to mid-June. Trunk injections begin once the tree has a full canopy. Full details are available in Iowa State University Extension and Outreach publication PM2084.

The recommendation from city staff, after further thoughts, would be not to treat any of the trees in the parks, cemetery or golf course due to the use of the treatment of a chemical in the public areas. Other reasons for not treating the Ash trees will be discussed at the City Council meeting. Scott Parcher, Parks Superintendent will be present to answer any potential questions or concerns during the meeting.


USDA
United States Department of Agriculture
Emerald Ash Borer Detections in Iowa
New County Detections and Suggested Treatment Areas
04/13/2018
EAB Location Information
New County Find
Iowa Treatment Areas
Neighboring State Treatment Areas
Ash trees at risk in shaded areas; protective treatment suggested here
LYON
OSCEOLA
DICKINSON
EMMET
KOSSUTH
WINNEBAGO
WORTH
MITCHELL
HOWARD
WINNESHIEK
ALLAMAKEE
SIOUX
OBRIEN
CLAY
PALO ALTO
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER
BREMER
FAYETTE
CLAYTON
WOODBURY
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
BLACK HAWK
BUCHANAN
DELAWARE
DUBUQUE
MONONA
CRAWFORD
CARROLL
GREENE
BOONE
STORY
MARSHALL
TAMA
BENTON
LINN
JONES
JACKSON
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
POWESHIEK
IOWA
JOHNSON
CEDAR
CLINTON
SCOTT
MUSCATINE
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE
Minnesota
South Dakota
Nebraska
Missouri
Illinois
Wisconsin
Iowa
Iowa State University Extension and Outreach
Iowa Department of Agriculture and Land Stewardship
Additional Information:
www.IowaTreePests.com
Iowa Department of Agriculture and Landstewardship, Entomology and Plant Science Bureau
Entomology@IowaAgriculture.gov
515-725-1470
The entire state of Iowa is quarantined
Other Information
State Boundaries
Iowa Counties
Other US Counties
Data Source:
-USDA, APHIS, PPQ
-NRGIS, IADNR
-IADNR
-USFS, STS
Coordinate System: NAD 1983 StatePlane Iowa North FIPS 1401 Feet
0 5 10 20 Miles
N
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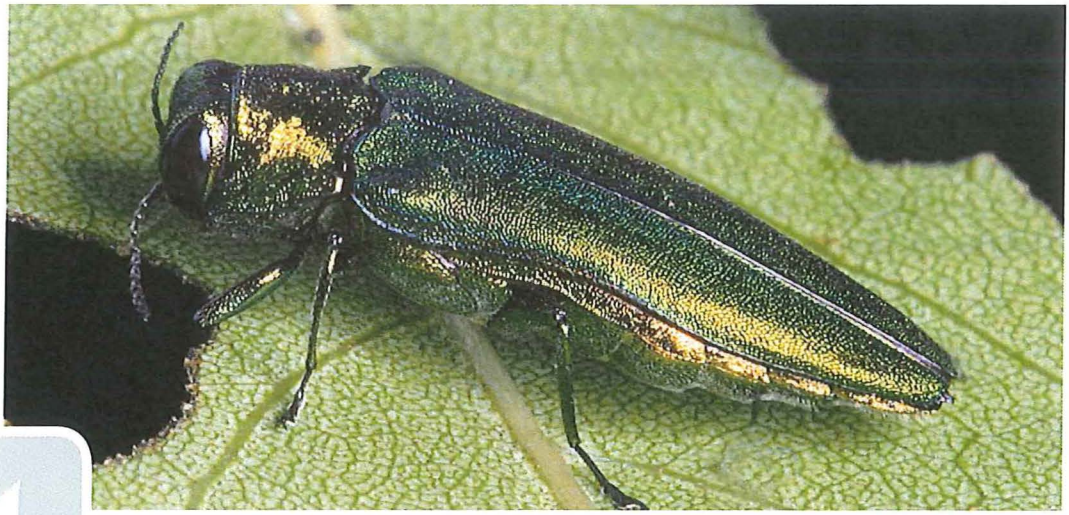

Emerald Ash Borer Management Options

The emerald ash borer (EAB) is an exotic insect that is destructive to ash trees (*Fraxinus* species). It is considered to be one of the most destructive tree pests ever seen in North America. Although the adult beetle causes minor feeding damage on ash foliage, the larval stage feeds beneath the bark and disrupts water and nutrient flow within the tree, which leads to tree death. Larvae actively feed from early summer through fall.

The insecticide products listed in this publication work best as **preventive** treatments for **healthy** ash trees planted along streets or in yards or parks. Healthy trees have full crowns, elongating branches, and bark held tightly to the trunk/branches. It is not practical or cost effective to treat woodlot trees where timber production is the primary goal.

Properly applied systemic insecticides provide effective and consistent protection from EAB. Unprotected ash trees will die from the borer's feeding. Before using an insecticide, several factors must be considered:

- Identify the tree as ash. For an identification aid, see ***www.extension.iastate.edu/forestry/iowa_trees/tree_id.html***
- Determine if your ash tree has EAB signs and symptoms: ***https://store.extension.iastate.edu/Product/1482***
- Estimate the tree's value in the community (see Table 1). Some benefits of urban trees include helping clean the air, slow stormwater runoff, raise property values, sequester carbon, and reduce energy costs.

Table 1. Estimated annual economic benefit of ash trees for a single family residence in Des Moines, Iowa*

Trunk Diameter (in)	Black Ash	Green Ash	White Ash
5	$35	$33	$32
10	$86	$86	$95
15	$141	$147	$177
20	$181	$197	$266
25	$215	$259	$359
30	$209	$300	$478
35	$191	$346	$488

* Based on National Tree Benefit Calculator (***www.treebenefits.com***).

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- Evaluate tree health. If the tree is declining, storm damaged, or growing in a limited site, has loose bark, or if the cost of treatment will exceed the landscape value, replace the tree with an alternate species rather than treat:
  - ***www.extension.iastate.edu/psep/Publications/EAB/AshAlternateShadetrees2013.pdf*** or
  - ***www.extension.iastate.edu/psep/Publications/EAB/AshAlternateSmall-staturetrees2013.pdf***
- Site and environmental factors can influence a tree's ability to uptake systemic insecticides, and determine how effective the treatment will be. Before treating, evaluate the soil moisture, soil compaction, and other site factors.
- Systemic insecticides are the products of choice when treating for the emerald ash borer. These chemicals are transported within the vascular system of the tree from the roots and trunk to the branches and leaves. Systemic insecticides reduce hazard such as drift of pesticides to nontarget sites or applicator exposure, and have less impact on beneficial organisms.
- Most of the insecticide products listed in this publication must be used each year for several years. The active ingredient emamectin benzoate protects ash trees for two years following treatment. Azadirachtin is effective for two years when EAB populations are low, but must be injected yearly when EAB populations are high.
- Ash trees within 15 miles of a confirmed EAB site are at risk of attack. Preventive treatments are suggested within this risk zone, but may be premature if outside this area. Continued monitoring of ash trees is valuable outside the immediate risk area. Known infestations are given at ***www.emeraldashborer.info***.

- Infested trees with less than 30 percent dieback of the crown due to EAB feeding may recover following treatment. Prune to remove dead branches.
- Broadcast applications (soil drench, soil injection, granular application, or basal trunk sprays) should not be made where there are roots of flowering plants (annuals, perennials, or shrubs) planted within the drip line since these ash trees are visited by bees and other pollinators. For more information on the effect of neonicotinoid insecticides on pollinators see: ***https://store.extension.iastate.edu/Product/14047***.
- Soil-applied and basally applied insecticides have annual per acre use limits. Refer to product labels and the following publication for more information: ***www.mda.state.mn.us/plants/pestmanagement/~/media/Files/chemicals/pesticides/eablabelguide.ashx.***
- Canopy sprays are not recommended because of limited effectiveness, the need for special equipment, spray drift, and possible adverse effects to nontarget organisms.

In addition to proper selection of ash trees for treatment, the susceptibility of EAB's life stages will determine the effectiveness of systemic insecticides. Table 2 shows the toxicity of the active ingredients to the egg, larval, and adult stages.

Table 2. Toxicity of systemic insecticides to emerald ash borer life stages*

Insecticide	Eggs	Larval stage				Adults
		L1	L2	L3	L4	
Imidacloprid	No	Yes	Yes	No	No	Sustained feeding
Dinotefuran	No	Yes	Yes	No	No	A few bites
Emamectin benzoate	No	Yes	Yes	Yes	Yes	One or two bites
Azadirachtin	No	Yes	Yes	Yes	Yes	Not toxic. Reduces fecundity

* Source: Cliff Sadof, Purdue University.

Table 3. Products for homeowners. Carefully follow label directions[1]			
Type of Application	**Active Ingredient**	**Tree Size – trunk circumference (diameter at 4.5 ft [dbh])**	**Time of Application[2]**
Soil drench[3]	Imidacloprid (1.47%)[4]	Up to 60" (20" dbh)	Mid-April to mid-May **OR** early August to mid-Sept.
Soil drench[3]	Imidacloprid (2.94%)[5]	Up to 60" (20" dbh)	Mid-April to mid-May **OR** early August to mid-Sept.
Soil drench[3]	Imidacloprid (21.4%)[6]	Up to 60" (20" dbh)	Early August to mid-Sept.
Soil drench[3]	Imidacloprid (0.74%) + Clothianidin (0.37%)[7]	Up to 60" (20" dbh)	Mid-April to mid-May **OR** early August to mid-Sept.
Granular[8]	Dinotefuran (2%)[9]	Up to 36" (12" dbh)	Mid-April to mid-May
Granular[8]	Imidacloprid (0.55%) + Clothianidin (0.275%)[10]	Up to 36" (12" dbh)	Mid-April to mid-May
Granular[8]	Imidacloprid (2.5%)[11]	Up to 36" (12" dbh)	Mid-April to mid-May

1 The amount of insecticide required depends on the tree's circumference in inches; see product label directions.

2 If the product label lists spring and fall as possible treatment times, homeowners can treat only ONCE per year. Research has shown spring applications are more effective than fall applications at the same rate. Fall applications do not affect overwintering larvae or pupae, but kill the next year's adults and first instar larvae.

3 Before applying a soil drench, pull back any mulch or dead leaves 12" from the base of the tree. Replace any mulch over the treated area after the mixture has been absorbed into the soil. For trees larger than 60" circumference, enlist the services of a commercial pesticide applicator. Do not make soil applications when soil is saturated or frozen.

4 Examples of products include: Bayer Advanced 12 month Tree & Shrub Protect & Feed Concentrate, Bonide Annual Tree & Shrub Insect Control with Systemaxx, Compare N Save Systemic Tree & Shrub Insect Drench, Ferti-Lome Tree & Shrub Systemic Insect Drench, Ortho Bug B Gon Year-Long Shrub Insect Control Concentrate, and Spectracide Tree & Shrub Insect Control Concentrate.

5 An example of product is Bayer Advanced 12 Month Tree & Shrub Insect Control Super Concentrate.

6 An example of product is Optrol Insecticide.

7 An example of product is Bayer Advanced 12 month Tree & Shrub Protect & Feed Concentrate II.

8 Spread granules evenly on the soil around the base of the plant within 18" of the trunk. Irrigate after application with enough water to dissolve granules and move product into root zone.

9 Examples of products include: Emerald Ash Borer Killer, Green Light Tree & Shrub Insect Control with Safari 2G, and Ortho Tree & Shrub Insect Control Granules.

10 An example of product is Bayer Advanced 12 month Tree & Shrub Protect & Feed RTU Granules II.

11 An example of product is Ferti-Lome Tree & Shrub Systemic Insect Granules, and Ortho Tree & Shrub Insect Control RTU Granules.

Table 4. Products for Commercial Pesticide Applicators			
Product (Formulation)	**Active Ingredient**	**Application Method**	**Time of Application[1]**
Arbormectin™	Emamectin benzoate	Trunk injection	**Full canopy:** Early spring to late-Aug.
IMA-Jet™	Imidacloprid	Trunk injection	**Spring:** Full canopy
Imicide®	Imidacloprid	Trunk injection	**Spring:** Full canopy
Merit® (75WP, 75WSP, 2F)	Imidacloprid	Soil injection or drench (1.4 g a.i./inch dbh)	**Spring:** Early April to mid-May
Merit® (75WP, 75WSP, 2F)	Imidacloprid	Soil injection or drench (2.8 g a.i./inch dbh)	**Fall:** Early Aug to mid-Sept.
Merit®Tree Injection	Imidacloprid	Trunk injection	**Full canopy:** Post bloom
Safari® (20SG)	Dinotefuran	Soil injection or drench	**Spring:** Late-April to late-May
Safari® (20SG)	Dinotefuran	Basal bark spray	**Spring:** Mid-May to mid-June
Transtect™ (70WSP)	Dinotefuran	Basal bark spray	**Spring:** Mid-May to mid-June
Transtect™ (70WSP)	Dinotefuran	Soil injection or drench	**Spring:** Late-April to late-May
Tree-Age®	Emamectin benzoate	Trunk injection	**Full canopy:** Early spring to late-Aug
TreeAzin™	Azadirachtin	Trunk injection	**Spring:** Early May to mid-June
Xytect™ (75WSP, 2F)	Imidacloprid	Soil injection or drench (1.4 g a.i./inch dbh)	**Spring:** Mid-April to mid-May
Xytect™ (75WSP, 2F)	Imidacloprid	Soil injection or drench (2.8 g a.i./inch dbh)	**Spring:** Mid-April to mid-May
Xytect™ (75WSP, 2F)	Imidacloprid	Soil injection or drench (2.8 g a.i./inch dbh)	**Fall:** Early Aug to mid-Sept.
Zylam Liquid Systemic	Dinotefuran	Soil injection or drench	**Spring:** Late-April to late-May
Zylam Liquid Systemic	Dinotefuran	Basal bark spray	**Spring:** Mid-May to mid-June

[1] Applications should be made after the ash tree has bloomed to adhere to pollinator protection statements on product labels.

Notes

- Trunk injections are absorbed and distributed throughout the tree more quickly (1-4 weeks) than soil applications (4-8 weeks), and are useful where soil treatments are not practical (excessively wet soils, compacted sites, or restricted surface areas). Research has shown that tree injections are tolerated in healthy green ash trees, especially if treatments are applied once every two years, small volumes of product are injected, and injection holes are small and shallow. If possible, rotate annual trunk injections with other management options to decrease the possibility of long-term damage.
- Before applying a soil drench, pull back any mulch or dead leaves 12" from the base of the tree. Replace any mulch over the treated area after the mixture has been absorbed into the soil. Do not make soil applications when soil is saturated or frozen.
- Soil injections should be made within 12 to18 inches of the trunk, and the solution placed 2 to 4 inches beneath the soil surface.
- Basal trunk sprays are applied to the tree trunk from the root flares at the soil surface to 4 to 5 feet above the soil surface. Surfactants/bark penetrants may be recommended on product label. Best results for trees up to 18" DBH.
- Good soil moisture is very important to move the systemic insecticides throughout the tree. Some products state to soil moist for at least 7 days following treatment.
- Emamectin benzoate has been shown to protect ash trees for 2 years from one application.
- Azadirachtin has been shown to protect ash trees for 2 years from one application when EAB populations are low; trunk injections must be made every year when EAB populations are high.

For more information:

Contact your Iowa State University Extension and Outreach office or see the following website for additional information: ***www.extension.iastate.edu/psep/EmeraldAshBorer.html***.

Prepared by Mark Shour, entomology program specialist; Laura Jesse, director and extension plant pathologist with the Plant and Insect Diagnostic Clinic; Donald Lewis, professor and extension entomologist; Jeff Iles, professor and extension specialist in horticulture; and Jesse Randall, assistant professor and extension forester, Iowa State University. Revised by Lina Rodriguez Salamanca, extension plant pathologist and diagnostician with the Plant and Insect Diagnostic Clinic.

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