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THE PURDUE LANDSCAPE REPORT

In This Issue

Watch for potential new boxwood pest

(Steve Frank, sdfrank@ncsu.edu)

Figure 1. Box tree moth. Szabolcs Sáfián, University of West Hungary, Bugwood.org

Boxwoods have so many pests it's a wonder we continue to grow them. On top of boxwood mites, psyllids, and leafminers boxwood blight has been spreading since 2011. Boxwoods are special though so we work to protect them from each new threat. That work will get harder if box tree moth gets established in North America.

The box tree moth, *Cydalima perspectalis*, feeds on boxwoods (*Buxus* spp.). It is native to China, Korea, and other parts of Asia but was recently found at a couple of sites in Ontario, Canada. So far just the brown and white moths have been found. It remains to be seen if they laid enough eggs in enough places to initiate a lasting infestation.

Box tree moth was introduced into Europe in 2007 and rapidly spread across the continent so its damage is well-documented. The caterpillars are yellow to lime green with dark stripes. They eat boxwood leaves and can quickly defoliate and even kill large hedges. In addition to feeding damage the caterpillars create a mess of webbing and frass within plants which is unsightly and protects them from predators.

Figure 2. Box tree moth caterpillar. Photo: Ferenc Lakatos, University of Sopron, Bugwood.org

So far no box tree moths or caterpillars have been found in the US. However, the moths can fly over two miles so it would not be hard for them to get from Ontario to Northeastern states. And of course they do not need to fly here. Box tree moths or caterpillars could easily travel on people or plants or in cars (driven by people) across the border.

For now public garden personnel, landscape and nursery professionals, extension personnel, diagnosticians, and the public need to be aware of this pest and look for it. The first Canadian sighting was made by a citizen scientist who uploaded a picture to iNaturalist. Box tree moth pheromone lures and traps are commercially available. It would be valuable to monitor with these to aid in early detection. No other pest in the US will defoliate boxwoods so the damage and webbing are easy to identify and distinguish from other causes.

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Distinguishing Hemlock from Yew

(Rosie Lerner, rosie@purdue.edu)

It is easy to confuse Hemlock (*Tsuga* spp.) and Yew (*Taxus* spp.) unless you can see the overall plant habit or have them both side by side. Further confusing them is that both species may be pruned into hedges or other shapes that obscure the natural plant habits.

Hemlock has short needles, 1/4 – 3/4″ long, green above and distinctly whitish silver below due to prominent white stomatal bands. Cones are 1/2 – 1″ long, ovoid, and pendulous.

View of above side. Top: Yew. Bottom: Hemlock. Photo Credit: Rosie Lerner

View of Underside. Top: Yew. Bottom: Hemlock. Photo Credit: Rosie Lerner

Yew has a slightly longer and wider needle -about 1/2 – 1 1/4″ long, dark green above and light green below, overall coarser texture compared to hemlock. Cones resemble berries, the brown seeds are covered by a fleshy red aril (seedcoat).

Hemlock Cones. Photo Credit: Purdue Arboretum

Yew Cones. Photo Credit: Purdue Arboretum

Fungicide Costs

(Janna Beckerman, janna@purdue.edu)

Fungal diseases of ornamentals will always be a limitation to profitable plant production and management—how significant that limitation is in your hands. Fungicides are effective in reducing the risk of loss– in numbers, in quality and in terms of aesthetics. However, fungicide costs in terms of product cost, number of applications and labor need to be evaluated against the benefits their use provides. It is important to keep in mind that these costs and benefits vary between greenhouse, nursery and landscape use; in the case of greenhouse and nursery, these costs are also weighed against plant (commodity) prices.

That said, there are several effective, and cost-effective fungicides available for each type of user, keeping in mind that what is effective and cost-effective for one may not be effective for another. For example, a pathogen like Rhizoctonia infects plants in the greenhouse, nursery, turf, and landscape! What is best for one user isn't necessarily best for another. Prostar (formerly Contrast) has excellent intrinsic activity against Rhizoctonia, and is important in the control of brown patch of turf. However, flutalonil, the active ingredient in Prostar, has a limited spectrum of pathogens it impacts (namely, basidiomycetes and diseases like rust and southern blight). This most likely makes it not the best choice for nursery, greenhouse, arborists or landscape managers that do not manage turf. For them a fungicide like Broadform, Compass, Heritage/Aframe, Pageant or Orkestra improve performance; for production, Empress (limited to production ornamentals), Heritage and Pageant are better choices. This choice also provides control against an assortment of fungal and pseudofungal pathogens.

As you can see from this example, pathogens management allows multiple choices. However cost is not the only factor to keep in mind. Be sure to balance efficacy with how much fungicide you need to apply, how frequently applications need to occur and the cost of rotation partners (always be sure to rotate any fungicide without a FRAC Code M!). To help with this, I've created a table that takes into account spray interval and rate(dose). What you'll discover when looking at this table is that an expensive product

at a low rate and less frequent interval is far less costly than a product that requires a high rate and/or frequent application interval. These costs were computed at the 100 gallon price and average price for the fungicide was determined after consultation with technical representatives and distributors. Please keep in mind that fungicide prices vary between distributors, states, and amount purchased. Lastly, this list does not imply endorsement, nor does exclusion imply disapproval.

Fungicide Price Guide 2019

Fungicide	Quantity	Average Cost	Rate Used/100 g	Application Interval	Cost/100 gal	Cost/ 28 days
Adorn	1 qt	$340	1-4 0z	14-28 days	$11-42	$11-84
Affirm	2.4 lbs	$210	4-8 oz	7-10 days	$21-42	$63-168
Aliette WDG	5 lb	$160	0.4-5.01b	28 days	$13 to 160	$13 to 160
Banrot 40WP	2.0 lbs	$73	4-12 oz	4-12 weeks	$9-27	$3-27
Banrot 8G	40 lb	$423	8 oz-16 /cu yd	at planting	$8 per cu yd	$8-36
Camelot	1 gal	$124	3pt	7-14 days	$16	$32-64
Captan 50WP	50 lb	$48	1-4 lbs	7-10 days	$1-4	$3-16
CHIPCO 26019 N/G	2 lbs	$95	1-6.5 oz	7-14 days	$3-19	$6-76
Cleary 3336G	30 lbs	$88	3-6 lb/1000s.f	14 days	$9-18/1000 sq	$18-36
Compass O 50 WDG	0.5 lb	$263	1-4 oz	14-21 days	$33-131	$49-263
Concert II	2.5G	$215	9-89 fl oz	14-28 days	$6-$48	$12-25
Contrast 70 WSP	8X 1 oz	$72	3-12 oz	14-21 days	$27-107	$40-214
Daconil Zn Flowable	2.5 G	$180	2pt	7-14 days	$9	$18-36
Daconil Ultrex 82.5WDG	6.5 lb	$88	1.4 lb	7-14 days	$19	$38-76
Decree 50 WDG	2.5 lb	$271	0.75-1.5 lb	7-14 days	$81-163	$163-326
Disarm O	1 lb	$100	2-4 oz	14 days	$13-25	$26-50
Eagle 20W	1 pt	$60	6-12 oz	10-14 days	$23-46	$46-126
Empress	24 oz	$160	1-6 oz	7-28 days	$7-42	$7-168
Fenstop	quart	$200	7-14 oz	28 days	$44-88	$44-88
Heritage	1 lb	$525	1-2 oz	14-21 day	$33-66	$49-132
Medallion	8-1oz packs	$206	1-4 oz	7-14 days	$24-103	$50-412
Micora	1 qt	$310	4-8 oz	7-14 days	$39-78	$78-$310
Mural	1 lb	$220	4-7 oz	7-21 days	$50-87.5	$50-$119
OHP 6672 50WP	2lb	$49	8-24oz	7-14 days	$12-37	$25-148
OHP 6672 4.5L	2.5G	$400	20 oz	7-14 days	$25	$50-100
Orkestra Intrinsic	16 oz	$160?	4-11 oz	7-28 days	$38-110	$76-$330
Orvego	28 fl oz	$200	11-14 oz	10-14 days	$79-100	$158-280
Pageant	1 lb	$80	4-18 oz	7-14 days	$20-90	$40-360
Palladium	2 lb	$300	2-6 oz	7-14 days	$19-56	$38-225
Pipron	quart	$380	4-8 oz	7-14 days	$48-95	$96-190
Protect DF	6 lb	$70	1-2 lb	7-14 days	$12-24	$24-96
Segovis	16 oz	$500	0.6 - 3.2 oz	5-14 days	$19-75	$38-$350
Segway	39.2 oz	$370	1.5 oz-6oz	14-28 days	$14-57	$28-114
Spectro 90 WDG	5 lb	$124	1-2 lb	7-14 days	$25-50	$50-200
Stature DM	25 oz	$165	3.2-12.8	10-14 days	$21-84	$42-252
Strike 50WDG	8 oz	$90	1-8 oz	7-14 days	$11-90	$22-360
Subdue Maxx	quart	$241	0.3-3 oz	30 days	$2-23	$2-23
Subdue G	25 lb	$133	8-75 oz/1000s.f.	At planting	$3-25	$3-25
Sulfur	30 lbs	$28	6 lb	7 days	$6-	$24-
Systhane	8 oz	$75	8 -12 oz	7-14 days	$75-113	150-452
Terrachlor 75WP	5 lb	$81	4-8 oz	Limit 2 apps.	$49-105	$49-210
Terrachlor 400	1 g	$92	6-12 oz	28-42 days	$4-9	$3-9
Torque	1 gal	$180	4-10 oz	14-21 day	$6-14	$8-28
Trinity	2.5 gal	$390	4-12 oz	7-14 days	$5-15	$10-60
Truban 30 WP	2 lb	$70	3-12 ozl	4-12 weeks	$7-13	$2-13
Truban 25 EC	quart	$70	3-8 oz	4-12 weeks	$7-18	$2-18
Veranda	1 lb	$124	4-8 oz	7-10 days	$32-64	$64-256
Zyban WSB	3 lb	$64	16-24 oz	7-10 days	$21-32	$61-128

Fungicide prices vary between distributors, states, and quantities purchased. The use of specific trade names in this publication does not constitute endorsement of these products nor does exclusion constitute discrimination. The label is the law.

New tips for managing emerald ash borer

(Elizabeth Barnes, barne175@purdue.edu)

When emerald ash borer swept through the Midwest it left three kinds of ash trees in its wake: the dead, the dying, and the diligently protected and thriving. The hunt was on for ways to stop this insect and save North America's ash trees. Now, nearly 20 years later, not only do we have tools to fight this insect but we are developing better management techniques every day.

Treating ash trees with emamectin benzoate has long been shown to be effective against emerald ash borer but new data shows that a single injection can last 3 growing seasons. Emamectin benzoate is injected into the trunk of a tree and travels throughout the live parts of leaves and stems. Insects that feed on this tissue are killed when they ingest the emamectin benzoate. Although this insecticide can kill adults in leaves for only 2 years, it lasts at least three years in tree trunks. Thus, emamectin benzoate only need to be used once every three years to protect ash trees from emerald ash borer.

Left: Thriving ash tree that is regularly treated with insecticide. Right: Dead ash tree that was not protected from emerald ash borer with insecticide (photo by Cliff Sadof, Purdue University).

Despite the need to for regular insecticide treatments keeping trees alive still remains the most cost effective response to emerald ash borer for most homeowners and municipalities. If an ash tree is left untreated there are direct costs as the tree dies like removal, replacement, and potential loss of property or life when branches break. Indirect costs include increased run off, loss of home and yard shade, and lower property values. It is also important to consider the sentimental value of specific trees. Many trees are beloved local landmarks or were planted in honor of someone departed. Losing this type of tree diminishes important cultural touchstones. All of these factors should be weighed when deciding whether to continue protecting a tree from emerald ash borer.

Finally, keeping trees alive allows communities to benefit from advances in emerald ash borer management. There are three major areas that show great promise for the future. First, researchers continue to develop better approaches to insecticide treatments leading to potentially cheaper and longer lasting management options. Second, parasitoids that exclusively attack and kill emerald ash borer continue to be released and increase in numbers in the wild. Eventually these insects may be able to lower the total number of emerald ash borer and reduce the number of ash trees they are able to kill. Finally, work on finding and breeding emerald ash borer resistant ash trees continues. Although we are unlikely to ever be completely free from emerald ash borer, these programs have the potential to help the forest coexist with this devastating beetle.

If you'd like to find out more details about advances in EAB management, check out:

Update on Practical Emerald Ash Borer Management

Cliff Sadof, Purdue University (see link below, EABU site, for webinar)

Emerald ash borer has been tearing through the trees of North

America for more than 15 years. In that time it has caused massive destruction to our forests, but we have also learned more effective ways to manage it. This talk will cover the progress that's been made in the fight against EAB and how you can apply improved management techniques to your own yard or in your tree care business. A recording of the webinar will be available through the EABU site.

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