THE PURDUE LANDSCAPE REPORT

In This Issue

Register Today for the Turf and Landscape Seminar

(Kyle Daniel, daniel38@purdue.edu)

Join us for the 2020 Turf and Landscape Seminar! Learn the latest research and best management practices from Purdue's Green Industry Specialists. The seminar is available now until November 18th with a live question and answer session with the specialists on November 19th. All participants will receive a free copy of the 2020 Turfgrass Weed Control for Professionals. Click here or on the picture for more information and to register.

MRTF Midwest Regional Turf Foundation — **Turf & Landscape Seminar** — **ONLINE** November 2-18, 2020

Participants will receive Purdue's 2020 Turfgrass Weed Control for Professionals book: FULL COLOR WEED ID by mail.

Available Events

	Golf Event	Lawn Event	Landscape Event
Talk 1	Old and New Considerations for Feeding a Healthy Turf, Cale Bigelow	Old and New Considerations for Feeding a Healthy Turf, Cale Bigelow	Update on Summer Defoliators, Cliff Sadof
Talk 2	What's New for the Golf Course in the Herbicide Market, Aaron Patton	Checking the Calibration of Your Ride-On and Backpack Sprayers, Aaron Patton	Identifying, Treating, and Planting a Tree with Root Defects, Kyle Daniel
Talk 3	Understanding Insecticide Performance Against White Grubs, Doug Richmond	Understanding Insecticide Performance Against White Grubs, Doug Richmond	Identifying Tree Defects; What to Do Next?, Lindsey Purcell
Talk 4	How Long Do Pesticides Remain Stable in Storage, Fred Whitford	How Long Do Pesticides Remain Stable in Storage, Fred Whitford	How Long Do Pesticides Remain Stable in Storage, Fred Whitford
Talk 5	Managing Minimal-to-No Mow Areas on the Golf Course, Ross Braun	Busting Weed Control Myths, Ross Braun	Verticillium Wilt of Landscape Trees, Tom Creswell & John Bonkowski
Talk 6	Using the Microbiome to Provide New Insights into Dollar Spot Control, Paul Koch	Danger Below: How to Identify, Manage, and Prevent Summer Patch, Paul Koch	Name That Twig! Identifying Deciduous Woodies in Winter, Rosie Lerner
Talk 7	Developing PGR Programs to Maximize Putting Green Performance, Bill Kreuser	Beyond the Four Step Program: The Nuance of N Programming, Bill Kreuser	What We NOW Know About Spray Tank Water Quality, Aaron Patton
Talk 8	What We NOW Know About Spray Tank Water Quality, Aaron Patton	What We NOW Know About Spray Tank Water Quality, Aaron Patton	
1-hour LIVE Zoom Q&A	November 19 at 10:00 am EST	November 19 at 11:00 am EST	November 19 at 12:00 pm EST
CCHs targeted (#-category)	5-3b, 4-RT GCSAA	5-3b, 1-6, 4-RT Michigan, Kentucky	1-2, 5-3a, 1-6, 1-7a, 4-RT Arborists

A tool to understand shrub maintenance and PGRs

(Ariana Torres Bravo, torres2@purdue.edu)

Plant Growth Regulators (PGRs) have been proposed as a management tool for reducing the labor needs in the Green Industry. Although PGRs are widely accepted in the ornamental plant production, their adoption among landscape maintenance companies is limited. The cost of PGRs and the lack of economic feasibility analyses are likely to undermine their adoption.

To address the lack of economic studies the Purdue Horticulture Business Extension program has developed a financial calculator, PGRcalculator. The calculator displays the economic impact of using PGRs (Paclobutrazol; Trimtect; Rainbow Treecare Scientific Advancements; Minnetonka, MN) for shrub maintenance, subject

to product efficacy, wages, and application rate.

This and other articles of the series **Economics of Using Plant Growth Regulators in the Landscape** can be downloaded at www.hort.purdue.edu/hortbusiness.

The tool consists of three sections:

1. The Site Information (Section 1) guides users through a series of questions to input key variables associated with calculating the impact of Trimtect. Key variables include total area of PGR treatment, number of hours for each pruning event, number of pruning events per year, hourly wage paid to pruning workers, shrub species, PGR application rate, and number of PGR applications per year.

Section 1. Site Information

What is the **total treated area** of each shrub species treated with Trimtect (sq. ft)*	1000
*Shrub species treated at equivalent application rates can be combined and calculated together.	
*Shrub species treated at different rates will need to be input separately.	
How many hours does it take to perform a pruning event for the area above?	10
How many pruning events will occur per year at this location?	30
What is the average hourly wage you pay employees who conduct shrub pruning?	13.7
What kind of shrub specie are you treating?	Asiatic jasmine
Which Trimtect rate, in fluid ounces per gallon (fl oz./gal), is being used?	9.6
*Please refer to Trimtect application guide table: https://www.treecarescience.com/wp-content/uploads/2019/04/Trimtect_Application_Guide.pdf	
Price of Trimtect (MSRP per gallon)	165
*Please consult with manufacturer for the price.	
How many square feet do you plan to cover per gallon of RTU of Trimtect?	300
*Manufacturer suggests that 1 gallon of RTU should cover an average of 300 square feet.	
Number of Trimtect applications per year:	2
*Trimtect applications would vary depending on species and location.	
*Manufacturer recommends two applications per year.	

Figure 1. Input information variables

2. Calculations (Section 2) provides the calculations obtained from inputting data into Section 1. The tool provides the following calculations: annual number of expected pruning events, annual number of expected pruning hours, coverage of Ready-To-Use (RTU) solution, and annual Trimtect volume. Cells in yellow indicate that the spreadsheet generates information automatically.

Section 2. Calculations

Number of expected pruning hours in a year:	300
Volume of Ready To Use solution in a year (RTU) (Gal.)	6.7
Volume of Trimtect used in a year (fl.oz.)	64

Figure 2. Calculations based on user's information

3. Economic Analyses (Section 3) provides the analyses including cost breakdown (Figure 3), labor cost (Figure 4), labor hours (Figure 5), and cost savings (Figure 6). The cost breakdown analysis illustrates the two main costs in the tool: labor cost without PGRs and cost of agrochemicals (Trimtect and surfactant).
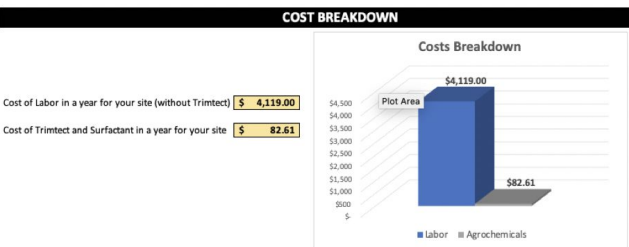
COST BREAKDOWN

Cost of Labor in a year for your site (without Trimtect)	$4,119.00
Cost of Trimtect and Surfactant in a year for your site	$82.61

Costs Breakdown chart — Labor: $4,119.00; Agrochemicals: $82.61

Figure 3. Costs Breakdown

The Labor Costs analysis is illustrated in Figure 4. This analysis uses a sensitivity approach to display how labor costs can change as the efficacy of Trimtect changes. We defined PGR efficacy by the percentage reduction of both pruning events and time per pruning event. In other words, labor costs reduce as the efficacy of Trimtect increases (*see other articles in this series for more information*).

Figure 4 illustrates that a 0% efficacy results in annual labor costs of $4,119, which were the costs incurred without Trimtect. On the other hand, a 50% reduction of both the number of pruning events and the time per pruning event decrease labor costs to $1,029.75. Furthermore, when the efficacy of Trimtect results in 90% reduction of both the number of pruning events and the time per pruning event, labor costs are projected to decrease to just $41.19.

The impact of Trimtect efficacy on labor hours is illustrated in Figure 5. Similar to Figure 4, labor hours can be impacted by the reduction of pruning events and time per pruning event.

LABOR COSTS

Percentage reduction in time per pruning event	Percentage reduction in number of pruning events										
	0	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	4,119.10	3,707.10	3,295.20	2,883.30	2,471.40	2,059.50	1,647.60	1,235.70	823.80	411.90	-
10%	3,707.10	3,336.39	2,965.68	2,594.97	2,224.26	1,853.55	1,482.84	1,112.13	741.42	370.71	-
20%	3,295.20	2,965.68	2,636.16	2,306.64	1,977.12	1,647.60	1,318.08	988.56	659.04	329.52	-
30%	2,883.30	2,594.97	2,306.64	2,018.31	1,729.98	1,441.65	1,153.32	864.99	576.66	288.33	-
40%	2,471.40	2,224.26	1,977.12	1,729.98	1,482.84	1,235.70	988.56	741.42	494.28	247.14	-
50%	2,059.50	1,853.55	1,647.60	1,441.65	1,235.70	1,029.75	823.80	617.85	411.90	205.95	-
60%	1,647.60	1,482.84	1,318.08	1,153.32	988.56	823.80	659.04	494.28	329.52	164.76	-
70%	1,235.70	1,112.13	988.56	864.99	741.42	617.85	494.28	370.71	247.14	123.57	-
80%	823.80	741.42	659.04	576.66	494.28	411.90	329.52	247.14	164.76	82.38	-
90%	411.90	370.71	329.52	288.33	247.14	205.95	164.76	123.57	82.38	41.19	-
100%	-	-	-	-	-	-	-	-	-	-	-

Figure 4. Impact of Trimtect on Labor Costs

LABOR HOURS

Percentage reduction in time per pruning event	Percentage reduction in number of pruning events										
	0	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	300	270	240	210	180	150	120	90	60	30	0
10%	270	243	216	189	162	135	108	81	54	27	0
20%	240	216	192	168	144	120	96	72	48	24	0
30%	210	189	168	147	126	105	84	63	42	21	0
40%	180	162	144	126	108	90	72	54	36	18	0
50%	150	135	120	105	90	75	60	45	30	15	0
60%	120	108	96	84	72	60	48	36	24	12	0
70%	90	81	72	63	54	45	36	27	18	9	0
80%	60	54	48	42	36	30	24	18	12	6	0
90%	30	27	24	21	18	15	12	9	6	3	0
100%	0	0	0	0	0	0	0	0	0	0	0

Figure 5. Impact of Trimtect on Labor Costs

COST SAVINGS

Time per pruning reduction	Number of pruning reduction										
	0	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	-83	329	741	1,153	1,565	1,977	2,389	2,801	3,213	3,624	4,036
10%	329	700	1,071	1,441	1,812	2,183	2,554	2,924	3,295	3,666	4,036
20%	741	1,071	1,400	1,730	2,059	2,389	2,718	3,048	3,377	3,707	4,036
30%	1,153	1,441	1,730	2,018	2,306	2,595	2,883	3,171	3,460	3,748	4,036
40%	1,565	1,812	2,059	2,306	2,554	2,801	3,048	3,295	3,542	3,789	4,036
50%	1,977	2,183	2,389	2,595	2,801	3,007	3,213	3,419	3,624	3,830	4,036
60%	2,389	2,554	2,718	2,883	3,048	3,213	3,377	3,542	3,707	3,872	4,036
70%	2,801	2,924	3,048	3,171	3,295	3,419	3,542	3,666	3,789	3,913	4,036
80%	3,213	3,295	3,377	3,460	3,542	3,624	3,707	3,789	3,872	3,954	4,036
90%	3,624	3,666	3,707	3,748	3,789	3,830	3,872	3,913	3,954	3,995	4,036
100%	4,036	4,036	4,036	4,036	4,036	4,036	4,036	4,036	4,036	4,036	4,036

Figure 6. Impact of Trimtect on Cost Savings

Lastly, Figure 6 illustrates how Trimtect can impact cost savings. Figure 6 displays the dollar savings per year as the efficacy of Trimtect increases. Cost savings were calculated based on the reduction of labor costs and additional costs of agrochemicals (Trimtect and surfactant), and does not include other maintenance costs (e.g., fertilization, pesticide applications, etc.).

Analyses show that PGRs can effectively reduce labor costs due to a reduction of pruning events and time per pruning. Our findings also show that depending on Trimtect efficacy, businesses can reduce the number of labor hours, which can directly impact labor reallocation to other tasks that offer higher return.

Potential benefits of PGRs may go further than time and cost savings. Benefits may also include savings on waste disposal and increased labor safety. Given the fact that PGRs reduce shrubs' biomass production, savings in waste disposal can potentially increase the economic benefit of PGRs. By reducing plant growth, PGRs can diminish the amount of workers' exposure to pruning

tools and equipment use. Reports show that landscape services is an industry with considerable rates of injury and illness, as well as fatalities. The National Institute for Occupational Safety and Health reported 45% of fatalities among landscape services workers are due to the use and operation of tools and machinery. Similarly, 51% of fatalities in the landscape industry were incurred by groundskeepers working in ornamental shrub and tree maintenance.

Distribution of the HortCalculator

The calculator will be hosted at
https://www.purdue.edu/hla/sites/hortbusiness/

The Tree Next Door
(Lindsey Purcell, lapurcel@purdue.edu)

Leaning trees can be a risk to neighboring property owners.

I hear this complaint or issue more frequently, "what can I do about the neighbor's tree?" or "my neighbor just butchered my tree!". Often, we see issues with a neighboring tree that may threaten safety or appears to be an elevated risk. For example, from the view of your window you see your neighbor's tree dropping dead branches all over your driveway. Or, you can't see a favorable view at all because of that tree or unruly hedge. Or you are certain that the neighbor's tree will eventually fall onto your garage.

Before you take any action, establish ownership of the tree, and find out if you have rights to work on the offending vegetation. Otherwise, it can land you into a contentious legal situation.

Some questions to consider include:

When tree limbs or even the trunk of the tree crosses property line, are you within your rights to prune or remove it?

Boundary laws vary with every state. Often the boundary lines are uncertain or assumed based on local information. However, in contentious situations that may result in major modifications to a tree, it is advised to get a survey to establish exactly who owns the tree.

Check with local government websites for property maps which can help identify boundaries.

Rights are determined by who owns the tree. Check with your town, city, county and state municipalities for regulations about trees and property lines. The rights and responsibility for care and maintenance of trees are assigned to its owner, and ownership is determined by the *location of the tree's trunk*. If the trunk is located entirely on the neighbor's land even if its limbs or branches overhang onto your land, the neighbor is the tree's owner. The neighbor has the sole right to preserve the tree or cut it down. This is true regardless of the neighbor's motivation or the impact the tree removal would have on your land.

It is always best practice and considerate to first ask your neighbor if you can arrange to have it removed or pruned. They might actually appreciate it.

When tree work is required to remove or prune the tree and neighbor conflict exists, have a qualified tree care provider determine the work specifications on exactly how the tree issue should be mitigated. It is usually a bit more complex than simply stating, "cut limbs back to property line." The work order must reference the ANSI A300 tree pruning standards to assure the procedures being proposed take into consideration the tree's future health. Ensure that your tree care provider has a copy of their current liability insurance policy on hand. Check their references as well, not all tree care companies are guaranteed to provide the best results for you or your tree.

An ISA certified arborist can provide mitigation options that are best for the tree and helpful for the tree owner.

The best advice is to hire a tree care professional with the experience, expertise, and equipment to assess and safely prune, remove or otherwise care for your or your neighbors' trees. Search for a tree care provider in your area. Also, consider hiring an ISA Certified Arborist which can be found here.

According to most attorneys, open-minded communications with the neighbor can result in an acceptable resolution for any situation. This will help to avoid a contentious, expensive, time consuming and unpredictable lawsuits.

Phytophthora bleeding Canker

(Tom Creswell, creswell@purdue.edu)

We often think of *Phytophthora* as mainly a root rot pathogen, but *Phytophthora* can also cause a bleeding trunk canker under the right conditions. The most commonly attacked trees we see in the diagnostic lab are American and European beech (*Fagus spp.*), maples (*Acer spp.*); but this disease is also reported to occur on Magnolia (*Magnolia spp.*), dogwood (*Cornus spp.*, oak (*Quercus spp.*) and other trees.

The presence of dark brown to black spots on the bark of trees near the base of the trunk may indicate a *Phytophthora* infection. These spots are the result of oozing sap from areas killed by the pathogen (Fig. 1). *Phytophthora* does not cause wood decay, but by killing bark and outer sapwood, it may allow entry of wood rot fungi that cause additional damage. The *Phytophthora species* that cause bleeding canker live in the soil and affected trees may also have damage from root rot disease, especially in poorly drained sites. Spores of the pathogen may be splashed up on the trunk and enter wounds or cracks in the bark. Affected trees may decline slowly and may show symptoms of early fall color (Fig. 2) or dieback (Fig. 3). Wilt symptoms may be present if much of the sapwood is killed and upward movement of water is limited.

Figure 1: Lower trunk of maple showing bleeding canker symptoms caused by a Phytophthora species.

Figure 2: Maple tree showing early fall color due to trunk damage and Phytophthora trunk canker.

Figure 3: European beech tree with dieback caused by Phytophthora trunk canker and root rot.

To reduce the risk of *Phytophthora* trunk canker plant susceptible trees only in well-drained sites. Mulch the root zone of trees to reduce water splashing soil on the trunk and to avoid injury to the trunk from mowers and string trimmers. Trees may recover under the right conditions or with effective treatment, such as trunk applications of Phosphorus acid products, like Agri-Fos, Phostrol or Phosphite with an adjuvant to help penetrate bark.

Don't assume all trees with black oozing sap have *Phytophthora* canker. Other problems such as injuries (Fig. 4), slime flux (https://www.purduelandscapereport.org/article/slime-flux-of-trees /), pathogens like *Botryosphaeria* and *Pseudomonas* or wood boring insects can cause similar symptoms. To diagnose the problem, you can send samples of the bark and sapwood taken from areas with sap staining to a diagnostic lab; where rapid *Phytophthora* ImmunoStrip tests and isolations will be used to confirm the problem. The samples can be as small as one- to two-inch square chips of bark that go only deep enough to include a thin layer of sapwood (Fig. 5).

Figure 4: Physical injury at the base of this maple allowed entry of wood decay fungi, contributing further to decline caused by Phytophthora trunk canker.

Figure 5: Phytophthora bleeding canker symptoms at the base of a European beech tree. The areas circled in red at the leading edge of the canker are good targets for collecting bark samples to send to a diagnostic lab for testing.

Purdue Landscape Report: Virtual

(Kyle Daniel, daniel38@purdue.edu)

Please join us Wednesday (November 4th) for our bi-weekly, live educational series. The event will take place at 12:00 pm (Eastern) on Zoom at **https://purdue-edu.zoom.us/j/96190839031** or on Facebook Live at **https://www.facebook.com/PurdueLandscapeReport/**.

The following speakers and topics will include:

The Tree Next Door-Lindsey Purcell

Preventing Southwest Injury and Bark Cracking on Trees-Kyle Daniel