

and speed of manual labor. One of the strategies has been the implementation of PGRs to their maintenance toolkit. PGRs reduce plant growth through the action of an active ingredient, such as paclobutrazol, which suppresses plant growth by acting as gibberellin biosynthesis inhibitor and blocking plant cell elongation.

Our experiment

Data for this analysis comes from four experiments conducted between April and May 2016 in Florida, Texas, and Indiana. Account managers of landscape maintenance companies collected data on three shrub species: Confederate jasmine (*Trachelospermum jasminoides*), Asiatic jasmine (*Trachelospermum asiaticum*), and Thorny eleagnus (*Elaeagnus pungens*). Data collected included number and time of pruning events and agrochemical (PGR and surfactant) applications. PGR (Paclobutrazol; Trimtect; Rainbow Treecare Scientific Advancements; Minnetonka, MN) and surfactant (Glycerin, diethylene glycol and alkyl polyglucoside; Audible 90; Exacto Inc.; Sharon, WI) rates followed product manufacturer recommendations (6.4 to 9.6 fl. oz/gal for PGR and 2ml/gal for surfactant).

Table 1 illustrates the data collected as well as the length of each experiment. We computed the percent reduction of the number of pruning events and hours per pruning for control and treated shrubs. For example, Table 1 shows treated Confederate jasmine (FL) received 67% fewer pruning events and 70% fewer hours per pruning event when compared to the control group. We can see similar results in Confederate jasmine (FL) that reduced the number of pruning events by 67%.

Table 1. Effect of Trimtect PGR treatment on number and timing of pruning cycles.

Shrub	State	Weeks experiment	Pre-treatment		Control		Treatment		Reduction number cycles (%)	Reduction hours per cycle (%)
			Number cycles	Hours per cycle	Number cycles	Hours per cycle	Number cycles	Hours per cycle		
Confederate jasmine	FL	6	1	1	3	1	1	0.3	67	70
Asiatic jasmine	FL	12	1	10	8	10	1	10	88	0
Asiatic jasmine	TX	6	1	3.75	6	3.75	1	3.75	83	0
Thorny eleagnus	IN	12	1	9	1	9	1	1	0	89

Economic Analyses

A partial cost analysis helped us investigate the change in labor costs due to PGR applications for shrub maintenance. Later, cost savings from the use of PGRs was also calculated by comparing costs of treated (with PGRs) versus untreated (control) shrubs. We standardized values to dollars per 500 ft² per year (\$/500 ft²/year). For example, the cost of pruning was standardized to dollars spent in pruning an area of 500 ft².

Findings

Three out of four experiments resulted in cost savings after applying PGR. Treating Asiatic jasmine (FL and TX) and Thorny eleagnus (IN) with paclobutrazol resulted in cost savings of \$956.95, \$23.14, and \$96.28 per 500 ft² per year, respectively. The amount of cost savings is mainly due to high demand of pruning hours in each species, which was offset by suppressed growth after PGR applications (Table 2). Alternatively, applying PGRs to control growth of Confederate jasmine (FL) resulted in a

negative economic impact. This negative impact is likely the result of two main factors: 1) a high rate of PGR application (9.6 fl. oz/gal), which resulted in “curved leaves” as reported by account managers; and 2) a low demand of pruning hours for Confederate jasmine in Florida.

Table 2. Partial cost analysis for each shrub species in the control and treatment groups.

Shrub species	State	Control		Treatment					Cost Savings
		Cost of pruning	Partial net cost	Cost of pruning labor	Cost of application labor	Cost of PGR	Cost of surfactant	Partial net cost	
Confederate jasmine	FL	\$50.46	\$50.46	\$5.05	\$1.01	\$72.77	\$0.10	\$78.92	-\$28.46
Asiatic jasmine	FL	\$1,516.57	\$1,516.57	\$189.57	\$5.06	\$364.51	\$0.49	\$559.62	\$956.95
Asiatic jasmine	TX	\$71.69	\$71.69	\$11.95	\$2.07	\$34.46	\$0.07	\$48.55	\$23.14
Thorny eleagnus	IN	\$234.21	\$234.32	\$26.02	\$1.52	\$110.24	\$0.15	\$137.93	\$96.28

Findings from this study show that, depending on the shrub species, PGRs can reduce the labor needs in landscape maintenance due to a reduction of pruning events and pruning time of each event. For example, applying PGRs can reduce the number of pruning events by up to 83% (Asiatic jasmine, TX) and hours per pruning cycle by up to 89% (Thorny eleagnus, IN).

Protect Pollinators and Plants with a Balanced Fall Garden Cleanup Plan

(Cliff Sadof, csadof@purdue.edu)



Septoria Leaf Spot on Rudbeckia

Most experienced gardeners will tell you that removing the dead foliage and stems of perennials and annuals in the fall is a great way to help next year's garden get off to a good start. Removing the stubble and leaves can remove overwintering fungi and insects that can attack plants in the spring. It also helps the garden soil dry more quickly so that you can plant earlier the following spring. Despite these advantages, these practices may also destroy or remove the habitat of the same solitary bees that gardeners want to lure into their garden.

Protect plants and pollinators this fall by identifying areas where you will focus on pollinator habitat conservation and other areas where you will focus on pest control. In this way, you will be able to leave nesting areas undisturbed for pollinators while removing pests from other areas. Consider moving the pollinator areas around your garden over a multiple year period to prevent pest buildup in any one area.



Four lined plant bug

Fungal diseases, like Septoria leaf spot can build up in perennial plantings and cause summer defoliation. Remove, or mow plants in the late fall to remove overwintering fungi that will attack next year's plants. Focus your removal on part of the garden that has the most heavy infestation of diseased leaves.

Four lined plant bugs can distort and discolor leaves of many perennials in late spring and early summer. Remove or mow perennial beds in the fall to destroy eggs that were laid in stems during the summer. This will leave fewer plant bugs to attack the garden in the following spring. Focus your removal efforts on areas of the garden that suffered from injury this summer.

Many solitary bees, like the small carpenter bee, orchard and mason bees can use stems of last year's perennials to build their nest. Some species require hollow stems. Others will excavate tunnels they need. Adult bees who lay eggs in these tunnels in spring and early summer will also provide enough food for their young to grow and develop during the rest of the growing season. A new generation of bees will emerge the following spring to start the cycle over again.



Small carpenter bee in stem. Photo by Howard Ensign Evans
Colorado State University, Bugwood.org



Echinacea stems cut for winter will provide habitat for solitary bees next year.

You can protect the habitat of stem nesting bees by cutting stems of varying heights that bees will use next spring. Although the stems will be visible in early spring, they will soon be covered by vigorous growth as the season progresses.



Pile of soil where a mining bee emerged from its nest.

Undisturbed soil provides nesting sites for many species of soil dwelling bees. Many of these bees are extremely good pollinators and should be left undisturbed through the summer to complete their life cycle. Designate areas where you will not dig for at least a year in order to conserve these pollinators.

Resources

Watch a how a blue orchard bee makes and provisions its nest in a hollow stem.

https://www.youtube.com/watch?v=oPbH1YhsdP8&ab_channel=DeeplLook

Recommended Indiana Native Plants for Attracting Pollinators.

<https://extension.entm.purdue.edu/publications/POL-6/POL-6.html>

Bees: An Identification and Native Plant Forage Guide, Heather Holm 2017

www.pollinatorsnativeplants.com

Purdue Tree, Shrub, and Flower Doctor Apps.

PurduePlantDoctor.Com

Purdue's Winter Cluster Webinar on YouTube:

https://youtu.be/9YrprR_inCI

Water Now Minimize Winter Injury

(Rosie Lerner, rosie@purdue.edu)

Dry summers are not that unusual in Indiana. Of particular concern this year is that the dry spell is lasting well into autumn, putting plants in poor condition to get through the winter.

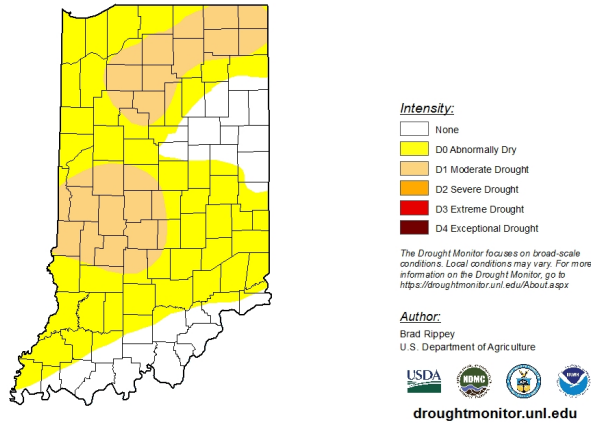


Figure 1. Indiana drought conditions as of September 29, 2020

Figure 1 from the US Drought Monitor shows that much of Indiana remains abnormally dry to under moderate drought. While some areas are expected to receive rain in coming weeks, it likely won't be enough to completely offset the moisture deficit.

Newly planted trees, shrubs and perennial flowers will be at most risk of winter injury from desiccation. Established plants may tolerate drought better, but they will be more susceptible to winter injury if they go into winter in stressed condition.



Rhododendron desiccation



Wilted hydrangea

Woody plants, especially evergreens, are susceptible to drying out over winter, broad-leaved evergreens even more so. Even dormant plants in winter continuously lose water through transpiration. Once the ground is frozen, the plant's roots are not able to take up water to replace that which is lost through the tops. The result is drying buds and twigs, and leaves in the case of evergreens. Sunny, windy conditions cause water to be lost from the tops more rapidly, further aggravating the situation. Broad-leaved evergreens are particularly vulnerable, since they have considerable leaf surface from which to lose water.

Next year's growth is determined by buds that formed in late summer and early fall when much of the state has been under extended dry conditions. Flower buds for many spring flowering plants also develop during that time. So even if plants aren't showing symptoms now, the damage may become apparent next season

Making sure the plants have a sufficient supply of soil moisture before the ground freezes will help to fight the winter battle. Where feasible, water gently but deeply, every 7-10 days.

It is the policy of the Purdue University that all persons have equal opportunity and access to its educational programs, services, activities, and facilities without regard to race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability or status as a veteran. Purdue is an Affirmative Action Institution. This material may be available in alternative formats. 1-888-EXT-INFO Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.