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THE PURDUE LANDSCAPE REPORT

In This Issue

Some Shrubs Best Pruned After Flowering

(Rosie Lerner, rosie@purdue.edu)

Although late winter is generally the ideal time for pruning chores, many of our spring-blooming shrubs are best pruned immediately after flowers have faded.

Trees and shrubs that bloom in early spring, such as forsythia, lilac, honeysuckle, quince and spirea, set their flower buds the previous fall, referred to as “flowering on old wood”. If you prune in late winter, some or all of the bloom potential for spring is sacrificed. By waiting until after flowering, you can enjoy the blossoms first, then attend to pruning chores.

As with any other pruning job, have a goal in mind before you begin cutting. First, any dead, diseased or damaged stems should be completely removed. Young plants and those that have benefited from pruning in recent years may only need light pruning to maintain the desired size or shape. Vigorous shrubs often grow so many stems that the interior leaves of the plant drop due to shading. Removal of excessive growth and crossed branches is a good strategy to remedy such crowding.

Older, overcrowded plants that have been neglected for a number of years may also produce fewer flowers and fruits. Some plants can be cut completely back to the ground to force new branches all at once, including forsythia, rose-of-Sharon, privet, honeysuckle, spirea and lilac. Although the results may look drastic, it is only temporary and within a year or so the new branches will camouflage the old base.

A more gradual rejuvenation process, known as renewal pruning, consists of a three-stage process that results in a completely new plant at the end of three growing seasons. The first year, remove one-third of the oldest, largest-diameter stems completely back to ground level. For example, if a particular shrub has 15 stems coming from the base, remove five of the largest stems completely back to the ground. The second year, remove the next five oldest, largest stems, and the third year remove the last five oldest, largest stems, so that by this time, all stems of the plant are no more than 3 years old.

Make sure that you have the proper pruning equipment for the job. You’ll need sharp, hand-pruning shears for cutting branches up to one-fourth inch in diameter and sharp, lopping shears for branches up to 1 1/2 inches in diameter. Use a pruning saw for all larger branches. Hedge shears should only be used when clipping hedges and shrubs that are pruned to a formal shape.

Fringetree in bloom Photo credit: Rosie Lerner, Purdue Extension

Forsythia in bloom Photo credit: Rosie Lerner, Purdue Extension

Rhododendron in bloom Photo Credit: Rosie Lerner, Purdue Extension

Here's a list of some common shrubs that flower on old wood that should be pruned soon after flowers fade.

Flowering Almond, Cherry, & Plum
Beautybush
Chokeberry
Cotoneaster
Deutzia
Forsythia
Fringetree
Lilac
Mockorange
Flowering Quince
Rhododendron (and azalea)
Spirea
Viburnum
Weigela

For more information on pruning, see Purdue Extension Bulletin HO-4.
https://www.extension.purdue.edu/extmedia/HO/HO-4-W.pdf

Dormant Applications of Horticultural Oil Can Help Control Troublesome Pests

(Cliff Sadof, csadof@purdue.edu)

Spring provides a great opportunity to kill insects that winter in vulnerable stages on leafless twigs, or on last year's hardened off evergreen leaves or needles. The absence of tender leaf tissue makes it possible to use higher concentrations of oil that can kill insects without harming the plant. Dormant oil applications can have the added advantage of protecting beneficial insects and pollinators that are not active on these plants during the dormant season.

What is a Dormant oil application and how does it kill insects?

Oil products that can be applied in the dormant season contain between 97 to 98.8% paraffinic oil plus a surfactant. Products that are 98.8 % pure are called summer superior oils and can be applied at a 4% rate in the dormant season. Whereas those products that are 97-98% pure are called dormant oils. These are applied at a 2% rate in the dormant season. Insecticidal oils dissolve and penetrate the waxy shells of insects and mites where they strip the fat out of insect tissues. Insects shrivel up and die when their tissues can no longer function to help them breath air or retain liquid.

When in the Dormant season can oils be used?

Apply oil to trees and shrubs with an historical problem of mites, armored scales or woolly aphids during the dormant season before trees and shrubs break dormancy. Temperatures must be above 40˚ F for 24 h and < 70 ˚ F. In the southern part of the state applications can be made as early as February, whereas in more northern areas the sprays can be applied in March. Oil can strip the wax from the needles of blue needled evergreens, including some spruce, junipers and cedars and turn them green. In some cases this can result in leaf burn. Chances of leaf burn are less when applications are made in spring that late fall. This is because the new leaf growth in spring can shade the oil treated leaves and shelter them from the drying effects of wind. Red maples and black walnuts can also be burned by dormant oil applications. Do not apply with sulfur containing pesticides. See the pesticide label for a complete list of susceptible plants.

Figure 1 Male, female, and egg stage of spider mite

Which insects are most easily killed by dormant applications?

Spider mites: (Figure 1) All stages that winter on plants are readily killed by dormant applications of oil. Most notable species include honeylocust spider mite, European red mite and spruce spider mite. Because these applications can also kill some natural enemies, it is best to limit applications to plants that had severe outbreaks last fall.

Armored scales who do not winter as eggs: (Figure 2)

Only armored scales can be controlled by applications of oil in the dormant season. Those species that winter as eggs (oystershell scale, some pine needle scales) can survive sprays of oil because only the top layers of eggs are killed. In contrast, those scales that winter as adult females or immatures (euonymus scale, San Jose scale, and obscure scale). Control of Japanese maple scale with dormant oil is difficult because many can winter with an extra layer of shell under their waxy covers. Soft scales that produce honeydew like calico, and tuliptree scale cannot be controlled by applications of oils.

Figure 2. Male and female euonymus scale

Figure 3. Pine bark adelgid

Woolly Aphids that winter as adults or immatures: (Figure 3) Pine bark adelgids, and woolly apple aphids are aphid like insects that winter on the trunk of pine and apple trees. Application of oil will dissolve their waxy wool and kill them.

Additional Resources:

Bulletins.

Spider mites

https://extension.entm.purdue.edu/publications/E-42/E-42.html

Scale insects

https://extension.entm.purdue.edu/publications/E-29.pdf

Purdue Plant Doctor Apps

https://purdueplantdoctor.com/

Research article on efficacy of oils and soaps against scale insects.

http://horttech.ashspublications.org/content/27/5/618.abstract

Taphrina Leaf Curl on Ornamental Flowering Peaches and Nectarines

(Gail Ruhl, ruhlg@purdue.edu)

There may still be time to protect Prunus spp. from Taphrina leaf curl.

Do you remember seeing red, curled, distorted, leaves on Prunus spp. last year and wondering what might have caused this symptom? Taphrina leaf curl, a fungal disease that survives in bark and bud scales, infects peaches and nectarines as well as ornamental flowering species of Prunus.

The symptoms of Taphrina leaf curl are very distinctive (Figure 1) and thus you definitely would have noticed this fungal disease if it was present in Prunus spp. last year. Infected leaves are severely puckered, distorted, thickened and reddish-to purple in color. (Figure 2) Premature leaf drop may also occur.

Figure 1. Symptoms of Taphrina leaf curl on peach tree leaves in early Spring

Figure 2. Distinctive leaf distortion and pink color due to Taphrina leaf curl

A single, thorough, **preventative fungicide application is recommended during dormancy (**after leaf drop in late fall **but prior to bud swell in early spring before green leaf tips are first visible)**. Several fungicides are recommended for dormant applications. Check the Midwest Fruit Pest Management Guide for the most recent recommendations. Read and follow all label instructions to insure safety and maximum effectiveness.

If temperatures in your area have been such that visible bud swell has already occurred in Prunus spp., making it too late for a dormant application of fungicide then the recommended management for this year is to promote tree vitality through pruning, fertilization and watering.

Blue Spruce Update

(Janna Beckerman, janna@purdue.edu)

Fig. 1. Severely infected tree showing the 'purple-brown' needle symptoms.

Colorado blue spruce is not native to Indiana (no spruce is!), and it often suffers from environmental stresses such as drought, excessive heat, humidity, and compacted or heavy clay soils—making it an already poor choice for our landscape. If that weren't enough, it also suffers from needle cast diseases. Needle cast is a generic term that refers to foliar diseases of coniferous plants that result in the defoliation ("casting off") of needles. Needle casts vary by host, and severity is dependent upon the age of infected needles. Of all the foliar diseases affecting woody landscape plants and shrubs, needle casts are the most serious for the simple reason that coniferous plants do not have the ability to refoliate, or produce a second flush of needles from defoliated stems. Rhizosphaera needle cast is a fungal disease, caused by Rhizosphaera kalkhoffii that attacks the needles of Colorado blue spruce in the spring, as new needles emerge. However, infected needles often don't show symptoms right away, and may take one to three years to develop. Infected needles later turn purple to brown and fall from the tree prematurely (Fig. 1), leaving the inner portion of the branch bare.

Fig. 2. As the disease spreads up the tree, lower branches begin to die.

As the disease progresses, severely infected branches die, leaving the tree with a hollow or thin appearance (Fig. 2). The disease usually starts near the base of the tree where humidity levels are the highest, but continues to spread upward. As the disease continues, trees become unsightly and lose their value as a visual screen or privacy fence.

The Rhizosphaera pathogen sporulates in the spring (Fig. 3), which is the best time to control this disease. The fungal fruiting structures emerge on these needles and are usually large enough to be visible to the eye, with the fruiting structures appearing as rows of small dots running lengthwise along the white bands of the needles. In severe infections, trees may only have the current year's needles remaining rather than the 5- to 7-year complement of needles a healthy spruce maintains. Destructive epidemics of needle casts or rusts are not uncommon, and develop under periods of extended leaf wetness. The after-affect of these epidemics can persist for several years. In the urban setting, needle casts are more of an endemic, as most conifers are ill-suited to the Midwest urban environment. Most conifers retain their needles for two to seven years. The length of time that a needle is retained depends on the species of coniferous plant and if the plant has been subjected to stress such as drought, flooding, salt damage, disease, or insect pest. Trees that lack the full complement of needles are stressed or undergoing pest attack. When attempting to determine the cause of needle drop, examine the branch carefully to determine if the problem is normal needle drop, the yearly occurance on normal needle shedding. The newest needles should not be affected and problems should not appear within the last two to three years of growth.

Fig. 3. Closeup of fruiting bodies. Photo by Paul Bachi, UK.

Managing Rhizosphaera

There are conifers that are more resistant to Rhizosphaera, and include white spruce (P. glauca) and its variant Black Hills spruce, both of which are intermediate in resistance. Norway spruce (P. abies) is highly resistant to this disease. Some Colorado blue spruce cultivars, like 'Hoopsii,' and 'Fat Albert' are reportedly more resistant to the disease.

Spectro-90, or copper-based fungicide, can protect new growth and prevent new infections; Concert II, Heritage, Pageant, and Trinity are labeled for use in commercial and residential landscapes, and nurseries, but data regarding their efficacy is lacking for this disease. Daconil Weatherstik is not labeled for blue spruce in the landscape but is still available for use in the nursery and for other landscape diseases.

It is important to protect new growth as it emerges no matter which fungicide you apply; fungicides should be applied when the new needles are half elongated (late April or early May) and again three to four weeks later, possibly with a third application if wet weather or growth persists. Rhizosphaera needle cast may be controlled in one year if fungicides are applied correctly. However, severely infected trees usually require two or more years of fungicideapplications. Even though fungicide application will effectively control this disease, reinfection may occur in subsequent years. Application to large trees requires special equipment to ensure adequate coverage. Read fungicide labels carefully and apply only as directed.

When planting new trees, consider planting Norway or white spruce, which are more resistant to Rhizosphaera. Other spruce, like Serbian, simply haven't had widespread evaluation in the Midwest, so buyer beware! Properly spacing spruce trees will help reduce disease incidence. Spruce trees grow best in moderately moist, well-drained soils but can be planted in other soils if adequate moisture is available. Avoid heavy clay, as trees planted on these sites often suffer iron, magnesium, and manganese deficiency. Water newly planted trees, and water during drought periods to help maintain tree vigor and minimize stress. Stressed trees should also be mulched and fertilized as needed. Properly prune dead or severely infected branches during dry weather. If trees are severely infected, the lower whorl of branches may also be removed to help increase air circulation.

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Early Season Predictions: Methods to Predict Weed Emergence

(Kyle Daniel, daniel38@purdue.edu)

Fill in the blank: Apply crabgrass preemergence herbicide when_____is in bloom.

If you said forsythia, you would be correct. Most of us have been told the answer to this for many years, but have you ever thought to yourself, 'Is it true?'

Figure 1. Callery pear in flower gives an indication of certain weed seeds germinating.

There are many ways that people make decisions on when to apply herbicides. Some of you may use growing degree-days, phenological cues (Figs. 1 and 2), or are you the one that says, 'I always put down my preemergence (PRE) herbicides on March 15th'? If you are the latter, there is a good chance that you spray a great deal of postemergence (POST) herbicides because of the weeds you missed with the PRE application.

Figure 2. Maple at bud break is an example of using a phenological cue to time weed control.

So, what exactly are phenological cues? Phenology is defined as the study of cyclic and seasonal natural phenomena, especially in relation to climate and plant and animal life. The use of phenology is applicable in many applications, including insect emergence and development, bloom dates, weed development and germination, and more. Continuing with our example of applying crabgrass PRE according to the timing of forsythia flowering, this is the utilization of this method of phenological cues to time the germination of a weed. Research has long demonstrated that plants break bud, germinate, and flower based on growing degree days. We can time these events to consistently apply preemergence herbicides at the correct time to prevent emergence by observing bud break and flowering of ornamental plants.

Utilizing growing degree-days to time phenological cues gives an approximation of the soil temperatures (which is a factor of what determines the timing of the germination of the weed seeds). Growing degree-days (GDD) are calculated by finding the mean temperature for the day. You do this by adding the high and low temperature and divide by two to find the mean. That number is then subtracted from the base temperature (usually 40° or 45° F for many ornamental species) to get the GDD for each day. We typically use between 35° and 50° F for the temperatures in which GDD's are accumulated. After an accumulation of these GDD's plants will begin to break bud, flower, produce seeds, etc. This number varies within species, which is why it is important to have an idea of the GDD's to time these phenological cues. There are calculators online that can be used in determining the amount of GDD's currently. A couple of recommended sites are: http://www.gddtracker.net/ or https://www.oardc.ohio-state.edu/gdd/.

Weed germination varies greatly by species, and sometimes even between ecotypes. Some weeds will complete germination within a few weeks, such as kochia (Fig. 3),

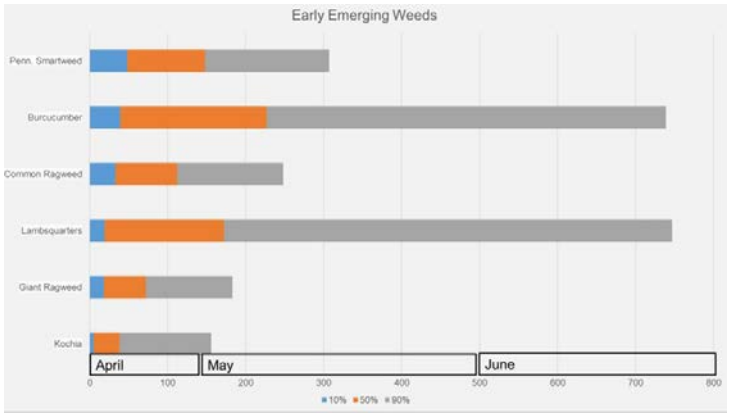

Figure 3. Early emerging weeds based on growing degree days. Blue is 10% germinated, orange is 50% germinated, gray is 90% germinated. Adapted from Werle et.al. (2014).

while others can take months, such as fall panicum (Fig. 4),

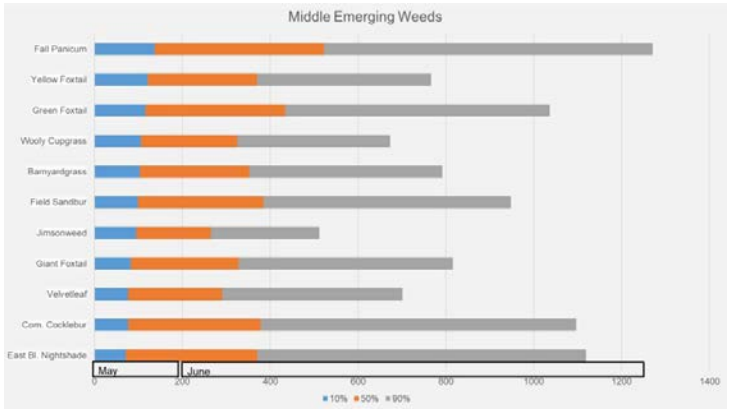

Figure 4. Middle germinating weeds based on growing degree days. Adapted from Werle et.al. (2014).

or ivyleaf morningglory (Fig. 5).

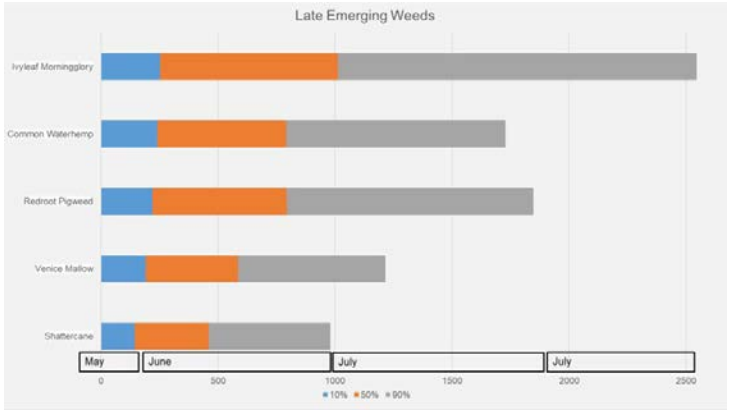

Figure 5. Late germinating weeds based on growing degree days. Blue is 10% germinated, orange is 50% germinated, gray is 90% germinated. Adapted from Werle et.al. (2014).

The longer germinating species can be more difficult to control due to the breakdown of the herbicide in the soil. To aide in increasing the longevity of your preemergence treatment, a split application can be utilized. A split application is applying half your product early and the other half about a month later.

As a reminder, remember that the most effective nursery and landscape weed control programs should rely on PRE as the

primary chemical control method. By reducing the amount of POST, phytotoxicity chances are reduced, money is saved by decreased labor inputs, and the weed seed bank is reduced. Remember that PRE must be applied PRIOR to weed germination or they are ineffective.

The figures and charts in this publication should be helpful in scheduling and planning your spring weed control program. As of the release of this article, silver maple is in bloom in West Lafayette, IN. I suspect most everything will be in a 'holding pattern' or 'suspended animation' until we begin to receive more warm weather later next week.

Common Name	Phenological Event	Date	Degree Day
Red Maple	First Bloom	March 20	89
Red Maple	Full Bloom	March 30	71
Star Magnolia	First Bloom	April 4	89
Border Forsythia	First Bloom	April 4	922
Border Forsythia	Full Bloom	April 13	105
Saucer Magnolia	First Bloom	April 13	119
Bradford Pear	First Bloom	April 15	137
Star Magnolia	Full Bloom	April 16	149
Saucer Magnolia	Full Bloom	April 18	184
Bradford Pear	Full Bloom	April 19	189
Eastern Redbud	First Bloom	April 20	192
Snowdrift Crabapple	First Bloom	April 21	213
Common Lilac	First Bloom	April 24	231
Common Horsechestnut	First Bloom	April 30	264
Eastern Redbud	Full Bloom	April 30	277
Snowdrift Crabapple	Full Bloom	May 1	268
Flowering Dogwood	First Bloom	May 4	293
Common Lilac	Full Bloom	May 7	331
Winter King Hawthorn	First Bloom	May 8	344
Common Horsechestnut	Full Bloom	May 11	385
Winter King Hawthorn	Full Bloom	May 15	423
Black Locust	First Bloom	May 20	459
Black Locust	Full Bloom	May 28	565
Washington Hawthorn	First Bloom	June 2	641
Northern Catalpa	First Bloom	June 5	678
Washington Hawthorn	Full Bloom	June 10	775
Northern Catalpa	Full Bloom	June 13	818

Table 1. Common ornamental plants bloom times based on growing degree days. Adapted from Cardina et.al. (2011).

Common Name	Environment	Emergence	Date	Degree Day
Smooth Crabgrass	Lawn	First Emergence	April 16	155
Smooth Crabgrass	Bare Ground	First Emergence	April 17	178
Large Crabgrass	Lawn	First Emergence	April 24	211
Smooth Crabgrass	Lawn	25% Emergence	April 28	263
Smooth Crabgrass	Bare	25% Emergence	May 1	284
Large Crabgrass	Bare	First Emergence	May 2	306
Smooth Crabgrass	Lawn	50% Emergence	May 7	347
Smooth Crabgrass	Bare	50% Emergence	May 9	354
Smooth Crabgrass	Bare	80% Emergence	May 19	448
Large Crabgrass	Lawn	25% Emergence	May 20	472
Large Crabgrass	Bare	25% Emergence	May 22	502
Smooth Crabgrass	Lawn	80% Emergence	May 24	548
Large Crabgrass	Bare	50% Emergence	June 1	623
Large Crabgrass	Lawn	50% Emergence	June 6	692
Large Crabgrass	Lawn	80% Emergence	June 30	1160
Large Crabgrass	Bare	80% Emergence	July 1	1188

Table 2. Using growing degree days to predict germination of large and smooth crabgrass. Adapted from Cardina et.al. (2011).

Common Name	Environment	Emergence	Date	Degree Day
Giant Foxtail	No Fall Tillage	25% Emergence	May 10	286
Giant Foxtail	Fall + No Tillage	25% Emergence	May 11	288
Giant Foxtail	Fall Tillage	25% Emergence	May 11	290
Giant Foxtail	Fall + No Tillage	50% Emergence	May 15	380
Giant Foxtail	Fall Tillage	50% Emergence	May 16	382
Giant Foxtail	No Fall Tillage	50% Emergence	May 18	413
Giant Foxtail	Fall Tillage	80% Emergence	May 30	578
Giant Foxtail	Fall + No Tillage	80% Emergence	June 8	693
Giant Foxtail	No Fall Tillage	80% Emergence	June 9	717

Table 3. Giant foxtail germination based on growing degree days in tilled vs. no-tilled areas. Adapted from Cardina et.al. (2007).

If you are a nursery or landscape company that would like to discuss your weed control program, please contact me at daniel38@purdue.edu.

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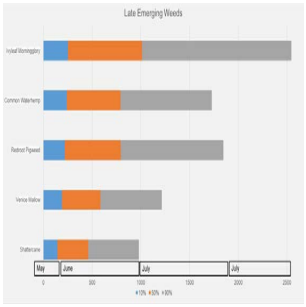

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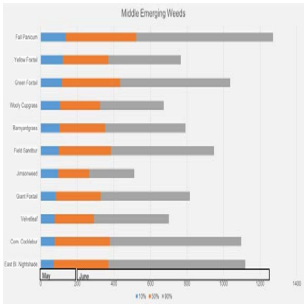
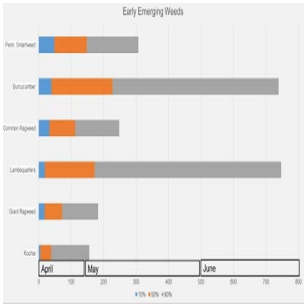


Figure 4. Middle germinating weeds based on growing degree days. Adapted from Werle et.al. (2014).



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