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This is the 10th 2015 edition of the Buckeye Yard and Garden Line (BYGL). BYGL is developed from a Tuesday morning conference call of Extension Educators, Specialists, and other contributors in Ohio.

*****HOW TO: BUCKEYE YARD AND GARDEN LINE SUPPORT. The Ohio State University (OSU) Buckeye Yard and Garden Line (BYGL) writers need your support to continue this newsletter. OSU puts a great deal of resources into this project and we do not receive funding necessary for full support. We know you like BYGL, as in the 2014 Reader's Survey respondents indicated BYGL saved them $2.45 million dollars, 96% indicated BYGL was useful in their jobs, and 87% indicated BYGL helped with their diagnostic skills.

Funds will support on-going work of the Ohio State University Extension Nursery Landscape and Turf Team in matters regarding preparation, compilation and travel for the weekly April-October BYGL e-newsletter. Expenditures will include but not be limited to equipment such as cameras, upgrades of computers and related devices, management of the website, editing and webinar costs, and travel reimbursements.

Here's how you show your support:

This is the direct link to the OSU giving site: [http://go.osu.edu/byglsupport].

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Also, if you would like to make a larger gift, please contact Jennifer Heller ([heller.4@osu.edu]), the Director of Development for the OSU College of Food, Agricultural and Environmental Sciences with your name and contact information. Jennifer's cell phone number 614.975.1317 and she will be more than happy to speak with you.

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1. PLANTS OF THE WEEK.

*ANNUAL - HAAGE'S AMARANTH OR BUTTON FLOWER (Gomphrena haageana). You can't beat this plant if you are looking for a tough, heat-tolerant annual that gives you color in the garden all season long. The plant grows to around 2 - 3' tall and around 1 1/2' wide. The bright yellowish-orange flowers bloom all season and make great cut or dried flowers; they are also extremely attractive to butterflies. Button flower is great to use in a cottage garden or an English garden mix. They thrive in full sun and tolerate drought situations.

You may not find the species sold as transplants in garden centers (you can direct seed it in the garden) but you will find some of the cultivars. One of the top performers in the OSU Extension Herbaceous Ornamental Field Trials in Clark County (Springfield, Ohio) a few years ago was a cultivar called 'Forest Carmine'. The rich pinkish-red flowers lasted all season and were butterfly magnets; in addition, they did not require deadheading. The plant was around 2' tall and about 1 1/2' wide.

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*PERENNIAL - COMMON YARROW (Achillea millefolium). This particular species of yarrow is called common yarrow because it has an ability to spread and grow just about anywhere. The deeply cut foliage is quite frilly and is deep green with flat-topped yellow flowers that bloom for several weeks in the late spring and early summer. The majority of the common yarrows planted today are hybrids that, according to Dr. Allan Armitage, have at least some A. millefolium in them. The great thing about these plants is that once established, they are extremely easy to care for.

After they finish the first flush of bloom in mid-summer (they are just beginning to hit full bloom in central Ohio), cut them all the way back to the ground. This is especially helpful for those plants that have a tendency to flop, either from being in the shade and stretching or from warm night temperatures that leads to weaker stems. They will regrow and bloom again later in the season. They have very few pest problems, and since they have flat-topped flowers, they are visited by butterflies and moths. Plant them in full sun for best flowering.

There are numerous hybrids on the market today with a variety of sizes and bloom colors. Armitage also notes that in warmer temperatures, some of these hybrid blooms' colors fade faster. I have noticed that myself with the 'Seduction' series. Most of the plants are around 2 - 3' tall and spread as much, filling in a planting area within a few years. The 'Seduction' series includes 'Saucy' (rose pink flower), 'Sunny' (yellow flowers), and 'Peachy' (orangish flowers). Other A. millefolium cultivars include 'Summer Berries' (white), 'Pretty Woman' (reddish), 'Pomegranate' (deep red), 'Paprika' (red and yellow) and 'Pink Grapefruit' (light pink).
WOODY - KENTUCKY COFFEETREE (*Gymnocladus dioica*). Kentucky coffeetree, which is in the pea family, is a nice medium to large tree for landscapes. This tree can reach up to 80' tall and 50' wide. It is easily recognized by its huge bipinnately compound leaves that are up to 2' long and 2' wide. This tree is found more often in the western half of Ohio, where the soils are more alkaline. Thick fruit pods containing large seeds are found only on female trees, and often hang on during winter. Pioneers used the seeds as a coffee substitute (often referred to as poor man's coffee) thus leading to the common name of this tree. Care should be taken for those who want to try the drink made from this tree, it has been found to cause toxicosis in livestock and humans. Kentucky coffeetree thrives almost anywhere it is planted, except for permanently wet soils. It is extremely tolerant to many stresses, including poor soils, high pH soils, occasional brief flooding, and air pollution. It grows in full sun to partial sun.

VEGETABLE - GARLIC SCAPES (*Allium sativum*). The graceful goose-neck loop of garlic scapes is an early bonus to growing hardneck garlic (*A. sativum var. ophioscorodon*). The scape is the immature flower stalk growing directly from the garlic bulb. They are not only aesthetically pleasing but also provide a sweet, mild garlic flavor as a garnish or added to an assortment of recipes. In parts of Ohio, NOW is the time to harvest these delectable treasures.

Garlic is divided into two categories - hardneck and softneck (*A. sativum var. sativum*). The hardneck produce the flower stalk and are best for longer bulb storage. The three different varieties of hardnecks are Racambole, Poreclain and Purple Stripe. All will produce edible scapes but at different times of the summer. Harvest the scapes by cutting or pinching the solid stems when they are in their curlicue stage, about 4 weeks into the season. The earlier you harvest the scapes the more tender they will be. The stem straightens as the garlic bulb matures and the scapes become tough, fibrous and stronger tasting. Enjoying the scapes now may help improve your garlic harvest by increasing the bulb weight by 25 - 30% because the plant can focus energy on bulb production.

If you have planted hardneck garlic, check your garden so you don't miss this short window of opportunity. You may also find garlic scapes at local farm markets. If you like them, plant garlic cloves in the fall so you can enjoy your own garlic scape harvest next June.

WEED - POKEWEED (*Phytolacca americana*). Pokeweed is making its presence known across Ohio. This plant is also known as garget, pigeon berry, inkberry, scoke, and pokeweed. Pokeweed is native to North America. This herbaceous perennial sends out shoots in the early spring which emerge as a tight cluster of leaves. However, pokeweed reproduces mostly by seed. The cotyledon leaves of pokeweed are green, about 1/2” wide by 1” long. It is a fast-growing plant and can reach heights of up to ten feet.

Pokeweed prefers rich, moist soil, and is found on recently disturbed land, ditches, and fence lines. The succulent stems can grow to 4” in diameter and are often reddish. The leaves are alternately arranged and grow 4 - 12” long and half as wide. The leaves tend to be reddish tinged. It will flower anytime from May to October and the berries will form about a month afterward. The individual flowers are tiny, consist of five pink or green sepals surrounding ten stamens and are arranged in clusters of up to 8” long. It is not uncommon for the plant to be bearing fruit and flowering at the same time.

Each mature dark-purple berry contains ten, disk-shaped seeds that are 1/8” diameter and poisonous, as is the rest of the mature plant. Research is underway to determine if the toxic properties of the plant could be used as pesticides. The mature tissues of the plant are toxic.
Plants can be hand-removed by cutting below the root crown. Pokeweeds have perennial root systems; therefore eradication is more likely through use of a systemic herbicide than a contact herbicide. Like most perennial weeds, the ideal time to apply an herbicide is in the fall. Many herbicides that contain 2,4-D or dicamba will effectively control pokeweed. Always follow label instructions.

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2. HORT SHORTS.

A. NEITHER PINE NOR SPRUCE, IT’S A FIR. Firs are evergreen coniferous trees that belong to the genus *Abies* in the family Pinaceae. There are about 50 species in the genus around the world. In nature, they are found growing on mountains; however, several species are regularly used as landscape plants (e.g. white fir, *A. concolor*) and/or Christmas trees (e.g. Fraser fir, *A. fraseri*). Not all trees that carry the common name of fir are true firs. DOUGLAS FIRS or Doug firs (genus *Pseudotsuga*) are not true firs.

True firs can be distinguished from other members of the pine family by the unique attachment of their needle-like leaves, by their different cones, and by the orientation of their cones. As was described in earlier articles, pines produce their needles in bundles of 2 - 5 needles attached to the branches in fascicles (BYGL Issue 2015-08, 5/28/2015) and spruces produce their needles singularly and are attached to the branches on short pegs (BYGL Issue 2015-09, 6/4/2015). The needles of firs are also produced singularly like the spruces however the base of the needle looks like a miniature suction-cup. When these needles are pulled off of the branches, they leave behind pit-like scars. The needles of firs are flattened and will not roll between one’s fingers, unlike the needles of spruces that are square and pines that are pie-wedge shaped. When the needles of firs are crushed, they typically have a citrusy scent to them.

Again like the pines and spruces, firs are monoecious (i.e., individual trees have both female cones, that bear the ovules which when fertilized, develop into seeds and male cones which shed the pollen). The female cones are the most obvious because of their size and the length of time that they are on the trees. The male cones are generally much smaller than the female cones and are present on the trees for a short period of time. Once the male cones shed their pollen, they often break apart and fall from the tree. The pollen is carried by wind and gravity; none of the firs are pollinated by insects or birds.

The female cones of firs are distinctly different than the cones of pines and spruces. Cones of firs are made up of scales (modified needles) attached to a center stalk the same as pines and spruce. However unlike the female cones of pines and spruces that start out their development pointing upwards and eventually drooping downwards as they mature, fir cones remain pointing upwards as mature cones. Pine cone scales are woody. Spruce cone scales are thin and flexible. Fir cones tend to be dense and solid until they are ready to release their seeds. Female pine and spruce cones typically fall whole from the tree relatively intact whereas fir cones break apart leaving the stalks of the cones attached to the tree. Seldom do fir cones fall from the tree intact.

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3. BUGBYTES.

A. ANOTHER WILLOW WOE. Last week (BYGL 2015-09, 06/04/15), we reported that first generation IMPORTED WILLOW LEAF BEETLE (*Plagiodera versicolora*) were damaging their namesake host in southwest Ohio. This week, Joe Boggs reported that he observed first generation WILLOW SAWFLY (*Nematus ventralis*) larvae feeding on containerized willows in a garden center in that part of the state. The distribution of the sawflies within the garden center pointed to the surrounding landscapes and
woods as the source of the infestation rather than the larvae having been shipped by a supplier. Despite its common name, this sawfly will occasionally feed on poplars.

The striking looking larvae are shiny black with a row of slightly raised orangish-yellow spots along the sides of their body. As with many types of sawfly larvae, when disturbed willow sawfly will form their bodies into an "S" shape (S for sawfly?). This species carries the approved common name of "willow sawfly" by the Entomological Society of American (ESA). There is another sawfly species found in North American that also feeds on willow. *Nematus oligospilus* has no common name approved by the ESA; however, it is also commonly referred to as the "willow sawfly." Larvae of this species are much less colorful; their head capsules are flesh colored and their bodies are light green with faded green and white longitudinal stripes.

Willow sawfly larvae feed in colonies that typically include 5 - 10 individuals. Early instars produce holes and notches in leaves while late instars consume entire leaves. Heavy defoliation is rare, so this sawfly is seldom considered a serious pest of established willows. However, since this sawfly has two generations per season in Ohio, the impact of the second generation on newly planted trees may be significant. Control options include simply knocking the colonies into a bucket of soapy water or onto the ground and doing the "sawfly stomp dance." Appropriately labeled insecticides are also effective.

Remember that although these and many other types of leaf and needle-feeding sawfly larvae may strongly resemble caterpillars, they are NOT susceptible to caterpillar-killing insecticidal products based on the naturally occurring bacterium, *Bacillus thuringiensis* (Bt). Sawflies are related to wasps (order Hymenoptera); caterpillars grow-up to become moths and butterflies (order Lepidoptera). A handy way to separate sawfly larvae from caterpillars is to count the number of prolegs. Starting at the head and working your way back, the first three pairs of hardened legs are the thoracic legs. The next pairs of fleshy legs are called prolegs; they are lost during pupation. Sawfly larvae have 6 or more pairs of prolegs. Caterpillars have 5 or less pairs of prolegs; the same number of pairs as fingers on one of your hands.

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B. CATALPA CATS ON THE PROWL. Participants in this week's Southwest Ohio BYGLive! Diagnostic Walk-About came across a significant population of CATALPA SPHINX MOTH CATERPILLARS (*Ceratomia catalpae*) feeding on their namesake host. Catalpa sphinx moth caterpillars are also called catalpa hornworms owing to a distinctive black "horn" on their posterior end. Although the caterpillars of this native moth are capable of producing significant defoliation of their native host, the hornworms seldom cause significant long-term injury to the overall health of catalpa trees. Indeed, this pest-host relationship has been studied for many years to learn how coevolution affects relationships between native trees and their native pests.

The caterpillars have two "color forms;" a dark form and pale form. Dark form caterpillars have a broad, "black-velvet" stripe running down their backs, and their sides are yellow to yellowish-white with black spots. Pale form caterpillars are light green or greenish-yellow and may have a row of black spots down their back rather than a black stripe, or they may appear almost albino-like by lacking any noticeable black markings. There are two over-lapping generations per year in Ohio with large late instar first generation caterpillars feeding alongside early instar second generation caterpillars. Winter is spent as pupae buried 2 - 3" inches beneath the soil surface.

Catalpa hornworm caterpillars feed exclusively on their namesake host and can occasionally produce noticeable defoliation. However, between egg hatch and pupation, the caterpillars must run a gauntlet of beneficial insects including both parasitoid and predatory wasps.

The parasitoid wasp *Contesia congregata* (Family: Braconidae) is a well-known nemesis of catalpa hornworms as well as a few other hornworm caterpillars. This is a "gregarious endoparasitoid" meaning that multiple wasps develop inside a single caterpillar. When a female wasp uses her ovipositor (=
stinger) to inject her eggs into a hornworm caterpillar, she also injects a symbiotic polydnavirus. The virus suppresses the caterpillar's immune system so it does not destroy the wasp's eggs and larvae. The wasp larvae are programmed to only eat internal structures that will not kill the caterpillar. However, once they near pupation, they consume all internal structures and emerge from their caterpillar host to spin cocoons. Zombie hornworm caterpillars festooned with the white, oblong, silken cocoons of this parasitoid wasp are a common sight in Ohio.

Some walk-about participants also witnessed the destruction of a luckless hornworm caterpillar by the mandibles of a paper wasp (*Polistes* spp.). The wasp was converting its hapless victim into caterpillar-pulp to be fed to helpless, legless, wasp larvae living in cells back in its paper nest. Wasps, yellowjackets (*Vespula* spp.), and baldfaced hornets (*Dolichovespula maculata*) may buzz around sugary or fermented drinks in the fall; however, during the summer they focus their attention on providing protein to their young in the form of harvested caterpillars, sawfly larvae, etc. Thus, these stinging insects are considered beneficial insects.

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C. HOPE SPRINGS ETERNAL WITH TWO WILD PARSNIP PESTS. Joe Boggs reported finding two pests in southwest Ohio causing noticeable damage to wild parsnip (*Pastinaca sativa*). This non-native weed has been the subject of numerous BYGL reports in the past owing to its noxious ability to choke out native plants and the nasty nature of its sap to cause phytophotodermatitis, or Berloque dermatitis. Wild parsnip sap contains chemicals called furocoumarins which are used for defense against herbivores. However, if absorbed through the skin and energized by ultraviolet light, such as exposure to sunlight, furocoumarin molecules go on a skin-cell-destroying rampage causing severe burning including long-lasting blisters. Curtis Young noted that wild parsnip is now a dominate plant in roadway right-of-ways in northwest Ohio.

The first pest Joe observed was the non-native PARSNIP WEBWORM (*Depressaria pastinacella*) which feeds on its namesake host as well as several species in the *Heracleum* genus. The caterpillars are bicolored with the lower half of their bodies being light yellow and the top half almost flesh-toned. They are covered in black spots with 1-2 short black erect hairs arising from each spot. Short hairs are common on nest-making caterpillars and help to suspend the caterpillars in their webbing.

The caterpillars damage wild parsnip in two ways. First, early and middle instar caterpillars envelop the flower parts with ever-expanding silk nests, and they feed on the plant tissue within their nests. As the caterpillars grow, the nests become larger until all of the parsnip’s flowers are being consumed by caterpillars. Next, mature caterpillars switch from feeding on flower parts to become stalk borers. The large caterpillars migrate to lower portions of the stem where they bore into the stalk. Numerous webworms boring into the stalk can completely cutoff the vascular tissue connected to the upper portions of the plant causing premature plant death.

As with other herbivores that are tuned to a host plant possessing chemical defenses, the parsnip webworm has evolved a method to thwart the plant’s chemical warfare. The caterpillars simply excrete most of the furocoumarins in their feces. Interestingly, some of the furocoumarins are incorporated into the caterpillar’s silk webbing. The purpose is unknown, but given that the webbing totally surrounds the caterpillars as they feed on the flower parts, the furocoumarins in the webbing may provide protection against predators and parasitoids.

The second pest Joe observed was something of a surprise: the FOURLINED PLANT BUG (*Poecilocapsus lineatus*) can be a serious pest in landscapes, nurseries, and home vegetable gardens. This sucking insect feeds on over 250 herbaceous plant species. Indeed, Julie Crook showed BYGLers images of fourlined plant bug damage on herbaceous perennials in a show-garden in southwest Ohio. Most of the damage caused by this plant bug is produced by the colorful quick-moving nymphs, which are reddish-orange with black wing-pads. The appropriately named adults vary from yellow to green in
and have four black stripes down the wings. The bug has one generation per season and they have reached the adult stage in the southwest part of the state.

The four-lined plant bug injects enzymes into the plant causing cells to collapse. The bugs then feed on the resulting "cell-slurry." The damage appears as small, black, angular sunken spots which may coalesce into extensive blackened areas on infested leaves. The symptoms are commonly mistaken for a plant leaf disease. Joe noted that the interesting thing about the plant bugs was their distinct preference for wild parsnip. The plants were selected over many other herbaceous annuals and perennials mixed in with the parsnip plants. BYGLers agreed this seemed strange given that wild parsnips are equipped with a serious chemical defense system; of course one BYGL quipped that Joe should be on lookout for blistered bugs!

There has been little research on the impact of the parsnip webworm on the persistence and spread of wild parsnip. Of course, the four-lined plant bug observation may not be too surprising given extensive host range of the insect. However, finding anything that causes damage to this odious non-native plant should be noted even if it only amounts to hope springing eternal.

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D. WINDSHIELD WIPES: BYGLers also ran into a few other insect pests this week including:

*Curtis Young reported that HOLLYHOCKS (Alcea rosea) are now being attacked by the HIBISCUS SAWFLY (Atomacera decepta) in the Ada, Ohio area. This small black sawfly (primitive wasp) uses hollyhock to rear its young. The male of the species is all black while the female has a reddish-orange prothorax and an otherwise black colored body. The larvae (grubs) annually skeletonize the leaves of hollyhocks. The worm-like larvae are pale-green with black-colored heads, and they have tiny black-colored spines on each body segment. This sawfly can have as many as three generations per year; usually their activity is first noticed in June. Management of the hibiscus sawfly is relatively easy. Sawflies are very sensitive to most standard insecticides (e.g. carbaryl, pyrethroids, malathion, etc.). Hand-picking may also be possible by removing leaves showing damage symptoms or by picking the larvae off of the leaves. During the day, many of the larvae will move to the undersides of the leaves; however on cloudy days and in the early morning hours, they can be found on the upper surface of the leaves.

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4. DISEASE DIGEST.

A. JEWELWEED RUST. Joe Boggs reported observing the faded yellowish leaf-spot symptoms produced by jewelweed rust on native stands of jewelweed (Impatiens capensis) growing in woodland in southwest Ohio. The rust fungus, Puccinia recondita, which is responsible for producing the disease, is heteroecious meaning that it requires two hosts to complete its life cycle. The second host appears to be various grasses.

Jewelweed is an important understory woodland plant in Ohio and the rust can have a significant impact. Studies have shown that fungal infection reduces the vigor of plants and subsequent seed production which may have a long-term impact on maintaining stand density from year-to-year.

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B. VARIABLE CEDAR-APPLE RUST LEAF SYMPTOMS. Cedar-apple rust, produced by the fungus Gymnosporangium juniperi-virginianae, is so named because it's another heteroecious fungus meaning it requires two hosts to complete its life cycle. As the fungus' scientific name indicates, one of its hosts is eastern red cedar (Juniperus virginiana), which is a type of juniper; the fungus does not infect cedar
(genus *Cedrus*). The fungus produces brain-like galls on the stems of juniper from which bright orange, gelatinous, tentacle-like "telial horns" are extruded in the spring during wet weather. The horns are composed of fungal teliospores, which give rise to basidiospores that are ejected into the air to drift onto apple, including crabapples, where they germinate, marking the beginning of the other half of the fungal life cycle.

Infections on crabapple produce lesions on the leaves and fruit. However, the size and colors of the spot-like leaf lesions can vary greatly depending on the crabapple variety. Joe Boggs showed participants at this week’s Southwest Ohio BYGLive! Diagnostic Walk-About infected leaves taken from two crabapples. The rust spot lesions on one crabapple were light yellow with only a tinge of orange while the leaf lesions on the other crabapple were deep, purplish-red. Erik Draper noted that leaf lesions may also appear as garish, lipstick-red spots. Why is this important? Knowing that the color of the leaf lesions is variable and depends on the crabapple variety is essential to correctly diagnosing this disease on crabapple.

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5. TURF TIPS.

A. NO BANANAS - JUST WEEDS. One of the BYGL themes of discussion was initiated by Curtis Young, Van Wert County, Ohio, with what to do to try and control weeds like BROADLEAF PLANTAIN (*Plantago major*) in lawns. One of the biggest cautions to controlling broadleaved weeds during this time of year is that most plants in landscapes and gardens are broadleaves too! The use of selective herbicides to remove those broadleaf weeds, like broadleaf and buckhorn plantain, dandelions, thistles, etc., from turf; unfortunately, if applied too close to vegetables, will just as easily do a great job removing the broadleaved plants we call tomatoes, peppers, beans and cucumbers from the garden.

An important thing to remember when using selective broadleaf herbicides like 2,4-D (2,4-Dichlorophenoxyacetic acid), MCPA (2-methyl-4-chlorophenoxyacetic acid), or MCPP (methylchlorophenoxypropionic acid) is to use the "amine salt" formulation and not the "ester" formulation. The ester formulations are more effective in controlling broadleaf weeds during environmental conditions dominated by much cooler air and lower soil temperatures. In general, amine formulations are less likely to volatilize. Volatility involves the herbicide being transformed from a solid or liquid into gaseous vapor, which can then move or drift onto other plants and damage them. The potential for volatilization always increases as air temperatures climb into the upper 80s and 90s F.

For the commercial lawn care companies, there are many formulations or mixes, often called a "three-way", which contain additional or alternative herbicides like Triclopyr, Fluroxypyr, Dicamba, Carfentrazone-ethyl, etc. These combination products/mixes for broadleaf weed control are always used as a post-emergence applications and research has shown liquid applications to be more effective than granules.

Timing-wise for most broadleaf weeds in lawns, a selective broadleaf herbicide application in mid-September to early November will be the most effective overall. This fall application will be the best time to control those tough, perennial broadleaf weeds, like clover, dandelion, and plantain. This efficacy is mainly due to the weed’s own physiology, which is preparing it for winter by storing carbohydrates in the stems and roots. Consequently, the herbicide moves into the plant and is then dispersed to these storage areas, along with the carbohydrates, resulting in a thorough kill of the weed. The second best time for a broadleaf herbicide application is late spring or early summer period, but mainly after the weeds have flowered and are developed. Remember that the best control of weeds will be achieved when weeds are actively growing and not under some type of stress.

The whole goal of effective weed control is to reduce the total number of viable weed seeds in the soil reservoir we call the seedbank. The very best way to achieve this overall reduction of seeds is to never
let weed plants flower, produce and ripen, and then release their "crop" of seeds. An old gardening adage expresses this anti-weed sentiment via the saying "One year's seeding equals seven years of weeding!" Most weeds are prolific seed producers and very efficient at dispersing those seeds. Many times, even if the seed head is totally removed from the mother plant, often those seeds will continue to develop, ripen and mature when entirely off of the plant! So when removing those full heads of young seeds, the best course of action is to carefully collect, precisely bag and then dispose of those clipped seed heads.

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6. INDUSTRY INSIGHTS.

A. CANADIAN HORSEWEED (MARESTAIL) MANAGEMENT CHALLENGE. Participants at this week's Southwest Ohio BYGLive! Diagnostic Walk-About viewed Canadian horseweed (Coryza canadensis, family Asteraceae) that had failed to respond to glyphosate. This annual weed, which is also known as just horseweed, Canadian fleabane, coltstail, and marestail, has moved in recent years from being a plague in field crops to become a scourge in landscapes and nurseries. Indeed, this native North America plant has become such a problem in Ohio it has been added to the state's noxious weeds list [http://www.agri.ohio.gov/Public_Docs/Pest_Study_Material/5%20Noxious%20Weeds%20ID%202007.pdf].

Challenges with managing this weed centers on three issues. First, horseweed can flourish under a wide range of growing conditions. It tolerates a wide range of cultivation conditions from field crops to nurseries to landscapes and will endure drought conditions as well as water-logged soils such as in drainage ditches. Plants will produce viable seeds in poor, low nutrient soils as well as highly fertile soils. Growth appears unaffected by soil pH with plants enduring both alkaline and acidic soils.

The second challenge is this annual weed's opportunistic life-cycle with the ability to behave as a summer annual and a winter annual. Seeds may germinate in late-summer to early fall (winter annual cycle) or in the spring (summer annual cycle). Once seeds germinate, the plant forms a ground-hugging rosette that can be easily mistaken for other weeds. As a winter annual, horseweed remains in the rosette stage through the winter, and then it bolts in the spring. As a summer annual, the weed remains in the rosette stage for only a very short time, and then it bolts in early to mid-summer. Thus, seed production is asynchronous with seed heads appearing at different times of the year. Indeed, the unexpected appearance of the seed heads can present an identification challenge.

Once horseweed bolts, it quickly forms a single, unbranched hairy stem that is densely covered in alternating oblanceolate leaves measuring 3 - 4" in length. Leaves near the base of the stem are longer and somewhat toothed compared to leaves near the top of the stem. As flowers are produced, old leaves on the lower stem wilt and turn brown. Numerous small flowers are borne on multi-stemmed panicles at the top of the stems. The common names "marestail" and "coltstail" are based on the broom-like flower structures. Horseweed is a prolific seed producer and membership in the Asteraceae family is clearly demonstrated by the tiny, puff-ball-like seed heads which resemble miniature dandelion seed heads. Seeds can be wafted considerable distances by the wind.

Finally, the most serious issue with managing horseweed is herbicide resistance, including resistance to the many forms of glyphosate (e.g. Roundup, Glyphomax, etc.). Roundup Ready soybeans were released in 1996; horseweed resistance to glyphosate was first reported in 2000 with glyphosate resistant biotypes now found in 13 states. Adding to the challenge, horseweed biotypes have also been identified that are resistant to other common agricultural herbicides including paraquat, diquat, atrazine, simazine, chlorimuron, diquat, linuron, and diuron. Indeed, it would appear the only thing keeping horseweed from clearly becoming a true "super-weed" is its annual lifestyle.
Horseweed can be culturally managed by maintaining a 2 - 3" mulch layer to bury seed and limit seed germination. Physically moving plants through cultivation or hand-pulling before seeds are produced is also effective. A note of caution: while the single, stout stem makes a nice "handle" for pulling this annual weed, hand pulling works best in wet, loose soils. The stem often breaks away from root systems anchored in dry and/or compacted soils. Decapitated plants behave like the Lernaean Hydra of Greek mythology by producing multiple stems to replace the single lost stem. Continual mowing or string trimming prevents seed head development and will eventually exhaust the resources of this annual plant.

Although herbicide resistance has become a major issue with managing Canadian horseweed, there remain a number of pre- and post-emergent herbicides that will suppress this stubborn weed. Effective preemergent herbicides include flumioxazin (e.g. SureGuard, BroadStar); oryzalin (e.g. Surflan); and isoxaben (e.g. Gallery).

Effective post-emergent herbicides include carfentrazone-ethyl (e.g. QuickSilver) if mixed with a phenoxy-type postemergent herbicide such as 2,4-D, and 2,4-D is effective if mixed with dicamba, MCPP, or MCPA. The mantra "read and follow label directions" is particularly important with these high-risk applications; pay very close attention to recommended distances to desired plants including warnings about plant root zones. However, no horseweed management strategy should depend entirely on herbicides. That's how we got into trouble with this weed in the first place!

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7. WEATHERWATCH.

A. WEATHERWATCH. The following weather information summarizes data collected at various Ohio Agricultural Research Development Center (OARDC) Weather Stations spanning the dates from June 1 - 10, 2015, with the exception of the soil temperatures which are readings from Wednesday, June 10, 2015 at 5:20 p.m.

While many BYGLers reported rain as part of their weather reports, each of the five weather stations listed below have reported below normal precipitation since June 1, 2015. This is a reminder that summer rainfall events can be spotty and localized.

<table>
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<tbody>
<tr>
<td>Ashtabula</td>
<td>NE</td>
<td>70.5</td>
<td>53.8</td>
<td>0.42&quot;</td>
<td>1.5&quot;</td>
<td>74.59/74.00</td>
</tr>
<tr>
<td>Wooster</td>
<td>NE</td>
<td>73.9</td>
<td>54.3</td>
<td>0.19&quot;</td>
<td>1.3&quot;</td>
<td>72.45/70.67</td>
</tr>
<tr>
<td>Hoytville</td>
<td>NW</td>
<td>74.9</td>
<td>53.6</td>
<td>0.94&quot;</td>
<td>1.3&quot;</td>
<td>75.22/69.96</td>
</tr>
<tr>
<td>Columbus</td>
<td>Central</td>
<td>76.6</td>
<td>57.2</td>
<td>0.68&quot;</td>
<td>1.4&quot;</td>
<td>75.48/72.69</td>
</tr>
<tr>
<td>Piketon</td>
<td>South</td>
<td>75.8</td>
<td>57.0</td>
<td>0.42&quot;</td>
<td>1.1&quot;</td>
<td>87.84/83.00</td>
</tr>
</tbody>
</table>

For a link to the OARDC Weather Stations, visit: [ http://www.oardc.ohio-state.edu/centernet/weather.htm ]

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B. GROWING DEGREE DAYS. GDD is a measure of the daily maximum and minimum temperature and directly relates to growth and development of plants and insects. The GDD of any zip code location in Ohio is estimated using the GDD of ten OARDC weather stations and available on the web at: [ http://www.oardc.ohio-state.edu/gdd/ ].

The range of GDD accumulations in Ohio from north to south is 659 to 944. Following is a report of GDD for several locations around Ohio as of end of the day of June 10, 2015: Painesville, 659; Cleveland,
To put these GDD accumulations into perspective, the following is an abbreviated listing of plant and insect species with their respective phenological event and average GDD accumulations at which these events occur. Due to variations in weather, temperature, humidity, etc., these events may occur a few days earlier or later than predicted by the average GDD. By looking at a city, town, or village nearby on the above list, or visiting the above web site, one can see what is approximately taking place in the landscape.

Multiflora rose, full bloom, 643; northern catalpa, first bloom, 675; black vine weevil, first leaf notching due to adult feeding, 677; Washington hawthorn, full bloom, 731; calico scale, egg hatch, 748; greater peach tree borer, adult emergence, 775; rhododendron borer, adult emergence, 815; northern catalpa, full bloom, 816; mountain laurel, full bloom, 822; dogwood borer, adult emergence, 830; oakleaf hydrangea, first bloom, 835; cottony maple scale, egg hatch, 851; panicle hydrangea, first bloom, 856; fall webworm, egg hatch (first generation), 867; mimosa webworm, egg hatch (first generation), 874; fuzzy deutzia, full bloom, 884; winged euonymus scale, egg hatch, 892; spruce budscale, egg hatch, 894; winterberry holly, full bloom, 897; paniced goldenraintree, first bloom, 924; and June bride littleleaf linden, first bloom, 953.

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8. COMING ATTRACTIONS.

A. A GARDENER’S GUIDE TO CLIMATE CHANGE. The Greene County Master Gardeners present "A Gardener's Guide to Climate Change." The workshop will focus on sustainable solutions to environmental challenges, featuring Ohio State University Professors Dan Herms and Jim Chatfield. Topics include: Earth is Warming - Are We the Cause?; What Science Tells Us About Climate Change?; Biological Calendars: Using Plant Phenology; Sustainable Gardening in a Changing Climate; and Ten Keys to Taking Action in Your Backyard. The event is June 13, 2015 at the Greene County Fairgrounds, 100 Fairground Rd, Xenia, OH. Registration begins at 8:30 a.m., with the program running from 9:00 a.m. - 3:30 p.m. For more information, including registration form, visit [http://greene.osu.edu/events/gardener%E2%80%99s-guide-climate-change-0].

B. THE OSU GREEN INDUSTRY SHORT COURSE, THE OHIO TURFGRASS FOUNDATION CONFERENCE AND SHOW, AND TREES ON TAP PROGRAMS. Mark your calendars now, as these shows will be here sooner than you think. The event will be moving back to the Columbus Convention Center in 2015 and will be held on December 8 - 10, 2015, with the addition of a special tree program on Monday, December 7, 2015. Details on over 100 educational programs and a wide array of certification credits will be coming throughout the BYGL season. We are happy to acknowledge the robust support of the Ohio Turfgrass Foundation for their financial and other aid of the educational efforts of the OSU Extension Nursery Landscape and Turf (ENLT) Team, a group of Extension Educators and OSU Specialists that brings to you a range of programs including field diagnostic walkabouts (such as BYGLive! in southwest Ohio) and diagnostic workshops as well as help with horticulture problem troubleshooting, numerous publications, and of course, the BYGL.

A key speaker for both the Trees on Tap program and the tree care track of the Green Industry Short Course will be Dr. Ed Gilman of the University of Florida Environmental Horticulture program. Ed is Professor of Urban Trees and Landscape Plants and his research and educational efforts focus on tree care practices such as the effect of tree pruning on tree biology, production practices and landscape establishment, root pruning, and irrigation and fertilization practices. He is reason enough alone to attend the conference.
9. BYGLOSOPHY. "Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information on it." - Samuel Johnson

APPENDIX
ADDITIONAL WEBSITE RESOURCES:

Ask a Master Gardener Volunteer
http://mastergardener.osu.edu/ask

Buckeye Turf
http://buckeyeturf.osu.edu

Emerald Ash Borer Information
http://ashalert.osu.edu

National Plant Diagnostic Network and First Detector Program
https://www npdn.org/first_detector

Growing Degree Days and Phenology for Ohio
http://www.oardc.ohio-state.edu/gdd/

Hungry Pests Website
http://www.HungryPests.com

Ohio Pesticide Safety Education Program
http://peed. osu.edu/

Ohio State University Department of Horticulture and Crop Science Plantfacts
http://plantfacts.osu.edu/web/

Ohio State University Extension Bee Lab
beelab.osu.edu

Ohio State University Extension Master Gardener Volunteer Program
http://mastergardener.osu.edu

Ohio Woodlands Stewards Program
http://woodlandstewards.osu.edu

The C. Wayne Ellett Plant and Pest Diagnostic Clinic (CWEPPDC)
http://ppdc.osu.edu/

USDA APHIS Beetle Buster Website (Asian Longhorned Beetle)
http://www.beetlebusters.info/

USDA APHIS Beetle Detective Website (Asian Longhorned Beetle and Emerald Ash Borer)
http://beetledetectives.com/

Following are the participants in the June 9th conference call: Pam Bennett (Clark); Joe Boggs (Hamilton); Julie Crook (Hamilton); Erik Draper (Geauga), Denise Johnson (Master Gardener Volunteer program); Jacqueline Kowalski (Cuyahoga); Ashley Kulhanek (Summit); Cindy Meyer (Butler); Amy Stone (Lucas); Nancy Taylor (C. Wayne Ellett Plant and Pest Diagnostic Clinic (CWEPPDC)); and Curtis E. Young (Van Wert).
BYGL is available via email, contact Cheryl Fischnich [fischnich.1@osu.edu] to subscribe. Additional fact sheet information on any of these articles may be found through the OSU FactSheet database [http://plantfacts.osu.edu/web].

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BYGL is available online at: [http://bygl.osu.edu], a website sponsored by the Ohio State University Department of Horticulture and Crop Sciences (HCS) as part of the "Horticulture in Virtual Perspective." The online version of BYGL has images associated with the articles and links to additional information.

Where trade names are used, no discrimination is intended and no endorsement by Ohio State University Extension is implied. Although every attempt is made to produce information that is complete, timely, and accurate, the pesticide user bears responsibility of consulting the pesticide label and adhering to those directions.

CFAES provides research and related educational programs to clientele on a nondiscriminatory basis. For more information: [http://go.osu.edu/cfaesdiversity].