# November 2016-Vol.2 No.11

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# Brown Marmorated Stink Bug

By Cleve Campbell | November 2016-Vol.2 No.11

Fall means different things to different folks. For some, it's football and fall foliage season, for others it's the time when they start anticipating the holidays with its shopping and gatherings. For gardeners, it's performing those final fall chores: harvesting, adding that protective layer of mulch around flower beds, and annual lawn feeding. But in recent years, fall has become the harbinger of a troublesome event — the **annual migration** of the brown marmorated stink bug (*Halyomorpha halys*), from the surrounding trees and plants to the **sides of our homes**, from which these bugs launch their annual home invasions. This migration begins around September 21st and continues through the middle of October.

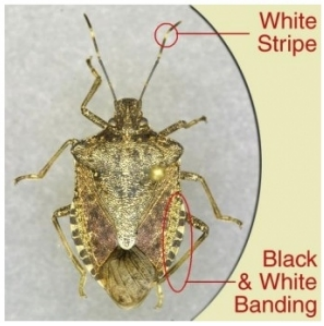
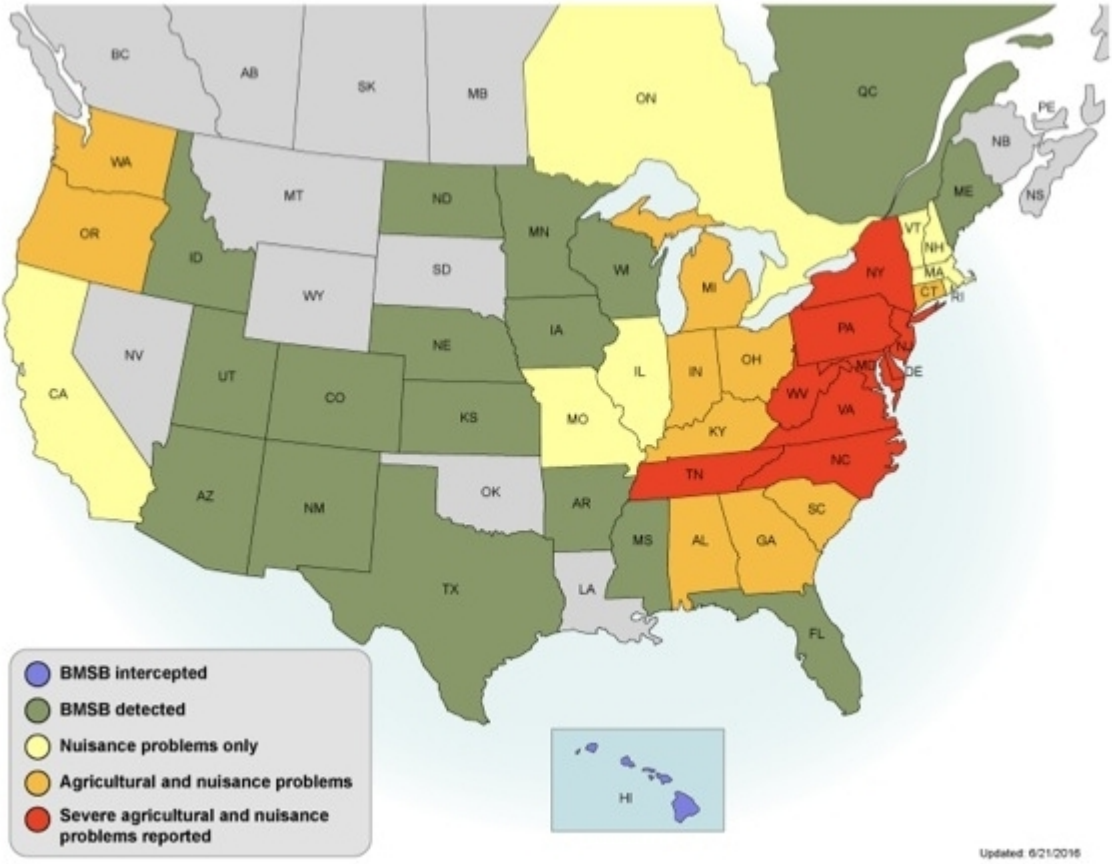



*Photo Credit: Virginia Cooperative Extension*

The brown marmorated stink bug, ("BMSB") — generally refered to as simply **"The Stink Bug" —** is a grayish brown bug about the size of a dime (3/4 inch long) with the typical stink bug "shield" shape; it is almost as wide as it is long. The adults are marbled brown in color, with white bands on the antennae and legs. This white banding distinguishes the adults from the native stink bug species. Young (nymphs) BMSB lack wings, and have reddish and white marking on the upper surface of the abdomen.

The brown marmorated stink bug is an invasive insect not native to North America. It was accidentally introduced near Allentown, PA in 1996 and has spread since that time. It was found in Virginia in 2004 and by 2010, it was found throughout most of the Commonwealth. Today the BMSB is found in 43 states and two Canadian provinces. Unfortunately, Virginia is the epicenter of this invasion.




*As of June 2016, BMSB had been detected in 43 states and two Canadian provinces. Source: T. Leskey, USDA ARS.*

The BMSB will feed on just about anything. They attack trees, ornamental plants, vegetables, fruits and agricultural crops. There are approximately 120 wide ranging plants that the BMSB has been observed (and documented) feeding upon. Many of these plants are the same ones preferred by humans — especially our favorite vegetables: beans, tomatoes, peppers, cucurbits, and sweet corn. They also feed on various fruits, including apples, peaches, raspberries and brambles. High densities of this pest species have also been found on soybeans and corn crops. However, so far in Virginia, the most severely damaged crops have been the tree fruits (apples and peaches). In addition, the BMSB buffet includes many ornamental trees:

crabapple, persimmon, catalpa, walnut, maple, sweet gum, red bud and American holly. One of its favorites is the tree of heaven (*Ailanthus)* — which is itself an invasive plant from Asia. Ornamental shrub hosts include butterfly bush, serviceberry, pyracantha, rose and honeysuckle. For homeowners, it is mainly a nuisance pest, as it invades houses in the fall looking for a place to over-winter. For businesses such as hotels, restaurants and other commercial settings with public interface, the presence of high numbers of these bugs in the fall can have economic consequences.

**The Successful Invasion**

There are a number of factors that have contributed to the success of the BMSB's colonization of America — the lack of specific natural enemies, its ability to reproduce in large numbers, its wide host plant range, resistance to cold weather, effective overwintering strategies, plus the impact of climate warming. In addition to their survival attributes, the BMSB is highly mobile; it can fly up to 70 miles per day. They are also efficient hitchhikers; they'll hitch a ride on ships, trucks, RVs, and cars, and will hide in cargo containers, packages, and suitcases.

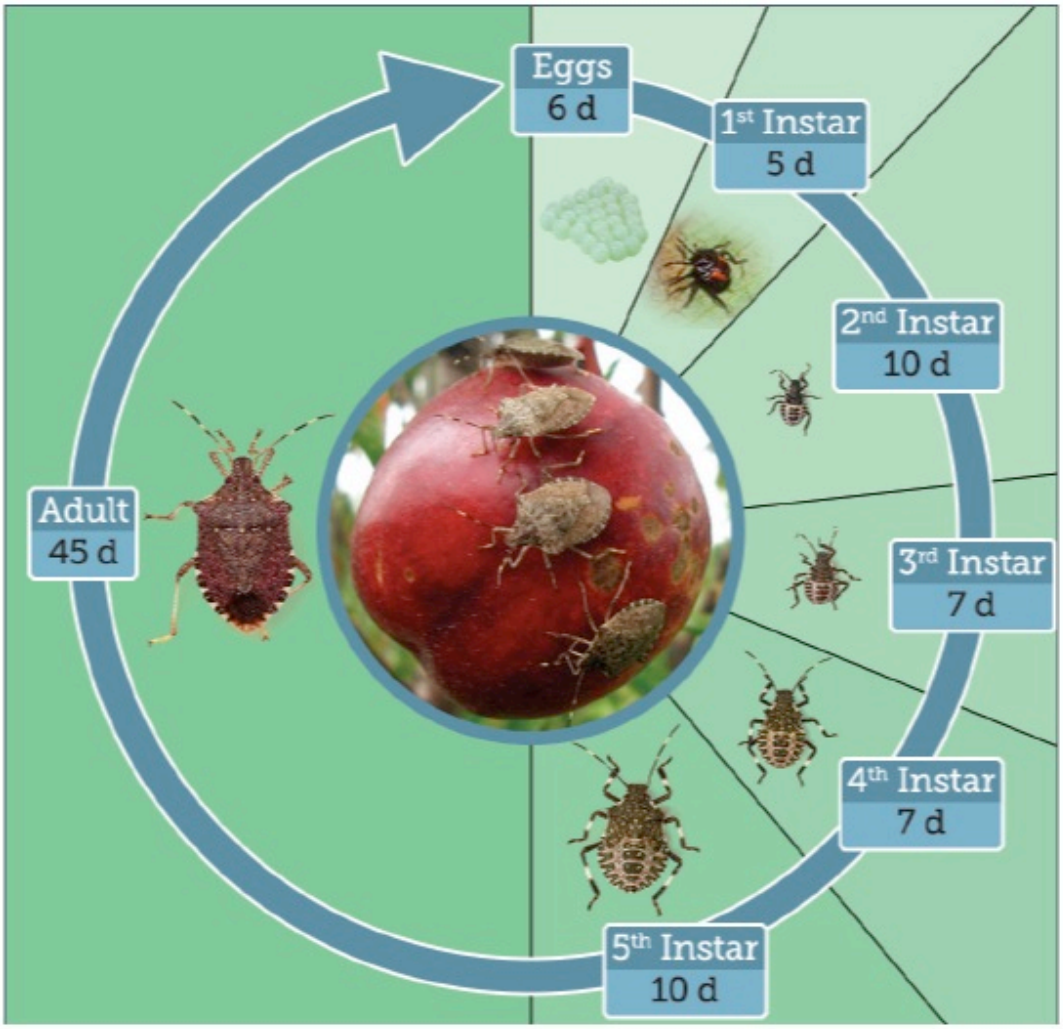
**The Life Cycle of the BMSB**

Adult stink bugs overwinter in the adult stage, often seeking shelter inside houses and other buildings. Once inside, they congregate in attics, closets, walls, nooks and crannies — almost anywhere — but it's important to remember that **they do NOT reproduce inside,** nor do they cause structural damage inside homes. They do not bite people or pets. Although they are not known to transmit disease or cause physical harm, the insect does produce a pungent, malodorous chemical, and when the bug is handled, the odor is transferred readily. In our area they also overwinter in natural settings, including dry crevices in dead, standing trees with thick bark, particularly oak and locust trees.

*An egg mass of the brown marmorated stink bug and newly emerged 1st instar nymphs are shown. Photograph: Karen Bernhard, Lehigh County Extension, Pennsylvania State University.*

Adults emerge from their overwintering sites and head outdoors in the spring, usually early May. After they feed for about two weeks, they mate, and the females begin to lay eggs in clusters of about 28 eggs on the undersides of leaves. About 9 to 16 batches, or a total of 234 to 416 eggs, are laid over a period of two to three months. The eggs hatch in about 4 to 7 days. The nymphs feed on fruits and seedpods and pass though five "instar" stages (immature sub-stages of development) with a molt between each instar stage. Each instar stage lasts about one week, before the final molt into the adult stage. New adults start to appear in late summer. Warmer temperatures allow time for the development of more than one generation. There are from one to two generations here in Virginia. We are lucky, as even more generations have been reported in their native Asian range.

**Life Cycle of the Brown Marmorated Stink Bug**




*Life Cycle of the Brown Marmorated Stink Bug. Source:* [*StopBSMB.org*]

**Stink Bug Damage**

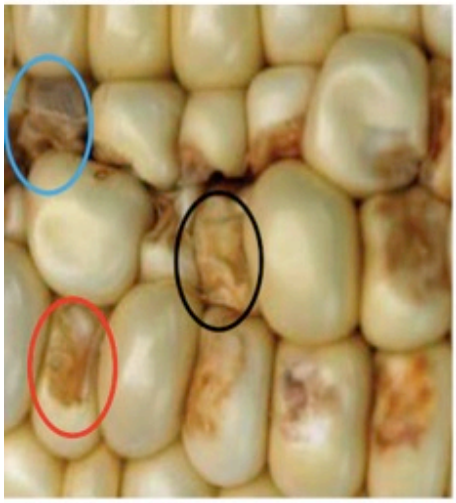
The BMSP is highly mobile and can switch hosts, moving from plants with early-ripening fruits to those of late-ripening fruit. Because it has a broad range, almost any crop that has fruit is at risk of attack. The BMSP bug feeds by sucking juices with its straw-like mouth parts (stylets) to feed on internal plant tissues.

**Feeding injury** to beans may result in scarred, faded, sunken areas and deformed pods; similar pod injury can occur when bugs feed on okra. Injury to fleshy fruit like tomatoes and peppers will produce white spongy areas of the skin and internal tissue damage. In addition to direct damage, the stylets (mouth parts) can transmit pathogenic bacteria and yeast, which can cause fruit to rot. BMSB appear to feed on developing kernels of corn by piercing the husk, and the resulting damage discolors and shrinks individual kernels. Vegetable and fruit trees located nearest overwintering shelters or directly bordering wooded areas are at the highest risk of attacks.

BMSB Damage on Tomatoes. Photo Credit: Stopbmsb.org

Indirect damage (bacterial rot) on tomato caused by BMSB. Photo Credit: Doug Inkley, National Wildlife Federation.

Brown marmorated stink bug nymphs feeding on an ear of corn. (Photo by Ronald Hoover, Penn State University.)

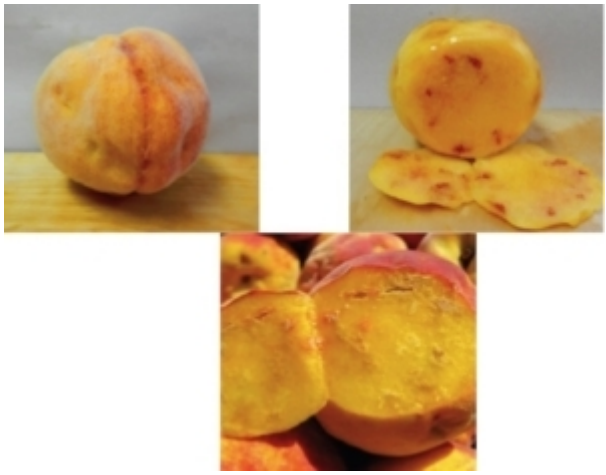


BMSB feeding injury on corn kernels. Photo Credit Stopbmsb.org

BMSM feeding injury on okra. Photo Credit: Stopbmsb.org

Severe BMSB injury on snap beans: Photo Credit: H. Doughty, Virginia Tech

Feeding injury from BMSB to stone fruit, principally peaches and nectarines, causes depressed sunken areas, called “cat facing” in the trade. On apples, feeding results in indented depressions on the surface and corky spots in the flesh of fruit.



**Internal and external injury on apples (Photo Source: USDA) and peaches (Photo Source: StopBMSB.org) caused by BMSB feeding.**

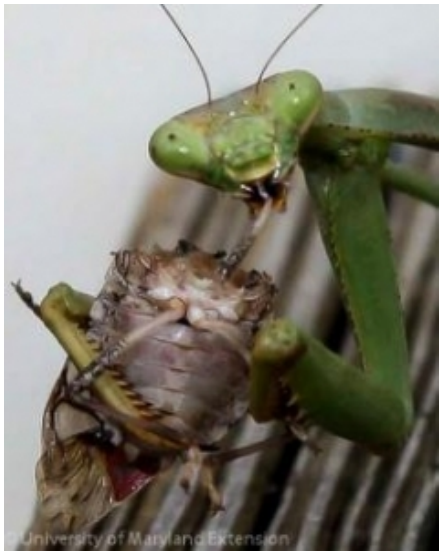
### Chemical Control

Since the widespread outbreak in the mid-Atlantic in 2010, chemical control has been the widely-used strategy for managing the BMSB. Active ingredients that have been most effective include several pyrethroids (bifenthrin, permethrin, fenpropathrin and beta-cyfluthrin) and neonicotinoids. Unfortunately, these insecticides are generally broad-spectrum in their activity. In past growing seasons, tree fruit growers increased the number of insecticide applications, in some cases up to fourfold. Since these insecticides are not insect-specific, they also kill beneficial insects as well. **Because of the depletion of beneficial insects, secondary outbreaks of aphids and scale insects have increased.** Thus, the increased use of insecticides has been disruptive to integrated pest management programs (IPM).

### Biological Control

Biological control is the **beneficial action of parasites, pathogens, and predators in managing pests.** A common biological control most gardeners embrace is the lady bug — more properly, the lady beetle — which wages war on aphids.

However, biological control isn't always so effective or prompt as we would like. In some cases, decades can pass before any results are noticed. A classic example is *Entomophaga maimaiga,* a common disease in gypsy moth populations in their native county of Japan. When scientists realized that this fungus might help control gypsy moth outbreaks in the U.S., this natural enemy of the gypsy moth was released near Boston in 1910. Fingers were crossed and breaths were held as the scientists waited for the results to come in. Much to their dismay, the expected results didn't materialize, and the research program was abandoned. Fast forward to 1989, almost 80 years later, when much to the science community's amazement, the fungus popped up in several northeastern states and caused a high mortality rate in many gypsy moth populations. Sometimes it just takes time for things to click and a new balance to be achieved.



*Praying mantis having lunch on a BMSB. Photo Source University of Maryland Extension*

**Now don't get too excited**, but we may not have to wait 80 years to check the population explosion of the BMSB, as there is evidence suggesting that our native predators have developed an appetite for the BMSB and may be having a greater impact on the BMSB population than previously thought. Recent observations of BMSB egg masses revealed that they were being eaten by predators. The katydids and ground beetles are the most aggressive chewers of BMSB eggs, followed by earwigs, jumping spiders, and crickets. In addition to the predators who eat BMSB eggs, spined-soldier bugs, assassin bugs, damsel bugs, minute pirate bug mantis and grasshoppers have all been observed to eat the actual bug, at least in some of its developmental stages! However, it has been estimated that destruction by predation and parasitism averages only 5-10% percent on organic farms and does not provide sufficient control of high populations of BMSB.

As evidence mounted that the local predator population was unable to control the BMSB, a search was conducted in the native habit, eastern Asia, to find a native predator. A small wasp, *Trissoicus japonicus*, about the size of a comma, was identified as the leading candidate. The *Trissoicus japonics* wasp is an egg parasitoid, which is just a fancy way of saying the wasp lays its egg in the BMSB egg, and when the wasp egg hatches, the baby wasp eats the contents, destroying the BMSB egg. The mortality rates have been reported to be as high as 80% in China. The USDA imported the wasp to quarantine facilities for evaluation as a potential biological control agent.

**Images of the tiny *Trissolcus Japonicus* wasp**

The tiny size of the wasp *Trissolcus japonicus* is apparent from this dime, which has several of the insects sitting on it.
Photo Source: USDA Image Number D3224-1

Highly detailed image of the wasp *Trissolcus japonicus,* a primary candidate for biological control of brown marmorated stink bug. The actual size of the wasp is just 1-2 millimeters long. Photo Source: USDA Image Number **(D3216-1)**

A female Trissolcus japonicus Parasitoid wasp emerging from BMSB eggs. Photo Source USDA-Aphis Quarantine Facility, Corvallis Oregon

Th

e wasps were placed in quarantine to insure that they were specific predators to the BMSB and would not throw the balance of nature out of whack. Well, sometimes the best laid plans go awry. Before the research was completed, and prior to any release of the wasps from quarantine, "wild" populations of the tiny wasp were discovered in Beltsville, Maryland, in 2014, and in Winchester, Virginia and Vancouver, Washington in 2015. DNA testing was performed, and it was determined that none of the wasps found in the wild originated

from the wasps held in quarantine! The origin of the wild wasp population is unknown, but it is speculated that,  just like the BMSB, they hitchhiked in cargo from their native lands. As the search for these tiny wasps expands, scientists expect to find them in other locations.

Well, if you are thinking that this tiny wasp could be a problem, you are right on target. It has been shown in the laboratory that *Tr. japonicus* readily and successfully parasitizes eggs of native beneficial insects, including the spined soldier bug, which is an important predator of both native and invasive pests such as Mexican bean beetle, Colorado potato beetle, cabbage looper, and gypsy moth. So only time will tell if this is the silver bullet, or if the cure is going to be worse than the disease.

*BMSB with Fungus. Photo Source: University of Maryland.edu*

**The Search is on to find fungi** that targets the BMSB and **only the BMSB**. Fungi that attack insects, called entomopathogenic fungi, can be effective against BMSB. In lab tests, several pure strains (isolates) of a fungi called *Beauveria bassiana* killed 100% of the BMSB (Gouli et al. 2012). Other effective fungi include *Ophiocordyceps nutans* and *Metarhizium anisopliae* (both from Japan), which have been shown to cause nearly 85% mortality of BMSB (Gouli et al. 2012). As promissing as this research is, we are reminded of our past gypsy moth experence. These biological methods require time  — time to infect, reproduce, spread, and infect again. Let's hope that it doesn't take 80 years this time!

**Management For BMSB In Homes**

**Before Bugs Enter a Building**

**Mechanical exclusion is the best method** to keep stink bugs from entering homes and buildings. Cracks

around windows, doors, siding, utility pipes, behind chimneys, and underneath the wood fascia and other openings should be sealed with good quality silicone or silicone-latex caulk. Damaged screens on doors and windows should be repaired or replaced.

Exterior applications of insecticides may offer some minor relief from infestations where the task of completely sealing the exterior is difficult or impossible. A licensed pest control operator should apply applications in the fall just prior to bug congregation. Unfortunately, because insecticides are broken down by sunlight, the residual effect of the material will be greatly decreased and may not kill the insects much beyond several days or a week.

**After Stink Bugs Have Entered the Structure**

If numerous bugs are entering the living areas of the home, attempt to locate the openings where the insects gain access. Typically, stink bugs will emerge from cracks under or behind baseboards, around window and door trim, and around exhaust fans or lights in ceilings. Seal these openings with caulk or other suitable materials to prevent the insects from crawling out. Both live and dead stink bugs can be removed from interior areas with the aid of a vacuum cleaner — be sure to seal the vacuum bag with duct tape when you dispose of it, to prevent any remaining live bugs from escaping.

**It is not advisable to use an insecticide inside** after the stink bugs have gained access to the wall voids or attic areas. Although insecticidal dust treatments to these voids may kill hundreds of bugs, there is the possibility that carpet beetles will feed on the dead stink bugs and subsequently attack woolens, stored dry goods or other natural products in the home. Although aerosol-type **pyrethrum foggers** will kill stink bugs that have amassed on ceilings and walls in living areas, it **will not prevent more of the insects from emerging shortly after the room is aerated.** For this reason use of insecticides is NOT considered a good solution to long-term management of the problem. In addition, spraying insecticides into cracks and crevices will NOT prevent the bugs from emerging and is not a viable or recommended treatment

In sum, the BMSB is an invasive insect unintentionally brought over from Asia; it is a voracious eater that damages fruit, vegetable, ornamental trees and plants and a serious nuisance to homeowners. Broad-spectrum sprays are being used to combat this alien pest, but they also kill beneficial insects that help to control pest populations, presenting a setback for growers and homeowners who use integrated pest management (IPM) to promote nature’s own checks and balances. Biological control of the BMSB from parasites or predators appears to have the potential to provide landscape-scale control of this pest in the future. Natural enemies of stink bugs that are native to North America could potentially play a role in controlling BMSB. In addition, BMSB enemies that are native to Asia could be considered for potential release in the United States, once USDA’s Animal and Plant Health Inspection Service is convinced the imported species will not threaten other insects.

Thanks for stopping by The Garden Shed; we hope to see you again next month.

**Warning:** Pesticides are poisonous. Read and follow directions and safety precautions on labels, **the label is the law**. Handle carefully and store in original labeled containers out of the reach of children, pets, and livestock. Dispose of empty containers right away, in a safe manner and place. Do not contaminate forage, streams, or ponds.

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# Oakleaf Hydrangea

By Patsy Chadwick | November 2016-Vol.2 No.11

Just mention the word “hydrangea” and most people immediately think of the mophead and lacecap selections of *Hydrangea macrophylla*. These glorious shrubs are very popular and commonly found blooming in summer landscapes throughout the country. A less commonly known hydrangea is the oakleaf species (*H. quercifolia*), which has a different look and feel to it. Like the mopheads and lacecaps, oakleaf hydrangeas also produce large, clusters of very showy flowers. But the similarities between the oakleaf hydrangea and its cousins basically end there.

*Oakleaf Hydrangea in Summer Bloom*

A number of significant characteristics set the oakleaf hydrangea apart from the other members of the genus.

- Flowering habit – Oakleaf hydrangea flowers appear in elongated, cone-shaped clusters, known as inflorescences (flower heads consisting of a group or cluster of flowers arranged on a stem). The inflorescences consist of a combination of showy sterile and inconspicuous fertile flowers. In contrast, the mophead hydrangeas have globe-shaped clusters of large florets. Lacecap hydrangeas have flattened bloom heads of small female flowers surrounded by larger male flowers.
- Foliage –
  Whereas the foliage on *H. macrophylla* species tends to be moderate sized, ovate or heart shaped, and smooth textured, oakleaf hydrangea foliage is large (4 to 12" long and wide, depending on the selection), lobed, and coarsely textured. Similar in shape to the leaf of an oak tree, the foliage is the inspiration for this shrub's botanical name, which is derived from the Latin words *quercus* (oak) and *folium* (leaf).

*Large foliage on Oakleaf Hydrangea*

- Origin – Most of the 23 recognized hydrangea species belonging to the genus are Asian in origin. Two exceptions, oakleaf hydrangea and smooth hydrangea (*H. arborescens*), are native to this country. Oakleaf hydrangea is native to all the states in the southeastern quadrant of the United States, from North Carolina south to Florida and west to Louisiana.
- Fall color –
  Oakleaf hydrangea is the only member of the genus that provides any significant fall foliage coloration. In November and December, when most other deciduous plants have shed their leaves, the oakleaf hydrangea remains fully clothed in stunning deep red to purple leaves that linger well into winter.

*Burgundy and Purple Autumn Foliage of Oakleaf Hydrangea*

- Cultural requirements – All hydrangeas generally prefer moist, well-drained soil. However, once established, the oakleaf species is able to tolerate drier soil and more sun than other members of the genus.

Oakleaf hydrangea is a deciduous, rounded shrub with a mounding form from the ground up. Strong, sturdy stems hold large clusters of flowers above foliage that is generally dark green on top and whitish green beneath. The stems are an attractive cinnamon or tan color with bark that peels in thin flakes. In the wild, this understory shrub is often found growing in the shade of mixed hardwood trees, along streams, and on forested hillsides. In the cultivated landscape, it is an ornamental plant that grows best in a partially shaded natural or landscaped woodland setting, preferably with morning sun and afternoon shade. It is hardy to zones 6 through 9 with some cultivars hardy to zone 5.

Depending on the cultivar, showy clusters of creamy white or pink flowers bloom on the previous year's wood. Most cultivars produce single blossoms, but a few produce double blossoms. The blossoms last 4 to 6 weeks or more before aging to either tan or deep pink and are borne in inflorescences measuring 6 to 12 inches long and 3 to 5 inches wide. The flowers dry in place, adding interest to the plant through autumn.

***SPECIES/CULTIVARS***

The following list, which is by no means complete, describes a number of oakleaf hydrangea selections and their general sizes and floral displays. While a few cultivars can grow 12 feet or more tall, most cultivars are medium sized, ranging from 5 to 8 feet tall on average. For the gardener with a small garden, many compact selections are available that grow 4 feet tall or less and have proportionately smaller foliage and flower clusters.

**TALL VARIETIES**

- **'Alice'** – 12' tall by 12' wide. This is a good selection for larger gardens that can handle a shrub this size. The large white flowers age to rosy pink before finally turning tan in late summer. 'Alice' was the winner of the State Botanical Garden of Georgia gold medal award in the year 2000.
- **'Alison'** – 8' to 10' tall. While similar to 'Alice', this cultivar is a little broader and the inflorescences are held more upright than those of 'Alice'. The large white flower clusters age to pink before turning tan by summer's end.
- **'Harmony' –** 10' tall and wide. This selection exhibits clusters of very large, dense, sterile, double flowers. Their weight can bend down branches. Not often found in nurseries, this selection is uncommonly beautiful, but the weight of the flowers may be a problem.

**MEDIUM-SIZE VARIETIES**

- **'Amethyst'** – 6' tall by 6' wide. A compact cultivar developed by Dr. Dirr, the flowers turn from white to rose. Both 'Alice' and 'Amethyst' have very deep pink inflorescences as they age.
- **'Gatsby Gal'** – 5' to 6' tall by 5' to 6' wide. This and the following two selections are members of the Gatsby series developed by Proven Winners and introduced in 2016. 'Gatsby Gal' has flowers that are upright, making them seem large compared to the compact size of the shrub.
- **'Gatsby Moon'** – 6' to 8' tall by 6' to 8' wide. The inflorescences consist of tightly packed, very full double flowers that are reminiscent of those on 'Harmony', described above. The flowers age from white to green rather than pink.
- **'Gatsby Pink'** – 6' to 8' tall by 6' to 8' wide. The massive, long lasting flower heads rapidly change from white to a rich shade of medium pink.
- **'Queen of Hearts'** – 6.5' tall by 9' wide. The U.S. National Arboretum's shrub breeding program developed this cultivar from a hybridization of cultivars 'Snow Queen' and 'Pee Wee', the same cross that also produced 'Ruby Slippers' described below. The flowers open white and slowly age to a deep pink color.
- **'Snow Queen'** – 6' tall by 6' wide. 'Snow Queen' holds its single-flowered inflorescences more

upright than other cultivars and can also handle sunnier sites. It was awarded the Royal Horticultural Society's Award of Garden Merit in 2012.

- **'Snowflake'** – 7' tall by 7' wide. Another recipient of the Royal Horticultural Society's Award of Garden Merit in 2012, this cultivar has a longer bloom season than most other cultivars. It sports very long (15 inch) spikes of double hose-in-hose flowers that persist for a long time on the plant. The flowers gradually age to pink and then to light tan.

**COMPACT VARIETIES**

- **'Little Honey'** – 4' tall by 5' wide. A sport of 'Pee Wee', the golden yellow spring foliage gradually darkens to chartreuse green in summer and then turns red in fall. Give it morning sun and afternoon shade for best results. The 5 to 6-inch long, cone-shaped inflorescences of white blooms are small, compared to those of other oakleaf hydrangea species.
- **'Munchkin'** – 3' tall by 4.5' wide. 'Munchkin was developed by the U.S. National Arboretum's shrub breeding program in McMinnville, Tennessee. The compact form and dense plant habit make it an ideal choice for small residential landscapes. The flowers open white and gradually turn medium pink.

*Dwarf Oakleaf Hydrangea 'Munchkin'*

- **'Pee Wee'** — 5' tall by 4' wide typically but may grow larger. This upright, compact selection holds its rich burgundy and purple leaves very late in the season before dropping them. The leaves average 5" in length and generally have 3 to 7 lobes each. The blossoms age to a tan color in late summer.
- **'Ruby Slippers'** – 3.5' tall by 5' wide. The U.S. National Arboretum's shrub breeding program developed this mounding, semi-dwarf cultivar from a hybridization of cultivars 'Snow Queen' and 'Pee Wee'. The flowers open white but quickly turn a pale pink shade, which deepens to rosy red later in the summer.
- **'Sikes Dwarf'** – 2' to 4' tall by 3' to 4' wide. This compact selection is perfect for smaller gardens and can also be used in a container garden. The flower clusters, which turn light pink as they age, are composed of sterile florets that hide the fertile flowers. 'Sikes Dwarf' has an open plant habit and an irregular rounded shape.

***CULTURAL REQUIREMENTS***

**Soil** – Oakleaf hydrangea prefers moist, organic, fertile, well-drained, slightly acidic soil with a pH of 5.0 – 6.5. Drought tolerant once established, it does appreciate water during very dry conditions. Good drainage is important. Although the plant likes moist soil, it cannot tolerate wet feet.

**Sunlight** – This shrub can thrive in full to partial shade. However, it performs better with at least a half day or more of sun, which produces a better floral display, stronger stems, and more colorful autumn foliage.

Some cultivars can take a sunnier site. Heavy shade, on the other hand, will result in fewer blooms but larger leaves.

**Pruning** – Oakleaf hydrangea generally requires little if any pruning. Should it become necessary to shape the plant or reduce its size, prune shortly after the shrub flowers. This shrub sets flower buds in late summer for next year. In other words, it blooms on old wood. Pruning at any other time of year will result in the loss of next year's blossoms.

***Pests*** – Other than occasional damage from spider mites and aphids, insects don't normally bother this plant. However, deer will nibble on this plant, especially the tender, young spring foliage, so protect the plant with either deer repellent or a physical barrier.

***Diseases*** – Other than leaf spot, this plant is seldom bothered by disease.

**Propagation** – The shrub may be propagated from stem cuttings. Because the branches are low to the ground, the plant may also be propagated by layering.

### *USES IN THE LANDSCAPE*

Oakleaf hydrangea is a versatile shrub that is bold yet elegant when used as a single specimen; a backdrop to smaller shrubs, bulbs, or perennials; a component of a mixed border; a deciduous hedge; or as a mass planting.

If there's a downside to oakleaf hydrangeas, it's that their large, coarsely textured foliage may be off-putting to a timid gardener. Rest assured, the foliage blends very well with daintier-leaved plants. For example, evergreens with their finer needles or scaly branches make a pleasing contrast. The more formal round shape and small, dense leaves of boxwoods contrast well with oakleaf hydrangea's looser form. Taller ferns, such as ostrich or cinnamon ferns, and shorter grass-like plants, such as liriope, also harmonize well with oakleaf hydrangeas.

### *YEAR-ROUND INTEREST*

Easy-care oakleaf hydrangea offers year-round interest, which makes it especially valuable in the landscape. In the spring, it makes an immediate impact as its bold, handsome foliage emerges. In summer, the large, long-lasting clusters of creamy white or pink flowers contrast with the dark green foliage. Many cultivars gradually mature to medium pink or deep rose. Fall is when the oakleaf hydrangea really makes an impact with its rich, deep burgundy/purple foliage that persists into winter. The dried tan or light brown flower heads add additional interest. In winter, the exfoliating tan bark provides an additional textural element to the snowy landscape.

### *RESOURCES*

*Dirr's Hardy Trees and Shrubs, An Illustrated Encyclopedia* (Dirr, Michael A., 1997)

"Hydrangea Selection, Pruning and Care," Virginia Cooperative Extension Publication (ext.vt.edu/chesapeake/programs/anr/Pruning )

"Hydrangeas: Breeding, Selection and Marketing," Michael Dirr's Plants Website (dirrplants.com/-hydrangeas)

"Problem-Free Shrubs for Virginia Landscapes," Virginia Cooperative Extension Publication 450-236 (ext.vt.edu/450/450-236/)

“Selecting Plants for Virginia Landscapes: Showy Flowering Shrubs,” Virginia Cooperative Extension Publication HORT-84P (ext.vt.edu/HORT/HORT-84/)

University of Connecticut College of Agriculture, Health and Natural Resources Plant Database, *Hydrangea quercifolia*, (hort.uconn.edu)

North Carolina State University Cooperative Extension (plants.ces.ncsu.edu/plants/all/hydrangea-spp)

United States National Arboretum, (usna.usda.gov/Gardens/faqs)

University of Tennessee Hydrangea Production (tnstate.edu/faculty/ablalock/documents/Hydrangea)

# The Ornamental Garden in November

By Patsy Chadwick | November 2016-Vol.2 No.11

It's November and there's a decided chill in the air. Leaves on millions of trees have completed their crash course on how to fall to earth gracefully.  Adolescent wild geese, so clumsy and disorderly-looking this summer, have now mastered the art of flying in a perfect V formation.  On warmer days, bees, flies and other insects continue to visit the few remaining flowers in search of just one more drop of nectar or pollen.  All the signs in the ornamental garden point to the end of the growing season and the beginning of winter dormancy.

*Pollinators on the last of the Fall-Blooming Hardy Chrysanthemums*

**GENERAL FALL CLEANUP AND MAINTENANCE TASKS**

Before calling it quits in the ornamental garden, a lot of tasks need to be completed this month.  Here's a checklist to help you get started:

- **Remove and dispose of plant foliage** from roses, irises, daylilies, phlox, peonies, and other plants that are subject to fungal leaf diseases. The cleanup you do now will help prevent fungal diseases in next year's garden.
- **Mulch flower beds** after the ground freezes to moderate soil temperatures and prevent frost heaving.
- **Leave ornamental grasses standing** to provide interest in the winter garden. Wait until late winter or early spring to cut them back.
- **Pull weeds** while the soil is still soft. Winter may be approaching, but cool-season weeds are oblivious to the cold.
- **Monitor moisture levels** for any plants that were added to the landscape during the previous growing season. Many plants, particularly newly installed plants, die during their first winter due to lack of moisture. Therefore, in the absence of rain, it's important to continue watering until the ground freezes.
- **Clean and store non-weatherproof objects**, such as terra cotta pots, rain gauges, birdbaths, portable trellises, statuary and other garden art.

- **Remove, clean, and store all stakes** and other plant supports.
- **Drain, roll up, and store garden hoses** on a warm sunny day when the hoses are pliable and easier to work with. Don't forget to clean watering wands, quick connects, or irrigation equipment and store in a frost-free location.
- **Inventory** all pesticides, fungicides, and herbicides to make sure they are well sealed. Store them in a frost-free area to protect them from freezing temperatures.
- **Note any needed servicing requirements** for your lawn mower, tiller, or other gardening equipment. Try to take care of those now or over the winter months rather than wait until next spring.
- **Inspect your garden tools** before storing them in your garage or tool shed for the winter. Remove dirt and grime from metal surfaces to prevent the formation of rust. Sharpen any tools that have grown dull from use. Treat wooden handles with a mixture of two parts boiled linseed oil to one part painter thinner or turpentine to prevent the wood from cracking. Finally, organize your tools so that you can easily find them next spring.

**ANNUALS, PERENNIALS AND BULBS**

Depending on the weather, the November ornamental garden typically looks quite bare, especially toward the end of the month. However, with overnight frost protection and a little cooperation from Mother Nature, it's possible to have some color in the garden even on the chilliest of late autumn days.

- **Include some cold-tolerant perennials and grasses** in your landscape for late autumn color, texture and interest. For example, Monkshood (*Aconitum napellus*), with its stunning, deep blue flowers and handsome foliage, is one of the last perennials to succumb to frost. Just be careful when handling this plant. All parts of it are poisonous.
  Consider a cold-tolerant foliage plant, such as *Yucca filamentosa* 'Color Guard' with its variegated cream and green leaves. Bergenia, Sweet Flag, Carex, Foxglove, Dianthus, and Jacob's Ladder are other plants that have interesting cold-tolerant foliage. Chrysanthemums, of course, will continue to provide plenty of color before finally succumbing to the first hard freeze. A few late-blooming asters, such as lavender-blue 'October Skies' may provide pops of color as late as November. The show won't be as glorious as it was in October, but the bees and other insects will appreciate the blooms nonetheless. TIP: If pinched back in late June or early July, asters will bloom a couple of weeks later in fall.

*Yucca 'Color Guard'*
*Photo: Pat Chadwick*

- I**nclude cold-tolerant annuals**,

such as pansies, violas, and snapdragons in the ornamental garden to prolong the color fest as late as possible into autumn. Ornamental kale and cabbage, also known as “flowering” kale and cabbage, are additional good choices that can withstand temperatures as low as 5°F (as long as they have been gradually acclimated to cold weather). Depending on the selection, some are frilly or curly in appearance and all are deeply colorful, displaying hues ranging from cream and deep green to brilliant magenta, purple, and burgundy. They look equally charming as a single specimen in a container or as a mass planting. As you plant them, bury the stems so that the lowest leaves are flush with the surface of the soil.

*Cool Season Tricolor Pansy*
*Photo: Wikimedia*

- **Cut back the stems and foliage of established chrysanthemums** about three inches above the ground now or, if you prefer, wait until late winter or early spring to cut them back. If the chrysanthemums were planted this fall, they may survive cold weather better if the stems are left in place. The dead foliage will help protect the plant crown during winter. Also make sure the mums are well-watered going into winter.
- **Leave tall sedum standing** over the winter months. The dried brownish-looking seed heads add plenty of color and texture to the garden in fall and winter. They’re also stunning when covered in frost or ice.

*Tall Sedum Seed Heads in Late Autumn. Photo: Pat Chadwick*

- **Plant tulip bulbs** in a prepared sunny, well-drained site once the soil cools to about 55°F and night-time temperatures range between 40° and 50°F. Tulips require cool soil so that they don’t send up shoots before the roots are established. They may be planted up until the soil freezes. Plant them deeply (about three times the diameter of the bulb) to help protect them from frost heaving as well as from mice, voles and squirrels. Cover with a layer of mulch about three inches deep. TIP: If you have a deer problem, make a note to protect your tulips from deer browsing the instant the foliage starts to appear next spring. Either use a physical barrier or

use a deer repellent.
- Daffodils and tulips are a welcome sight in the springtime, but they never seem to last very long. Prolong the show by planting selections that bloom in early, mid, and late spring. TIP: If you're planting bulbs in a naturalized (informal) rather than a formal setting, space them a little farther apart than you would normally so that they have ample room to multiply.

**TREES AND SHRUBS**

Autumn is, of course, the time of year when trees and shrubs take center stage in the ornamental garden. Look around you and note plants that continue to provide interest well into November. Keep in mind that weather conditions have a great deal to do with how long some plants retain their color. In general, Scarlet Oaks, Black Gums, Ginkos and some Crape Myrtles may be relied upon to carry their fall colors into November. Likewise, some shrubs hold their fall colors longer into the month. Oakleaf hydrangeas, Fothergilla, Spicebush *(Lindera benzoin*), and *Spirea thunbergii* 'Ogon' are examples. Other shrubs, such as winterberries and certain rose selections, provide interest in late autumn with their brightly-colored fruits.

- This is the time of year to **fertilize dormant trees and shrubs** with a slow-release organic fertilizer so that nutrients will be available to the plants in early spring. Virginia Cooperative Extension (VCE) publication 430-018, "Fertilizing Landscape Trees and Shrubs," can provide advice if you're not sure whether your trees and shrubs need to be fertilized. This publication covers fertilization basics, such as the signs of plant stress and diminished vigor, types of fertilizers, when to apply fertilizer, and how much. When you apply fertilizer, water it into the soil. Without moisture, plants cannot absorb nutrients from fertilizers.
- **Thoroughly water both deciduous and evergreen trees and shrubs** until the ground freezes. They will thrive better in moist rather than dry soil once the ground is frozen.
- **Mulch boxwoods and broad-leaved evergreens** before the ground freezes but avoid piling the mulch up against the trunks.
- **Protect dormant trees from mouse and vole damage** over the winter months. Contrary to what some people think, these diminutive creatures don't hibernate. In fact, they can do some of their worst damage over the winter months. Voles can do extensive damage to the roots and bark of many woody plants. Several strategies can help mitigate damage from the beasties. Install a physical barrier of hardware cloth or wire mesh trunk guards at the base of vulnerable young trees. Wait until after the first frost to apply mulch at the base of trees and shrubs but be sure the mulch is not touching the trunks. If you were using vole and mole repellents over the summer months, don't stop just because the weather has turned cold.
- **Continue planting deciduous trees and shrubs** until the ground freezes. Make sure they are well-watered when cold weather comes.
- If you plan to buy a **live Christmas tree** and plant it later, dig a planting hole for it now while the ground is still soft. Store any soil that you removed from the planning hole in a spot where it won't freeze.

**HOUSEPLANTS**

Now that houseplants are acclimated to the indoors after their vacation outside this summer, it's time to focus on their health and well being within your home's warmer, drier conditions.

- **Make sure light levels are adequate** for the needs of each houseplant. Give each plant a quarter turn weekly to prevent the plant from leaning toward the light.
- **Monitor moisture and humidity levels.** The biggest mistake many people make is overwatering their houseplants. With the exception of ferns, which generally prefer evenly moist soil, allow the soil of other houseplants to dry between waterings. Meanwhile, most

houseplants prefer relative humidity levels of about 40 to 50% and benefit from being misted two or three times a week.  Another way to increase humidity is to place the plants on a tray of moist pebbles.  Brown tips on the ends of leaves usually indicate that the humidity is too low.

- **Plant paperwhite bulbs** in a suitable container such as a small pot or bowl. Fill the container part way with pebbles. Place the bulbs on top of the pebbles. Add a few more pebbles to support the bulbs and water up to the base of the bulbs. Once the flowers start to appear, stake the flower stalks to prevent them from falling over.
- **Pot hardy spring bulbs for indoor forcing**. For advice on forcing bulbs, see Virginia Cooperative Extension (VCE) Publication HORT-76,  "Fooling Mother Nature:  Forcing Flower Bulbs for Indoor Bloom."
- **Tropical plants** such as Mandevilla, Fuchsia, or Hibiscus may continue to bloom if they are overwintered indoors. Give the plant plenty of bright light, water it when the top inch or two of soil becomes dry and mist the foliage periodically to raise the humidity level. If the plant is too large to overwinter indoors, it may be maintained in a semi-dormant state in a frost-free garage or basement.  If you choose this storage method, water the plant sparingly so that the root ball does not dry out.

# The Vegetable Garden In November

By Cleve Campbell | November 2016-Vol.2 No.11

Last week I was in the vegetable garden harvesting radishes, and even though I was well aware of how little rain we've had lately, I was nevertheless shocked by the dryness of the soil. So I checked The National Weather Service, and learned that our rainfall so far this year, through the month of October, is **over five inches below our average rainfall** — 5.36 inches to be exact! And here's another unusual thing about our 2016 growing season — the first killing frost date of October 15 has come and gone without a killing frost. Wow, what a growing season. We started off with periods of too much rain, followed by weeks of no rain, and now our fall killing frost is more than two weeks late.

November in the vegetable garden is the time to harvest fall crops — lettuce, spinach, kale, radishes, turnips — and it marks the beginning of the garden clean-up season. It is also a time to reflect back on the growing season as to what varieties performed well and what varieties performed below our expectations. Don't forget to make year-end notes in your garden journal, as this information can be very valuable when planning for the 2017 growing season. We will soon be reminded of the upcoming 2017 growing season because in December we will start to receive the 2017 seed catalogs — chock full of pristine and unblemished photos and exciting new vegetable offerings.

**Here's my Vegetable Garden To-Do list for November:**

- **Root crops** such as carrots, radishes, turnips and parsnips **store well outdoors in the ground**. Just before the ground freezes, bury these crops under a deep layer of leaves or straw. Harvest as needed during the winter months.
- Dig up some of your parsley plants (including the root) and plant into a small container which can be placed in a sunny spot in your kitchen.
- If your soil test revealed a low pH — meaning it's too acid — now's the time to add lime in accordance with your soil test recommendation. **Lime acts very slowly** but will permeate the soil over the winter and adjust your soil pH before spring planting season. **Avoid other fertilizing treatments in late fall,** because they will leach away before spring and be unavailable for your spring crops.
- **Prepare a spot in the garden NOW for early planting of peas.** This way you'll be all ready for planting peas in the spring, before the soil dries out.
- Don't forget the garden hoses: drain and roll up and store on a warm sunny day. It's hard to get a cold-water hose to coil into a tight coil. Also, be sure to shut off and drain any outdoor water pipes and irrigation systems that may freeze during the cold weather.
- Fallen, spoiled or mummified fruit should be cleaned up and destroyed by burying or placing them in the trash. Good sanitation practices reduce re-infestion of insects and diseases in the following seasons.
- **Mulch strawberries** with straw or leaves**.** This should be done **after several nights near 20ºF but before the temperature drops into the teens.** Apply the straw or leaves loosely but thick enough to hide plants from view.
- Now is a good time to collect soil samples to test for pH and nutrient levels. A free soil testing

kit is available at your local Extension Office. The Charlottesville-Albemarle Extension Office is located in the County Office Building on 5th Street Extended, 460 Stagecoach Road, (434) 872-4580.

- **Rhubarb plants** that are four years old or more can be divided and transplanted. A site prepared by deep digging and incorporating compost will pay off with a good yield in upcoming years.
- Tidy up the asparagus bed. Cut off the tops of the plants to about 3-4 inches above the soil level. Weed and add a winter dressing of compost or aged manure to the bed.
- Early November is a good time to plant most fruit trees, especially if a little mulch is added. Local gardening and landscape centers often offer discounts on fruit trees at this time of the year.
- Keep mulches pulled back several inches from the base of fruit trees, to prevent bark injury from hungry mice and rodents.
- If you have been thinking about installing a deer fence around your vegetable garden, the fall and winter months are a good time to design and build a deer fence.

November may not be a busy month for growing produce or harvesting a garden's bounty, but there are plenty of gardening tasks to keep a gardener busy, and they're well-worth the effort because they'll ensure not only a healthy winter in the garden, but a quick start to a productive spring.

Thanks for stopping by **The Garden Shed;** we look forward to your visit next month.

**Sources:**

Tips and Tasks adapted fromVirginia Cooperative Extension, Albemarle/Charlottesville, November Monthly Horticulture Tip Sheets, Va. Coop.Ext. Monthly Tip Sheets
http://offices.ext.vt.edu/albemarle/programs/anr/tip-sheets/index.html

"Deer," Internet Center For Wildlife Damage Management, Cornell University, Clemson University, University of Nebraska-Lincoln and Utah State University, Internet Center for Wildlife Damage Management, http://icwdm.org/handbook/mammals/Deer.asp

# Manure

By Cleve Campbell | November 2016-Vol.2 No.11

There's an old garden saying — "feed the soil, not the plant" — and if you ask any gardener what's the best way to feed the soil, a likely response is manure. Many gardeners consider manure to be one of our most precious resources: it adds organic matter to the soil, improves soil structure, increases water-holding capacity, and provides beneficial microbes and nutrients that plants need to flourish.

**For all the benefits** of using manure and manure-based composts in the garden, there are also some **risks.** Animal manures harbor pathogens harmful to humans, including *E. Coli, Salmonella* and *Campylobacter bacteria*, and *Giardia* or *Cryptosporidium* protozoa. Pathogens can pass from animal manure to humans through direct contact between contaminated manure and fresh fruit or vegetables.

In general there are three stages of manure: fresh or raw, aged, and composted. Each stage has different level of risk of harboring pathogens:

- **Fresh or raw manure**: **High Risk**
- **Aged manure** (at least 6 months old): **Medium Risk;** pathogens are reduced but could still be present.
- **Composted manure: Lower risk;** microbial pathogens are substantially reduced.

**Health risks can be reduced** when using manure in the home gardens by adhereing toe the following

precautions:

- **Wait at least 120 days after applying raw or aged manure before you harvest crops** that have had contact or potential **contact with the ground**. This includes root crops (carrots, radishes and the like) and leafy green crops (lettuce, spinach and the like).
- **Wait 90 days before harvest** for those crops that do **not come in contact with the groun**d: corn, okra, for example.
- Once the garden is planted, avoid using animal manures unless they have been composted.
- As a general rule, **un-composted** manure should only be **incorporated into the garden in the fall**.

And by the way, **horse manure is notorious for spreading weed seeds** into the garden. Composting kills most of the weeds.

**Herbicide Residue**

There have been cases where vegetable gardeners have unknowingly used manure and composts that are contaminated with widely-used herbicides — **clopyralid** and **aminopyralid —** which are used to kill broad leaf plants in golf course turf, pastures, hay crops, grain fields, and roadways.

Manure becomes contaminated when it passes through a farm animal that has eaten a herbicide-treated plant. Compost can also become contaminated when it is made with grass and leaves that have been sprayed with herbicide or when it's made with contaminated manure. In general, herbicides do eventually breakdown and lose activity over time, particularly as they are exposed to microbes, heat and moisture; however these particular herbicides (clopyralid and aminopyralid) are simply more resistant to these natural processes.

On broadleaf crops, these herbicides can cause poor germination and kill seedlings and they cause new leaves to **become twisted and malformed**. Sensitive crops include a wide array of crops including tomato, potato, and other solanaceous crops, lettuce, beans and other legumes, strawberry, grapes, and most other crops except those in the cabbage family.

*Distortion of tomato leaves caused by clopyralid. Photo: University of Maryland Extension*

**Suspected contaminated compost can be tested**. Here's how: combine some of the suspected material (compost, manure, hay or grass clippings) with a soilless mix and place it in a pot; then plant pea or bean seeds and observe what happens. Contamination is indicated if the seeds fail to germinate or if seedings emerge that are twisted and deformed.

**Composting Manure**

Composting manure is just like composting yard or vegetable waste. It's not complicated, but there are some key factors to success. Composting horse manure is super easy, especially if it's mixed with old hay or pine shavings. It's pretty much the perfect carbon to nitrogen ratio. Everything decomposes eventually, but **true composting is an accelerated decomposition process** that reaches an optimum temperature (140-160°F) and sustains that temperature for a period of time — about 3 weeks. During this time, weed seeds and fly larvae are killed, while the manure decomposes. The pile continues to decompose as it cools down, with the whole process taking between 3-4 months. Many folks believe that you can't use horse manure unless it's at least a year old. Not true, but if the manure is "stockpiled" rather than "composted," the decomposition process does take longer (plus it often smells bad and attracts flies).

The keys to making sure that your compost pile reaches the right temperature and doesn't stink is air and moisture. Composting is an aerobic process (meaning that it requires air). Piles that don't get enough air go through anaerobic decomposition, which takes longer and doesn't reach high enough temps to kill weed and insect larvae, causing the pile to smell and attract flies. In order to keep the process aerobic, the pile either needs to be turned regularly, or it needs to have a way to draw air in, like via PVC pipes that are laid when the pile is built. The pile should also have enough moisture…the general rule of thumb is to keep the pile the consistency of a wrung out sponge. In Virginia, I find that my pile seldom gets too wet, but often needs a little extra water. For this reason, my pile is close enough to the house to reach with the hose.

I know what you're thinking…**CLOSE** to the house? Yep. If it's done right, there's virtually no odor, no flies and it's convenient to the flowerbeds. One tool that I find helpful in managing my compost pile is a compost thermometer. These look like giant meat thermometers, with a probe 2-3 feet long, and enable to you monitor the temperature within the pile. For smaller piles, I have also used a compost aerator -mine looks like a giant cork screw, that I drill into the pile, then pull out to create air holes. Remember the pile needs to reach that ideal temperature range, and in order to do that, you just need air and moisture.

If you have horses, don't waste that valuable resource! If you don't have horses, find a friend or neighbor who does and talk them into composting (or take the fresh manure home and do it yourself).

Thanks for stopping by The Garden Shed; we look forward to seeing you next month.

**About the Author**: Carrie Swanson is a Virginia Cooperative Extension Agent and Unit Coordinator for Albemarle County and Charlottesville, specializing in Agriculture, Natural Resources and Animal Science.

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# Pumpkin Chiffon Pie

By Cate Whittington | November 2016-Vol.2 No.11

Thanksgiving is just around the corner. No doubt you are anticipating the autumnal holiday offerings from

your youth. Depending upon where you grew up, the menu may vary somewhat, especially where the stuffing is concerned— from oyster or chestnut or cornbread to the basic bread stuffing.

Most of you are probably conjuring up images of turkey, gravy, cranberry sauce, stuffing, mashed potatoes, cornbread, and perhaps a healthy green or two. And then, there's dessert. Pies rule the day–apple, pecan, and pumpkin. For my mother, nothing reigned more supreme than a pumpkin chiffon pie, lighter than its more common and rather heavy alternative. The following recipe is one that never weighs your guests down after the gluttonous indulgence of a true American Thanksgiving meal.

**Pumpkin Chiffon Pie**

**Yield: 6-8 Servings**

*Ingredients*

1/3 cup brown sugar, packed

½ teaspoon salt

½  teaspoon ginger

1 teaspoon cinnamon

1 teaspoon flour

¾ cup canned or fresh puree pumpkin

2 eggs, separated

1/3 cup cream

1 envelope (1 Tbl.) plain gelatin

1/3 cup milk

¼ cup orange juice

½ teaspoon grated orange rind

2 Tablespoons sugar

Baked 8" pie shell

*Directions*

1. Combine dry ingredients. Add a little pumpkin and blend to a smooth paste.
2. Add this mixture to the rest of the pumpkin in top of a double boiler. Mix well.
3. Add yolks to cream. Beat. Add to pumpkin mixture and cook over hot water for 10 minutes. Stir.
4. Soften gelatin in hot milk and add to mixture.

5. Add orange juice and rind and cool.
6. Beat egg whites until stiff, gradually add sugar, and beat until smooth and thick. Fold into pumpkin mixture.
7. Pour into prepared piecrust and chill for at least one hour.
8. Top with whipped cream.

Piecrust Options:

- Bake your favorite crust or rely on the pre-baked variety.
- Use a graham cracker or ginger snap crust. It's easy. Simply crush the cookies and add melted butter, patting into the pan.
- For added sweetness, add a thin bottom layer of the following mixture to the pre-baked piecrust:

*Combine 1/3 cup butter with 1/3 cup sugar. Bring to simmer until bubbly (frothy) and add ½ cup chopped pecans. Spread in bottom of prepared crust and bake at 425º for 3-5 minutes.*