

I received a call from a self-described "more-than-a novice" gardener who was frustrated because she could not grow a vegetable garden at the old home she had just bought. She described the plants as looking wilted with a sickly off-yellow color a short time after planting. Given our cool, wet weather, I questioned whether she had put out her tomatoes and peppers too early, or perhaps was overwatering them. She had planted in late May and always paid careful attention to the soil moisture.

I asked if other plants looked sickly. Was runoff from pavement or downspouts keeping the vegetable garden too wet? Had a misplaced weed killer applied to the surrounding lawn affected the garden? No, no, and no.

I asked what was doing well in her yard. Other than turfgrass and wild violets, nothing was growing but a large tree whose massive canopy covered almost one-third of the yard. Once I saw a leaf from the tree, her dilemma became clear. The gardener had had run up against a formidable foe—a black walnut tree.

More potent than any of the other related and not-so-related

allelopathic (meaning it inhibits growth of certain kinds of plants species), black walnut (*Juglans nigra*) gives most neighboring plants a hard time; that is, if they have any chance of survival at all. The reason is an interesting evolutionary development of a compound called juglone. Somewhere along the line, ancestors to the black walnut of today became more successful in competing for resources as they developed their ability to produce juglone.

Research has shown that juglone acts as a respiration inhibitor that deprives sensitive plants of energy for metabolic activity. Plants literally poop out, which accounts for their listless appearance and eventual death. Black walnut roots, buds and nut hulls are full of juglone; leaves and stems have less. Juglone is not water-soluble. It stays close to where the tree excretes it rather than traveling through the soil. Close contact between the tree and a susceptible plant is necessary

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**STRIKE A GARDENING
TRUCE WITH YOUR
BLACK WALNUT**

THINGS TO DO THIS MONTH...

- Dig summer bulbs and store inside for the winter.
- Cut back perennials and compost. Save perennials and ornamental grasses with winter interest. Cut those back in the spring.
- Winterize lawn mowers and other equipment.
- Use a preemergent herbicide to control problem winter annuals (such as henbit, common chickweed, bromegrasses, pepperweed and shepherd's purse) in

landscape beds.

- Remove all rubbish and dead plants or shred and add to the compost pile.
- Rake and shred leaves as they fall. Incorporate into the garden, add to the compost pile or use as mulch.
- Before the ground freezes, give evergreens a final watering.
- Dig the hole for a live Christmas tree if you plan to get one and fill the hole with leaves to keep it from freezing.
- Cover tender perennials with loose

mulch such as evergreen boughs.

- Store your fresh Christmas tree in a bucket of water in a shady, protected location. Re-cut the stem before bringing indoors.





STRIKE A GARDENING TRUCE WITH YOUR BLACK WALNUT

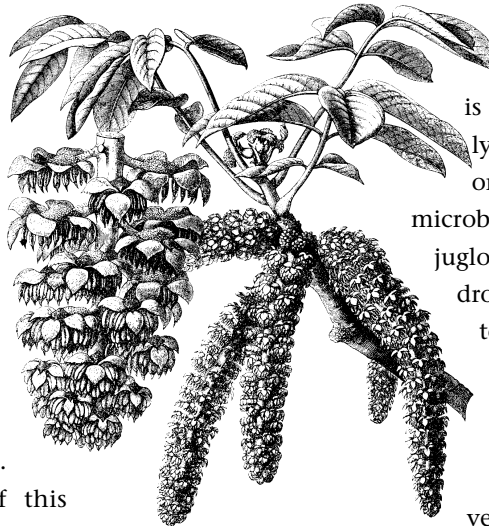
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to produce the allelopathic effect. Therefore, root contact is the primary means of eliminating rivals that intrude upon a black walnut's root zone.

Actually the juglone a black walnut secretes is not directly deadly to plants. Rather, susceptible plants have the ill-gained ability to convert juglone to hydrojuglone, which does the plant in. Soil microbes can digest juglone into non-allelopathic compounds. Researchers have seen evidence of this breaking of the juglone molecule by noting that a well-aerated, organic matter-rich soil allows better growth of semi-sensitive plants in the presence of juglone. Perhaps juglone concentrations build up in heavier, water-logged soils because there are fewer microbes to break it down.

This distraught gardener need not raise the white flag and throw in her knee pads. It is possible to have an attractive landscape (or productive vegetable garden) and a stately black walnut overlooking it all. She has several options available to her: place the vegetable garden well away from the farthest reach of the tree's roots; give up planting Solanaceae family (tomato, potato, pepper, eggplant, etc.) within the tree's root zone; or grow veggies in containers or raised beds (lined with heavy grade plastic) so the tree roots and garden plant roots do not come into contact. A final resort is to cut down the black walnut. But even then, it can take several years for the stump remnants to decay enough to stop giving off juglone.

Despite the many plants that succumb to juglone, others do well. Use the charts below to guide your plant choices. For some reason, I found little formal research on juglone's effects on other plants. One source says that the research base is minimal, period. Just be aware that much of these recommendations are based on observation rather than hard science and that certain cultivars of the same species (on their own roots or grafted) can vary in their susceptibility. Not all "experts" agree on what will and will not grow in harmony



with a black walnut.

Start with one or two plants to see how they do before you invest in more. Regardless, it is a good idea to put these plants into a carefully prepared site with proper pH, nutrient and organic matter levels. This encourages more microbes to populate the soil, which work to keep the juglone concentration lower. Regularly rake out dropped leaves, twigs, and fruits from the garden to prevent juglone from accumulating in the soil.

Trying to garden with a black walnut nearby can be challenging, but there is good news. Black walnut leaves composted for a year are safe to use as a soil amendment. However, for hulls, sawdust, twigs or wood chips, compost for two or three seasons to ensure the juglone has broken down. At each anniversary of composting, use seedling tomato plants (one of the most juglone-sensitive species around) to test the compost. If they sicken, then the compost needs to go for another year. Manage your compost pile to maintain good moisture levels and aeration for the health and well-being of juglone-munching microbes.

— Jo Mercer

Plants that may tolerate growing near a black walnut (alphabetical by genus)

Trees

Japanese Maples, *Acer palmatum*
 Many Other Maples, *Acer species*
 Eastern Redbud, *Cercis canadensis*
 Red-cedar, *Juniperus species*
 Sycamore, *Platanus occidentalis*
 Cherry, *Prunus species*
 Plum, *Prunus species*
 Pear, *Pyrus species*
 Oaks, *Quercus species*
 Black locust, *Robinia species*



Vines and Shrubs

Clematis species
 Euonymus species
 Forsythia, *Forsythia* species
 Rose of Sharon, *Hibiscus syriacus*
 Juniper, *Juniperus* species
 Honeysuckle, most *Lonicera* species
 Virginia Creeper, *Parthenocissus quinquefolia*
 Lilac, *Syringa* species
 Arborvitaes, *Thuja* species
 Viburnum species (some cultivars)

Annuals & Herbaceous Perennials

Bugleweed, *Ajuga reptans*
 Hollyhock, *Alcea rosea*
 Astilbe species
 Begonia, *fibrous cultivars*
 Pot-marigold, *Calendula officinalis*
 Chrysanthemum species (some cultivars)
 Trout Lily, *Erythronium americanum*
 Snowdrop, *Galanthus nivalis*
 Sweet Woodruff, *Galium odoratum*
 Cranesbill, *Geranium sanguineum*
 Grasses (most) *Gramineae* family
 Daylily, *Hemerocallis* species (some cultivars)
 Coral Bells, *Heuchera* species
 Plantain-lily, *Hosta* species
Hyacinthus orientalis (some cultivars)
 Iris species
 Shasta Daisy, *Leucanthemum* species
 Liriope species
 Peony, *Paeonia* species (some cultivars)
 Primrose, *Primula* species
 Lungwort, *Pulmonaria* species
 Stonecrop, *Sedum* species
 Lamb's-Ear, *Stachys byzantina*
 Meadow Rue, *Thalictrum* species
 Spiderwort, *Tradescantia virginiana*
 Periwinkle, *Vinca minor*
 Violets & Pansies, *Viola* species
 Zinnia species

ASSESS IN AUTUMN, SUCCESS NEXT SPRING

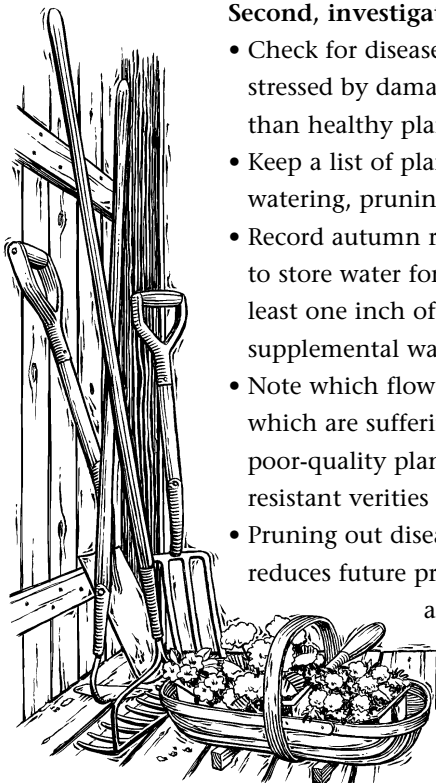
November is great month in our area for preparing next year's yard and garden. On a crisp, sunny autumn day, forget the football game and make a tour of your landscape. Take along a pencil and pad to jot down ideas, plan changes, solve problems for next season, even sketch what you see in your garden's future.

First look at the big picture.

Maybe some areas would be more pleasing with the addition or reduction of plants. Step back for a long-view assessment of the entryway into your house. Could it be more inviting or safer with a change in landscape plants and hardscape? Does the landscape have color, texture and year-round interest? Every season has something to offer so have a strategy for landscape design and plant choices. Perhaps some trees and shrubs have overgrown their space and need to be pruned or divided. Put any gardening chores on your list, and make up a schedule to tackle specific problems.

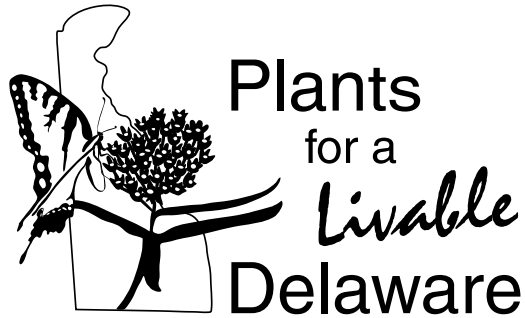
Second, investigate the details.

- Check for disease and cultural problems. Trees and shrubs stressed by damaged roots will develop fall color earlier than healthy plants.
- Keep a list of plants that could benefit from mulching, watering, pruning or removal
- Record autumn rainfall. Plants, especially evergreens, need to store water for winter. If nature doesn't provide at least one inch of precipitation every week, give the plant supplemental water until the ground freezes.
- Note which flowers and vegetables performed well and which are suffering from leaf disease. Keep a record of poor-quality plants, and replace them with disease-resistant varieties next year.
- Pruning out diseased, dead or insect-infested branches reduces future problems, because unhealthy plant parts are more susceptible to these maladies.





PLANTS FOR A LIVABLE DELAWARE



Plants for a Livable Delaware is a new campaign to educate homeowners about problem invasive plants and suggest alternatives for their landscapes. Livable Delaware Plants thrive without becoming invasive and must

- Possess adaptable characteristics to landscape situations (i.e., drought resistant, tolerant of poor soils, etc.)
- Pose no potential threat as an invasive plant
- Have no serious disease or insect problems
- Be hardy to Delaware

In this issue we are featuring the invasive plant—Periwinkle with its corresponding Livable Delaware alternatives.

Take a closer



Periwinkle (*Vinca minor*) – is a vine or groundcover. A native of Europe, it grows vigorously and forms a dense cover that excludes most other plants, including woodland wildflowers. It only spreads vegetatively so it poses the greatest threat when planted adjacent to a natural area. Its evergreen nature and vigorous growth are hard to replace in the garden.

Alternative groundcovers include:

Bearberry (*Arctostaphylos uva-ursi*) 6-12" tall glossy, evergreen groundcover forming broad, thick mats; dainty flowers in May; does best in poor, sandy, infertile, acid (pH 4.5-6.0) soils; tolerates salt, prefers full sun, grows slowly (N)

White heath aster (*Aster ericoides*) – 1' tall small-leaved aster with small white flowers in late summer to fall; prefers full sun and average to dry soil (N)

Allegheny pachysandra (*Pachysandra procumbens*) – 6-12" semi-evergreen groundcover with green to blue-green mottled foliage; white-pink flower spikes in spring; tolerates partial to full shade but grows slowly (N)

Virginia creeper (*Parthenocissus quinquefolia*) – deciduous vine that will also crawl across the ground; brilliant red fall color; tolerates just about any kind of soil and tough conditions, full sun to full shade; fast growing (N)

Christmas fern (*Polystichum acrostichoides*) – 1' tall evergreen fern, tough and undemanding, grows in partial to full shade (N)

Sweetbox (*Sarcococca hookeriana* var. *humilis*) – 1-2' tall dense evergreen shrub that spreads by stolons and develops into a colony; black berries and lustrous green foliage; grows in partial to full shade

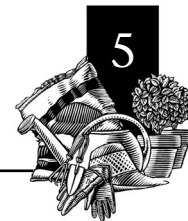
Lowbush blueberry (*Vaccinium angustifolium*) – 6" to 2' tall spreading deciduous shrub; white flowers, blue fruit and crimson fall color; tolerates sandy, rocky, poor soils (N)

Barren-strawberry (*Waldsteinia fragarioides*) – 6" with trifoliolate, glossy, evergreen leaves; yellow flowers in spring; tolerates partial shade but full sun if preferred (N)

Yellowroot (*Xanthorhiza simplicissima*) – 2' tall spreading (stolons) groundcover grows vigorously in wet soils and slower in dry soils; tolerates full sun to shade, somewhat inconspicuous clusters of purple spring flowers (N)

N = native to Delaware

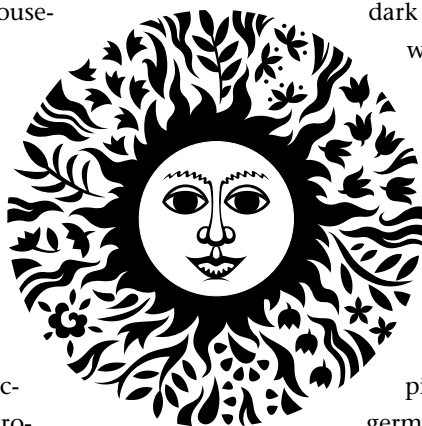
— Susan Barton



SHEDDING LIGHT ON A PLANT'S RESPONSE TO DARKER DAYS

Warm, brighter days have given way to short, darker ones. You have brought your houseplants indoors from their summer respite, placing them in the best light to overwinter. Ever noticed how certain houseplants lean toward the window seeking sun?

As a child, I thought my grandmother's houseplants were like her Tabby cat—they just like the warmth of the sun on a chilly day. It was not until I learned a plant's three basic reactions to light—photosynthesis, phototropism, and photoperiodism—that I understood the phenomenon. With little for gardeners to do outside during the colder November days, maybe you have time for a refresher course—a brief "Understanding Your Plant's Behavior 101."



All life on earth depends on the process of photosynthesis—a fact we all learned in grade school. In high school we explored why—radiant energy from the sun is converted into chemical energy, which is stored in sugars glucose and fructose. Directly or indirectly, animals get food (and so energy) by ingesting plant materials that break down sugars and starches.

Phototropism is the plant's movement in response to light. As growth hormones are produced, stem cells on the side away from the light begin to multiply. The stem tilts putting its leaves closer to the light source in a position to intercept the most light.

The most interesting plant response to light is photoperiodism, which is the plant's reaction to the dark, a response controlled by the phytochrome pigment in the leaves. The pigment shifts between two forms based on whether it receives more red or far-red light. Photoperiodism controls several different plant reactions, including seed germination, stem elongation, dormancy, and blooming in day length-sensitive plants.

Some common ornamental plants are day length-sensitive, requiring specific light conditions to initiate bloom. Poinsettia and chrysanthemums are short-day plants. To set bloom, the night (or dark period) must be longer than 12

consecutive hours. Some plants are so sensitive that if the dark is interrupted by even a blink of light, the plants will not bloom. Conversely, long-day plants require more than 12 hours of light to bloom. A common long-day plant is the Easter Lily. The plants without this light-length requirement are called day-neutral. Asters, for example, have a combination requirement of long-day followed by short-day.

Some seeds are also light sensitive. Germination is controlled by the reaction in the phytochrome pigment. Many lettuce varieties must have light to germinate. Lettuce is packaged and distributed in foil packets to prevent sprouting before planting. Most weed seeds are in this category. Have you noticed how every time you till the soil more weeds shoot up? Weed seeds lie dormant in the soil for years waiting for you to stir up the soil so they get enough light to germinate.

Phytochrome also controls lengthening or elongation of stems. A good example is leggy plants in low light. The light reaction in phytochrome also guides the germinating seedling stem through the soil toward light.

The final photoperiod response is stimulation of dormancy. While several factors trigger dormancy, a major one is shorter day length. It is critical that we understand this mechanism when we move plants out of the area in which they evolved. For example, a sugar maple grown in the north but from southern seed will not become dormant early enough to escape winter cold injury. Therefore it is important to buy perennial plants from seed sources at similar latitudes to our own.

It's interesting to ponder on these short, darker days as you daydream about next growing season that your plants are reacting to the light (or lack of it) even more than you are.

— Susan Baldwin

Adapted from an 2002 article written by Barbara Larson, Extension horticulture educator, Illinois



DON'T GIVE CLOTHES MOTHS AN OPENING

In Delaware the two most common fabric moth (order Lepidoptera) pests are the webbing clothes moth and the casemaking clothes moth. The adult moths look alike: they are yellowish to buff in color and have a small wing span, only 1/2 inch. Many other small moths have a similar appearance. The larvae are whitish with a dark hair capsule. They are small, only about 3/8 inch when fully grown. You can usually see a silken feeding tube or larval case in the material they feed upon.

Clothes moth larvae are most destructive to articles that are left undisturbed for a long time. The adult moths prefer darkness. They can fly and attempt to hide when exposed to light. The larvae stay on the fabrics they feed on and withdraw into silken tunnels/cases when disturbed. Colorless except for dark head capsules, the moth develops as rapidly as a month under favorable conditions.

Clothes moth larvae are usually found on the fiber they feed upon, thriving in out-of-the-way places, where they can go undetected for a long time. Clothes moths are nocturnal and avoid lighted areas. They run to hide when their infestation site is exposed.

Eggs and larvae of fabric-infesting moths and beetles may be carried into the home on articles containing wool or animal fibers. Secondhand clothing, home furnishings or wool scraps also may be infested when you bring them home. Once inside, clothes moths are capable of moving from one location to another. They may crawl, walk, or fly.

Sanitation is key to control

You can keep an infestation from developing by practicing good housekeeping and by applying protective treatments to items in storage. Once an infestation has begun, you must eliminate it. This almost always involves using an insecticide.

The best control is to avoid infestation in the first place.

Examine the following hiding places:

- Woolens, especially if dirty, like woolen scrap, old socks, stored clothes not properly protected, even wool lining of slippers.



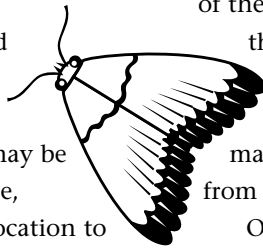
- Lint accumulations such as in floor cracks, behind baseboards, in closets, in ventilation ducts, in furniture or drawers. Some treated materials such as carpets may have a lint accumulation sufficient to support carpet beetles.
- Cereals or high protein foods (dog food, fish meal, fertilizer) or their debris where they accumulate in kitchen shelf cracks and crevices.
- Fur or feathers of stuffed items, unused hats or in stored material.
- Furniture or clothing in storage.
- Felt linings in pianos, lining of draperies, or other lined items.
- Animal products or items made with them.
- Closets, especially those containing stored clothing.
- Carpets or rugs, especially areas hard to reach with normal cleaning, beneath furniture, in corners, behind radiators, etc.

If you have an infestation, the most effective course is to search for and isolate the source of the insects rather than treat an entire room or structure. Begin by getting rid of the items that are infested, and then thoroughly clean the area. Clean up accumulated lint if the insects are in rugs, carpets or furniture. If the offending insects are in stored materials, you may have to discard infested materials or at least thoroughly clean them. Protect them from reinfestation before returning them to storage.

Once a hole is found in the fabric, the damage is done. To prevent this, use a vacuum regularly. Give close attention to:

- rugs and carpets
- drapes and upholstered furniture
- closets, particularly those storing clothing
- radiators, furnace vents, and surfaces behind hard to clean items
- corners, cracks, baseboards, moldings, and areas where lint may accumulate

If you suspect an infestation, vacuum and promptly dispose of the vacuum cleaner bag in a closed trash bag. Rotate rugs or furnishings periodically and clean beneath and around them as you do so.





COAXING AN EARLY SPRING



Brighten the dreary months of winter with an early reminder of spring. By using a gardening technique known as bulb-forcing, you can coax daffodils into full bloom indoors when snow still blankets the landscape.

Fall is the time to plan for household winter blooms, when the bulbs are still available. You can pot bulbs anytime from October to the first of December.

Bulb-forcing is a two-step process—the rooting and chilling stage, which requires eight to 10 weeks, and the actual forcing, which takes four weeks. Some bulbs, such as the paper-white narcissus, don't require the cold stage; they can be planted and forced immediately. Bulbs planted in pots in November could be in full flower by the holidays.

Good choices for forcing are crocus, hyacinth, daffodils and the early and midseason tulips. Look for the larger-sized, top-quality bulbs. Select those that are full, solid and blemish-free.

You can use plastic or clay pots, wooden boxes or ceramic bowls as long as there is a hole in the bottom. Light soil is vital for good drainage. Combine equal parts of potting soil, peat and sand or vermiculite. Don't worry about fertilizer; each bulb contains all the food it needs to bloom.

Fill pots two-thirds full with soil. Gently tuck the bulbs into the soil so that the top of the bulb is about a half inch from the top of the pot. Then cover with soil, leaving another half inch of space for watering. The bulb tips will be visible. Set the bulbs close together, but not touching. A 6-inch pot will hold six tulips or daffodils or 15 crocus. Water thoroughly from the top until all the soil is moist and water regularly until bloom. Label each pot with the type of bulb, date of planting, colors and date for removal from storage.

Just as many spring-flowering bulbs planted in the garden must experience a period of winter cold, you must provide a cold period for forced bulbs. Bulbs must be exposed to cold—35 to 48 degrees, but not freezing—for about 12 weeks, depending on the type of bulb, while the plant forms roots. Any cold, dark place will serve as a storage area, including a cool basement, garage, outdoor shed or even the refrigerator.

After eight to 12 weeks of cold, bulbs will be ready to trans-

fer inside. The top growth will be about 2 inches high, and roots will be coming through the drainage hole. Put the pot in a well-ventilated, cool area (60° to 65° degrees F). Expose the plants to low light for a day or two until tops turn green, then move to full light. Within a month, you will have bunches of spring blooms to enjoy, long before the last snowflake falls.

— Susan Barton



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Call the Garden Line for help with home lawn, garden, and pest questions:
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Susan Barton, Extension Specialist
Ornamental Horticulture

IT'S NOT TOO LATE TO PLANT BULBS

The ideal planting time for spring-flowering bulbs is November, any time before the ground freezes (usually Dec. 15 in Delaware). Choose a sunny location with well-drained soil. Wet ground will rot the bulbs before they can grow. Another challenge is animal meddling. Groundhogs, squirrels and other rodents dig bulbs up and feast. One way to keep critters at bay is to plant bulbs they don't enjoy such as daffodils. Stay away from crocuses, however, because rodents eat them like crazy.

Take special care with bulbs planted in containers. For best results, use a container that is at least 24 inches in diameter and has good drainage. Use fresh soil. Bulbs planted in containers can freeze more easily than bulbs planted in the ground. Cover with a 2-inch layer of mulch for protection in freezing temperatures. Container plants are especially vulnerable to the desiccating effects of freezing, so keep bulbs well watered. For further protection, move the container to a sheltered area, porch or under the eaves on the south side of the house.

— Susan Barton

