Missouri Environment & Garden

January 2012 Volume 18, Number 1

2012: Year of the Heuchera

The National Garden Bureau has selected heuchera as its perennial plant to promote this year. Accordingly, 2012 has been dubbed the "Year of the Heuchera" by that organization. Not only are these plants aesthetically pleasing, they have been improved recently to be stronger, fuller, and more disease resistant. With relatively few pests, great adaptability to containers and a seemingly unending number of forms and leaf colors, heuchera should be in everyone's garden.

History. The genus *Heuchera* is a member of the *Saxifragaceae* family and contains nearly 50 species. Most heuchera (the word is both singular and plural) are native to the United States. Their habitat ranges from the coastal islands of California, to the Rocky mountains, and south to the Gulf of Mexico. The genus was named in honor of Johann Heinrich von Heucher, a German professor of medicine and botany and a friend of Linnaeus, the father of plant taxonomy. Common names include coral bells and alum root. The latter alludes to the medicinal use of certain members of the genus as an astringent to stop wounds from bleeding.

Although a species of heuchera was offered for sale in seed catalogs as early as 1804, for decades it remained a rather utilitarian plant for shady spots that failed to excite the senses. Breeders in America and Europe worked with heuchera to develop a wide array of plants with amazing flower and foliage forms. A milestone was reached in 1980 when *Heuchera villosa* 'Palace Purple' was released. At about the same time, a strain of *Heuchera americana* called 'Dale's Strain' was released. Heuchera soon was accepted by gardeners as a desirable foliage plant for shady areas and its popularity continues to grow.

Classification and Varieties. As previously stated, there are nearly 50 species of heuchera inhabiting various regions of the United States. The flowers of most are dainty with a color range of whites, pinks and reds. There are a few cultivars with flowers that have a very pale yellow tone. Although the flowers of some cultivars are quite showy, heuchera are grown primarily for their foliage. The latter can vary in size from the ½" wide leaves of *H. pulchella* to the 11" wide leaves of *H. villosa*. Foliage can be matte or glossy, hairy or smooth, and can have contrasting veins which change color with the seasons.

Before the new wave of hybrid heuchera, many claimed a heritage that included only one species, *H. sanguinea*. This species is the coral bells your grandmother grew. Today, however, in order to give gardeners stronger, more attractive plants, breeders are combining species so the newest coral bells provide a mix of outstanding characteristics. The common species used in today's hybrids are *H. sanguinea*, *H. americana*, *H. micrantha*, *H. villosa*, and *H cylindrica*. 'Chocolate Ruffles', for example is hybrid between *H. micrantha* and *H. americana* and 'Velvet Night' is a hybrid between *H. micrantha* and *H. americana*. The very colorful, striking variety 'Electra,' reportedly is a mix of three species: *H. americana*, *H. micrantha*, and *H. villosa*.

Continued on page 2

In This Issue

Missouri Environment & Garden newsletter is published by the MU IPM Program of the Division of Plant Sciences Extension. Current and back issues are available on the Web at **http://ppp.missouri.edu/newsletters/megindex.htm**. Mention of any trademark, proprietary product or vendor is not intended as an endorsement by University of Missouri Extension; other products or vendors may also be suitable. Editor: Kate Riley (rileyka@missouri.edu)

2012: Year of the Heuchera

...continued from page 1

By taking *Heuchera*, with its many forms and leaf colors and crossing it to *Tiarella* (another genus in the *Saxifragaceae* family), whose beauty is defined by leaf-shape, zonation and growth, a vast array of new hybrids referred to as "Heucherella" have resulted. They tend to exhibit the best qualities of both of their parents, having brightly-colored foliage with dark leaf patterns with unique shapes. Their culture is similar to that of heuchera.

Culture. When using heuchera in the landscape, they are best triangulated with most cultivars planted 24 inches on center. Look at the plant label to determine the spread and best spacing. Heuchera require well-drained soil. If you've had problems with them in the past, most likely you've tried to plant them in soil that's too wet or "heavy". Incorporation of organic matter such as compost into the soil will help lighten it and improve drainage. Additionally, planting in raised beds, on berms or in containers can help to solve drainage problems.

Other than keeping the soil well-drained and mulched, heuchera have very few maintenance needs. Allow them to dry between watering and refrain from using excess fertilizer. Heurchra prefer a neutral or slightly acidic soil (the ideal pH is 5.8 to 6.3) but most are tolerant. Most varieties are drought-tolerant as well.

Many heuchera do well in part-sun exposures, however, hot afternoon sun should be avoided. Foliage will often fade, wilt, or scorch under intense sunlight. Instead, provide shade during the hottest times of the day, or plant heuchera in full or filtered shade.

Heuchera are remarkable for needing little care. When flowers fade, they can be removed with little effort. If stems get too long they can be cut off; the resulting stub will re-sprout and the piece that was removed can be replanted to form a new plant. This helps keep heuchera compact. It's best to divide them every two to three years, with the spring being the best time to perform this task.

Propagation. While many heuchera are initially propagated by tissue-culture, they can be divided by a sharp shovel in early spring when the soil has thawed. A two-year-old plant can easily be divided into as many as six plants. Place the divisions buried to the crown in a good garden soil and water in. Foliage may have to be removed if any wilting is observed.

Pests. Heuchera have relatively few pests but they do suffer from attack by strawberry or black vine weevil. Plants whose tops "fall off" in the spring most likely were being eaten underground by weevil larvae. These are creamy-white grubs somewhat crescent-shaped. Weevil control involves a twofold approach. The brown or black adults emerge in late May to early June and can be treated with an insecticide that has some residual activity such as acephate. In fall, beneficial nematodes can be applied to the soil around the plants to help control weevil larvae.

Diseases. There are two diseases especially troublesome for heuchera: mildew and rust. Mildew tends only to attack varieties of *Heuchera sanguinea*. Organic controls such as baking soda in water can provide some prevention. Mancozeb can be applied as both a preventative and a remedy. Rust can be a severe problem if the plants are moist and the temperature is cool. Infected plants will appear dark-spotted from above and, when a leaf is turned over, orange patches are evident. Preventative measures for rust include clean, dry facilities (for growers) and fungicide application. Mancozeb, thiophanate-methyl or chlorothalonil can prevent rust infestation and provide long-term control. Once a plant has been attacked, remove the affected leaves and apply one of the above sprays. Clean and disinfect equipment after use.

Credit: This article was adapted from a publication of the National Garden Bureau.

Dave Trinklein,
Associate Professor
Division of Plant Sciences
TrinkleinD@missouri.edu

View MEG Publications on the web
http://ipm.missouri.edu/newsletters/megindex.htm

Cnestus mutilatus, Another Exotic Pest on the Move

The camphor shot borer (also known as Xylosandrus mutilatus), is a species of ambrosia beetles that has been found in states close to Missouri. This shot borer is native to Southeast Asia and was first detected in Mississippi in 1999. Since then, it has been discovered in Hawaii, West Virginia, North Carolina, Georgia, Florida, Louisiana, Texas, Tennessee, Indiana, Ohio, and Arkansas. In early December, specimens believed to be the camphor shot borer were collected in East St. Louis, Illinois.

Figure 1. Camphor shot borer (*Cnestus mutilatus*) adult.

Adult shot borers are black (about 3.5 mm-long) with reddish-colored legs and antennae (Figure 1). They attack small diameter shoots of a wide range of hosts and excavate galleries in the wood. As the shot borers move between trees, they introduce fungal spores into gallery walls. Beetles deposit eggs in the fungus and larvae feed on the inoculum and can kill plant tissue. Larvae are white with a brownish head capsule and are legless (Figures 2 and 3).


Figure 2. *Cnestus mutilatus* larva in a gallery.

In Asia, the camphor shot borer is a major pest attacking the trunk and branches of Chinese chestnut. This insect can attack over 200 plant species, including eastern black walnut, hickory, muscadine grape, sweetgum, flowering dogwood, red, sugar, and Japanese maple, yellow poplar, chinaberry, black cherry, winged elm, American beech, and hophornbeam. In a study conducted in Mississippi, shot borers were found on stressed trees including sugar maple with crown dieback, hophornbeam on a herbicide-sprayed right-of-way, flowering dogwood in a poorly drained soil, and sweetgum, hickory, winged elm, and muscadine grape seedlings after a prescribed burn. Camphor shot borers successfully attacked stems that were around 2 cm-diameter with a 2.2 m mean tree height. Reports from Tennessee indicate that the shoot borer not only infests stressed or dying trees, but also healthy, container-grown nursery stock. Symptoms of a shoot borer infestation include wilting foliage or twig dieback. When tissue is examined, pin-holes in the tree bark may bleed or light-colored boring dust is visible. Galleries in the xylem (wood) range from 1 to 4 cm-long with short brood chambers (Figure 2). Staining along galleries is also noticeable.


Figure 3. Empty gallery following *Cnestus mutilatus* damage.

It is suspected that several of the exotic ambrosia beetle species were introduced into the United States in wood packing materials, crates or pallets. They may infest new sites with the movement of firewood, logs, lumber, or nursery stock. Female camphor shot borers can fly up to 3 miles to attack a host tree and they can also disperse by air currents. Alcohol traps are used to monitor these insects. For the granulate ambrosia beetle, pyrethroid insecticides can be used as a preventative control. However, once the beetles are inside trees, insecticides and fungicides are ineffective control measures. Additional information about various types of traps may be found at http://www.ces.ncsu.edu/depts/ent/notes/O&T/trees/note111/note111.html.

The camphor shot borer has not yet been found in Missouri. However, it is likely that may be found on nut or fruit trees, as well as ornamental landscape plants. If you suspect ambrosia beetle damage, please contact and/or send the insect to Doug LeDoux at the Missouri Department of Agriculture, 1616 Missouri Blvd., PO Box 630 Jefferson City, MO 65109 (email: Douglas.LeDoux@mda.mo.gov or by telephone at 573-751-5505).

Photos courtesy of Doug Stone, Mississippi State University

Michelle Warmund,
Professor
Division of Plant Sciences
WarmundM@missouri.edu

Winter Gardening using Cold Frames and Hotbeds

For many avid gardeners, the winter months are viewed as a dull, uninspiring period that must be endured in order to experience the joy of the growing season that follows. Although cold temperatures dramatically alter gardening activities, they do not necessarily have to end them. The use of plant growth structures such as cold frames and hotbeds can transform gardening into a year-around activity. January is a good month to plan and (weather permitting) build a cold frame or hotbed since many people find themselves searching for useful projects as they await spring.

A cold frame is a simplistic plant growth structure designed to protect tender plants during the winter, harden started plants before setting them outdoors or start cool-season plants earlier than they can be started without protection. Given a bit of added insulation, cold frames allow for the production of cool-season plants (e.g. vegetables such as lettuce and spinach) during the winter. Cold frames take advantage of solar heat for warmth. Soil and other materials in the cold frame absorb heat energy during the day; the protective covering and insulated sides of the cold frame help to retain this energy at night.

A hotbed is simply a cold frame supplied with additional heat energy, usually from electric heating cables. In many ways hotbeds are miniature greenhouses that provide many of the same benefits but at minimal expense. They are most often used to give an early start to warm-season annual and vegetables but can be used for other purposes such as providing a more reliable supply of cool-season vegetables during the winter months.

Site Selection.

Because they rely heavily on solar input, cold frames and hotbeds should have a southern exposure to maximize sunlight. They often are dug into a south facing slope to take advantage of the insulative nature of soil against the northern wall. The location selected should have good natural drainage so there will not be unwanted water in the structure. If the cold frame is dug into the ground, excellent drainage is necessary to keep water from accumulating. This can be accomplished through the use of perforated plastic drainage pipe located under a thick layer of gravel or sand. Finally, the cold frame should be located where it will be easy to attend since ventilation is accomplished manually.

Construction.

Cold frames and hotbeds are usually rectangular wooden frames constructed with sidewalls between 8 and 16 inches in height and covered with glazing materials such as glass, fiberglass, polycarbonate or plastic film. The size of the structure often depends on materials and funds available for construction. Wood used should naturally resist decay (e.g. cypress or redwood) or be treated to resist decay. ACQ (alkaline cooper quaternary) is a relatively new pressure-treated wood preservative that (reportedly) is safe to use near vegetables. Avoid using creosote or penta-treated wood since these preservatives are toxic to plants. The use of bricks, cinder blocks or poured concrete can make the structure more permanent but they add significantly to the cost of construction.

Glass is the traditional glazing material used to cover cold frames although the newer twin-walled, rigid plastics (i.e. acrylics and polycarbonates) are gaining popularity because of their greater R-value and light weight. Standard glass sashes manufactured for cold frame use are 3 by 6 feet; this limits the cold frame to be about 6 feet wide and any length that is divisible by 3. Used window sash is an inexpensive alternative but the dimensions of the cold frame will have to be adjusted to accommodate the dimensions of the window sash. Covering frames can be constructed that substitute fiberglass, twin-walled acrylic, twin-walled polycarbonate or polyethylene film for glass. Such frames are light in weight and must be secured somehow to prevent winds from lifting them during storms. Glass substitutes tend to yellow with age and will need to be replaced in time, depending on their summer storage. This is especially true of polyethylene film which has a life expectancy of four years or less.

Heating.

If the structure is to be operated as a hotbed, supplemental heating will be required. Heating methods include manure, electric cables, light bulbs, hot water and steam. Electric heating cables are probably the most practical choice for most Missouri gardeners due to their availability and ease of installation and operation. Hotbeds in Missouri should be equipped with 12 watts of electricity per square foot of hotbed area. Heating cables vary in wattage rating per linear foot; the two most popular options being 6.7 and 3.5 watts/foot. Each is available in different lengths as well with popular lengths being 6, 12, 24, 36 and 48 feet.

To determine the size of cable needed for a particular hotbed, simply divide the total square footage of the hotbed by the wattage rating per foot of the cable to be used. If that length is not available, chose the next longest size. For example, suppose we have a hotbed 6 x12 that will be

Continued on page 5

Winter Gardening using Cold Frames and Hotbeds

...continued from page 4

heated with cable rated at 3.5 watts/foot. This scenario results in the need for 72/3.5 or 20.6 feet of cable, in which case would choose one 24 feet long.

To install, space out the cable on a 2 to 3 inch layer of sand excavated and leveled into the floor of the hotbed. It never hurts to have extra protection ready in case of extremely cold weather. Old blankets, straw or burlap bags are effective ways to provide additional insulation to hotbeds (or cold frames) on frigid nights. Bales of hay or straw can be stacked against the sides of the structure to further prevent heat loss.

Operation.

Both cold frames and hotbeds require proper temperature control, ventilation and watering. Plants can be grown in amended soil covering the floor of the structure given there is adequate drainage. Another alternative is to grow in containers (pots or flats) filled with a soilless medium. In either case, the root zone temperature should be between 70 and 75 oF for seed germination. Once seeds have germinated the temperature should be adjusted according to the requirements of the species being grown. Basically, one can group most herbaceous plants into one of two temperature categories. Cool-season plants prefer air temperatures in the neighborhood of 65 to 70 oF during the day and 55 to 60 degrees at night whereas warm-season plants prefer days 5 to 10 degrees warmer. Lower temperatures can be maintained to "harden" cool-season plants before setting them outdoors.

Ventilation is most critical when days are sunny but cool. When ventilation is required, raise the sash on the leeward side of the prevailing wind. This will prevent the introduction of massive amounts of cold air that could damage tender plants. On days when additional cooling is required the sashes can be opened wider or removed totally. A well-placed thermometer is the best guide to determine how much ventilation or cooling is needed. Since cold frames totally rely on solar energy for heat, it is important that their sashes be closed immediately after the danger of excess heat build-up passes to allow for the storage of solar energy for the ensuing night.

Water is critical for plant growth. Watering should be done early in the day to allow foliage to dry as quickly as possible after watering. Also, avoid opening the sashes widely to water on cold days to avoid plant damage. Fortunately, relatively little water is required while plants are small and outside temperatures are cool. As plants grow and the season becomes warmer more water will be required and the frequency of watering will need to be increased. As a general rule, one should wait until the surface of the growing medium is dry to the touch before watering. Wilting is not a good indicator for the need for water since plants frequently wilt when sunny conditions follow several overcast days even when soil moisture is adequate.

Dave Trinklein,
Associate Professor
Division of Plant Sciences
TrinkleinD@missouri.edu

Factors Affecting Root Growth in the Landscape

The root environment for a landscape plant is often far different from that found in the native habitat of that plant. There is usually considerable disturbance of the soil during building construction, leading to loss of topsoil, compaction and grade changes, causing poor soil drainage. As a result, conditions for growth of roots and beneficial microorganisms in the soil are often far from ideal, leading to poor performance and pest susceptibility of plants in the landscape. Although it is rarely possible to maintain or create an ideal root zone environment in a landscape, it is often possible, though soil conservation and cultural practices, to create conditions in which roots can survive and grow reasonably well. Keeping in mind some general guidelines on what roots need in order to grow can help with decision making on establishment and maintenance practices.

In general roots grow best in a moist soil with adequate air filled pore space to allow good internal drainage and gas exchange. Air filled pore space is primarily dependent on the texture, structure and level of compaction of a soil. The texture of landscape soil often starts with a high clay content, since topsoil may not be saved and replaced after construction. Compaction by equipment during construction can reduce pore space of a tight soil even further. Attempts should be made during construction to limit compaction by restricting travel routes of equipment and laying down thick layers of wood chips to distribute the weight. Organic matter (OM) can play a key role in maintaining a porous structure. As soil microbes break down soil OM, they exude waxy substances which cement clay particles together into water stable aggregates. Mulch

Continued on page 6

Factors Affecting Root Growth in the Landscape

...continued from page 5

applied to the soil surface around landscape plants can help to maintain a reasonable OM content in the soil. This generally works best where groups of trees and shrubs are mulched together in large, turf-free areas. This approach can also minimize compaction from foot traffic over the root zones of trees and shrubs.

What do roots need?

Roots are dynamic and their growth is strongly affected by the environmental conditions found in the root zone. To survive and grow, they need Air (gas exchange), Water, Non-limiting Temperature, Carbohydrates, Minerals, Space, Low Soil Density, Microbial Associations and Non-toxic soil chemistry. Some parameters to shoot for might be a minimum 25% air filled pore space which contains no less than 10% Oxygen one day after a soaking rain (free air is 21%), bulk density less than 1.3 grams per cubic centimeter, a temperature between 40 and 90 degrees F and a pH between 4.5 and 7.5. In a compacted soil, CO2 can accumulate to toxic levels due to poor gas exchange. Under chronic waterlogged conditions, there may also be an accumulation of toxic metabolites from anaerobic respiration and toxic forms of iron and manganese (reduced from +3 to +2) may accumulate.

Cultural Practices Promoting Root Growth

If the quality of the soil in the root zone of a landscape starts out reasonably high, certain cultural practices can help to maintain an environment conducive to root growth of ornamental plants. Good planting technique can have long term benefits. Pulverize the soil in a wide, but shallow area and never work the soil deeper than the root system. Trees should be planted so that a root flair is evident at the soil surface. Planting too deep can lead to root suffocation and development of stem girdling roots. Research by Dr. Gary Watson at the Morton Arboretum has shown that roots of fescue give off allelopathic chemicals which retard the growth of other plants. Mulching groups of plants together in turf-free zones greatly enhances establishment and growth of trees and shrubs relative to that of plants with small mulch rings. This practice can also help to maintain a high organic matter content, leading to improved soil structure and increased microbial activity. In addition to mycorrhizae, many fungi and bacteria have beneficial effects on plant root growth.

Irrigation practices can have a major impact on the quality of the root zone environment for ornamentals in a landscape. In general the irrigation required to keep turf green in mid-summer is greater than that required to keep established ornamentals healthy. Irrigation applied by a sprinkler tends to compact the soil surface and reduce infiltration rate and gas exchange. It can also promote disease by creating a moisture film on leaves. If possible, it is best to irrigate ornamental beds using drip lines under the mulch set on a different schedule that that of the turf sprinklers.

Excessive fertilization with nitrogen can retard root growth by depleting woody plants of carbohydrates. Most woody ornamentals in a landscape do not require more than about 3 pounds of actual nitrogen per 1000 square feet per year to keep them healthy. Remember that plants get some of their nitrogen from the breakdown of organic matter in the soil, so maintaining OM with good mulching practices is important. Whenever possible, split nitrogen into 2 or 3 applications and use a slow release nitrogen source. Always fertilize according to soil test results and do not apply phosphorus or potassium unless they are called for. Yearly fertilization with a "complete" fertilizer without soil testing may lead to imbalances that can interfere with uptake of certain minerals like iron and manganese.

Chris Starbuck,
Associate Professor
Division of Plant Sciences
StarbuckC@missouri.edu

February Gardening Calendar

Ornamentals

- **Weeks 1-4:** Winter aconite (Eranthis sp.) and snowdrops (Galanthus sp.) are hardy bulbs for shady gardens that frequently push up through snow to bloom now.
- **Weeks 1-4:** Inspect summer bulbs in storage to be sure none are drying out. Discard any that show signs of rot.
- **Weeks 1-4:** Enjoy the fragrant blooms of the Ozark Witch Hazel flowering in shrub borders or wooded areas on warm sunny days.
- **Weeks 1-4:** Take geranium cuttings now. Keep the foliage dry to avoid leaf and stem diseases.
- **Weeks 2-4:** Sow seeds of larkspur, sweet peas, Shirley poppies and snapdragons where they are to grow outdoors now. To bloom best, these plants must sprout and begin growth well before warm weather arrives.
- **Weeks 2-3:** Seeds of slow-growing annuals like ageratum, verbena, petunias, geraniums, coleus, impatiens and salvia may be started indoors now.
- **Week 4:** Dormant sprays can be applied to ornamental trees and shrubs now. Do this on a mild day while temperatures are above freezing.
- **Week 4:** Start tuberous begonias indoors now. "Non-stop" varieties perform well in this climate.

Vegetables

- **Weeks 1-4:** Season extending devices such as cold frames, hot beds, cloches and floating row covers will allow for an early start to the growing season.
- **Weeks 1-4:** Start onion seeds indoors now.
- **Weeks 1-4:** Don't work garden soils if they are wet. Squeeze a handful of soil. It should form a ball that will crumble easily. If it is sticky, allow the soil to dry further before tilling or spading.
- **Weeks 2-4:** Sow celery and celeriac seeds indoors now.
- **Weeks 3-4:** Sow seeds of broccoli, cauliflower, Brussels sprouts and cabbage indoors now for transplanting into the garden later this spring.

Fruits

- **Weeks 1-4:** Check fruit trees for tent caterpillar egg masses These are laid on twigs in tight clusters that resemble an oblong brown lump of gum wrapped around the stem. Prune off these twigs or destroy the eggs by scratching off the clusters with your thumbnail.
- **Weeks 1-4:** Inspect fruit trees for tent caterpillar egg masses. Eggs appear as dark brown or gray collars that encircle small twigs. Destroy by pruning or scratching off with your thumbnail.
- **Weeks 1-2:** Collect scion wood now for grafting of fruit trees later in spring. Wrap bundled scions with plastic and store them in the refrigerator.
- **Weeks 3-4:** Begin pruning fruit trees. Start with apples and pears first. Peaches and nectarines should be pruned just before they bloom.

Miscellaneous

- **Weeks 2-4:** Maple sugaring time is here! Freezing nights and mild days make the sap flow.
- **Weeks 2-4:** Begin to fertilize house plants as they show signs of new growth. Plants that are still resting should receive no fertilizers yet.
- **Weeks 3-4:** Tall and leggy house plants such as dracaena, dieffenbachia and rubber plants may be air layered now.

Gardening Calendar supplied by the staff of the William T. Kemper Center for Home Gardening located at the Missouri Botanical Garden in St. Louis, Missouri. (www.GardeningHelp.org)