Issue: 19-15
September 17, 2019

THE PURDUE LANDSCAPE REPORT

In This Issue

White Mold

(Janna Beckerman, jbeckerm@purdue.edu)

White mold, caused by the fungus *Sclerotinia sclerotiorum,* is a specific fungal pathogen that infects several hundred species of plants from more than 75 different families, resulting in death of the infected plant (Fig. 1). Many of the most popular annuals and perennial plants have been reported to be susceptible to white mold, from aster (*Aster* spp.) to zinnia (*Zinnia spp.*), and even a few woody ornamentals, too (Table 1).

Figure 1. White mold infections aren't noticed until much later in the season, when management is much more difficult. Photo by Janna Beckerman.

Figure 2. Overwintering sclerotia of white mold forms in the stems of many plants, including this dahlia.

Infection by the fungus often begins early in the season when overwintering structures called **sclerotia** [not Latin for 'fungus ball that looks like a rat poop' (Fig. 2)] germinate in the spring, forming either:

1. a specialized infection structure called an apothecium. After apothecia have formed, they mature to produce sacks (asci) containing ascospores. Ascospores are discharged and inoculate flowers of the host plant and germinate to form hyphae, or
2. hyphae that directly infect the plant.

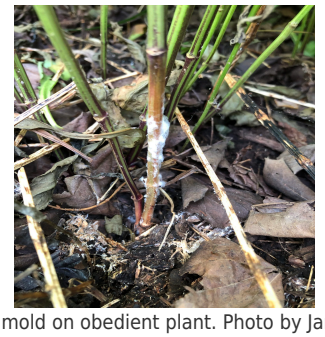


Figure 3. White mold on obedient plant. Photo by Janna Beckerman.

Option one occurs more commonly in early spring, and option two occurs throughout the growing season. Regardless of how the infection starts, the fungus continues to produce oxalic acid, which kills plant tissue. This is followed by hyphae that grow and invade the plant and feed upon it. One of the most frustrating aspects of this disease is the fact that plant death from white mold isn't noticed until later in the summer (Fig. 3). By this point, infestation of a garden bed with *S. sclerotiorum* often results in a long-term problem, because the fungus produces numerous sclerotia. Once established and left untreated, white mold can persist with repeated infection each year, particularly in those beds where plants are closely spaced, mulched, and watered overhead.

Figure 4. Where's white mold? Look carefully at the sunflowers, volunteers from the birdfeeder. Dying sunflowers were infected by white mold. Photo by Janna Beckerman.

Although controlling when and where ascospores land is not

possible, there are things that can be done to reduce your risk of acquiring sclerotia, and white mold. Bird seed from feeders are a significant source of sclerotia, particularly when black oil sunflower seed is used (Fig. 4). Sclerotia are of similar size, and often get included in seed mixes. This is the primary source of inoculum for most landscapes.

Managing this disease is challenging, but not impossible, and involves cultural, biological and chemical management.

Cultural: Good sanitation and removal of debris and of infected plants is necessary—along with good spacing and airflow of neighboring plants to allow the lower leaves to dry out. To do this effectively requires ruthlessness. In my personal experience, removing all my lovely mulch and humus, in addition to seemingly healthy plants was probably the toughest part of management. Weeds can also become infected with this pathogen, so good weed control is an important component of disease management.

Some plants are less susceptible than others, and should be used to replace any gaps in the landscapes, or used in future plantings. These include pentas, impatiens, sweet flag (*Acorus* spp.), purple millet grass (*Pennisteum glaucum*) and other ornamental grasses.

Biological controls containing *Coniothyrium minitans* (Contans) and *Trichoderma spp.* (PlantShield, SoilGard,) have reduced the incidence and severity of white mold infections. These mycoparasites colonize and feed on the sclerotia, reducing to preventing germination of hyphae or apothecia development.

Chemical: To protect neighboring plants prior to infection, the FRAC 7-11 fungicides (Pageant, Orkestra, Mural) are labeled. Any of these should be rotated with Terrachlor (FRAC 14) to provide different modes of action and minimize the risk of resistance.

Table 1. Plants Susceptible to *Sclerotinia sclerotiorum*. Modified from:
https://pnwhandbooks.org/plantdisease/pathogen-articles/common/fungi/plants-susceptible-sclerotinia-sclerotiorum

Latin Name	Common Name
Herbaceous Ornamentals	
Aconitum	aconitum, monkshood
Alcea	hollyhock
Amaranthus	love-lies-bleeding, prince's feather
Anemone	anemone, windflower
Antirrhinum	snapdragon
Aquilegia	columbine
Asarum	wild ginger
Aster	aster
Begonia	begonia
Bellis	daisy
Calceolaria	slipper flower, pocketbook flower
Calendula	pot marigold
Campanula	bellflower
Centaurea	bachelor's button
Chrysanthemum	chrysanthemum
Coreopsis	coreopsis, tickseed
Dahlia	dahlia
Delphinium	larkspur
Dicentra	bleeding heart
Digitalis	foxglove
Dimorphotheca	cape marigold
Erigeron	fleabane, midsummer aster
Euphorbia	euphorbia, spurge
Gazania	African daisy
Gerbera	gerbera, transvaal daisy
Helianthus	sunflower
Iris	iris
Liatris	blazing star
Lupinus	lupine
Mertensia	bluebell
Myosotis	forget-me-not
Nasturtium	nasturtium
Nicotiana	flowering tobacco, nicotiana
Paeonia	peony
Papaver	poppy
Petunia	petunia
Physostegia	Obedient plant
Proboscidea	unicorn flower
Ranunculus	buttercup
Rudbeckia	black-eyed Susan
Senecio	cineraria, dusty miller
Stachys	lamb's ears
Stokesia	Stoke's aster
Tagetes	marigold
Tulipa	tulip
Zinnia	zinnia
Woody Ornamentals	
Camellia	camellia
Euonymus	euonymus, burning bush
Forsythia	forsythia
Hedera	ivy
Hibiscus	hibiscus
Prunus	cherry, plum, cherry laurel
Pyrus	pear
Syringa	lilac

Native Shrubs For Fall Color

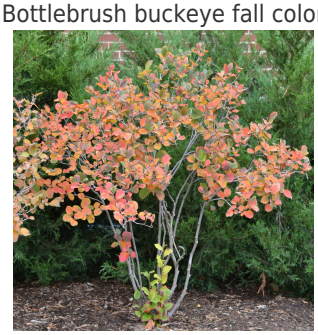
(Rosie Lerner, rosie@purdue.edu)

If you're looking to add native shrubs to your home landscape, fall is an excellent time to look for those with good fall color. While many factors affect the display of fall color, there are a number of native shrub species that perform reliably in our area.

Here's a short list to consider including their mature height as well as flowers and fall color. Most can adapt to either full sun or partial shade, especially morning sun with afternoon shade with the exception of *Dirca* which prefers shade.

You can look up more details for each of these species at the Purdue Arboretum Explorer website, including location of these shrubs on the West Lafayette campus.

Bottlebrush buckeye fall color



Dwarf fothergilla fall color

Oak-leaved hydrangea fall color

Photo Credits: Purdue Arboretum

https://mlp.arboretum.purdue.edu/ecmweb/findPlant.php

Selected Native Shrubs for Fall Color

Scientific Name	Common Name	Size	Flowers	Fall Color
Aesculus parviflora	bottlebrush buckeye	6-12'	white, summer	yellow
Aronia melanocarpa	black chokeberry	3-6'	white, spring	yellow orange
Calycanthus floridus	sweetshrub	6-10'	maroon, spring	yellow
Cephalanthus occidentalis	buttonbush	5-12'	white, spring	
Clethra alnifolia	summersweet	3-8'	white, summer	yellow
Cornus alternifolia	pagoda dogwood	15-25'	off white, spring	red purple yellow
Corylus americana	American hazlenut	10-16'	brown, spring	variable
Dirca palustris	leatherwood	4-6'	yellow, spring	yellow
Fothergilla gardenii	dwarf fothergilla	2-3'	white, spring	yellow orange red
Fothergilla major	witch-alder	6-10'	white, spring	yellow orange red
Hamamelis vernalis	vernal witchhazel	6-10'	yellow, spring	yellow
Hamamelis virginiana	common witchhazel	15-20'	yellow, fall	yellow
Hydrangea quercifolia	oakleaf hydrangea	3-8'	white, pink, spring summer	red purple
Itea virginica	Virginia sweetspire	3-5'	white, summer	red orange
Lindera benzoin	spice bush	6-12'	yellow green, spring	yellow
Physocarpus opulifolius	ninebark	5-9'	white, pink, spring	dull yellow
Rhus aromatica	fragrant sumac	2-6'	yellow, spring	orange red purple
Rhus glabra	smooth sumac	9-15'	yellow green, spring	orange red
Rhus typhina	staghorn sumac	15-25'	yellow green, summer	orange red
Sambucus canadensis	American elderberry	5-12'	white, summer	yellowish
Viburnum dentatum	arrowwood viburnum	6-10'	white, pink, spring	variable
Viburnum lentago	nannyberry viburnum	14-16'	white, spring	variable
Viburnum prunifolium	blackhaw viburnum	12-15'	white, spring	variable
Viburnum trilobum	American cranberrybush	8-12'	white, spring	purplish red

Purdue Landscape Report © Purdue University - www.purduelandscapereport.org
Editor: Kyle Daniel | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907

Spotlight on Weeds: Ground Ivy/Creeping Charlie (Glechoma hederacea)

(Aaron Patton), (Leslie Beck) & (Kyle Daniel, daniel38@purdue.edu)

Biology: Ground ivy (*Glechoma hederacea*), also known as creeping Charlie, is a very difficult to control perennial broadleaf weed. It can often be seen growing in the shade and invading turfgrass and landscapes throughout the United States. Ground ivy thrives in moist, rich soils located in shaded areas, but will grow in full sun as well. These traits combined with the ability to produce aggressive rooting stolons, tolerate low mowing heights, and shade/crowd-out surrounding plants, help to make ground ivy one of the most difficult-to-control weeds.

Identification: Ground ivy is a perennial broadleaf weed that invades through aggressive stolons that 'creep' below the turfgrass canopy. It forms very dense, mat-like patches that effectively crowd-out the surrounding turf. Like other members of the mint family, ground ivy has distinctive square stems with two leaves branching from each origin point (node) and emits a disagreeable odor when crushed, damaged, or mown. Leaves are round to kidney-shaped with prominent veins and broad rounded edges. These leaves are held above the canopy by long petioles (leaf stems). Spreading stolons root aggressively at the node, further making ground ivy difficult to control. It produces flowers from April to June that are tubular in shape, purplish blue with red speckles, lobed petals, and are arranged in groups of three to seven. Ground ivy can often be mistaken for other broadleaf weeds such as common mallow, purple deadnettle (https://www.purduelandscapereport.org/article/spotlight-on-weeds-purple-deadnettle/), or henbit (https://www.purduelandscapereport.org/article/spotlight-on-weeds-henbit-lamium-amplexicaule/). However, common mallow has rounded stems and sharply toothed leaf edges while henbit and purple deadnettle stems do not 'creep' along the ground nor root at the nodes.

Figure 1. Dense arrangement of ground ivy leaves.

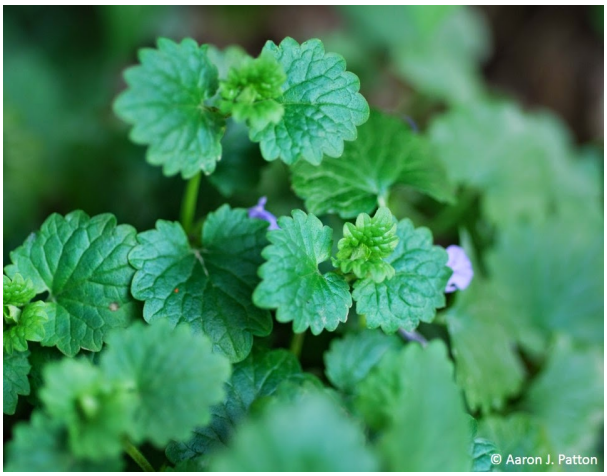


Figure 2. Two leaves branch from each node.

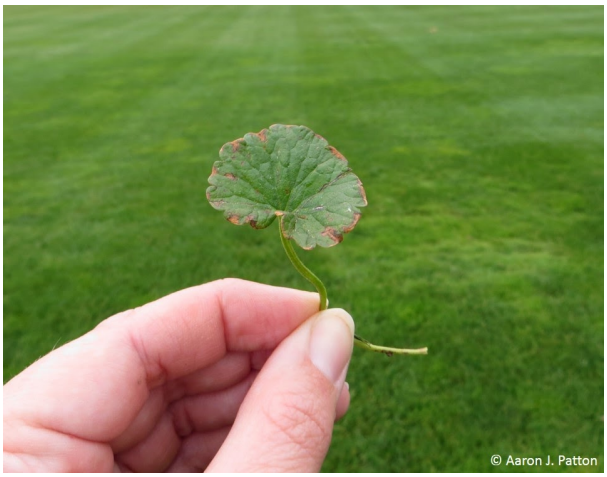


Figure 3. Leaves held atop long petioles.

Figure 4. Ground ivy has square stems, the common characteristic of plants in the mint family.

Figure 5. Ground ivy spreads by very aggressive stolons with the ability to root at each node.

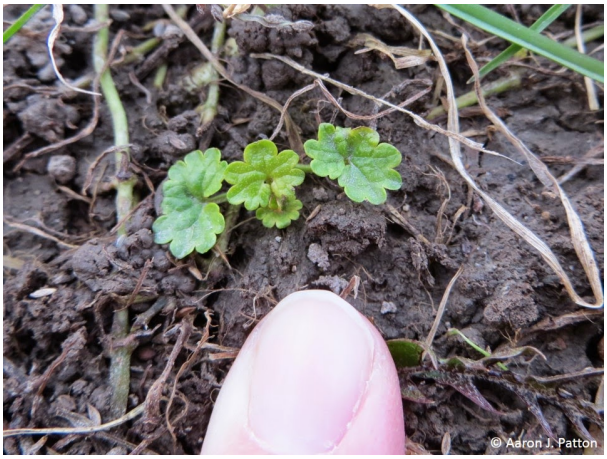


Figure 6. A node in contact with the ground via stolons produces a new plant.

Figure 7. Ground ivy flowers are purple.

Cultural control: Because of its aggressive growth and establishment, there are very few cultural practices that have been observed to effectively control ground ivy. Management practices such as improving surface drainage, watering deeply and infrequently, and cultivating (aeration) compacted soils may hinder the development of ground ivy.

Biological control: None known for specific use in ground ivy.

Chemical control: Because of its aggressive nature and the survivability of stolons, there are few preemergence herbicides that will work. Sureguard/Broadstar (flumioxazin) can reduce populations and Gallery (isoxaben) can help reduce the ability of stolons from rooting which will slow the spread of this weed. As a result, management must focus on postemergence herbicides. The two most effective postemergence herbicides labelled for ground ivy in the landscape include Dismiss (sulfentrazone) and Certainty (sulfosulfuron). Glyphosate is not nearly as effective and will take several applications to control ground ivy. Most herbicides require supplemental applications for adequate control.