

Ericacea (Heath) Family and Their Culture

The Ericaceae family consists of more than 70 genera and over 1,900 species. The genera within this family are grouped together based on similar reproductive structures (e.g., flower, fruit, and seed), general appearance, and preferred growing conditions. Generally, the ericaceous plants are woody and range in size from low ground covers to small trees over 20 feet tall. Most plants in the family exhibit an alternate branching habit while some members may be opposite or whorled with simple flowers either solitary, or in axillary or terminal inflorescences. In most cases, the members of this family express fused petals, such as the cupcake-cup appearance of mountain laurel (*Kalmia*) and carry twice as many stamens as petals. Fruits are typically a capsule or berry. Ericaceous plants are widely distributed on acidic, well-drained soils through most of the temperate climate zones and are found at high elevations in mountainous areas of the tropics.

Some members of the Ericaceae:

Andromeda (bog rosemary)
Arbutus
Arctostaphylos (bearberry)
Calluna (heather)
Cassiope
Chamaedaphne (leatherleaf)
Enkianthus
Epigaea (ground laurel, mayflower, trailing arbutus)
Erica (heath)
Gaultheria (wintergreen)
Gaylussacia (huckleberry)
Kalmia (mountain laurel)
Ledum (Labrador tea, wild rosemary)
Leiophyllum (sand myrtle)
Leucothoe (fountain or drooping leucothoe)
Loiseleuria (alpine azalea, Trailing azalea)
Lyonia (stagger-bush)
Menziesia (minnie bush, fool's huckleberry)

Monotropa (Indian pipe, pine sap)
Oxydendrum (sorrel tree, sourwood)
Pieris (mountain fetterbush, andromeda)
Rhododendron (rhododendron and azalea)
Vaccinium (blueberry, bilberry, cranberry, cowberry)

Ericaceous plants offer beautiful flower colors, robust forms, and attractive deciduous or evergreen foliage. Some, such as the Indian pipe (*Monotropa uniflora*), are parasitic plants and look more like a fungus than a green plant. Mountain laurel and rhododendrons remain a highly prized spring flowering plant for most landscapes. Unfortunately, as we relish and desire their vivid colors and unique flowers in the landscape we sometimes misunderstand their site requirements, often placing them in compromising positions. They are literally the square peg forced into the round hole. Something must give and, unfortunately, it is the plant rather than the client.

Plant Characteristics Determine Successful Survival

Plant Structure

Ericaceous plants have shallow-spreading root systems with a majority of their root masses located within a few inches of the soil surface. Roots are fine, fibrous, and lack root hairs. Moisture and nutrient absorption occur directly through the mass of fine, fibrous roots that these plants produce. The lack of root hairs is one reason that ample moisture is required during the summer months. Ericaceous plants, especially rhododendrons and blueberries, also rely on a close symbiotic relationship with mycorrhizae in order to adequately acquire nutrients and water from the surrounding soil. Ericaceous plants are made up of at least three growth habits including surge growers (e.g., rhododendron, pieris, and mountain laurel), continuous

growers (e.g., azaleas), and basal growers (e.g., leucothoe). Young and vigorous surge growers may make three different growth surges during the growing season that will reduce summer flower bud set. As they mature, the number of surges reduces to one and typical flower buds set in mid to late summer. Young plants may become long and leggy due to the surges of growth. Continuous growth plants such as young azaleas may begin top growth in the spring and not stop until autumn. As with the surge plants, as the continuous growth plants mature, growth tends to stop in mid summer rather than continuing to the fall. Finally, the basal growing plants such as Leucothoe tend to have sparse branching and become straggly if not monitored.

Plant Nutrition

Rhododendrons utilize nitrogen in the form of ammonium more efficiently than nitrate nitrogen. Early Ohio State research indicated that nitrate nitrogen is not directly usable by rhododendrons and could be toxic. Ammonium sulfate and urea were more readily available and used. Similar results were found with cranberry and blueberry plants. Not all members of the heath family have been studied to determine whether ammonium forms of nitrogen fertilizer are preferred. Indirect evidence-based observation of where ericaceous plants are found and cultivated suggests that many thrive under similar cultural conditions as rhododendrons, blueberries, and cranberries. When considering ericaceous plants, think about using other members of the family in the same planting beds to enhance the garden and streamline fertilizer and cultural maintenance activities.

Environmental Tolerances

Temperature

Minimum temperature tolerances are dependent on genus, species, and variety. In general, some ericaceous plants will tolerate temperatures reaching -25°F . Species that flower and leaf out early are often damaged by spring frosts. This is especially true when they are located in low areas or frost pockets. Broadleaved ericaceous plants are more adept at hardening-off and surviving low winter temperatures under gradually decreasing temperatures that occur in the fall. Locations experiencing rapid changes in temperature or areas that commonly have wide temperature fluctuations are difficult places for these plants. Landscapes that experience high summer temperatures combined with low humidity are also difficult sites for ericaceous plants. Similarly, rapid changes between cool and moist to hot and dry are inhospitable sites for ericaceous plants.

Wind

Strong winds during periods of low humidity may cause severe desiccation (leaf scorching). While periodic strong winds are unavoidable, sites that experience frequently windy conditions, especially during winter, should be avoided. The rigid form exhibited by ericaceous plants (e.g., rhododendron) also increases susceptibility to breakage during strong winds.

Moisture

Adequate soil and air (humidity) moisture are necessary for survival and success with ericaceous plants. Often a recommendation for adequate moisture is misunderstood to mean maintaining a wet soil. Although some ericaceous plants (e.g., *Chamaedaphne*) are naturally found on wet sites, most prefer well-drained, well-aerated, moist soils. Overly wet soils favor *Phytophthora* root rot and other health problems. Avoid overwatering.

Light

Although some ericaceous plants grow well in full sun (e.g., *Arctostaphylos uva-ursi*, bearberry) most prefer light shade to heavy shade in the south. In their natural environment most are found in areas with frequent fog and long rainy seasons. Providing partial or intermittent shade, especially in areas prone to high summer temperatures, intense sunlight, and low humidity, is necessary to avoid failure. Broken shade found on the north or east sides of structures or natural windbreaks allowing for early-morning and late-afternoon light during the season and protection from late-afternoon winter sunlight are important.

Soil Conditions

Well-drained, aerated, moist, high organic matter-containing soils with a pH of 4.5 to 5.5 are important for overall success. Raised beds or elevated planting sites can further assure the survival of ericaceous plants by providing improved drainage.

Checklist for Growing Ericaceous Plants

I. Site Selection

A. Choose a sheltered site away from windswept areas, frost pockets, intense summer sunlight, and late-afternoon and early-morning winter sunlight. Use structures, windbreaks, fences, or evergreens as a backdrop and wind screen for ericaceous plants. Avoid planting under the eaves of buildings where little natural rainfall occurs.

II. Soil Preparation

A. Test soil to determine whether conditions are suitable for ericaceous plants. If the soil pH is above

6.5, incorporate agricultural sulfur at the soil test recommendation rate in the fall prior to spring planting to allow soil sulfur interaction. A general rate is 2 pounds per 100 square feet. Do not use aluminum sulfate as aluminum toxicity is possible. If you choose to amend the soil in order to grow ericaceous plants, monitoring the soil pH and further sulfur applications will be required over time. Testing the soil every 3 to 5 years will provide you with an idea of the soil pH and rates for further sulfur amendments.

B. Alternatively, if the pH is above 6.5 or will require intense management (e.g., *Syringa*, *Viburnum*, *Spiraea*, *Potentilla*), consider alternatives that are better suited to higher pH sites.

C. For low areas with heavy, poorly drained soils:
1. Raised beds supplemented with 50 percent organic matter in the form of leaf mold, sphagnum peat moss, pine bark mulch, and compost worked to a depth of 12 inches will assure proper drainage, pH stability, and a source of organic matter for successful plant establishment and growth.

2. Prepare group plantings or beds rather than individual holes.

III. Planting

A. Digging the hole within the prepared bed: To avoid planting too deeply, the planting hole depth should ensure that 1 to 1½ inches of the root ball will be above the soil line of the bed upon planting.

B. The root ball should be moist prior to planting. A dry root ball will not absorb water after planting. For containerized plants, soaking the plants in a tub of water until the pot sinks to the bottom of the water basin and bubbles stop rising to the water surface will assure adequate moisture in the root ball. For balled in burlap plants, thoroughly water the root ball the day before planting.

C. Preparing for planting: Containerized plants should be carefully removed from the pot after soaking. If a thick mass of entangled roots is present, the root ball should be scored in quarters along the sides and across the bottom of the root ball. For balled in burlap plants, once situated in the planting hole, remove the burlap entirely because the fine fibrous roots will not readily grow through the burlap.

D. Gently firm the soil around the roots in the hole. Do *not* stomp the soil around the roots. Place 2 inches of pine or shredded bark mulch around the part of the root ball above the soil line. Water the plant well after planting to settle the soil and remove air pockets.

IV. Watering

A. Water logging and drought stress are two factors that lead to loss and poor health of many ericaceous plants.

B. Rule of thumb: at least 1 inch of water per week in the form of rain or irrigation. Use a rain gauge to keep track of rainwater amounts.

C. More frequent watering is needed during the dry hot summer months.

D. Stages of drought stress symptoms:
1. Stage 1: Slight curling or twisting of leaves (water now).
2. Stage 2: Wilting (root damage is occurring and growth momentum is being stopped).
3. Stage 3: The above stresses favor attack by fungi that cause stem dieback.

E. Monitor soil moisture to determine when watering is appropriate. There are several methods for doing this including:

1. Using your finger to determine when the top inch of soil is dry.
2. Plant and observe indicator plants such as coleus or impatiens and water when they begin to wilt.
3. Irrigators (tensiometers) can provide you with a number value for water deficiency.

F. Drip irrigation and irrigators together can aid in automating irrigation.

G. Irrigate in preparation for winter and the desiccating winds that affect both deciduous and evergreen plants. Provide water before the ground freezes to provide a moisture source for the roots during the winter.

V. Fertilization

A. Annual fertilization benefits most ericaceous plants. However, some ericaceous plants (bearberry and heather) prefer infertile soils.

B. Fertilizers should be applied late fall after a hard freeze or in the early spring.

C. A fertilizer formulated for acid loving plants is best with most of the nitrogen in an ammonium form.

D. Follow soil test reports and recommendations. If your soil is low in phosphorus, then there is a potential for reduced flowering in subsequent years. Incorporating a super phosphate at planting time can reduce this problem.

E. Chlorosis due to iron deficiency suggests that the pH is not being maintained below 6.0. Chelated iron can be applied in the form of Sequestrene as a quick fix. However, judicious use of sulfur to reduce the pH is the best long-term solution to prevent iron chlorosis and impending plant failure.

VI. Maintenance

A. Do not cultivate around ericaceous plant roots. The fine, fibrous, shallow roots are easily damaged during cultivation.

B. Maintain a 2-inch layer of mulch over the roots to reduce weed pressure and conserve soil moisture.

C. Apply sulfur in the spring according to soil test results to maintain the proper pH.

D. Deadhead old flowers to improve the appearance and assure bloom impact for future years.

Pests of Ericaceous Plants

Listed below are some key arthropod pests and diseases that cause injury to ericaceous plants in Pennsylvania. Management suggestions are also provided for these species. Consult your current woody ornamental pest management guide for pesticide recommendations and formulations registered for management of these pests.

Arthropod Pests

Azalea bark scale, *Eriococcus azaleae*

This species may cause injury to azalea, Japanese pieris, and rhododendron. Dead twigs may be one symptom of the presence of this pest. This key pest tends to settle in branch crotches. It feeds on the bark of twigs and stems and secretes honeydew. A black sooty mold grows on this material. The female is small, dark purple, and is covered with a white waxy material. About one-third of most populations of this species may die during the winter. Application of dormant horticultural oil should be made according to label directions against the overwintering nymphal stage. Treat the crawler stage with a registered insecticide when they hatch during June.

Azalea or rhododendron stem borer, *Oberea myops*

Clusters of small holes in twigs and stems of azalea, rhododendron, and blueberry may be evidence of the presence of this pest. Adults are 9 to 18 mm long and feed on the underside of the leaves on the midvein, causing the earliest damage to key hosts. Callus tissue forms around the injured vein, and the leaf may curl abnormally. In late June to early July, adult females lay eggs in new shoots several inches below a bud. The

larval stage bores down the center of the twig and overwinters in the stem. Signs of larval injury are frass, sawdust, and broken or dead terminal shoots and twigs. To manage this species, prune and destroy wilting branches with the larval stage inside.

Black vine weevil, *Otiorhynchus sulcatus*

The 9- to 13-mm long adults are brownish-black weevils with golden hairs on their front wings. Adults are active at night and cause injury to azalea, rhododendron, and many other ornamental plants. During the day, adults hide in dark places on the stems of very dense plants or in ground litter and mulch. All adults are female and cannot fly. Adult feeding on broadleaved evergreens consists of marginal notching of the leaves. The immature stage of this pest feeds on the roots of host plants. They are legless, C shaped, and yellowish white with brown heads. There is one generation each year in Pennsylvania. Treat the foliage of infested plants in early evening with registered insecticides applied according to label directions to manage adults in May and June.

Lace Bugs

Andromeda lace bug, *Stephanitis takeyai*; Azalea lace bug, *S. pyrioides*; Rhododendron lace bug, *S. rhododendri*

Azalea, Japanese pieris, mountain laurel, and rhododendron foliage affected by these pests appear stippled and yellowish to silverish. Brownish-black “varnish-like” spots may be evident on the lower leaf surface of infested plants. Damage is caused by both the adult and immature life stages. An adult lace bug is small (2 to 5 mm), oval, and has an overall flattened appearance. While at rest, wings are held flat over the insect, with tips and outer margins extending beyond the perimeter of the body. The tops of the front wings, head, and thorax are membranous and composed of many raised ridges, which give a lacelike appearance; thus the common name, lace bug. Severe infestations of this pest may occur on key hosts when they are grown in sunny rather than shady locations. These key pests overwinter as an egg on or in leaves of key host plants. Treat host plants with registered insecticides applied according to label directions when lace bug infestations are first seen in May.

Redbanded leafhopper, *Graphocephala coccinea*

This pest attacks azalea, rhododendron, and mountain laurel. Eggs are laid in the spongy portion of the leaf and appear oval and flattened. They may appear to be swollen internal tissues. The white molted exoskeletons of this species may be evident on the lower leaf surface. Injury may occur from both the feeding and egg-laying

Symptoms remain visible throughout the life of the leaf. Young life stages of this pest feed on immature foliage and elongating shoots. This brightly colored leafhopper may be found throughout the growing season. Two generations are produced each year in Pennsylvania. An infestation of the first generation of this pest should be treated with a registered insecticide applied according to label directions during late April through early May. The second generation should be managed during mid to late July.

Rhododendron borer, *Synanthedon rhododendri*

Early symptoms of this pest are similar to drought stress. The foliage of infested rhododendron, azalea, and mountain laurel becomes pale green and, finally, chlorotic or yellowish. Holes may be apparent in the bark, particularly at limb crotches. Accumulation of “sawdust” may occur on the scaly bark or on the ground beneath the damage. When monitoring in May or early June, some holes may contain pupal skins that extend out of the adult emergence holes. The adult’s abdomen is steel blue or black with the top of segments two, four, and five each having a thin, yellow, transverse band. The forewings and hindwings are transparent with a few scales on the veins. Adults have a 10- to 15-mm wingspread. Past infestations may be recognized by loose bark that covers longitudinal scars. Treat the trunk and larger twigs with a registered insecticide applied according to label directions from mid May through early June. Pheromone traps may assist in determining adult flight activity and optimizing control measures. The first insecticide application should be made 7 to 10 days after the first male is captured in a pheromone trap. Also, prune and destroy wilting branches in late summer.

Rhododendron gall midge, *Clinodiplosis rhododendri*

Distorted foliage is the typical symptom demonstrated as the result of injury caused by this pest. Most infested leaves develop a strong inrolling of one or both leaf margins. This small, fragile, straw-colored fly attacks *Rhododendron catawbiense* and its many hybrids, as well as *R. maximum*. It overwinters in the soil as a prepupa. Adult emergence from the soil is closely synchronized with the spring development of host plant foliage. The larval stage feeds on the lower leaf surface and causes the foliage to curl. Larvae mature in about 7 days. Apply registered insecticide formulations according to label directions during mid to late May. Repeat applications may be necessary because rhododendrons may produce second and occasionally third flushes of plant growth that may result in two additional generations of this pest.

Southern red mite, *Oligonychus ilicis*

This key pest may be detected by observing tiny, red eggs that overwinter on the underside of azalea, mountain laurel, and rhododendron foliage. Summer eggs of this pest are darker red and are often extremely abundant on preferred hosts. Numerous generations occur each year, but this pest is most prolific in cooler weather. Populations are greatest in the spring and fall. Injury primarily occurs as stippling of foliage, but leaves may be distorted when they are young and expanding. Treat the foliage of infested plants with registered miticides applied according to label directions to manage this key pest during May and again in September before populations increase.

Twobanded Japanese weevil, *Callirhopalus bifasciatus*

The 6-mm-long adult may vary from light to dark brown with mottled color bands on the front wings. This insect cannot fly because the wing covers are fused. All specimens are females. They lay tiny white eggs inside of a folded leaf. Immature larvae drop to the ground and burrow into the soil. Mature larvae are yellowish white and legless. The daytime feeding by the adult causes notches of various depths in the foliage of azalea, rhododendron, and mountain laurel. Treat infested plants with a registered insecticide applied according to label directions when new foliage has notched margins from early July through August.

Whiteflies

Azalea whitefly, *Pealius azaleae*; Rhododendron whitefly, *Dialeurodes chittendeni*

These key pests prefer to feed on the tender terminal leaves of azalea or rhododendron. The yellowing, cupping, and rolling of terminal leaves are characteristic injury symptoms caused by these whiteflies. The immature larvae attach themselves to the underside of the leaf, where they feed for the duration of their lives. Infested foliage takes on a yellow, mottled appearance on the upper leaf surface. Honeydew produced by the immature larvae drops on the leaves below giving them a varnished look. Black sooty mold usually grows on this sugar-rich material. Treat with registered insecticides applied according to label directions when an infestation is first noticed usually during mid to late May.

Diseases

Botryosphaeria canker

This canker disease is caused by the fungus *Botryosphaeria dothidea*. When attacked by *Botryosphaeria*, rough, sunken, dark-brown areas are visible around wounds or natural openings in the bark, and dead bark falls off the

cankered area. The wood of a recently killed branch is lighter brown than the pith. Leaves of affected branches wilt as the branches die. Chocolate-brown cankers enlarge along the branch more quickly than around its circumference. Tiny black fungal fruiting structures that pepper the dead bark are most easily seen on the light tan-colored bark.

Cultural practices for this disease include irrigating plants to prevent drought stress that predisposes the plants to this canker. Prune infected branches, cutting back to where growth will resume. Do not leave large stubs of nongrowing tissue. Disinfest the pruning shears frequently. No chemicals adequately control this disease. Finally, select resistant cultivars in areas prone to drought. The following hybrids have some resistance: Roseum Elegans, English Roseum, Lebar's Red, Cunningham's White, Roseum 2, and Boursault.

Botrytis blight

Botrytis cinerea causes small water-soaked lesions on petals as the gray fungal hyphae cover the infected petals. Cultural management strategies for this disease include properly spacing plants, providing ventilation to avoid excessively high humidity, and removing faded flowers and yellowing leaves.

Cercospora leaf spot

Ericaceous plants that are attacked by *Cercospora handellii* exhibit circular to irregular brown spots up to ½ inch in diameter on lower leaves. Spots may become tan in the center and have a yellow halo. Dark-brown pimple-like fungal fruiting structures form within the spots. Infected leaves may fall. To avoid this problem, inspect new plants and do not use if found to be infected. Rake and destroy fallen leaves. Avoid overhead irrigation. Fungicides can be used to protect plants from infection.

Cylindrocladium blight

Plants infected by *Cylindrocladium scoparium* die rapidly with leaves turning brown to black and falling in 3 to 4 days. Close inspection of stems will reveal brown spots on which white masses of spores form later. Alternatively, the roots die and plants wilt without visible leaf spots forming. To reduce the potential of acquiring this disease, pot and propagate in pasteurized media; do not reuse propagation media; use clean, disinfested tools; discard infected plants; and remove all crop debris.

Damping off

Pythium spp. is a common problem during propagation resulting in cuttings failing to root followed by defoliation and death. To avoid damping off, pot and propagate in pasteurized media; use clean (disinfested) tools; discard infected plants; do not leave cuttings in

mist beds for excessive periods; and pot as soon as rooted.

Leaf and flower gall

Young leaves and flowers infected with *Exobasidium vaccinii* become swollen, fleshy, and pale green. The galls become white due to the formation of spores by the fungus on the surface. Later, the galls become hard and brown. Infection occurs in the spring. The new spores formed on the surface of the galls are dispersed but do not cause more galls to form during that same season. They remain dormant until the following spring. Cultural management strategies include removing and destroying all galls before they become white with new spores. If many plants had the disease in previous years and galls were too numerous to pick, apply a fungicide to protect new foliage and flowers as they emerge. Applications can cease when the leaves reach their full size.

Ovulinia petal blight

Ovulinia azalea infection produces pale-white to rust-colored spots on petals. Spots enlarge rapidly and the petals become slimy and fall apart easily. Cultural management strategies include removing crop debris; watering the plants in a manner that keeps plant surfaces dry; spacing plants to avoid contact; and heating and ventilating to maintain low humidity under greenhouse conditions. Several fungicides are labeled for this disease.

Phytophthora root rot and top dieback

Plants with roots infected by *Phytophthora* spp. will be stunted and wilted, have yellow leaves, and will die. Stem wood at the soil level will have a red-brown discoloration. In the top dieback phase, leaves exhibit dark-brown spots. Shoots die from the tips back with dark-brown cankers forming. To avoid *Phytophthora*, pot and propagate in pasteurized media; use clean, disinfested tools; use composted tree bark as a potting mix; avoid overhead watering; discard infected plants; and plant resistant cultivars. The following azalea cultivars are reportedly *Phytophthora* resistant: Formosa, Fakir, Corrine Murrah, Merlin, Hampton Beauty, Higasa, Glacier, Rose Greeley, Polar Seas, Redwing, Chimes, Alaska, New White, Shin-Ki-gen, Rachel Cunningham, Pink Gumpo, Eikan, Sweetheart Supreme, Morning Glow.

Rhizoctonia web blight

Plants infected with *Rhizoctonia solani* exhibit small tan to black spots on their leaves. These spots expand to encompass the entire leaf, webbing may develop, and the leaves fall. Small plants may die. To avoid infection, maintain good air circulation and do not water in the late afternoon.

Powdery Mildew

Erysiphe polygoni and *Microsphaera penicilata* infections result in powdery mildew. Infected areas appear as faint-yellow areas on expanded leaves. White fungal growth forms on the yellow areas of some cultivars while only small dead spots with no fungal growth form on other cultivars. Fungicides can be applied to control powdery mildew.

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Prepared by Jim Sellmer and Rick Bates, ornamental horticulture extension specialists; Greg Hoover, extension entomologist; and Gary Moorman, plant pathology extension specialist.

PENN STATE COLLEGE OF AGRICULTURAL SCIENCES
DEPARTMENT OF HORTICULTURE
102 TYSON BLDG.
UNIVERSITY PARK, PA 16802
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