

Managing Moss in Lawns in Western Oregon

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The mild, wet winters in western Oregon encourage the growth of lawn mosses. Understanding the factors that contribute to this growth can provide tips for reducing problems.

Moss is different from the typical grassy or broadleaf weeds found in lawns. Mosses do not have a true root or stem system, and spread either by spores or plant fragments, which is unlike vascular plants that spread via seeds, rhizomes, or stolons.

There are several species of moss, with *Rhytidiadelphus* sp. and *Brachythecium albicans* found most frequently in Oregon lawns (Figure 1). While moss can thrive in a wide variety of environmental conditions and soil types, it is most common in lawns that are mowed too short, infertile, wet, shady, or some combination of these factors.

Moss growth requires a high-moisture environment. In western Oregon, growth normally starts with fall rains and reaches a peak in early spring. Because most grasses grow poorly in winter, mosses are able to invade and dominate lawns in only a few months. Moss growth declines in summer as conditions become drier and turfgrass growth increases. However, under shady, irrigated conditions, moss can continue to grow through the summer. Moss can tolerate long periods of drought in a dehydrated condition, and then rehydrate and continue growth with the onset of fall rains.

The three steps to managing moss in lawns are outlined below.

Step 1: Promote a healthy lawn

Moss will invade lawns when environmental conditions and cultural practices enable it to outcompete turfgrass. Long-term moss control is impossible unless environmental conditions and cultural practices promote healthy, dense turfgrass and prevent moss encroachment during the winter months (Table 1, page 2). Only after you have tried to improve the environmental conditions and cultural practices of your lawn should you consider using chemical pesticide treatment for moss.



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Figure 1. A lawn in western Oregon invaded by moss growth, which is encouraged by a combination of shade and wet soil conditions.

Reduce shade. Grasses are sun-loving plants that cannot persist in areas of dense shade; therefore, shady lawns usually have more moss than lawns in full sun. Thinning out trees by selective pruning or removing trees completely may reduce moss encroachment. When planting new lawns in shady sites, use fescues (e.g., tall fescue, creeping red fescue, or chewing fescue) because they are more shade-tolerant compared to perennial ryegrass. Regardless of the species of turfgrass you select, turfgrass will likely not grow well in areas that receive less than 4 hours of direct sunlight per day. In cases when the daily sunlight requirement cannot be met, redesigning the area to eliminate turfgrass may be the best option.

Reduce excessive soil moisture. Poor drainage or excessive irrigation (particularly in the fall or spring when moss growth is vigorous) provide the perfect environment for the germination and growth of moss spores or plant fragments. Poor drainage will not only promote moss establishment but also promote turfgrass thinning or death. Turfgrass, unlike moss, is a true vascular plant and requires adequate drainage for root system survival.

Table 1. Conditions and practices that prevent and encourage moss encroachment

Practices that PREVENT moss encroachment	Practices that ALLOW moss encroachment
<p>Environmental:</p> <ul style="list-style-type: none"> • Plenty of sunlight • Adequate drainage • Fertile soil <p>Cultural:</p> <ul style="list-style-type: none"> • Proper mowing • Fertilization • Irrigation 	<p>Environmental:</p> <ul style="list-style-type: none"> • Shade • Excessive soil moisture • Poor soil fertility <p>Cultural:</p> <ul style="list-style-type: none"> • Improper mowing • Inadequate fertilization • Excessive irrigation

Methods used to improve drainage include aeration or core cultivation, sand topdressing, establishing a grade or surface slope, and installing a drain tile or a catch basin during extensive lawn renovations. Improving the soil drainage will generate conditions that support turfgrass vigor and discourage moss establishment and survival.

Manage poor soil fertility (nutrient levels and pH). Turfgrass growth is often sparse because the soil is lacking essential nutrients. These nutrients may be deficient because of pH imbalances (acidic conditions) or lack of fertilizer application. See “For more information” (page 4) for tips on collecting soil samples and a list of testing laboratories. Results of a basic soil test will document the soil pH and indicate the lime application rate necessary to resolve acidic soil conditions, if they are present. Liming soil to maintain the soil pH between 6.0 and 6.5 will benefit turfgrass in the long run by improving the soil’s ability to maintain adequate nutrient levels; however, it will have no direct effect on existing moss populations. When considering soil fertility, maintaining adequate primary nutrient (nitrogen, phosphorous and potassium) levels will also be very important to sustaining a dense turfgrass stand.

Focus on primary cultural practices (mowing, fertilization and irrigation). When striving to maintain a high-quality lawn, more time and money should be spent on the primary cultural practices of mowing, fertilization, and irrigation than on any others. Increasing your mowing height will increase turfgrass rooting depth, and increasing your mowing frequency will improve turfgrass density, both of which will ultimately reduce the occurrence of moss in your lawn. Mowing once per week at 2 to 3 inches is recommended for the cool-season grasses that dominate Oregon lawns. See “For more information” (page 4) for publications on lawn maintenance.

Maintaining adequate levels of nitrogen (N), phosphorous (P), and potassium (K) is important for a dense

lawn. Fertilizer applied to established lawns should have high amounts of N, low amounts of P, and moderate amounts of K. At a minimum, apply 4 to 6 lb N per 1,000 ft² annually. Applications should be made in the spring and fall months at a rate of 1 lb N per 1,000 ft² per application.

Irrigation should be applied at a 0.25-inch depth per application 4 to 6 times per week totaling 1.0 to 1.5 inches per week, depending on the environmental conditions, especially during dry summer months.

Step 2: Dethatch or chemically treat moss-infested areas or both

If you still have moss after addressing the lawn’s environmental conditions and focusing on primary cultural practices (Table 1), you may want to try dethatching or chemically treating your lawn.

Dethatch. Moss can be removed from the lawn by dethatching in early spring. Thatch is the naturally occurring layer of dead stems and roots between the living blades of grass and the soil (Figure 2, page 3). This is the zone where mosses thrive. Dethatching uses a tool to physically remove the dead roots, stems, and mosses. Optimum timing for dethatching is mid-March through April, when the moss growing season is coming to an end.

Use a flail dethatcher (available at equipment rental stores) or a hand rake. When using a flail dethatcher, make passes across the lawn in alternating directions until the moss has been removed (Figure 3, page 3). Because this also will likely remove a large portion of the turfgrass, it will be necessary to interseed the area afterwards. Interseeding a lawn (also called overseeding) is spreading seed mixes over the top of existing turf to fill in thin areas. See “Step 3: Renovate lawn” for full details. Do not dethatch in the fall because moss will outcompete the lawn in the late fall and winter months. Instead, dethatch in the spring when turfgrass has better odds of establishing.

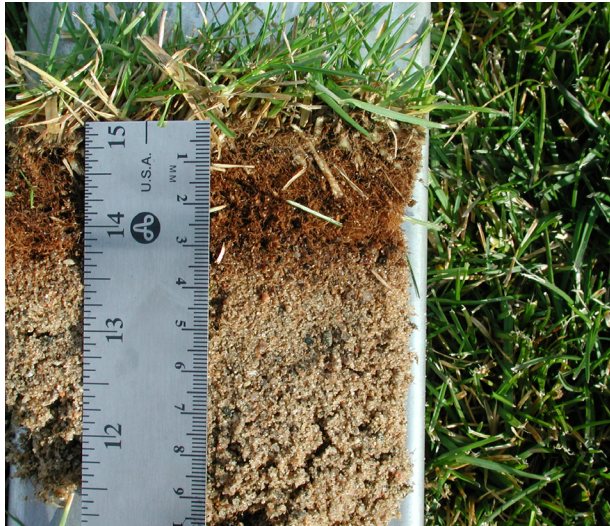


Figure 2. Moss can thrive in the dark brown zone of thatch (naturally occurring layer of dead stems and roots between the living blades of grass and the soil).

Chemically treat moss. Where moss has invaded extensively, an herbicide application may be needed to increase control. Moss control products available to homeowners include non-selective herbicides, potassium salts of fatty acids, and sulfur-based fertilizers. Professional lawn care companies may have access to pesticides with other active ingredients like carfentrazone (e.g., with the common trade name QuickSilver).

Nonselective herbicides, like glyphosate (e.g., with the common trade name Round-Up) will kill moss, but these products will also kill turfgrass; therefore, this herbicide is an option only when you are planning on doing a complete renovation. For selective control of moss, apply products with the active ingredient potassium salts of fatty acids.

When using herbicides, be sure to use personal protective equipment and to follow the label's recommendations for mixing, loading, and application. It is important to note that products containing fatty acids can cause significant damage to the human eye and should be used with caution.

Sulfur-based fertilizers (ammonium sulfate and iron sulfate) can be applied to a lawn to provide plant-essential nutrients (e.g., ammonium, sulfate, and iron), which will stimulate turfgrass growth while also killing moss.

Note: Products specifically used to control mosses on roofs and walkways contain copper and zinc, which will injure or kill desirable grasses in lawns. Read the product label carefully; do not use lawn- and structural-moss chemicals interchangeably.



Figure 3. Remove moss using a mechanical dethatcher (foreground) or dethatching rakes or both prior to lawn renovation and interseeding.

Ammonium sulfate, when applied at 1 lb N per 1,000 ft² (the recommended rate) will significantly stunt moss growth and development while stimulating turfgrass growth, allowing the lawn to outcompete the moss. Iron sulfate, on the other hand, will stunt moss growth and give turfgrass a deep green color, but result in very little turfgrass growth.

Step 3. Renovate lawn

After removing the moss with a dethacher or herbicides or both, the lawn will have bare areas. To avoid reinvasion by moss and other weeds, it is important to fertilize and interseed the lawn (Figure 4). See "For more information" (page 4) for resources on lawn renovation.



Figure 4. Apply fertilizer to encourage turfgrass growth after mechanical dethatching or pesticide application or both to remove moss.

Fertilize the lawn with a product containing nitrogen, phosphorus, and potassium at a rate of 1 lb N per 1,000 ft². Turfgrass seed can be applied immediately following the fertilizer application. Lawn grasses that do well in western Oregon include perennial ryegrass and fescue. Perennial ryegrass and tall fescue will thrive in sunny lawns, while fine fescue (e.g., creeping red fescue and chewing fescue) will persist longer in shadier areas. For lawns with a combination of sun and shade, use seed mixtures containing perennial ryegrass and fine fescue. See *Retail Lawn Seed Mixtures for Western Oregon and Western Washington* (EM 9100) for details on selecting a seed mix. After seeding an area, lightly mulch with compost or straw, and water daily for at least two weeks.

For More Information

OSU Extension Resources

- Managing Moss in Lawns in Western Oregon (video)(EM 9176)
<https://catalog.extension.oregonstate.edu/em9176>
- *A Guide to Collecting Soil Samples for Farms and Gardens* (EC 628)
<https://catalog.extension.oregonstate.edu/ec628>
- *Fertilizing Lawns* (EC 1278)
<https://catalog.extension.oregonstate.edu/ec1278>
- *Analytical Laboratories Serving Oregon* (EM 8677)
<https://catalog.extension.oregonstate.edu/em8677>
- *Practical Lawn Care for Western Oregon* (EC 1521)
<https://catalog.extension.oregonstate.edu/ec1521>
- *Practical Lawn Establishment and Renovation* (EC 1550)
<https://catalog.extension.oregonstate.edu/ec1550>
- *Retail Lawn Seed Mixtures for Western Oregon and Western Washington* (EM 9100)
<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9100.pdf>
- Pacific Northwest Plant Disease Management Handbook article on thatch in home lawns <https://pnwhandbooks.org/plantdisease/pathogen-articles/nonpathogenic-phenomena/thatch-home-lawns>

Additional resource

For more information on basic moss biology, please refer to the Living with Mosses website at:
<http://bryophytes.science.oregonstate.edu/mosses.htm>

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Use herbicides safely!

- Wear protective clothing and safety devices as recommended on the label. Bathe or shower after each use.
- Read the herbicide label—even if you've used the herbicide before. Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply herbicides. Know your legal responsibility as an herbicide applicator. You may be liable for injury or damage resulting from herbicide use.

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