

Alternatives

A Washington Toxics Coalition Fact Sheet



Tales from the North Side: Problems with Moss

by Maria Mergel & Philip Dickey



*The Seattle Japanese Garden at Washington Park Arboretum cultivates mosses in its beautiful landscapes.
(Photo by Maria Mergel)*

Here in the maritime Northwest, mosses seem to grow everywhere: on roofs and sidewalks, in lawns, and even occasionally on cars! The different opinions that people have about moss seem to be as numerous as the myriad locations where mosses can grow. Some folks view mosses primarily as weeds to be eradicated, while others value them as beautiful plants to be encouraged in the landscape. Wherever you may fall on the spectrum, this fact sheet will help you to learn more about moss, evaluate situations to determine whether moss control is necessary, and choose the safest and most effective control methods when needed.

What is Moss Anyway?

Moss consists of a mass of tiny plants called bryophytes. Mosses grow on rocks, tree bark, and soil, and practically any location where conditions are shady and moist: the north sides of buildings and roofs, heavily shaded roofs and decks, and poorly drained and shady lawns. They are usually yellowish, green, or greenish brown in color, and can appear as small tufts, large mats, or anything in between. Unlike ordinary landscape plants, mosses don't have vascular systems that carry water and nutrients, and they have underground structures called rhizoids instead of roots.

Mosses love shade and moisture, and dozens of species are perfectly at home here in the maritime Northwest. They generally remain dormant throughout dry weather and revive with rainy cycles, being most obvious in western Washington starting in early winter and reaching their peak vigor in late spring. Other similar-looking plants such as algae and lichens enjoy the same conditions as mosses and may be found growing along with them, possibly causing some confusion. Algae create thin and moist mats of growth that can make decks or patios slippery. Lichens, which are actually combinations of algae and fungi, are usually dry and hard and come in various colors and shapes. They are most commonly seen growing on tree branches and rocks.

With the exception of mosses growing on roofs, mosses generally don't cause any damage. They do not harm turfgrass or landscape plants, and play crucial roles in their native ecosystems. In fact, some gardeners grow them on purpose! In the Pacific Northwest, moss gardens can be visited at locations including the Bloedel Reserve, Seattle Japanese Garden in Washington Park Arboretum, and Nitobe Memorial Garden at the University of Victoria. Mosses are essential to traditional Japanese garden design, and Saiho-ji Temple in Kyoto, also known as 'Moss Temple,' is renowned for its garden that contains over 120 types of moss.

Moss on Roofs

Moss growing on your roof needs attention because it keeps the roof surface wet, providing a breeding ground for decay organisms such as fungi. It can also damage shingles and cause water leaks, and may require premature replacement of the roofing. Cedar shake roofs are more prone to moss problems than composition asphalt or metal roofs.

Instead of relying on chemicals to kill the moss on your roof, focus on preventive methods that will keep the moss from growing, or at least significantly reduce it:

- ❖ Design your landscape for the long term. Trees are wonderful for shading and cooling your house in summer, but tree limbs shouldn't overhang the roof or touch the house.
- ❖ Trim any overhanging branches to reduce shade and falling leaves and needles.
- ❖ Keep your roof clean. Sweep off plant debris such as leaves, needles, or small branches, which can provide the shade and moisture that are breeding grounds for moss. A garden blower is a helpful tool; be sure not to pressure wash composition roofs or use anything abrasive.
- ❖ Look for early signs of moss growth, indicated by green or black discoloration. This can be spot-treated with a moss-killing soap (see below). It's better to catch the moss early than to wait until the moss has covered much of your roof.
- ❖ Consider mounting zinc strips along your roof peaks or beneath shingles.
- ❖ Consider choosing zinc-impregnated composition shingles when installing new roofing, or installing a metal roof if structure is located in a wooded area.

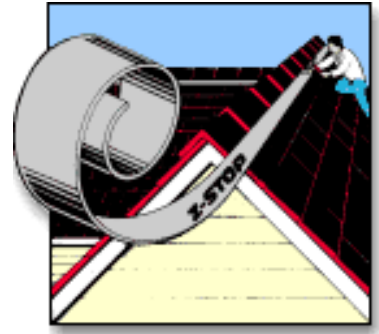
Zinc is available in three forms for roof installation to prevent moss: zinc strips to be attached along roof peaks, zinc strips designed to slip beneath shingles, and zinc-impregnated composition roofing. The strips can be made of approximately 99% zinc or be galvanized (stainless steel coated with zinc), and rainwater contacting the strips picks up enough zinc to protect up to fifteen feet of roofing below. These strips can be nailed or glued onto roofs. Be sure to confirm that the strip you are considering is compatible with the type of roofing that you have, and follow manufacturer instructions carefully to ensure that any holes created during installation are sealed. In order for zinc strips to be effective, any existing mosses should be physically removed before installation. Zinc strips are long-lasting; some manufacturers state that their products last for at least twenty years. Galvanized flashing, which is usually installed on roofs for weatherproofing, has the same effect on moss as zinc strips.

Zinc-impregnated composition roofing contains zinc granules that work in much the same way as the strips. Some experts have said that these shingles are more effective than zinc strips. One possible disadvantage of the zinc-impregnated roofing is that it is costly to replace if it loses its effectiveness; be sure to check specifications and warranty information before purchasing.

Zinc is potentially toxic to fish and other aquatic life. If you install zinc strips or zinc-impregnated composition roofing, ensure that roof runoff doesn't flow directly into storm drains, streams, or other bodies of water. If you collect water from your roof in rain barrels, you may want to avoid using the water for your vegetable garden. Copper strips and copper-impregnated shingles should be avoided due to copper's toxicity: copper is roughly 10-25 times more toxic to aquatic life than zinc.

If your roof is already heavily colonized with moss, evaluate the roofing to see if the roofing material can withstand moss control measures or is already in need of replacement. You may need to have an independent roofing expert make such an evaluation. If the roofing is still functional, remove as much moss as possible physically. A garden blower or soft broom are appropriate for composition roofing; cedar shake roofs can withstand a garden rake or a stiff brush or broom. Pressure washing to remove moss can damage roofing and should be avoided. Also, watch your feet! Walking about on mossy roofs, with or without tools, is dangerous. It may be best to hire someone specifically trained in such work. Once the bulk of the moss has been removed, apply a least-toxic pesticide to what's left. For better control, you can repeat these steps after a few months.

There are two types of low-toxicity moss killers: one type is based on soaps (potassium salts of fatty acids) and the other type is based on acids (citric and acetic acids). We recommend soap-based products for roofs and walkways because the



Zinc strips such as Z-Stop® can be installed on roofing to control moss growth. (Image reprinted with permission)



Galvanized flashing around this skylight releases zinc into rainwater and prevents moss from growing below it. (Photo by Bruce McCune)

IPM Strategies for Moss Control

On roofs:

- ❖ trim overhanging branches
- ❖ keep roof free of plant debris
- ❖ consider mounting zinc strips, galvanized flashing, or zinc-impregnated roofing
- ❖ remove as much moss as possible physically, then apply a least-toxic moss killer to what's left (see page 4 for a list of products)

On sidewalks, driveways, decks:

- ❖ scrape off as much moss as possible, then apply a least-toxic moss killer to what's left (see page 4 for a list of products)

In lawns:

- ❖ Rake out existing moss
- ❖ Improve drainage
- ❖ Thin out tree canopies
- ❖ Check soil acidity and add lime if necessary
- ❖ Reseed bare or thin areas with appropriate grass seed
- ❖ Follow healthy lawn maintenance practices: mow at the proper height and leave the clippings, water deeply and infrequently, aerate and overseed when thatch builds up, and fertilize with a balanced fertilizer with nutrients in a 3-1-2 ratio (for western Washington)

acid-based products can damage metallic surfaces and lighten surfaces such as wood, tile, and concrete. They are also fairly new and there aren't many studies evaluating their effectiveness. An added benefit of the soap-based products is that they clean surfaces as they kill the moss. One soap-based product is Safer Moss & Algae Killer and Surface Cleaner II by Woodstream Corp. This ready-to-spray product can be used on decks, fences, roofs, and lawns. Always read and follow label directions when using pesticides.

While the Safer product is less toxic and biodegradable, all moss killers are toxic to aquatic organisms. Be sure that rinse water does not run off down the street, into a storm drain, or directly into any body of water. Avoid products containing zinc sulfates or copper sulfates because these chemicals are not biodegradable and the products are often corrosive to skin and eyes. Do-it-yourself concoctions are sometimes recommended in articles for cleaning moss from roofs, such as chlorine bleach, laundry detergent, and salt. While these home remedies may be less hazardous than some specially formulated moss control products, there is little information available on their effectiveness and the ingredients are not EPA-registered for killing moss, so there are no label instructions.

Moss on Sidewalks, Driveways, Decks, etc.

Moss can also grow on other household surfaces such as sidewalks, driveways, or decks, and sometimes cause safety problems due to loss of footing or traction. This usually happens in shaded areas, on the north sides of houses, or under large trees. Oftentimes the slipperiness on roofs and driveways is actually caused by algae growing in areas where moss has not yet taken hold. The solution is much as described above. Physical removal in these locations is usually easier than up on the roof. Scrape off as much moss as possible. If this isn't enough, you can use one of the soap-based or acid-based moss killers. If choosing an acid-based product, read the label to make sure that it won't lighten the surface you are treating. When working in driveways, be especially careful to keep runoff from entering storm drains.

Moss in Lawns

In lawns, moss appears as a green or yellowish mat, either velvety or rough-textured, that is distributed throughout the lawn or clumping in areas where grass is growing poorly. If moss is thriving in your lawn, it indicates that your lawn's environmental conditions do not favor turfgrass. Grass likes sun, and fertile, alkaline soil that is well-aerated and dries out between waterings. Moss does well in shady, moist soil that is slightly acidic, and also tolerates soil that is compacted or low in fertility. The key to successful control of moss in lawns is to create environmental conditions that encourage the turf and discourage the moss. Remember that moss does not harm turfgrass or other plants; it fills in spots where turfgrass is not growing thickly. If the moss doesn't bother you aesthetically, the simplest solution is to leave it be. This is especially worth considering in cases where changing the environmental conditions will be difficult. Moss provides many of the benefits of turf without the maintenance.

If you decide to control the moss in your lawn, remember that your efforts will be temporary at best unless you change the environmental conditions that allowed the moss to thrive in the first place. Here are the basic steps to follow:

- ❖ Rake out existing moss with a stiff metal rake. If moss is very thick and heavy, a lawn de-thatcher or power rake will make removal easier.
- ❖ Correct poor drainage, and fill in low areas where water may gather.
- ❖ Thin out tree canopies to allow more light onto the lawn.
- ❖ If the soil pH is too low (below about 5.5) add lime to improve the condition of your turf and help it to outcompete weeds. The lime will not kill the moss directly.
- ❖ Apply a slow-release balanced fertilizer with NPK ratios of 3-1-2, according to Washington State University recommendations for western Washington. With a

slow-release fertilizer, you can fertilize twice a year, in mid- to late May and in early September, or just once in the fall. Fertilization can also help grass outcompete weeds.

- ❖ Reseed bare or thin areas with appropriate grass seed.
- ❖ Mow at the proper height and leave clippings on the lawn.
- ❖ Water deeply and infrequently after seed germinates.
- ❖ Aerate and overseed areas of turf when thatch builds up.

Even though following the steps above may seem time-consuming, in addition to achieving long-term moss control you will have a lawn that is healthy and easier to maintain in the long run. To learn more about creating and maintaining a healthy lawn, please read our Lawn Care fact sheet. If you would like to control the moss in your lawn but improving drainage and light levels will be difficult or impossible, consider alternative plants that tolerate shady, moist, but not boggy conditions (see sidebar at right for list).

Using a pesticide to control moss in lawns should be a last resort. Two kinds of chemical control are available for temporary moss control in grass: iron-based products (containing iron sulfate, ferrous sulfate monohydrate, ferric sulfate, or ferrous sulfate anhydrous) and soap-based products (containing potassium salts of fatty acids). Soaps and some iron salt products can be highly irritating to eyes and skin; avoid using products with the word DANGER on the label. Iron products may stain sidewalks or other cement surfaces. Always read and follow label directions when using pesticides, and be sure to keep runoff out of storm drains and bodies of water. ■

Alternative Groundcovers for Moist Shade

- Cornus canadensis (creeping dogwood)
- Vancouveria hexandra (inside-out flower)
- Epimedium spp.
- Galium odoratum (sweet woodruff)
- Hostas (dormant in winter)
- Fragaria chiloensis (beach strawberry)
- Fragaria frel 'Pink Panda'
- Laurentia fluviatilis (blue star creeper)
- Mahonia nervosa (longleaf mahonia)
- Vinca minor (dwarf periwinkle)

Resources

- Schenk, George. 1997. Moss Gardening. Timber Press. Portland, Oregon.
- Oregon State University: Living with Mosses.
<http://bryophytes.science.oregonstate.edu/mosses.htm>
- Washington State University Extension: Gardening in Western Washington. Moss in the Landscape: Friend or Foe?
<http://gardening.wsu.edu/column/10-08-00.htm>
- Sound Home Resource Center: The Sound Roof
www.soundhome.com/topics/topic_roof.shtml
- Washington Toxics Coalition. Home Safe Home Fact Sheet: Lawn Care. 2006.
www.watoxics.org/files/lawncare.pdf
- Seattle Public Utilities: Natural Lawn Care brochure, Ecologically Sound Lawn Care for the Pacific Northwest report, and other information on natural lawn care
www.seattle.gov/util/Services/Yard/Natural_Lawn_&_Garden_Care

A Few Least-toxic Moss Killers

Product:	Known Ingredients:
Safer Moss & Algae Killer and Surface Cleaner II (Ready-to-spray)	Potassium salts of fatty acids
Bayer Advanced 2-in-1 Moss & Algae Killer (Ready-to-spray)	Potassium salts of fatty acids
Worry Free Moss & Algae Control (Ready-to-spray)	Sodium lauryl sulfate, citric acid, acetic acid
St. Gabriel Laboratories Moss Killer (Ready-to-use)	Clove oil, sodium lauryl sulfate, acetic acid, citric acid, mineral oil, lecithin

This fact sheet was funded through a grant from Washington State Department of Ecology. While these materials were reviewed for grant consistency, this does not necessarily constitute endorsement by the department.

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