

Moss

What is it?

Mosses are plants comparatively simple in structure and function and, with the Liverworts, comprise the *Bryophyta* family - one of the least complicated groups of the plant kingdom.



Mosses are found in very many situations, for example, on stones, tree trunks and turf. If you have moss on your lawns then it is primarily an indicator that you are not looking after the millions of individual grass plants that make up your lawn.

About 600 species of moss occur naturally in this country, but only a few are common on turf. Distinguishing three types of moss is helpful, as each of the three groups of turf-inhibiting mosses tends to occur under rather different conditions.

Although it is generally assumed that moss infestation in lawns is a direct result of acid, waterlogged and compacted soil conditions, some species favour chalky or alkaline soils. Others can be found on light, sandy soils.

Where moss is a persistent problem, it often indicates some fundamental weakness in the turf and treatment with a moss killer is often only a short-term answer.

From the 'Causes of Moss Invasion list', it should be obvious that persistent moss problems are an indication of some fundamental weakness in a turf area. The presence of significant quantities of moss for long periods each year suggests that the turf may be excessively acid, lacking in fertilizer dressings or excessively wet with a small percentage of actual grass content.

Correcting these deficiencies will result in stronger grass growth and the moss then tends to disappear naturally because of the increased competition presented by healthy grasses.

Simple treatment with a moss-killing chemical is, therefore, often not the complete answer to moss trouble. Cultural control should always be considered first. Prevention is always better than cure.

A lawn should have nothing in it except good dense healthy desirable grasses - neither weeds nor moss.

Causes of Moss Invasion

1. A moist turf - poor drainage encourages the fern-like and tufted mosses
2. A soft, spongy sward with a thick fibre layer
3. A very dry soil, e.g. over drains, on mounds and ridges. Inadequate watering or over-drainage encourages the upright type
4. Bare areas remaining after weeds have died
5. Cutting the grass too low
6. Diseased turf
7. Dry acid soil
8. Low fertility, e.g. deficiencies of plant nutrients
9. In appropriate maintenance
10. Inadequate or poor grass cover and growth
11. Low nutrient status
12. Neglect
13. Over-consolidation of the soil - compaction
14. Poor surface levels which may lead to scalping
15. Shade from trees, hedges and buildings and topography - north facing lawn
16. Turf that is not growing under ideal growing conditions
17. Weak and sparse turf
18. Compaction & over consolidation
19. Prolonged periods of wet weather
20. Time of year - autumn, winter and spring

There are three main groups of Moss

Type 1: *Hypnum* and *Eurhynchium* species
Fern-like mosses usually trailing amongst the grass stems. Present in many types of turf but characteristic of moist, rather spongy swards where there is a soft surface mat and a quantity of loose litter. Such mosses are often a problem in turf.



Type 2: *Ceratodon purpureus* and *Bryum* species
Tufted or mat-forming mosses that are particularly common on excessively acid soils. *Ceratodon purpureus* is common and is the so-called "winter moss", as it appears to die in spring when native growth starts, only to reappear in the autumn. Tends to become progressively worse unless checked on lawns.



Type 3: *Polytrichum* species
Upright variety of moss, most common on dry mounds surrounding golf greens etc. Not normally very troublesome, except occasionally under acid conditions.



Mosses are quite distinct, possessing a simple or branched delicate brown stem, which bears directly, and on its branches, thin green filamentous leaves. The plant is anchored to the soil by means of rhizoids, (root-like structures similar to root hairs on flowering plants). The rhizoids also absorb water and mineral salts that are transported via the stem to the leaves. The leaves are delicate, thin and flat and only one cell thick except at the midrib. Because the leaves are thin, carbon dioxide can enter them more easily, resulting in more efficient use of poor light, but the frailty of the leaves also makes mosses very susceptible to drought.

A few mosses such as *Polytrichum* have extra rows of cells, making the leaves harder, drought-resistant and more difficult for chemicals to penetrate. Along with broad-leaved weeds, moss is the commonest invader of lawns. It will quickly colonise a lawn if conditions are favorable, preventing the establishment of the turf grasses.

Moss Invasion in Lawns

Moss soon establishes on weak and thin swards where there is a lack of competition from vigorous turf. Most moss killers are palliative - the weed soon returns unless the factors responsible for a thin sward are removed. A strong healthy turf is the best answer to moss prevention.

The invasion of turf grass areas by moss plants seems to be on the increase. Poor surface drainage has always been considered responsible for the invasion or mosses, yet many prestigious arenas have been troubled by the incursion of mosses in spite of their intensive care programmes of scarification, aeration and soil modification and over seeding with new grass seed. Most modern chemical control materials seem to be short lived and repeated applications become necessary.

Perhaps lawn owners are not applying the chemical controls accurately enough for a positive response, or are the chemical controls being applied at the wrong time in the moss plant life cycle? Are the moss plants becoming more resistant to the available chemical controls?

There is one point that does spring to mind - there are two periods of growth each year. The first period is in the spring, and then following the compaction of the soil surfaces during use over the summer. At this time of the year, lawn owners begin cultural operations in earnest, including thorough scarification. If the germinating moss spores are not controlled, prior to scarification, the mosses will spread by vegetative reproduction and produce another crop of spores. These will remain dormant, protected by actively growing turf grasses through any dry spell until the autumnal rains occur. Once again the moss spores will germinate and moss growth will be rapid while the soil is still warm.

Most lawn owners will budget for recurring moss invasion each year; but not for a second crop in that year. Again it is interesting to note that after a very dry summer, moss growth can be seen as soon as the soil becomes moist again.

Control of Moss - Cultural Practices

A whole variety of different causes may be responsible for the establishment of one or more species of moss in quantities detrimental to the turf. These causes and their remedies are listed as follows:

Certain mosses are encouraged by lack of subsoil drainage, a compacted or water-saturated surface, or excessive rolling. Excessive moisture in the surface soil, if only a temporary winter phenomenon, may be relatively unimportant, but if the moss becomes established, the porosity of the surface must be improved by aeration, scarifying and the application of sharp sand, or in some cases Charcoal, Gypsum or Lime.

Soil impoverishment leads to scanty covering of grass and the establishment of quite different moss species. Fertilizer applications - Sulphate of Ammonia at 9 grams to 18 grams per sqm, to which some Ferrous Sulphate or Super-Phosphate, both of which scorch but do not kill moss, may be added - encourage thickening of the sward, something that is easily achieved with regular application of a suitable lawn fertiliser every three months. Timing is important, as the moss also benefits from the addition of plant nutrients, so that fertilizer should be applied at the period of maximum grass growth, preferably in February to October.

Some moss species including the troublesome *Polytrichum*, as well as tough flat lichens like *Peltigera canina*, develop on acid, sandy or peaty soils, and must be treated with lime or alkaline fertilizers. Similarly, *Pohlia nutans* can be controlled to a certain extent by making the soil more alkaline. Conversely, *Barbula fallax*, which generally occurs on calcareous soils, can be gradually reduced by the judicious use of acidic fertilizers such as Sulphate of Ammonia.

The overall problem is that if lawn owners actually looked after their lawns like the turf grass science books advise, they would not have all the problems with their lawns that escalate with the rapid reduction of quality. This assumes that the quality of the lawn is good when they start the ownership of the area.

The lawn renovation process is to turn the tide on the percentage of moss to grass ratio so that grasses are dominant whereas the moss is not.

Control of Moss - Non Cultural

This works well in the long term only if it is combined with cultural control. Do not plan to kill the moss off if you are not going to over seed the lawn to improve the grass content.

Sometimes moss can be encouraged in the short-term on even the most well managed turf areas and lawns. A particularly wet spell of weather or cold conditions when grass growth is limited can, for example, encourage a temporary outbreak of moss. Under these circumstances treatment of the area with a suitable moss killing chemical is often an adequate answer to the problem although underlying factors that can encourage moss should always be considered.

The traditional chemical for moss control in turf is Sulphate of Iron known as Ferrous Sulphate, applied in the calcined form, with or without Sulphate of Ammonia. It is often the form of moss control in the majority of lawn fertiliser sold in Garden Centres. Sulphate of Iron gives a fast kill and is cheap, but is not long lasting. It is often baulked with a carrier such as kiln dried sand, especially in winter, but is more often used for spring/summer application in Lawn Sand. For example, a mixture of 1 part Sulphate of Iron: 3 parts Sulphate of Ammonia: 10-20 parts carrier (sand or compost). This mixture is used at 140g/m² (4oz/yd²) and is commonly known as "Lawn Sand". You can also purchase soluble Sulphate of Iron which you mix with water and apply as a foliar spray to the lawn.

It is always the Sulphate of Iron in the lawn treatment that will turn the moss black very quickly and stimulate a rapid greening up of the turf area.

New chemicals are most persistent. One of the most popular is Dichlorophen but the use of this active ingredient has now been withdrawn. It had a rapid effect and which persisted for some time. Phenolic moss killers also have their uses and also help control the weed Speedwell, which is a bonus. Some discolouration of the grass can occur unless the material is carefully applied. It is important that the moss is thoroughly wetted with the control chemical too.