Weed of Interest: Liverwort (*Marchantia polymorpha L.*)

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Liverwort holds a unique place in the world of weeds that infest greenhouses and container nurseries. This 'plant' has almost no height, yet, if left unchecked liverwort growth can wreak havoc in propagation beds and containers. The interference that liverwort causes is not in the classical sense of 'competition' for resources, but in the way that it grows over the growing media surface preventing water and nutrients from moving into the plant root zone. The costs in labor for hand removal, plant loss, and preventative practices such as mulches and topdressing can contribute significantly to the expense of operations. Liverworts are small nonflowering plants that grow close to the ground and anchor themselves to the soil surface by root-like structures called rhizoids. Liverworts in this order (Marchantiales) are nonleafy and are comprised of a plant body (thallus) which is amorphously shaped but can resemble the shape of the liver. The common name dates to medieval times when early herbals cited it as a medicinal remedy for liver ailments. Both asexual and sexual reproductive structures develop on the surface of the thallus. The gemma cups give rise to clonal bodies (gemmae) which are easily detached by water droplets and carried to new territory. Sexual reproduction is carried out through spores that are produced on sharply differentiated stalked bodies elevated above the thallus. The mature spores are wind dispersed and can be carried far from the parent plant. This reproductive strategy ensures a short- and long-term means of dispersal. Liverwort is a cosmopolitan species and has been reported as a colonizing species in the temperate zones of North America, Europe, Australia, and New Zealand. This species is considered native to North America. Liverwort spreads to new sites primarily on the surface of the media of contaminated plant material. It is a particular problem in herbaceous perennial nurseries. Liverwort has been a serious weed problem of long standing in many nurseries in the Pacific Northwest (PNW). On Long Island and other areas in the US, the appearance of first infestation in nurseries is often associated with plants shipped from the PNW. A single infested container can cause infestation to neighboring plants as the gemmae are easily moved to new pots by splashing of irrigation water. Within weeks of introduction, hundreds of containers can be infested as the gemmae move radially from the original plant. As liverwort matures, spores are produced and dispersed by air currents. They are capable of remaining dormant for many years or producing new plants in other areas of a nursery if the conditions are favorable.

A thick layer of liverwort thalli prevents water from penetrating to plant roots. Photo by A.F. Senesac

A closeup of gemmae, disclike clones that get dislodged by water droplets. Photo by A.F. Senesac

Management

Although there are several preemergence herbicides that work well in preventing liverwort establishment, they are not often useful in managing this weed. Generally, liverwort is a problem in growing situations where too much moisture exists. This is usually a situation where perennials and/or shade loving plants are being grown. Most uses of the effective herbicides are for woody plants and are usually harmful to herbaceous plants material. Even so, the herbicides are only a short-term fix for this weed. The best long-term solution is to alter the watering practices so that the media surface has an opportunity to dry out for at least an hour or so once or twice a day.

Cultural practices

Preventing liverwort introduction through exclusion and sanitation are important ways to minimize liverwort. Nurseries that inspect purchased plants and rogue or remove infested containers will greatly reduce problems with this weed. Controlling irrigation so that a daily period of drying out on the media surface will help prevent liverwort establishment. Using a coarse growing media that will drain well can improve or hasten this process. Controlling nitrogen at the soil surface by incorporating fertilizer into media rather than surface applications has been shown to improve liverwort management. Light but coarse mulch materials like boiled rice hulls will drain well and can offer a short-term level of control. Research has shown that even a thin layer (½ inch) applied over liverwort will starve it of light and prevent new infestations. This seems to be more successful in dormant overwintering houses that are rarely irrigated. Hand weeding is difficult. Roguing infested plants is usually more cost effective. ●

Actively growing liverwort in a heated greenhouse. Photo by A.F. Senesac

Besides gemmae, liverwort also disperses by spores that are formed on these odd looking stalks. Photo by A. F. Senesac

Dormant liverwort in an unheated hoophouse. Photo by A.F. Senesaac