

Liverwort (*Marchanta polymorpha*) Biology and Recent Research Results

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Liverwort is a serious weed problem in ornamental plant production, particularly in greenhouses where plants are typically grown using excessive irrigation and nutrients. These lower order plants (bryophytes) spread rapidly in the greenhouse and can cover the media surface resulting in strong competition with the crop for water and nutrients. Small plants and liners cannot get good root development in upper part of media. This weed cover also impedes water from reaching the media thereby increasing runoff and water use. The presence of liverwort in the container reduces salability of crop and increases the chance that the weed will spread to other containers and other areas of the nursery. Liverworts growing on the media and greenhouse floors and under benches provide excellent habitat for fungus gnats and snails.

The plant does not have flowers, seeds, leaves, or roots. The flat green organ is the thallus or gametophyte. The single cell rhizoids act similarly to roots attaching the thallus to the soil. Liverwort can spread vegetatively and by spores. There are two alternate forms in its life cycle: a gametophytic stage and a sporophytic stage. In sexual reproduction, the gametophyte produces male and female structures that look like little palm trees (sporophytes). The female form will produce spores that are propelled into the air.

In vegetative reproduction, new plants are formed when older plant parts die at the fork of a branch of a thallus. Gametophytes also produce gemmae cups that hold gemmae, often described as looking like a nest with eggs. These gemmae can spread by water splash and produce new young plants vegetatively.

We recently completed a greenhouse study¹ examining several treatments for their pre- or post-emergent control of liverwort.

Treatments² in the test were:

Inoculated check (control)

Broadstar 0.25G (flumioxazine) @ 50lb/A

Ronstar 2G (oxadiazon) @ 100lb/A

Ground Mustard Seed Meal (MSM) @ 2090 and 4180 g/100ft²

Freehand (dimethenamid-P + pendimethalin) @ 150lb/A

Eight replications were used. Treatments were applied to 4" pots that had young plants on the media surface (POE treatments) or applied after the pots were inoculated with a solution that contained a suspension of gemmae (PRE treatments). The experiments were conducted in a

¹ Funded by a grant from the California Nursery and Garden Centers

² Products in these tests were for experimental use only. Their mention anywhere in this document does not constitute a recommendation or endorsement.

greenhouse at the UC South Coast Research Center in Irvine, CA and irrigated twice daily with overhead sprinklers. Pots were evaluated 7, 14, 29, and 42 days after treatment (DAT).

Results

The MSM treatments were quickly infested by an unknown fungus that covered the media surface. The media remained covered with the fungus for at least 14DAT, with the higher rate lasting longer, in some cases up to 42DAT.

Nevertheless, the MSM treatments provided excellent liverwort control, superior to that of Broadstar and Ronstar in both PRE and POE tests (Figures 1 and 2). The higher rate of MSM continued to maintain excellent control for the duration of the study while the lower rate started to lose liverwort control after 4 weeks. Freehand also provided excellent PRE control of liverwort for the duration of the study. In the Freehand treated pots in the POE test, there was no reduction in liverwort cover from the time of application but they had approximately 85% less green liverwort cover than the inoculated check even 42DAT (Figure 2). That is, while Freehand did not completely control liverwort, it did inhibit the growth of liverwort in the pots such that it did not increase on coverage.

Currently, there are no selective herbicides registered for use in enclosed greenhouses. Freehand shows excellent potential and could be used in non-enclosed areas such as open nurseries and shade houses that are open on both ends. Additional work needs to be done examining MSM rates, timing of reapplication, and crop selectivity.

Figure 1. Percent green cover of liverwort as affected by preemergent treatment.

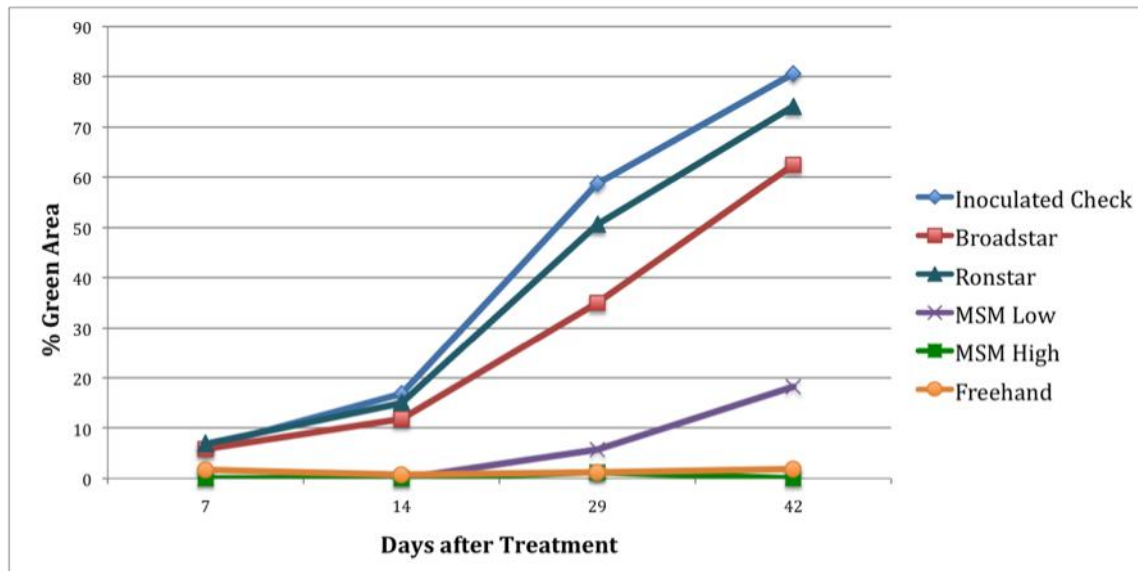


Figure 2. Percent green cover of liverwort as affected by postemergent treatment.

