

**Best management practices for the control of silvery-thread moss****June 15, 2017**

Several species of mosses occur on creeping bentgrass putting greens, but silvery-thread moss (*Bryum argenteum*) is most common. Mosses are nonvascular plants that lack roots and conductive tissues (i.e. xylem and phloem). Mosses are not competitive in the root zone because, unlike grasses that absorb water and nutrients from soil, mosses rely on foliar absorption of water and nutrients. Water (and nutrients in solution) are largely transported externally via capillary flow in between individual moss shoots that make up a colony (mat).



**Figure 1.** Silvery-thread moss in a creeping bentgrass putting green (*left*) and a colony, or mat, (*right*). Several species occur on putting greens, but silvery-thread moss is most common.

Simply from moss morphology, we can conclude that mosses do best in areas with surface moisture, where foliar nutrients are applied, and where moss shoots are in close enough proximity to allow the capillary flow of water. Anything that *can be done* to disrupt this type of environment *should be done*.

**Best Management Practices**

- 1. Irrigation.** Reduce surface moisture with “deep” irrigation that gets into the rootzone. Limit light, frequent irrigation, which keeps moss hydrated (and benefits annual bluegrass).
- 2. Cultivate.** Thatch and layering increase surface moisture. Improve water infiltration with aeration, vertical mowing, etc. These practices also physically remove moss, and break up mats of moss that encourages the drying of colonies.
- 3. Topdress.** Again, improve surface characteristics to decrease surface moisture with frequent topdressing. Biweekly topdressing, alone, has been shown to reduce moss cover by 34%.

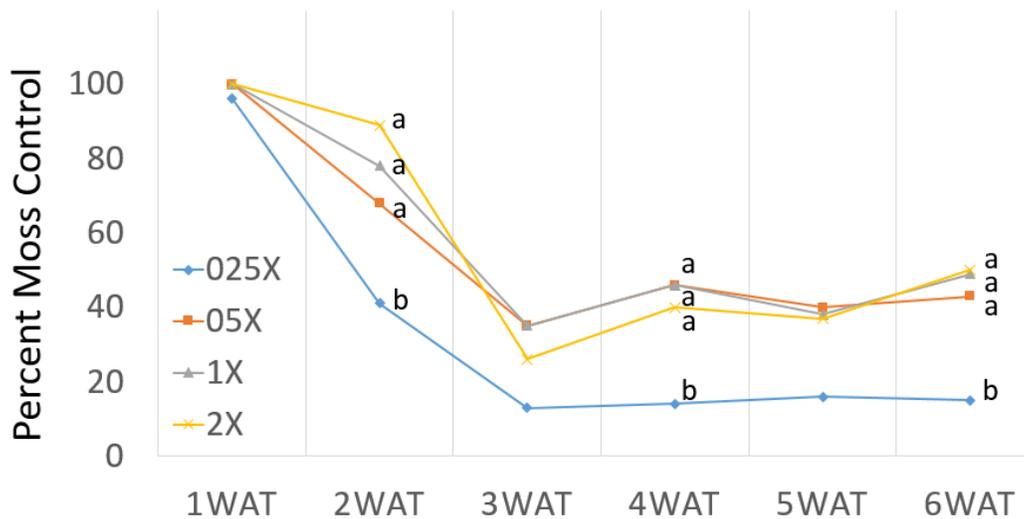


**Figure 2.** Silvery-thread moss drying out from cultivation and topdressing.

4. **Mowing.** Research has demonstrated that moss is more competitive even when mowing heights are reduced only 1/32" from 5/32" (0.156") to 1/8" (0.125"). Mow higher and alternate mowing with rolling to encourage turf health. Frequent topdressing also buries crowns, and increases the actual height of cut without increasing the effective height of cut.

5. **Fertilizer.** The foliar spoon-feeding of soluble nitrogen sources (urea or ammonium sulfate) at 0.1 to 0.33 lbs N/1,000 ft<sup>2</sup> has been shown to increase moss cover compared to granular applications of urea, poultry litter, or IBDU. Further, ammonium sulfate appears to increase moss cover even compared to urea.

6. **Quicksilver (carfentrazone-ethyl).** Quicksilver works very well to control moss, and, in my opinion, the product is best used with frequent applications of lower rates (instead of a few times a year at 6.7 fl oz/A). I've collaborated with others on research that shows similar control of moss with a single application of Quicksilver at 3.3, 6.7, or 13.4 fl oz/acre. In the research, 3.3 fl oz/A appeared to be the lowest effective dose of Quicksilver in a single application – this rate allows up to eight applications before reaching the annual max (26.9 fl oz/A/year). Quicksilver is only effective if applied to photosynthesizing tissue, so don't retreat moss until it is green (and hydrated). Successive applications are required for effective control.



**Figure 3.** Silvery-thread moss control from a single application of Quicksilver at 1.7 (0.25X), 3.3 (0.5X), 6.7 (1x), or 13.4 fl oz/A (2X) in an experiment in Manhattan, KS and San Luis Obispo, CA. From 2 to 6 weeks after treatment (WAT), control was similar from all but the 1.7 fl oz/A rate.

Quicksilver is very safe on creeping bentgrass – I've never personally observed injury from an application, even at very high, off-label rates. However, there are reports of injury from Quicksilver applications within 60 days of an application of Bensumec (bensulide). Annual bluegrass may be injured at > 2.0 fl oz/A.

**Bottom line.** Be cognizant of irrigation frequency, and cultivate, topdress, etc. to break up moss colonies and reduce surface moisture. Quicksilver is effective at 2.0 to 3.3 fl oz/A, and should be applied only to green, hydrated moss (~3 week interval).

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