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Effects of Nitrogen Source and Spray Volume on the Establishment of Silvery-Thread Moss

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Summary. Applying soluble nitrogen increases silvery-thread moss (*Bryum argenteum* Hedw.) cover. Spray volume did not significantly affect moss growth throughout the experiment. Pots treated with ammonium sulfate (AMS) had more moss cover compared with urea and the control, regardless of spray volume. Similarly, *B. argenteum* dry weight increased threefold when sprayed with AMS compared with all other treatments; the increased dry weight was the result of longer gametophyte filaments.

Rationale. The practice of spraying small quantities of soluble nitrogen (<8 lb/a N) at relatively high frequencies (e.g., biweekly) may promote *B. argenteum* growth because the moss lacks a vascular system capable of removing water and nutrients from the soil. Different water-soluble N sources such as AMS have not been evaluated for their effects on the spread of *B. argenteum*. Decreasing spray volume raises the concentration of a spray solution; therefore, it was hypothesized that reducing spray volume when applying soluble N would have a negative effect on *B. argenteum* growth.

Objectives. Determine the effect of spray volume and different soluble N sources on *B. argenteum* growth.

Study Description. A population of *B. argenteum* collected from a putting green at the Rocky Ford Research Center in Manhattan, KS, was increased via asexual propagation in the greenhouse. *Bryum argenteum* plugs were dried and processed with a coffee grinder, and 0.7 g of ground plant material was placed

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in 10 × 20-cm pots containing sand conforming to United States Golf Association specifications for putting green rootzones. A control and two N sources, urea and AMS, were applied weekly at 4.35 lb/a N at three spray volumes: 10, 44, and 108 gal/a of water. Dibasic potassium phosphate was used to supply all treatments with 0.37 lb/a phosphorus (P) and 0.94 lb/a potassium (K). Percentage moss coverage was determined weekly using a camera mounted on a custom-made light box, and digital images were analyzed using SigmaScan (hue: 45-75, saturation: 50-100). Treatments were evaluated in a completely randomized two-factor design (factor A = nutrient source; factor B = spray volume), and the study was repeated. At 7 weeks after initial treatment (WAIT), moss was harvested, placed in a drying oven for 72 hours at 75°C, and dry weight was recorded.

Results. Overall, spraying soluble N increased moss cover compared with the untreated control at several rating dates, and AMS had the highest moss cover at three rating dates in both experiments (Tables 1 and 2; Figure 1). Compared with urea, AMS caused more than a threefold increase in *B. argenteum* dry weight in both experiments; no differences in dry weight between urea and the water control were observed (Figure 2). Spray volume was not significant at $P = 0.05$ for percentage cover or dry weight at any rating in Experiments 1 and 2.

Table 1. Effect of urea and ammonium sulfate (AMS) on percentage *B. argenteum* cover in Experiment 1

Treatment	% cover ¹			
	1 WAIT ²	3 WAIT	5 WAIT	7 WAIT
AMS	35 a	53 a	62 a	74 a
Urea	31 b	53 a	44 b	42 b
Control	26 c	35 b	33 c	40 b

¹ Means followed by the same letter in a column are not statistically different ($P \leq 0.05$) by Fisher's LSD.

² Weeks after initial treatment.



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Table 2. Effect of urea and ammonium sulfate (AMS) on percentage *B. argenteum* cover in Experiment 2

Treatment	% cover ¹			
	1 WAIT ²	3 WAIT	5 WAIT	7 WAIT
AMS	35 a	60 a	55 a	60 a
Urea	33 a	43 b	34 b	36 b
Control	29 b	33 c	28 b	34 b

¹ Means followed by the same letter in a column are not statistically different ($P \leq 0.05$) by Fisher's LSD.

² Weeks after initial treatment.

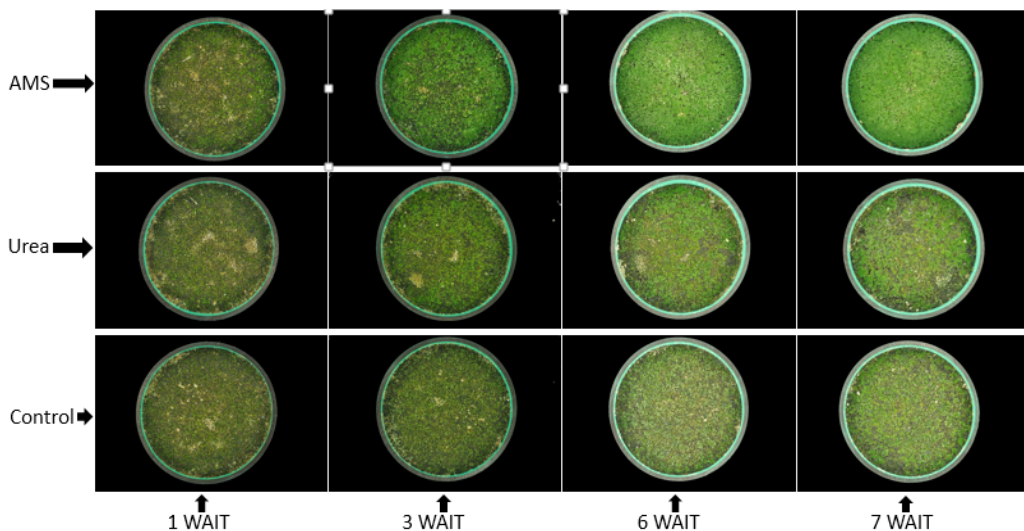


Figure 1. *B. argenteum* cover in Experiment 1 when fertility treatments were applied using a spray volume of 44 gal/a of water.

(AMS: ammonium sulfate.)

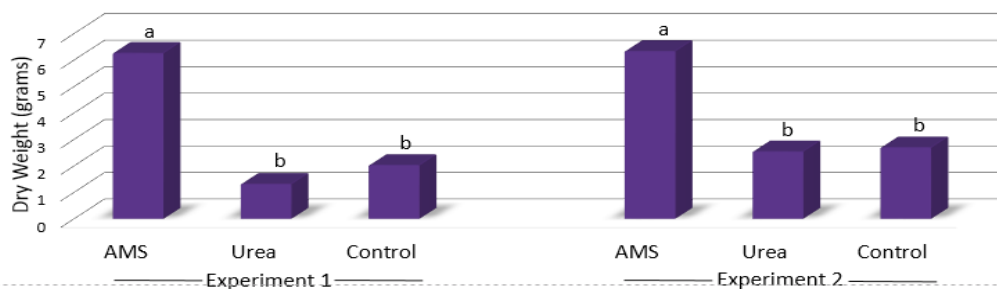


Figure 2. Effect of urea and ammonium sulfate (AMS) on *B. argenteum* dry weight harvest 7 weeks after initial treatment.

