Research Progress Report : Ornamental Grass Growth Regulator Study

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Summary. During production, pampas grass can become disproportionately large relative to container size when grown in a greenhouse or nursery. Rates of Bonzi at 1 and 2 mg were considered optimal, with the 1 and 2 mg drench costing $0.03 and $0.06 per pot, respectively. The Sumagic rates used in this study may have been excessive due to the stunting of the pampas grass in the landscape. Using lower rates of Sumagic than were used in this study may provide economical control of pampas grass for the grower, as the 0.125 and 0.25 mg rates cost $0.03 and $0.06 per pot to treat, respectively. These results demonstrate that plant growth regulators can be effectively and economically employed in controlling plant height of pampas grass.

Objective

This study was initiated to compare the efficacy of plant growth regulator (PGR) substrate drenches of A-Rest (ancymidol), Bonzi (paclobutrazol), and Sumagic (uniconazole) applied to pampas grass on chemical height control during greenhouse forcing, and to evaluate the residual effects of the PGRs on plant growth in the landscape.

Materials & Methods

Greenhouse conditions. Pampas grass plugs were transplanted into six inch pots containing Fafard 4P potting substrate on March 3. Plants were fertilized at each watering with 150 ppm N from Excel 15-5-15 Cal-Mag, and grown under natural daylight. Greenhouse day/night temperatures were 75/65 F.

PGR treatments. Plants were treated 17 days after potting using 4.5 oz (133 ml) of solution per pot (in mg a.i.) of A-Rest at 0.25, 0.5, 1, 2 or 4; Bonzi at 1, 2, 4, 8, or 16; and Sumagic at 0.125, 0.25, 0.5, 1, or 2; and an untreated control. The experiment was a completely randomized design with eight replicate plants for each of the 16 treatments. On April 27, total plant height (measured from the pot rim to the top of the inflorescence), basal diameter at the soil line (measured at the widest dimension and turned 90 degrees, and averaged), and plant diameter (measured at the widest dimension and turned 90 degrees, and averaged) were recorded.

Field conditions. Four replications of each treatment were transplanted outdoors in a randomized complete block design on May 8 in a sandy-loam soil 4 feet apart and to a depth corresponding to the pot rim. Data on total plant height and plant diameter were collected on July 8 (15 weeks after the PGR applications) and September 8 (24 weeks after the PGR applications).

Results

Greenhouse observations. During greenhouse production, all rates of Sumagic reduced plant height by 56 to 71% compared to the untreated control, whereas A-Rest and Bonzi treatments reduced plant height by 0 to 34% and 14 to 61%, respectively. Severe height retardation was evident at > 2 mg of Sumagic (Figure 1).

Upon planting into the landscape, all plants treated with Sumagic, Bonzi rates of 4, 8 or 16 mg and with 4 mg of A-Rest were significantly shorter than the untreated control. Plant diameter was significantly less for all plants treated with Sumagic, Bonzi (excluding 1.0 mg rate), and A-Rest rates of 2 and 4 mg at week 5.

Field Observations. At the conclusion of the study (week 24), all plants in the landscape exhibited similar heights, except plants treated with Sumagic at 1, 2, or 4 mg which remained significantly shorter than the untreated control. All plants treated with Sumagic also had a significantly smaller plant diameter when compared to the untreated control (Table 1).

Conclusions

• Rates of Bonzi at 1 and 2 mg were considered optimal, with the 1 and 2 mg drench costing $0.03 and $0.06 per pot, respectively.

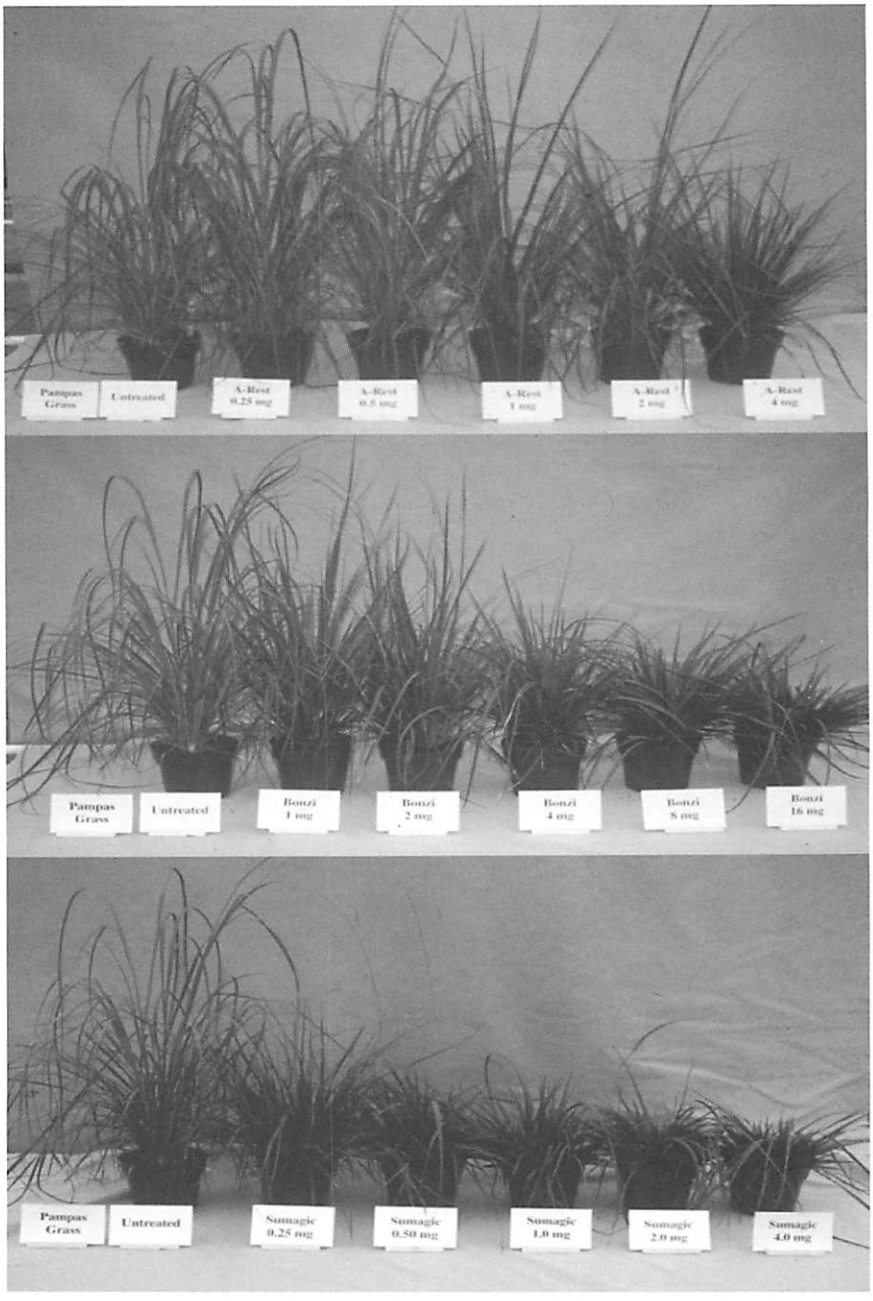

Figure 1. Plant growth retardant effect on growth (top): A-Rest, (center) Bonzi, and (bottom) Sumagic. Drench rates (in mg a.i.) are from the left to right for A-Rest (0, 0.25. 0.5, 1, 2, and 4), Bonzi (0, 1, 2, 4, 8, and 16), and Sumagic (0, 0.25, 0.5, 1, 2, and 4).

• Plant growth was similiar at week 24 among the A-Rest treatments and the untreated control. However, it may not be economical for the commercial grower to use A-Rest on pampas grass because the 1 and 2 mg drench costs $0.26 and $0.52 per pot, respectively.

• PGR rates of Sumagic used in this study may have been excessive due to the stunting of the pampas grass in the landscape. Using lower rates of Sumagic than were used in this study may provide economical control of pampas grass for the grower, as the 0.125 and 0.25 mg rates cost $0.03 and $0.06 per pot to treat, respectively.

• These results demonstrate that PGRs can be effectively and economically employed in controlling plant height of pampas grass during greenhouse and nursery forcing and production.

• The PGRs and rates used resulted in little persistence of growth reduction when planted in the landscape.

• Greenhouse and nursery growers may apply PGRs to pampas grass during production to prevent plants from becoming disproportionately large relative to the container size.

Acknowledgements

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Table 1. Landscape response of pampas grass to drench applications of A-Rest, Bonzi, or Sumagic (1 inch = 2.54 cm).

		Plant Height (cm)[1]			Plant Diameter (cm)[2]		
			Weeks			Weeks	
Treatment	Rate	5	15	24	5	15	24
Untreated	0	60.2	111.9	131.3	62.2	96.9	142.1
A-Rest	0.25	56.6	112.7	148.3	61.9	97.4	140.5
	0.5	61.0	113.8	142.8	66.5	97.4	141.6
	1.0	56.2	104.8	132.3	46.0	96.2	127.4
	2.0	49.9	107.8	148.3	44.7	99.9	138.8
	4.0	42.2	99.0	130.5	35.0	97.8	137.5
Bonzi	1.0	56.0	103.9	145.8	58.1	99.8	147.6
	2.0	49.4	104.7	134.0	41.5	98.6	140.6
	4.0	31.8	100.7	122.0	35.0	80.9	125.5
	8.0	25.0	92.3	130.5	35.3	80.9	130.0
	16.0	21.5	77.4	118.3	32.0	79.9	113.5
Sumagic	0.25	26.4	96.7	132.3	37.0	96.6	124.9
	0.5	22.4	84.1	118.1	36.8	76.2	116.1
	1.0	19.7	59.9	98.3	33.7	57.0	105.5
	2.0	17.1	38.4	93.8	36.0	40.6	94.8
	4.0	15.3	27.3	63.0	32.0	34.9	54.3

[1] Plant height significantly different for the treatment x week interaction of $P \leq 0.001$ (LSD *alpha* at 0.05 = 16.1 cm).

[2] Plant diameter significantly different for the treatment x week interaction of $P \leq 0.001$ (LSD *alpha* at 0.05 = 14.6 cm).