Use of Growth Retardants for Floral Initiation of Hydrangeas

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ABSTRACT

Floral initiation was successfully stimulated for plants of Hydrangea macrophylla 'Rose Supreme' under non-inductive environmental conditions by spraying plants with XE-1019 or paclobutrazol. Effective treatments were 10 weekly or 5 biweekly sprays of 100 mg·liter^{-1} paclobutrazol, 5 biweekly sprays of 15 or 30 mg·liter^{-1} XE-1019, and 4 triweekly (once every 3 weeks) sprays of 15 or 30 mg·liter^{-1} XE-1019.

INTRODUCTION

Hydrangea producers historically have depended on the cool, short day conditions of autumn to facilitate flower bud initiation in their plants. This method has two major drawbacks: 1) the initiation (and subsequent sales) period is limited; and 2) if the plants encounter too warm an autumn, floral initiation can be delayed.

The use of paclobutrazol and ancymidol for floral initiation has been previously explored. However, the technique employed requires 13 weekly sprays at a high concentration of chemicals. Therefore, this study was conducted to examine XE-1019 and lower numbers of paclobutrazol sprays as potential floral initiating treatments.

MATERIALS AND METHODS

Plants of Hydrangea macrophylla 'Rose Supreme' were grown in a 22°/26°C (night temperature/venting temperature) greenhouse under a 24 photoperiod to maintain vegetativeness. The plants were pruned 17 September 1987 to 2 shoots each. Treatments commenced 25 September at which time shoots averaged 6 expanded leaf pairs each. The treatments consisted of 1) no sprays (control); 2-4) 100 mg a.i. paclobutrazol/liter applied weekly, every 2 weeks, or every 3 weeks (10, 5, and 4 total applications, respectively); 5-6) 15 mg a.i. XE-1019/liter applied every 2 or 3 weeks (5 and 4 total sprays); 7-8) 30 mg a.i. XE-1019/liter applied every 2 or 3 weeks (5 and 4 total sprays). All sprays were applied at 204 ml·m^{-2} (0.5 gal/100 ft^2), and treatments were replicated 10 times.

One shoot per plant was removed 4 December 1987, 10 weeks after the first spray applications. Data taken on the excised shoots were shoot length, number of expanded leaf pairs, number of leaf pairs within the bud, and bud stage of development. Bud stages of development are:

1) Apex is completely covered by the upper leaf pair primordia; meristem is vegetative.
2) Apex is broadened, upper leaf pair primordia is separated; meristem is vegetative.
3) Apex is swollen and dome-shaped; meristem is transitional between vegetative and reproductive development.
4) Five primary inflorescence axis primordia are visible; apex is reproductive.

5) Both primary and secondary inflorescence axis primordia are visible; apex is reproductive.

RESULTS AND DISCUSSION

All XE-1019 treatments reduced shoot elongation compared to control plants (Table 1). Paclobutrazol sprayed weekly reduced shoot elongation, but did not affect shoot length when applied every 2 or 3 weeks (compared to controls).

Plants sprayed weekly with 15 or 30 mg a.i. XE-1019/liter developed fewer expanded leaf pairs than control plants or plants sprayed every 3 weeks with paclobutrazol (Table 5). Paclobutrazol did not affect the number of expanded leaf pairs compared with controls. No treatment effect was observed for the number of leaf pairs within the apical bud, and the buds averaged 10.3 $\pm$ 0.9 leaf pairs.

Inflorescence initiation and development was enhanced by all chemical treatments except 100 mg a.i. paclobutrazol/liter sprayed every 3 weeks (Table 1). Although not statistically significant, XE-1019 sprays resulted in more complete inflorescence development at time of sampling than did paclobutrazol sprays.

Based on these results, the least amount of chemical in conjunction with the least spray number would be 15 mg a.i. XE-1019/liter sprayed every 3 weeks. However, prior to making any recommendations, the plants should be forced into bloom to confirm that normal inflorescence expansion will take place after chemical floral initiation. If inflorescence expansion can occur normally, chemical initiation of inflorescences would allow growers to finish plants for the Christmas and Valentine's Day holidays.

Table 1. Growth parameters (means) for hydrangea plants after 10 weeks of growth retardant treatments.

Treatment	Growth response		
	Shoot length (cm)	No. of expanded leaf pairs	Apical bud stage
Control	11.0 b[z]	11.3 B	2.7 A
Paclobutrazol: 100 ppm applied weekly (10 total)	8.0 a	8.8 AB	4.4 B
Paclobutrazol: 100 ppm applied every 2 weeks (5 total)	9.6 ab	10.8 AB	3.9 B
Paclobutrazol: 100 ppm applied every 3 weeks (4 total)	9.2 ab	11.2 B	3.5 AB
XE-1019: 15 ppm applied every 2 weeks (5 total)	7.6 a	8.3 A	4.7 B
XE-1019: 15 ppm applied every 3 weeks (4 total)	8.0 a	9.4 AB	4.6 B
XE-1019: 30 ppm applied every 2 weeks (5 total)	7.2 a	8.0 A	4.7 B
XE-1019: 30 ppm applied every 3 weeks (4 total)	7.5 a	8.7 AB	4.3 B

[z]Means separated within columns by Student-Newman-Keuls test, 5% level (lowercase letters) or 1% level (upper case letters).