CONCLUSION

There is an opportunity and a need for the exchange of horticultural ideas, plants, and practices. We (trade associations, nurseries, academia, and government personnel in both countries) desire to create a horticultural exchange.

Use of Ethephon Treatments to Reduce Seed Set and Stimulate Shoot Production in *Kalmia latifolia*

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INTRODUCTION

Nursery production of mountain laurel (*Kalmia latifolia* L.) often involves labor-intensive, manual deadheading of flower clusters immediately after flowering to stimulate the formation of new shoots. A chemical method of deadheading that encourages shoot production would save time and labor costs while maintaining current production schedules. Perry and Lagarbo (1994) used ethephon sprays to eliminate fruit formation in flowering pear (*Pyrus calleryana*) and American sweet gum (*Liquidambar styraciflua*). They found that 1000 ppm ethephon applied to runoff at full bloom eliminated 95.3% and 99% of fruit in flowering pear and American sweet gum, respectively. Proper timing of ethephon application was crucial for these results. On the basis of these studies I tested the effectiveness of ethephon in reducing seed set and stimulating shoot production and growth in *K. latifolia*. Since blossoms in mountain laurel open over an extended period of time and since nursery production may involve many cultivars which bloom at different times, the current experiment made no adjustment for bloom stage. I wished to answer the following questions: (1) does ethephon have any potential in chemical deadheading of mountain laurel; (2) what are the appropriate rates of application; (3) is shoot production and growth stimulated; (4) does ethephon have any phytotoxic effects?

MATERIAL AND METHODS

Experiments were conducted on field-grown mountain laurel cultivars at Broken Arrow Nursery, Hamden, Connecticut, in the spring and summer of 1995 and 1996. Treatments were applied on cultivars 'Snowdrift', 'Hoffman's Pink', and 'Angel' in 1995 and 'Snowdrift', 'Hoffman's Pink', and 'Tinkerbell' in 1996. In each year plants in different populations of each cultivar were treated in a completely randomized design.

Single applications containing 0 (water), 500, 1000, and 2000 ppm ethephon were made on 9 June 1995 and 5 June 1996. In 1995 seed set was estimated by counting the number of nonsenescent seed capsules out of the total number of blossoms (= % viable seed capsules), and new shoot production was scored as the total number of new shoots per plant. In 1996 seed set was estimated by counting the number of flower clusters which were completely senescent out of the total number of flower clusters per plant; new shoot production was recorded as the number of new shoots produced below a flower cluster; and new shoot growth was determined by measuring the shoot length. Data were collected at weekly intervals after ethephon treatment, but are reported here only at 30 and 32 days after ethephon application in 1995 and 1996, respectively.

RESULTS AND DISCUSSION

Treatments with 500, 1000, and 2000 ppm ethephon significantly reduced seed set when compared to the control treatment containing no ethephon. Although the differences between the 500 ppm and the higher concentration ethephon treatments were not always significant, in all populations, higher ethephon concentration resulted in greater reduction in seed set.

Table 1. Effects of ethephon treatments applied on 9 June 1995 on seed set and new shoot production in field populations of *Kalmia latifolia* cultivars Angel, Snowdrift, and Hofman's Pink.

		19 July 1995	
Cultivar	Ethephon treatment (ppm)	Viable seed capsules(%)	New shoots/ plant
Angel (N = 41; 52.9% open flowers at start)			
	0	20.1	2.8
	500	9.0	27.8
	1000	4.2	65.4
	2000	2.2	57.2
	$LSD_{0.05}$	9.1	20.0
Snowdrift (N = 17; 53.4% flowers open at start)			
	0	28.3	2.2
	500	12.2	16.8
	1000	9.8	26.2
	2000	6.9	31.6
	$LSD_{0.05}$	2.4	1.4
Hoffman's Pink (N = 37; 27.3% flowers open at start)			
	0	20.1	2.8
	500	9.0	27.8
	1000	4.2	65.4
	2000	2.2	57.2
	$LSD_{0.05}$	6.4	21.5

All treatments with ethephon significantly increased shoots produced per plant. The 1000 and 2000 ppm ethephon treatments resulted in significantly more shoots than the 500 ppm treatment, but the effects of the 1000 and 2000 ppm treatments on shoot production were not significantly different in two of the three populations.

The 1995 experiments suggest that application of 1000 ppm ethephon is sufficient to reduce seed set and stimulate shoot production in *K. latifolia* even when blossoms were not fully open. No phytotoxic effects were observed. These experiments were repeated in 1996 on different populations of 'Snowdrift' and 'Tinkerbell' and on untreated 'Hoffman's Pink' from the 1995 population. In 1996 an additional control was included. In populations of 'Hoffman's Pink' and 'Tinkerbell', plants were also manually deadheaded in order to test if ethephon treatments stimulated shoot growth to the same extent.

Table 2. Effects of ethephon treatments applied 5 June 1996 on field populations of *Kalmia latifolia* cultivars Hoffman's Pink, Snowdrift, and Tinkerbell.

		New shoots	
Cultivar/ethephon treatment (ppm)	Flower cluster abscission (%)	per flower cluster	Mean length (cm)
Hoffman's Pink (N = 39; 66.7% blossoms open at start)			
Deadhead control	Removed	2.6	1.58
Water control	0.0	0.0	0.0
500	79.4	2.0	1.63
1000	98.4	2.7	2.17
2000	100.0	2.7	2.41
$LSD_{0.05}$	12.4	0.4	0.40
Tinkerbell (N = 73; 94.7% blossoms open at start)			
Deadhead control	Removed	2.3	8.18
Water control	0.0	0.1	2.56
500	79.4	2.2	5.71
1000	88.9	2.4	6.23
2000	100.0	2.5	6.22
$LSD_{0.05}$	8.6	0.5	1.55
Snowdrift (N = 21; 22.8% blossoms open at start)			
Water control	5.6	0.1	1.00
500	83.7	2.1	5.94
1000	100.0	3.0	6.94
2000	100.0	2.9	5.73
$LSD_{0.05}$	6.3	0.4	1.73

The 1996 results confirmed the 1995 observations. The 500, 1000, and 2000 ppm ethephon treatments significantly reduced seed set and stimulated shoot production and length when compared to treatment with water only. In most cases the 1000 and 2000 ppm ethephon treatments stimulated the production of significantly more shoots per flower cluster than the 500 ppm treatment, but significant differences in shoot length were more difficult to detect. In 'Hoffman's Pink', treatment with ethephon stimulated shoot growth equal to or in excess of that seen in the deadhead controls. However, in 'Tinkerbell' the deadhead control produced significantly longer shoots than the 1000 and 2000 ppm ethephon treatments. Phytotoxic effects indicated by premature leaf yellowing and drop was observed in the 2000 ppm ethephon treatment of 'Snowdrift'. The leaves affected were those just beneath the flower cluster.

The results of 2 years of study on six populations of *K. latifolia* show that application of 1000 ppm ethephon is effective in reducing seed set and stimulating shoot production and growth without phytotoxicity. Further studies will be required to determine if these observations are true for all cultivars and environmental conditions.

LITERATURE CITED

Perry, E. and **A. Lagarbo.** 1994. Ethephon sprays eliminate the messy, hazardous fruits of flowering pear and liquidambar. California Agriculture, March-April, pp. 21-24.

Elements of a Winning Proposal for an I.P.P.S. — Eastern Region Research Grant

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1) Read and follow all directions carefully. This is the single most important part of the process. Ignoring trivial items such as proposal length, number of copies required, or a submission deadline could disqualify an otherwise winning proposal.
2) State the question that your research is aimed at resolving. Do not assume that the evaluators are experts on your particular topic.
3) Describe your expected results and the impact that they can have on the plant propagation community. This includes both breadth and depth that your findings may have on commercial, research, and/or educational plant propagation activities.