The Effect of Paclobutrazol (Bonsi) on Shoot Elongation and Flower Bud Set of Container Grown 'Roseum Elegans' Rhododendron

R. E. Bir and T. G. Ranney
North Carolina

Nature of Work: Hybrid evergreen rhododendrons are most salable to retail customers as compact, well branched plants flowering in a springtime garden center. Achieving uniform branching plus compaction and abundant flower bud set requires timely pruning as well as skillful manipulation of fertilizer and irrigation. If a chemical treatment could be found that reduces labor as well as the skills required to produce a salable crop, hybrid rhododendrons might be produced less expensively and marketed to a broader segment of the general public. Plant growth regulators have shown promise in reducing growth of woody plants (Keever, et. al. 1989, 1990) but have only shown limited commercial use (Finney and Witte, 1988).

All research was conducted at MHCREC, Fletcher. Quart container grown liners were obtained from Appalachian Nurseries, Waynesboro, PA in April 1992. They were potted into Lerio 300 (trade gallon) containers in a growing medium of 5 parts pine bark and one part Canadian sphagnum peat (v:v) to which 7 lbs of dolomitic limestone per cubic yard had been added and thoroughly mixed prior to potting. Plants were placed outdoors under 50% lath shade for one week to acclimate prior to being placed in full sun on a crushed rock container pad. Irrigation was applied on an as needed basis via Roberts Irrigation spray stakes below the leaf canopy of the plants. No herbicide was applied during this test. Fertilizer used was ProKote Intermediate 22-3-10 from O.M. Scott at 13 grams per pot.

An initial growth index (GI) was determined for each plant by measuring the height and greatest width. The sum of these two figures was divided by two to provide the starting growth index.

Treatments were applied on June 15, 1992 following the first growth flush. Formulations and rates are shown in Tables 1 and 2. Spray was applied with a Polyspray 1 liter pump-up sprayer to the point of run-off without run-off occurring. Twenty-six ounces of spray were applied to 12 plants for each treatment. Drench applications were applied at the rate of 12 ounces of solution per pot. Weather was partly cloudy/overcast with no rain all day. Air temperature at time of treatment was 72°F. Medium temperature was 84°F. Twelve complete blocks were established with treatments randomized within each block utilizing single plant replicates.

Results and Discussion: In October 1992, when they could be differentiated from vegetative buds, flower buds were counted. Bonzi .128% L applied as a soil drench at 10 ppm increased the number of flower buds per plant over the control and all treatments except the 200 ppm Bonzi .128% foliar treatment (Table 1). Flower bud response was statistically the same as the other Bonzi .128% L drench treatments except the 20 ppm treatment. The 20 ppm Bonzi .128% L drench treatment resulted in more buds than all other treatments.

A growth index was determined in October when leaf and stem growth had ceased for the 1992 growing season. The final growth index was determined by measuring the height and greatest width of plants, dividing their sum by two. This final growth index was subtracted from the initial growth index to obtain a growth index for the 1992 growing season. The plants treated with 10 and 20 ppm Bonzi .128% L drench had a lower growth index compared to the control, Bonzi .128% 50 ppm foliar treatment and the Bonzi .4% SC 2.5 ppm drench treatment but they were not significantly less than any of the other treatments (Table 2.)

Since the growth index is a reflection of total growth and the growth regulator treatments were not applied until just before the last flush of growth during the 1992 season, an additional growth measurement was taken. The length of growth from the last node to the terminal of the three longest shoots was measured for each plant. Their average is reported as terminal growth in Table 2.

Terminal growth was less on the Bonzi .128% L 10 ppm and 20 ppm drench treated plants than for any other treatment. The next lower concentration for this treatment, Bonzi .128% L at 5 ppm, had shorter terminals than the control, both Bonzi .4% SC treatments, and the two lowest rates of the Bonzi .128% L foliar treatments.

Significance to Industry: Bonzi .128% L as a 10 and 20 ppm drench resulted in the greatest reduction in plant growth as well as the greatest number of flower buds with no visual symptoms of phytotoxicity. This suggests promise in the commercial use of this product to regulate shoot growth and increase flower bud numbers in hybrid evergreen rhododendrons.

Literature Cited:

1. Keever, G. J., W. J. Foster, and J. C. Stephenson. 1990. Paclobutrazol inhibits growth of woody landscape plants. J. Environ. Hort. 8:41-47.

2. Keever, G. J. and W. J. Foster. 1989. Response of two florist azalea cultivars to foliar applications of a growth regulator. J. Environ. Hort. 7:56-59.

3. Finney, J. and W. T. Witte. 1988. Improved flowering of twogallon rhododendron with growth retardants and phosphorous fertilization. Proc. SNA Res. Conf. 33:19-22.

Table 1. Mean number of flower buds per plant on container grown *Rhododendron cv.* 'Roseum Elegans'

Treatment	ppm	Number of Flower buds*
Control	0.0	3.33 c
Bonzi .128% L Foliar	50.0	2.33 c
Bonzi .128% L Foliar	100.0	2.67 c
Bonzi .128% L Foliar	200.0	4.25 bc
Bonzi .4% SC Foliar	50.0	3.17 c
B-Nine 85% SP Foliar	2500.0	2.67 c
Bonzi .128% L Drench	2.5	4.50 bc
Bonzi .128% L Drench	5.0	4.42 bc
Bonzi .128% L Drench	10.0	5.58 b
Bonzi .128% L Drench	20.0	8.89 a
Bonzi .4% SC Drench	2.5	3.08 c

Rp05 Duncan's New Multiple Range Test

Table 2. Growth Index (in.) and average length of terminal growth flush on *Rhododendron cv .* 'Roseum Elegans'.

Treatment	ppm	Growth Index*	Terminal Growth*
Control	0.0	15.06 a	2.95 ab
Bonzi .128% L Foliar	50.0	14.77 a	2.88 abc
Bonzi .128% L Foliar	100.0	13.43 ab	2 . . 69 abc
Bonzi .128% L Foliar	200.0	14.27 ab	2.21 cd
Bonzi .4% SC Foliar	50.0	14.53 ab	3.17 a
B-Nine 85% SP Foliar	2500.0	14.46 ab	2.47 bcd
Bonzi .128% L Drench	2.5	14.42 ab	2.53 abcd
Bonzi .128% L Drench	5.0	14.23 ab	2.02 d
Bonzi .128% L Drench	10.0	12.64 b	1.40 e
Bonzi .128% L Drench	20.0	12.58 b	0.98 e
Bonzi .4% SC Drench	2.5	15.06 a	2.71 abc

Rp05 Duncan's New Multiple Range Test