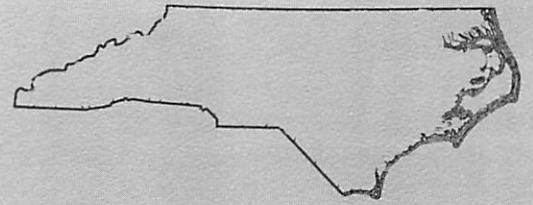


North Carolina

# Flower



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## 1979-80

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Is Chemical Pinching of Azaleas Worthwhile?  
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Department of Horticultural Science  
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Chemical pinching of azaleas has been a commercial reality since the late 1960's. Off-Shoot-O was the first compound that made chemical pinching more than wishful thinking, and it has been used sporadically by azalea growers. The mode of action of Off-Shoot-O requires that the chemical come in direct contact with the shoot tips for the physical damage to occur that would prompt lateral shoot development. Temperature, relative humidity, cultivar response, stage of shoot tip development all affect the effectiveness of Off-Shoot-O and growers also have to carefully mix the active ingredient in water to achieve optimum benefits. It is obvious to growers that days of laborious hand-pinching can be replaced with a couple of hours of spraying with Off-Shoot-O, and that often more lateral shoots will develop after chemical pinching than with manual pinching, primarily because there are more leaf axils remaining from which new shoots could arise.

Atrinal is a more recently introduced chemical pinching agent. Much of the early experimentation with Atrinal was conducted in Switzerland and Belgium but some U. S. researchers also have had considerable experience using it. Its mode of action is very different from that of Off-Shoot-O. Atrinal is translocated from the foliage so the application does not have to be directed to the shoot apex to be effective. The activity and effectiveness of Off-Shoot-O can be observed within a day after application, as the shoot tip turns brown or black in color, while symptoms revealing the activity of Atrinal might not be evident for two weeks. These symptoms can be chlorosis of the younger leaves. Foliage on the new lateral shoots often will be very narrow and several weeks might elapse before the leaf blades approach normal size.

It has been reported that 40 times more plants can be chemically pinched than can be pinched manually in the same amount of time. Labor costs have been quoted as high as 35% of total production costs, so this spectacular savings in labor seems like an obvious advantage that all azalea growers would fully exploit. It is doubtful, however, if most growers have realized the potential of the chemical pinching agents. Lack of success in the early days of chemical pinching, a need for manual pruning to produce properly shaped plants, a lack of desire to change present production practices, or the initial cost of the chemicals might be reasons for the reluctance of growers to use the chemicals.

A primary concern of growers and researchers should relate to the quality of the plants that are produced with various production practices. Are better plants produced more economically with chemical or manual pinching? What is the effect of either pinching method on floriferousness?

Several experiments have been conducted at North Carolina State University, to compare pinching methods. Extensive efforts also have been made to develop a successful production program for 4" azaleas. These 2 aspects of azalea culture -- pinching of 4" azaleas -- were combined in a year-long study on the cultivar Red Wing. The study was started May 14, 1979 on plants which had been propagated in November, 1978. Pinching treatments are shown in Tables 1 and 2. There were 12 plants in each of the 18 treatments but 4 of the plants in each treatment were given the final pinch in mid-May, 1979 while the remaining 8 plants per treatment were given an additional pinch in mid-July.

Some explanations pertaining to the pinching treatments might be helpful to the reader. In our first experiments with Atrinal we did not manually pinch the plants. Researchers in Belgium and Switzerland combined the 2 pinching treatments to get a maximum number of shoots. They would manually pinch and then apply Atrinal 2 to 5 days later. Reversing the order of pinching also was suggested. The same procedure was followed in this study, with a 2-day interval between pinching procedures. Off-Shoot-O (4.2%) and P293 (0.8%) substituted for the manual pinch in the appropriate treatments. (P293 is the Uniroyal compound which was originally used in chrysanthemum disbudding experiments).

The manual pinch was generally a soft pinch, with little more than the shoot tip being removed unless the shoot was excessively long and required pruning. A maximum period of 8 weeks was allowed to elapse between pinching dates, as flower bud initiation was not desired.

The effectiveness of the pinching treatments on lateral shoot development and flowering are shown in Table 1 for the first phase and in Table 2 for the second phase (plants received one additional pinch). Plants typical of the treatments listed in Table 2 are shown in Figures 1-6. The dates shown in the tables indicate when the new shoots were counted but the pinching dates were in mid-May and mid-July, 1979. Flowering data were recorded in early December, 1979 for plants in the first phase and in March for the second phase.

TABLE 1

Lateral shoot development of 'Red Wing' azaleas subjected to several pinching treatments. Study was started in May, 1979. Plants in this phase were in flower in December, 1979.

Treatment	Number of shoots produced after pinching		Number of flowers December, '79	% of shoots that flowered
	May 14	June 26		
1) Manual; 2.5% Atrinal	5	20	23	65
2) Manual; 3.0% Atrinal	6	20	34	90
3) Manual alone	5	12	26	100
4) Off-Shoot-O; 2.5% Atrinal	5	18	20	61
5) Off-Shoot-O; 3.0% Atrinal	5	22	31	68
6) Off-Shoot-O alone	5	12	26	100
7) P293; 2.5% Atrinal	7	21	31	81
8) P293; 3.0% Atrinal	6	20	33	80
9) P293 alone	5	15	24	87
10) 2.5% Atrinal; manual	5	14	26	100
11) 3.0% Atrinal; manual	5	19	29	84
12) Manual alone	6	13	22	92
13) 2.5% Atrinal; Off-Shoot-O	6	19	31	89
14) 3.0% Atrinal; Off-Shoot-O	7	18	34	100
15) Off-Shoot-O alone	6	15	32	100
16) 2.5% Atrinal; P293	5	18	27	67
17) 3.0% Atrinal; P293	7	22	27	73
18) P293 alone	6	16	29	94

Off-Shoot-O was applied at 4.2% (1:10) and P293 was applied at a concentration of 0.8%.

TABLE 2

Lateral shoot development of 'Red Wing' azaleas subjected to several pinching treatments. Study was started in May, 1979 and was concluded in March, 1980.

Treatment	Number of shoots produced after pinching			Number of flowers March, '80	% of shoots that flowered
	May 14	June 26	August 20		
1) Manual; 2.5% Atrinal	5	19	54	58	57
2) Manual; 3.0% Atrinal	6	19	54	42	41
3) Manual alone	5	12	27	44	81
4) Off-Shoot-O; 2.5% Atrinal	6	18	42	45	57
5) Off-Shoot-O; 3.0% Atrinal	5	17	41	44	61
6) Off-Shoot-O alone	6	13	32	47	75
7) P293; 2.5% Atrinal	6	15	49	67	65
8) P293; 3.0% Atrinal	6	18	53	64	68
9) P293 alone	6	14	29	49	83
10) 2.5% Atrinal; manual	5	18	45	52	62
11) 3.0% Atrinal; manual	6	20	55	63	60
12) Manual alone	5	12	27	53	96
13) 2.5% Atrinal; Off-Shoot-O	5	18	46	69	74
14) 3.0% Atrinal; Off-Shoot-O	6	19	41	55	71
15) Off-Shoot-O alone	5	11	26	52	92
16) 2.5% Atrinal; P293	6	17	39	64	82
17) 3.0% Atrinal; P293	5	20	52	73	71
18) P293 alone	5	15	29	53	83

Off-Shoot-O was applied at 4.2% (1:10) and P293 was applied at a concentration of 0.8%.

## Results and Discussion

First phase: All plants had a similar number of shoots at the start of the experiment (5 to 7). When shoots were counted again on June 26, approximately 6 weeks from the pinch, it was evident that Atrinal had promoted lateral shoot development, as the fewest numbers of shoots were always counted on the plants which had not received the Atrinal application. It did not matter if the Atrinal had been applied before or after the other pinching treatment had been made. The most flowers were produced on plants which had received the higher rate of Atrinal but the percentages of shoots that flowered was generally highest when Atrinal was not used. Atrinal has consistently delayed shoot initiation and development, so such shoots might not have been as receptive to the flowering stimulus as shoots on plants not treated with Atrinal.

Plants in all treatments would have been salable but one of our original questions was "Are better plants produced more economically with chemical or manual pinching?" In this phase a combination of pinching treatments seemed superior to one pinching procedure, whether it was manually or chemically accomplished. Unfortunately Atrinal was not used alone as a treatment. This procedure is being studied once again at N. C. State University.

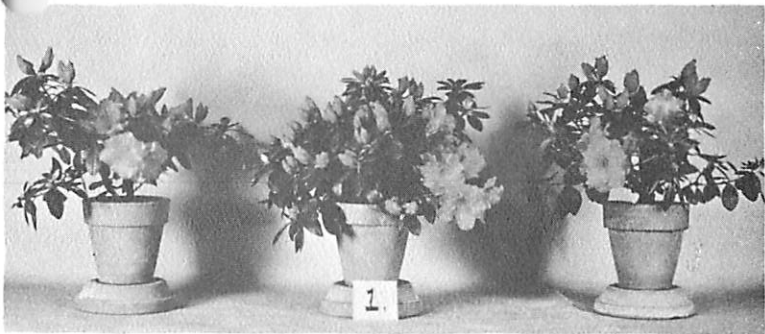
Second phase: Plants given this additional pinch in mid-July usually had over twice as many shoots and flowers as the plants in the first phase. Again, treatment with Atrinal always resulted in a larger number of shoots than when plants were pinched solely by hand, with Off-Shoot-O or with P293 (Table 2). Plants which were manually pinched and then treated with Atrinal 2 days later had exactly twice as many shoots as plants which were only manually pinched. Quite similar results occurred if Atrinal was applied 2 days prior to the manual pinch, though there were differences between the 2 rates of Atrinal when plants were treated this way. The test material P293 was more effective in combination with Atrinal than was the commercial product Off-Shoot-O.

Numbers of flowers were also increased with the dual application of pinching procedures, but the percentages of flowering shoots were again highest when Atrinal was not used. The floriferousness of plants in the various treatments also can be seen in the photographs.

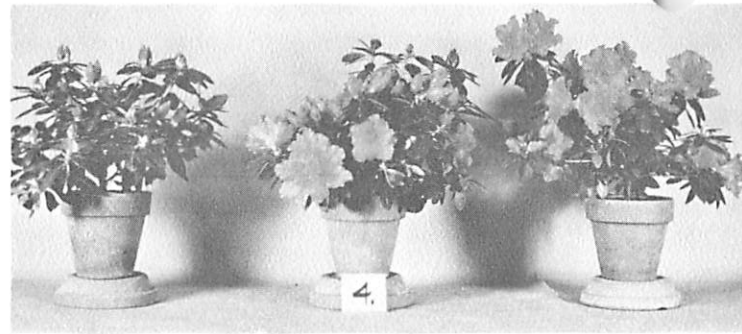
The economics of azalea production has troubled many growers who relate everything to the profitability of producing pot mums. Plants in the first phase should be sold at a lower price than those in the second phase because of the 3-month reduction in production time. They also had fewer shoots and flowers than plants in Phase 2. Some of the plants in the second phase were sold during the Easter holidays at a plant shop located in a large shopping center in Raleigh. Plants which were not decorated with foil or ribbon had a retail price of \$3.50. Plants with pot decoration were \$4.50 while plants placed in decorative baskets cost \$5.50. All plants sold for the same price in the 3 categories, regardless of pinching treatment.

We are now engaged in research where manual pinching is not practiced. It is our opinion that the major advantage of chemical pinching is nullified if the plants must be manually pinched, other than to remove or prune especially long shoots. We want to realize fully the reduced labor costs, so the cost of azalea production can be substantially reduced.

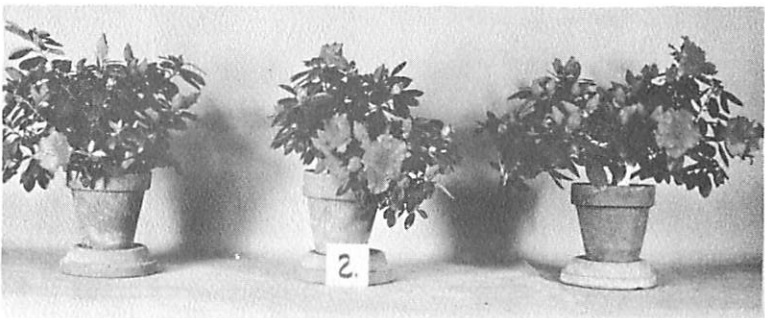
The authors are grateful to Uniroyal, Procter and Gamble and Maag Agrochemicals for their donations of P293, Off-Shoot-O and Atrinal, respectively.



1. Left to right: Manual + 2.5% Atrinal; manual + 3.0% Atrinal; manual alone.



4. Left to right: 2.5% Atrinal + manual; 3.0% Atrinal + manual; manual alone.



2. Left to right: Off-Shoot-O + 2.5% Atrinal; Off-Shoot-O + 3.0% Atrinal; Off-Shoot-O alone.



5. Left to right: 2.5% Atrinal + Off-Shoot-O; 3.0% Atrinal + Off-Shoot-O; Off-Shoot-O alone.



3. Left to right: P293 + 2.5% Atrinal; P293 + 3.0% Atrinal; P293 alone.



6. Left to right: 2.5% Atrinal + P293; 3.0% Atrinal + P293; P293 alone.