plants. The plants are then spread to allow room for the second growing season.

Timing is going to play a large part in the overall growth manipulation of junipers to obtain quality in the container stock. It is the big key to larger profits If what has to be done in the production of container grown junipers is not timed properly, you can be assured that quality and profits will be reduced.

I have discussed with you 10 points to consider in the overall growth manipulation of junipers. You need to neglect or disregard only one of these and the result will most likely be a second or poor quality plant.

Start with a strong, vigorous liner. Use an adequate container filled with a medium in which you can control the moisture and nutrient levels. Closely monitor the water and fertility needs of the plants. Provide control of insects, diseases, and weeds. Shear for proper growth, space for proper size, and overwinter to protect your investment. Above all, properly time each step in the growth manipulation of junipers so you can be assured that quality and profits will be increased.

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CHARLIE PARKERSON: Questions for Blake Fletcher. How do you shear by hand?

BLAKE FLETCHER: We use Corona grass shears and grab-shear. That is, one hand is placed at the correct height and the plant given a single cut. All the branches are an even height.

CHARLIE PARKERSON: Do you pay on a piecework basis?

BLAKE FLETCHER: No, as we feel it is too difficult to control quality.

CHARLIE PARKERSON: Can you produce a 2-gallon plant in the same time as a 1-gallon?

BLAKE FLETCHER: Yes. The only difference is the cost of 2 liners instead of 1

ATRINAL AND OFF-SHOOT-O IN AZALEA PRODUCTION

RICHARD A. SCHNALL

Haywood Technical College
Clyde, North Carolina 28721

The production of azaleas requires that the apical growing points of the plants be periodically removed during the growing

season. This removal induces side branching and produces a well-branched, higher quality plant.

Manual removal is a labor-consuming and costly process. The use of shears to speed up the process often results in neglecting to pinch apical tips occurring below the shearing level. These shoots then grow, and the result is a poorly shaped plant.

Various chemical pinching agents have been developed to replace manual methods This paper compares two of these chemicals.

Off-Shoot-O Off-Shoot-O (2) (methyl ester of fatty acids, Proctor & Gamble) was the first commercial pinching agent for azaleas. It was originally used in tobacco production. When the chemical is sprayed on azaleas, it selectively destroys unexpanded leaves and shoot tips. Branching occurs since lower buds then develop. There must be physical contact between the chemical spray and the shoot tips because the chemical is not translocated.

While many growers have success with Off-Shoot-O, acceptance has been hindered due to problems of stem girdling and crop destruction. Variations in cultural conditions, spray equipment, surfactant, chemical concentration, variety of plant, and maturity of shoot tips have caused erratic and, often, unsatisfactory results (3).

The price of Off-Shoot-O is $65.00 per gal. When applied at a recommended rate of 14 ounces per gal, it costs $7.11 to prepare a gallon of spray. One gallon treats between 100 and 400 square ft of plants.

Atrinal Atrinal (1) (dikegulac, Hoffman-LaRoche) is a plant growth regulator with systemic activity for chemical pinching of ornamental plant materials. When the chemical is sprayed on azalea foliage, it is absorbed and translocated to the plant's apical tips. The chemical temporarily halts apical dominance thereby inducing side branching There is no destruction of plant parts. After treatment, plants temporarily become chlorotic and cease growth. This is followed by a significant increase in the development of new shoots In tests (5), Atrinal has produced more new breaks per shoot than Off-Shoot-O.

While there have been no reports of crop destruction associated with Atrinal, increased production time, due to excessively long delays in growth following treatment, has been experienced by some growers. As yet there is no explanation. In the north the new growth may not have time to harden-off before winter. In addition, a wide range in cultivar response has been noted (3).

However, Atrinal has been demonstrated to have a role in azalea propagation (3,4). Our tests have indicated that Atrinal-

treated stock plants yield cuttings that root normally. These cuttings develop into higher quality liners with more new shoots than cuttings removed from untreated stock plants. In addition, azalea stock plants treated with Atrinal develop more new shoots than untreated stock plants. As a result, more shoots are available for propagation. This can also be an aid in the rapid development of azalea stock blocks.

The price of Atrinal is $89 per liter. When applied at a recommended rate of 1¼ ounces per gal, it costs $3.34 to prepare a gallon of spray.

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AUXINS OTHER THAN INDOLEBUTYRIC ACID WHICH CAN EFFECTIVELY BE USED TO STIMULATE ROOTING

FRANK A. BLAZICH[1]

Department of Horticultural Science
North Carolina State University, Raleigh, North Carolina 27650

The chemical identification and elucidation in 1934-35 of the role of auxin [indoleacetic acid (IAA)] in promoting adventitious root initiation was a landmark in the history of plant propagation (8,9). This advancement led to auxin treatment of cuttings to stimulate rooting and made it possible to consistently root large quantities of cuttings from difficult-to-root plants.

Following the discovery that IAA promoted adventitious root initiation, the search began for other naturally-occurring auxins. Also, chemicals with structures similar and dissimilar to IAA

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