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Use of Benzyladenine to Enhance Production and Postharvest Quality of Floricultural Crops: 1. Branching and Flowering

Sonali Padhye and Wook Oh, Postdoctoral Research Associates
Erik Runkle, Associate Professor
Department of Horticulture, Michigan State University, East Lansing, MI 48824

American Floral Endowment

Funding Industry Solutions
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Phone 703-838-5239
Fax 703-838-5212
E-mail: afe@endowment.org
Website: www.endowment.org

BACKGROUND

Spray applications of the synthetic plant hormone benzyladenine (BA), alone or in combination with (±) the hormone gibberellic acid (GA), reportedly can improve quality of some potted plants by increasing branching and stimulating flowering. However, the use of BA on floral crops has been limited by a lack of adequate information on application techniques, timing, and effective rates of these products. This research evaluated the use of several BA±GA products to improve plant quality. This could increase sales, enhance consumer satisfaction, and generate a higher crop price.

Chemical abbreviations (and commercial products): BA1 = BA (Configure), BA2 = BA (BAP-10), BA+GA = BA+GA_{4+7} (Fascination or Fresco).

MATERIALS & METHODS

Plants were treated with BA1, BA2, or BA±GA at various concentrations and stages of development using different application techniques. The effects on branching and flowering were quantified on *Phalaenopsis* orchids, petunias, geraniums, miniature roses, poinsettias, and purple fountain grass.

RESULTS

Phalaenopsis orchids

Two hybrids of *Phalaenopsis* were sprayed with BA1, BA2, or BA+GA on week 0, 1, and 2 after transfer to an inductive temperature (from 84 °F to 73 °F) to quantify the effect on flowering. Following ≥200 ppm sprays of either BA formulation, Brother Apollo '072' and Golden Treasure '470' averaged 1 or 3 more inflorescences, and 4 or 7 more flowers per plant, compared with the non-treated plants (Figure 1). Plants sprayed with BA also flowered 3 to 9 days earlier than the controls or BA+GA-treated plants. We also determined that inflorescence number was greatest when BA was sprayed one week following transfer to the inductive environment; earlier or later applications were slightly less effective.

Petunias

In *Petunia* Double Wave 'Spreading Rose', an application of ≥100 ppm BA1 21 days after sticking the cuttings increased the number of lateral branches at flowering by >55% compared to non-treated controls. BA sprays ≥100 ppm inhibited the length of lateral branches by >20%

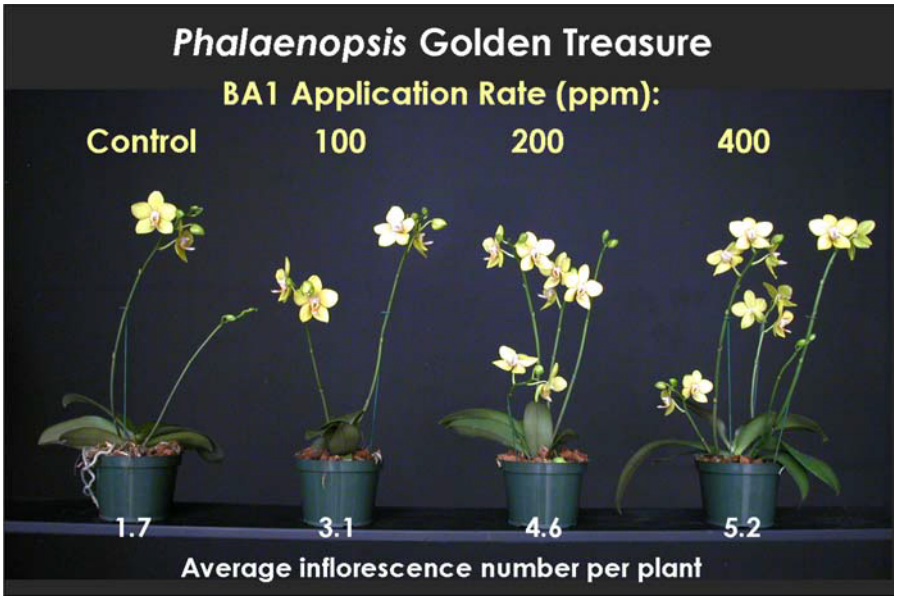

Figure 1. Sprays of benzyladenine (BA) increased the number of flowers and inflorescences per plant in *Phalaenopsis* Golden Treasure.

compared to non-treated control plants.

Geraniums
BA spray treatments did not consistently influence lateral branching of geraniums. BA+GA drenches applied 1 week after transplant at 5 or 10 ppm increased lateral branching. However, there was no obvious improvement in the visual quality of the treated plants. Higher rates of BA as a spray caused phytotoxicity. BA treatments had no effect on flowering time, inflorescence number, or plant height at flowering. Spray applications of BA+GA at high rates slightly increased plant height.

Miniature Roses
In miniature rose 'Alicante', applications of BA1 at 1,000 ppm applied after the second pinch (but not the first pinch) increased the number of lateral branches by about 50% compared with the non-treated plants. BA2 sprays were less promotive at the rates tested. In a separate experiment, 'Alicante' and 'Alto' miniature rose developed more branches by increasing the BA1 rate from 0 to 2,000 ppm and sprayed after the second pinch (Figure 2A, B).

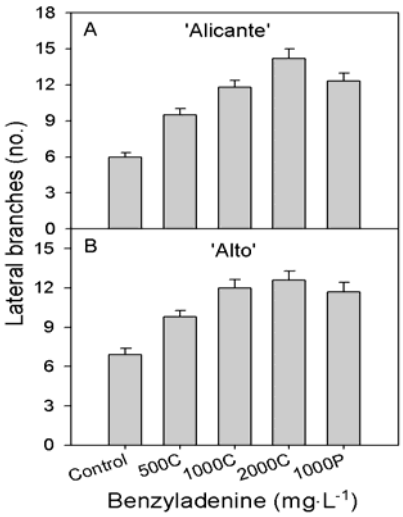

Figure 2. BA sprays promoted lateral branching of miniature rose 'Alicante' (A) and 'Alto' (B). C = Capsil; P = Penta-Bark.

Figure 3. A greenhouse crop producer is using information generated from this project to increase flowering of potted *Phalaenopsis* orchids.

Poinsettias and Purple Fountain Grass
In poinsettia 'Freedom Red', application of BA1, BA2, or BA+GA had no effect on primary branching of shoots. Some treatments increased the number of secondary laterals produced, but there was no obvious improvement in plant appearance at flowering. In purple fountain grass, sprays of either BA formulation at up to 1,000 ppm did not have a consistent effect on tiller number, flowering time, or the number of inflorescences at flowering.

CONCLUSIONS
We have identified how BA±GA can improve branching and flowering of the potted flowering crops, particularly *Phalaenopsis* orchids, petunias, and miniature roses. This information could be used by greenhouse growers to improve the quality attributes of these crops.

IMPACTS TO THE INDUSTRY
Using BA products to enhance flowering of orchids has generated significant greenhouse grower interest. One greenhouse company in the Midwest has already implemented and validated our research findings and is using BA to improve flowering of potted phalaenopsis orchids (Figure 3). They estimate that the number of plants with multiple spikes has increased by at least 60%, which has increased the price they can receive by 15% to 25%.

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For Additional Information
Contact: Erik Runkle by E-mail at runkleer@msu.edu or read the article entitled "Improving Branching and Postharvest Quality" published in the August 2008 issue of GPN magazine.