

Evaluating the Influence of Benzyladenine on Branching of *Echinacea* Cultivars

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Introduction

Echinacea cultivars are one of the top 10 herbaceous perennials grown and sold in the United States. The recent introduction of *Echinacea* hybrids in new attractive colors has boosted the consumer interest and sales. Commercial growers producing finished *Echinacea* for spring sales are interested in improving its quality by manipulating production practices to obtain aesthetically appealing plants that are well-branched and compact in height. Young plant producers are also interested in increasing branching of *Echinacea* cultivars to maximize the number of cuttings obtained from stockplants.

Benzyladenine (Configure, Fine Americas) foliar sprays have been reported to promote branching of select *Echinacea* cultivars. Most of these studies have been performed on seed-propagated cultivars with an exception of a few with the new hybrids. The seed-propagated *Echinacea* cultivars are typically more vigorous and branch more readily compared with the new inter-specific hybrids. A commercial young plant producer of *Echinacea*, Emerald Coast Growers has reported that Configure sprays did not increase branching of several *Echinacea* hybrids when stage-3 tissue culture plants were planted and sprayed in the early spring of 2008. The influence of Configure sprays on branching of the new *Echinacea* hybrids needs further investigation. It has been reported that the timing of Configure application during the development of *Echinacea* may also influence the branching and should be further studied.

The flowering of *Echinacea* in response to photoperiod has been well-documented for seed propagated cultivars such as 'Bravado' and 'Magnus'. Under 10- or 12-hour photoperiods, these cultivars rosette, and they flower rapidly under a 14-hour photoperiod or when plants are grown under short-days (10-hour photoperiod), followed by long-days (24-hour photoperiod) (short-long-day treatment). When grown under a 16-hour photoperiod or night interruption treatment, flowering is delayed compared with that under a 14-hour photoperiod or short-long-day treatment. Based on these photoperiodic responses, we postulate that photoperiod may be a regulatory factor during the development of lateral branches of *Echinacea* and warrants further studies. The objectives of these experiments are to: 1) quantify the influence of Configure sprays on branching of select new *Echinacea* hybrids, 2) determine the influence of timing of Configure application on branching of *Echinacea* cultivars, and 3) investigate the effect of photoperiod on branching of *Echinacea* cultivars sprayed with Configure.

Materials and Methods

Experiment-I

Objective: Quantifying the influence of Configure sprays on branching of select new *Echinacea* hybrids and determining the influence of Configure application timing on branching of these cultivars.

Protocol: Young plants of *Echinacea* ‘Harvest Moon’ or ‘Twilight’ (reportedly most difficult to branch), ‘After Midnight’ (reportedly average branching), ‘Sunrise’ or ‘Summer Sky’ (reportedly easier to branch) (stage 3 tissue cultured) and ‘Magnus’ (seed propagated cultivar for comparison) will be obtained from Emerald Coast Growers. Plants will be transplanted in a peat-based medium and grown in the polycarbonate greenhouse at WFREC, Milton under a 16-hour photoperiod provided as a day-extension using high-pressure sodium lamps.

Half the *Echinacea* plants of each cultivar will be sprayed with Configure at transplant and the remaining half will be allowed to grow until the roots circle the pots (~3 weeks) and then sprayed with Configure. Configure will be applied as a single foliar spray (volume of 2 quarts/100 ft², with Capsil as a surfactant) at 300, 600, or 900 ppm rates. An additional treatment will consist of 600 ppm Configure at the same spray volume with Penta-Bark as a surfactant added at the labeled rate. A non-sprayed control will be maintained. Ten plants will be subjected to each treatment combination. The fertility and pest management will be as per standard protocols developed at WFREC.

The number of lateral branches and plant height (from surface of the medium to the apical meristem) will be recorded at least two times when differences in branch numbers are observed (possibly 3 and 6 weeks after Configure application). Additionally, at first open flower, data collection will include date, number of branches, number of flower buds, and plant height.

Treatments and Plant Numbers:

2 application times + 3 chemical rates + 1 Penta-Bark treatment + 1 non-sprayed control = 9 treatments per cultivar

Total = 9 treatments x 10 plants/treatment = 90 plants per cultivar (360 plants total)

Estimated Start Date: June 2008

Experiment-II

Objective: Investigating the effect of photoperiod on branching of *Echinacea* cultivars following Configure sprays.

Method: Based on the results of experiment-I, appropriate developmental stage, Configure spray rate and surfactant to promoting branching of *Echinacea* cultivars will be selected. Young plants received from Emerald Coast Growers will be transplanted and sprayed with Configure. Plants will be grown in polycarbonate greenhouse at WFREC under a 9- or 16-hour photoperiod. Data collection will be similar to experiment-I.

Treatments and Plant Numbers:

2 photoperiods + 2 treatments (Configure treatment + non-sprayed control) = 4 treatments per cultivar

Total = 4 treatments x 10 plants/treatment = 40 plants per cultivar (160 plants total)

Estimated Start Date: About 2-4 weeks after the end of experiment-I.

Photographs will be taken to document plant responses in both the experiments.

Budget: \$6,000