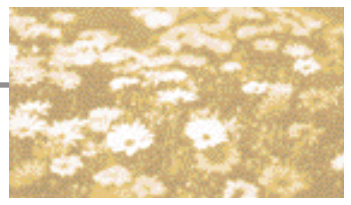

Black-Eyed Susan: A Novelty Potted Plant

A combination of pinching and growth regulator application achieves the most uniform flower development for dwarf rudbeckia cultivars produced as potted plants.

By Meriam Karlsson

Rudbeckia, or black-eyed susan, is a well-known perennial garden plant. The two most commonly grown species are *Rudbeckia fulgida* and *Rudbeckia hirta*. *R. fulgida* is a perennial herb that grows to a height of at least 24-30 inches; *R. hirta* is often treated as an annual because it rarely survives cold winters and readily reseeds itself. Several dwarf *R. hirta* cultivars such as 'Becky Mix', 'Sonora' and 'Toto' are now available. The height of these dwarf cultivars is 10-15 inches and expected production time is between 12 and 16 weeks. Many perennials sold as flowering house plants perform well when planted outside in full bloom. An alternative is to market dwarf *R. hirta* as a flowering potted plant and then later plant it outdoors as a bedding plant.

UNIFORMITY AND QUALITY

Plant growth regulators such as B-Nine, Cycocel and Bonzi improve crop uniformity, marketability and overall plant quality of many floral crops. Due to environmental concerns, health risks and costs, attempts are emphasized to decrease the use of growth regulators and other chemicals. Environmental management may be used, for instance, to enhance greenhouse crop performance. Close temperature monitoring, including the relationship between day and night (DIF), is commonly used to control plant height. However, correctly used growth regulators remain effective height management tools when other methods are inadequate, impractical or unavailable.

Application techniques and strategies are continuously developed, researched and tested to improve efficiency at a reduced rate or amount of a growth regulator. As an example, promising results have been recorded with applications directly to the surface of the medium prior to planting. The growth regulator becomes available to the roots as plants are irrigated and the substance moves down through the medium. Compared to a traditional drench or spray application, the media spray technique is less labor-intensive. In addition, the application rate can be reduced, and the growth regulator is more efficiently utilized with decreased risk for plant injury or phytotoxicity.

In some floral crops, the development of lower buds is suppressed and held back while the top flower is developing. Removing the top growing point (pinching) early in production promotes the development and uniformity of all shoots and flowers on a plant. Taking the top flower bud off at a stage when the bud is half an inch or smaller allows the lower flowers to develop and open at a similar time. This method is sometimes called center budding and is commonly used for the uniform flower development of, for instance, daisy-type chrysanthemums.

Since dwarf rudbeckia cultivars are relatively new on the market, the response to specific production techniques and growth regulators for potted plant production is not known. B-Nine has earlier been reported effective for controlling height of rudbeckia

TURNING POTTED PLANTS INTO PROFIT PLANTS

Success is all about improving margins, minimizing costs and staying strong in the market. One of the key ways to improve margins and decrease costs is through efficiency. Efficiency, loosely defined, is the ability to produce with the least amount of effort; experience usually brings efficiency.

A large part of this equation is under the grower's control in the greenhouse business. Through hard work and focus, growers typically develop skill sets that align with given types of plants. As their experience defines their product line, their efficiency grows. Growers share stories of their first crop of a given plant type: it developed the disease du jour, the entire crop died in unison, it cost twice what it could be sold for, and so the stories go. Yet, as growers experience a crop and develop their skills, their operation defies that of the most sophisticated industrial production facility. They learn the short cuts, they learn how to avoid pests and diseases, they find just what it takes to "dial in" that crop — they become efficient.

Tuberous begonia 'Fortune Salmon Rose' surrounded by impatiens 'Carnival Metallic Deep Salmon', Diamond Phlox 'Drummond: Blue w/ Dark Eye' and white sweet alyssum.

The margins improve and the costs are minimized. Now, for the market. Consumers have screamed what they want this year. "It" needs to have size. "It" needs to be a sure bet. "It" needs to be immediate satisfaction. That completes the formula — that's the market.

Use what you already know — what you're good at — and make it look like that "sure bet" that the retailers and consumers are looking for.

At the Daehnfeldt pack trial, that "efficiency" is just what was emphasized. Daehnfeldt helped growers look at what they already do (and do well!) and build on that efficiency to meet the market head on. Growing varieties that the operation already does well, then simply marketing them differently, can help growers realize improved profitability. Displays encouraged the grower to consider the "same ol' plant material" they grow efficiently and simply look at how they are presenting it to the market. The begonia that has been the mainstay of the operation can mean improved profits with a simple shift in the container. Grown in a large container or placed into a hanging basket, those same grower skills can bring home enhanced profits. And, for the growers who have developed a number of "standby" crops, mixed containers are the answer. Daehnfeldt displayed simple yet colorful and engaging mixed containers ranging from floor-level patio containers to hanging baskets and window boxes. All are "fast sells" on the retail floor and reap improved margins, yet incorporate the same skill sets that helped the grower to succeed all along. Efficiency — with a twist.

Gypsophilia 'Garden Bride' is used to surround Hypoestes 'Confetti Pink Hypoestes, 'Carnival' impatiens and 'Blue Astra' Playcodon.

So use those skills. You worked hard to develop them. Just show them off a little differently.

— Kathy Cron, Director of Marketing Daehnfeldt

while Cycocel was ineffective. Information on the efficacy of other commonly used growth regulators is not available for *R. hirta*. This study was therefore initiated to evaluate growth regulators, pinching and center budding for the development and flowering of dwarf *R. hirta*.

EXPERIMENT CONDITIONS

Seed of the cultivar 'Toto' germinated at 68 ± 4° F. Seven weeks after seeding, plants with 7-8 expanded leaves were transplanted into 4-inch pots filled with Premier Pro-Mix BX (Premier Horticulture; Premier Brands, Inc., Red Hill, Pa.). The plants were grown in a greenhouse with a polycarbonate covering at a spacing of four pots per sq. ft. High-pressure sodium lamps supplemented natural light to provide 16 hours of light each day. The daily light at the height of the plants was approximately 7.2 mol·d-1·m-2 or about 600-650 foot-candles throughout the 16 hours. Temperature was maintained at a constant 64 ± 4° F. Plants were watered once per day with a fertilizer solution of 100 ppm nitrogen using Peters' 15-16-17 (The Scotts Company, Marysville, Ohio).

Resulting plant growth after media surface application (top) and spray application (bottom) of PGRs. (All photos courtesy of Meriam Karllson)

The growth regulators tested were Bonzi, Sumagic and B-Nine. Bonzi and Sumagic were used as plant sprays or sprayed directly to the surface of the growing medium immediately prior to planting as a media spray. Since B-Nine is not effective as a drench or when applied to the surface of the medium, B-Nine was only used as a plant spray. In addition, pinching and center budding were compared to the use of growth regulators.

Bonzi at a rate of 20 ppm and Sumagic at 10 ppm were used for both media and plant applications. The rate of B-Nine was 5,000 ppm. The media surface of each pot (12.2 sq. in.) was treated with a 0.054-fluid ounce solution resulting in 0.032 milligrams (mg) active ingredient (a.i.) Bonzi and 0.016 mg a.i.

Sumagic per pot. The rate of 0.054 fluid ounces per pot was based on the recommendation to use two quarts per 100 sq. ft. For plant sprays, a 0.34-fluid ounce solution was used for each plant, resulting in 0.2 mg a.i. Bonzi, 0.1 mg a.i. Sumagic or 50 mg a.i. B-Nine per plant.

RESULTS

Pinched plants had the top bud and stem above the most recently fully expanded leaf removed two weeks following transplant. At the time of pinch, the plants had on average of 14 leaves and a plant height of 2.4-2.8 inches. Center budded plants had the top flower bud removed at the bud size of 0.2-0.4 inches seven weeks from transplant.

Time to the first and third open flowers was recorded as days from seeding. Plant height, plant width, flower and bud number were documented for individual plants as they reached flowering. Height was measured from the surface of the growing medium to the tallest point of the plant and the width as the diameter across the plant.

Average height of untreated plants was 9.5 inches (Figure 1). There was no significant difference in height between the control plants and those with the top flower bud removed (center budding). Pinching reduced overall plant height at flowering by an average of 0.8 inches. Plants sprayed with Sumagic were shortest with an average height of seven inches. B-Nine and Bonzi applied as plant sprays and Bonzi and Sumagic as media applications resulted in plants with a similar plant height of eight inches at flowering.

The untreated control plants had one open flower after an average of 110 days from seeding (Figure 2). The development and flowering of black-eyed susan is highly dependent on light conditions. Flowering was relatively slow in this study and an increased light intensity is expected to result in faster development. Removing the top flower bud (center budding) did not affect the time the first or the following two flowers opened, compared to control plants. Pinching or growth regulator application delayed the opening of the first flower by 4-5 days.

The shoot and flower development of each individual plant varied with the method of growth regulator application (Figure 2). Plants sprayed with growth regulator had slower development by approximately seven days compared to the opening of the first three flowers. Black-eyed susan receiving a media spray of growth regulator developed three open flowers at the same time as the control plants. Pinching the plants

resulted in faster opening of the first three flowers by four days compared to the untreated control plants. The difference in rate of flowering (three open flowers) among pinched plants and those treated with a media application or center budding was too small to be statistically significant.

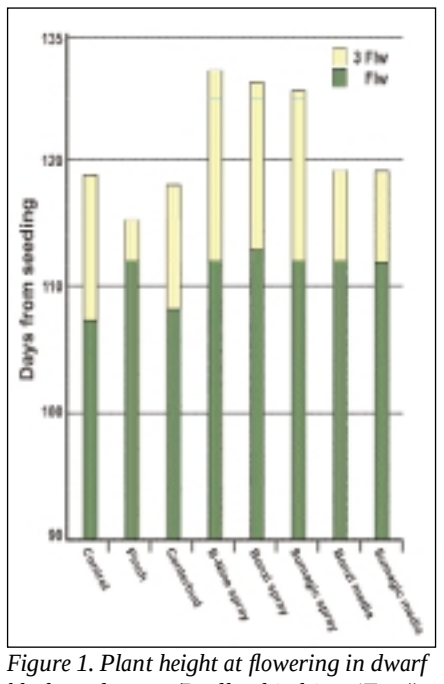

*Figure 1. Plant height at flowering in dwarf black-eyed susan (*Rudbeckia hirta *'Toto'). Plants were treated with a spray application of B-Nine, a media or plant spray application of Bonzi or Sumagic, or left as untreated control plants. In addition, plants pinched two weeks from transplanting and plants with the top flower bud removed seven weeks from transplanting (center bud) were included for comparison.*

CONCLUSIONS

Only one application rate was included in this study for each growth regulator. The most efficient application for reducing overall plant height was the plant spray application of Sumagic (Figure 1). To produce *R. hirta* with a height similar to those treated with Sumagic, the other growth regulators may need to be applied at a higher rate. There was no delay in development and flowering for plants treated with a growth regulator in the form of a spray to the media surface. These media spray results are promising for getting good control of plant height with only one growth regulator application at a considerably lower rate than required for a plant spray.

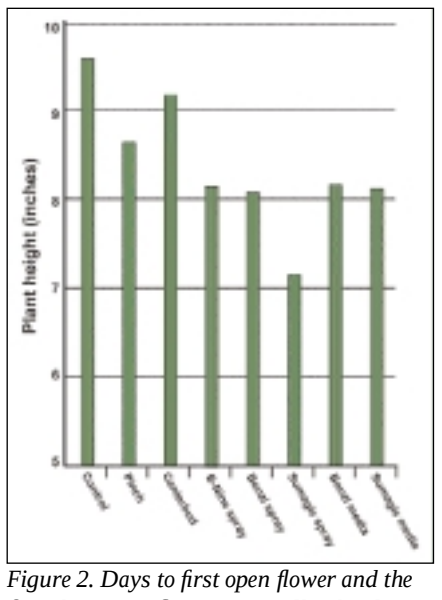

Figure 2. Days to first open flower and the first three open flowers in Rudbeckia hirta *'Toto.'.*

Center budding did not affect height, overall flower development, plant uniformity or quality compared to untreated control plants (Figures 1 and 2). Therefore, removing the apical flower bud appears inefficient and unnecessary in dwarf black-eyed susan production. Pinching produced the most uniform flower development and is beneficial to achieve high-quality potted *R. hirta*. Due to the limited height reduction, however, pinching may need to be combined with a growth regulator application or other production technique such as DIF to result in a well-proportioned, containerized *R. hirta* 'Toto'. GPN

Editor's Note: The use of specific trade names in this publication does not constitute endorsement of these products in preference to others containing the same active ingredients. The use of trade names is solely for the purpose of providing specific information and does not signify that they are approved to the exclusion of others. Mention of a product does not constitute a guarantee or warranty of the product by the author or magazine.

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