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DIANTHUS 'BOUQUET PURPLE' AS A POTENTIAL CUT FLOWER FOR FLORIDA IS INFLUENCED BY COMPOST AMENDED MEDIA AS TO GROWTH, YIELD AND QUALITY

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Abstract. **Plug seedlings of 'Bouquet Purple' Dianthus (*Dianthus baratus* × *chinensis*) were planted on 15 cm centers in 1.2 m wide beds amended with two applications of cured municipal solid waste/biosolids co-compost at rates of 1.5, 3.0, and 6.0 $m^3/100\ m^2$ of bed space on 9 January 2002. The experimental design was a randomized complete block design with three replications. 'Bouquet Purple' is an interspecific hybrid of two *Dianthus* species and is a tall cut-flower Dianthus with potential for cut-flower growers in Florida. The first flowers were harvested on 15 March 2002 and the experiment terminated on 6 May 2002. Maximum harvest occurred on April 8. Results showed that increased rates of compost amended media positively influenced growth parameters such as quality, stem length and yield. The control yielded 2.1 marketable stems (greater than 45 cm stem length) per plant and as compost rate increased yield was 3.6, 4.0 and 7.1 harvested quality stems per plant respectively. These findings were expected from results previously reported on sunflower and results on other crops in the extensive literature on compost amended media. After the end of April, the yield of non-commercial grades dominated production while stems greater than 45 cm ceased for all treatments. Further, the study demonstrates the potential for 'Bouquet Purple' as a specialty cut flower in Florida with high sustained yields of quality flowers as a cool season premium cut flower.**

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The primary purpose of the University of Florida specialty cut flower program is to study the cultural physiology of crops that may be grown as specialty cut flowers and make these findings available to the specialty cut flower industry and scientific community. Dianthus 'Bouquet Purple' is an interspecific hybrid of two Dianthus species (*Dianthus baratus* × *chinensis*) and is a tall cut-flower Dianthus with potential for specialty cut-flower growers in Florida. Dianthus 'Bouquet Purple' and similar cultivars are new plants to commerce and appear to date only in literature related to trial garden results and not in the refereed literature. The following websites, http://www.florifacts.umn.edu/trials.html and http://www.

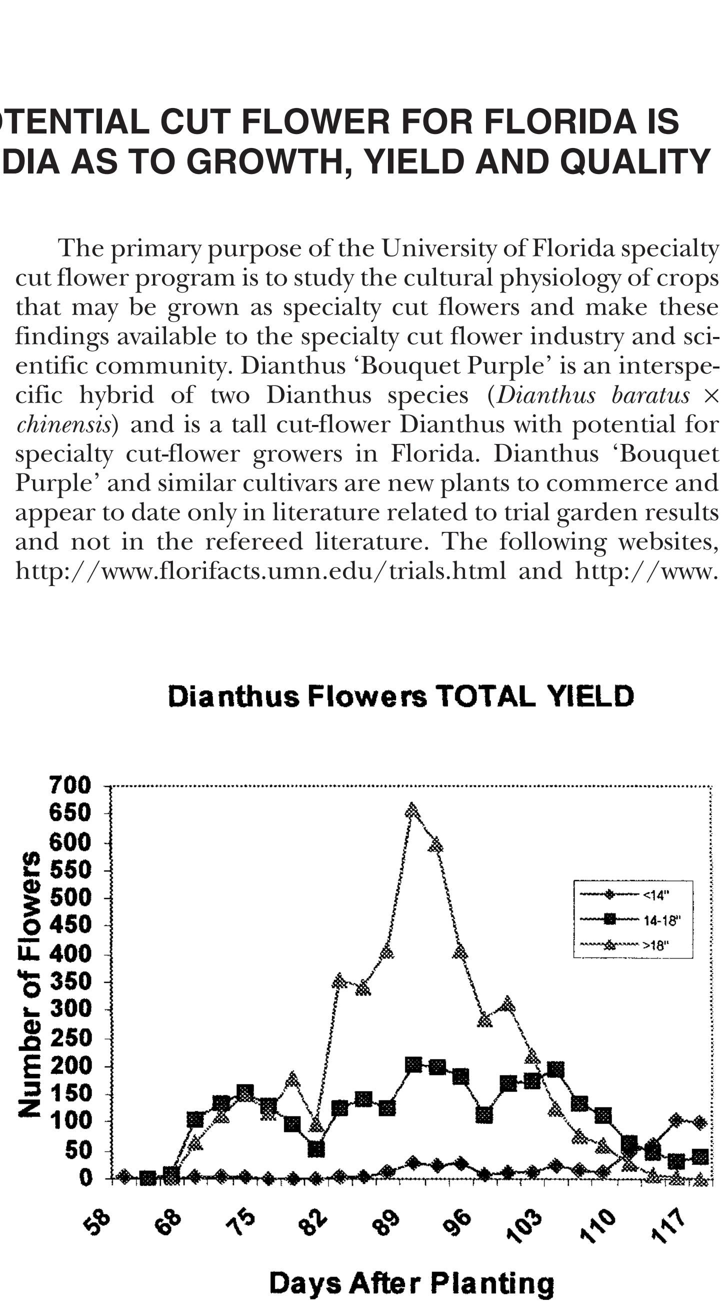

Fig. 1. Total yield and harvest distribution of Dianthus 'Bouquet Purple' in each of three stem length quality categories.

argia.org/Arkansas_Select.html list 'Bouquet Purple' as a desirable garden plant but does not mention its potential as a premium cut flower. We hypothesize that Dianthus 'Bouquet Purple' when grown in the cooler months of the year in Florida will produce good yields of marketable flowers, greater than 46 cm stem length. Similarly, as we reported for Sunflower (*Helianthus* sp.) (Emino and Hamilton, 2002a) we hypothesize that if we improve the root environment with the addition of mature cured compost, growth, yield and quality will be enhanced.

Materials and Methods

Plug seedlings of 'Bouquet Purple' Dianthus (*D. baratus* × *chinensis*) were planted on 15 cm centers in 1.2 m wide beds amended with two application of cured municipal solid waste/biosolids co-compost at rates of 1.5, 3.0, and 6.0 m^3/100 m^2 of bed space on 9 Jan. 2002. The experimental design was a randomized complete block design with three replications. There were 91 plants per treatment. Culture of the plants was based on Armitage (1993) and Dole and Wilkins

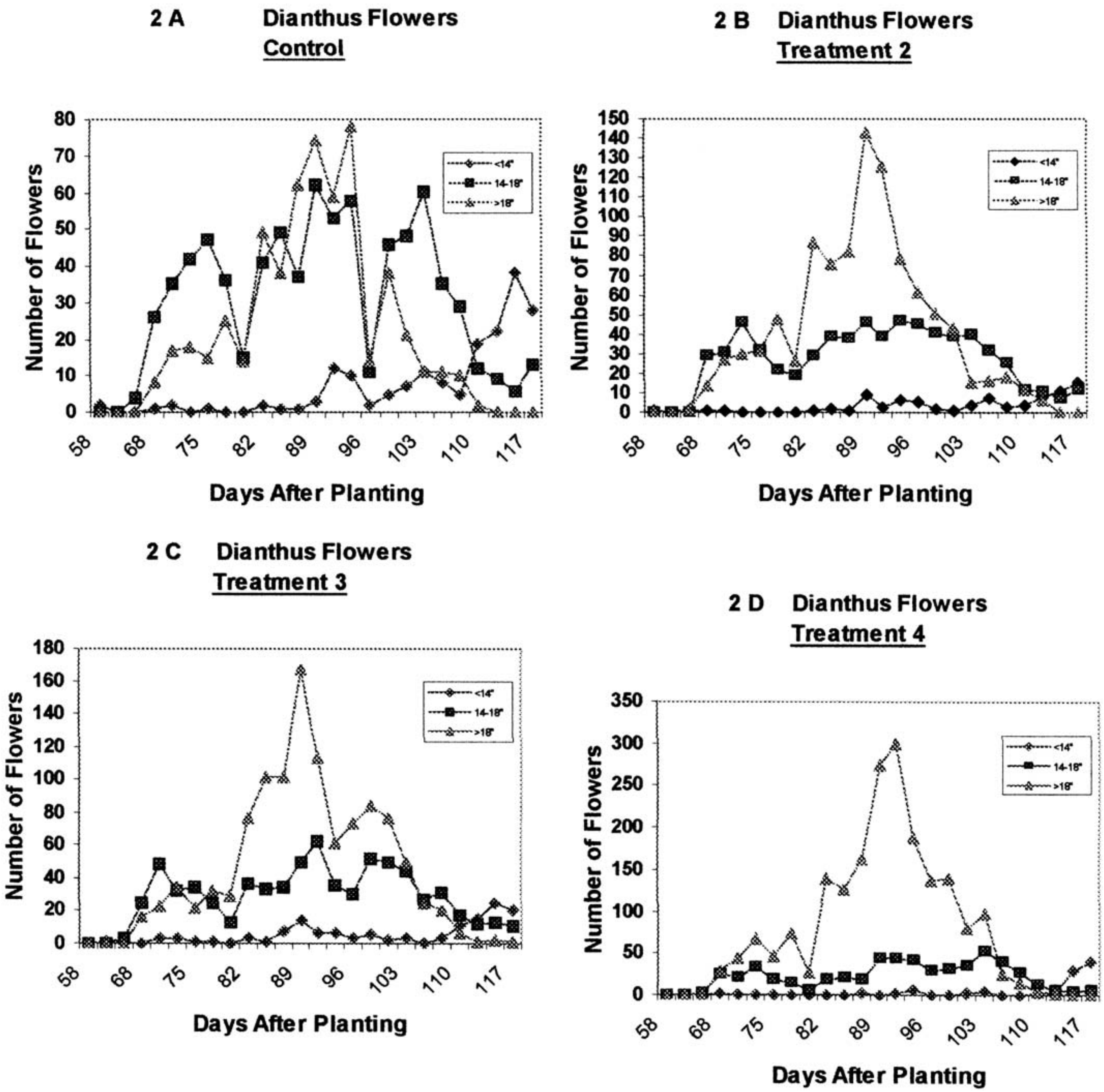

Fig. 2A-D. The total yield and yield distribution by stem length as influenced by increasing rates of compost. Treatment 1 is the control or zero rate, treatment 2 is 1.5, treatment 3 is 3.0 and treatment 4 is 6.0 m^3/100 m^2 respectively of cured municipal solid waste compost as a soil amendment. Note the Y axis scale increases from A-D to show the increase in yield from increasing rates of compost.

(1999) for *D. barbatus*. Harvesting started on 15 Mar. and continued to 6 May. After each twice weekly harvest, the flowers were graded into three quality categories based on stem length, those under 35.5 cm, between 35.5 and 46 cm, and greater than 46 cm. Stems over 46 cm were defined as marketable flowers, while stems between 35.5 cm and 46 cm were suitable for farmers market bouquets and less than 35.5 cm were culls. Data included the number of days to anthesis and the yield in each quality category for harvest date. Yield data was subjected to statistical analysis.

Stems exceeding 46 cm and length were combined into 10 stem bunches and placed in a simulated postharvest consumer environment of 21 °C, 60-65% relative humidity, and 14 $\mu moles \cdot m^{-2} \cdot s^{-1}$ irradiance using cool-white fluorescent lamps for 12 $h \cdot d^{-1}$. Dianthus flowers were evaluated as described by Emino and Hamilton (2002b).

Results and Discussion

The first flowers were harvested on 15 Mar. 2002 and the experiment terminated on 6 May 2002. Maximum harvest occurred on 8 Apr. The results of the overall harvest (yield and distribution of yield) from all treatments are presented in Fig. 1. This data shows that large numbers of marketable flowers were produced from the planting. After the end of April, the yield of cull (non-commercial) grades dominated production while stems greater than 45 cm ceased for all treatments. The experiment was ended based on that data.

Compost amended media positively influenced growth parameters such as quality, stem length and yield and is presented in Fig. 2 A-D. These figures show the total yield and distribution of yield from increasing rates of compost amendment. The control (Fig. 2A) yielded 2.1 stems greater than 45 cm stem length per plant and as compost rate increased yield was 3.6 (Fig. 2B), 4.0 (Fig. 2C), and 7.1 (Fig. 2D) harvested marketable stems per plant respectively. This is consistent with the earlier results we obtained with sunflowers in the same treated growing area (Emino and Hamilton, 2002a) and with the same compost (Biaz and Emino, 2002) in pot culture. Also these findings are expected from results previously reported results on other crops in the extensive literature on compost amended media. Clearly these graphs show a increased yield of total flowers and the higher grade of flowers as the compost level in the growth media is increased. Work by Zinati and Emino (2002) reported on compost analysis of these amended plots and noted of all the parameters measured, cation exchange capacity was sufficiently different and positively related to the growth data. Nutrient content of major elements were not significantly different although some minor elements were higher in the compost beds, but these levels should not have been limiting factors in the control. Thus, the addition of compost positively affects quality and yield of Dianthus, presumably from the benefits of increased holding and availability of applied nutrients from the increase in cation exchange capacity and from the intangible aspect of improved soil quality such as drainage, gas exchange and workability.

The results of the post harvest study are presented in Fig. 3. The actual longevity data plotted clearly shows the benefit with fresh flower food. Those flowers in water as the vase solution started to decline on day six and all flowers had declined beyond consumer acceptance by day 11. Those in the preservative (Floralife Crystal Clear®) vase solution started to

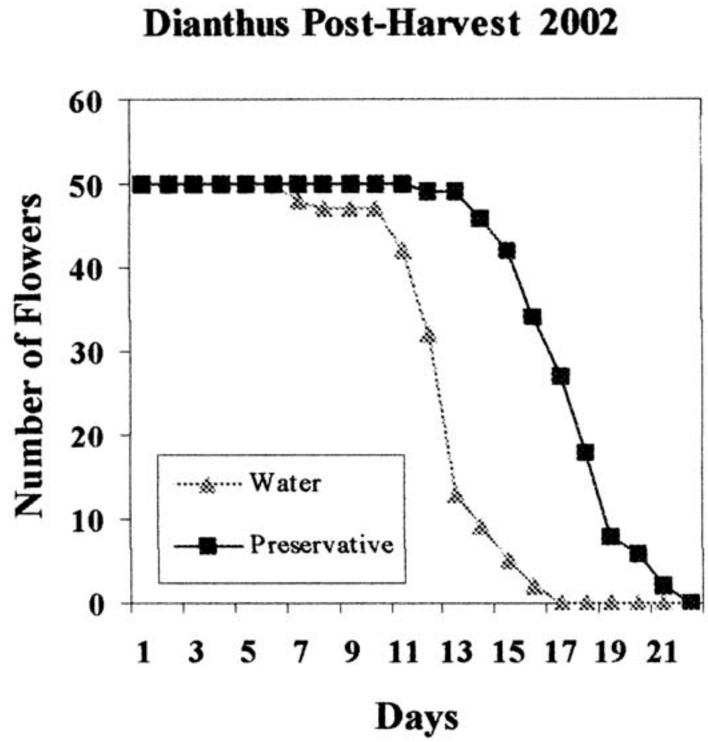

Fig. 3. The influence of fresh flower food (preservative) compared to plain water as vase solutions on the postharvest performance of Dianthus 'Bouquet Purple'.

decline on day 13 and lost all consumer acceptance on day 15. Nell and Reid (2000) described the benefit of preservatives for *D. barbatus* and Dianthus 'Bouquet Purple' responded similarly. These four to five additional days in addition to being statistically significant, makes a great difference in consumer satisfaction with cut flowers.

In addition to the yield per plant data, this data was converted to Imperial units as yield per square foot. The data is presented as total yield and yield of marketable stems and is presented in Fig. 4. The 29.0 stem per ft^2 yield from the 6.0 $m^3/100\ m^2$ treatment was significantly higher using Tukey's Mean Separation Procedure than the other rates of compost and the control. Further the 16.4 stem per ft^2 of the 3.0 $m^3/100\ m^2$ treatment was significantly higher than the control which had 8.3 stem per ft^2. The lowest rate compost treatment had 14.6 stem per ft^2 yield. Since 'Bouquet Purple' is not widely grown in the specialty cut flower industry to date we were not able to obtain price data but at the time these were grown, but a typical price of a 10 stem bunch of *D. barbatus* was $4.00 USD. This would be a gross return of $11.60 per ft^2 from the best treatment for a growing and harvesting window of four months. Returns could even be higher if a market was available for the 35.3 cm to 46 cm category for bouquets and/or farmers market sales.

The study concludes by accepting both hypotheses. 'Bouquet Purple' can be grown as a specialty cut flower in Florida with high sustained yields of quality flowers as a cool season premium cut flower. Further, by amending growing beds with well cured compost, yields can be enhanced over the control as the treatment with the highest rate of compost gave the best results. Dianthus 'Bouquet Purple' also benefits from the addition of fresh flower food (floral preservative) in postharvest handling and care.

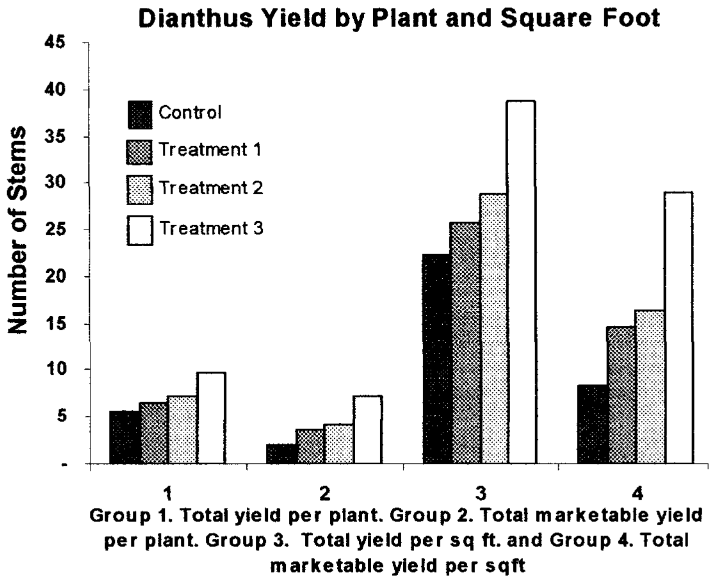

Fig. 4. Yield per plant and per square foot as influenced by increasing rates of compost soil amendment. HSD at the 5% level of significance is 1 = 1.4, 2 = 1.8, 3 = 5.6, and 4 = 7.3.

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