Bulletin 463
January 1989

Edited by Joe J. Hanan

Colorado State University

research bulletin

Published by the Colorado Greenhouse Growers' Assoc., Inc. in cooperation with Colorado State University

SCHEDULING SINGLE STEM JAPANESE CUT ASTERS

Part II: Winter and spring responses of Japanese cut asters

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Results of the summer experiment confirmed previous cultivar responses (Part I, CGGA Bul. 462). Asters grown under short days flowered in 33 days as contrasted to long day plants which flowered in 46 days.

Methods

Four of the aster cultivars, 'Matsumoto Red', 'Rose', 'Purple', and 'Pink', involved in Part I (Bul. 462) were used in this study. Plants were grown in a fiberglass covered, east/west oriented greenhouse and watered three times daily with the continuous feed program. Seeds were sown on May 9, transplanted to cell packs on May 28, and planted in 6-inch pots of pea gravel on July 9. Part I temperatures were used and no CO_2 fertilization. Each photoperiod treatment had three pots each containing three plants of a cultivar. The following long natural day (ND)/short day (SD) treatments were applied on the planting date:

Treatment No.	Treatment Applied
1	SD, blackclothed from start to finish
2	One week ND, moved to SD until harvest
3	Two weeks ND, moved to SD until harvest
4	Four weeks ND, moved to SD until harvest
5	Five weeks ND, moved to SD until harvest
6	Six weeks ND, moved to SD until harvest
7	ND, natural days from start to finish

Blackcloth was drawn from 7:00 p.m. to 8:00 a.m. for a total of 13 hours of darkness. Natural long days varied from 13 to 15 hours of daylight in Fort Collins at the time of this experiment.

[1] *Professor, former graduate and undergraduate Research Assistants, respectively.*

Flowers were harvested and data recorded when the terminal flower began to dehisce pollen. Parameters measured included:

Days to Harvest (DTH) — Days to harvest from potting,
Stem length — from growing medium to tallest flower,
Buds — total number of buds showing color at harvest, and
Quality — Stems graded using scale from Part I.

Results

The data from the summer experiment reinforced the previous cultivar responses in relation to height and DTH. Plant responses were similar to those occurring in the March planting (Part I). Overall comparisons indicated that reduced solar radiation was the major limiting growth factor when the asters were planted in December, January and February.

Stem lengths of plants grown in mid-summer were slightly longer **(Fig. 1)** than those produced during winter months (Bul. 462). The same graphs indicate that the most lateral breaks/buds were developed when plants were grown in SD photoperiods. But, there was only a slight reduction, which was not significant, when three to four weeks of LD preceded the SD treatments.

The stem lengths and bud count of plants grown to full flower in either SD or LD treatments were not only statistically significantly different but presented highly visible differences **(Fig. 2)**.

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The plants grown in continuous SD were ready to harvest 33 days after planting and those in the long day (ND) treatment required 46 days. There were no significant differences in the number of days required to harvest flower stems after three weeks of LD photoperiod treatments had been given. The quality of the flower stems harvested in Part II were comparable to the results in Part I.

Conclusions

High quality 'Matsumoto', 'Chikuma' and 'Kurenai' cut asters can be grown year around in the greenhouse by manipulating the photoperiod. Plants given LD photoperiods from germination until three to four weeks after planting, then followed by SD until harvest, will provide 24-inch, quality flowers approximately 55 days (winter months) after they are benched or potted (in gravel). Spring, summer and fall planting can yield quality flowers in 46 to 50 days. If grown in soil, at least seven more days will probably be required to produce marketable stems.

Blackclothing would not have to be used in the summer if slightly lower quality flowers with longer stems (30+ inches) can be tolerated. However, three weeks of ND followed by SD until harvest (approximately 3 weeks) will provide excellent quality with slightly shorter stems.

The post harvest requirements are similar to those for spray mums, including keeping life. Marketing for this crop is going to be the key to its success and a few growers may want to eventually specialize in it. Research is presently underway to determine how the stems should be marketed and the percentage of grades.

Discussion

Growers are encouraged to become acquainted with cut aster production using the Matsumoto series on a small scale. Care should be taken to keep the plants actively growing in the young vegetative stages and not let them become stressed or root bound in the plug or cell pack stage. If they are not given LD and transplanted in the actively growing stage, flower initiation will occur and short, eight to ten inch, flowering stems will result.

A cut aster crop, like chrysanthemums or snaps, is an excellent catch crop for bedding plant growers. They can be grown in pots, benches, flats, etc. It is desirable to use one layer of caging as a planting guide and raise it as the crop grows. In Colorado's high light, plants can be spaced about 4 x 4 inches but no more than 4 x 5 inches. They are not pinched! The grower may want to pinch out the terminal bud as it approaches color on a few stems. Removal of the terminal bud has improved the floral display of some cultivars. Watch for aphids, white fly and thrip, they are not a big problem, but must be controlled. The old disease, Aster Yellow Virus, has not been noted; however, insects transmit it and a summer crop could be highly susceptible.

The flower spray formation of the cut aster is similar to that of a spray chrysanthemum. The flowers can provide a year round range of pastel colors that are not normally available in cut flower products. Some cultivars have dark centers and others white or yellow.

More research on the cultivar of this crop in soil is needed and no doubt plant responses will differ. Temperature ranges should also be studied. It is possible that both photoperiod and temperature can be used to control stem quality and scheduling. At least 5 crops should be realized per square foot of bench and a little "pencil farming" can provide insight to the economic potential of the corp.

Appreciation is expressed to the T. Sakata Seed Corporation, Yokohama, Japan for participation in this project.

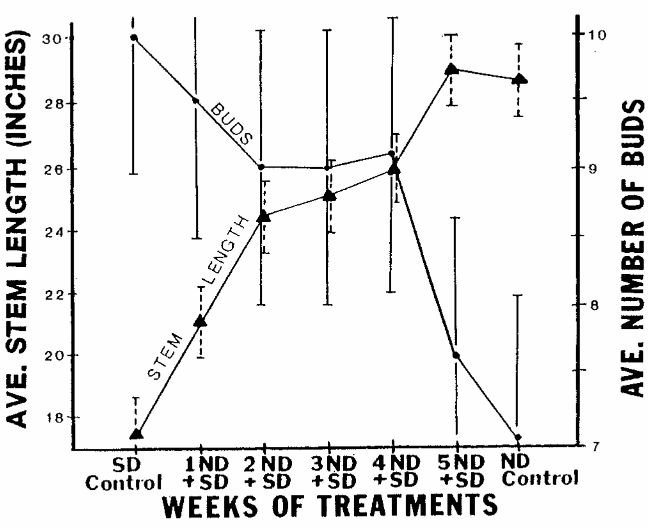

Fig. 1: The average stem lengths and number of flowering shoots developed for seven natural long days (ND)/SD photoperiod treatments averaged over four Sakata Aster cultivars planted on July 9, 1986. Non-overlapping bars indicate two means are significantly different using HSD (α=.05).

Fig. 2: Flowering and height responses of Sakata Aster 'Matsumoto Purple' to continuous SD and natural day photoperiods from 9 July planting, to harvest. The SD treated plant (left) flowered in 33 days and the ND (right), 45.

Abstracts from the American Society for Horticulture Science Annual Meeting, 1988, Michigan State University

ETHYLENE-REGULATED GENE EXPRESSION DURING CARNATION PETAL SENESCENCE

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New gene expression is required for the developmentally regulated process of flower senescence. To study expression of specific genes during petal senescence three unique cDNA clones representing two mRNA classes that increase in abundance during petal senescence were isolated. One class is aging related. This mRNA is present in petals at low levels in tight buds (TB), expanding petals (EP), and open flowers (OF). Its expression increases with petal age, peaks with the ethylene climacteric, and is induced in presenescent petals exposed to ethylene. It is slightly reduced by the ethylene biosynthesis inhibitor aminooxyacetic acid (AOA) or the ethylene action inhibitor silver thiosulfate (STS). In contrast, the other mRNA class appears to be under more strict ethylene regulation. These mRNAs are undetectable in TB, EP, or OF petals and increase in parallel with ethylene in senescing flowers. Their expression is greatly reduced by AOA or STS. Ethylene exposure increases their abundance in OF petals, and to a lesser extent in younger flower petals. These results indicate their expression is regulated both by ethylene concentration and tissue sensitivity.

VARIABLE SHOOT RENEWAL POTENTIAL IN CUT ROSE CULTIVARS

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Eight cut rose cultivars were greenhouse grown in benches for one year. High pressure sodium light was provided in late fall and winter. Bushes were planted and pinched twice to establish plants. All plants were subjected to two cutbacks: 1) all canes were pruned to six nodes, 2) all canes except one were removed; the remaining cane was pruned to eight nodes. For each graft union the number of shoots arising as a result of pinching and pruning was recorded. For each new shoot, caliper and presence of flower was noted. Regeneration potential varied between cultivars. 'Gabriella', 'Golden Fantasie', 'Mary Devor', 'Minuette', and 'Royalty' regenerated more shoots. 'Emblem', 'Samantha', and 'Sonia' regenerated fewer shoots. In addition, quality of new shoots (caliper and presence of flower) varied between cultivars. Graft unions were sectioned. Renewal potential of the graft union (the number of preformed buds present) will be reported for each cultivar.

EVALUATION OF GROWING MEDIA ON GREENHOUSE ROSE PRODUCTION

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In June, 1985, an experiment was started to evaluate the influence of growing media on the production of greenhouse roses. There were four media evaluated: Fafard #2 Mix, Smithers-Oasis bulk medium, Grodan rock wool and a control consisting of 80% soil and 20% peat moss. Two benches (replications) of each medium were planted in a randomized complete block design. The cultivars that were evaluated were 'Kyria' and 'Samantha'. Data on the number of roses produced, rose weight and rose length were collected for three years. Plants grown in the control medium produced larger quantities of roses, as well as better quality roses than the other media. Rose production and quality of the three soilless media were not significantly different. Advantages and disadvantages of each medium will also be discussed.

NUTRITIONAL FACTORS AFFECTING LEAF EDGE BURN ON POINSETTIA STOCK PLANTS

Peter Bierman, Carl Rosen and Harold Wilkins, Department of Horticultural Science and Landscape Architecture, University of Minnesota, St. Paul, MN 55108

Plants of the leaf edge burn (LEB) sensitive cultivar Gutbier V-14 Glory were grown and the effects of varying proportions of NO_3 vs NH_4-N, Ca sprays, medium applied $CaSO_4$, and medium applied Mo were investigated. Data were collected on the number of leaves showing LEB, total cutting production, and Ca and Mo concentrations of leaves at the susceptible growth stage. LEB expression was doubled for plants receiving 1/3 or 2/3 NH_4-N as compared to 100% NO_3-N. However, cutting production was reduced by 28% with 100% NO_3-N. There was no difference in LEB or cutting production between 1/3 and 2/3 NH_4-N. Weekly 500 ppm Ca sprays were extremely effective in reducing LEB (by 90%), while soil applied $CaSO_4$was ineffective. Plants sprayed with tap water (28 ppm Ca) + wetting agent had an intermediate effect. Leaf Ca concentrations showed a strong negative correlation with the occurrence of LEB. Mo treatments were ineffective, despite greatly increasing tissue Mo levels. Results suggest that LEB is a localized Ca deficiency due to inadequate translocation of Ca to the numerous, simultaneously developing axillary shoots on poinsettia stock plants.

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Fort Collins, Colorado 80523
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