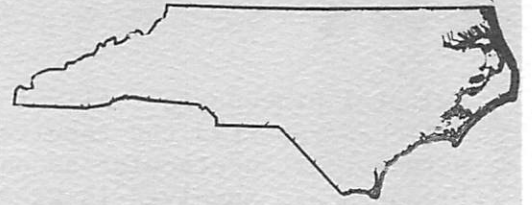


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Commercial Production of Exacum

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The quest for new potted crops is a fascinating aspect of floriculture, and occasionally a new crop emerges which truly warrants the label "promising." Exacum has gone past the stage of "promising" in many greenhouse ranges and now is an accepted item on growers' lists of flowering pot plants. Production of excellent plants has become routine in some greenhouse ranges, as exemplified by the plant in the photo (Photo courtesy of Earl J. Small Growers, Inc., Pinellas Park, Florida.)

The history of Exacum affine as a commercial crop almost seems to be a secret. One of the earliest reports on Exacum was published in one sentence in a Canadian annual report in 1971-72, in which a researcher reported that Exacum was being tested as a flowering pot plant (2). The crop was not mentioned again in later reports issued by the Canadian Department of Agriculture. One of the earliest and most comprehensive U.S. reports was made by Jim Irwin

of Canyon, Texas and his cultural suggestions are often followed by commercial growers (7). Earl J. Small Growers, Inc. (3) also have printed cultural recommendations which are followed by growers throughout the nation. Other sources of information are articles or reports by Kamp and Nightingale (8), Hammer (6), Ball (4), Irwin (1), and Rathmell (10). Love (9), recently prepared a mimeo on Exacum production in which he summarized

cultural procedures. All of these reports pertain to cultural techniques. Semeniuk (11) has reported the results of his genetic studies on *Exacum*. Though his findings were not as spectacular as one might desire it is reassuring to know that plant breeders are involved in *Exacum* research.

Exacum is the name familiar to growers but it is also referred to as Arabian violet, Persian violet and even German violet. *Exacum* is native to the Socotra Islands, southeast of Yemen in the Middle East, so the common names of "Persian" or "Arabian" are logical. It is a member of the Gentian family, however, so the reference to "violet" is not so logical.

Appealing aspects of *Exacum* are its numerous, attractive fragrant flowers and long-lasting qualities. The most prominent varieties such as "Blue Champion," "Jill" and "Midget" have petals which are bluish or lavender in color, with very conspicuous yellow stamens, generally referred to as "eyes" in variety descriptions. "Lou" has white petals, with yellow stamens. Plants remain in flower in the home or office for at least 4 weeks if exposed to adequate light but the petal color will fade drastically if conditions are unsatisfactory. Waxy, attractive leaves also are positive features of *Exacum*. Cultural features appreciated by growers are its self-branching traits with no need for pinching or disbudding and no need for daylength control to regulate flowering.

Propagation

Exacum can be propagated by seed or from terminal cuttings. According to Rick Brown (5), seed should germinate in 9 to 21 days at temperatures of 72 to 80°F. He sows seed in a peat-lite mix with no cover over the seed. These suggestions are very similar to those of Jim Irwin (7). Seedling growth is relatively slow and can take from 4 to 7 weeks before seedlings are transplanted to 2½" pots. Growth continues at a slow rate and 6 to 10 weeks might elapse before the final shift to a 6" pot occurs. Quick calculations would inform the reader that approximately 4 months might have passed from date of sowing to time of transplanting to the finishing pot. Large numbers of seedlings would not have occupied much space, however, as seedlings were either in the propagation unit or in 2½" pots.

Vegetative propagation is faster than seed propagation. Brown (5) has reported that rooting requires about 2½ weeks, and another 2½ weeks of sheltered conditions should be provided before plants are placed under full sun. He recommended that vegetative plants should be used as stock plants and that each cutting should have at least 8 terminal shoots when removed from stock plants. He also suggested that bottom leaves should be removed before cuttings are stuck in the propagation medium.

Growers can avoid the propagation segment of *Exacum* production and buy seedlings or cuttings from commercial propagators. There are advantages in buying small plants, and the economics of the choices should be evaluated by the grower.

Finishing the Plants

A first step in finishing is determination of final pot size and calibre of product desired. Plants can be sold in containers ranging in size from 4" pots to 10" hanging baskets. Number of plants per container will partially determine the time required from transplanting time to date of sale. Growers should strive to select uniform seedlings or cuttings when more than one plant is placed per container. Size differences often will be accentuated as the crop matures.

Growth and flowering of established plants proceeds quite rapidly but is dependent on pot size, time of year and greenhouse environment. Salable plants in 6" pots could be produced in 7 to 8 weeks in the summer months while 12 to 14 weeks might be required in mid-winter (3). Less time is usually needed for plants in smaller containers.

Temperature: Recommended temperatures vary almost as much as the predicted growth rates described above, and perhaps are the primary reasons for those variations. Irwin (7) suggested 70°F night temperatures for the early stages of growth and 65-70° as a finishing temperature. Day temperatures of 80 to 85° were acceptable. Brown (5) suggested 63° nights. The native habitat would prompt one to try warm night temperatures and greatest success seems to be achieved with such a practice. One North Carolina grower places most of his Exacum plants on planks overhead where temperatures can be a few degrees higher than at bench level where other crops are growing. This practice enables Exacum to be grown at the suggested warm temperatures without additional fuel being required. It also makes it difficult for the grower to use thermal screens for heat conservation, however.

Light: Exacum plants are often grown under full light intensity as plants grown under darker conditions seem to get "soft" and collapse if not staked. Some shade is used when the seedlings or cuttings are first transplanted but then the shading material is removed. Love (9) has suggested a 25% light reduction in the summer but full light at other times of the year. Lighting or pulling black cloth are unnecessary for flower manipulation.

Water: The importance of proper watering cannot be overstated. One of the most serious problems with Exacum is Botrytis, a disease intensified with poor watering practices (see related article in this issue, by Jones, Strider and Trolinger). Wet foliage and watering late in the afternoon should be avoided. Tube watering of Exacum would be beneficial. Wilting from inadequate watering must also be avoided, as plants do not seem to recover fully from excessive wilting.

Media: Watering practices can be simplified if a proper potting medium is selected. We have grown excellent plants in a medium composed of pine bark humus: peat moss: sand (3:1:1 on a volume basis). Irwin (7) has had success with clay: peat: Terragreen in equal proportions. A pH of 6.0 to 7.0 is recommended, which means media containing peat moss or pine bark humus will require additions of dolomitic limestone to raise pH to the desired level. Traits of the optimum medium would be good aeration and drainage, water and nutrient retention, proper pH and freedom from pests.

Fertilization: Some growers have similar fertilizer programs for Exacum and pot mums. Irwin's fertilizer program (7) consists of 200 ppm N, 50 ppm P and 150 ppm K at each watering. Later reports caution growers against following such a program, as high nutritional levels are suspected of causing some of the dieback which occurred during the winter of 1981. Growers should restrict or stop fertilization 7 to 14 days prior to sale as the same nutrient levels will not be required in the home.

Not much information is available on nutrient deficiency or toxicity symptoms. A symptom which might be diagnosed as boron deficiency could be damage caused by very small broad mites.

Spacing: Quality of the Exacum crop will be greatly affected by spacing practices. Plants can be grown almost pot-to-pot in the early stages of growth but high priority must be given to moving plants to more generous spacing the day the need arises. Love (9) suggests a finishing spacing of 11" x 11" for plants in 4" pots and a 14" x 14"

spacing for plants in 6½" pots. Brown (5) reported that plants in 4" pots could be grown 9/sq. ft. for much of the crop duration but spacing should be increased to 2/sq. ft. for the final 4 weeks. This spacing is much closer than that suggested by Love. Space requirements for Exacum started as seedlings were tabulated by Irwin (7) and are as follows:

Stage of development	Number of weeks	Square feet per plant	Total square feet per plant
Sow to 2¼" pot	5	.01	.05
2¼" to pan	10	.21	2.10
Pan to space	3	.50	1.50
Space to sell	5	1.25	6.25
Total		23 weeks	9.90 sq. ft.

Pests: Major pests (Botrytis and broad mite) are discussed elsewhere in this issue. Rhizoctonia stem rot and pythium also can be troublesome and fungicide applications might be necessary for control. Thrip also infest Exacum and growers should be aware of the potential problem.

Post-greenhouse Care

The ultimate concern should be performance of Exacum at the site for which the crop was grown. A bright greenhouse and generous fertilizing and watering programs would be in sharp contrast to the home or office environment. Plants should be placed where light is adequate. Window sills would be ideal sites except most American homes probably don't have window sills large enough to hold even the smallest of pots. Artificial lighting is another solution if sunlight is inadequate or unavailable. Blue or lavender petals will not retain their intense color very long under low light, warm temperature conditions. Customers should be advised to check plants daily to determine if watering is needed. This practice is particularly advisable if "artificial" mixes have been used.

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The following guidelines for Exacum culture were published by Earl J. Small Growers, Inc. in March, 1981. The guidelines are printed with no editorial changes.

ADDITIONAL CULTURAL NOTES FOR GROWING EXACUM

Since publishing our new catalog with cultural notes last Fall it has become evident that we should list some additional procedures - especially for those growing Exacum during Winter months.

1. Winter seems to produce more growing problems than Summer. Apparently the lower light levels and shorter days make a softer plant that can be easily attacked by rot and disease. This must be compensated by lower fertilizer levels and reduced watering to make a "harder" plant.
2. Exacum requires much less fertilizer and soil moisture than Pot Mums, Lilies or Poinsettias and responds poorly if fed with high levels of fertilizer on constant feed with every watering such as other crops may require.
3. Water should only be applied in the morning hours and leaves of Exacum should not be wet for any reason in the late afternoon as this invites disease.
4. Let Exacum plants dry out thoroughly between waterings, as frequent watering promotes disease. Keep the foliage dry in the evenings.
5. We have minimized disease problems with Exacum by the following procedures. A use of Banrot as a light drench or heavy spray at 8 oz. per 100 gallons of water applied right after potting and at 3 to 4 week intervals. If Banrot is not used, Benlate at 6 oz. plus Dexon (Lesan) at 8 oz. per 100 gallons works well. A new chemical just being released, Ridomil 2-E has been very effective at 2 oz. per 100 gallons.
6. Excessive crowding of plants at any stage will promote disease on Exacum. Plants should be grown at 4000 to 6000 foot candles for best results - they can take nearly full sun in Winter but watch out for too much heat and too much light or fading of blooms will result.
7. To accelerate Winter flowering of Exacum one should lower fertilizer levels about 4 to 5 weeks before desired flowering date and make sure the plants dry out between waterings.
8. Plants finished under lower light levels have much deeper colored blossoms.
9. Exacum can be flowered more quickly in 4 to 4½" pots if they are run a bit on the dry side and fertilizer levels be kept low.
10. Exacum grows and flowers much more quickly in Summer than in Winter and light should be reduced to about 4000 to 5000 foot candles to keep them from being shocked into flower while too tiny.
11. In case of premature budding of small Exacum, larger plants can be produced by removing the earliest flowers.
12. Remove any dead or damaged lower leaves that might contribute to Botrytis buildup.

Comments on Exacum

Norm Lamberg, sales representative for the Geo. J. Ball Company, considered Exacum to have a great deal of potential, in 4" and 6" pots. He saw more and more growers getting in 2" plants, rather than starting them from seed. Disease problems have prompted Norm to stay away from Exacum in the winter months.

Jim Weaver, grower for Fallon's in Raleigh, N. C., wrote: "The Exacum plant is a very welcome addition to our summer pot plants. It has been popular with our customers because of its lovely glossy green foliage, profuse and fragrant blue flowers and excellent keeping quality. It is easy to grow and makes nice shaped plants without pinching or pruning. The size of the plant can be controlled by pot size for the mass market or retail outlets."

Phil Kurlich, Fred C. Gloeckner Co., Inc., was enthusiastic about Exacum. He stated it is not without problems -- "softness" in winter, some disease troubles, particularly with deep planting and excessive nitrogen. He said it is a nice novelty plant, a very good house plant, and one which would really benefit if it could be placed on a window sill or under fluorescent lights.

Charles White, Vaughan-Jacklin Corporation, reported that Exacum had made great headway in the last few years but it "seems to sell in small batches." His advice -- "Grow it, Sell it, Wait a while, Then do it all again." He wondered if the plants in small pots had the shelf-life of plants in larger pots. Most of his customers were going to skip the winter months, as they seemed to lose a few each week, until the crop was gone "out the back door".