GROWING GARDEN MUMS FOR FALL SALES

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Garden chrysanthemum sales have increased significantly each year over the past decade. While they help fulfill an increasing consumer demand for fall color, more and more garden mums are also being used by landscapers in late fall plantings.

While most growers view garden mums as a fall commodity, the possibility of enhancing spring and summer sales should not be overlooked. In the spring, garden mums can be sold as green plants along with perennial crops, or as flowering plants where they can be planted by the consumer to flower again in the fall. Garden mums can also be shaded and grown for markets in July and August. Although it is too late to consider these markets this year, they can be considered for 1994. The most common market for garden mums continues to be late summer and fall which will be the focus of this article.

Handling Cuttings

It is best to plant the cuttings immediately. If necessary they may be stored for several days in a cooler at 33-40°F. Before placing the plants in the cooler, inspect them for damage from heat or cold, broken cuttings, or wilted cuttings. Be certain that the rooting medium is slightly damp.

CONTAINER PRODUCTION

Growth media. Any growth medium that is well-drained and aerated may be used for planting. The mix must be free of insects, disease organisms, weeds, and toxic chemicals such as herbicides. The pH for a soil-based medium should be 6.3 to 6.7 and 5.5 to 6.0 for a soilless medium. Have your mix tested prior to potting.

Planting. Plant one rooted cutting per 8-inch mum pan or similar sized container. The potting mix should be moist but not sopping wet. Plant cuttings very shallow (barely cover the roots) to avoid the incidence of root and stem rots. Irrigate the medium after planting at least two times, and three if necessary, until the growth medium is wet. The final initial irrigation should contain 200 ppm each of nitrogen and potassium using 20-10-20, or a combination or ammonium nitrate and potassium nitrate. Some growers prefer to initially plant the cuttings in small containers and transplant them later into their final larger containers when more space is available.

Garden mums have a 6 or 7 week flowering response and are less sensitive to long days. They may initiate flower buds under photoperiods in excess of 12 hours (spring and summer). If terminal flower buds are observed when cuttings arrive, they should perform satisfactorily. When cuttings with terminal flower buds are planted, they should be pinched hard (allow 4-5 leaves to remain) when they are turgid (4-5 days after planting). This will force out lower breaks which tend to be more vegetative. If both terminal and lateral buds have developed when cuttings arrive, it is best not to plant them, as they most likely will not perform satisfactorily.

Irrigation. Whenever possible, irrigate garden mums automatically (spaghetti tubes, drip tubes, subirrigation). Overhead irrigation is satisfactory and inexpensive; but the umbrella effect caused by the leaves and the effect of the winds results in a lot of wasted water. Also, wet leaves can encourage disease. To prevent foliar diseases always water early enough during the day to allow the foliage to dry before evening hours. Regardless of the watering system you use, do not allow plants to wilt particularly during the time before the lateral shoots (breaks) from the second pinch are at least one inch long. It is critical to keep plants actively growing in the early stages. Plants that undergo water stress are more likely to initiate premature flower buds.

Fertilization. Garden mums can be fertilized with water-soluble fertilizers using rates from greenhouse pot plant production. Ralph Freeman, Cornell Extension, recommends one of the 3 following programs:

1. 250 ppm N at every watering using 20-10-20 or 15-0-15.
2. 350 ppm N once per week using 20-10-20 or 15-0-15.
3. 200 ppm N at every watering using 20-10-20 or 15-0-15 and incorporating Osmocote 14-14-14 at 5 lbs./cu.yd.

Use of 15-0-15 assumes that superphosphate has been mixed with the growing medium prior to planting. Other high-nitrate "peat-lite" fertilizers or calcium and potassium nitrate could be used instead of 20-10-20 and 15-0-15.

Stop fertilization at the beginning of the last three weeks prior to sales. This will result in hardened plants which will ship better and last longer during retail sales.

Controlled-release fertilizers. Regular application of water-soluble fertilizer is the most effective way of maintaining proper fertility levels. A water-soluble program gives the grower control over the fertility of the plants. On the other hand, growers with large numbers of plants, limited labor or overhead irrigation may find the use of water-soluble fertilizers impractical. Injecting fertilizer through overhead irrigation systems is wasteful and contributes to water pollution.

Topdressing Osmocote or Sierra controlled-release fertilizers shortly after planting has become a popular and successful way of fertilizing garden mums. Growers can choose the best rate based on fertilizer type growing medium, irrigation practices, and pot size.

A single topdress application of Osmocote 14-14-14 (3-4 mo.), Osmocote 19-6-12 (3-4 mo.) Osmocote 18-6-12 (8-9 mo.), Sierra 17-6-12 (3-4 mo.), or Sierra 17-6-10 (8-9 mo.) have grown good garden mums in local trials. Before changing fertilization methods, slow-release formulation, or growing medium, try the new method on a small scale beginning with low or medium rates listed in the manufacturer's brochures. Fertilizer can always be added later on if necessary.

Controlled-release fertilizers should be applied by spreading the material evenly around and away from the base of the plant. Dumping it in one spot may cause localized hot spots. Use a level tablespoon when measuring. There is almost 25% more Osmocote in a heaping tablespoon than a level tablespoon. Manufacturer's recommendations are based on a level tablespoon. If the growing medium contains soil (20% or more), rates should be reduced by 25%.

Keep in mind that nutrient release is temperature dependent and nutrient movement is dependent on watering and rainfall. Nutrients in controlled-release fertilizers will release faster when growing medium temperature is above 70°F. Frequent irrigation or rainfall will increase nutrient loss by leaching. Excess soluble salts may occur during warm periods of leaching is inadequate.

Spacing. Space pot to pot until the first pinch then move to a final spacing, depending on variety. Space so plants barely touch each other at the time of flowering. Eight-inch pots and nursery containers used for fall sales can be spaced on 18- to 24-inch centers. Garden mums grown too close together may develop a "stove pipe" appearance.

Pinching. The first pinch should be made when roots of the cutting reach the bottom and sides of the container and the tops show 1.5-2.0 inches of new growth. Allow 6-7 leaves to remain following the pinch. This is a much better and more specific recommendation to give workers rather than instructing them to remove 0.5-0.75 inches of growth.

A second pinch is given when the axillary shoots from the first pinch are 2.5-3.0 inches long. This pinch should be made prior to July 20th. Allow 3-4 leaves to remain following the second pinch. Some growers have had success planting two or three weeks later than normal, using two cuttings per pot, and giving only one pinch.

Growth Regulators. B-Nine may be used on taller garden mum varieties. The first application should be given when breaks following the second pinch are two inches long. The rate recommended is 2500 ppm. Additional applications, if required, should be made at two week intervals. A marker stock can be used to track the weekly growth rate. Every seven days mark the height of the plants on a wood label inserted in the pot.

SCHEDULING GARDEN MUMS

Regular Crop for Fall

Plant: From mid-May to mid-June

First pinch: Approximately two weeks after planting (roots must be at bottom and sides of pots, and 1.5 to 2.0 inches of new growth must occur).

Second pinch: When breaks following the first pinch are 2.5 to 3.0 inches long.

Flower: September 10 to October 10, depending on cultivar.

Fall garden mums are best produced outdoors or in an uncovered greenhouse with proper irrigation. Temperature and humidity levels are often too high in a covered greenhouse for many cultivars. Cool night temperatures promote early flowering of garden mums while very warm night temperatures can delay flowering. Expect garden mums grown in a covered greenhouse to flower two weeks later than those grown outdoors for fall sales.

Fast Crop for Fall

Plant July 16 to 30 and space on 12-inch centers. Do not pinch and don't worry about crown buds. Water and feed immediately and regularly to push this crop. Cultivars flower up to a week later than natural season, allowing a longer period of sales. Because they are naturally later, their buds are seldom harmed by early frost.

The fast crop is a real time and cost saver with only 9-10 weeks of crop time compared with 15-16 on the regular program. More than twice as many plants can be grown in the same area since the fast crop will make smaller finished plants, 10-14 inches in diameter. Plant one rooted cutting per 6.5 inch pot and space plants on 12-inch centers. B-Nine is not needed.

Pests. A clean production area is important to disease and insect prevention and prevention saves money. Train your employees to "think clean" at all times. Pests of garden mums include aphids, mites, various caterpillars, leafminers and thrips. The main goal is to keep pest levels low enough to prevent plant injury.

The most common disease problems are pythium root and stem rot, fusarium wilt, bacterial leaf spot, and botrytis blight. Diseases are best prevented by using a well-drained growth medium and by proper spacing to allow good air movement. Also, do not water late in the day. The **New England Floricultural Crop Pest Management, Growth Regulation Guide** provides current information on pest management.

Other Problems. Last summer many growers reported early flowering and/or too short plants. These two problems may have been caused by low night temperatures early in the season. Low might temperatures speed flower bud initiation resulting in early flowering and shorter plants. More information on early flowering can be found in the September-October issue of *Floral Notes*.

Weed Management. Weeds can be controlled by mulches or chemical herbicides. Mulches such as gravel, black plastic, and woven plastic ground covers provide satisfactory weed control.

Chemical weed control offers further help to container growers provided reasonable precautions are followed. Growers should first prepare a weed-free growing area. Surflan, Dacthal, Devronol and Treflan are herbicides that have been used to prevent weed growth in outdoor areas used for garden mums. Be sure to follow label instructions. If the weed pressure is not great, one treatment over the area may be adequate.

Cultivars. Plant breeders have been active in developing new cultivars of garden mums. Features that breeders look for include plant habit, flower form, flower color, branch flexibility, foliage durability, disease resistance, time of flowering and keeping quality. Shown below are today's most popular cultivars and those that were popular just five years ago.

Today (1991-92)	Five years-ago (1986-87)
Bravo	Debonair
Target	Ruby Mound
Debonair	Jackpot
Allure	Allure
Jessica	Grenadine
Yellow Triumph	Stargazer
Sundoro	Minngopher
Anna	Remarkable
Tolima	Goldmine
Legend	Minnautumn
Red Remarkable	Tinkerbell
Emily	Stardom
Encore	White Stardom
Dark Triumph	Patriot
	Yellow Jacket

Production Costs. Knowledge of production cost is useful for both cost control and pricing. Variable costs involved in producing an average garden mum pot are shown below. These costs vary from grower to grower, but it gives you an idea of the costs associated with production. You might also add in the cost of weed management. This analysis does not take into consideration fixed costs, which are those costs which ordinarily do not change with the level of production (e.g., taxes and insurance).

Actual Production Costs:

Cutting (rooted)	$0.25
Pot (2R86-fiber)	0.32-0.34
Fertilizer (Osmocote one application plus 12 applications liquid feed)	0.054-0.07
Insecticide (Orethene: 10 oz /100 gal.)	0.01
Fungicide (Banrot; 1 application)	0.03
Labor (Plant, transplant, 3 pinches, load for market; $5-$7 per hour)	0.10-0.20
Watering (drip vs. hand)	0.15-0.31

(Drip is based on annual costs with 5 year depreciation. Hand watering: each pot requires 4 seconds to water, 3600 seconds = 1 hour. 4/3600 = 0.001 hrs to water each pot. 40 waterings x 0.001 hrs/watering = 0.04 hrs./pot/season. 0.04 hrs. x $7 per hr. = 0.31 to water each pot each season).

Growing medium	0.15-0.23
Total Variable Cost	**$1.06-$1.44**

Consider that any portion of the crop lost during production will increase the total variable cost of the remaining pots. For example, a grower producing 1000 pots determines the variable cost of each pot is $1.00. If 5% of the crop is lost, then the per pot cost of the remaining pots will have to rise to compensate for the loss.

5% loss of 1000 plants = 50 plants
50 plants at $1.00 each = $50
$50 divided by remaining 950 plants = $.052
Final cost of each pot to recoup 5% loss is $1.00 + 0.052 = $1.052 final variable cost.

Maintaining Quality Plants. Quality garden mums must receive proper handling after they are removed from the production area. Shipping and storage time in the box should be as short as possible. Optimum temperatures for holding and shipping plants are 38-40°F and optimum conditions for displaying plants are 45-60°F with high light levels. Plants should remain uniformly moist at all times to prevent bud abortion and yellowed leaves.

Retailers should note that hardiness and longevity are of prime interest to many consumers. Attempt to learn something of performance of the cultivars you sell. Plants which produce the greatest number of stolons and an abundance of new shoots from just below the soil line are more apt to survive the rigors of winter.

Field Production

A few growers still prefer to grow their garden mums in the field and then dig them in the fall or have customers dig their own. These plants should be spaced 18-24 inches apart, in rows 30-36 inches apart.

Prior to planting, apply any needed lime or phosphorus based on a soil test. Water cuttings immediately after planting with 1 to 1.5 pounds of 20-20-20 per 100 gallons of water to help establish the plants more rapidly. Two weeks after planting, sidedress dry 5-10-5 fertilizer down the rows, at the rate of 3 to 4 pounds per 100 linear feet. Place fertilizer about 3-4 inches from the plant. Repeat at one-half this rate four weeks later. It is important to provide additional water during hot and dry weather. An adequate supply of water throughout the growing season is essential to insure optimum plant growth and flowering.

Check with your plant supplier for garden mum cultivars that are adaptable to field growing and subsequent digging. It is a good idea to provide shade and ample water for a few days after digging and potting before offering them for sale. This will help acclimate the plants. Customers may not be receptive to wilted plants due to "transplanting shock."

If consumers are pleased with their plant's performance, then the popularity of garden mums will continue to grow.

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