Gigi™ Orange Garden Mum

syngenta flowers

Garden Mum
Culture Guide

Garden Mums are easy to grow when basic guidelines are followed. Simply plant rooted cuttings and feed. Today's varieties do all the work when you provide the appropriate feed. Below is a list of the points for successfully growing any garden mum crop.

1. Plant (rooted) or stick (unrooted) cuttings as soon as they arrive and always plant or stick cuttings into moist media. For natural-season East Coast and Midwest crops, planting rooted cuttings outside in mid- to late June, or even early July, saves growing time and reduces premature budding caused by the cool nights of late May and early June.
2. Start the liquid feed program in the first three days after stick for unrooted cuttings and at the time of planting for rooted cuttings.
3. Maintain the level of fertilizer in the root zone with a constant liquid feed program and be sure to re-feed after rain so the plants always have fertilizer during the growing phase.
4. Pinches are not required for most crops. One pinch may be beneficial if your cuttings have stretched due to delayed planting, if large propagation cells were used, or if you are in a low humidity growing area.
5. Space pots so plants will not touch when they reach the desired finished size.
6. Monitor the feed levels in the pot and in the irrigation line to prevent problems before they show up in the plant.
7. Take notes on procedures used, any problems seen and weather conditions to allow for adjustments and planning for a better crop next year.

Michelle™ Gold Garden Mum

Cristina™ Red Garden Mum

Recommended Cultural Practices

ON RECEIPT OF CUTTINGS

Plant (rooted) or stick (unrooted) garden mum cuttings immediately. If the cuttings cannot be planted immediately, they may be stored for one or two days in a cooler at 33–40 °F (0.5–4.4 °C), but this is not recommended.

ROOTING UNROOTED CUTTINGS

Rooting hormone increases uniformity. The easiest way to apply hormone is to spray cuttings after stick with 200 ppm IBA (indole-3-butyric acid). If spraying IBA, spray in the early morning the day after stick to allow the mist program to be turned off for one to two hours and then resume mist after cuttings begin to wilt. An alternate method is to apply 1,000–1,500 ppm IBA in powder or liquid form to the bottom 1/8–1/4" of cuttings before sticking.

Always stick cuttings into moist root media. The longer you plan to hold the cutting in the cell tray before planting, the bigger the cell should be. Unrooted cuttings can also be stuck directly into the finishing container, which requires more propagation space.

Allowing plants to become over-rooted, dried out, crowded and/or under-fertilized serves to compromise plant growth and sets the stage for severe budding very early in the crop. Proper care initially is crucial for easy, high-quality finished crops. Plant the cuttings as soon as possible after rooting so quality is not compromised.

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Ideal light levels are 3,500–4,000 foot candles, but mum cuttings can be rooted in full sun with adjustments to the misting frequency. Rooting medium temperature should be 70–74 °F (21–24 °C). Maintain air temperature of 70–85 °F (21–29 °C). Use longday lighting year round to reduce budding during rooting (see Photoperiod Control section). Fertilization during propagation also reduces rooting time. Apply a complete N-P-K fertilizer containing 165–200 ppm of nitrogen approximately two or three times a week starting on the third day after stick or when callus starts to form.

Misting guidelines: Use of an environmental controller to vary the mist based on weather and the stage of root development is ideal. More traditional mist time clocks can also be used. In most cases, mist can be off 10 days after stick and with a 100-cell tray, cuttings can be ready to plant in 14 days. Overall, less mist is better at all stages of development since water-logged media slows the rooting process. There is no need to mist a turgid cutting. Mist during daylight hours throughout the rooting process and during the night for the first three to four days to help keep cuttings turgid. You will find it is possible to shut the mist system off in the morning and wait until cuttings first start to wilt before turning the mist back on. This will reduce the amount of mist at the least stressful part of the day and decrease overall time needed in propagation.

PLANTING

Always plant the cuttings into moist growing media. Planting a garden mum cutting into dry media reduces initial growth and future potential. Plant cuttings deep enough to cover the root ball and part of the base of the stem. With today's well drained growing mixes, disease issues from planting deeper are not seen. Planting deeper can be done on taller cuttings, but is not necessary or recommended on regular size cuttings. Deep planting will reduce overall growth.

Liquid fertilization at planting time gets the plant off to a vigorous start. Immediately after planting, water-in freshly planted cuttings with a complete N-P-K fertilizer containing 200–300 ppm of nitrogen. Allowing garden mum cuttings to wilt inhibits their establishment, future branching and overall growth. It may be beneficial to mist or syringe the plants for the first few days, or until the plants are fully turgid and the roots are absorbing water.

BUDDED CUTTINGS

Garden mums are very reproductive. At times, some buds may be present when cuttings are received. When producing garden mums, this must be expected. With the free branching varieties of today, small buds on the cuttings will have little to no effect on the finished plant.

To prevent garden mum cuttings from becoming prematurely reproductive, it is necessary to keep them actively growing. Therefore, it is essential to provide the plant with optimum moisture and fertility levels. Use night interruption lighting during propagation and before the start of short days with blackcloth crops to help prevent premature bud initiation (see Photoperiod Control section). This should be done even during natural long-day periods. Varieties that naturally come into flower in late August and early September, initiate flower buds in mid to late July. The natural daylength in mid to late July is similar to the natural daylength in mid to late May. Relying on only natural daylength in May can lead to flowering plants at the end of June.

Many areas of North America experience very cool nights in May and June, which may cause cuttings to initiate buds prematurely. It is best to avoid exposure of the cuttings to these low night temperatures (see Temperature section). If you can keep the plants actively growing with fertilizer and water, in most cases the cuttings can grow over any premature buds that are set.

GROWING MEDIA

For mum production, the growing medium should retain adequate water after irrigation but also drain sufficiently to provide aeration during rainy weather. Many growers use peat-based mixes commonly used for bedding plants and baskets. Some growers prefer heavier bark-based mixes. Of the two types of growing media, bark-based mixes are more porous and might require 20% more nitrogen with the feed program. In either case, be sure that the growing mix is well drained with 12–18% air-filled pore space. The pH range should be 5.8–6.2. If a very lightweight mix is used, large plants can be top heavy and prone to tipping over in windy conditions. If this is a problem, use a growing mix that contains a heavier component (like bark) to provide weight and stability to the pots.

CONTAINERS

There are a variety of container sizes used in garden mum production. Cell packs, handle baskets and 3- to 6-inch (8–15 cm) pots are widely used for spring sales. For summer and fall sales 6- to 8-inch (15–20 cm) plastic and fiber pots are used, along with one to two-gallon nursery containers. Many growers find demand for large pot sizes such as 10-inch (25 cm), 12-inch (30 cm) and 14-inch (35 cm) pots as well as different pot colors and styles. As a general rule, the larger the container, the larger the finished plant will be. We recommend using new containers each year. Reused containers must be properly cleaned and sanitized to prevent possible crop disease issues.

There is also the potential to "upgrade" traditional pots with pot covers put on at the time of retail delivery. Seasonal themes such as Jack-o-lanterns or bushel baskets are available. Pot covers add market value at a low cost and do not require any adjustments to your current growing process.

Wanda™ Lavender Garden Mum

Chelsey™ Pink Garden Mum

TEMPERATURE

Once the cuttings are in the final container, keep night temperatures above 62–65 °F to allow growth and reduce the potential for budding. Night temperatures in the 50's can cause garden mum bud initiation and potential development even under long day conditions. Plant outdoor crops in mid to late June after the night temperatures are above 60 °F. This will allow for more growth than planting in late May because of a lack cold night temperatures and premature bud initiation.

FERTILIZATION

Fertilization is the key to success with any garden mum crop. Mums demand fertilizer and providing this early solves headaches that could occur later in the crop. Fertilization rates vary depending upon the type of media, fertilizer used and application frequency. Growers can utilize a water-soluble fertilizer, a controlled release fertilizer, or even a combination of the two depending on preference. Lack of fertility during the vegetative development phase (first half of the crop) will adversely affect plant size and quality. High ammonium levels can help overcome crown-budding but can also delay flowering. During the flowering phase, nutrient demand drops and fertility can be reduced.

WATER-SOLUBLE FERTILIZER (WSF) USAGE

The first five weeks of the crop is critical, so check your feed system and injectors before you plant the cuttings. Growers should use a complete N-P-K fertilizer with trace elements. The best fertilizer product to use will depend more on your water quality than any preference by the mum. During the first half of the crop cycle EC values of 2.0–3.5 mS/cm (SME extract) or 2.5-4.5 mS/cm (pour through extract) should be maintained. We have traditionally recommended a high level of fertilizer (200–300 ppm N) from a constant liquid feed program to get the plants started. Some growers use an ammonium-based fertilizer for the first two weeks, and then switch to a higher-nitrate fertilizer. Fertilizer rates can be reduced once the plant body has been built and/or once there is a need to irrigate more than once a day. It is better to maintain constant feed at half the rate than use a feed-then-water program when irrigating twice a day. The application rate might have to be adjusted to accommodate weather conditions or the degree of leaching that occurs.

An alternative to the traditional liquid feed program is a low N-P-K constant liquid feed program that is supplemented with magnesium sulfate and micronutrients. Research* and grower trials over the past several years have found that high levels of nitrogen are not necessary to drive growth. By increasing the level of micronutrients and magnesium sulfate to the levels that are equivalent to a standard 200–250 ppm N fertilizer program, lower levels of nitrogen, phosphorus, and potassium can be applied without sacrificing proper growth and development of the plant. The lower N-P-K program utilizes a complete fertilizer at 75–150 ppm N that is supplemented with 1–2 ppm iron from a complete micronutrient fertilizer package and magnesium sulfate at 25–30 ppm. The additional micronutrients and magnesium sulfate are best added through a second injector. This is a constant feed program, so every irrigation needs to include fertilizer. If bark is incorporated into your growing media, plan to use nitrogen rates at the higher end of the recommended range. After a significant rain event (½"–1" of rain), it is important to apply 200–300 ppm N feed to re-charge the soil solution. This can also be done at the start of your crop if your growing media does not contain a starter fertilizer. Lower EC values in the media would be expected with this program because the plant will be more fully utilizing the nutrients being supplied.

The magnesium sulfate can also be applied every three to four weeks as a separate application at 50–75 ppm to help reduce potential precipitate issues that can occur when mixing with other fertilizer products. The required extra micronutrients can be added as a control release product that is incorporated into the growing media before the cuttings are planted. This may be an easier option for some growers to be able to reduce N-P-K levels without using two injectors to prevent precipitate problems. There are some new fertilizer products now available with increased levels of micronutrients and magnesium that may also be an option when using lower N-P-K levels.

Overall, a low N-P-K program helps to reduce fertilizer costs and simplifies irrigation in the field because the same fertilizer level is used at all stages of the crop, allowing different plant dates to utilize the same feed tank. It is suggested to trial this program before changing your entire production schedule. Dedication to monitoring the feed is one of the keys to a successful low N-P-K fertilizer program.

CONTROLLED-RELEASE FERTILIZER (CRF) USAGE

Some mum growers use CRF instead of liquid feed. Be sure to use one that contains trace elements. CRF can be incorporated into the growing medium prior to planting or top dressed after planting. If at all possible, water in the plants with a WSF to boost initial fertility. CRF release is temperature dependent, releasing faster during warmer weather. CRFs are categorized by release rate in months or days. Northern growers often use 3–4 or 5–6 month products while southern growers use 5–6 or 8–9 month products. The recommended application rates vary by product and are listed on the labels. High application rates are required to provide adequate nutrition. Growers should take great care when selecting a CRF and its application rate, especially if there is no way to apply supplemental WSF if needed. Depending upon weather conditions, it is sometimes necessary for additional top-dress applications to avoid low fertility. Growers should regularly monitor growing medium electrical conductivity (EC). Low or decreasing EC values would indicate the need for supplemental fertility.

Danielle™ Red Garden Mum

WATER-SOLUBLE FERTILIZER/CONTROLLED-RELEASE FERTILIZER COMBINATION

Some growers produce mums alongside lighter feeding crops using a single injector. With this system, heavier mum fertility requirements can be accommodated by including a light to moderate CRF application to the crop. This provides continuous low to medium fertility levels supplemented by the liquid feed.

IRRIGATION

Proper irrigation is critical to produce high-quality garden mums. Always apply enough fertilizer solution so it soaks through the pot and up to 10% of the solution drains out of the pot to prevent soluble salts build-up.

Garden mums should never be allowed to wilt during the early stages of growth. Wilting can restrict branching and overall growth as well as contribute to premature budding. Slight wilting can be beneficial late in the crop to help harden the plant off, control height and promote more uniform flowering. Keeping plants evenly moist (not wet) can increase overall plant size even after buds are seen. This can be a useful tool if your plants look like they will finish too small.

Drip irrigation is better than overhead irrigation because drip irrigation can more uniformly water a pot especially when the plants are large in size and because overhead irrigation can promote the development of leaf spotting foliar diseases. If using overhead irrigation be sure the foliage is dry before evening hours. When using drip irrigation, it is not required to place drip emitters close to the center of the pot to ensure uniform irrigation throughout the pot.

Pulse irrigation is a useful tool to more fully irrigate pots with drip irrigation. Instead of running one long irrigation cycle, break that run time into two or three shorter segments with time in between to allow the irrigation solution to move laterally in the pot not just run out the bottom. Doing this can also allow you to time your irrigation so the pots never completely dry out which will encourage more growth and plant size.

During extremely hot periods, do not apply extra water to the pots in an attempt to lower temperatures. This leads to overwatering, root loss and chlorosis. Syringing plants reduces heat stress and lowers leaf temperatures without overwatering. With greenhouse grown crops, 25–30% shade can be used to reduce temperatures, but the reduction in light will slow response.

PINCHING

In most cases, garden mums no longer require pinching, and certainly do not require multiple pinches to obtain beautiful round plants. Many of the newer varieties will actually start branching during propagation, well before you would even think about pinching. We have stopped pinching in all of our garden mum trials to allow us to introduce and recommend the best varieties for no pinch production.

Sometimes cuttings rooted in large plugs and cuttings held in small plugs too long before planting may require a pinch. Some growers may still want to give one pinch if they are located in an area of the country with low humidity or if more spread is needed on some varieties grown as a blackcloth crop.

On crops that will be pinched, the ideal would be to pinch when the plants are ready, not based on a calendar date. Plants are ready to pinch when their roots are established in the pot and they achieve 1–1.5" (2.5–3.8 cm) of new growth. This is generally 10–14 days after planting. The top ½" of growth should be pinched out. Many growers rooting mums in trays for transplant into the final containers pinch the cuttings by machine right before transplanting to reduce labor and handling costs. When pinching, the last pinch should be given sometime in July—early in the month for crops in cool areas, and as late as August in warm regions.

Remember, with today's improved varieties there is no reason to plant a cutting in May or early June and pinch it multiple times. Excellent fall crops can be grown by planting in mid-June and not pinching. Some growers find it more economical to plant two to four weeks later with two cuttings per pot and no pinch.

SPACING

Proper spacing is important for producing garden mums with beautiful round shapes. Pots grown too close together have an upright appearance, even when the right varieties have been selected and proper fertilization is given. Space pots to allow plants to reach the desired head size without touching the adjacent plants. Finished plant head size and sale price are the main factors used to determine proper spacing.

Gigi™ Gold Garden Mum

Stacy™ Pink Garden Mum

GROWTH REGULATORS

Some garden mum varieties tend to get too big. If these varieties are needed, they can be controlled with the use of growth regulators. Effective use of all growth regulators is more of an art than a science. Stage of the crop, concentration of the plant growth regulator (PGR) used, uniformity of application, and the weather after the application all factor in to the level of control seen. Accurate records are needed to learn from crop to crop and year to year to know how to best adjust applications for a location.

If most of the varieties in your crop require growth regulators, consider a later plant date to reduce growing time and, therefore, plant size. Proper use of fertilizer and irrigation can also help control plant size later in the crop (see the Fertilizer and Irrigation sections).

B-Nine® plant growth regulator is a traditional plant growth regulator for garden mums. Typical rates are 1,000–5,000 ppm with 2,500 ppm as a normal starting point. Rates vary depending on a variety's vigor, temperature, and growth stage of the crop. Usually B-Nine plant growth regulator is not applied after the buds can be seen to avoid flower discoloration and delay.

Bonzi® plant growth regulator is also an effective tool that can be used to regulate plant growth. The active ingredient in Bonzi plant growth regulator is absorbed by roots and stems and can be applied as either a spray or drench. Spray rates range from 30–50 ppm, while drench rates range from 0.5–2 ppm. While drench applications can be applied at any point during production, foliar sprays are best used after transplanting up until the early stages of bud formation. Drench applications can be particularly helpful at the end of the crop cycle to maintain plants at their finished size prior to shipping. Late applications using low drench rates do not appear to delay flowering. Use rates and application frequency will vary based on the vigor of the variety and the climate in which it is grown. It is always best to trial at a lower rate first, especially when growing in regions with cooler climates and for first time users.

Sumagic® is also a very effective plant growth regulator, but results have been more variable. Spray rates range from 2.5–10 ppm and drenches of only 0.1–1 ppm are used. Uptake of Sumagic plant growth regulator is similar to Bonzi plant growth regulator.

Florel™ plant growth regulator has been promoted for several uses on garden mums: to increase branching, to prevent premature budding and to delay flower dates of the same variety. More recently, Florel plant growth regulator is being used by some growers to replace night interruption lighting during the long-day period of the crop schedule.

Makenna™ Orange Garden Mum

Vanna™ Snow Garden Mum

In our trials, we have not found Florel plant growth regulator to increase the branching of garden mums as it does in other crops. With the free-branching garden mums now available, Florel plant growth regulator is not required to have well-branched plants.

Florel plant growth regulator can be used as insurance against premature flowering and to manipulate the flower date of varieties when night interruption lighting is not possible. The key to both of these uses is to plan ahead and make Florel plant growth regulator a part of the production schedule from the beginning. Florel plant growth regulator will be less effective if applied after buds are already seen.

When using Florel plant growth regulator as insurance or to substitute for night interruption lighting, plan the first application for 8–10 days after stick for unrooted cuttings or about three days after planting for rooted cuttings. The goal is to make the first application early but to not apply to stressed cuttings. Subsequent applications can be made every 10–14 days. The last application should be made eight weeks before the desired ship date or about two weeks before the start of short days. Spray rates of 300–500 ppm are commonly used.

Mum cuttings that are stuck or planted in May have a good chance of setting flower buds early because the natural daylength is not long enough to prevent flower initiation. If night interruption lighting (see Photoperiod Control section) is not possible, a Florel plant growth regulator program will help keep your plants vegetative.

GREENHOUSE VS. OUTDOOR GROWING

A better quality fall garden mum is produced outdoors versus indoors. Temperature and humidity levels are often too high in a greenhouse. Outdoor-grown mums are tougher, more compact and generally perform better for the consumer. Fall garden mums grown indoors under natural day length may flower approximately two weeks later than those grown outdoors as warm summer night temperatures can delay flower initiation. With proper variety selection, high quality "summer shaded" garden mums can be produced indoors before the fall season (see Blackcloth Selection).

PHOTOPERIOD CONTROL

Long days are needed to generate vegetative growth. Sufficient long days must be provided to obtain the proper finished plant size for a given container. Artificial long days should always be provided during mum propagation, with spring-lighted/shaded crops and blackcloth garden mum programs. Artificial long days can be supplied by lighting plants from 10:00 p.m.–2:00 a.m. with 10–15 foot candles or 1.5–2.0 w/m2. This can be obtained with 100 watt incandescent bulbs or 33 watt corkscrew-type compact fluorescent bulbs. A typical set up would be to have light lines 10 feet apart and incandescent bulbs placed every 10 feet down the light line. When using compact fluorescent bulbs, additional bulbs are necessary and should be spaced every five feet down the light line. Even with the additional bulbs, there should be a 33% energy savings using the compact fluorescent bulbs. For either bulb, a reflector (pie pan) is recommended to be sure the light is directed down toward the plants. Use a timer to control when the lights go on and off. Use of artificial "mum lighting" should be done even when the natural day length is greater than 12 hours, to ensure the cuttings do not initiate flower buds early.

Short days are needed for flowering. Artificial short days are provided by covering plants with an impermeable light barrier like blackcloth or four to six mil black plastic for at least 12 hours daily. Accomplish this by pulling blackcloth before the sun sets and opening after sunrise (7:00 p.m.–7:00 a.m.), or by pulling blackcloth early in the morning before the sun rises and opening mid to late morning (5:00 a.m.–10:00 a.m.) to help reduce the temperature under the cloth during the night. Light intensity under the blackout must be less than two foot candles to be effective. For the most predictable timing, we recommend covering every night for at least four weeks to initiate flowers. When using blackcloth outside of the greenhouse, some growers use weed barrier cloth since it allows the passage of air and water. Blackcloth can be laid directly atop plants, but most often a support structure is used to prevent damage from windy or rainy conditions. The covering is pulled over the structure at the end of each day from either the sides or ends of beds, and then rolled and stored in the aisles in the morning.

COMBO MUM CULTURE

Garden mum combos are very popular and are very easy to grow. Requiring more than one cutting in a pot, they are usually grown in larger container sizes and upgraded containers. The easiest way to create a garden mum combo pot is to choose varieties from the same family. Families will be the most consistent between the colors in any crop schedule. Individual varieties can be used, but may not be consistent and reliable.

For natural-season crops, we recommend planting multi cutting pots 2–4 weeks after your single cutting 8-inch pots to reduce risk of premature budding under cool night temperatures and inadequate natural day lengths.

For a shaded program, expect large containers to be ready to ship faster after blackcloth is started than what you have scheduled for standard 6-inch crops. The same variety can flower as much as a week faster in a 14-inch pot versus a 6-inch pot going into blackcloth at the same time.

For planting multi cutting pots, keep the cuttings closer to the center of the pot to help reduce individual plant separation at finish. In general, plant cuttings no more than two inches apart and as close as having the rootballs touch near the center of the pot. This allows the cuttings to grow together early in the crop and create a stronger plant base.

Reference our Garden Mum Combination recommendations and cultural information at www.syngentafhg.com for additional details.

PEST CONTROL

There are several insect pests that can be a problem on garden mums which include aphids, mites, various caterpillars, leafminer, whiteflies and thrips. Fortunately, insects are not usually a significant problem, but pressure can vary from region to region. Previous scouting data can provide a history of which pests are more prevalent in your area and help provide a framework for building a preventive program for routine pests. Avid®, and Mainspring® GNL insecticides, with their broad-spectrum activity across some of the major garden mum pests, will be two important staples in your insecticide rotation program. Additional information for various pests can be found at www.syngentafhg.com under Cultural Information in the Technical Support tab.

Leafminer: Leafminer pressure can vary from year to year and if not recognized in time, this pest can cause serious damage to garden mums. It is important to inspect plants upon arrival and note any active mines. Monitor the growing areas with sticky cards so you can check for adult activity. Good scouting and proper use of effective controls is the best way to protect crops that are prone to leafminer. A preventive approach is best, as once leafminer gain a foothold in the crop; it is often difficult to get them under control. This is due to the unsynchronized timing of the different life stages and the difficulty of getting good spray coverage once the crop has gained some size.

A rotation using Avid, Citation®, Mainspring GNL and Conserve® SC Insecticides can be used to protect garden mums from leafminer as well as other pests listed on these labels. Use Citation and Avid in a block rotation of three spray applications each, then rotate to the next product. This targets the lifecycle of the pest and allows you to effectively rotate to another product to help minimize the chance of resistance. The systemic activity of Mainspring GNL insecticide provides extended protection of 8 weeks (depending on the rate used) when used as a drench and will also provide protection against thrips, aphids, whiteflies and worms. This is best applied once the crop has rooted in well, in order to maximize uptake. Mainspring GNL may also be applied as a spray using a two week interval. Use Conserve insecticide at the end of the crop if needed for leafminer and thrips control. Products containing Azadiractin can be applied at the end of the week (or 4–5 days after a treatment of Avid, Citation or Conserve insecticides) if pressure is high and/or during the third week prior to rotating to the next product.

Cheryl™ Spicy Orange, Cheryl™ Sparkling Yellow & Cheryl™ Regal Purple Garden Mums

Ursula™ Sunny Yellow, Ursula™ Fancy Orange & Ursula™ Lavender Garden Mums

DISEASE PROBLEMS

The most common diseases found on garden mums are caused by Pythium, Fusarium, Rhizoctonia, and foliar leafspots caused by Pseudomonas cichorii (bacterial leaf spot). The first defense for disease prevention is to start clean—using clean cuttings, soil/ planting media, equipment and good cultural practices that create an unsuitable environment for disease organisms.

For the field, be sure the ground cover is free of weeds and debris to remove any potential inoculum source from last year. Prior to placing plants in the field, clean irrigation lines by flushing with chlorinated water containing 2–3 ppm chlorine, followed by a 1 ppm chlorine rinse to clear out any debris. Please note that this may cause some clogging in the lines as algae and other debris is dislodged. Be sure to check drippers after flushing and replace those as needed. ZeroTol® algaecide/fungicide can also be used to clean and flush irrigation lines. Be sure to check the label for the instructions on applications and use rates. It is also important to check for low spots in the field that can be collection points for excess water after rain or irrigation. These areas can contribute to root rot and other disease problems. If the low spots cannot be properly leveled, raising pots up on trays in these troublesome spots can help alleviate future disease problems.

Other cultural practices that can help reduce the risk of disease include moving from a high ammonium fertilizer to one with a nitrate form of nitrogen after initial growth has begun and maintaining the soil pH at the higher end of the desired range. A sand filter and chlorination of the irrigation water if it is from a surface water source is also a good idea.

DISEASE CONTROL

Infections by Fusarium sp. can cause root, stem and foliar blight on garden mums. If this disease has been a problem in the past, a preventive program using systemic and protectant fungicides can be beneficial for producing a healthy garden mum crop. A rotation using Heritage® (0.9 oz/100 gal) or Mural® fungicides (2–3 oz/100 gal) as a drench four weeks after planting, followed by a Medallion® fungicide drench (2 oz/100 gal) four weeks later; then apply a Mural® fungicide spray (7 oz/100 gal) focused on the center of the plant three weeks after the Medallion fungicide treatment can help provide protection against Fusarium sp. and many other diseases such as Rhizoctonia, Rust and foliar leafspots that can affect garden mums. Please refer to the product labels for specific instructions on applications and use rates.

Pythium root rot can also be a problem in garden mum production, particularly in crops grown outside. The heat of the summer months and the periodic rains can sometimes put additional stress on the root system which can make them prone to infection. Build-up of salts in the planting media can also contribute to root problems, so monitor the EC and pH regularly to be sure it is within the proper range. Using a preventive fungicide rotation can help avoid problems that can show up in the crop and disrupt sales. Begin by drenching mums after transplanting or seven days after stick. The following products listed below have shown to be effective in controlling diseases caused by Pythium sp. For prevention, apply on a 21–28 day interval; for active infections apply on a 14-day interval. Products should be used in a rotation to avoid problems with resistance.

MOA#	Fungicide	Rate (per 100 gal)
4	Subdue Maxx®	1–2 fl oz
3	Truban®	4–10 fl oz
21	Segway®	1.5–3 fl oz
11+7	Mural	2–3 oz

Gigi™ Coral Garden Mum

For more details on chrysanthemum disease management, see the Mum Disease Control tip sheets at www.syngentafhg.com.

Chrysanthemum White Rust (CWR) is a pest of quarantine significance in North America that can affect garden mum production. Visit www.syngentafhg.com for a complete bulletin on the disease lifecycle and preventative management.

WEED CONTROL

Weed control in outdoor garden mum production areas is primarily accomplished with solid or woven plastic ground cover. Use clean media in containers to prevent any weeds in the pots. Other manual methods or mulches can be used in field cultivation. There are several pre- and post-emergence chemicals available for use with mums. Barricade® 4FL or 65WG is a pre-emergent herbicide that can be helpful in reducing a broad-spectrum of broadleaf and some grassy weeds. For best results, apply to the ground/groundcover prior to setting plants in the field. Remember that both preemergence and post-emergence herbicides only control certain weeds. Read the label for weeds controlled and for use rates and application methods. Also keep in mind that damage can occur with drift or vaporization when using weed killers near growing plants.

NOTE: These suggestions are only guidelines and may have to be altered to meet individual growers needs.

Visit www.syngentafhg.com for more detailed information.

syngenta *flowers*

*Based on a program developed by Dr. Royal Heins.

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