

GARDEN MUMS

A strict fungicide program is critical to prevent White Rust.

- Chrysanthemum White Rust (CWR) is a quarantinable disease where the USDA will destroy your crop.
- In areas with elevated risk for CWR, growers must have a preventative spray program to manage the risk.
- Fusarium vascular wilt frequently occurs when grown outdoors on contaminated ground or when irrigated with contaminated water.
- During high temperature or rainy periods Pythium species can be a significant problem.
- Garden mums are heavy feeders early in production and failure to feed will result in small chlorotic mums
- Flower initiation is ‘thermo-periodic’ where night temperatures below 68F (20C) will promote flower initiation (crown buds) while high night temperatures above 70F (21C) will promote vegetative growth (big, tall plants)

Garden mums @ Risk Crop

*Garden mums are susceptible to several fungal diseases that, if not managed throughout the production cycle, will cause serious plant losses. Ball has worked diligently to minimize the risk, BUT growers are **solely responsible** for growing the plants under clean cultural conditions and applying correct fungicides throughout the production program to suppress the diseases.*

TEMPERATURE

- Night – Vegetative growth: 70-75° F (21-24° C)
Flower Initiation: <65-68° F (18-20° C)
- Day - 75-80°F (24-27°C) To control stretch, keep day temp within 15°F (8°C) of the night temp

WATER

- Keep media evenly moist but not saturated. Avoid wilting of the plant.
- Keep EC below 1.0 mmhos/cm (2:1) when feeding aggressively.

LIGHT

- Maintain highest light levels possible (4500-7500+ Ftc) without stressing plants.

MEDIA

- A well-drained, disease-free medium with a medium initial nutrient charge and a pH 5.8--6.2.

FERTILIZATION

- Mums are heavy feeders.
- Once rooting into soil, feed constantly at 250-350 ppm (20-10-20 or similar).
- Use slow release fertilizer when grown outdoors due to rain effects
- Once flower buds are visible reduce fertilizer rate and monitor EC to prevent root damage

CONTROLLING HEIGHT

- Use graphical tracking tool to manage PGR applications.
(<https://www.ballseed.com/QuickCulture/ProductionGuides/>)

Problems	Causes
Plant not sizing up or breaking	<ul style="list-style-type: none"> ✓ Low fertility rates during first 4-6 weeks ✓ Insufficient ammonia and phosphorus fertilizer ✓ Low light ✓ Low temp ✓ Poor root development
Root loss	<ul style="list-style-type: none"> ✓ High soluble salts ✓ Poor drainage ✓ Extreme hot temperatures ✓ Root disease problems
Poor root development	<ul style="list-style-type: none"> ✓ Poor aeration ✓ Insufficient water ✓ Low calcium and phosphorus
Flower buds do not develop on schedule	<ul style="list-style-type: none"> ✓ Crown buds – night temps below 65°F ✓ Delayed initiation – night temps above 80°F ✓ Insufficient long or short days ✓ Poor fertilization
Flower blight or foliage diseases	<ul style="list-style-type: none"> ✓ High humidity ✓ Poor air movement ✓ Lack of preventive fungicides

DISEASES AFFECTING GARDEN MUM PERFORMANCE

Besides Chrysanthemum White Rust and Fusarium, growers should monitor for several other diseases that affect outdoor production during the summer months. Review GrowerTalks Insect, Mite and Disease Guide for chemical control strategies (<https://www.growertalks.com/SpecialEditions/>).

Disease	Symptoms	Pathogen/Cause	Management
Ascochyta Ray Blight	Flower development is retarded on one side of the bud. Petals exhibit a brown discoloration. Browning and blackening extends down the stem, causing the flower to droop. Brown to black irregularly shaped spots develop on leaves.	<i>Ascochyta (Mycosphaerella)</i>	Avoid overhead irrigation. Apply a fungicide to protect healthy plants.
Alternaria or Stemphylium Ray Speck	Pin-point dead spots develop on petals. These spots may not enlarge. If enough spots are present, the entire flower dies.	<i>Alternaria or Stemphylium</i>	Avoid overhead irrigation. Maintain greenhouse humidity below 98%. Apply a fungicide to protect healthy plants.
Bacterial Blight	Cuttings turn dark brown and collapse. Surviving cuttings may be infected but have no symptoms. Established plants wilt during the day when infected and recover at night.	<i>Erwinia chrysanthemi</i>	Purchase culture-indexed cuttings that are free of the pathogen. Disinfect propagation beds between crops. Destroy infected cuttings.
Bacterial Leaf Spot	Small dark brown to black spots on lower leaves enlarge and become irregular in shape. When infected leaves dry, the spots become brittle and crack. The disease often spreads up plants in one side of the pot, eventually to the flowers.	<i>Pseudomonas cichorii</i>	Do not plant infected cuttings. Avoid overhead irrigation. Water in a manner that keeps leaf surfaces dry at all times. Protect plants grown outdoors from splashing.
Botrytis Blight	Light brown spots form on lower petals. Browning spreads to other petals. Infected tissues become covered with dusty gray spores.	<i>Botrytis cinerea</i>	Maintain greenhouse humidity below 98% at all times. Apply a fungicide to protect healthy plants.
Chlorotic Mottle	Leaves, at first mottled, become completely yellow. Infected plants grown under low light conditions and when temperatures average less than 20° C (69° F) exhibit no symptoms.	<i>Chrysanthemum chlorotic mottle viroid</i>	Purchase virus-indexed plants that are free of the pathogen. Destroy infected plants and disinfect tools used to handle them. Do not handle healthy chrysanthemums after handling infected plants.
Fusarium Wilt	Symptoms vary with the cultivar infected. Yellowing of leaves, wilting, and discoloration of the vascular tissue develops up one side of the plant.	<i>Fusarium oxysporum</i>	Management: Purchase culture-indexed cuttings free of the pathogen. Plant in pasteurized soil or soilless mix free of the pathogen. Maintain soil pH between 6.5 and 7.0. Use nitrate rather than ammonium forms of fertilizer. Apply a fungicide to protect healthy plants.
Powdery Mildew	Leaves have white, dry fungal growth on their surfaces.	<i>Golovinomyces cichoracearum (formerly Erysiphe)</i>	Apply a fungicide to protect healthy plants.
Pythium Root and Stem Rot	Stems turn dark brown to black at the soil line. Plants are stunted, wilt, and die.	<i>Pythium</i>	Plant in pasteurized soil or soilless mix free of the pathogen. Apply a fungicide to protect healthy plants.
Rhizoctonia Stem Rot	Young infected plants wilt during the day and recover at night. Reddish-brown dead areas develop at the soil line and girdle the plant.	<i>Rhizoctonia solani</i>	Plant in pasteurized soil or a soilless mix free of the pathogen. Apply a fungicide to protect healthy plants.
Rust, Brown	Dark brown masses of spores form in pustules on both leaf surfaces.	<i>Puccinia chrysanthemi</i>	Remove and destroy infected leaves. Apply a fungicide.
Rust, White	Small, yellow to tan spots are observed on the upper surface of leaves. On the underside of the leaf below the spots, raised, pinkish to white to cream-tan areas develop in which spores of the fungus are produced.	<i>Puccinia horiana</i>	Contact your state plant inspector and comply with regulations requiring the destruction of infected plants and fungicide treatment of remaining chrysanthemums.
Stunt	Symptoms vary with the cultivar infected. Young leaves are light green and very upright. Plants are stunted to half their normal height at maturity. Infected plants flower prematurely and flower size is reduced. Some cultivars exhibit small dead spots or flecks on the leaves.	<i>Chrysanthemum stunt viroid</i>	Purchase virus-indexed plants that are free of the pathogen. Destroy infected plants and disinfect tools used to handle them. Do not handle healthy chrysanthemums after handling infected plants.
Verticillium Wilt	The margins of lower leaves wilt and die. Or, the entire leaf dies. Symptoms proceed up one side of the plant.	<i>Verticillium</i>	Plant in pasteurized soil or soilless mix free of the pathogen.