

chrysanthemum stunt

BULLETIN

Chrysanthemum Stunt

Chrysanthemum Stunt crippled mum crops and growers prior to 1950. It can be devastating as seen in these pictures. Chrysanthemum Stunt, unlike Chrysanthemum White Rust (CWR), is not a quarantine disease. However, it is potentially no less devastating on a commercial basis. It can be more damaging to Chrysanthemums than CWR since **there is no chemical control** for Chrysanthemum Stunt; we do have fungicides for CWR control. Since the mid-1940s, the chrysanthemum industry has been implementing exclusion programs for Chrysanthemum Stunt—primarily through the efforts of specialist chrysanthemum propagators. At one point the disease nearly brought the chrysanthemum industry to its knees.

The effectiveness of a propagator's certification program can be directly measured by their ability to exclude this disastrous and fast spreading disease.

Around the world, there are various levels of success achieved by commercial and self-propagators in controlling this disease. Given the proper attention to detail and a significant level of investment, it is possible to eradicate this disease from commercial chrysanthemum stock production and maintain that environment indefinitely. This is not a small effort, nor does it come without a substantial financial investment.

Causal Agent

Chrysanthemum Stunt is caused by a viroid. A viroid is similar to a virus, but is even smaller. It is sub-microscopic and cannot live separately from a plant. A viroid has none of the cellular apparatus we commonly associate with living things and lacks even the protein coat of viruses. It consists only of a fragment of nucleic acid (the basic genetic material). It takes over plant cells to reproduce itself, disrupting physiological processes and causing symptoms of disease.

Symptoms

Although symptoms of Chrysanthemum Stunt are difficult to detect in stock, they can be so severe at flowering that infected finished crops of flowers are unmarketable. It's important to note that Chrysanthemum Stunt can be spread from plant to plant on material that is infected but not yet showing symptoms. Because it takes weeks from the time the plant can transfer the viroid to the time symptoms appear, many other plants are potentially infected before the plants with the greatest amount of the viroid show symptoms. Also, there are varieties which never show symptoms but are still effective carriers of the viroid.

Symptoms of Chrysanthemum Stunt are most prominent in finished flowered crops. The most pronounced may include shortened stems, different response time, uneven flowering, irregular size of flowers, irregular size of parts within single flowers, smaller than normal foliage, and uneven maturation of parts within single flowers. Reduced plant size and reduced flower size may be evident even in cuttings infected during stick where growers cross-handle diseased and healthy material. Flowers may appear faded or irregular in color, particularly reds and bronzes.



Typical Mum Stunt symptom—shorter plants, smaller flowers. **Not a Yoder Brand Variety.**



Typical Mum Stunt symptom—shorter plants, smaller leaves, response variation. **Not a Yoder Brand Variety.**

Occurrence and Current Situation

Brierly and also Keller first described Chrysanthemum Stunt in 1947 after it became a threat to the chrysanthemum industry in 1945. By the end of that decade it was prevalent in greenhouses in the United States and Canada, with infection rates as high as 50-100%. The North American chrysanthemum industry was nearly destroyed by this single disease during this period.

Yoder (brand) plant pathologists Conrad Olson and Herb Johnson worked with researchers at Cornell University and the USDA to develop techniques for the detection of Chrysanthemum Stunt that could be used commercially. This effort provided the foundation for plant certification programs which are at the heart of Chrysanthemum Stunt control today.

In the early days, Chrysanthemum Stunt was detected by grafting onto indicator varieties that displayed distinctive symptoms. Today, Chrysanthemum Stunt is detected by dot-blot hybridization (RNA) and also by a polymerase chain reaction known as PCR.

Chrysanthemum Stunt has been around for a long time at low levels, particularly in Europe and Latin America. We are aware of current problems with Chrysanthemum Stunt in the Netherlands, Latin America, and North America.

Dispersal

Chrysanthemum Stunt viroid is highly mechanically transmissible. For example, it is transmitted locally on fingers of workers, on tools and equipment used during cultivation, crop maintenance or harvest, and by contact between plants. Long distance spread occurs with shipment of infected cuttings or plants. There are no known insect vectors.

Survival

The viroid survives from season to season in infected stock plants. Plant debris can also serve as a source of disease. Chrysanthemum Stunt viroid can survive 212°F for 10 minutes. It remains infective in dried leaves as long as two years.

Environment

Chrysanthemum Stunt symptoms in flowers are expressed at a wide range of temperatures and light levels. Optimum temperature for expression of foliar symptoms is 75°F in some indicator varieties.

Host Relations

Under natural conditions stunt viroid has been identified in chrysanthemums and argyranthemums, though a number of plants in the Asteraceae family (Compositae family) are susceptible by artificial inoculation. All types of chrysanthemum can be infected with the stunt viroid, but some are virtually symptomless. Symptomless carriers can only be detected by specific testing.

Control

Chrysanthemum Stunt can be economically controlled only through the exclusive planting of Chrysanthemum Stunt-free cuttings from a stock producer with a rigorous testing and exclusion program. The only way to control Chrysanthemum Stunt is to eliminate the viroid from the production process. To ensure this, require your cutting supplier to provide you with clean cuttings. Obtain cuttings only from a commercial propagator with an established, reliable testing and certification system, and a nucleus of stock that is regularly tested for stunt viroid.

Remember, there are no chemical means to protect growing plants from infection or to cure infected plants.



Typical Mum Stunt symptom—less vigor, smaller foliage. **Not a Yoder Brand Variety.**



In longer-term crops, such as spray mums (shown) or garden mums, Chrysanthemum Stunt symptoms can be more pronounced than in fast, pot mum crops. **Not a Yoder Brand Variety.**

The Syngenta Flowers, Inc. Chrysanthemum Stunt Exclusion System

Syngenta Flowers maintains an exacting exclusion system to assure that the cuttings we deliver are free of Chrysanthemum Stunt.

Chrysanthemums collected around the world for trials and breeding are **all tested for Chrysanthemum Stunt Viroid** prior to release to breeders or crop development staff by the Gilroy West Pathology Department.

When a variety is coded for introduction, it **passes through the certification program**, which qualifies the variety for entry into our tissue culture elite nucleus.

All Syngenta Flowers chrysanthemum products are **increased from the tissue culture elite nucleus** on a regular schedule to **assure that Chrysanthemum Stunt Viroid and other systemic diseases are not introduced** into chrysanthemum stock production or our customers' greenhouses.

For further information, contact:

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