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How to manage stock plants

Growers who produce their own cuttings may have more control over availability, quantity and quality. However, maintaining stock plants requires additional space, strict pest-management protocols, controlled environments to maintain vegetative growth and often precise application of growth regulators.

The quality of a stock plant has a direct effect on the quality and number of cuttings that can be harvested. Poor stock plants yield poor cuttings, which can lead to nonuniform and low-quality finished plants.

Make sure you have appropriate permission to propagate protected cultivars and have arranged royalty payments for patented crops.

Maintain clean stock plants

Probably the most important aspect of producing stock plants is to ensure that they are free of insects, diseases and especially viruses. Cuttings taken from a stock plant with a virus will continue to carry that virus. Grow stock plants in sanitary environments with proper safeguards in place to prevent the entry of pathogens and pathovars.

Starting material should be virus-indexed and plants should be grown in disinfected greenhouses. Sanitation protocols should include:

- Use only new containers and sterilized growing media to prevent the introduction of pathogens.
- Keep floors clean and free of debris, media, weeds and unnecessary plant material.
- Place foot mats or foot baths containing a disinfectant solution at every entry point. Maintain this solution so that the entire shoe bases are wetted. Change it regularly. Employees and guests should step into the foot bath every time they enter a greenhouse section.
- Sanitize hands by immersing them in a disinfectant solution, by wearing latex gloves or both. Employees and guests should apply hand sanitizer each time they enter a greenhouse section. Employees who smoke and work with stock plants should wear latex gloves after smoking.
- Wear lab coats to help prevent the introduction of insects or diseases.
- Use sterile cutting utensils or knives. Sterilize them by flaming the cutting tool or by frequently immersing them in a disinfectant.
- Limit the entry of people in greenhouses containing stock plants.

Prevent the introduction of pests that can spread viruses to stock plants. Thrips-exclusion screening installed on side and roof vents can prevent thrips entry. Thrips spread some of the most common viruses. If possible, do not commingle stock plants with other crops to avoid introducing insects and diseases.

Control the environment

Stock plants of nearly every plant species should be maintained in a vegetative state whenever possible. Stock plants with flowers or flower buds produce reproductive cuttings that can perform poorly during propagation and subsequent growing on. There are several strategies to keep plants vegetative. Usually more than one strategy is used concurrently.

Photoperiodic plants should be grown under non-inductive conditions. Long-day plants such as petunia should be grown under a photoperiod of 12 hours or less. This requires the use of black cloth from March to October.

Provide short-day plants with night-interruption lighting from September through March to maintain vegetative growth.

To reduce or delay flowering, consider shading so that the average daily light integral is between 12 and 15 moles per square meter per day. A higher daily light integral can induce more rapid flowering, so applying some shade from midspring to midfall can help to retard flowering.

When the daily light integral is low (less than 10 moles per square meter per day), consider using supplemental lighting from high-pressure sodium lamps. Supplemental lighting from October to March usually increases the number of cuttings that can be harvested and can increase the quality of the cuttings.

Applying growth regulators

Controlling photoperiod and the daily light integral is not always sufficient to maintain vegetative growth. For many crops, ethephon (Florel) is applied once every two to three weeks at rates ranging from 200 to 750 parts per million or higher. Ethephon releases the gas ethylene, which can abort open flowers and flower buds.

The frequency and rate of ethephon application depends on the crop and environmental conditions and can vary within cultivars of the same species. Growers need to fine-tune their applications to determine the best strategy to abort flowers.

Applications of ethephon can also inhibit stem extension. After repeated applications, stock plant stems can become too short, resulting in short, stumpy cuttings.

To overcome stunted growth, gibberellic acid can be applied either with the ethephon solution or between ethephon applications. Rates and application frequency of gibberellic acid should be trialed to determine the desirable response.

In some aggressive plants, growth retardants can be applied at low rates to inhibit internode extension. In many cases, a growth retardant with a relatively short residual effect (such as products containing daminozide) is more desirable to prevent a long-lasting response.

Maintain adequate nutrition

Provide macronutrients and micronutrients to stock plants to prevent nutrient toxicity or deficiency. Equally important is to maintain a desirable medium pH so that nutrients are readily available.

In the Michigan State University greenhouses, we use the same strategies for maintaining the pH and nutrition as with our finished plants; the pH and electrical conductivity are checked weekly, and if values are out of their species-specific desirable ranges, corrective actions are made. Stock plants that are adequately fertilized and grown in media with a desirable pH produce cuttings that are green and actively growing. GM PRO