

Maintaining Clean Stock for Propagation at EuroAmerican Propagators[®]

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INTRODUCTION

Thank you for the opportunity to share this presentation on Maintaining Clean Stock for Propagation, with an emphasis on virus prevention, as we do it at EuroAmerican Propagators in Bonsall, California. I am the stock production manager at Euro and have served in this position since 1998.

BRIEF OUTLINE

In this talk, I will first define what “clean stock” means at EuroAmerican Propagators. Next, I will describe the virus testing methods used and then talk about our virus, disease, and pest prevention program in some detail. Then, I will describe our sanitation program and methods. I will talk about our employee training program for virus, disease, and pest prevention. Finally I will tell you how we monitor and measure results to evaluate how our virus prevention program is working.

DEFINING “CLEAN STOCK”

Stock is grown to produce cuttings that will be rooted and sold to other wholesale nurseries. Stock plants should be:

- Virus “tested” or “indexed” for the appropriate pathogenic viruses.
- The stock is not called “virus free”, because that is not realistic, but they are tested for the known pathogenic viruses and are free of those viruses. We realize that there may be unknown virus infections or asymptomatic virus infections present, but we do our best to find and eliminate these and grow our stock clean.
- Stock plants should be grown under sanitary conditions.
- There are effective pest and disease prevention programs in stock production areas.
- There is continuous elimination of weeds, algae, trash, and debris in stock production areas.

VIRUS TESTING METHODS

- Most of the time we do in-house testing at the Euro virus testing lab.
- We do outside testing at Agdia in Elkhart, Indiana. We use Agdia for confirmations of positive results, overflow testing, and new problems.
- Most testing is done by ELISA (enzyme linked immunosorbent assay). It is a virus/protein recognition test using an enzyme linked antibody or antigen.
- Polymerase chain reaction (PCR) is used when ELISA is not available; it is a virus DNA recognition test. It is very accurate but very expensive.
- We do some bio-indicator testing, but it can be a slow process. Host plants need to be inoculated with sap from a suspected infected plant, then over a period of 1 to 2 weeks, the host plants are monitored for virus symptoms. The symptomatic tissue can then be virus tested.

UNKNOWN VIRUS IDENTIFICATION

When we find an unknown virus, we try to have it identified. We have worked closely with plant virologists at Agdia, University California Riverside, University of Washington, University of Minnesota, U.S.D.A., and other locations for this kind of help in the past.

We are constantly on the watch for new viruses by talking to other growers and researchers around the world.

Virus Screening

- Virus screening varies with crop, depending on which viruses they are susceptible to.
- We can screen for up to 24 pathogenic or quarantinable viruses.

- Plants are virus screened on arrival and at regularly scheduled intervals.
- Virus, disease, and pest prevention program.
- We source our elite stock from clean stock producers.
- We do annual replacement of most taxa.
- All taxa are tested on a regular schedule. We do monthly or quarterly sampling of randomly selected plants and any plants with suspected virus symptoms.
- We use insect screen on vents and doors to exclude insects.
- We scout weekly for pests, diseases, and viruses, especially thrips, aphids, and whitefly since they are well known virus vectors.
- We do weekly insecticide and fungicide applications in stock production areas.
- The employee training program emphasizes virus prevention and recognition of virus symptoms. We explain virus transmission, diseases, pests and vectors; the importance of sanitation, and the reasons for sanitation rules.

SANITATION PROGRAM

This program is in place for all of our stock production areas.

- Hand wash stations and footbaths are provided at the entrances to all stock production areas and everyone is required to use them before entering to reduce the introduction of viruses, diseases, and pests.
- Coveralls and hair nets are also required to enter the stock production areas; plus gloves and aprons are required before contacting plants for the same reasons. In addition, gloves and aprons are changed before moving from one crop to the next crop.
- Clipper and hand disinfection is required between each stock pot and clipper sterilization is required at 5-ft intervals to reduce the spread of viruses, diseases, and pests.
- Tool and equipment disinfection is required before entry into the stock production areas.
- Disinfection of growing surfaces is required before planting new crops and after disposing of old crops.

EMPLOYEE TRAINING

This is required for all stock area workers.

- Virus prevention training is provided for all new employees and we do additional training every 2 weeks emphasizing virus prevention.
- Virus symptom identification on various crops is provided with photos and live examples when possible.
- Pest and disease identification is provided with photos and live examples when possible. Identification of insects that vector plant viruses is emphasized.
- Sanitation regulations are discussed and their purpose and importance is explained.
- Employee's work habits are monitored for compliance with sanitation regulations and consequences are established for non-compliance.
- Incentives for complying with regulations are provided. We serve lunch to the crew if they are able to complete the month with no violations of the sanitation regulations.
- Smoking is not allowed in the nursery and we do not hire smokers in the stock department to reduce the chance of tobacco mosaic virus infections.

MONITORING RESULTS

Last, but not least, we evaluate our program by monitoring our results.

- The virus detection history is a record of the number of positive virus results detected in our stock plants.
- The sanitation rule violation history is a record of the number of stock employee violations of the sanitation rules.

CONCLUSION

- Results show that our clean stock program is succeeding in reducing and preventing virus, disease, and pest infections in EuroAmerican stock.
- We continue to improve and update our training, testing, sanitation, pest and disease

prevention and monitoring programs to provide our customers with virus tested, pest, and disease free plants.

