

## CLEAN PROPAGATING MATERIAL

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Following the publication by Kenneth F. Baker of "The U.C. System for Producing Healthy Container Grown Plants" (1), plant propagators have introduced various techniques to treat growing media to eliminate diseases and pests. The pasteurisation of growing media has resulted in improved profitability of propagation enterprises and a healthier product for the consumer.

However, it is evident from requests to import propagation material from overseas, that many plant propagators, fanciers, or plant breeders are unaware of the advantages of clean propagating material.

### Advantages of Clean Propagating Material

- Reduction of "nesting" diseases in propagating benches, e.g. water-borne diseases—*Pythium*, *Phytophthora*, *Fusarium*, and *Verticillium*.
- Reduction in foliage diseases, e.g. mildews, rusts.
- Improvement in "bud-take" with use of virus-tested budwood, e.g. prune dwarf virus and *Prunus* necrotic ringspot virus-tested peach budwood.
- Better plant growth using virus-tested budwood, e.g. cherry nursery plants free of pollen-borne viruses.
- Improved nursery productivity through:
  - lower rejection rate
  - lower spraying costs
  - less consumer complaints
  - greater throughput
  - production of quality product

### Disease/Pest Risk level of Propagating Material

Tissue Culture	↓ increasing risk of introducing diseases and pests.
Seed propagation	
Budding	
Grafting	
Cuttings	
Bulbs, corms, rhizomes	
Rooted plants	

#### Tissue Cultures:

Contamination from:

- Bacteria/fungi/nematode/virus/mycoplasma/insects.

Decontamination by:

- Reculturing

Prevention:

- Hygiene in operations
- use of disease-screened mother stocks to eliminate virus/viroid/mycoplasma diseases.

*Seed propagation:*

Contamination from:

- trash
- seed coats—rusts/smuts/tobacco mosaic virus
- foreign seeds—weeds
- internal—seed-borne viruses (lettuce mosaic, pea seedborne, prune dwarf, prunus necrotic ringspot) fungal smuts and bunts.

Contamination Control:

- Immersion in hot water (temperature and exposure time dependant on species).
- aerated steam (temperature and exposure time dependant on species).
- chemical dips (bacteriacides (streptomycin, sodium hypochlorite).
- fumigation, (methyl bromide for insects).
- Screening (removal of weed seeds).

Prevention:

- Use of certified seed

*Budding/Grafting/Cuttings*

The difference in disease/pest risk between buds and graftwood is the number of contaminants per unit propagule.

Contamination:

Surface—bacteria/fungi/nematode/insects  
Internal—bacteria/fungi/nematode/virus/mycoplasma.

Decontamination:

- Chemical dips—fungicide/bacteriocides/insecticides
- Fumigation—methyl bromide for insects
- Immersion in hot water

Prevention:

- Routine hygiene programme to reduce disease/pest levels on stock plants.
- Disease screening of stock plants (elimination of virus/viroid/mycoplasma diseases).
- Isolation of stock plants to reduce pest/disease contamination.

*Bulbs/Corms/Rhizomes:*

Additional contamination from soil-borne pests and diseases.

Contamination from:

Surface—airial and soil-borne bacteria and fungi, insects/nematodes.  
Internal—bacteria/fungi/nematode/virus/mycoplasma

Decontamination:

- Hot water treatment (temperature and exposure time dependant on species)
- Chemical dips—insecticides/fungicides
- Fumigation—insect control

Prevention::

- Routine hygiene programme to reduce pest/disease levels on stock plants.
- Disease screenings of stock plants (elimination of virus/viroid/mycoplasma diseases).
- Containerisation to reduce soil borne pests/diseases
- Isolation of stock plants to reduce pest/disease contamination

*Rooted Plants:*

Contamination:

- Surface—aerial and soil borne bacteria and
- Fungi/insects/nematodes
- Internal—bacteria/fungi/nematode/virus/mycoplasma

Decontamination:

- Soil removal
- Chemical treatment—fungicide/insecticide
- Fumigation—methylbromide

Prevention:

- Plants from accredited programmes, e.g. Avocado Nursery Voluntary Accreditation Scheme
- Routine hygiene programme to reduce pest/disease levels in stock plants
- Disease screening of stock plants
- Isolation of stock plants

### LITERATURE CITED

1. Baker, K. F., ed. 1957, The U.C. System for Producing Healthy Container-Grown Plants. Berkeley, Calif. Division of Agricultural Sciences. University of California.