Diseases of Orchids in Hawaii

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Viral Diseases

2 common viral diseases on orchids:

1) Cymbidium Mosaic Virus (CyMV)

2) [Odontoglossum ringspot virus (ORSV)] Tobacco Mosaic Virus Orchid strain TMV-O

Electron micrographs of virus particles
Cymbidium Mosaic Virus (CyMV):

Common in Hawaii; most common on orchids world wide.

The virus particle is stable.

Easily transmitted. Easily moved from one plant to another.

Many orchid hosts.

Several common symptomless hosts.
Petal streaks and spots caused by CyMV on dendrobium.

Cattleya
Necrotic flecks and streaks over entire flower

More severe during the winter months.
CyMV: Circular dark spots on *Cattleya* leaves
Vandas are symptomless hosts; all infected with CyMV due to propagation by cuttings.
Viral Disease Management

Prevention and Sanitation

Only purchase plants without symptoms;
Be familiar with symptomless hosts;
Screen plant stock using ELIZA;
Keep new plants quarantined;
Discard all plants with symptoms of viral infection; or grow them in isolation.
Bacterial Diseases

2 Common Bacteria in Commercial Dendrobium fields

- *Erwinia chrysanthemi*
- *Burkholderia gladioli pv gladioli* (Pseudomonas gladioli pv gladioli)
Water soaked leaf spot; probably started at leaf wound (Dendrobium)

Soft rot of Phalaenopsis leaf
Pseudostems or canes break as the internal structure is destroyed by bacteria.
Example of high number of bacteria that emerge from diseased host tissue; Marjoram leaf spot

Cloud of trillions of Bacterial cells
Photomicrograph: Inside a dendrobium cell*

Tiny bacteria cells
Weevils aid the movement of bacteria; they probe or walk on diseased plants then infect healthy plants in the process.

Wounds made by probing weevils

Water-soaked tissues indicate bacterial disease
Bacterial Disease Management

Prevention:

Do not transport diseased plants to your nursery;

Carefully check all new plants;

Use solid covered greenhouses.
Sanitation:

Gather all infected plants and remove from the nursery.

Set up a Hospital. Assign an area for sick plants. Keep DRY. Place diseased but precious plants in the Hospital. Avoid going in and out of the hospital.

OR
Orchid Pathogens and Pests

Pathogens

- Fungi  Kingdom Fungi
- Bacteria  Prokaryotic
- Virus  Prokaryotic
- Nematodes  Kingdom Animal

Pests: Insects

- Mealybugs
- Thrips
- Beetles
- Weevils
- Midges
- Leaf Cutting Bee
- Aphids
- Moths
- Scales

Pests: Mites

Pests: Mollusks:  Snails and Slugs
Nematodes

- Round worms; Over 10,000 species.
- Some attack humans
  - Eye worm.
  - Trichinosis; man is infected by consuming infected pork.
  - Elephantiasis; huge malformations from infection and blocking of the lymph glands; spread by mosquitoes.
Lymphatic Filariasis, is a disorder of the lymphatic system.

Eye worm

Elephantiasis
- **Plant Parasitic nematodes**
  - All have a spear or stylet, that is used for feeding.
  - Many types of nematodes cause diseases of a wide range of crop plants.
- Orchids: Foliar nematodes or *Aphelenchoides*
NEMATODE ANATOMY

no brain
no heart
no lungs

head
stylet
esophagus
mouth and lips
vulva
egg
ovary
intestine
anus
tail

mouth and lips
**Foliar Nematode Biology:**
- Live in and outside of root system
- Depend on **moisture**
- Lay **eggs**.
- With dry weather, the nematodes migrate back to the root system or die.

**Prevention**
- No chemical (nematicide) registered on orchids
- Sanitation (dilute bleach)
- Reduce Moisture