Bacteria – Fungi – Viruses & Other #*>@

A simplified, easy to understand presentation.

Introduction:

As a University student, I was told again and again of the importance of the inclusion of good quality pictures in scientific articles and reports (papers). "A picture is worth a thousand words," I was told.

Humans have eyes and memory. When we see something we remember it and we can identify it when we see it again. The more often we see something the more confident we are about its identification.

Imagine my surprise and disappointment when, after searching for scientific articles related to orchid plant pathogens online for weeks, I realized that there were very few "papers" that had relevant pictures of diseased plants incorporated in the article. Even then, pictures were either old black and white or unreliable for identification purposes. What is wrong? Why do scientists use words to describe the symptoms rather than letting a good picture do the talking? Don't they believe that a picture is worth "thousand words"? Is it possible that test tube cultivated bacteria and fungi were used to carry out the research studies? Is it possible that the scientists did never see the real thing? Is there a different explanation?

All orchid growers have seen diseased orchids. A "Spot" on a leaf, if it is black it is called a "Black Leaf Spot/Rot", if it is brown it is a "Brown Leaf Spot/Rot". Meaningless names for identification purposes because many pathogens (bacteria, fungi and viruses) can "create" brown or black spots or rot on leaves. Sunburn, natural events, pests, chemical imbalance, etc can also cause spots on leaves.

Now, "Black Leaf Spot" has been "identified". Suddenly, the world is falling apart. The plant is being placed out of site under the table and must be destroyed even the local nurseryman (the local God) says so. Like the "Daleks" in Dr. Who: "Destroy", "Destroy", "Destroy".

In my opinion, you, the orchid grower, should make an effort to find out "what it is" first and if there is anything you can do about it, before you start destroying plants. Sometimes, simple things like better air circulation can solve a problem.

Very few orchid growers or nurseries use Bio-labs to identify plant pathogens because they are convinced they know everything. Has anyone actually seen a Bio-Lab report? I have never seen one.

When you know what causes the problem, it is easy to judge if your plant is going to make it or not. There are a few "lethal" pathogens that justify the "burning" of a plant. Crown rot can be the last straw for some plants and advanced roots rot is a killer.

Generally speaking most fungal and bacterial pathogens can be successfully treated with copper compounds or systemic fungicides. Nutrition plays also a role in the control of fungi, especially anthracnose. Colletotrichum orchidacearum causes Anthracnose in Cymbidiums. By applying potassium (K) and Phosphorus (P) Anthracnose can reduce (Yi et al, 2003; Acosta-Ramos et al, 2003). Other experiments found that foliar application of nutrients can reduce anthracnose incidents caused by Colletotrichum sp. and Lasiodiplodia sp.

Improved Air circulation, changes in watering practices, controlled changes in day/night temperatures, control humidity, etc. can substantially decrease the susceptibility of your orchids to funguses and bacteria. In fact, some existing diseases may disappear.

We know antibiotics kill viruses. Antibiotics are not used to combat plant

viruses yet, but that may change in the future. As I understand it, experiments are in progress.

Some experts recommend the use of fungicides/bactericides as a "precaution". That is wrong. There are "beneficial" bacteria/fungi out there needed by the plants. By spraying, these bacteria/fungi will die and the associated plants will be deprived from symbiotic benefits. The “chemicals” will also confuse the plants and lessen their defense mechanisms making them more susceptible to pathogens. Finally, the pathogens of interest multiply very fast and evolve (mutate) to survive. In no time, new strains of super-pathogens, now immune from the sprays used, will laugh at you every time you spray them. Are you prepared to take the risk? You do not take antibiotics every day, why should you give them to your plants?

General:

For a disease to occur, a susceptible host, a pathogen and favorable environmental conditions are needed to interact with each other. Without these necessities a disease will not occur. These events form the disease cycle.

The life cycle starts with the production and dispersal of primary inoculums (=materials used for the inoculation), followed by the infection, growth and finally the development of the pathogen. The first infection is the “primary infection”. A “primary infection” occurs when pathogens come in contact with a susceptible host under favorable conditions.

We know that plants have hereditary immunity or resistance to many pathogens. We also know that plants can harbor pathogens without showing any symptoms.

Fungi and bacteria require water for their spores to germinate. Infections are favored by prolonged warm weather with rain periods and high humidity.

Most pathogens penetrate the surface of a plant by entering through wounds or natural openings. Further growth and development of the pathogens occur on or within infected plant tissue. The spores are dispersed by wind, splashing water, rain, insects or infested tools.

Our ability to manipulate the environment inside an orchid house is our best defense to stop or prevent bacterial or fungal diseases.

Related assays: Bacteria, Fungi, Viruses, and Biological Control Agents.