St. Augustine Orchid Society
www.staugorchidsociety.org

# Summer Rots – The Water Molds

by Sue Bottom, sbottom15@gmail.com

It is summer. The days of low humidity are gone and each day seems hotter and more humid than the last. The water molds (also known as oomycetes) thrive in this environment. Different organisms in this group of devastating plant pathogens are responsible for the Irish potato famine, sudden oak death syndrome and downy mildew. In orchids, Black Rot is caused by *Phytophthora* and *Pythium*.

*Black rot travels quickly through your plant destroying it in a matter of days*

As Janna Beckerman of Purdue University wrote in Greenhouse Management magazine:

> *Water molds are quite possibly one of the most destructive groups of plant pathogens. At first glance, they seem very similar to fungi, and they share a lot of traits in common. Both are barely visible, spreading by fine threads called hyphae, and both produce unbelievable numbers of spores. But that is where their likeness ends. Water molds are more like algae than fungi, so the fungicides that control them aren't the same as what you would use for Fusarium wilt or powdery mildews. The key take-home here is that many fungicides that work great on true fungi, like Cleary's 3336 or Systhane, don't work on water molds...*

# Summer Rots – The Water Molds

by Sue Bottom, sbottom15@gmail.com

Understanding what these disease-causing organisms are and how they live is essential to managing them and limiting their destructive potential. The website Small Things Considered provides more detail, but as the Purdue article explains :

> *All of the water molds have a similar lifecycle: Upon germination from thick-walled oospores, hyphae emerge to directly infect or develop into a zoosporangium, a big word that describes a swollen sac that develops at the end of a hyphal thread and releases tiny, swimming zoospores in the presence of water. These zoospores then swim to and infect plants. The zoosporangium can also germinate and infect plants directly. Upon infection, new hyphae grow into and throughout the plant, absorbing nutrients as a food source and breaking down plant tissues. These water molds then form news zoosporangia or oospores to repeat the cycle.*

**Symptoms.** In cattleyas, the infection usually starts on the roots or basal portion of the pseudobulb, though all plant parts are susceptible. The first signs are a cream-colored discoloration that starts at the base of the pseudobulb and moves upward, followed by a dark brown to black often sharply delineated discoloration. As the infection moves up the pseudobulb, the leaves begin to yellow at the leaf axil moving toward the leaf tip, very different from the yellowing that occurs as a result of normal aging that usually begins at the leaf tip. The leaf falls from the plant with a slight jarring. The infection moves quickly along the rhizome from growth to growth. The entire plant can be consumed in a matter of days, so quick action is required.

*If you see leaf yellowing, it's time to investigate, inspect the plant to find the problem.*

*See the creamy discoloration on the pseudobulb with the leaf yellowing to the left?*

*The rot on this plant is fairly advanced, time for radical surgery to remove infected tissue.*

The aerial portion of the plant can also be affected, particularly during periods of extended leaf wetness during the tropical storm season. The damage caused by water molds is difficult

to distinguish from the damage caused by bacterial organisms like Erwinia. Both types of organisms produce black, water-soaked lesions that spread rapidly, though the ooze produced by bacterial infections is quite offensive.

The water molds also cause damping off in seedlings and community pots. Small water soaked spots may start on the seedling, and plant after plant rots and dies.

*The rot moves up the pseudobulb, dissolving the plant tissue. Adjacent healthy growths are next!*

*It doesn't just move up the pseudobulb, it is also moving through the rhizome looking for its next target.*

# Summer Rots – The Water Molds

by Sue Bottom, sbottom15@gmail.com

**Prevention.** You may be able to avoid radical surgery if you alter your cultural practices so as to avoid the conditions that favor the growth of the water molds. Prevention requires managing water, in that the motile spores require free water to move around and infect new plant tissue. Some suggestions:

- Watering Practices – Let your plants dry completely throughout the root zone between waterings, sometimes referred to as going to a "hard dry". This means you will be watering less frequently than you did during the low humidity spring and fall when the pots dry out so quickly. Avoid watering late in the day, better to have everything watered before noon so the leaves can dry by evening. Don't use overhead watering systems, especially for cooling.

- Repotting – Avoid repotting during the high humidity summer months. Repot through the spring months, and then wait until the humidity breaks in the fall to do any last minute repotting. If you have a bifoliate cattleya in need of repotting that is throwing out new roots and you can't simply drop into a larger pot, repot it dry. Don't wet the plant or the roots before repotting, dust any cut surfaces with Banrot and then repot it, but do not water for a week or two. Let all the wounds seal over before watering. This will also encourage new root growth.

- Protective Drenches – If your plants tend to get black rot every year, you might consider a monthly drench with the active ingredients Fosetyl Aluminum (trade name Aliette), Metalaxyl (trade name Subdue) or Etridiazole (trade names Banrot, Terrazole and Truban). To help prevent the disease from getting a foothold, start in June and continue through September.

- Don't Overpot - Whatever mix works for your watering habits, remember that as the mix ages, salts accumulate and organic matter degrades. The mix tends to hold much more water after two or three years than it did when it was fresh. Ideally, your plant will outgrow both the mix and the pot before the time the mix is degraded and starts to hold too much moisture.

- Tropical Storm Season – Extended periods of leaf wetness can result in bacterial rots on the aerial portions of your plants. Protective sprays with hydrogen peroxide (and the stronger Zerotol) and quaternary ammonium compounds (Consan, Physan, pool algaecide) before and after storms can help protect your plants. Copper is an excellent fungicide and bactericide, but can accumulate to toxic levels in sensitive plants, particularly dendrobiums and thin leaved orchids, so caution is advised in its use.

- Proper Nutrition - Use dilute fertilizer solutions, say 1/8 to 1/4 strength, to help the plant grow, without growing too quickly. The form of nitrogen in the fertilizer makes a difference, ammonium and urea nitrogen tend to produce lush, soft growths while nitrogen in the nitrate form tends to form harder growths. Understand your water quality so you can select the right fertilizer, and use calcium and silicon supplements, if required.

One of the best preventatives against black rot and other diseases is growing plants with strong, hard cell wells that are more impenetrable to pathogenic organisms. This requires

you to grow the healthiest and strongest plants you can, with the proper balance of light, water, air, and all the other essentials. As you maximize your culture, you will enjoy your plants more, even when not in bloom. When you are watering, really look at your plants. If you notice something is not quite right, stop what you are doing and investigate. Early intervention can prevent you from administering their last rites during the summer rot season.

Citations and Additional Reading

Beckerman, Janna. Minding Water Molds, *Greenhouse Management, February 5, 2013. Accessed June 26, 2020:* https://www.greenhousemag.com/article/gm0213-disease-water-molds-control/

Schaechter, Moselio (Elio). Five Questions About Oomycetes, Small Things Considered website. Accessed 9/4/2020: https://schaechter.asmblog.org/schaechter/2009/11/fiv-1.html