NEW DISEASE FOR DAYLILIES: DAYLILY RUST

by Jean Williams-Woodward, University of Georgia

A new disease on daylilies (*Hemerocallis* spp.), daylily rust, has been identified in the United States. The disease is caused by the fungus *Puccinia hemerocallidis* and it was first identified in Georgia in August 2000. Currently, daylily rust has been identified on plants within nurseries in Georgia, South Carolina, Alabama, Florida, California, and Texas. A survey of other states by the Department of Agriculture in each state is underway and will continue through this summer to determine the full distribution of the rust in the U.S.

The disease has caused quite a concern among growers and for good reason. The Southeast produces most of the daylilies sold nationwide, and daylilies are the number one perennial plant in the country. There is a daylily in almost every garden across the country and the Department of Transportation in many states are planting daylilies along roadways partly because of its' "pest-free" reputation. There is a very real concern that the rust could spread nationwide within a few years, if the rust is not controlled in infected nurseries and gardens today.

Rust fungi are obligate pathogens meaning that they require living tissues to grow and reproduce. Therefore, rust diseases traditionally don't readily kill infected plants. The threat is not that infected plants will die from the disease and be a loss to a grower, but that they will survive, disfigured and unsaleable, while they produce more and more spores that can be easily spread by the wind to other non-infected daylilies before the infected leaves eventually die.

How or when the disease was introduced into the U.S. is uncertain. According to some daylily growers and hybridizers, the rust has been known or seen for several years within the U.S., particularly in Florida. This may be true, but the rust has not been identified by any university diagnostic laboratory or U.S. Department of Agriculture prior to 2000. The first introduction of the rust in Georgia appears to have come from imported plants from Central America.

What may be confused with daylily rust is the common daylily disease, leaf streak, caused by the fungus *Aureobasidium microstictum*, which also has been known by the fungal names of *Collecephalus, Gloeocephalus*, and *Kabatiella*. The typical symptom of leaf streak disease is the browning and yellowing of the mid-vein of the daylily leaf. In addition, tan to brown spots that enlarge and often coalesce are also common. The smaller, water-soaked, tan spots of leaf streak look very similar to early rust symptoms. The two diseases can be distinguished easily by giving the diseases time to develop. If spots are detected on your daylily leaves, make a note of it, then go back to the daylilies in a few days to a week and see how the spots developed.

From inoculation studies in Georgia, daylily leaves can be infected with rust by exposing plants to 100% humidity for 24 hours with plenty of leaf moisture. Within 3-5 days after exposure, light yellow, water-soaked spots develop on the upper leaf surface where infection occurred. The spores (urediniospores) of daylily rust are bright orange and are produced on both the upper and lower leaf surfaces in pustules 7-14 days after infecting plants. In contrast, leaf streak spots will have a sunken appearance and be tan with a darker border. The leaf streak fungus produces clear to lightly pigmented spores on stalk-like structures from the center of the spot that can be seen with a hand lens. By far, leaf streak is more common than daylily rust.

Very little is known about the daylily rust lifecycle and studies are currently underway in Georgia to learn more about how this rust survives, infects, and spreads. What is known about *P. hemeorcallidis* is that it is a heteroecious rust, meaning that it requires two different hosts to complete its lifecycle. Rusts may produce up to five different spore stages in its lifecycle. The uredinial/telial host is daylily in the Liliaceae family, and the alternate (spemagonial/aecial) host is the herbaceous perennial, *Patrinia* spp. in the Valerianaceae family. *Patrinia scabiosifolia, P. gibbosa, P. triloba,* and *P. villosa* have been described as alternate hosts for the rust in Asia and all are grown in the United States. The most common of these is *P. scabiosifolia* 'Nagoya'. However, daylily rust has not been found on any *Patrinia* spp. within the U.S.

It has been reported on some web pages and pest alerts that *Hosta* is an alternate host for daylily rust. In published descriptions of the rust from Japan, *Hosta* spp. were reported as a host for *P. hemerocallidis*. However, no *Hosta* plant has been infected by daylily rust in inoculation studies in Georgia, and at this point *Hosta* is not considered a host for daylily rust.

The presence (or absence) of the alternate host, *Patrinia*, does not affect daylily rust survival or spread because the rust can survive on and infect daylilies without completing its' lifecycle. The uredinial spore stage is often referred to as the "repeating stage", and it is the spore stage that can re-infect the same host plant. What compounds daylily rust survival and spread is that there are dormant and non-dormant daylily varieties. So, although the rust may not survive the winter on dormant varieties, it could on non-dormant varieties.

Daylily varieties appear to differ in susceptibility to the rust and there appears to be two symptom types. Symptoms range from bright yellow spots to streaks on 'Pardon Me' to smaller, water-soaked, tan spots with darker borders on 'Gertrude Condon' (pictures can be seen on the website: http://www.ces.uga.edu/Agriculture/plantpath/daylilyrust.html).

Because daylily rust is spread by wind, it has the potential to spread very quickly. If you think that you have the rust in your nursery, please take a sample to your local county extension agent for submission to UGA Plant Disease Clinic or state diagnostic clinic for confirmation. Nurseries in which the rust is found are to remove

all infected leaves from the plants as close to the soil as possible (no more than ° inch of tissue is to be left), and all of this material is to be burned or buried. Because this rust spreads quickly, assume that all plants within the same area are infected whether rust pustules are seen or not.

A fungicide spray program should begin immediately following foliage removal and as new leaves emerge. There are many fungicides labeled to control rust diseases. Many, including triadimefon (Strike, Bayleton), propiconazole (Banner Maxx), and myclobutanil (Systhane) are sterol inhibitors with the same mode of action. It is a good practice to rotate fungicides with different modes of action to reduce the development of fungicide resistance. A rotation of a sterol inhibitor with azoxystrobin (Heritiage), trifloxystrobin (Compass) and/or flutolanil (Contrast) can help reduce daylily rust. Quick action in controlling daylily rust could prevent the disease from spreading across the country and being a continual problem for daylily growers and gardeners.

2001: Water In The West

by Karen Panter, University of Wyoming

After a summer like last year, when lack of precipitation created one of the driest seasons on record here in Wyoming and the West, managing water in a production operation should certainly be on every grower's mind no matter your location. If weather patterns are indeed changing we ought to be preparing for conserving and reusing our most precious resource here: water.

To that end, the University of Wyoming is trying to set an example. Last fall we completed installation of ebb-and-flood benches in the horticulture research greenhouse. Not only did we increase available growing space by 56%, but we now have the capability of recirculating the water to boot.

How did we do this? The ebb-and-flood benches are also rolling benches. By using rolling bench technology, we eliminated all but about 1-1/2 aisles. (The way the greenhouse is configured, we couldn't get it down to only one aisle.) There are four benches, two of which are filled from an 80-gallon stock tank that can be easily drained and refilled at any time. Each bench has its own pump. The other two benches are smaller and only require 40-gallon stock tanks. Currently we use plain, domestic water for crops grown on the benches. As the plants grow and develop we can either fill the stock tank with a fertilizer solution or keep it plain water and use a slow release fertilizer applied around each plant. We prefer the latter.

Currently the pumps are on timers set to fill the benches twice a day, early morning and mid-afternoon. There is a crop of *Dianthus* 'Telstar Scarlet' and some *Artemisia frigida/Castilleja linariifolia* (fringed sage with Indian paintbrush) plants on one bench right now, all in 4" square pots. We can reset the timers for any configuration we'd like. This is an important aspect of growing on these benches, because watering schedules can be changed according to weather patterns, seasonal changes, and the growth and development of the crop.

As 2001 has unfolded, we are already seeing more warm, dry weather and low precipitation levels in the already-arid West. But at least a few of us are prepared for possible water shortages. Are you?

Karen L. Panter, Ph.D.
Extension Horticulture Specialist
Department of Plant Sciences
P.O. Box 3354
University of Wyoming
Laramie, WY 82071-3354
phone 307-766-5117
fax 307-766-5549
cell phone 307-760-0581
e-mail kpanter@uwyo.edu