

Oxalis Rust

Brian E. Whipker, North Carolina State University
(bwhipker@ncsu.edu)

Bright-orange spore pustules on the leaf underside denote rust disease.

A grower called and reported red growth on the underside of oxalis leaves. The problem turned out to be rust (*Puccinia oxalidis*). This disease attacks both red leaf types (*Oxalis triangularis*) and green leaf types (*Oxalis regnellii*) of oxalis.

From the top, the pale white spots will most likely be the first sign of the disease, especially on red leaf types (Figure 1). A closer inspection of the undersides of the white spots one will notice bright-yellow to bright-orange spore pustules of the rust (Figure 2). The pustules can also form concentric rings on the leaf underside (Figure 3). Figure 4 illustrates rust on a green leaf cultivar in the garden with light yellow to tan spots on the top of the leaf and red pustules on the bottom.

With advanced symptoms, leaf death occurs (Figure 5).

Margery Daughtrey (2005) reported that the alternate host is Oregon grape (*Berberis spp.*). In addition, this rust disease can spread to oxalis weeds [Yellow

wood sorrel (*Oxalis stricta*)] commonly found in greenhouses and can infect future crops of shamrocks. Therefore it is important to eradicate oxalis weed species in the greenhouse.



Figure 1. Pale, white spots on the upper leaf surface are the initial sign of rust.



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CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension -
Suffolk County
dog1@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech University
jlatime@vt.edu

Dr. Roberto Lopez
Floriculture Extension Specialist &
Research
Purdue University
rglopez@purdue.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
brian_whipker@ncsu.edu

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Figure 2. Inspecting the leaf undersides will reveal orange pustules.

Management.

Once an oxalis plant has rust, it may be difficult to control. Remove severely infected plants if the problem is not wide spread.

rust is much easier to prevent than eradicate. Regular scouting is essential so that outbreaks are caught early when they are most treatable.

So what crop protection chemicals work? To answer this, turned to an expert, Rick Yates of Griffin Greenhouse and Nursery Supplies. Rick states "Oxalis

Strobiluron fungicides such as Pageant® Intrinsic™ at 12 ounces per 100 gals or Heritage® at 4 ounces per 100 gallons can be used as preventatives. At the



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Figure 3. Concentric rings of pustules typically form on the leaf undersides. (Better examples of concentric rings can be found on the internet.)

first sign of disease Eagle® can be used at 8 ounces per 100 gallons with CapSil® at 8 ounces per 100 gallons. Make 2 applications 10 to 14 days apart. Eagle® kills spores on contact and also provides a locally systemic residual without the stunting that sometimes is seen with similar products.

Any pesticide that you have not previously used under your conditions should be trialed on a limited basis for plant safety before large scale applications are made. Read and follow the pes-

ticide label. Pesticides other than those mentioned may be safe, legal and effective."

Also remember to scout the greenhouse and control any oxalis weeds that can harbor the disease.

Other Oxalis Problems.

While the orange pustules on the bottom of the leaves, help in the diagnosis of rust, there are a number of other disorders that you need to be aware of with oxalis.

Probably the main disorder in interveinal chlorosis (Figure 6) of the youngest leaves caused by an iron deficiency. This iron deficiency can be induced by either high substrate pH (>7.0) or over-irrigating the plants (which leads to compromised roots and negatively impedes uptake of iron). For additional information with excellent color photographs, please refer to the GPN article by Chad Miller and Bill Miller (<http://www.gpnmag.com/still-keeping-shamrocks-green>).

Distinctive yellow ringspots (Fig-

ure 7) can also occur and is caused by the chlorotic ringspot virus (<http://sdb.im.ac.cn/vide/descr719.htm>). This virus is spread by aphids.

In the Holland Bulb Forcer's Guide (1996), page C-135, Dr. DeHertogh also lists leaf edge burning, leaf wrinkling, leaf bronzing, leaf greening, and leaf spotting can occur, although no known cause is reported for any of these disorders.

Key Points.

Orange pustules on the underside of oxalis leaves denote a rust disease. Interveinal chlorosis of the upper foliage denote an iron deficiency, which can be caused by multiple problems.

Additional Resources.

There are few online resources with details about the disease, host range, and how it is spread. Below is one from 2005 by Margery Daughtrey of Cornell University.

Daughtrey, M. 2005. Don't let rust pounce on your Oxalis. Northeast Greenhouse IPM Notes. Volume 15(3):3.



Figure 4. View of a green leaf cultivar with yellowish-tan upper leaf spots and orange pustules on the lower leaf surface. This plant was in a garden in Normandy.



Figure 5. With advancement of the disease in the landscape, leaf death can occur.



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Figure 6. Interviental chlorosis of the youngest leaves caused by a lack of iron, due to elevated substrate pH levels, over irrigation, cold growing or impaired roots.



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Figure 7. Yellow ringspots caused by chlorotic ringspot virus.