

Powdery Mildew on Nasturtium in South Florida¹

Pamela D. Roberts, Katherine E. Hendricks, Francesco Di Gioia, Joubert Fayette, and Monica Ozores-Hampton²

Introduction

Powdery mildew, which is caused by the fungus *Leveillula rutae* (syn. *Oidiopsis haplophylli*) on nasturtium (*Tropaeolum majus* L.), was found in southwest Florida for the first time in 2015 (Fayette et al. 2016). The affected plants were growing within a tunnel-greenhouse. The disease could become a limiting factor for the commercial greenhouse cultivation of this crop in Florida.

Nasturtium (*Tropaeolum majus* L.), also known as Indian cress, belongs to the Tropaeolaceae family and is a warm weather annual plant native to South America. Widely used as an ornamental, nasturtium is also increasingly being used as a medicinal and edible plant (Figure 1). All parts of the plant, including flowers, flower buds, and leaves, are edible and contain high concentrations of bioactive metabolites, which confer several medicinal and beneficial properties. Nasturtium is a rich source of vitamin C. The leaves have high concentrations of glucotropaeolin (a glucosinolate whose break-down products have anticancer properties), and the flowers are a valuable source of anthocyanins and carotenoids. (Garzon and Wrolstad 2009; Ghedira and Goetz 2013). In the United States, although the market of nasturtium is limited to local use as a specialty crop, it is highly valued and is increasingly distributed in specialty stores and farmer's markets as a nutraceutical food (dietary supplement).



Figure 1. Healthy garden nasturtium (*Tropaeolum majus* L.) plants grown in hanging pots for the production of edible leaves and flowers of different colors.

Credits: Francesco Di Gioia

Pathogen and Symptoms

On the foliage, symptoms of powdery mildew initially appear as yellow leaf spots that develop into angular and necrotic lesions (Figure 2). White fungal structures can be seen on both surfaces of the leaves, although there is usually a higher abundance on the abaxial (lower) leaf surface (Figure 3). In severe cases, the entire plant and flowers can be covered with the white spore-bearing structures of the fungus (Park et al. 2010). Plants with powdery mildew

1. This document is PP335, one of a series of the Plant Pathology Department, UF/IFAS Extension. Original publication date May 2017. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
2. Pamela D. Roberts, professor, Plant Pathology Department; Katherine E. Hendricks, molecular biologist, UF/IFAS Southwest Florida Research and Education Center; Francesco Di Gioia, post-doctoral research associate, Plant Pathology Department; Joubert Fayette, former graduate student, Plant Pathology Department; and Monica Ozores-Hampton, associate professor, Horticultural Sciences Department; UF/IFAS Extension Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

usually do not die, but become progressively weaker and unproductive.



Figure 2. Garden nasturtium (*Tropaeolum majus* L.) exhibiting symptoms of powdery mildew in the production house.
Credits: Katherine Hendricks



Figure 3. Underside of garden nasturtium (*Tropaeolum majus* L.) leaves with powdery mildew.
Credits: Katherine Hendricks

The fungus causing this disease is an obligate parasite, meaning that it can only survive and reproduce on a living host. The fungus feeds on the host through specialized structures called haustoria that invade the host cells to obtain nutrients. The feeding process causes the cell to yellow and then die. The fungus reproduces through spores, called conidia, which are borne on upright conidiophores. Spread occurs when the conidia are splash dispersed by rain or irrigation water or when they travel longer distances by wind. Powdery mildew disease development is favored by moderate temperatures (65–80°F), high humidity, and low light conditions.

Management

Management practices that reduce plant shading and decrease humidity, such as increasing plant spacing and growing in well ventilated houses, might help with powdery

mildew. Timing production to occur during cooler months, September to March when humidity is lower, may be helpful. Infected plants should be removed from the house to reduce the spread of inoculum within the house. Plants should be bagged in place to minimize spore movement rather than just carrying them out. Although no fungicides are specifically registered for use on nasturtiums, there are broadly-labeled biopesticides with potassium bicarbonate, biological controls, or oils as the active ingredient that might help to suppress powdery mildew on this host. Check product labels to be sure that application to nasturtium as a food crop is an option according to regulations in your state. Apply regularly starting before or at first symptoms.

References

- Fayette, J., K.E. Hendricks, K.E. M. Ozores-Hampton, F. Di Gioia, and P.D. Roberts. 2016. "First report of powdery mildew caused by *Oidiopsis haplophylli* on garden nasturtium (*Tropaeolum majus* L.) in Florida." *Plant Disease* 100:646.
- Garzon, G. A. and R.E. Wrolstad. 2009. "Major anthocyanins and antioxidant activity of Nasturtium flowers (*Tropaeolum majus*)." *Food Chem.* 114:44–49.
- Ghedira, K., and Goetz, P. 2013. "*Tropaeolum majus* L. (Tropaeolaceae)." *Phytothérapie* 11:316–319.
- Park, M. J., J.Y. Kim, J.G. Han, and H.D. Shin. 2010. "First Korean Report of Powdery Mildew on *Tropaeolum majus*." *Plant Pathology J* 26:204–204.