

Geranium Rust:

Learn to Recognize and Manage this Noxious Disease

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An epidemic of Geranium Rust in South Carolina's Low Country Rust diseases, which are caused by a specific group of basidiomycete fungi, attack a number of ornamental and agronomic crops annually. Many of these diseases are endemic (i.e., they occur naturally and are native) to the locations where they occur. Geranium rust is not such a disease! It is not endemic to the United States and occurs only sporadically and usually insignificantly each year when the causal fungus sneaks into the United States on infected or contaminated geranium cuttings or plants coming from locations where the disease is endemic. Many states have quarantines against this disease, and some people in the industry consider rust to be one of the most potentially threatening diseases to geranium production and cultivation.

Unfortunately, we are experiencing an epidemic of rust on zonal (or florist) geraniums in plant beds on Hilton Head Island, SC this spring. In addition, a number of "rusty" geraniums were distributed to some of the large discount chain stores as well as to some retail nurseries and garden shops in South Carolina's Low Country. Consequently, homeowners also have diseased plants. The best way to manage rust and prevent this noxious disease from recurring in 1998 is to destroy infected geraniums now and eliminate the fungus from the landscape. Read on for more information on geranium rust and how to manage this disease.

Rust Symptoms-How to Recognize this Disease

Symptoms and signs of geranium rust occur mainly on the foliage but also may occur on stems and leaf petioles. Initially, symptoms appear as relatively inconspicuous yellow or white circular spots (or lesions) on both upper and lower leaf surfaces (see pictures) 10-14 days after infection has occurred. On the underside of affected leaves, a small, blister-like pustule (called a uredium) develops in the middle of the lesion. Mature pustules

break open to expose large quantities of rusty brown spores (called urediospores); spores are released about three weeks after infection has occurred. As the disease progresses, the number of lesions or spots per leaf increases and a ring of smaller pustules develops around the central pustule in many lesions. When the disease is severe, as we have seen on Hilton Head this spring, entire leaves wither and die and whole plants may succumb to infection.

Geranium Rust: The Disease Cycle, Pathogen Biology, and Host Range

Geranium rust is caused by the fungus *Puccinia pelargonii-zonalis*. This fungus, like most fungi that cause other rusts, has a very restricted host range and is an obligate parasite — that is, it only exists on living plant tissue and can not survive for long in the absence

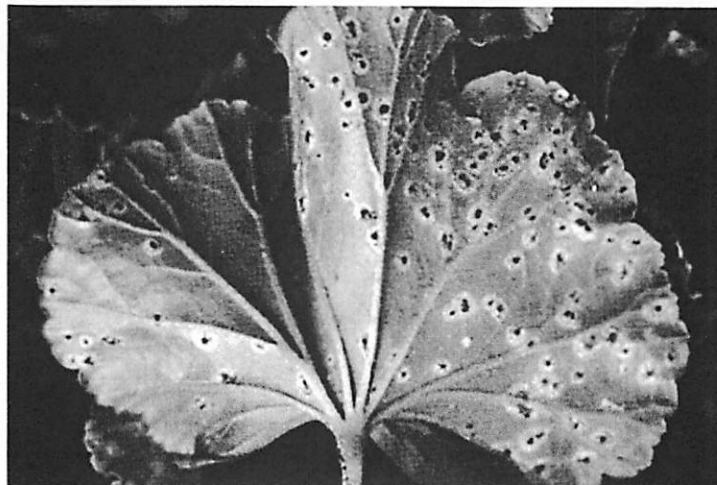


of the host plant. Spores of *P. pelargonii-zonalis* have survived for up to 12 weeks on dried leaves under controlled laboratory conditions. How long spores survive on dead leaves in a greenhouse or the landscape has not been determined. Unlike many rust pathogens that have multiple spore types and require two hosts to complete a life cycle, the fungus causing rust on geranium usually has

only one spore type (the urediospores) and requires only one host to complete its life cycle (i.e., it is autoecious). Consequently, urediospores infect geraniums, rust pustules containing more urediospores then form on infected leaves, and these spores are moved around by wind and water and eventually cause new infections on leaves on the same plant as well as on other plants. This disease cycle continues indefinitely as long as environmental conditions are favorable.

This rust rarely occurs on geraniums in South Carolina or elsewhere in the United States because the geranium host usually is not grown throughout the year. This year, however, the fungus sneaked into the country from

Mexico on unrooted cuttings, was propagated unknowingly along with the plants, and has been difficult to eliminate. The disease has reached epidemic proportions in plant beds on Hilton Head presumably because the relatively cool temperatures that have prevailed this spring have allowed the fungus to reproduce and spread at will. This rust disease develops best around 65-70 F but very poorly at temperatures over 80 F. In addition, water is required for infection to occur. Spores need to be in water on plant surfaces for at least 3 hours to germinate and cause infection. In the absence of water, spores can survive and remain infective on leaves for as long as leaves persist on the plant (2-4 weeks).



P. pelargonii-zonalis attacks zonal geraniums (*Pelargonium x hortorum*) almost exclusively; although, rust has been reported on several other *Pelargonium* species, (e.g., *P. zonale* and *P. inquinans*). Rust does not affect regal geraniums (*P. x domesticum*), most cultivars of ivy geranium (*P. peltatum*), and *Geranium* species.

How to Manage Geranium Rust

Prevent rust from ever getting established in your greenhouse, nursery, or landscape by carefully examining cuttings or plants before buying them. Greenhouse and nursery operators should question suppliers of propagation material about the occurrence of rust at their production facilities, particularly those located outside the United States. Avoid purchasing plants from locations where rust is endemic.

What if you find rusty geraniums in your greenhouse, nursery, or backyard?? **The best and most effective method of managing geranium rust is to rogue out and destroy affected plants as soon as they are recognized!!** By eliminating the host plant, the life cycle of the fungus is broken and the pathogen cannot survive. Diseased plants should not be placed on a compost pile because fungus spores can persist and remain infective for several months on dead geranium leaves. Keeping zonal geraniums out of the greenhouse, nursery, or landscape where rust has occurred for a period of four to six months should insure that rust will not reoccur the following year.

Fungicides can be effective at preventing rust from developing in the greenhouse or spreading in the landscape. Geraniums usually are not sprayed with fungicides in the landscape, but this year plants were

treated in selected beds on Hilton Head Island where the disease was not too severe. Newer fungicides registered for use on geraniums and containing the active ingredients triadimefon (Bayleton, Strike) and myclobutanil (Systhane) should be most effective against geranium rust. However, these fungicides are in a class of chemicals that also has growth regulator activity and should be used

sparingly on young actively growing plants. In addition, mancozeb products (e.g., Dithane, Protect) traditionally have had reasonably good activity against rust diseases on other crops. Probably the best fungicide treatment would be a combination of one of the newer fungicides and a mancozeb product. This would take advantage of two types of chemistry and should provide excellent disease management.

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