

# Rhizopus Soft Rot of Sweetpotato

Vegetable Pathology Factsheets

## Pathogen

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Rhizopus soft rot is caused by the necrotrophic, Zygomycete fungus *Rhizopus stolonifer*.

## Host Crops and Plants

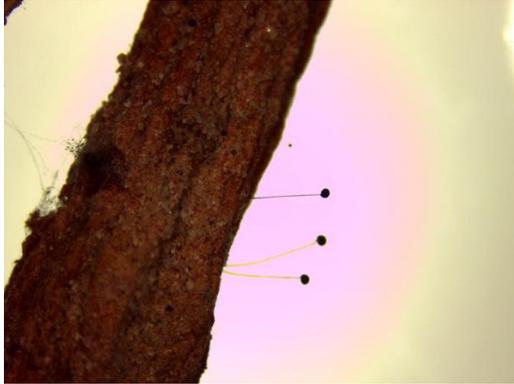
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*R. stolonifer* is a ubiquitous fungus that causes postharvest soft rot on more than 200 fruit and vegetable crops, most notably sweetpotato and stone-fruits.

## Identification

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Rhizopus soft rot typically appears during postharvest handling and transport and is rarely observed in the field. Symptoms originate at a wounded area in the sweetpotato and consist of a soft, watery rot that progresses quickly under favorable conditions and can result in full decay of an infected root in as little as three days (Figure 2). White to grey fungal mycelium producing black sporangia (Figure 1) of *R. stolonifer* are often observed growing on decayed roots, resembling a distinctive "grey man's beard." (Figure 3).



*Figure 1. Sporangiophore of R. stolonifer giving rise to a black sporangium, containing numerous sporangiospores.*

*Attribution: Andrew Scruggs and Dr. Lina Quesada, NC State Vegetable Pathology Lab*



*Figure 2. Soft, watery decay of a sweetpotato root infected with Rhizopus soft rot.*

*Attribution: Andrew Scruggs and Dr. Lina Quesada, NC State Vegetable Pathology Lab*



*Figure 3. Decay and fungal sporulation due to Rhizopus soft rot.*

*Attribution: Andrew Scruggs and Dr. Lina Quesada, NC State Vegetable Pathology Lab*

## **Favorable Conditions for Disease**

*R. stolonifer* requires wounds in the sweetpotato root, particularly bruising wounds, for the disease to initiate. Disease progression and sporulation are then significantly influenced by storage conditions. While disease can occur over a broad range of temperatures, elevated temperatures of 25-29°C favor disease progression. Storage of sweetpotatoes at relative humidities between 75-100% seems to have little effect on disease progression, however higher humidities significantly

increase sporulation of *R. stolonifer*, leading to increased secondary inoculum. Likewise, initial inoculum levels also have little impact on disease progression but do promote higher amounts of secondary inoculum.

## Disease Transmission

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*R. stolonifer* is a ubiquitous fungus, thus difficult to eliminate. Considering this is primarily a postharvest disease, it is often transmitted due to unsanitary harvest equipment, wash lines, packing equipment, and transportation containers.

## General Disease Management

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Prevention is the best method for control of Rhizopus soft rot and several steps can be taken to eliminate disease outbreaks:

- Reduce wounding during harvest, washing, and packing.
- Cure roots in a timely manner after harvest to allow for proper wound healing.
- Store sweetpotatoes at 85% humidity and 13°C with proper ventilation.
- Maintain sanitary harvesting, storage, washing, and packing equipment. Growers with established protocols to daily clean facilities and tools experience few problems with Rhizopus soft rot.
- Transport roots in sanitary containers.
- Eliminate infected roots from entering wash tanks and packing lines. Quickly remove discard bins or culls away from healthy roots in a way such that infected roots with sporulation are not exposed.

## Disease Control for Conventional Growers

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Traditionally, fungicides have been effective in the control of Rhizopus soft rot, however there are few labeled products of Rhizopus soft rot. For the latest fungicide recommendations for Rhizopus soft rot of sweetpotato see the [\*Southeastern US Vegetable Crop Handbook\*](#). Fungicide labels are legal documents, always read and follow fungicide labels.

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Example products for postharvest application to control Rhizopus soft rot:

Active Ingredient	Example Product	Application Rate
dicloran	Botran 75W	1 lb product/100 gal
fludioxonil	Scholar 1.9SC	16-32 oz product/100 gal

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## Disease Control for Organic Growers

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Two OMRI products are currently listed for control of *Rhizopus* soft rot on sweetpotato, but they show reduced efficacy compared to conventional fungicides. Proper sweetpotato handling and sanitation of equipment (see [General Disease Management](#) above) is essential for controlling *Rhizopus* soft rot in organic systems.

Example products labeled for postharvest application to control *Rhizopus* soft rot:

Active Ingredient	Example Product	Application Rate
<i>Pseudomonas syringae</i>	Bio-Save 11LP	250 g/40 gal
hydrogen peroxide	SaniDate 5.0	59.1-209.5 fl oz/1,000 gal

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## Useful Resources

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- The [NCSU Plant Disease and Insect Clinic](#) provides diagnostics and control recommendations
- The [Extension Plant Pathology Portal](#) provides information on crop disease management
- The [Southeastern US Vegetable Crop Handbook](#) provides information on vegetable disease management
- The [USDA Fungus-Host Distributions Database](#) provides information about reported hosts for fungal pathogens

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## Acknowledgements

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This factsheet was prepared by the [NCSU Vegetable Pathology Lab](#) in 2015.

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