



Mesonet Agweather Spinach White Rust Advisor Description

Introduction:

The Mesonet Agweather Spinach White Rust Advisor is a Web based weather tool that has been developed to warn spinach growers about the risk for white rust, a chronic foliar disease of spinach, and to aid growers in proper timing of fungicide application for its control. Using the Oklahoma Mesonet, the state's automated weather station network, the model calculates daily "white rust hours" for each Mesonet site. White rust hours measure the duration of weather favorable for white rust development. Disease risk is increases as more leaf spot hours accumulate.

This model is designed to estimate the likelihood of disease outbreak from existing white rust infections and may NOT be effective in predicting the very first appearance of disease (Trent, 2004).

White Rust Hour:

A white rust hour is defined as one hour with relative humidity at or above 90 percent and air temperature in the range of 52 to 68 degrees Fahrenheit (11-20° Celsius) (Sullivan et al., 2003). When relative humidity is at or above 90 percent and the air temperature is above or below the range of 52 to 68 degrees Fahrenheit (11-20° Celsius), the white rust hour is weighted (multiplied) by a temperature factor to account for slower disease development.

First True Leaf Stage:

This growth stage occurs when the first pair of true leaves fully expand, each being about the size of a quarter.

Fungicide Protection:

Fungicides are assumed to provide protection for seven days after application. The white rust advisor does not consider weather to be important during the fungicide protection period.

Spinach White Rust Air Temperature Weightings

Air Temp Range (Fahrenheit)	Air Temp Range (Celsius)	Temperature Factor
<43°F	<6°C	0
43-<48°F	6-<9°C	0.5
48-<52°F	9-<11°C	0.75
52-68°F	11-20°C	1.0
>68-72°F	>20-22°C	0.75
>72-81°F	>22-27°C	0.5
>81°F	>27°C	0

Advisor Rules:

- The spinach is at risk to white rust and a fungicide application is recommended when 12 white rust hours have accumulated since the date of the first true leaf stage (for the spinach not yet sprayed) or after the 7-day fungicide protection period (for spinach previously sprayed) (Sullivan et al., 2003).
- The last Effective Spray Date is also reported. The last effective spray date moves forward in time as white rust hours accumulate and automatically accounts for 7-day fungicide protection period. A fungicide application is recommended when a fungicide was applied prior to the last effective spray date.

White Rust Advisor Season:

The Spinach White Rust Advisor runs from September 15 to May 15.



White Rust Advisor Updates:

The Spinach White Rust Advisor is updated hourly. Each hour Mesonet data replaces forecast data. The forecast data are updated four times a day. All times and dates use Central Standard Time (CST).

Data Displays:

Statewide Maps

Last 7-Days White Rust Hours Map

Oklahoma map showing spinach white rust hours for the last 7 days. Updated hourly.

Season-long White Rust Hours Map

Oklahoma map showing spinach white rust hours from September 15th. Updated hourly.

Local Mesonet Site

White Rust Spray Advisor

Interactive advisory that shows a graph of accumulated white rust hours beginning 7 days after a fungicide application. The 15-year average and last season's white rust hours are included in the graph for reference. Forms Fields are included for entering the **Date of First True Leaf Stage** or **Date of Last Fungicide Application** to get a recommendation. Updated hourly.

Last 7 days and Forecast White Rust Hours Graph

Graph that shows the white rust hours accumulated over the last 7 days and forecast for the next 84-hours for a single Mesonet site. The 15-year average and last season's white rust hours are included in the graph for reference. Updated hourly.

Season-long White Rust Hours Table

Table that shows the daily white rust hours accumulated since September 15th for a single Mesonet site. The table includes: last effective spray date, air temperature, and relative humidity maximums and minimums. Updated daily.

Forecast White Rust Hours Table

Table that shows the hour-by-hour forecast of white rust hours over the next 84-hours for a single Mesonet site. The table includes hourly air temperature, relative humidity, wind speed, wind direction, and 1-hour rainfall. Updated four times a day.

Past Years

Past Years White Rust Comparison Graph

Graph showing season-long accumulation of white rust hours from September 15th through May 15th for the current season, last year's season, season 2 years ago, and the 15-year average for a single Mesonet site. Updated daily.

Three-year White Rust Comparison Table

Table with season-long accumulation of white rust hours from September 15th through May 15th for the current season, last year's season, season 2 years ago, and the 15-year average for a single Mesonet site. Updated daily.

Past Years White Rust Daily Comparison Graph

Graph showing season-long daily white rust hours from September 15th through May 15th for the current season, last year's season, season 2 years ago, and the 15-year average for a single Mesonet site. Updated daily.

References:

Sullivan, M.J., J.P. Damicone and M.E. Payton. 2003. Development of a Weather-Based Advisory Program for Scheduling Fungicide Applications for Control of White Rust of Spinach. Plant Disease 87:923-928.

Trent, M.A. 2004. Etiology and Management of Spinach White Rust. Oklahoma State University Master of Science Thesis.

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