Using Contans (*Coniothyrium minitans*) for White Mold Management on Organic Farms

Alex Stone, Oregon State University

March 4, 2014

Welcome to the webinar!

- The webinar will start at the top of the hour.

- If you'd like to type in a question, use the question box on your control panel and we will read the questions aloud after the c. 45 minute presentation.

- The webinar will be recorded and you can find the recording and a pdf handout of the slides at [http://www.extension.org/pages/69132](http://www.extension.org/pages/69132)

Alex Stone
Oregon State University
Questions

• What crops are hosts to white mold?
• What are white mold and *Sclerotinia sclerotiorum*?
• What are Contans and *Coniothyrium minitans*?
• How do *Coniothyrium* and *Sclerotinia* live in annual rotational systems?
• How does Contans suppress white mold?
• How can I best integrate Contans into an integrated white mold management system?

Poll Question 1

• Have you every used (or recommended) Contans for white mold control?
  1. Yes
  2. No
  3. Not applicable to me
Poll Question 2

• If you have used or recommended Contans, was Contans effective in suppressing white mold?
  1. Yes
  2. No
  3. Not applicable, I have never used or recommended Contans

Ecology of Sclerotinia sclerotiorum

White mold
Pathogen: Sclerotinia sclerotiorum

3/4/2014
White mold
Pathogen: Sclerotinia sclerotiorum

Sclerotia can also germinate and infect the plant directly

from Mohler and Johnson, Crop Rotation on Organic Farms
What is Contans?

Coniothyrium minitans is a naturally occurring fungus that specifically destroys Sclerotinia.

Contans is the water dispersible granular formula of this fungus.

Contans is allowed for use on organic farms.
Coniothyrium mimitans is a fungal parasite of Sclerotinia sclerotiorum (almost exclusively). A Coniothyrium spore infects a white mold sclerotium. Coniothyrium grows throughout the sclerotium and then creates pycnidia, its resting structures. We have found that about 5% of sclerotia in the field are naturally colonized by Coniothyrium.
The pycnidia ooze spores. The spores splash when it rains and land on other sclerotia. Coniothyrium grows throughout those sclerotia and develop pycnidia, which then ooze and splash.

Ecology of *Coniothyrium mimitans*
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Contans Application Directions

- Apply Contans WG at a rate of 1-4 pounds per acre to the soil prior to or at planting or at time of transplant.
- If incorporated at greater than 2 inch depth, increase application rate to 3-6 pounds/A.
- Contans may also be applied to plant debris after harvest.
- Contans costs $20-25 per pound

http://www.sipcamadvan.com/contans-wg
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Coniothyrium minitans infects and kills sclerotia and develops pycnidia filled with spores. These spores splash and infect new sclerotia. Can this generate a ‘biocontrol epidemic’ in the field?

Contans was applied to the field at 2lbs/A in November
January 1
20 sterile sclerotia put out in field

6 weeks later (Feb 14)
18 sclerotia, all alive
1 colonized by soil fungus

March 27
20 sterile sclerotia put out in field

9 weeks later (June 5)
13 sclerotia
7 dead sclerotia
12 living sclerotia
8 colonized by Coniothyrium

June 5
20 sterile sclerotia put out in field buried at 2 inches

June 5
20 sterile sclerotia put out in field on soil surface
Most common native soil fungi cultured from sclerotia (and shown to kill sclerotia)

- *Coniothyrium minitans*
- *Trichoderma hamatum*
- *Fusarium spp.*
- *Paecilomyces lilacinus*

More active at warmer soil temperatures and when sclerotia were buried
Contributed significantly to sclerotial death
Some fields had more of these than others

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**What is the effect of a low rate Contans application on sclerotial survival over time in a rotational system?**

From Mohler and Johnson, *Crop Rotation on Organic Farms*
Applied 1 lb/A Contans to snap beans at bloom
- 80-95 Cm spores per blossom
- 50 percent reduction in white mold incidence (low disease pressure)

At-bloom applications are not currently a labeled use

25 percent of pods and 63 percent of stems were colonized by *Coniothyrium minitans*
Installed at-bloom spray trials in these fields in 2012

2009 2010 Spring 2011

8% 74% 50%
14%

Water Contans Top+Contans

% colonization of sclerotia by Cm

Control field (no history of Contans applications)

At-bloom Contans application did not reduce disease severity

Contans field (history of Contans application – 3 yrs previous)

At-bloom applications are not currently a labeled use

2009 2010 Spring 2011

67% 50% 74%
40% 14%
8%
Contans Summary

Contans applications are effective in destroying Sclerotium sclerotia over time.

Contans applications to sclerotia left on the soil surface 'grew up' *Coniothyrium minitans* (biocontrol epidemic) and provided a long term reservoir of *Coniothyrium minitans* in the field.

- *Coniothyrium minitans* destroys sclerotia more rapidly when introduced earlier in the process of white mold and sclerotia development on the plant.

Contans Application Recommendation?

- Apply post-harvest to all diseased residues
- Apply in any way that is economical and is compliant with the label
Use Contans as one component of a systems white mold management strategy

- Integrated management during the production season
  - Plant genetic resistance and architecture
  - Irrigation management (↑ canopy drying)
  - Plant spacing (↑ drying)
  - Row orientation w/prevailing winds (↑ drying)
  - Nitrogen management (manage plant/canopy size, ↑ drying, reduce tissue susceptibility)
  - Cultivation (destroys apothecia)

Systems White Mold Management:
- Integrated management throughout rotation cycle
  - Rotation with non-host crops and cover crops
    - 4 yrs out of susceptible crops, or less in combination with Contans and other strategies
  - Sanitation – flail diseased plants ASAP to stop disease progress
  - Tillage – leave sclerotia on surface after Contans application, but bury them otherwise
  - Irrigation of fields infested with sclerotia – it speeds sclerotial death
  - Cover cropping? Don’t know. Brassicas and legumes are hosts!
Contans

Contans is distributed by Advan LLC
300 Colonial Center Pkwy
Roswell, GA 30076
www.advanllc.com
800-250-5024

Available as 25 and 50 pound units, $20 - 25 per pound. Can be frozen.

Poll Question 3

• Do you intend to use Contans for white mold control in the future?
1. Yes
2. No
3. Not sure
4. Not applicable to me

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Questions?

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- Find all upcoming and archived webinars at http://www.extension.org/pages/25242.
- Find the recording and pdf handout for this webinar at http://www.extension.org/pages/69132.
- Have an organic farming question? Use the eXtension Ask an Expert service at https://ask.extension.org/groups/1668/ask.
- We need your feedback! Please respond to an email survey about this webinar which you’ll receive later.
- Thank you for coming!