

Alternatives to Ronilan

by Dan McGrath, Alex Stone, Ed Peachey, and Russell Wymore, Oregon State University

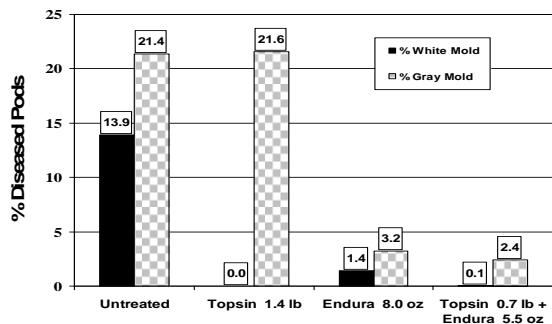
Introduction

The Willamette Valley processed vegetable industry in cooperation with the Oregon Processed Vegetable Commission, Oregon State University, and the American Farmland Trust formed a Bean Mold Task Force in the spring of 2005 to respond to the loss of Ronilan fungicide for control of white (*Sclerotinia sclerotiorum*) and gray mold (*Botrytis cineraria*) on snap beans. Use of Ronilan will not be permitted in the 2006 and will be removed from the market place. The work of the thirty five member task force focused on two questions.

- **What is an effective alternative to Ronilan for control of gray and white mold in snap beans when mold pressure is severe?**
- **When can we use a less expensive single fungicide application without putting the bean crop at significant risk?**

Alternative materials such as Topsin control white mold but fail to control gray mold (Figure One). Gray mold has developed resistance to Topsin. When we add Topsin and Endura together, we get excellent control of both gray and white mold.

**Figure One. Mold Control in Beans
Cornell, New York**



Topsin, Endura, and Rovral are primarily protectants. Unlike Ronilan which has a curative effect, the alternative fungicides must be on the blossom at the moment of infection. This has a significant effect on application timing. The alternative fungicides must be applied earlier than Ronilan.

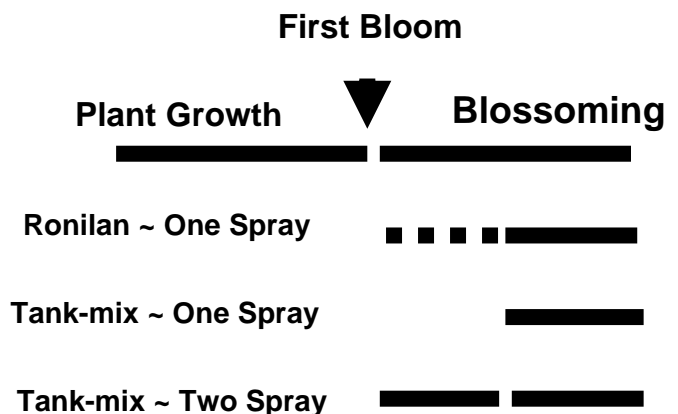
In an experiment conducted in New York, white mold spores were applied at first blossom (Figure Two). Either Ronilan or Topsin were applied at day zero (inoculation day) or two, four, or six days later. The Ronilan was effective even when it was applied six days after blossom infection. Ronilan cured the early infections. Topsin was effective at controlling white mold when it was present on the blossoms at the time of infection (day 0). Topsin applied several days after infection was not effective because it did not cure the infected blossoms.

Figure Two - Application Timing

Treatment	Spray Day	% White Mold
Ronilan	0	1.6 fg
	2	0.6 g
	4	2.2 fg
	6	3.0 efg
Topsin	0	1.2 fg
	2	2.8 fg
	4	7.2 def
	6	15.6 bc
Untreated		33.4 a

Beans were inoculated with white mold spores on day zero, Ludwig, 1989

Using currently available alternatives to Ronilan, the fungicides must be applied much earlier because they do not have the “kick back” of Ronilan.



If mold infections begin at first blossom, a two spray program is required. In a two spray program, for example, the first fungicide application is made with ten percent of the plants have one blossom open (popcorn stage). The second application is made five to ten days later.

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Fungicide trials conducted in other states in years past helped the task force to develop a list of possible treatments that were tested during the 2005 growing season.

Operating assumptions

- 1) Topsin provides excellent control of white mold but poor control of gray mold
- 2) Rovral and Endura provide moderate to good control of gray and white mold, but their performance has been inconsistent across trials, crops, and production areas.
- 3) A tank mix of Topsin plus either Rovral or Endura is effective at controlling both white and gray mold.

The tank mixes were applied either once or twice with the first spray at first bloom. The Ronilan and Topsin single fungicide treatments were applied once, five to seven days after first bloom.

Treatments of Interest

- 1) Ronilan EG @ 1.0 lb product/A
- 2) Topsin 4.5 FL @ 28 fl oz product plus Rovral 4F @ 1.5 pints product/A
- 3) Topsin 4.5 FL @ 28 fl oz product plus Endura 70WP @ 8.0 oz product/A plus methylated seed oil @ 0.5% v/v
- 4) Topsin 4.5 FL @ 40 fl oz/A (single application)

Spray Timing

Two Spray Program

First spray applied when ten percent of the plants (1 out of 10) have a single open bloom (“popcorn”)

Second spray applied 5 to 7 days later (Topsin PHI = 14 days)

One Spray Program

Single spray applied 5 to 7 days after popcorn

Oregon Fungicide Trials 2005

Oregon State University working closely with the bean mold task force conducted thirty three fungicide trials during the 2005 growing season. The fungicide trials were conducted at three levels of resolution. Four trials involved detailed variations in fungicides, fungicide combinations, rates, spray timings, adjuvants, etc. Eighteen replicated small plot trials were conducted on farms with registered materials. They were focused on Topsin used in combination with either Rovral or Endura in a one or two spray program. Finally, there were eleven grower managed large plot simple paired comparisons of Ronilan versus Topsin/Rovral or Topsin/Endura in one or two spray programs.

- **Four detailed, replicated small-plot spray trials (Ocamb et al)**
- **Eighteen on-farm, replicated small-plot spray trials with registered treatments only (McGrath et al)**
- **Eleven on-farm un-replicated large strip paired comparisons (Stone et al)**
- **Thirty-five grower and industry cooperators**

Figure Three

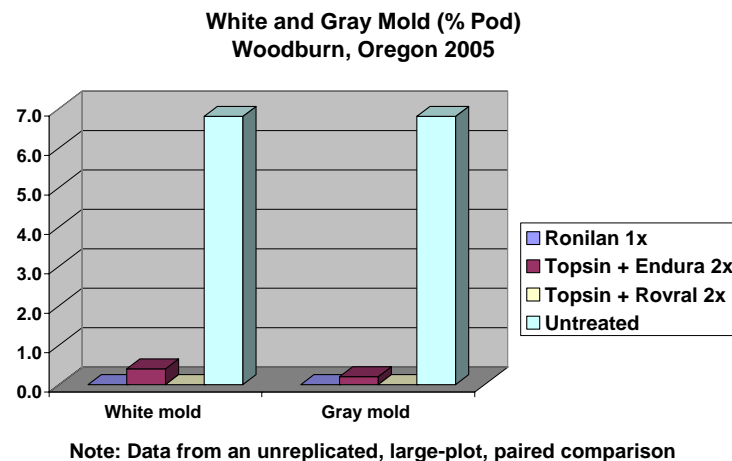


Figure Three shows data from a large plot, unreplicated comparison. In this experiment, either of the tank mixes, either Topsin/Endura or Topsin/Rovral can provide excellent control of both

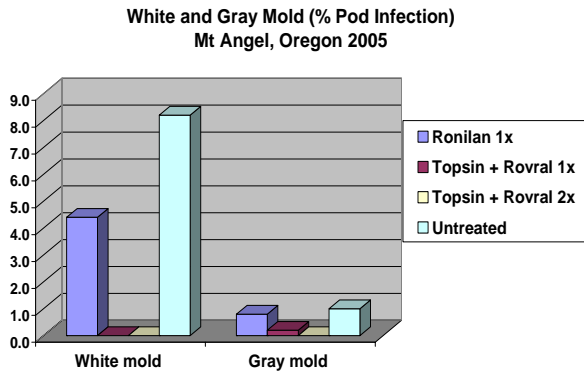
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white and gray mold, even though the mold pressure was severe.

- In some cases, a single application of either tank mix is adequate to control white mold.
- In some cases, a single application of Topsin alone controls white mold.

Figure Four



Note: Data from an unreplicated, large-plot, paired comparison

Figure Four shows data from a large plot, unreplicated comparison that two applications of Topsin/Rovral were more effective than a single application of Ronilan. There did not appear to be a difference between a one or two spray program using the tank mix.

Figure Five

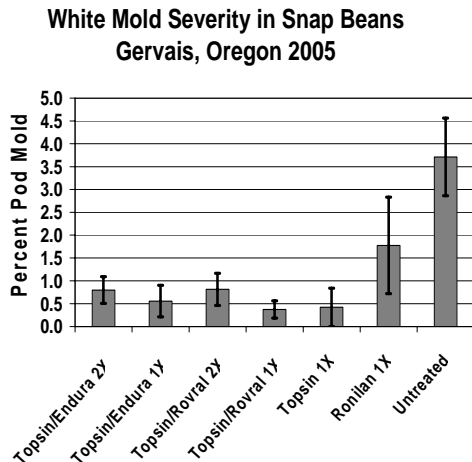
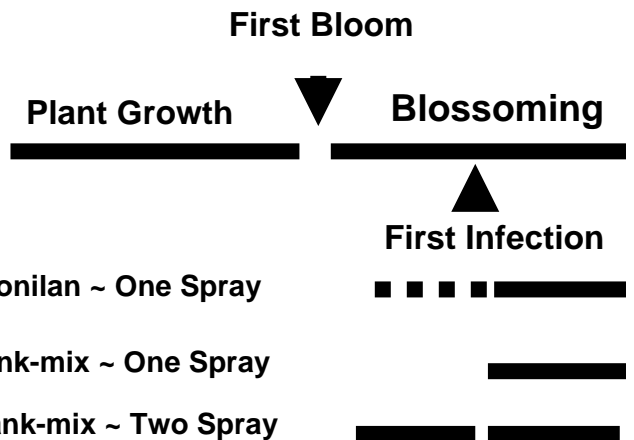


Figure Five shows data from a replicated trial that validates the results of the large plot comparisons for white mold.

- Two applications of a tank mix of either Topsin/Endura or Topsin/Rovral consistently provides excellent control of white mold.

So the question that rises is, “Do we need to spray twice?” The answer is it depends on when the mold develops in a field.



If the weather is dry and the canopy is open prior to first bloom, mold may not develop for several days following first bloom. Mold may not develop until the canopy closes. In this case, a single fungicide application may be all that it needed. How do we determine the risk of mold in making a one versus two spray decision?

One vs Two Spray Decision

There are several factors that influence mold development in snap beans.

- **White mold occurs every year, but not in every planting.**
- **Gray mold occurs when the summer weather is cold & rainy.**
- **Risk factors that determine if two sprays are needed include: field history, variety, weather prior to first bloom, and canopy closure at first bloom**

Decision at planting

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If the field has had a lot of bean crops in its rotation and/or a history of mold problems, it is a high risk field. If you are planting a high risk bean variety (Italian, Yellow Wax) into a high risk field, you should plan on a two spray program.

Decision at first bloom

If the weather has been wet leading up to first bloom, then the white mold mushrooms have probably formed. If the bean canopy is closed at first bloom, then the humidity surrounding the first bean blossoms rises dramatically. If the weather prior to first bloom has been wet and the canopy is closed at first bloom, you should plan on a two spray program.

One Spray Decision Check List

- ✓ **No field-history of mold problems**
- ✓ **Low risk bean variety**
- ✓ **Dry weather prior to first bloom**
- ✓ **Open canopy (6-12 inches) at first bloom**
- ✓ **No evidence of mold found in field**

If you are considering a one spray program, we recommend you use the one spray check list (above). The field should not have a history of mold problems and the variety should not be a high risk vining type.

Guiding questions

What is an effective alternative to Ronilan for control of gray and white mold in snap beans when mold pressure is severe?

Fungicide Trials – Other Production Areas

Cornell results

Figure One – Cornell, New York