REPORT TO THE AGRICULTURAL RESEARCH FOUNDATION
For the Oregon Processed Vegetable Commission
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Title: **Evaluation of Fungicides for the Control of Gray and White Mold in Snap Beans**

Project Leader: **Robert B. McReynolds, Extension Agent, North Willamette Research and Extension Center, 503-678-1264 #25, bob.mcreynolds@oregonstate.edu**

Cooperators: **Ed Peachey, Department of Horticulture, OSU**
Cindy Ocamb, Extension Plant Pathologist, OSU

Funding History: Annual funding for this research began in 2000 with $4000. Funding in 2001 and 2002 was $6000.

Abstract: *Two verification field trials were establish in the Willamette Valley that included the same foliar applied fungicides evaluated in 2000 and 2001. Although, mold levels were low in both field trials, all treatments, with the exception of Serenade, significantly improved White Mold control in comparison to the untreated in the Dickman trial. There were no differences in White Mold control in the campus trial, but Ronilan and both rates of Endura (BAS510) significantly improved Gray Mold control. A whole plant disease severity rating that measures fungal infection on stems and branches showed all treatments, except BAS516, providing better plant protection than the untreated. The registration of Endura is expected to be completed in 2003 and the product will be available for the 2004-growing season. Omega is a registration objective of Syngenta and is supported by the IR-4 Project.*

Justification: The EPA will cancel the Ronilan registration by 2005. Finding effective alternatives before that date is critical. The OPVC began funding research in 2000 to identify replacements for Ronilan. Selected products used in the 2000 and 2001 trials demonstrated effectiveness against both white and gray molds. Data on the effectiveness of these alternatives is needed in order to expedite their registration.

Objective: The purpose of this research was to verify fungicide performance observed in the previous two years.

Procedures: Two randomized complete block field trials were established in the Willamette Valley using the snap bean variety 91G. One trial was established in a commercial field with Dickman Farms near Mt. Angel and the other was located at the OSU Horticultural Research Farm in Corvallis. The same fungicides and rates were used in both trials. The Serenade treatments (QRD137) were applied twice in the Dickman trial, but because of low mold levels the other fungicides were only applied once. Serenade was applied three times in the campus trial and all other treatments were applied twice. The volume of spray solution was higher in the campus trial as well. All treatments were applied with a CO_2 backpack sprayer to two rows spaced 30 inches apart. Plot size was 5' by 20' replicated four times. A single unsprayed row separated each of the treatments. Environmental conditions recorded on the applications dates are listed in the table below.

Environmental Parameter	Application Information				
	Dickman Trial		Campus Trial		
Date	8/06/02	8/14/02	8/07/02	8/14/02	8/20/02
Air Temp in Canopy, ^{0}F	69	73.1	75.6	81.4	77
Soil Temp ^{0}F, 2" deep	63.9	67.9	64.6	68.4	65.7
Relative Humidity	69-70%	68-71%	67-70%	66%	72%
Soil Surface	Dry	Dry	Moist	Dry	Moist
Cloud Cover	10%	0	0	0	30-40%
Wind Speed mph/Direction	0-1.5/NE	None	Gusty 0-4.2/W	None	Gusty 0-4.5/NE
Time of Application	10:15-11AM	7:30-8AM	10-11AM	9:45-10AM	9-10AM
Crop Growth	15-20% Bloom	Full Bloom	30% Bloom	Full Bloom	Early set
GPA/Actual Volume	23/800ml	28.8/1000ml	34.5/1200ml	28.8/1000ml	34.5/1200ml
Treatments Applied	All	QRD 137	All	QRD 137	All
Planting Date	6/19/02		6/25/02		
Harvest Date	8/22/02		9/10/02		

Treatment comparison were made at harvest by stripping pods 3" and longer from ten plants in each plot in the Dickman trial. The pods were counted and evaluated for the presence of either mold species. The number of infected pods as a percentage of total pods harvested was calculated and statistically analysis (ANOVA) to compare the performances the fungicide treatments. A whole-plant disease comparison was not completed.

The same evaluation procedure was employed in the campus trial using 15plants/plot. In addition, 5 plants were randomly selected from each plot to use in the whole-plant disease severity rating to establish the level of plant protection provided by the fungicides. The stems and branches on the 5 plants were examined for mold. The number of branches infected was recorded as a percentage of all the stems on each of the five plants. Those results were also analyzed to compare the relative effectiveness of each treatment.

Results: The levels of both Gray and White Mold were low in both trials. Only an occasional pod was infected with Gray Mold in the Dickman trial and treatment comparisons were not feasible. In the case of white mold, all treatments were statistically equal in reducing mold levels in comparison to the untreated, except for Serenade (QRD137). With that exception, the data did not support comparisons among fungicide treatments as to whether one (or more) was any more effective than the others.

In contrast to the Dickman trial, there were no differences among treatments for White Mold control in the campus trial. Although Gray Mold levels were also extremely low, differences among the treatments were observed. Control with both rates of Endura was equal to Ronilan and better than Quadris, Serenade, the Botran/Rovral combination and the untreated. Plant protection, as measured by the whole plant disease severity rating, was equal among all the fungicide treatments except for BAS516, which was no better than the untreated. The table below summarizes the results from both trials.

The effectiveness of various foliar applied fungicide in controlling White and Gray Mold in Snap Beans, Oregon-2002.

Fungicide	Rate/acre	% White Mold-pods, Campus	% White Mold-pods, Dickman	% Gray Mold-pods, Campus	Plant Disease Severity Rating, Campus**
Ronilan EG	16 oz	1.14	0.23 *	0 *	0.05 *
Endura (BAS510)	10 oz	1.62	0.23 *	0 *	0 *
Endura (BAS510)	8 oz	2.23	0.98 *	0 *	0.93 *
Omega 500F (Fluazinam)	14 fl oz	1.76	0.75 *	0.52	1.83 *
Switch 62.5WG	16 oz	1.85	0.83 *	0.48	2.75 *
BAS516	19 oz	2.97	0.93 *	0.49	5.85
Quadris	5 oz	3.01	0 *	1	1.27 *
Serenade (QRD137)	6 lbs	4.5	2.9	2.05 *	2.55 *
Botran 5F + Rovral 4	29 fl oz + 16 fl oz	2.51	0.7 *	1.5	1.72 *
Untreated		2.54	6.9	1.04	11.47
LSD 0.05		NS	4	0.92	8.58

*Indicates significantly different from the untreated control.

**A rating of 0=no mold on stems and a rating of 100=all stem/branches infected.

Conclusions: Dryer than normal weather conditions in the Willamette Valley during the 2002 season limited the impact of mold in commercial fields and fungal infection in these research plots as well. Even though the campus trial was irrigated every other day, mold levels never developed to any serious extent. The differences among fungicides were so small, that ranking them by their performance is not possible. It is encouraging, however, that product performances this year were comparable with the previous years results. There were no reversals that would cast doubt regarding the consistency of their effectiveness. The leading candidate for registration, Endura (BAS510), has consistently performed as good as Ronilan for the three trial years. Omega (fluazinam) has continued to be a very close second as well. Serenade, a biological control product, continues to under-perform the other products.

BASF is scheduled to submit the registration data package for Endura to the EPA in 2003. Baring any unforeseen problems, it is likely that the agency will approve a tolerance late in 2003. Registration of a labeled use in beans is anticipated early enough in 2004 for the product to be available in the same year.

Omega is not as far along as Endura. It was only selected as a residue project priority by IR-4 this year, as a result of the OPVC and General Mills field studies completed in 2001-02. It is not likely to be registered for use until 2005 or 2006.

The objectives of this research have been met. Two products have been identified, as effective replacements for Ronilan and one will be available for use before 2005. The data shows that both of these products are effective in the Oregon production environment. The OPVC can be commended for serving its members well, by addressing this critical problem in a timely manner.