

# Seedpiece And Soil Treatments To Reduce Powdery Scab Infection On Potatoes

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## Abstract

An experiment to evaluate the effects of five seedpiece and soil-applied treatments on powdery scab infection and control was planted May 29, 2003 in an area known to be infected with powdery scab at the Powell Butte site of Central Oregon Ag Research Center. Although there were no statistically significant differences among the treatments, the Maxim and Wet Sol Gro treatments reduced the number of tubers with powdery scab lesions. The scab index for those treatments also trended lower than the scab index for the Evolve and meadowfoam meal treatments.

## Introduction

Powdery scab, caused by *Spongospora subterranea* (Wallr.) Lagerh. f. sp. *subterranea* Tomlinson, is believed to have originated in the Andean highlands of South America and has spread to almost all potato growing regions in the world. The fungus continues to spread primarily through infected seed tubers. In the past few years, the disease has been observed on potatoes in areas of the U.S. where it was previously not known to occur. It has the potential to cause significant economic losses to fresh market potato producers by making tubers non-marketable or by lowering the grade. Tubers with superficial scab lesions can be utilized for processing, but peeling costs for infected tubers are greater than costs for uninfected tubers. Seed lots infected with powdery scab may or may not be certified depending on the regulations of the certifying agency and the degree of infection. Infected tubers may develop dry rot or more scab lesions in storage and are predisposed to infection by other organisms that cause rot in storage.

The control of powdery scab with metallic compounds, fungicides, and other compounds applied to the soil has generally not been successful under field conditions (Burnett 1991). However, tuber infections were reduced when infested soils were treated with soil fumigants methyl bromide, metham sodium, and chloropicrin. Seed piece treatments containing zinc compounds and seed piece dips with formalin and sodium hypochlorite reduced the number of tuber surface spores but were largely ineffective on spores beneath the tuber surfaces (Burnett 1991 and Mohan 1991).

Potato varieties differ in their susceptibility to powdery scab; generally light-skinned and red-skinned varieties are most susceptible (Christ 1993). Powdery scab has been observed in Oregon on several chipping varieties, reds, Shepody, and Ranger Russet. The trend toward growing varieties other than Russet Burbank may, in part, contribute to increased observations of powdery scab. If this trend continues, powdery scab could become an increasing problem in Oregon.

This study was designed to explore the effect of various soil and seedpiece treatments in controlling powdery scab infection.

## **Materials and Methods**

An experiment to evaluate the effects of five treatments on powdery scab infection and control was planted May 29, 2003 in an area known to be infected with powdery scab at the Powell Butte site of Central Oregon Ag Research Center. Thirty seedpieces of the red-skinned variety Dark Red Norland were planted nine inches apart in each of the two plot rows (60 seedpieces per plot). Seedpieces contained powdery scab spores and lesions on the periderm surface. Treatments included an untreated check and two seedpiece treatments; Evolve (thiophanate-methyl, mancozeb, cymoxanil, Gustafson) applied at 0.75 pounds per 100 pounds of cut seedpieces and Maxim (fludioxonil, Syngenta) applied at a rate of 0.50 pounds per 100 pounds of cut seedpieces. A fourth treatment, meadowfoam meal, was worked into the top four inches of soil at a rate of 5 pounds per 100 square feet prior to planting. Finally, Wet Sol Gro solution (biodegradable non-toxic blended non-ionic surfactant type soil conditioner that contains bio-stimulants, B-Complex vitamins, hormones and fermentation products, Schaeffer) was applied to seedpieces at a rate of 4 ounces/5 gallons water, allowed to dry overnight before planting. In addition, plot foliage was sprayed with Wet-Sol solution (2 oz Wet Sol/15 gallons water) on July 7, August 4 and Sept 2 (Wet Sol Gro treatment only). The trial area was sprinkler irrigated and managed with cultural practices common in central Oregon. The stand in each plot was recorded on July 7, 2003.

The experiment was desiccated with Reglone (1 1/2 pt/a) on September 11 and harvested on October 6. The tuber production from each plot was weighed and total yield, US No. 1 yield, and other grade categories were calculated. An unbiased sample of twenty tubers from each plot was rated for tuber scab lesions.

## **Results and Discussion**

Seed pieces treated with Maxim had the highest percent stands on July 7, 2003. Percent stands were 70, 80, 83, 76, and 77 percent for the check, Evolve, Maxim, Wet Sol Gro and meadowfoam meal treatments, respectively.

There were no differences among the five treatments in yield, grade or specific gravity (Table 1). The plots treated with Wet Sol Gro produced the lowest yields, while the yields of all other treatments were nearly identical.

Tuber powdery scab lesion ratings are shown in Table 2. Although there were no statistically significant differences among the treatments, the Maxim and Wet Sol Gro treatments reduced the number of tubers with powdery scab lesions. The scab index was also lower for those treatments. Wet Sol Gro was applied directly to seedpieces prior to planting. Performance of the product may be enhanced by applying the product in the furrow prior to covering the seedpieces. Future research will explore that type of application method.

Table 1. Yield and specific gravity for treatments applied to control powdery scab, Powell Butte, Oregon, 2003.

Treatment	<---- Ones ----->					Culls	Total Yield	Specific Gravity
	<4oz	<---- 4-6	6-12	12+	Twos			
	<-----cwt/acre----->							
Check	54	32	134	124	5	138	487	1.070
Evolve	54	31	148	101	8	146	488	1.067
Maxim	36	26	186	141	1	97	488	1.071
Wet-Sol Gro	42	35	129	108	1	137	453	1.068
Meadowfoam	37	23	124	157	5	142	489	1.070
LSD (5%)	ns	ns	ns	ns	ns	ns	ns	ns

Table 2. Effects of seedpiece and soil treatments on powdery scab, Powell Butte, Oregon, 2003.

Treatment	Number of Tubers with Powdery Scab	Tuber Scab Rating (1=none 5=Severe)	Scab Index*
Check	10.75	2.50	1.86
Evolve	10.00	2.45	1.65
Maxim	5.50	2.50	1.33
Wet-Sol Gro	6.50	2.45	1.47
Meadowfoam Meal	10.25	2.53	1.66
LSD (5%)	ns	ns	ns

\* Scab index = (1 x number of tubers rated 1) + (2 x number of tubers rated 2) + (3 x number of tubers rated 3) + (4 x number of tubers rated 4) + (5 x number of tubers rated 5) / total number of tubers rated

### References

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