SILVER SCURF – WHAT HAVE WE LEARNED IN THE PAST 3 YEARS?

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Silver scurf, caused by the fungus *Helminthosporium solani*, damages potato tubers by reducing quality with unsightly blemishes and increasing water loss through infected areas. The disease is important because of the occurrence of fungicide-resistant strains, increased disease severity, and increased financial losses from blemished tubers. Transmission of the fungus primarily occurs from seed tubers to progeny tubers. However, infection can also occur in storages and in the field. The purpose of this research was to determine the relative importance of tuber-borne inoculum and evaluate disease development in the field under different cultural practices.

The importance of disease level on seed tubers was demonstrated in an experiment conducted at Othello, WA in 1997 and 1998, and in Hermiston OR and Othello, WA in 1999. The level of silver scurf was determined on seed tubers of a large number of seed lots and then on the progeny tubers from each seed lot in 1997 and 1998. In 1999, disease levels were determined on successive generations of certified generation 1, generation 2, and generation 3 seed, and then on the progeny tubers of each generation. There was a positive correlation between the amount of scurf on the seed and on the progeny tubers all three years (Figures 1, 2 & 3). As the severity of seed tuber infections increased, the amount of scurf on the progeny tubers also increased, indicating a need for clean seed. However, disease levels of seed tubers did not account for the entire amount of disease increase on progeny tubers, indicating other factors are also important.

In another experiment, the level of silver scurf was determined on successive generations of seed tubers to evaluate when the disease may be building up during the seed tuber increase process. Disease levels were determined for nuclear, generation 1, generation 2, and generation 3 seed tubers from three seed growers in February of 1998 and 1999, and in October of 1999. Cropping histories and storage conditions were noted for each lot. In all lots of seed tubers, the amount of silver scurf increased with each successive generation of seed (Figure 4). Factors that reduced silver scurf were early seed generations, which was directly related to the level of disease or initial inoculum on the seed tubers in the field and long rotations between potato crops.

Nine fungicide seed treatments were tested for their efficacy in reducing silver scurf on progeny tubers by lowering the amount of scurf passed from the seed. All seed treatments were replicated at four different locations in the Columbia Basin in 1998 and 1999. The same seed source of Russet Burbank was used for all four locations. Silver scurf was significantly less on tubers from seed tubers treated with Maxim + Blocker, Quadris, Maxim, New Tops MZ, and Tops MZ (Table 1). Silver scurf differed among the four locations indicating that location is important and that soil conditions and perhaps soil-borne inoculum is important in silver scurf development (Table 2).

To determine the effects of differing cultural practices on the severity of silver scurf two experiments were conducted. First, potato plants of cultivar Russet Burbank were defoliated and not defoliated then harvested on the same day in a commercial potato field near Moses Lake, WA.

Second, cultivars Russet Burbank and Ranger Russet were planted on three different planting dates and harvested on two different dates to determine the influence of the length of time that tubers are in the soil in relation to disease severity. In the defoliation experiment, tubers that were defoliated two to three weeks before harvest had less silver scurf than tubers that were harvested green (Figure 5). In the second experiment, silver scurf severity decreased as the time that tubers were in the soil decreased (Figure 6).

Recent research demonstrates that management of silver scurf can be achieved with an integration of several practices. First, plant seed with minimal amounts of silver scurf. There is a positive relationship between the amount of silver scurf on the seed and that found on the progeny. Second, use seed-tuber fungicide treatments. This will help to minimize the effects of infected seed. Third, shorten the time period that the tubers are in the soil and vine kill two to three weeks before harvest. Fourth, disinfect potato storages to kill spores that are remaining from the previous year's crop. Fifth, storage temperatures and relative humidity should be lowered as fast as possible without damaging the tubers. This will reduce growth, germination and reproduction of the fungus by creating an unfavorable environment. Sixth, if silver scurf is a possible problem, sell the tubers as soon as possible because disease symptoms will increase the longer they are in storage.

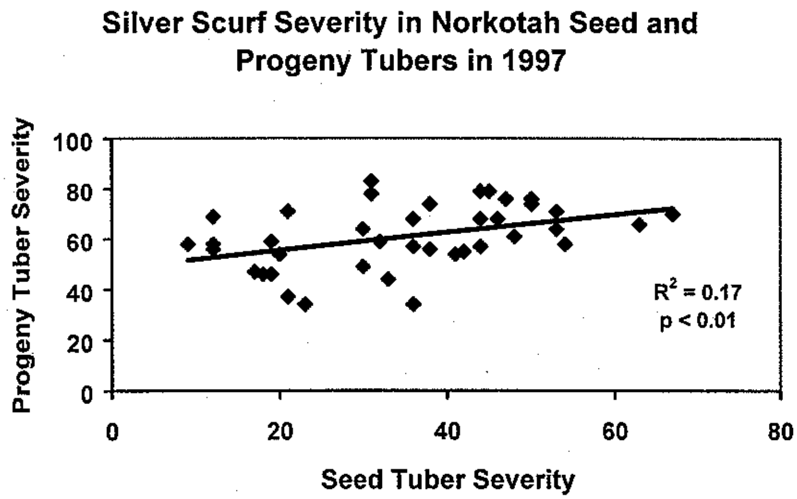

Figure 1

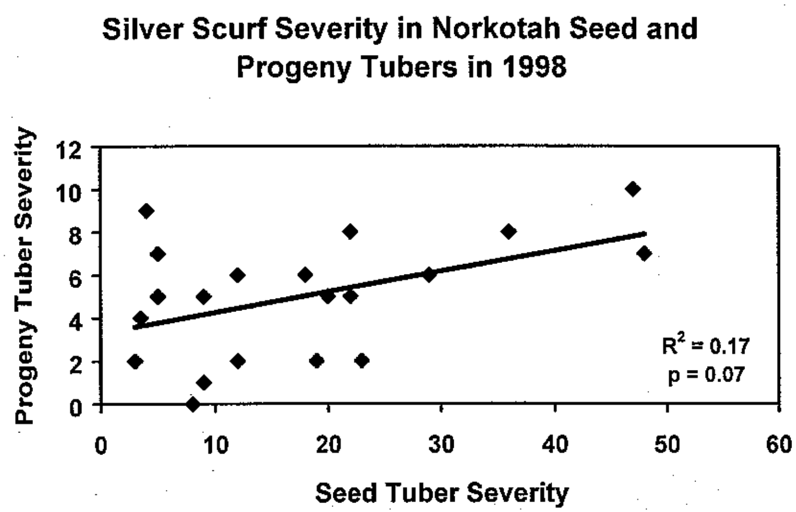

Figure 2

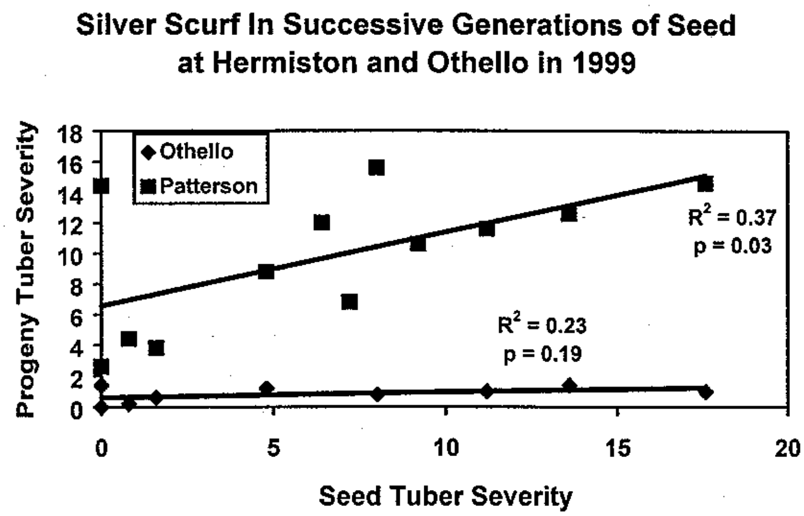

Figure 3

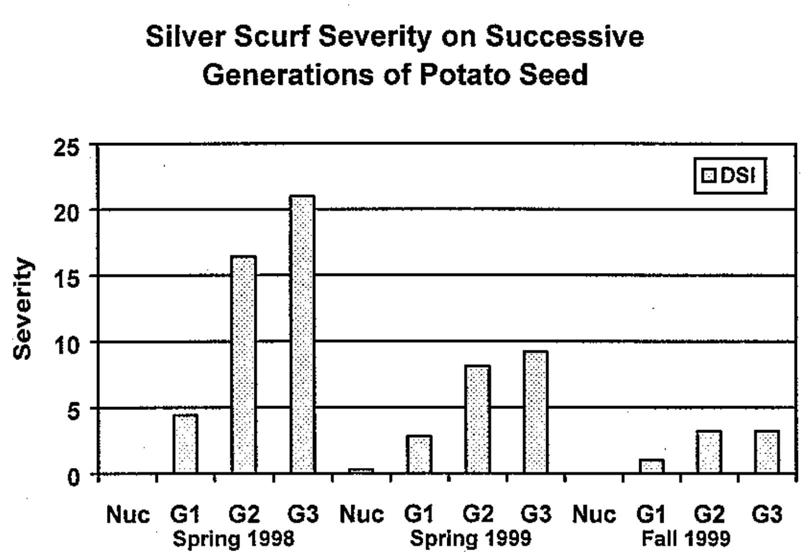

Figure 4

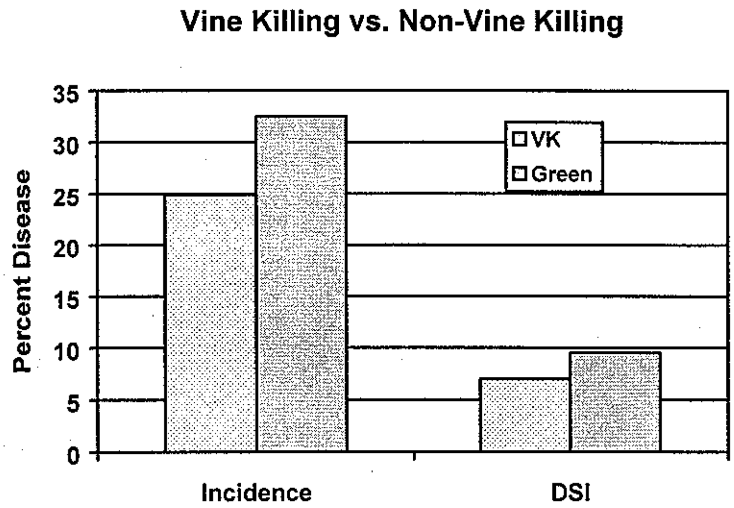

Figure 5

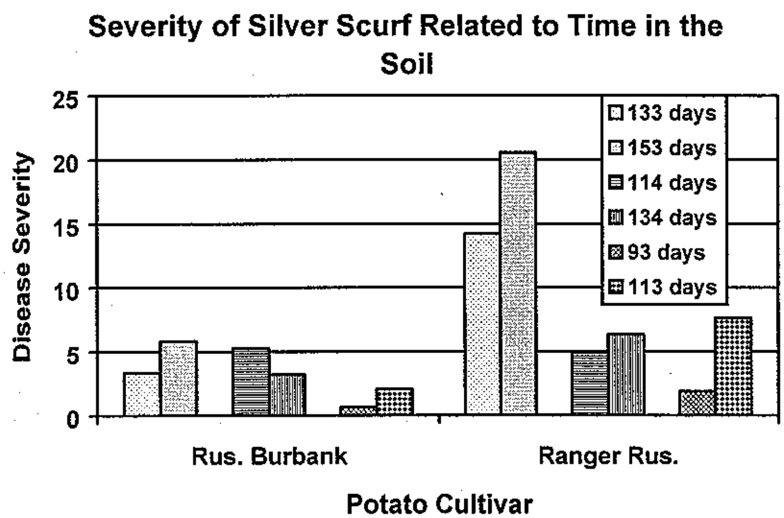

Figure 6

Table 1

Silver Scurf Incidence and Severity on Tubers Produced From Treated Seed Pieces

Location	Incidence	Severity
Klamath Falls OR	12.3 a	3.2 a
Redmond OR	32.4 c	8.8 c
Hermiston OR	12.2 a	3.2 a
Othello WA	26.1 b	5.7 b

Table 2

Silver Scurf Incidence and Severity on Tubers Produced From Treated Seed Pieces

Treatment	Incidence	Severity
Maxim + Blocker	10.3 a	0.9 a
Quadris (1/2 lbs / cwt)	10.8 a	3.2 b
Maxim (1/2 lbs / cwt)	12.5 a	3.2 b
New Tops MZ (12 oz / cwt)	12.9 a	3.2 b
Tops MZ (1 lbs / cwt)	14.8 a	4.2 b
Sorbic Acid (1 lbs / cwt)	23.5 b	6.8 c
Untreated Control	28.7 bc	8.3 c
Sodium Carbonate (1 lbs / cwt)	30.6 c	8.5 c
Dithane 8% (1 lbs / cwt)	31.0 c	8.5 c
Tops 5 (1/2 lbs / cwt)	32.3 c	8.4 c