# POSTHARVEST TREATMENTS TO CONTROL SILVER SCURF IN POTATOES: FIRST YEAR PRELIMINARY REPORT

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## Abstract

Fungicide treatments were applied to 'Russet Norkotah' *(Solanum tuberosum)* tubers prior to placement in a commercial storage. Samples were stored for eight months and then rated for silver scurf *(Helminthosporium solani)* development. Silver scurf lesions appeared on nearly all of the untreated tubers. All fungicide treatments except Mertect 340-F (thiabendazole) reduced the percentage of tubers on which silver scurf lesions developed as compared with the untreated check. The potassium sorbate treatment produced the largest percentage of scurf-free tubers. The average tuber surface area covered with silver scurf lesions was significantly lower with potassium sorbate treated tubers than any of the other treatments. Of the tubers with silver scurf le'sions present, potassium sorbate treated tubers had a lower percentage of surface area infected than any other treatment.

## Introduction

Silver scurf is a disease of potatoes caused by the fungus *Helminthosporium solani.* It causes blemishes and lesions on the skin of the tuber that reduces tuber quality and marketability. Packing houses report increased sorting costs, increased inspection time, and rejected lots at destinations. Processors have difficulty peeling the skin off tubers when symptoms become excessive.

Silver scurf infection can occur in the field or in storage. Primary infection occurs in the field while tubers are attached to the stolons from spores that have survived either in the soil or on the surface of seed tubers. Secondary infection occurs during harvest and piling operation's or from spores moving about in the storage environment (Frazier et. al., 1998).

Silver scurf spores can remain viable for extended periods of time on structural materials such as wood and polyurethane. There is evidence that the fungus can live for over nine months in the soil of the storage floor, particularly when the soil contains decaying tubers or other organic matter (Shetty et. al., 1997).

Once the tubers are placed in storage, free moisture can increase sporulation and secondary spread of the disease. Free moisture forms inside storages when condensation occurs on ceilings and walls because of to poor insulation or improper management of humidity and ventilating systems. Silver scurf pockets often appear in the warmest areas of the pile and also near the bottom vents where moisture tends to accumulate (Frazier et. al., 1998).

Treating tubers with a fungicide prior to placing them in storage is one strategy to control the development and spread of silver scurf. Postharvest tuber treatments are only one part of an

integrated program to control the disease. This study was designed to evaluate several postharvest treatments to control silver scurf in storage.

## Materials and Methods

A commercial lot of 'Russet Norkotah' potatoes was identified in a Madras, Oregon, field with the potential for silver scurf infection based on field history. Six hundred tubers (one hundred tubers for each of six treatments) were randomly selected from the conveyor belt moving the potatoes from the truck to the storage. One hundred tubers were immersed in a solution made by combining 1 9 oz. of Dithane ST (mancozeb) in three gallons of water, another set of 100 tubers was dipped in a 0.2 M solution of potassium sorbate ($C_6H_7O_2K$), and a third set of 100 tubers was dipped into a 0.2 M solution of calcium propionate ($C_3H_5O_2$•1/4Ca). Maxim Potato Seed Protectant (fludioxonil) was applied to a fourth set of 100 tubers at a rate of 0.5 lb. product per 100 lb potatoes. The fifth set of 100 tubers was sprayed with Mertect 340-F (thiabendazole) as they tumbled through the piler unit at a labeled rate of 0.42 fl. oz. of product per ton of potatoes. A sixth set of 100 tubers was left untreated. After the fungicide treatments were applied, the tubers were allowed to air dry. The untreated check tubers and the treated tubers for each treatment were placed into mesh bags of twenty tubers each. The mesh bags were placed onto the face of the pile about four feet above the floor of the storage and buried with potatoes. The samples were stored at 42°F until they were removed from the storage on June 2, 1998 after about eight months in storage. Tubers from each mesh bag were placed in plastic bags, moistened, and placed in a dark room to cause the silver scurf lesions to sporulate. After a month, tubers were removed from the plastic bags. Each tuber was scored for the presence of silver scurf, and the tuber area covered by lesions was visually rated.

## Results and Discussion

The postharvest fungicide treatments had a significant effect on the number and area of silver scurf lesions that developed during eight months in storage (Table 1). Silver scurf lesions appeared on nearly all of the untreated tubers. All treatments except Mertect reduced the percentage of tubers on which silver scurf lesions developed as compared with the untreated check. The potassium sorbate treatment produced the largest percentage of scurf-free tubers.

Mertect has been commonly applied for a number of years to control Fusarium dry rot in many commercial storages. Apparently, it also controlled silver scurf as well. However, it has been noted that *H solani* has recently developed resistance to Mertect (Merida and Loria, 1990). This study suggests that local *H solani* populations have also developed some degree of resistance to Mertect as 93 percent the tubers developed silver scurf lesions.

All fungicide treatments significantly reduced the average tuber surface area covered by silver scurf lesions as compared to the untreated control (Table 1). The average tuber surface area covered with silver scurf lesions was significantly lower with potassium sorbate treated tubers than with any of the other treatments. Of the tubers with silver scurf lesions present, potassium sorbate treated tubers had a lower percentage of surface area infected than any other treatment. Similar results have been observed in *in vitro* and greenhouse experiments (Olivier et. al., 1998).

Calcium propionate and potassium sorbate are fungicides commonly used in food products. Dithane ST was registered in 1997 for post-harvest treatment of seed potatoes only. Mertect is currently registered as a postharvest treatment. Maxim is not currently registered for this type of application.

Table 1. Postharvest fungicide treatments to control silver scurf, Madras, 1997-98.

| Treatment | Tubers with | Tuber skin surface covered by silver scurf lesions (%) | |
|---|---|---|---|
| | silver scurf lesions (%) | All | Diseased |
| Potassium Sorbate | 47 | 5 | 11 |
| Maxim | 68 | 10 | 14 |
| Dithane ST | 78 | 13 | **17** |
| Calcium Propionate | 79 | 14 | 17 |
| Mertect 340-F | 93 | 16 | 18 |
| Untreated Control | 99 | 23 | 23 |
| LSD 5% | 18 | 5 | 5 |

## Literature Cited


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