



Potato Seed Piece Treatments (SPT)

Dr. Loretta Mikitzel, P.Ag. & Peter Scott, P.Ag.
 New Brunswick Department of Agriculture, Fisheries and Aquaculture
 Potato Development Centre, Wicklow, NB

Fusarium dry rot/seed piece decay can seriously affect plant stand, robbing you of tuber yield and quality. *Fusarium* is present in the soil and is found on the surface of tubers but requires a wound to cause an infection. Well suberized cut surfaces will not be infected by *Fusarium*. Chemical seed piece treatments (SPTs), used in conjunction with properly handled, wound healed, disease-free seed, may suppress fungal growth on seed pieces and young plants and improve your bottom line.

Potato growers currently have access to dry seed piece treatment fungicides containing four different active ingredients: fludioxonil (Maxim[®]), mancozeb (Clean crop[®], MancoPlus[®] and Tuberseal[®]), metiram (Polyram 16D[®]) and thiophanate methyl (Senator[®]). Control of *Fusarium* dry rot is on the label of each product. Some of these chemicals are also registered to control other seed tuber-borne fungi such as silver surf, *Rhizoctonia* and common scab.

Targeting *Fusarium* dry rot on cut seed potatoes, field trials were conducted in New Brunswick from 2001-2003 to compare the performance of various dry seed piece treatments. We intentionally infected freshly cut Russet Burbank seed tubers with *Fusarium* spores, air dried the seed overnight, then treated them with commercially available SPTs. The SPTs were applied at the rate of 500 g/100kg cut seed. To allow the disease to grow and challenge the SPTs efficacy, the cut infected and treated seed was stored at 7-8°C for 21-25 days before planting. The trials were planted in mid to late May each year using a commercial field, fertilized and maintained for full season growth of 104-118 days. The treatments were replicated and randomized to allow for statistical determination of differences in tuber yield and quality measurements.

The treatments included: No SPT (inoculated with *Fusarium*, no SPT), Lime SPT, Clean Crop[®], Senator[®], Polyram 16D[®], Tuberseal[®], Maxim[®] and UI Control (no *Fusarium*, no SPT).

Regardless of the seed piece treatment used, few differences were noted in plant growth or crop development. The crop was fully emerged by 30 days after planting, even in 2001 when cool weather immediately after planting delayed emergence somewhat. The treatments did not affect total tuber yield, tubers/plant or specific gravity of the harvested tubers (Table 1). The benefits of using a SPT when *Fusarium* was present were evident in marketable yield data. Tuberseal[®] increased yield of marketable tubers by 18% over the No SPT control. Using Maxim[®], Senator[®] or Clean Crop[®] improved marketable yield by 14% compared with no SPT. *Fusarium* pressure alone with no SPT resulted in a 10% reduction of marketable yield (compare No SPT with UI Control in Table 1).

Table 1: Average tuber yield and quality of Russet Burbank, New Brunswick 2001-2003.

Treatment	Total yield Cwt/acre	Marketable yield Cwt/acre	Tubers/ Hill	Specific Gravity
No SPT	311 a ^z	230 b	9.7 a	1.0837 a
UI Control	327 a	255 ab	9.2 a	1.0825 a
Lime	317 a	245 b	9.3 a	1.0843 a
Polyram 16 [®]	320 a	245 b	9.9 a	1.0814 a
Clean crop [®]	338 a	263 ab	10.1 a	1.0839 a
Tuberseal [®]	342 a	271 a	9.8 a	1.0831 a
Maxim [®]	344 a	262 ab	9.8 a	1.0855 a
Senator [®]	345 a	264 ab	10.1 a	1.0833 a

^z Numbers followed by the same letter within a column are not significantly different at P=0.05.

Treating seed tubers with a SPT did not influence yield of cull/misshapen tubers or of tubers between 2" diameter and 10 oz (Table 2). One portion of the tuber yield profile affected by *Fusarium* and SPT was the small tubers. The lowest yield of small tubers <2" diameter was produced in the absence of *Fusarium* (UI Control). There was no effect of SPT on yield of large tubers >10 oz. when results were averaged over the three years of the study due to yearly variability amongst treatments. However, Tuberseal®, Maxim® and Senator® tended to produce higher yields of large tubers >10 oz compared with the No SPT control. Yield profiles are depicted graphically in Figure 1.

Table 2: Tuber yield profile of Russet Burbank, New Brunswick 2001-2003.

Treatment	< 2" dia Cwt/acre	2" – 10 oz. Cwt/acre	>10 oz. Cwt/acre	Culls Cwt/acre
No SPT	61 ab ^z	181 a	58 a	19 a
UI Control	49 b	190 a	65 a	23 a
Lime	55 ab	178 a	68 a	17 a
Polyram 16®	61 ab	197 a	49 a	14 a
Clean crop®	60 ab	204 a	59 a	14 a
Tuberseal®	55 ab	198 a	73 a	16 a
Maxim®	67 a	194 a	68 a	15 a
Senator®	64 a	197 a	68 a	17 a

^z Numbers followed by the same letter within column are not significantly different at P=0.05.

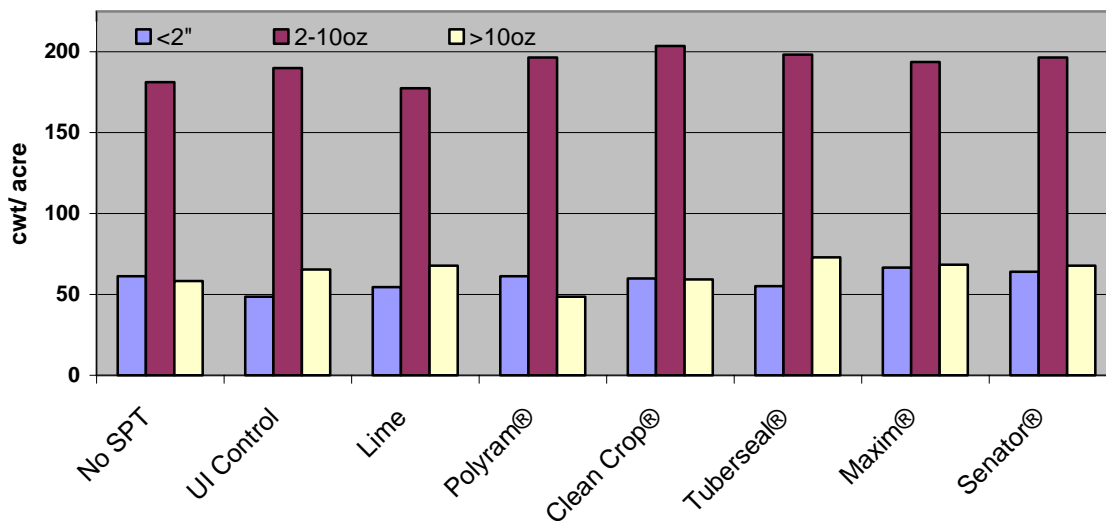


Figure 1: Tuber yield profile of Russet Burbank, New Brunswick 2001-2003.

Potential value of using a SPT may be measured by net gain per acre. Net gain per acre was calculated by assigning a value of \$7/cwt for the marketable tuber yield over and above that produced by the No SPT control with the cost of the SPT subtracted (Figure 2). It is clear that value of the marketable portion of the crop is greater when a SPT is used especially under *Fusarium* pressure. Also evident is that the absence of *Fusarium* on seed tubers results in more valuable marketable yield.

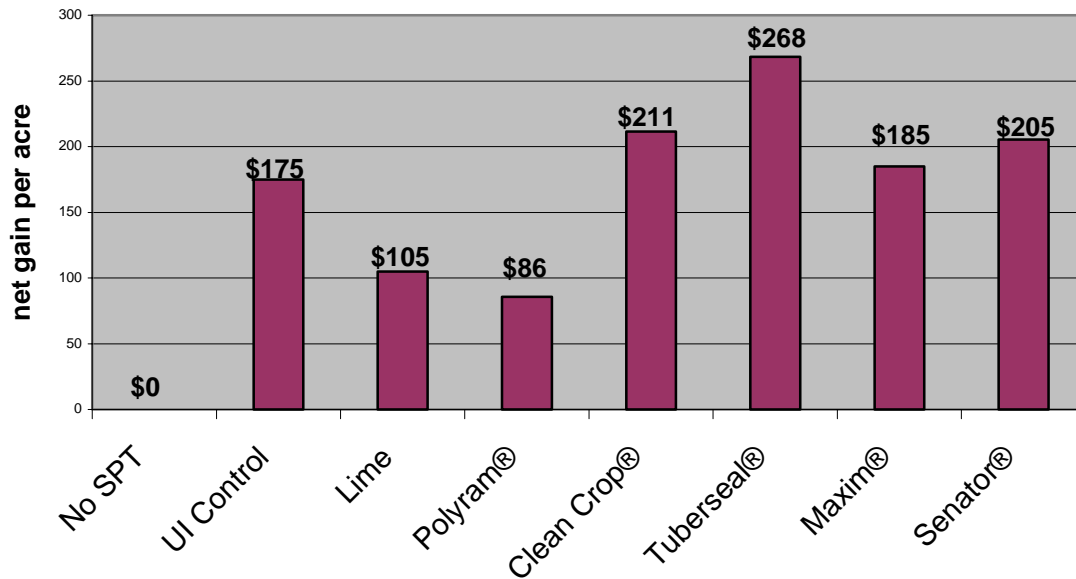


Figure 2: Net gain in marketable crop value per acre of Russet Burbank, 2001-2003.

Fusarium is found in all potato producing areas and *Fusarium* dry rot can be difficult to see in a seed lot because most symptoms are found internally. All inspected seed lots may contain a level of dry rot but will not exceed 2%, even at the certified level. Disinfection of seed cutters is recommended often and especially between each seedlot.

When *Fusarium* is of primary concern, any of the registered SPTs will work but if other diseases are of concern, use the SPT labeled for that use. Always follow the label, label rates and take all necessary worker safety precautions.

When soil conditions at planting favour rapid suberization and plant emergence, the benefit from using a SPT may be negligible. But if planting conditions are likely to favour seed piece decay rather than plant emergence, treat cut seed with a SPT.

Accumulated trial data indicate tuber yield and quality increase with SPTs. However, these increases do not justify specific SPT recommendations but do defend the use of a registered fungicidal seed piece treatment.