

Evaluation of ozone and post-harvest treatments to control silver scurf spread on potato tubers in storage, 2012.

Potato tubers were grown during the summer of 2011 at the Hancock Agricultural Research Station in Hancock, WI and placed into a storage locker in the Storage Research Facility on site on 22 Dec 2011. Post-harvest treatments were evaluated for the control of silver scurf spread on 'Dark Red Norland' potato tubers. Fifty-six storage containers (2 x 1 x 1 ft) accommodated a 14-treatment trial with four replications at 55±2°F and 97% relative humidity. Containers were randomized in a complete block design and connected to an enclosed ventilation exhaust system. Each container contained 40 potato tubers and was equipped with an input and output valve to allow proper airflow across tubers. For ozone treatments, storage locker air was drawn into a portable ozone generator to produce a 25% ozonated (O₃) flow and circulated through 28 of the 56 containers for 4 hrs each day. The remaining 28 containers received ambient air as control. Post-harvest fungicides were applied to tubers using a hand-pressurized sprayer at a volume of 200 ml per 160 tubers prior to bin placement. Control tubers were sprayed with water at the same application volume. Inoculum was provided to each container by adding 10 field-infected, silver scurf symptomatic tubers (marked as inoculum to avoid evaluation) to 30 healthy-appearing tubers. Tubers were mixed to create a 40 tuber experimental unit with approximately 25% disease incidence at initial status. Ten non-inoculum tubers were randomly selected and temporarily removed for disease and desiccation evaluations on 25 Feb (60 days post initiation or DPI) and 28 Apr (120 DPI). Disease severity and desiccation were rated for each tuber (0-100%, each parameter) and mean ratings across 10 tubers were evaluated. Data were analyzed with StatGraphics statistical analysis software package (StatPoint Technologies, Warrenton, VA).

Disease pressure was low with approximately 10% severity in the untreated control at 60 DPI with an increase to just 16% at 120 DPI. All treatments, but one, had statistically the same amount of disease as the untreated, inoculated control at 60 DPI. The Oxidate 27L 6.25 fl oz/ton treatment was the exception which resulted in statistically higher disease at 60 DPI when compared to the untreated control. At 120 DPI, all treatments exhibited increased disease compared to 60 DPI. Quadris 2.08SC-treated tubers had the lowest amount of disease numerically, but were not statistically less diseased than the control tubers. In approximately 57% of all treatments, there was a larger increase in disease from 60 to 120 DPI when ozone was used compared to its respective treatment without ozone. Tuber desiccation was not observed in the untreated control tubers at 60 DPI. Tubers treated with Phostrol 53.6F (6.4 fl oz) had significantly more desiccation than the untreated control. At 120 DPI, Quadris 2.08SC had the least amount of desiccation numerically. Ozone treatments on both non-inoculated and inoculated tubers produced the highest values for desiccation. In most (87%) treatments containing a post-harvest applied fungicide and ozone, desiccation was numerically higher than when the product was used without ozone.

Treatment and rate/ton of tubers		% Disease severity ^z		% Tuber desiccation	
		60 DPI ^y	120 DPI	60 DPI	120 DPI
1	Untreated control (non-inoculated).....	10.0a ^x	16.3a	0.0a	9.4ab
2	Control (non-inoculated) + Ozone 10ppm.....	16.9ab	33.8bc	1.0a	23.0d
3	Untreated + inoculated.....	10.6a	30.0abc	0.7a	10.3abc
4	Inoculated + Ozone 10ppm.....	23.8ab	28.8abc	7.6ab	23.3d
5	Phostrol 53.6F 6.4 fl oz.....	25.6ab	27.5abc	13.6b	10.1abc
6	Phostrol 53.6F 6.4 fl oz. + Ozone 10ppm.....	11.3a	38.8c	1.3a	13.2abcd
7	Phostrol 53.6F 12.8 fl oz.....	10.0a	33.8bc	5.5ab	11.9abcd
8	Phostrol 53.6F 12.8 fl oz. + Ozone 10ppm.....	16.9ab	27.5abc	1.6a	15.5abcd
9	Quadris 2.08SC 3.0 fl oz.....	15.0ab	23.1ab	4.9ab	3.9a
10	Quadris 2.08SC 3.0 fl oz + Ozone 10ppm.....	12.5a	33.1bc	1.9a	22.6cd
11	Mertect 340SC 0.42 fl oz.....	16.3ab	38.1c	2.3a	9.4ab
12	Mertect 340SC 0.42 fl oz. + Ozone 10ppm.....	13.8ab	29.4abc	2.3a	15.4abcd
13	Oxidate 27L 6.25 fl oz.....	30.0b	35.0bc	3.9ab	20.8bcd
14	Oxidate 27L 6.25 fl oz. + Ozone 10ppm.....	20.6ab	31.3bc	3.2a	14.9abcd

^z Average disease severity and desiccation percentages on ten randomly selected tubers.

^y DPI = days post initiation of trial.

^x Column means with a letter in common are not significantly different (Fisher's LSD, *P*=0.05).