

USING JUNIPER WOOD FLOUR AS A CARRIER FOR SEED PIECE TREATMENTS ON RUSSET NORKOTAH POTATOES

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Abstract

An experiment to evaluate the effects of using juniper flour as a carrier for seedpiece treatments on Russet Norkotah potatoes was planted at the Madras site of the Central Oregon Agricultural Research Center. Plant emergence for the treatments containing juniper wood flour combined with Dithane[®] was significantly lower than the treatment with juniper wood flour but no Dithane. The lower emergence observed for the seed pieces treated with the combination of juniper wood flour and Dithane resulted in lower yields of U.S. No. 1s when compared with the juniper wood flour without Dithane. The results suggest a possible deleterious effect on emergence when juniper wood flour is combined with Dithane.

Introduction

Various pathogens have the potential to cause serious problems in cut potato seed. Poor stands caused by seed piece decay may be especially troublesome in years characterized by unfavorable soil moisture and weather conditions. Some seedpiece treatments applied to the cut surfaces of seed potatoes serve to protect them from infection and decay, while others enhance wound healing and periderm formation on the cut surface. Tree bark flours are typically used in seed piece treatment formulations and serve as carriers for fungicides and to enhance wound healing. In addition, bark, talc, and other seed piece treatment carrier materials adhere to moist surfaces of cut tubers and promote a smooth flow of seed pieces in planting equipment.

Potato seed piece treatment formulations with bark typically have used Douglas fir (*Pseudotsuga menziesii*) or alder (*Alnus rubra*) bark because this material was readily available. Western juniper (*Juniperus occidentalis*) is a nuisance species that has invaded millions of acres in the western states. Extensive efforts are underway to develop markets for products from this species. This study was initiated to determine whether wood flour from western juniper could be a suitable alternative to alder or fir bark as a carrier for potato seed treatment products. A secondary objective was to evaluate altered ratios of the ingredients. Three locations were included to expose the formulations to a range of soil and climatic conditions with potentially different disease pressures. This report does not include the results from the Klamath Falls or Ontario locations.

Materials and Methods

Four experimental formulations containing juniper wood flour and one containing alder bark were compared with a commercial standard, Evolve[®] (thiophanate-methyl-mancozeb-cymoxonil, Gustafson). Experimental formulations evaluated included: F1) alder bark, talc, and zeolite at 31 percent each and Dithane (mancozeb, Dow Agro

Sciences, LLC) at 7 percent; F2) juniper flour, talc, and zeolite at 31 percent each and Dithane at 7 percent; F3) juniper flour, talc, and zeolite at 33.3 percent each; F4) juniper flour at 31 percent, talc at 47 percent, zeolite at 15 percent, and Dithane at 7 percent; and F5) juniper flour and talc at 31 percent each, zeolite and beet pulp at 15.3 percent each, and Dithane at 7 percent.

Certified Russet Norkotah seed was sorted into 6- to 8-oz tubers and cut into 4 pieces per tuber on May 10. One hundred twenty seedpieces (30 per replicate) were weighed and placed in a clean, dry bucket. Treatment materials were weighed and about 500 g of material was added to each respective bucket. Seed pieces and treatment material were mixed and transferred several times between two buckets. Seed pieces were allowed to air-dry and any remaining treatment material was collected and weighed.

The experiment included four replications of single-row, 30-hill plots arranged in a randomized complete block design. Seed was spaced at 9 inches in 36-inch rows. Fertilizer was banded at planting on May 13 at 166 lb N, P₂O₅, and K₂O/acre, and 73 lb S/acre. Admire[®] (imidicloprid, Bayer) was applied at 0.27 lbs active ingredient/acre at planting to control insects. Eptam 7-E[®] (s-ethyl dipropylthiocarbamate, Gowen) and Matrix[®] (rimsulfuron, DuPont) were applied at 5 pints/acre and 1.5 oz/acre, respectively, to control weeds. The experiment was irrigated with solid-set sprinklers based on AgriMet crop water use calculations. Emergence data were collected on June 23. Stem counts were taken on October 20 prior to harvest.

Vines were rolled on September 15 and tubers were harvested on October 20. All tubers were graded to USDA standards in late October.

Results and Discussion

The amount of product that adhered to cut seed was greatest for the F1 treatment at 0.71 lb/cwt of seed. Treatment F5, which included beet pulp, was retained at 0.41 lb of product/cwt. All other treatments were within a narrow range of 0.47 to 0.55 lb of product/cwt of seed.

Plant emergence 40 days after planting ranged from 90 to 100 percent with Evolve and F3 at 100 percent and F1, F2, F4, and F5 at 97, 90, 93, and 93 percent respectively. Plant emergence for the treatments containing juniper wood flour combined with Dithane was significantly lower than the treatment with juniper wood flour but no Dithane. Alder bark combined with Dithane did not significantly lower plant emergence. The results suggest a possible deleterious effect on emergence when juniper wood flour is combined with Dithane.

Stem counts taken prior to harvest were 1.7 stems/plant except treatment F5, which had 1.6 stems/plant.

High yields were observed with a high percentage of large tubers (Table 1). Excessive tuber size resulted in rough tubers and contributed to relatively high cullage in all

treatments. Seed pieces treated with the commercial standard Evolve produced the highest total yield and largest tuber size. The trend in yield of U.S. No. 1s was consistent with emergence data. The lower emergence observed for the seed pieces treated with the combination of juniper wood flour and Dithane resulted in lower yields of U.S. No. 1s when compared with the juniper wood flour without Dithane.

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Table 1. Effects of seed piece treatments on yield and tuber size of Russet Norkotah potatoes, Madras, Oregon, 2004.

Treatment	<4oz	<--- 4-12	Ones 12+	-----> Total	Twos	Culls	Total yield	Tuber size
	<-----cwt/acre----->							oz
Evolve	20	148	444	592	0	106	718	13.6
F1	26	161	328	489	6	153	674	12.2
F2	18	179	265	445	0	120	582	11.8
F3	18	237	307	544	0	51	613	11.0
F4	19	166	290	456	0	107	582	12.4
F5	20	189	293	482	0	123	625	12.6
LSD (5%)	ns	ns	94	104	4	56	96	1.3

