PRE AND EARLY POST-EMERGENCE WEED CONTROL WITH PARAQUAT IN POTATOES

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ABSTRACT

Studies using Paraquat herbicide for early post-emergence control of broadleaved and grass weeds in Katahdin and Russet Burbank potatoes were conducted in Maine during four growing seasons. All rates and times of application of Paraquat gave good commercial control of grass and broadleaf weeds when compared to Premerge and Dowpon treatment as checks. Paraquat applied to Katahdins 2 weeks after ground crack reduced the yield of tubers but did not significantly affect specific gravity. Yield and specific gravity of Russet Burbank was reduced by Paraquat applied one and 2 weeks after ground crack.

Paraquat can be used effectively for weed control in Katahdin up to one week after ground crack without crop damage. In Russet Burbank it appeared that application at ground crack was about as late as Paraquat could be applied without affecting yield or specific gravity of tubers.

RESUMEN

Estudios en el control de malezas de hoja ancha y pastos con Paraquat, en las primeras etapas de post-emergencia, se realizaron durante cuatro temporadas en Maine. Las variedades estudiadas fueron Katahdin y Russet Burbank.

Todas las concentraciones y épocas de aplicación de Paraquat usadas produjeron mejor control comercial de malezas que los herbicidas Premerge y Dowpon. Las aplicaciones de Paraquat dos semanas después de los "primeros signos de brotación" (agrietadura del suelo), redujeron el rendimiento de tuberculos, pero no afectaron la gravedad específica de estos en forma significativa. Las aplicaciones de Paraquat una o dos semanas después de los "primeros signos de brotación" en la variedad Russet Burbank produjeron una reducción tanto del rendimiento, como de la gravedad específica de los tubérculos.

El uso del Paraquat en la variedad Katahdin no presenta ninguno problema en su aplicación hasta la primera semana de la aparición de los "primeros signos de brotación." Para la variedad Russet Burbank las aplicaciones solo pueden realizarse, sin afectar el rendimiento y la gravedad específica, hasta el momento de la aparición de los "primeros signos de brotación."

Paraquat (1, 1′ dimethyl-4, 4′-bipyridinium chloride) was observed to be an effective herbicide for control of broadleaved and grass weeds

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3Paraquat manufactured in England and sold in the United States by Chevron Chemical Co. under U.S.D.A. registration No. 239-1994. Residue tolerance 0.5 P.P.M. as cation in potato tubers.
while testing as a candidate desiccant for potato vine killing. No reports that Paraquat had been studied for early post-emergence weed control in white potatoes have been found in the literature. The lack of such information and need for an early post-emergence herbicide encouraged the authors of this paper to conduct a study on rate and time of application of Paraquat for early post-emergence weed control in Maine.

**MATERIALS AND METHODS**

Katahdin and Russet Burbank potatoes were planted in 1966, 1967, 1968 and 1969 in separate blocks at Aroostook Farm, Presque Isle, Maine. Plots were band fertilized each year with 1300 pounds (589.7 kg) of 10-10-10 (oxide basis) analysis fertilizer per acre (0.4047 ha). Katahdin seedpieces were spaced 8 inches (20.32 cm) apart in 34 inch (86.36 cm) rows and Russet Burbank seedpieces were spaced 16 inches (40.64 cm) apart. All cultural practices, except weed control, were similar to commercial practices used in the area. Soil type was a Caribou gravelly sandy loam with an organic matter content of 4.65 percent.

Herbicides were applied at the times indicated in Tables 1 and 2 with a compressed air sprayer using a two-nozzle brush-type boom. All materials were applied as dilute sprays in 80 gallons (302.8 L.) of water at a pressure of 40 p.s.i. (2.81 kg. sq. cm.). A non-ionic spreader sticker X-77 was included as part of the diluted mixture at a rate of 4 ounces per acre.

Plots of each variety were single rows, 24 feet (7.3 m.) in length arranged in randomized block designs with buffer rows between each treatment row. Four foot (1.2 m.) alleyways between ends of plots were removed prior to harvest.

Principal weed species in the experimental plot areas were: Lamb’s quarter (Chenopodium album L.), Wild rutabaga (Brassica campestris L.), Redroot pigweed (Amaranthus retroflexus L.), Smartweed (Polygonum persicaria L.), Barnyard grass (Echinochloa crusgalli L.), Green foxtail (Setaria viridis, Beaux) and minor amounts of Quack grass (Agropyron repens L.)

Weed control ratings were made each year about three weeks after ground crack treatments were applied and again just prior to harvesting. Broadleaved weed and grass weed ratings were made separately using a five-step rating scale of 1 representing no control and 5 representing excellent control. Yield of tubers was determined at harvest time for each plot and samples of twenty medium sized tubers saved for specific gravity determinations and internal discoloration inspections.

**RESULTS AND DISCUSSION**

**Katahdin Variety**

Data presented in Table 1 indicate the effect of two rates of Paraquat applied at ground crack of row and at 1 and 2 weeks after ground crack. Premerge, Dowpon, and Premerge plus Dowpon were applied as standard herbicide treatments for comparison with Paraquat.

Data presented in Table 1 indicate yields of Katahdin from Paraquat-treated plots were not significantly higher than untreated check plots treated with 2 pints of Paraquat at ground crack. Yields of tubers