

APPLICATION OF METRIBUZIN IN IRRIGATION
WATER FOR WEED CONTROL IN POTATOES

by

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Many of the new areas where potatoes are grown utilize center-pivot irrigation systems to supply the water need for producing the crop. Besides for applying irrigation water, these systems are used for applying nitrogen fertilizer and fungicides. Because center-pivot use saves time, labor, and equipment, interest in its use is growing for applying herbicides to control weeds in potato fields. However, little, if any, scientific information is available on how effective and safe this method is for applying herbicides to potatoes grown in the coarse-textured soils of the Columbia River Basin. These soils often contain more than 90% sand and less than 1% organic matter.

Preliminary tests in 1972 indicated that metribuzin (4-amino-6-tert-3-(methylthio)-as-triazin-5(4H)one), a promising herbicide for weed control in potatoes, was effective when applied with irrigation water.

In 1975, we established two field size test plots in cooperation with the Chemagro Agricultural Division of Mobay Chemical Corporation on two potato fields irrigated by center-pivot sprinklers. The first location was near Boardman, Oregon. Russet Burbank potatoes, planted on April 9, were just emerging when the first application was made on May 13, 1975. Soil was a Winchester sand that contained about 0.2% organic matter. The weed population was as follows:

Lambsquarters: Uniformly dense over the entire field; growth stage varied from just emerging to 8 leaves.

Barnyardgrass: Variable population; up to 2 leaf stage.

Nightshade: Light to dense population; up to 1 inch tall with 4 leaves.

Russian Thistle: Scattered patches; up to 2 inches tall with 6 leaves.

Annual Bursage: Scattered plants, up to 1 inch tall with 2 leaves.

Sixteen pounds of metribuzin were thoroughly mixed with 300 gallons of water before the treatment was started. A Lapp Hydratube injector pump, calibrated to inject 30 gallons per hour, was used to inject the herbicide solution into the Gifford Hill 360 center-pivot sprinkler system. The sprinkler system was set to irrigate one-half of the field (64 acres) in 10 hours and to apply 0.25 inches of water. With these conditions, the calculated rate of application was 0.25 pounds of metribuzin per acre.

Large sheets of plastic (12 by 30 feet) were placed on the ground in several locations ahead of the sprinkler. These areas served as untreated controls so that weed control and crop tolerance could be assessed accurately. A second application of metribuzin at the same rate was made on June 18, 1975, after the final hilling of the potatoes. Method and rate of application was the same as described earlier.

Within one week of the first application many of the weeds were dead. Except for a few large Russian thistles, all weeds were controlled effectively two weeks after treatment. The only injury symptoms observed was some slight venial chlorosis 10 to 16 days after the first application. Potatoes recovered rapidly and no differences in vine growth or color were visible three weeks after treatment. After the final hilling operations more weeds appeared, but they were controlled by the second application of metribuzin. The field was virtually weed free the remainder of the growing season.

The second location was near Paterson, Washington. Kennebec potatoes, planted on March 6 to 7, 1975, were 12 to 18 inches tall when the treatment was applied on June 10. Potatoes were in the early bloom stage of growth and a few plants had tubers up to 0.75 inches in diameter. Soil was a Koehler loamy fine sand that contained about 0.5% organic matter. The weed population was as follows:

Nightshade: Uniformly dense; up to 0.5 inches tall with 2 leaves.

Lambsquarters: Scattered areas where numbers were high; up to 0.25 inches tall in cotyledonary leaf stage of growth.

Russian Thistle: Scattered patches; up to 1.5 inches tall with 2 to 4 leaves.

Pigweed: Scattered areas where numbers were high; up to 0.5 inches tall with 2 to 4 leaves.

For this test, 20 pounds of metribuzin was mixed into 118 gallons of water and the solution was injected into a Pierce center-pivot sprinkler at the rate of 30 gal/hr. The sprinkler system was set to irrigate one-half of the field (64 acres) in 3.5 hours and to apply 0.13 inches of water. With these conditions the calculated rate of application was 0.25 pounds of metribuzin per acre.

Observations 10 days after treatment revealed that all weeds were controlled effectively. Weeds in the untreated controls were growing vigorously. Potatoes were not injured visibly.

After about August 20, the potato vines in the field became senescent. Nightshade germinated and grew as the crop canopy broke down.

Results of these tests indicate that applications of metribuzin through the center-pivot sprinkler systems will control small weeds in potato fields. However, because of the short residual period of these treatments, season-long weed control is dependent upon a vigorous, dense crop canopy to prevent late germinating weeds from becoming a problem.