NEMATICIDAL AND HERBICIDAL PROPERTIES OF PROPYLENE OXIDE

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The nematotoxic properties of an aqueous solution [2.5%, v/v] of propylene oxide [PO] were studied in a greenhouse pot experiment with soil from a cotton field infested with the reniform nematode [*Rotylenchulus reniformis*]. The compound was added preplant to soil at rates of 125 - 1500 mgs/Kg soil in increments of 125 mgs. All pots were covered with standard polyethylene [1 mil] immediately after application of the chemical . There were in the experiment a control and 12 treatments each with 7 replications [pots] arranged in a randomized complete block design. After two weeks, the covers were removed, soil samples for nematological analyses [salad bowl incubation technique] were collected and 'Young" soybean was planted [5 seed/pot]. Numbers of the reniform and microbivorous nematodes declined sharply in response to increasing PO rates up to 750 mgs/Kg soil; dosages $\geq$ 750 mgs/Kg soil resulted in 100% kill. The same pattern of response to PO applications was observed for soil and root populations of *R. reniformis* at termination of the experiment 8 weeks after planting. Significant populations of microbivorous nematodes were observed in control and all PO-treated soils at the end of the experiment; soil and root populations of these nematodes increased directly in response to PO dosages between 125 -1000 mgs/Kg soil but declined in soils treated with rates $\geq$ 1125 mgs. Weights of fresh roots and shoots were increased by all PO rates but the highest; the sharpest increase for the two variables was observed in response to the lowest PO dosage. In other greenhouse trials application of a 5% aqueous PO solution to a soil infested with crabgrass [*Digitaria sanguinalis*], yellow nutsedge [*Cyperus esculentum*], Jimson weed [*Datura stramonium*] and a variety of other weed species resulted in 100% control of all weeds at rates >600-800 mgs a.i./Kg soil. Results from microplot experiments demonstrated that PO injected directly into soil to a depth of 36 cms [14 inches] and covered with polyethylene was effective in controlling yellow nutsedge and other weeds at rates of $\geq$ 12 mls/meter row [approx.$\geq$ 25-30 gal/A depending on bed or row width]; drenching soil with a 20% aqueous solution of PO to soil was 40 - 50 % less effective than direct injection of the chemical for control of weeds in the microplots.