PREEMERGENCE WEED CONTROL IN ONION WITH PENDIMETHALIN, FLUMIOXAZIN, ETHOFUMESATE, DIMETHENAMID-P, S-METOLACHLOR, ACETOCHLOR, AND PROPACHLOR.

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The majority of Michigan onion production occurs on muck soils, and onions are direct-seeded in April and harvested in September. The long growing season and poor competitive ability of onion require season-long weed control efforts, including several preemergence and postemergence herbicide applications and potential handweeding. Several preemergence herbicides have been labeled for use in onion recently, including flumioxazin, ethofumesate, dimethenamid-p, and s-metolachlor. A new, water-soluble formulation of pendimethalin increases crop safety. Two unlabeled chloroacetamides, acetochlor and propachlor, have potential to provide good weed suppression.

Field experiments were conducted in 2008 and 2009 to evaluate the weed control efficacy and crop tolerance of these preemergence herbicides on muck soils. Plots were treated sequentially, and the first application (PRE) was made to bare soil after seeding but prior to onion emergence. The second and third applications were made at the 2 leaf stage (LS) and 4-5 LS, respectively. All plots were rated for weed control efficacy and crop injury 30 days after treatment. Application of pendimethalin ACS at 2.2 or 4.4 kg/ha caused no injury in 2008 or 2009 at any application timing. In 2009, the higher rate of pendimethalin ACS increased early-season control of ladysthumb from 53 to 83% and redroot pigweed from 55 to 85%, when compared to the lower rate. Flumioxazin applied PRE at 0.036 kg/ha caused no injury or yield reduction in 2008 or 2009. Applying flumioxazin at 0.036 or 0.072 kg/ha to onions at the 2 LS did not result in significant crop injury and provided excellent burndown activity on many of the broadleaf weed species present in 2008 and 2009. Applying flumioxazin in a tank mix with labeled rates of pendimethalin EC, dimethenamid-p, or s-metolachlor resulted in serious stunting, stand thinning, and 48-63% yield reduction in 2008 and 56-78% yield reduction in 2009.

PRE application of dimethenamid-p at 1.10 kg/ha caused 18-30% injury in 2008 and 28-35% injury and stunting in 2009. PRE application of acetochlor at 1.12 kg/ha caused 23-35% injury in 2008 and 25-35% injury in 2009. Sequential application of acetochlor resulted in stunting and 20% yield reduction in 2008. PRE application of s-metolachlor at 1.46 kg/ha caused 20-28% injury and stunting in 2009. In 2008, sequential application of s-metolachlor caused stunting and 22% yield reduction. Acetochlor, dimethenamid-p and s-metolachlor gave 65-93% yellow nutsedge control in 2008 and 68-75% control in 2009 and were the only herbicides that provided adequate control of yellow nutsedge. Propachlor at 4.5 kg/ha produced no onion injury or yield reduction in 2008 or 2009 and provided moderate to good control of most weed species. Ethofumesate at 1.12 kg/ha resulted in no onion injury but did not provide sufficient control of the weed species present.

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