HERBICIDE ALTERNATIVES TO METHYL-BROMIDE IN CONIFER SEEDLING PRODUCTION

D.A. Little*, M.W. Marshall, B.H. Zandstra[1] and R.J. Richardson[2], [1]Michigan State University, East Lansing, MI 48823, [2]North Carolina State University, Raleigh, NC 27695.

Approximately 15 percent of the United States Christmas trees come from the state of Michigan. An estimated 1400 growers manage about 52,650 hectares of Christmas trees. The annual Michigan wholesale value is about $60 million. Due to an increase in competition, growers now concentrate on producing higher quality trees. Methyl-bromide has been an important pest management tool for growers in their conifer seedling beds, were quality development is important. With the removal of methyl-bromide and the ongoing fear of the removal of the triazine herbicides, growers are looking for effective ways of weed control.

Field studies were established from 2004 to 2006, to evaluate the weed control and phytotoxicity of different herbicides or herbicide combinations. The conifer seedlings used were *Picea pungens, Abies fraseri, Abies balsamea, Pinus strobes,* and *Pseudotsuga menziesii*. Weeds evaluated include, but are not limited to *Chenopodium album, Ambrosia artemissiifolia, Amaranthus* spp., *Digitaria sanguinalis,* and *Mollugo verticillata.*

In 2004, a field was established in southwest Michigan near Benton Harbor. The study consisted of 11 treatments including methyl-bromide and an untreated. Two year-old seedling *Abies fraseri* and *Pinus strobes* were planted. Visual ratings of tree injury were made for four months after herbicide treatments, weed control was made for two months, and tree heights were measured two months after treatments. In 2005, herbicide treatments were reapplied and ratings were made for four months after treatment, methyl-bromide was not reapplied.

In 2005, another field was established adjacent to the 2004 field. The study consisted of 12 treatments including methyl-bromide and an untreated control. The study consisted of 12 treatments including methyl-bromide and an untreated control. Ratings were made for months after treatment. Treatments, including methyl-bromide, were reapplied in 2006, along with the addition of two treatments. One treatment used in 2005 was excluded in 2006 because of poor weed control. A destructive harvest was performed in 2006 to measure above ground dry biomass.

A third field was established in 2006, near Lansing in central Michigan. The study consisted of 15 treatments including methyl-bromide, the fumigant Telone C-35 which was tarped for 10 days after application, and an untreated control.

Ratings of crop injury and weed control were made for three months after the herbicide treatments. Measurements of crop height were made after three months.

Treatments containing oxyfluorfen(1.12 kg ai/ha) yielded similar weed control results as methyl-bromide, with minimal crop injury. Adding metolachlor(1.68 kg ai/ha) to oxyfluorfen provided greater than 75% weed control of all weed species rated in 2004 and 2005. Though not currently labeled for conifers, the herbicide mesotrione(0.28 kg ai/ha) provided greater than 75% weed control of all weed species rated in 2004 and 2005 and crop injury is minimal in the *Abies* spp.. Data for 2006 is currently unavailable. In its first year, the Telone C-35(327 L/ha) tarped treatment showed potential.