HERBICIDE EFFICACY OF METHAM AND METHYL IODIDE APPLIED THROUGH IRRIGATION SYSTEMS IN GEORGIA.

Clyde C. Dowler*, Harold R. Sumner, and A. W. Johnson

Preliminary experiments were initiated in 1996 and continued in 1997 to determine the efficacy of metham and methyl iodide on several weed species common to the southeastern U.S. that cause significant losses to several horticultural crops. Since metham is labeled for application through irrigation systems, and the facilities, equipment, and technology at this location were available, we decided to emphasize irrigation application technology through sprinkler and drip irrigation systems to measure herbicide efficacy of metham and methyl iodide as compared to methyl bromide. Herbicide activity of metham was measured through both sprinkler and drip irrigation but the physical properties of methyl iodide and methyl bromide limited their application to drip irrigation systems only.

In initial experiments, metham was applied at 25, 35, and 59 gal/A. Sprinkler irrigation rates were 0.3, 0.4, and 0.6 inches of water. Drip emitter rates were 2 or 4 gal/hr with and without clear plastic mulch. In later experiments, metham application was limited to 35 gal/A and 0.4 inches of water through sprinkler irrigation or 0.24 to 0.6 gal/hr drip emitter rates. Other variables include black and infrared transmitting (IRT) plastic mulch cover Methyl bromide and methyl iodide were applied at 150,250, and 435 lbs/A in initial experiments as broadcast application or application through drip irrigation. In later experiments, methyl iodide and methyl bromide were applied at 150 lbs/A under black or IRT plastic mulch with drip tubing emitters ranging from 0.24 to 0.6 gal/hr. AB experiments were conducted on a Lee-field or Tifton loamy sand soil.

Yellow or purple nutsedge was present in all experiments. Depending on time of year, other weeds included Texas panicum, crabgrass, Florida beggarweed, Florida pusley, Palmer amaranth, smallflower morningglory, henbit, cutleaf evening primrose, cudweed, toadflax, chickweed, annual bluegrass, and wild radish. Nutsedge is the most troublesome weed in horticultural crops. Crops included in these experiments were pepper, cucumber, cantaloupe, tomato, spinach, onion, and eggplant.

Metham, applied through sprinkler irrigation temporarily suppressed but did not control yellow and purple nutsedge. This suppression lasted about 10 days. Control of all other weed species generally ranged between 80 and 100**%.** Covering the metham-treated areas after application with a plastic mulch increased herbicidal activity on all weeds to 90% or more control. Metham applied through drip irrigation systems with a plastic mulch cover controlled all weed species and also controlled 80 to 90% of the yellow. and purple nutsedge present in an 18 inch band over the drip tube. The amount of water applied through sprinkler irrigation or the flow rate through drip irrigation emitters did not affect metham activity.

In preliminary experiments, methyl iodide and methyl bromide applied at 250 and 435 lbs/A controlled yellow and purple nutsedge, Florida beggarweed, Palmer amaranth, Florida pusley, smallflower morningglory, Texas panicum, and crabgrass. In a follow up experiment, methyl bromide applied through drip irrigation tubing was as effective as applying a broadcast treatment. Methyl iodide was slightly less effective when applied through drip tubing than as a broadcast treatment. In another experiment in which methyl bromide and methyl iodide was applied through 0.36 and 0.6 gal/hr drip tubing emitters under both black and IRT plastic mulch indicated no difference in activity through different drip tubing emitters, but that IRT plastic mulch resulted in more nutsedge suppression than black plastic mulch. Methyl bromide and methyl iodide did not improve weed control. when compared to the non-treated black and IRT plastic mulch.

Another experiment compared the removal of black plastic mulch seven days after application of metham, methyl iodide, and methyl bromide through drip irrigation versus black plastic mulch remaining. Methyl iodide and methyl bromide did not control purple nutsedge. Metham controlled purple nutsedge in an 18 inch band down the drip irrigation tubing. Crops were not affected in these experiments.

Experiments in 1996 and 1997 indicate that metham applied through drip and/or sprinkler irrigation may be a viable alternative to methyl bromide for weed control in horticultural crop production in the southeastern United States. With the exception of nutsedge species, metham controlled a broad spectrum of annual weeds commonly found in horticultural crops. Using other cultural practices, such as stale seedbed techniques to control yellow nutsedge in combination with metham applied through sprinkler irrigation may be utilized on many more horticultural crops than is now being treated with methyl bromide. These results also indicate that metham can be effectively used in drip irrigation and plastic mulch culture for many crops. Methyl iodide appears to be almost as effective as methyl bromide on a broad spectrum of weeds, but economic and environmental impact factors will have to be clarified. Application of methyl bromide or methyl iodide through drip irrigation systems may be feasible and can eliminate some field operations, but more research is necessary on types of drip tubing and vaporization techniques required for methyl iodide and methyl bromide.