EFFECTIVE RATE OF PROPYLENE OXIDE FOR NUTSEDGE CONTROL

James P. Gilreath*, Bielinski M. Santos and Joseph W. Noling
University of Florida

Propylene oxide has been included in numerous field trials in tomato and strawberry as part of the USDA, IR-4 Methyl Bromide Alternatives Program over the past several years, as well as investigated by other scientists not associated with the IR-4 program. Results have been erratic and have led some to conclude that propylene oxide is not efficacious under field conditions; however, observations made at the ends of experimental rows suggest that perhaps the rate being investigated was insufficient. Previously rates were based generally on estimates of the required amount and limited field data.

As a result, a study was conducted to determine the required rate for efficacy with propylene oxide under field conditions. The target pests were yellow and purple nutsedge (*Cyperus esculentus* and *C. rotundus*), chosen for their resistance to control by most soil fumigants. Propylene oxide was applied at rates of 0, 20, 40, 60, 80 and 100 gallons per treated acre (187, 374, 561, 748 and 935 liters/ha) through 3 chisels per bed under standard low density polyethylene film. Beds were 0.7 m wide by 20 cm tall and were spaced 1.5 m apart on centers. Two experiments were conducted: one in late fall 2003 and the other in spring 2004. Test crops were early spring cucumbers in the first trial and tomatoes in the spring experiment. Nutsedge control was determined by enumerating the number of nutsedge plants which emerged through the mulch film at selected intervals. Soilborne disease incidence as well as populations of various pathogenic nematodes nematodes were determined as well.

Results indicate that the effective rate of propylene oxide for nutsedge control in these experiments occurred between 80 and 100 gallons / acre (748 and 935 L/ha). These rates of propylene oxide were sufficient to control most nematodes and other soilborne pests and produced the highest yields of cucumber and tomato fruit.