COMBINATIONS OF METAM SODIUM AND PROPYLENE OXIDE FOR WEED CONTROL

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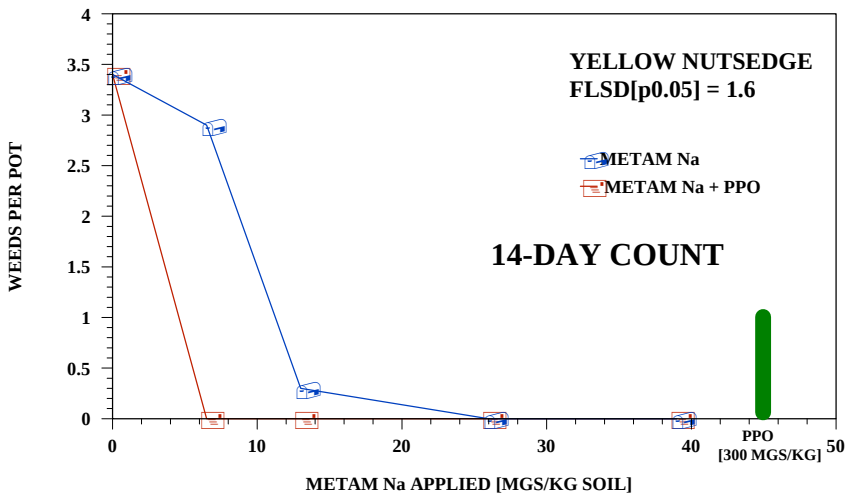
The herbicidal properties of combinations of propylene oxide [PPO] and metam-sodium [MS] were studied in greenhouse experiments with a sandy loam soil [pH 6.5; org. matter <1%; C.E.C.< 10 meq./100 gms soil] from a cotton field. The soil was infested with a variety of weed species principal among which were: crabgrass [*Digitaria sanguinalis*] and other gramineae, pigweed [*Amaranthus* spp.], morning glories [*Ipomea* spp.], sicklepod [*Cassia tora*], and yellow nutsedge [*Cyperus esculentus*]. PPO and MS were delivered as a drench in water equivalent to 1" acre. MS was applied using the Vapam HL^{R} formulation at rates of: 6.4, 13.1, 26.2, and 39.2 mgs a.i./Kg soil. These rates were applied with MS alone and in combination with PPO [Propazone^{R}] at 300 mgs a.i./Kg soil. PPO was also applied alone at rates of 100, 200, 300, and 400 mgs a.i./Kg soil. The experiment included no treatment controls. Each treatment was represented by 7 replications [pots] in a randomized complete block design. Each pots contained 1 kg soil. The pots with soil were covered with transparent polyethylene bags [1 mil] immediately after treatment. The bags were removed after eight days and the number of weeds were counted at weekly intervals for 3 weeks. Combination treatments resulted in superior control of all weed species compared with PPO or MS alone as shown in Fig. 1 for yellow nutsedge. PPO was ineffective against yellow nutsedge at rates < 300 mgs. [Fig. 2]; satisfactory control of all weeds required rates $\geq$ 300 mgs. In a second experiment with identical procedures MS was applied at the same rates but the rate of PPO for the combination treatments was reduced to 80 mgs/Kg soil. The combination of MS + PPO again was superior to treatments with MS alone; this difference was particularly pronounced for the 13.1 and 26.6 rates [Fig. 3]. PPO applied alone at rates of 40, 80, 120, and 160 mgs/Kg soil was again ineffective against yellow nutsedge [Fig. 4] although it reduced numbers of the other weed species significantly at rates >80 mgs [Fig. 5]. Results indicate strong synergy for herbicidal activities between the two compounds.



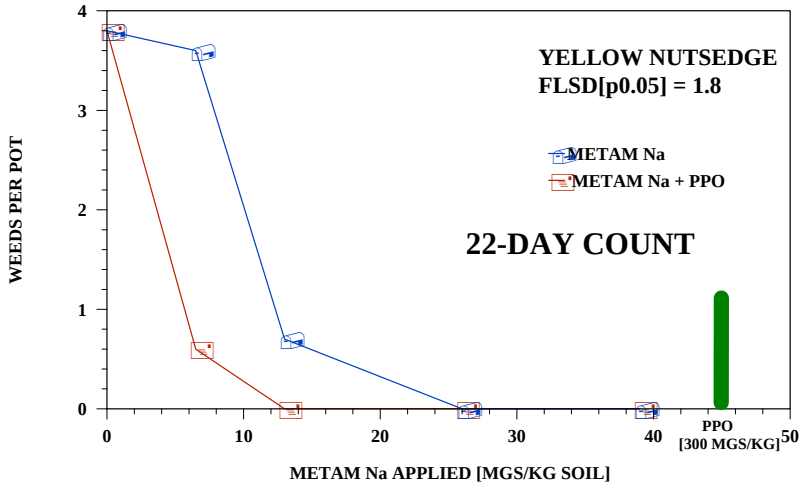
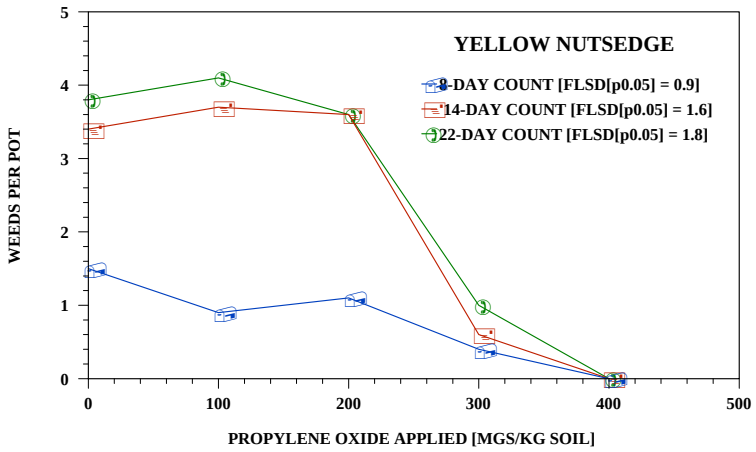


Figure 1. Effect of metam Na [Vapam HL^{R}] applied by drenching alone and in combination with propylene oxide [PPO] on the incidence of yellow nutsedge [*Cyperus esculentus*] in a first greenhouse experiment 14 and 22 days after delivery into soil in 1" acre of water.



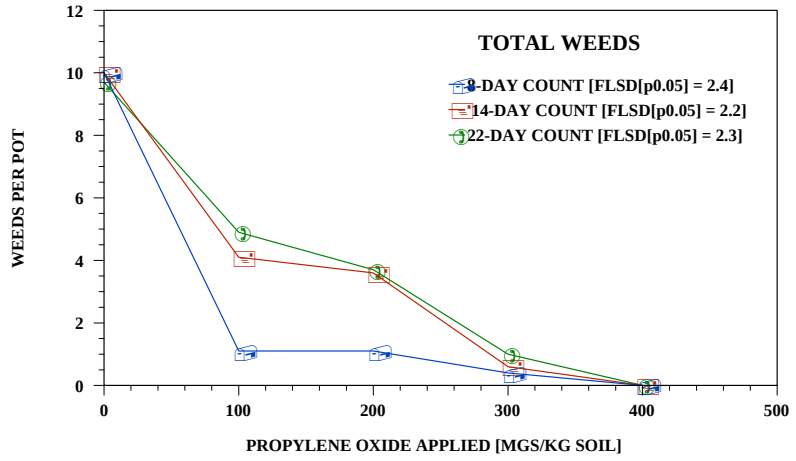


Figure 2. Relation between numbers of yellow nutsedge and other weeds and dosage of propylene oxide applied by drenching in 1" acre of water in a first greenhouse experiment.

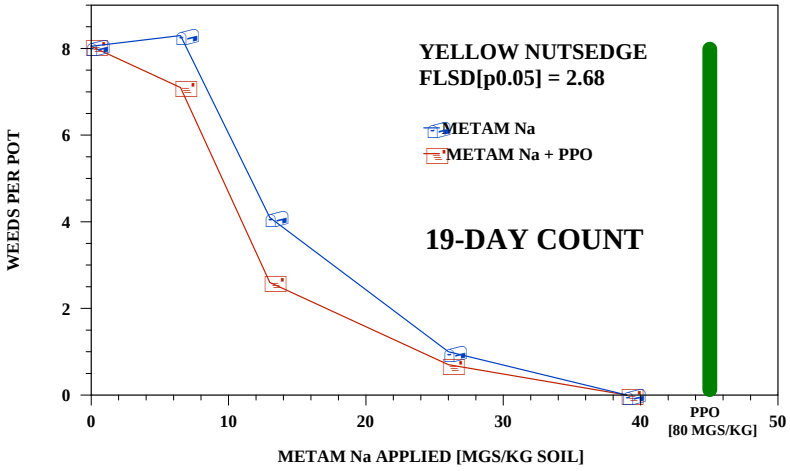


Figure 3. Effect of metam Na applied by drenching alone and in combination with propylene oxide [PPO] on the incidence of yellow nutsedge [*Cyperus esculentus*] in a second greenhouse experiment 19 days after delivery into soil in 1" acre of water.

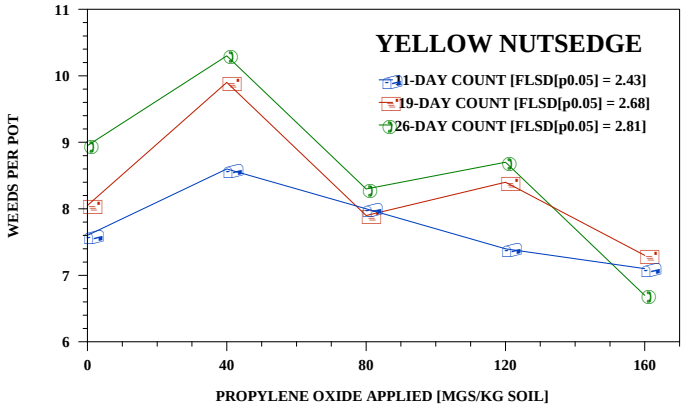


Figure 4. Relation between numbers of yellow nutsedge and dosage of propylene oxide applied by drenching in 1" acre of water in a second greenhouse experiment.

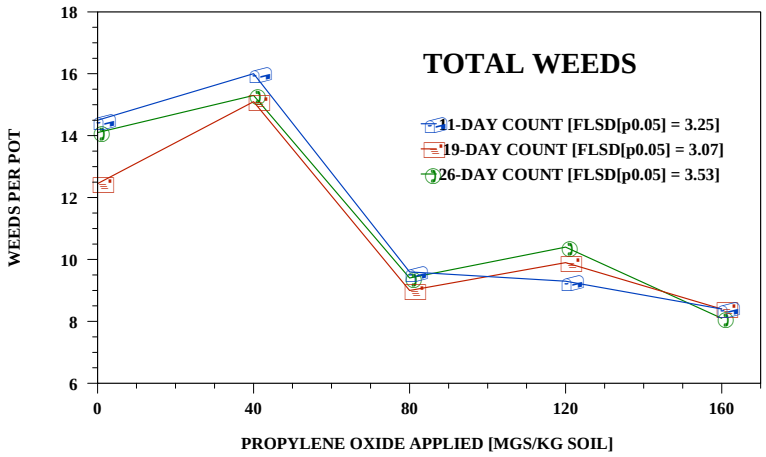


Figure 5. Relation between total number of weeds and dosage of propylene oxide applied by drenching in 1" acre of water in a second greenhouse experiment.