EFFECT OF ETHANEDINITRILE ON NUTSEDGE SPECIES WHEN DRIP-APPLIED

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Introduction

The commercial production of high-value vegetable crops throughout the United States and in other countries relies upon the use of pre-plant soil fumigants. Due to the ban on methyl bromide, the incidence and severity of many pests, such as plant pathogens, parasitic nematodes, and weed species has increased, resulting in decreased yields. Examination of several soil fumigants has resulted, with few comparable options. The efficacy of ethanedinitrile (EDN) against purple (*Cyperus rotundus*) and yellow (*C. esculentus*) nutsedge species when drip-applied in an open-field plasticulture field setting was examined in these experiments.

Materials and Methods

An experiment was initiated in the fall of 2017 and spring of 2018 at the North Florida Research and Education Center (NFREC) in Quincy, Florida to evaluate the efficacy of EDN on nutsedge species when applied via drip tape. Treatments consisted of 300, 400, and 500 lb/ac EDN, 250 lb/ac of a 39:60 mixture of 1,3-dichloropropene and chloropicrin (Pic- 60), 40 gallons/ac of a 79:21 mixture of dimethyl disulfide and chloropicrin (DMDS:Pic), and a non-treated control. Beds were 8 inches tall, 30 inches wide, and covered with totally impermeable film (TIF). All treatments were injected through a 5/8”, 8 mil thick drip tape buried one inch below the bed surface. EDN was applied using a static mixer which distributes EDN bubbles within the water. Both experiments were set up as randomized complete blocks with four replications. Muskmelon were transplanted in the center of each experimental plot. Fruit were harvested, counted, and weighed at appropriate intervals. Nutsedge shoots that punctured the plastic in the planting area were counted at 30, 60, and 90 days after fumigation (DAF).

Results

The 2017 experiment resulted in EDN applied at 500 lb/ac at 30 DAF was the only EDN treatment that controlled nutsedge species significantly better than the non-treated control. At this time, 300 and 400 lb/ac EDN were not

significantly different from 500 lb/ac EDN, they also were not significantly different from the non-treated control. The standard Pic-60 treatment was not significantly different than the non-treated control at all dates. At 60 DAF, none of the treatments were significantly different than the non-treated control. Pic-60 was the only treatment with significantly higher nutsedge density than DMDS:Pic. By 90 DAF, 500 lb/ac EDN and DMDS:Pic performed significantly better than Pic-60, however, they were not different than the non-treated control. Yield data resulted in significantly greater yield for DMDS:Pic compared to all other treatments. 400 and 500 lb/a EDN yield was similar to DMDS:Pic, but were not different than the non-treated control. All other treatments exhibited yield significantly lower than DMDS:Pic.

Data from the 2018 experiment resulted in all EDN treatments controlling nutsedge significantly better than the non-treated control at all dates. Pic-60 did not perform better than the non-treated control at any date during this experiment with respect to nutsedge control. At 30 DAF, DMDS:Pic did not control nutsedge better than the non-treated control, but was similar to 300 and 400 lb/a EDN. By 60 and 90 DAT, DMDS:Pic performed better than the non-treated control, but not as well as the EDN treatments. Yield data for this experiment revealed no significant differences between any of the treatments.

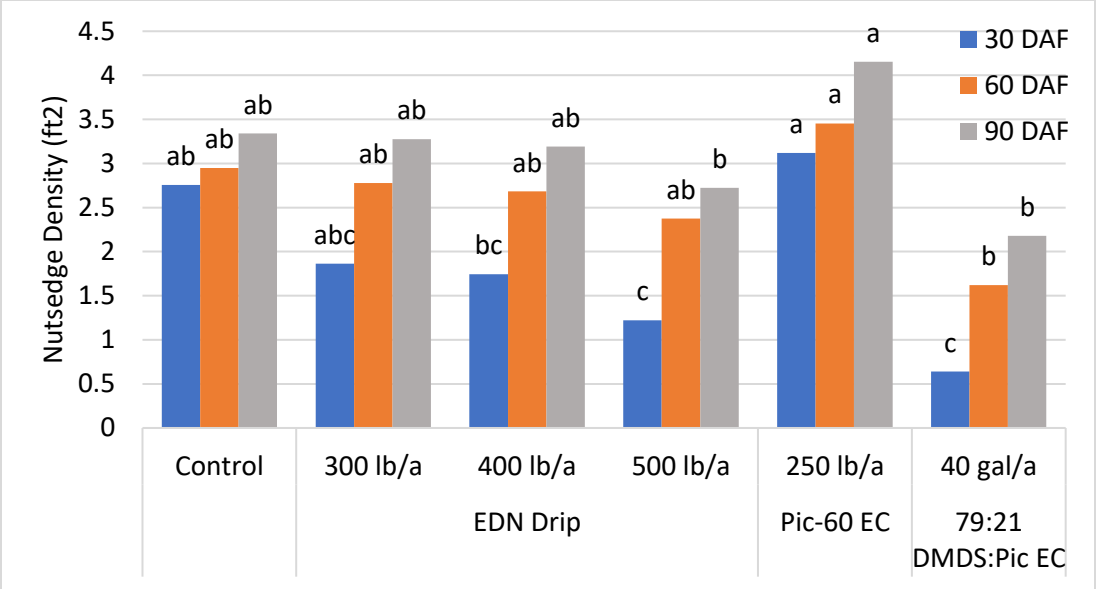

Figure 1. Control of nutsedge species by EDN, Pic-60, and DMDS:Pic when drip-applied at NFREC in fall 2017. Means followed by the same letter are not significantly different at P<0.05. Means are compared within the same day.

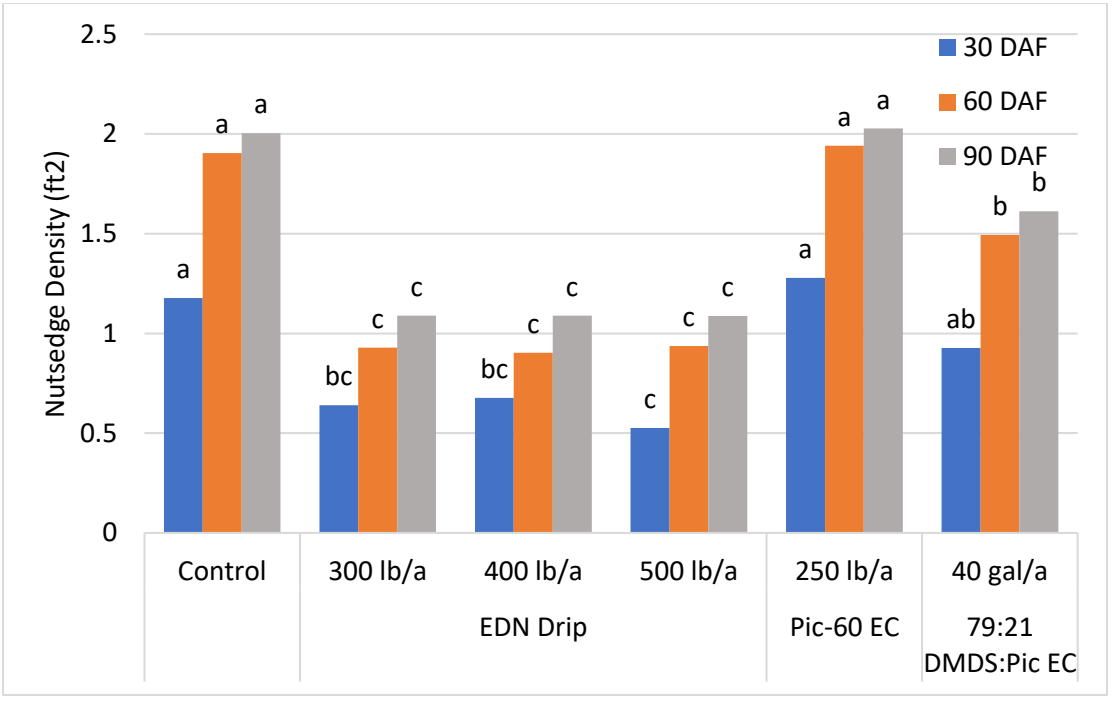

Figure 2. Control of nutsedge species by EDN, Pic-60, and DMDS:Pic when drip-applied at NFREC in spring 2018. Means followed by the same letter are not significantly different at P<0.05. Means are compared within the same day.