RETENTION OF 1,3-DICHLOROPROPENE AND NUTSEDGE CONTROL WITH VIRTUALLY IMPERMEABLE FILM

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Field studies were conducted to determine the effect of virtually impermeable film (VIF) and "high barrier" (ldpe) mulches on retention of two formulations of 1,3-dichloropropene + chloropicrin (Telone C-35 and Inline) and their impact on nutsedge control. Efforts also were made to determine the distribution of 1,3-D vapors in the soil air over time as influenced by delivery method (chisel vs. drip tube) and mulch film type.

Twenty-eight inch - wide, 8 inch - tall beds were formed in the field using standard bedding equipment. Telone C-35 was applied to the bottom of the bed through two chisels which were spaced 12 inches apart. Inline was delivered 1 to 1.5 inches below the bed top through two drip irrigation lines spaced 12 inches apart. Telone C-35 and Inline were applied at 26 gal/acre (242 L/ha). Inline was delivered in 1 acre-inch (2.5 cm/ha) of water. Soil air samples were collected from the bed center and bed shoulder daily for 6 days following application and the quantity of 1,3-D in the soil air was determined for each location. Nutsedge populations were quantified to determine any treatment effects. A water soluble dye was injected with the Inline and the location of it relative to the location of nutsedge plants was determined.

Initial concentration of 1,3-D was higher following application of Inline than Telone C-35, but declined faster, regardless of mulch type. The concentration of 1,3-D was higher under VIF than "high barrier" mulch at each location in the bed and it was retained much longer. Significantly more 1,3-D was detected in the bed center than in the shoulder and 1,3-D was detected beyond the wetting front. Nutsedge control was not affected by mulch type but was superior with Telone C-35.

A second experiment was conducted with 5 VIF mulches and one "high barrier" film to determine differences in handling properties, 1,3-D retention and control of purple nutsedge (*Cyperus rotundus*). The VIF mulches consisted of Klerk's Hytibar and 4 Bromostop films manufactured by IPM and the "high barrier" film was made by Pliant. Inline was applied under each mulch through 2 tubes per bed at concentrations of 0, 400, 600, 800, 1000, and 1200 ppm in an acre-inch of water. The concentration of 1,3-D in the soil was measured each day for 4 days following application. The resultant population of nutsedge was determined 10, 45, and 80 days after application. Observations on physical handling properties

also were made.

The two white on black and the black Bromostop films from IPM were capable of being laid at ground speeds equal to the Pliant "high barrier" film (4 mph), while the Klerk's Hytibar and the green Bromostop became difficult to lay at speeds above approximately 3 mph and had a tendency for linear shear along the area of the "cup" or "tuck" where the soil covers the edge of the mulch film. The most retentive film was Klerk's Hytibar, but the green and black Bromostop films were very similar in retention. The two white on black Bromostop films were less retentive of 1,3-D. All of the VIF products were more retentive than the Pliant "high barrier" film.

A reasonable level of nutsedge control was achieved with concentrations of 600 ppm or higher when observed 10 days after application and VIF provided improved control at that time with the relative degree of control similar to the ranking of films for 1,3-D retention. While still providing some level of control at 45 days after application, the difference among concentrations was not as great. Klerk's Hytibar and the green and black Bromostop films from IPM were still the most efficacious at this time, but the two white films were no longer any more effective than Pliant 'high barrier" film for nutsedge control when averaged over concentrations. By 80 days after application, there was little difference in nutsedge control with any concentration of Inline and there was no difference among the film types.

- Initial concentration of 1,3-D was higher with Inline than Telone C-35, but declined faster, regardless of mulch type.
- VIF retained more 1,3-D and retained it longer than ldpe film.
- The concentration of 1,3-D from Inline was higher in the bed center than on the bed edge, but there was 1,3-D beyond the wetting front, indicating movement as a gas from the zone of deposition.
- Nutsedge control was better with Telone C-35 than with Inline at the same rates.
- Differences existed among VIF products with Klerk's Hytibar being the most retentive but it did not have the best handling properties.
- IPM's Bromostop white on black film had good handling properties but was not as retentive as Hytibar.
- Nutsedge control varied among films and concentrations of 1,3-D.