

COTORAN WASH-OFF FROM COVER CROP RESIDUES AND DEGRADATION IN GIGGER SOIL

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INTERPRETIVE SUMMARY

Cover crop residues on the soil surface of no-till operations will intercept a portion of spray-applied herbicides. Therefore, the effectiveness of the herbicide will depend, in part, on rainfall to wash the herbicide from the residue and onto the soil. How fast a herbicide is degraded in the soil may also depend on tillage, as well as cropping system. Ideally, a herbicide will persist long enough to be effective against target weeds but not carry-over into subsequent growing seasons. This research examined the wash-off of Cotoran (fluometuron) from native winter annuals, vetch, and wheat cover crop residue. At most, only about half of the fluometuron spray-applied to these materials was washed off by a series of three simulated 0.8-inch rainfalls. The most fluometuron was removed from the native vegetation mix. Relative amounts of fluometuron washed off were inversely related to increasing strength of adsorption of fluometuron to the different plant residues. Absolute amounts of fluometuron washed off could be predicted on the basis of how strongly the residue adsorbed fluometuron.

Both tillage (conventional- and no-) and type of cover crop (native vegetation, hairy vetch, and wheat) affected how rapidly fluometuron degraded in

a loess soil. Fluometuron in no-till surface soil was degraded more than twice as fast as in corresponding conventional-till soil. This result was consistent with greater microbial activity in the no-till soil. Long-term use of vetch cover crop slowed fluometuron degradation relative to either native vegetation or wheat. In no-till soil with native mix or wheat cover crop, no fluometuron could be recovered after a 60-day incubation period. In contrast, about 35% of the fluometuron applied to no-till vetch soil remained and about 50% of the fluometuron applied to the conventional-till vetch soil remained 60 days later.

Since native vegetation produced much less biomass than either vetch or wheat, wash-off would likely play a more minor role in the efficacy and environmental fate of fluometuron than is the case for vetch or wheat. Interception of fluometuron by vetch residue, coupled with its slow release by wash-off and slow degradation in the soil, may provide longer weed control. Any prolonged susceptibility to loss in runoff would be likely counterbalanced by the high sorptive capacity of vetch residue.

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