

RESEARCH PROJECT TITLE: The influence of polyacrylamide on the movement of soil-applied herbicides in furrow-irrigated dry bean (*Phaseolus vulgaris*)

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INTERIM OR FINAL REPORT: interim

PROJECT OBJECTIVES:

1. Determine the effect of polyacrylamide (PAM) on the transport of two herbicide classes represented by ethalfluralin and dimethenamid from the field in the irrigation outflow and eroded soil sediments, using furrow-irrigated dry bean as a model crop.
2. Determine the effect of PAM on the vertical and lateral movement of these herbicides in the soil.
3. Evaluate crop injury by visual assessment and measuring fresh weight of aboveground biomass of the crop.
4. Evaluate weed control efficacy by determining weed populations prior to the initial irrigation and 7 to 10 days after each subsequent irrigation.
5. Determine the effect of PAM on weed seed migration from the field in irrigation water.

KEY WORDS: herbicide movement, ethalfluralin, dimethenamid

STATEMENT OF PROBLEM:

Irrigated agriculture has been identified as a major non-point source of water pollution. Over 7,904,000 acres are irrigated in the PNW with about 43% surface irrigated. Return flows from eroded fields to surface water may include soil sediment, nutrients, and pesticides. From 12 to 124 tons of soil per acre can be lost each year from typical surface irrigated fields in the PNW.

Using polyacrylamide (PAM) in surface irrigation can reduce soil erosion from furrow irrigated fields by 94% and increase infiltration by 15%. However, little is known how PAM may influence the movement of soil-applied herbicides. If this technology is to develop to its full potential, it is necessary to understand the influence that it may have on the movement of soil-applied herbicides both within the field and from the field.

ZONE OF INTEREST: Irrigated agriculture in the PNW

ABSTRACT OF RESEARCH FINDINGS:

This project was initiated in May 2000 and data collection completed in 2001. Funding provided the salary of a graduate student and the cost of herbicide residue analysis of soil and water samples. Currently, the graduate student is writing the results of this study for his thesis and anticipates completion in December. All of the soil and water samples have been analyzed for herbicide residues and the data have been statistically analyzed. To date we have the following results to report. Weed seeds that were collected continuously from the irrigation run-off to determine total weed seed migration were influenced by PAM. Polyacrylamide-treated irrigation water reduced broadleaf weed seed migration 34% to 98%, depending on the species, compared to untreated irrigation water. Weed seed migration from ethalfluralin, dimethenamid-P, and

control herbicide treatments ranged from 34 to 99%, depending on weed species. In the ethalfluralin, dimethenamid-P, and control herbicide treatments, grass weed seed migration in irrigation run-off was reduced 26% to 99%, when PAM was present. More significantly polyacrylamide-treated irrigation water reduced ethalfluralin herbicide concentrations in run-off water compared to water without PAM. Dimethenamid-P herbicide concentrations in irrigation water do not appear to be reduced with the addition of PAM.

RESULTS AND INTERPRETATION:

We anticipate providing a full report of this research in early 2003.

INTERACTION (COOPERATION) WITH OTHER SCIENTISTS CONDUCTING RELATED ACTIVITY: We have worked with Dr. Pamela Hutchinson, University of Idaho and Dr. Bob Sojka, USDA-ARS in Kimberly, Idaho.

PUBLICATIONS AND PRESENTATIONS: none at this time.