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Weed Seed Distribution in Irrigation Water

Abstract

A study was conducted on established alfalfa to determine the effects of glyphosate and paraquat. Plots were established under dryland conditions at the Research and Extension Center at Archer, Wyoming to evaluate weed control and alfalfa response to glyphosate and paraquat. Herbicide treatments were applied by broadcasting on March 4 to dormant and 5 leaf alfalfa. No glyphosate or paraquat treatment reduced alfalfa stand. However, alfalfa injury was evident when both herbicides were applied at the 5 leaf stage. Alfalfa rapidly recovered from early season injury and by harvest injury was not evident. Weed control was better when applying at the five leaf stage rather than at the dormant stage. This is just one of the studies that Mr. Miller has performed on the effects of weed seed distribution in irrigation water.



Introduction

The following study is being conducted by Stephen D. Miller for the prevention of weed seed distribution in irrigation water. Water carried seed are a serious problem with irrigated crops. It is a nuisance to farmers and animals because it causes a crop loss and it can get into vacant feedlots. It can also be very costly to a new stand of alfalfa, for it can take over the field in a single year. The study of Stephen D. Miller that he is performing will help to solve these problems.

How Weed Seed gets into Irrigation Water

Dissemination of weeds within our region may be accomplished by water carried seeds. Some areas now being opened up for farming and irrigation, a rare opportunity exists for weed seed to grow. No weeds have grown in these areas because the land has lain undisturbed for many years. If the importation of weed seed can be stopped the battle against weeds will be won. Weeds usually get into irrigation water by growing

around or on irrigation ditch banks. They also can be wind blown into the ditches where they enter the irrigation water. Semiaquatic weeds are often found on the banks of drainage and irrigation ditches. These weeds that take position of ditch banks must be combated because they cause definite problems to farms. The ditch bank weeds interfere with canal maintenance and often fall into the water, obstructing flow. They also transpire tremendous quantities of water (Ahlgren, 1951, pp189). With the weeds falling in the ditch, this usually results in the quantity of water flowing out of the ditch becoming a lesser value. This results in the cost of cleaning the ditch out so that you can get back to the original flow. In addition to the semiaquatic weeds, weeds that are only on land are a problem. These land seeds are usually transported into the irrigation water by leaching or runoff of water. Such perennial weeds as hoary cress, bindweed, canada thistle, and russian knapweed, which require so much labor and expense to get rid of, are particularly important to eliminate from ditches (Ahlgren, 1951, pp189).



Prevention of Weed Seed Distribution

The water-carried seeds are an especially serious problem in irrigated crops. The most sustainable agricultural practice is the use of weed screens, but one should still be concerned with the escapees before they produce seed. Seeds of many species such as bindweed can live for five years once they are in water (Muzik, 1970, pp.43). Nurse crops continue to be the preferred method of weed control and seedling alfalfa. However, nurse crops slow the development of alfalfa and in many situation can be replaced by the use of herbicides thus permitting more rapid establishment. For example, two to three cuttings of alfalfa have been obtained at Torrington Wyoming the year of establishment without a nurse crop (Miller, 1995. pp.5). To prove this point the following is a result of Stephen D. Miller's studies of weed control in established alfalfa: Plots were established under dryland conditions at the Research and Extension Center in Archer, WY to evaluate weed control and alfalfa response to glyphosate and paraquat at two growth stages. Plots were 10 by 40 ft. with three replications arranged in a randomized complete block. Herbicide treatments were broadcast applied with a CO₂ pressurized knapsack sprayer delivering 10gpa at 40 psi on March 4 (air Temp 50F, relative humidity 20%, wind northwest at 12-14mph, sky cloudy and soil temp.-0 inch 50F, 2 inch 38F and 4 inch 36F) to dormant alfalfa (var. Ranger) and 0.5 to 1 inch weeds, or April 2, 1996 (air temp. 65F, relative humidity 24%, wind west at 5-7 mph, sky partly cloudy and soil temp.-0 inch 67F, 2 inch 57F and 4 inch 44F) to 5-leaf alfalfa and 1-2 inch weeds. Visual crop damage and weed control evaluations were made on April 16 and May 6 and plots were harvested on June 24 1996. Downy Brome and Tansymustard infestations were heavy (15-20 plants/yd²) and uniform throughout the site.

No glyphosate or paraquat treatment reduced alfalfa stand; however, alfalfa injury was evident when both herbicides were applied at the 5-leaf stage of alfalfa. Alfalfa injury was greater with glyphosate than paraquat regardless of formulation and tended to increase as rate increased. Alfalfa rapidly recovered from early season injury and by harvest, injury was not evident in any treatment. Weed control was better at the 5-leaf than dormant application timing in alfalfa with both paraquat and glyphosate. Further, weed control was similar with both glyphosate formulations and both were more effective than paraquat in controlling downy brome and tansymustard. Alfalfa yields were closely related to weed control but not early season injury and were 0.0 to 0.4 T/A higher with dormant and 0.6 to 0.8 T/A higher with 5-leaf herbicide applications compared to the weedy control.



Works Cited

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