MANAGEMENT OPTIONS FOR VOLUNTEER ESTABLISHED ANNUAL RYEGRASS SEED CROPS

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Introduction

Few studies have focused on the improvement of nonthermal cropping systems for annual ryegrass seed production and with reductions in open field burning allowances, other economic alternatives to managing low value crops such as annual ryegrass seed production are needed. Current alternatives to conventional plow-drill establishment include use of no-till establishment systems and reliance of seed lost in the harvesting operations to provide a volunteer seed established crop.

A major obstacle with volunteer established annual ryegrass seed crops is the very high plant density resulting from the typically several hundred pounds of seed from swathing and combining losses. The effect of these high density stands is a resultant decrease is seed yield due to plant competition. Previous studies determining the impact of high densities have been conducted by OSU personnel (see previous articles in the 1995-1997 editions of Seed Production Research).

Stand densities can be reduced by spraying out rows and leaving a portion of the stand unsprayed to form "rows." This method has been tried with some success using different herbicides such as Roundup, Gramoxone, or Diuron. These methods are effective at reducing the population and can improve yields over the straight volunteer stand but do not always result in seed yields as high as drilled stands. Growers also reduce plant density by grazing with sheep during the winter-spring period. This practice works well to reduce volunteer annual ryegrass stands and provide pasture for the livestock. The actual benefit is not well documented but growers report it has helped increase yields from volunteer stands. However, many of the volunteer established fields are not capable of being grazed so the option of spraying out a portion of the volunteer seedling to improve yield conditions could be a viable alternative.

This study is the second year of a 2-year experiment to measure the effects of both grazing and row spraying under actual field conditions to determine if row spraying is comparable to grazing and help increase seed yields in annual ryegrass.

Procedure

A volunteer annual ryegrass trial was located in a grower's field that would be grazed during the winter. An annual ryegrass seed crop had been drilled in the fall of 1998. This planting was harvested in 1999 and provided the volunteer seedling population for the 2000 crop. Plots were established in the field using electric fencing to exclude sheep grazing from selected plots. Individual plot size was 22 ft x 300 ft. The experiment was a split-plot design with grazing duration as the main plot and row spraying as the subplot. There were four main plot treatments: 1) grazing all season, 2) grazing during the first part of the season, 3) grazing during the later part of the season and 4) no grazing. Within each main plot half was row-sprayed and half was left unsprayed. These eight treatments were replicated three times in the field. The factors reported for the different grazing durations are the averages of both the sprayed and unsprayed sub-plots in each main grazed plot. The factors reported for the rowspray are the averages of all the grazing durations across each rowspray (or non sprayed) treatment. The total plot area is about five acres. Fencing was shifted once to change exclusion areas in order to control the duration for each graze treatment. A shielded row sprayer was used to spray out a nine inch wide band on twelve inch centers thus leaving three inch wide "rows." Plots were row-sprayed January 28 using Roundup Ultra at 2 qt/a applied at 50 gal/acre coverage. Sheep were moved into the field March 1 and grazed until Mid-April. Fences were shifted March 28 to expose the late grazing plots and exclude the early grazing plots. On April 15 the sheep and fences were removed. The field was fertilized by the grower April 16 with 250 lb/a 32-0-11-5 and two weeks later with 12.5 gal/acre of Solution 32.

Plots were sampled for yield components at early bloom. Swathing and combining were done by the grower on June 29 and July 14 respectively. Each plot was combined and augered into a weigh wagon to measure yields. Subsamples were then taken for cleanout and seed weight measurements.

Results

In contrast to last year, seed yield was not affected by grazing or row spraying (Table 1). The total grazing period this year was much shorter (6 weeks vs 15 weeks in 1999) and therefore not as much of the winter growth was removed. Fertile tiller density was decreased and harvest index was increased by the row spraying ($P=0.10$), but these were not enough to make a difference in seed yield. Also, 1000 seed weight tended to be greater in the non-row sprayed treatment. The overall health and appearance of the 2000 stand was not as vigorous and fast growing as the 1999 trial. The volunteer stand did not fully fill-in the field and provide a large quantity of winter growth. The effectiveness of using grazing or row-spray methods of stand thinning need to be used when the volunteer crop is dense enough to warrant these practices for reducing plant populations to a level that is beneficial for increasing seed yield.

Table 1. Seed yield and harvest components of annual ryegrass under graze and row spray treatments, 2000.

Main factors	Seed yield	1000 seed weight	Above-ground biomass	Harvest index	Fertile tillers
	(lb/a)	(g)	(tn/a)	(%)	(no/sq ft)
Grazing duration					
None	1756	2.74	4.2	21	185
Early	1621	2.70	4.4	19	157
Late	1737	2.68	4.7	19	173
Full season	1773	2.72	4.6	20	225
Row-spray					
None	1689	2.75 a*	4.7	18 b	204 (a)[1]
Spray	1754	2.67 b	4.2	22 a	165 (b)

*Means in columns followed by the same letter are not significantly different by Fisher's protected LSD values P=0.05.
[1] P value <0.10