SUPPRESSING THE GROWTH OF ANNUAL BLUEGRASS

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Annual bluegrass (*Poa annua L.*) is a serious weed problem facing grass seed growers in the Willamette Valley. This weed has developed resistance to two widely used herbicides, diuron and ethofumesate. Due to the ineffectiveness of herbicides and reductions in field burning, other methods to control annual bluegrass need to be investigated. The purpose of this research was to investigate the ability of straw mulches to prevent the germination of this important weed.

Methods

A greenhouse study was conducted to determine the effect of straw length and application rate on the germination and growth of annual bluegrass. Twenty-eight trays were packed with a mixture of river loam and transplanting soil. Annual bluegrass seed, provided by Steve Glaser Farm, was applied to each tray at a rate of 200 pounds per acre. This rate was representative of a grass seed field with a high infestation. The seeds were evenly dispersed onto the trays filled with the soil mixture, and kept moist near 50 degree F.

Tall fescue grass straw was cut into two lengths: short length pieces ranging from 1-3 inches, and long length pieces ranging from 5-7 inches. Straw was then applied at a rate of two tons per acre to eight trays. Four of these trays were treated with short length straw, the other four with long length straw. This procedure was repeated for straw application rates of four and eight tons per acre. A group of four control trays that were not treated with straw were also included.

Two different methods were used to measure the effects of the straw mulch on the growth of annual bluegrass. The first method was to count the germinated seeds in each tray seven days after planting, to determine the initial effect on germination. The second method was to measure percent groundcover of annual bluegrass after germination and growth was underway. To do this, a clear grid was held over each tray and the areas of grass growth were outlined with an erasable pen. Measurements of groundcover were made every five days following the initial germination count. Final data was collected on the twenty-seventh day after planting. By that time the growth and germination of grass seed had tapered off and the control trays had reached nearly one hundred percent coverage.

Results

Both the rate of straw used and its length had a significant effect on the germination of annual bluegrass (table 1). The first seeds to germinate appeared five days after planting. Straw applied at all rates, except for short straw at 2 tons/acre, reduced germination. Long straw was more effective in suppressing initial germination than short straw.

Table 1. The effect of straw length and rate of application on the germination and groundcover of annual bluegrass, 1998.

Straw mulch treatments		Initial germination	Days from planting			
Rate	Length	day 7	12	17	22	27
(ton/a)		(no./ft^2)	-------- (% groundcover) --------			
0	0	141 a[1]	56 a	90 a	96 a	98 a
2	short	155 a	42 b	86 a	91 b	93 b
2	long	46 b	36 b	75 b	90 b	92 b
4	short	29 bc	27 c	73 b	80 c	81 c
4	long	21 bcd	7 d	16 c	28 d	29 d
8	short	7 cd	5 d	15 c	20 e	20 e
8	long	0 d	0.5 d	3 d	6 f	6 f

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

The rate and length of straw application also affected annual bluegrass groundcover. Similar to the effect on initial germination counts, long length straw suppressed subsequent groundcover more than short straw. In contrast to the initial germination counts though, this difference was only significant at the higher rates of straw application (4-8 tons/acre). For example, straw applied at a rate of two tons per acre resulted in very little weed suppression, regardless of straw length. Both lengths provided some initial suppression, but by the end of the study, there was nearly as much growth at this lowest application rate as there was in the control trays.

Overall, rate of application had a greater effect on suppressing the growth of annual bluegrass than length of straw. Straw applied at a rate of eight tons per acre was the most effective treatment. It is important to note, however, that eight tons per acre is an extremely large application rate. Most fields do not have this much straw remaining after harvest. Rates of two and four tons per acre are more realistic in terms of actual straw production in Willamette Valley grass seed fields.

Currently, many grass seed farmers have the straw baled off their fields after grass seed harvest. The remaining stubble is then flail chopped and either left on the field or

vacuumed off. This study indicates that the short length mulch left after flailing stubble is not an effective weed deterrent. If a farmer is experiencing a significant problem with annual bluegrass, it could be more effective to leave the straw on the field rather than having it baled and removed. Furthermore, long length straw could suppress annual bluegrass germination more effectively than finely chopped straw. This needs to be verified under field conditions, where the effect of crop competition and herbicide applications can be taken into account. Similarly, the suppression of annual bluegrass at lower straw rates (2 tons/acre) in a commercial grass seed field could be greater than observed in this study due to management practices that contribute to weed control.