

THE INFLUENCE OF MEADOWFOAM SEEDING RATE, SEEDING METHOD, AND PRESENCE OF ANNUAL BLUEGRASS ON MEADOWFOAM SEED YIELD AND ANNUAL BLUEGRASS GROWTH

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Meadowfoam is one of the few crops that can be grown on the poorly drained soils of the mid and southern Willamette Valley. These soils have largely been in grass seed production for several decades. This continuous cropping system, with a reliance on a limited number of herbicides for weed control, has caused the development of herbicide resistant annual bluegrass (*Poa annua* L.) in many of these fields. In some cases the annual bluegrass populations have become very dense and a large number of bluegrass seeds are produced each year. As a rotation crop, meadowfoam may have to compete with this weed if control measures are not successful. Research was conducted for four years (1994-95 through 1997-98) at the Oregon State University Hyslop Research Farm near Corvallis to investigate the interaction of meadowfoam and annual bluegrass. In the first two years of these studies, hand-weeding and applications of Stinger herbicide were used to control broadleaf weeds, and Prism was used to control grasses in the bluegrass-free plots. During the final two years of these studies, the soil was fumigated with methyl bromide prior to seeding to reduce weed interference from non-subject weeds. Infestations of *Scaptomyza* sp. fly larvae during the first 2 years of the studies greatly reduced meadowfoam growth despite an application of Metasystox-R in the 1995-96 trial. Sequential applications of Dimethoate and Metasystox R greatly reduced the fly problem in the third year, and an even more aggressive insecticide application schedule implemented in the fourth year eliminated the problem.

The experimental design was a randomized complete block with four replications and 8 ft by 30 ft plots. Annual bluegrass seed was broadcast over half of the plots prior to seeding the meadowfoam. >Floral= meadowfoam was drilled in 6-inch rows in half of the plots and was broadcast in the other half; the application of both seeding methods was accomplished with a Nordsten drill. A harrow was pulled behind the drill in both seeding methods. Four meadowfoam seeding rates (15, 30, 45, and 60 lb/a) were used in each of the four studies. The seeding dates were as follows: October 6, 1994; October 5, 1995; October 10, 1996; and September 29, 1997. The fertilizer program consisted of 40 to 50 lb/a of nitrogen applied as urea in February each year. Annual bluegrass stand counts in November for the bluegrass-infested plots were as follows:

1994, 15 per sq ft; 1995, 74 per sq ft; 1996, 32 per sq ft; and 1997, 40 per sq ft.

Meadowfoam seed yields were significantly greater in broadcast-seeded plots than in drill-seeded plots in 1995 and 1997 (Table 1). The reason for this greater seed yield is not clear since there were more meadowfoam plants established in the drill seeding in 1995, while there were more in the broadcast seeding in 1997 (data not shown). In both years the seed weight was greater in the broadcast seeding. Annual bluegrass had no negative effect on meadowfoam seed yield, and in 1996 and 1997, annual bluegrass infested meadowfoam significantly out-yielded annual bluegrass free meadowfoam (Table 2).

Table 1. Meadowfoam seed yield as influenced by seeding method in four consecutive years.

Seeding method	Seed yield ¹			
	1995	1996	1997	1998
	----- (lb/a) -----			
Drill	324	188	711	754
Broadcast	400	201	902	791
LSD 0.05	38	NS	53	NS

¹Values are means of 16 annual bluegrass infested plus 16 weed-free plots.

Table 2. Meadowfoam seed yield as influenced by the presence of annual bluegrass in four consecutive years.

Annual bluegrass	Seed yield ¹			
	1995	1996	1997	1998
	----- (lb/a) -----			
Present	363	265	958	780
Absent	361	125	655	765
LSD 0.05	NS	62	53	NS

¹Values are means of 16 drill-seeded plus 16 broadcast-seeded plots.

Other research that we have recently completed shows that populations of annual bluegrass as dense as 800 plants per square foot have little effect on meadowfoam seed yield. This may be partially due to the low nitrogen requirement of meadowfoam, which may make it fairly tolerant of competition for nitrogen from the bluegrass. Higher meadowfoam seeding rates resulted in higher seed yields in 1995 and 1997 (Table 3). The cost of the seed seems to be the

only negative factor in considering higher seeding rates. When looking within the four seeding rates in each year (Table 4), the broadcast seeding with annual bluegrass present had the highest average seed yield in 12 of the 16 observations, although most of these yields were not statistically greater than the three other yields in each observation.

Table 3. Effect of seeding rate on meadowfoam seed yield in four consecutive years.

Seeding rate	Seed yield ¹			
	1995	1996	1997	1998
	----- (lb/a) -----			
15	286	183	580	796
30	367	201	787	755
45	388	192	923	776
60	408	203	936	761
LSD 0.05	54	NS	76	NS

¹Values are means of 8 drill-seeded plus 8 broadcast-seeded plots.

There was no clear advantage of one seeding method over the other in suppressing annual bluegrass dry weight (Table 5). In only one year (1997) was there a statistically significant difference, with broadcast seeding suppressing the bluegrass to the greater degree.

Table 5. Annual bluegrass dry weight in drill-seeded and broadcast-seeded meadowfoam in 4 consecutive years.

Seeding method	Dry weight ¹			
	1995	1996	1997	1998
	----- (g/sq ft) -----			
Drill	2.9	3.6	3.5	4.8
Broadcast	4.0	3.2	2.6	5.9
LSD 0.05	NS	NS	0.9	NS

¹Values are means of 16 annual bluegrass-infested and 16 bluegrass-free plots.

Meadowfoam seeding rate had a definite suppressing effect on annual bluegrass growth (Table 6). Growers concerned with preventing annual bluegrass seed production could consider higher seeding rates of meadowfoam as part of their control program, but annual bluegrass control seems unnecessary for meadowfoam seed production.

Table 6. Annual bluegrass dry weight as influenced by meadowfoam seeding rate in 4 consecutive years.

Seeding method	Dry weight ¹			
	1995	1996	1997	1998
	----- (g/sq ft) -----			
15	4.9	5.6	4.3	9.1
30	4.7	2.4	3.0	5.4
45	3.1	3.1	2.8	4.2
60	1.0	2.5	1.8	2.7
LSD 0.05	2.0	1.6	1.2	2.1

¹Values are means of 8 bluegrass-infested and 8 bluegrass-free plots.

Table 4. Meadowfoam seed yield as influenced by seeding method, seeding rate, and presence of annual bluegrass in 4 consecutive years.

Seeding method	Seeding rate	Annual bluegrass	Meadowfoam seed yield			
			1995	1996	1997	1998
			----- (lb/a) -----			
Drilled	15	P ¹	242 a ²	217 b-e	753 de	791
Drilled	15	A	278 ab	136 abc	251 a	711
Broadcast	15	P	322 a-d	302 e	882 ef	891
Broadcast	15	A	302 abc	78 a	433 b	794
Drilled	30	P	353 b-f	299 e	866 ef	722
Drilled	30	A	290 abc	109 a	530 bc	763
Broadcast	30	P	415 d-g	264 de	1001 fg	786
Broadcast	30	A	412 d-g	132 ab	752 de	750
Drilled	45	P	344 a-e	262 de	967 f	722
Drilled	45	A	359 b-g	136 abc	657 cd	784
Broadcast	45	P	391 c-g	239 cde	1132 g	803
Broadcast	45	A	458 fg	133 abc	936 f	797
Drilled	60	P	374 b-g	247 de	929 f	786
Drilled	60	A	354 b-f	101 a	738 de	755
Broadcast	60	P	466 g	289 e	1138 g	741
Broadcast	60	A	436 efg	174 a-d	941 f	764

¹P = present, A = absent

²Mean separation according to Duncan's Multiple Range Test, means within a column followed by the same letter or group of letters are not different at P = 0.05.

