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Phillip W. Stahlman

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Competition and Control of Annual Bromes in Winter Wheat

Phillip W. Stahlman
Weed Control Research Agronomist
Fort Hays Branch Station

Downy brome (*Bromus tectorum*), Japanese brome (*B. japonicus*), and cheat (*B. secalinus*) are winter annual grass weeds, which are referred to collectively as cheat or cheatgrass. The increase and spread of these weeds have been rapid in recent years, in response to favorable conditions created by conservation tillage practices and semi-dwarf wheat varieties. Increased use of commercial fertilizers and selective, highly effective herbicides for broadleaved weeds in wheat also favors annual bromes.

Cheat is most common in the continuous wheat region of Kansas, whereas downy brome predominates in the drier western part of the state. Japanese brome grows throughout Kansas, but becomes less abundant as soil moisture supply decreases.

Most germination of annual bromes coincides with the seeding of winter wheat in the fall, when soil moisture is adequate. Additional seeds often germinate after fall rains and in early spring, so to be effective, soil-applied herbicides must remain active for several weeks and postemergent herbicides should be effective over a range of growth stages.

AGRICULTURAL EXPERIMENT STATION
Kansas State University, Manhattan
Walter R. Woods, Director

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Competition

Studies at the Fort Hays Branch Experiment Station near Hays indicated that downy brome and cheat were highly competitive, when they emerged 1 to 7 days after wheat emerged in late September or early October. Crop losses increased linearly as downy brome and cheat density increased from low (20-25/yd²) to moderate (85-100/yd²) levels; yield losses for moderate densities of both species averaged 36 percent (Table 1). Downy brome competition was less severe when wheat and weed establishment was delayed until early November in 1984; however, competition from cheat remained severe (Table 2). The competitiveness of both species was reduced when the weeds emerged 3 to 4 weeks after wheat emerged in late September, 1985 (Table 3).

Control

Metribuzin (Sencor and Lexone) is labeled for use in Kansas, Oklahoma, and Texas as a postemergent treatment to control annual bromes and other weeds in winter wheat. However, because of marginal crop safety, metribuzin should be applied only to certain tolerant varieties after they have three or more tillers and

Table 1. Percent crop loss from downy brome and cheat that emerged 1 to 7 days after wheat emerged in late September or early October, Fort Hays Experiment Station, Hays, KS.

	% Crop Loss		
Year	20-25 weeds/yd²	40-50 weeds/yd²	85-100 weeds/yd²
	Downy brome		
1983-84	17	21	45
1985-86	1	10	26
Mean	9	15	36
	Cheat		
1983-84	6	19	35
1985-86	16	22	38
Mean	11	20	36

Table 2. Percent crop loss from downy brome and cheat that emerged 1 to 7 days after wheat emerged in early November, 1984, Fort Hays Experiment Station, Hays, KS.

	% Crop Loss			
Species	20-25 weeds/yd²	45-50 weeds/yd²	85-100 weeds/yd²	180-190 weeds/yd²
Downy brome	0	5	1	11
Cheat	3	30	35	51

Table 3. Percent crop loss from downy brome and cheat that emerged 21 to 28 days after wheat emerged in late September, 1985, Fort Hays Experiment Station, Hays, KS.

	% Crop Loss			
Species	20-25 weeds/yd²	45-50 weeds/yd²	85-100 weeds/yd²	180-190 weeds/yd²
Downy brome	1	2	5	4
Cheat	9	16	16	14

Table 4. Control of downy brome in winter wheat with metribuzin (Sencor or Lexone) applied postemergence at 0.375 and 0.50 lb ai/acre, Fort Hays Experiment Station, Hays, KS.

Time of Application	Years Tested	Control, %	
		Avg.	Range
Fall	4	73	58 to 96
Spring	7	42	23 to 100

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secondary roots 2 inches or longer. Metribuzin is most effective when applied to actively growing weeds in the fall, but wheat in western Kansas often is not sufficiently well developed to withstand fall-applied metribuzin before weeds go dormant. At Hays, postemergent applications of metribuzin in the fall (when possible) have given fair to good control of downy brome, but control with spring applications has been poor in most years (Table 4).

Diclofop (Hoelon), which was labeled in 1986 for control of downy brome, applied preplant and incorporated at 0.75 lb ai/acre, has given good control of downy brome at Hays (Table 5), but has been less effective on cheat and Japanese brome (data not shown), for which it is not labeled. The granular formulation of triallate (Granular Far-go) at 1.5 lb ai/acre was also labeled in 1986 for control of annual bromes as a preplant or preemergent treatment that does not require mechanical incorporation; however, rainfall is required to activate granular triallate not incorproated mechanically. Liquid-formulated triallate applied preplant at 1.0 lb ai/acre and incorporated has given good control of downy brome at Hays (Table 5). Granular triallate applied preplant at 1.5 lb ai/acre controlled 90 percent of downy brome on a 15-acre plot at Hays in 1985-86.

Table 5. Control of downy brome in winter wheat with preplant and incorporated applications of diclofop (Hoelon) and triallate (Far-go), Fort Hays Experiment Station, Hays, KS.

Herbicide and Rate	Years Tested	Control, %	
		Avg.	Range
Diclofop 0.75 lb ai/A	6	84	64 to 99
Triallate 1.00 lb ai/A	4	85	60 to 96

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Recommendations

Yearly infestations of annual bromes often vary depending on the time and amount of fall rains. When possible, wheat seeding should be delayed until after one or two flushes of emerging bromes following August and September rains have been killed with tillage or non-selective herbicides (Roundup, Landmaster, or Paraquat).

Because diclofop and triallate must be applied before the severity of the brome infestation is known, apply these herbicides only to fields having a history of annual brome presence. Herbicide application to the outer 100 to 200 ft of other fields will slow the migration of annual bromes into fields from road ditches.

Annual bromes that emerge soon after wheat has been seeded should be sprayed with metribuzin in the fall, only after wheat has developed several tillers and has well-developed secondary roots. If metribuzin application must be delayed until spring, apply as early as possible, but only after weeds have resumed growth and when rainfall is predicted. Application of metribuzin to varieties other than those listed on the herbicide labels may result in crop injury.

NOTE: Trade names are used to identify herbicides. No endorsement is intended, nor is any criticism implied of similar products not mentioned.

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Agricultural Experiment Station, Manhattan 66506

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