

Studies on Wheat Varietal Suppression of Wild Oats [*Avena ludoviciana* (Dur.) Nym.]

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Wild oats [*Avena ludoviciana* (Dur.) Nym.] is a common serious weed in wheat crop. Its certain feature is similar in morphology requirements. Early shedding of seeds and dormancy of the seeds make this weed much competitive with wheat and menace to successful wheat cultivation. Wild oats at 600 kg dry matter production ha⁻¹ caused 6.7% loss in the grain yield of wheat under Haryana conditions (Bhan *et al.*, 1984). The canopy spread of wheat variety decides the competition between two species. The early canopy spread (cover) and plant height are the important determinants of competitiveness of wheat variety. Competing with wild oats for various inputs, wheat also suppresses the growth and development and grain yield of wild oats. Therefore, the present investigation was undertaken to study and assess the impact of different wheat varieties on wild oats and also of wild oats on the growth and development of wheat under field conditions.

A field experiment was conducted to study the effect of wild oats competition on the growth and yield of wheat varieties (having different canopy spread) and also the effect of wheat varieties on the

growth and seed yield of wild oats at the Crop Research Centre of G. B. Pant University of Agriculture & Technology, Pantnagar, Uttaranchal. The soil of experimental field was clay loam in texture, medium in organic matter (0.7%), potassium (228 kg ha⁻¹) and high in available phosphorus (29.9 kg ha⁻¹) content. The treatment consisted of three wheat varieties viz., PBW 343 (less spreading or droopy canopy), UP 2382 and UP 2425 (medium to high spreading) with wild oats and as pure stand. The wheat and wild oats were sown at 100 and 80 kg ha⁻¹, respectively. That wheat was sown at 20 cm row to row spacing and one row of wild oats was sown in between two rows of wheat. The experiment with six treatments (Table 1) and three replications was laid out in randomized block design. After 15 days of wheat and wild oats emergence, plots were kept weed-free from other weeds manually. Recommended package of practices was adopted to raise the experimental crop.

Effect on Wheat

Plant height of wheat varieties was not affected

Table 1. Plant height (cm) and dry matter (g m⁻²) of wheat varieties as affected by wild oats competition at various growth stages

Treatment	Plant height (cm)			Plant dry weight (g m ⁻²)		
	30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS
PBW 343+wild oats	26.9	40.9	85.0	86.2	331.2	1287
UP 2382+wild oats	32.8	56.3	97.0	87.0	417.3	1378
UP 2425+wild oats	33.9	60.7	91.7	87.7	463.0	1331
PBW 343	26.4	41.2	90.7	91.8	401.9	1915
UP 2382	34.5	58.3	103.0	93.3	466.9	1648
UP 2425	35.6	62.3	93.0	99.3	592.8	1501
LSD (P=0.05)	2.6	8.2	2.7	NS	97.9	333

DAS=Days after sowing.

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Table 2. Grain yield, straw yield and yield attributes of wheat varieties as affected by wild oats competition

Treatment	Grain yield (kg ha ⁻¹)	Straw yield (kg ha ⁻¹)	No. of spikes m ⁻²
PBW 343+wild oats	3018	92922	288
UP 2382+wild oats	3803	10117	330
UP 2425+wild oats	3282	9500	328
PBW 343	4168	9990	458
UP 2382	3922	11467	500
UP 2425	4393	11946	587
LSD (P=0.05)	239	1635	169

significantly due to presence of wild oats. In general, PBW 343 was observed to have shorter plant height than UP 2382 and UP 2425 at all the growth stages (Table 1). At 90 days stage, maximum reduction in the plant height (6%) was observed in PBW 343 due to wild oats. Dry weight of all the wheat varieties was not affected due to wild oats competition at 30 days stage but at 60 and 90 days stages, wild oats significantly reduced the dry matter production of PBW 343. In general, UP 2382 and UP 2425 produced dry matter at par with each other at 90 days stage but PBW 343 produced more dry weight in absence of wild oats (Table 1) at the same stage.

Wheat variety UP 2382 produced more grain than other two varieties when grown with wild oats. Significantly, lowest grain yield was recorded in PBW 343 when grown with wild oats. Lowest reduction in the grain yield was observed in UP 2382 due to wild oats competition. UP 2425 yielded more than UP 2382 when grown without oats but the difference in the grain yield of these two varieties was non-significant due to wild oats (Table 2).

Straw yield of UP 2425 was more than that of other varieties. No difference in the straw yield was recorded in UP 2382 and UP 2425 when grown with oats. PBW 343 produced significantly less straw

than other two varieties due to wild oats competition (Table 2). Number of spikes m⁻² at harvest was counted more in UP 2425 than other two varieties when grown without oats. All the varieties had similar number of spikes per unit area in presence of wild oats (Table 2). In general, varieties had more spikes without wild oats than that grown with oats. Number of grains per spike was more in UP 2382 than in UP 2425 but at par with PBW 343 when grown without oats but no difference in this parameter was observed when varieties were grown with wild oats. On an average, UP 2382 had more number of grains per spike than other varieties.

Effect on Wild Oats

Dry matter production of wild oats growing with PBW 343 was higher at all the growth stages as compared to that of with UP 2382 and UP 2425. At 30 and 60 days stages, there was no much variation in dry weight of wild oats grown with UP 2382 and UP 2425. However, at 90 days stage, dry matter of wild oats was much less than when grown with UP 2382 as compared with other two varieties. Similarly, grain production of wild oats was also affected by the varieties. UP 2382 was more effective in reducing the grain of the oats as compared with UP 2425 and

Table 3. Wild oats dry weight (g m⁻²) at various growth stages and grain yield as affected by wheat varieties

Treatment	Stages (DAS)			Grain yield (kg ha ⁻¹) 30 DAS
	30	60	90	
PBW 343+wild oats	12.5	68.0	861	184
UP 2382+wild oats	10.6	63.3	577	127
UP 2425+wild oats	10.0	61.0	720	165
LSD (P=0.05)	NS	NS	168.8	12

DAS-Days after sowing, NS-Not Significant.

PBW 343 (Table 3).

PBW 343 is a short stature and less spreading variety, whereas UP 2382 and UP 2425 are of tall growing nature and having erect canopy. So, the light interception and photosynthesis were least affected in case of UP 2382 and UP 2425 varieties as they grow erect, thus, they were less affected by the wild oats competition. Paul and Gill (1979) also reported that tall growing wheat genotypes had

considerable effect on the growth and development of *Phalaris minor*.

REFERENCES

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