

Studies on the Threshold Values of *Avena ludoviciana* and *Rumex spinosus* in Wheat

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Under non-rice-wheat rotations, *Avena ludoviciana* Dur. (Wild oats) and other broad leaf weeds particularly, *Rumex spinosus* are the dominating weeds and these weeds compete with the crop for various inputs and they need to be controlled effectively when their intensity exceeds the critical limits. A decrease in wheat grain yield by 1.0% for every wild oats (*Avena fatua*) plant per square metre was reported by Wilson *et al.* (1990). The study was conducted to find out the threshold values of *A. ludoviciana* and *R. spinosus*.

The trial was conducted on the experimental area of the Department of Agronomy and Agrometeorology, Punjab Agricultural University, Ludhiana during **rabi** seasons of 2002-03 and 2003-04. The experimental field was loamy sand in texture

(non-paddy rotation) which was having higher population of both *A. ludoviciana* and *R. spinosus*. Sowing of wheat with variety PBW 343 was done on November 12, 2002 and November 14, 2003 at row spacing of 22.5 cm. A plot of one square metre (0.9 m x 1.1 m) was marked before applying first irrigation to the wheat crop. The intensity of wild oats plants was 0, 1, 2, 3, 4, 5, 10, 15, 20, 30, 40, 50, 60, 70, 80 and 100 plants m⁻². The population of *R. spinosus* was 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25 and 30 plants m⁻¹. These population levels were maintained after applying first irrigation to wheat crop i. e. about 30 days after sowing. Recounting was also done 15 days after maintaining the variable population levels and desirable population was ensured by uprooting the second flush of weeds. A

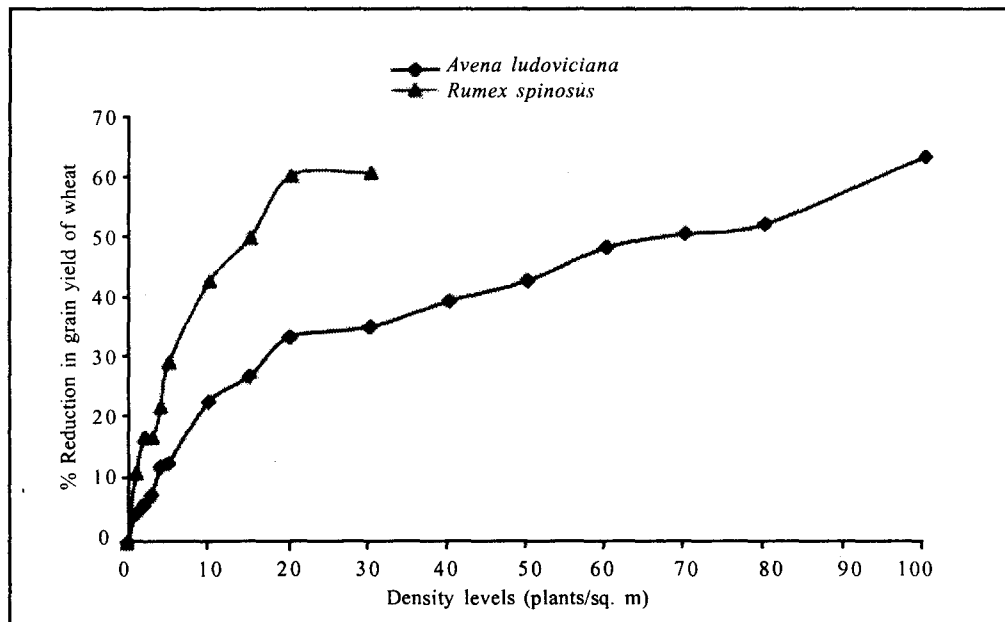


Fig. 1. Per cent reduction in wheat yield due to *A. ludoviciana* and *R. spinosus* infestations.

general spray of metsulfurom-methyl at 5 g a. i. ha⁻¹ was made in wild oats intensity trial in order to control broad leaf weeds. In *R. spinosus* intensity trial, a blanket spray of clodinafop at 60 g ha⁻¹ was done to control wild oats.

Competition by *Avena ludoviciana*

Dry matter of wild oats increased with increase in its density. Crop plant height showed a decreasing trend with the successive increase in the intensity of wild oats.

Wheat grain yield during both the years was decreased with the increase in intensity of wild oats from 0-100. During 2002-03, the differences in grain yield of wheat raised without wild oats infestations and with the association of 1, 2, 3 and 4 plants m⁻² of wild oats were found to be non-significant and all other intensity treatments produced significantly less grain yield as compared to weed-free treatment. During second year, the differences in grain yield upto three plants of wild oats m⁻² produced grain yields at par with weed-free crop. Thus, threshold level of wild oats in wheat grown under light textured soil was 3-4 plants m⁻² and beyond this a significant reduction in grain yield was observed.

The mean reduction of 13.0, 23.2, 27.3, 33.8, 43.1 and 63.6 % in grain yield was recorded with 5, 10, 15, 20, 50 and 100 plants of wild oats m⁻² as compared to weed-free crop, respectively (Fig. 1). Similarly, Walia *et al.* (2001) reported that wheat yield decreased exponentially with the increase in wild oats intensity from 1 to 10, 15, 20, 25 and 30 plants m⁻² with wheat yield loss between 1.06 to 15.0% upto three plants of wild oats m⁻² and reached upto 30-40% at 10 plants m⁻² and yield losses were nearly 50% at 30 wild oats

plants m⁻² over the control (weed-free) treatment.

Competition by *Rumex spinosus*

Only one plant m⁻² of *R. spinosus* produced 38.8 g ha⁻¹. The difference between one and two plants was non-significant. Dry matter accumulation by 2, 3 and 4 plants m⁻² was at par among themselves. The highest intensity (30 plants m⁻²) of this weed produced significantly higher dry matter than other intensity upto 20 plants m⁻².

Lowest crop plant height of 54.4 cm was recorded due to 30 *R. spinosus* plants m⁻² and it was significantly less than intensity upto 15 plants m⁻².

The grain yield of wheat was decreased with the successive increase in the intensity of *R. spinosus*. Highest grain yield of 5537 kg ha⁻¹ was recorded in weed-free treatment and it was significantly higher even than the crop competing with only one plant of *R. spinosus* m⁻² indicating severity of competitiveness by this weed. The grain yield of wheat did not differ significantly due to 20, 25 and 30 plants of *R. spinosus* m⁻². The infestation of 1, 2, 5, 10, 20 and 30 plants m⁻² of *R. spinosus* resulted in decrease in grain yield of wheat by 11.4, 17.3, 29.7, 43.1, 60.3 and 60.8%, respectively, over weed-free crop (Fig. 1).

REFERENCES

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