Short Communication

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Weed dynamics in fodder oat (*Avena sativa* L.) genotypes

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Abstract

A trial was conducted at Jhansi during *rabi* of 2012-13 to study the weed dynamics in six oat genotypes for screening of strong competitive genotypes and major associated weed flora in oat. Amongst the six oat genotypes (JHO-822, JHO-851, JHO-99-1, JHO-99-2, JHO-2000-4 and Kent) used in study, JHO-99-2 was found strong competitor due to early vigorous growth, higher plant height and drooping leaf habit and recorded lowest weed population (97) and weed intensity (21%) and highest green fodder yield (33.18 t/ha). JHO-851 proved poor competitor and recorded highest weed population (248). *Melilotus alba, Rumex dentatus* and *Chenopodium album* were found major weeds associated with fodder oat. Therefore, JHO-99-2 can be recommended as a fodder variety in Bundelkhand region as it was found a strong crop-weed competitor and produced highest green fodder yield.

Keywords: Fodder oat, Oat genotypes, Weed dynamics

Oat is an important *rabi* fodder crop of India and often suffers heavy losses both in quality and quantity due to weed menace. Differences in competitive ability have been observed among both crop species (Pavlychenko and Harrington, 1934) and genotypes (Appleby *et al*., 1976 and Lemerle *et al*., 1996). Similarly, different oat varieties have their characteristic growth habits and phenology, which in turn, may affect the associated weed flora. Oat variety that is slow in initial growth may allow more weeds while varieties with fast initial growth may be strong competitor of weeds. Similarly, oat variety with profuse tillering and drooping leaf will also offer strong competition to weeds compared to low tillering and erect leaf varieties. Therefore, a trial was conducted to study weed dynamics in different popular fodder oat varieties. The primary hypothesis of this work was that oat genotypes possessing diverse morphological characteristics would differ in competitive ability versus weeds and use of such highly competitive genotypes could produce higher yield of quality forage.

Six fodder oat varieties, viz., JHO-822, JHO-851, JHO-99-1, JHO-99-2, JHO-2000-4 and Kent were sown in 40 m x 10 m plots at TD Block of farm during 25th October, 2012. This plot is continuously under cowpea ï oat rotation since last 10 years. The soil of the site was sandy loam with medium in available N (334 kg/ha) and P (19.2 kg/ha) and high in available K (143 kg/ha). All the varieties were dry sown at 30 cm row spacing and then provided irrigation. No weeding and intercultural operation was done and the other agronomic operations were remained same for all the varieties. The observations on weed and crop performance was recorded before first cut at 70 DAS (days after sowing). The total vegetation present in 1x1 m random quadrants was cut and separated species wise. The number of oat plants/m^2, height and fresh weight was recorded. Similarly, weed species were identified and counted separately and expressed as number of weeds/m^2. The fresh weight of each weed species was also recorded. Based on this data, fresh weight of crop and weeds /m^2 and /ha were worked out and expressed in g/m^2 and q/ha respectively. The data on weed intensity (WI) was calculated using, WI % = (Number of all weed species / total number of crop and weed) x 100 and Relative Density (RD) was calculated using RD % = (Density of a given weed species / total weed density) x 100 as suggested by Gupta (2011). Four random samples from each varietal block were taken and considered as replication and statistical analysis was done as simple Randomized Block Design.

Oat genotypes evaluated for growth and fresh fodder yield (Table 1) at first cutting (70 DAS) showed that plant height observed with JHO-99-2 (108.3 cm), JHO-2000-4 (107.8 cm) and JHO-99-1 (106 cm) were at par but significantly higher over other genotypes with lowest in JHO-851 (60.8 cm). However, JHO-851 produced significantly higher tillers/m^2 (535) over rest of the genotypes followed by JHO-99-1 (411) and Kent (389.3) with minimum in JHO-822. The green fodder yield (Table 1) was higher in JHO-99-2 (33.18 t/ha) and was closely followed by JHO-99-1 (33.02 t/ha) and significantly greater than all other genotypes.

Table 1. Oat genotype - weed growth and biomass scenario at 70 DAS

Oat genotype	Plant height (cm)	Tillers/m²	Crop fodder yield (t/ha)		Weed biomass (t/ha)	
			Green	Dry	Green	Dry
JHO-822	95.5	342.5	26.11	6.00	8.69	1.56
JHO-851	60.8	535.0	31.02	7.19	10.2	1.93
JHO-99-1	106.0	411.0	33.02	7.53	9.93	1.80
JHO-99-2	108.3	368.3	33.18	7.63	6.48	1.45
JHO-2000-4	107.8	373.0	32.17	7.59	8.67	1.55
Kent	97.3	389.3	29.27	6.99	6.39	1.43
SEm±	1.2	2.91	0.13	0.03	0.17	0.04
LSD at 5%	3.7	8.77	0.39	0.09	0.50	0.11

Table 2. Weed dynamics as influenced by oat genotypes (70 DAS)

Weed	JHO-822	JHO-851	JHO-99-1	JHO-99-2	JHO-2000-4	Kent
Total weed plants/m²	306	428	419	97	247	117
Relative dominance (%)						
Rumex dentatus	27.3	29.2	31.1	37.1	56.2	40.5
Melilotus alba	9.1	66.2	63.6	25.7	30.3	31.0
Chenopodium album	10.0	2.6	2.7	2.9	1.1	4.8
Others	53.6	1.9	2.6	34.3	12.4	23.8
Weed intensity (%)	47.1	44.4	50.5	21.0	39.9	23.1

Weed dynamics presented in Table 2 revealed that total number of weed/m² and weed intensity was higher in JHO-851, JHO-99-1 and JHO-822. Weed population and weed intensity was only 97 and 21 %, respectively in case of JHO-99-2 and it might be attributed to its early vigorous growth, highest plant height and drooping leaf habit, which as a result, suppressed weed flora (Table 1 and 2). While more weeds/m² and higher weed intensity in JHO-851 may be due to its slow initial growth, erect leaves and shortest height made it poor competitor. Weed fresh biomass was also highest in JHO-851 (10.2 t/ha). Froud Williams (1997) also reported that highly competitive genotypes often exhibit early vigorous growth, high tillering capacity, robust root system, increased height and the ability to intercept a large portion of available light. As far as major weed flora in oat is concerned, *Melilotus alba, Rumex dentatus* and *Chenopodium album* were found major weeds (Table 2). The other weeds observed in oat were *Coronopus intybus, Spergula arvensis* and *Anagalis arvensis.* The relative dominance of *Melilotus alba* was as high as 66.2 and 63.6 % in JHO-851 and JHO-99-1, respectively (Table 2). Similarly, relative dominance of *Rumex dentatus* was 56.2, 40.5, 37.1 and 31.1 % in JHO-2000-4, Kent, JHO-99-2 and JHO-99-1, respectively.

It can be concluded that JHO-99-2 was found a strong crop-weed competitor and produced highest green fodder yield, and *Melilotus alba, Rumex dentatus* and *Chenopodium album* were major weeds associated with fodder oat in Bundelkhand region of Uttar Pradesh.

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