



## Distribution of weed flora of greengram and blackgram in Haryana

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### ABSTRACT

To study the floristic composition of weeds in greengram, 50 fields were surveyed in Hisar, Sirsa, Bhiwani, Mahender Garh and Fatehbad districts of Haryana state during July-August, 2011 and 23 fields were surveyed for blackgram in Shiwalik foot hills region of Panchkula, Ambala and Yamuna Nagar districts of the state during August-September, 2012. Weed flora in greengram was more diverse as compared to blackgram. Twenty-two weed species (5 grassy, 3 sedges and 14 broad-leaved) belonging to 12 families were found dominant in greengram, whereas in blackgram only 11 weeds of 7 families were found to be very aggressive. Broad-leaved weed *Digera arvensis* (L.) of family *Amaranthaceae* was the most dominant and aggressive weed of both crops with a relative density and frequency of 511% and 86% in green gram whereas in blackgram it was 38% and 96%, respectively. *Dactyloctenium aegyptium* (L.) was the most dominant grassy weed with IVI values of 24.5 and 22.6 in greengram and blackgram, respectively. Important broad-leaved weeds found in greengram were: *Trianthema portulacastrum*, *Mollugo distachya*, *Cleome viscosa*, *Cucumis callosus*, *Corchorus tridens*, *Corchorus aestuans* and *Tribulus terrestris*, whereas in blackgram *Commelina benghalensis*, *Physalis minima*, *Solanum nigrum* and *Chorchorus olitorius*.

**Key words:** Blackgram, Distribution, Greengram, IVI, Relative density, Weed flora

Due to limited irrigation facilities, greengram is the important *Kharif* season crop of south-western part of Haryana, and blackgram in Shiwalik foot hills region of Panchkula, Ambala and Yamuna Nagar districts. Weeds have been reported to offer serious competition to crop and full season competition with the weeds cause yield reduction to the extent of 25-100% in these crops. Weed emergence in greengram and blackgram begins almost with the crop emergence leading to crop-weed competition from initial stages. Critical period of crop-weed competition in green gram and blackgram is 20-40 days after sowing (Saraswat and Mishra 1993). Horse purslane (*T. portulacastrum*), an annual broad-leaved weed germinates at the same time as greengram crop and completes its life cycle within 30 days (Balyan 1985). Grassy weeds *D. aegyptium* and *E. colona* germinate immediately after onset of rains. The magnitude of loss as a result of crop-weed competition depends upon type of weed species, associated with crop, their densities and duration of competition with crops. Crop type and soil properties have greatest influence on the occurrence of weed species. The type of irrigation, cropping pattern, weed control measures and environmental factors had a significant influence on the intensity and infestation of weeds. So, knowledge of weed species associated with crops in a region is therefore piv-

otal and necessary to plan and execute a sound and economical weed management schedule depending upon various factors affecting weed distribution in different areas. The present survey was the first attempt to document weed composition of blackgram and greengram crops in Haryana and to suggest their control measures.

### MATERIALS AND METHODS

To study the floristic composition of weeds in greengram, in all 50 fields in south-western region of the state situated at 28.26-29.95°N latitude and 74.66-76.15° E longitude characterized by loamy sand soil texture, with rain fall of 300-500 mm were surveyed in Hisar, Sirsa, Bhiwani, Mahender Garh and Fatehbad districts of during July-August, 2011. Greengram cultivation in this part is totally dependent upon rainfall. Another pulse crop, black gram grown in Shiwalik foot hills region of Panchkula, Ambala and Yamuna Nagar districts of state situated at 30.83-30.15°N latitude and 76.78-77.30° E longitude is characterized by sandy loam to silty soils, with rain fall of 900-1200 mm. Total 23 blackgram fields were surveyed in this region for recording weed distribution pattern during August-September, 2012. This period depicted most appropriate representation of majority of weed species as the weeds have cumulative effects of all agronomic practices, soil type, fertilizer and irrigation application and weed control measures adopted during initial crop growing pe-

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riod. The road map of Haryana state was followed and routes were planned to establish sampling localities as equidistantly as possible (about 10 km) avoiding inhabited areas. Four observations on density of individual weeds were recorded per field at one spot by using quadrat of (0.5 x 0.5 m), 100 m deep inside the fields. Pooled average values of observations of relative density, relative frequency and IVI of individual weeds were thus calculated as per method suggested by Raju (1977).

### RESULTS AND DISCUSSION

Twenty two weed species (5 grassy, 3 sedges and 14 broad-leaf) of 12 families were found to be dominant weed species in the phyto-sociological survey of weeds in greengram crop in Hisar, Sirsa, Bhiwani, Mahender Garh and Fatehabad districts of the state (Table 1). Broad-leaf weed *Digera arvensis* L. of family *Amaranthaceae* with a relative density of 50.7% and IVI value of 63.8 was the most dominant weed occurring at 86% of sites surveyed in all districts. Among grassy weeds *Dactyloctenium aegyptium* was most dominant grassy weed with relative density of 10.7% and IVI value of 24.46. Perennial sedges *Cyperus rotundus* L., *Cyperus compressus* and *Bulbostylis barbata* also showed infestation in greengram crop with

IVI values of 15.8, 3.0 and 2.9, respectively. *Trianthema portulacastrum* with RD of 6.3 plants/m<sup>2</sup> occurring at 24% sites with IVI value of 10.8 was the 4<sup>th</sup> most important weed of greengram accorded to be given preference for adopting control measures. Other important weeds of light textured soils found in low rainfall areas, viz. *Cenchrus echinatus*, *Mollugo distachya*, *Cucumis callosus*, *Corchorus tridens*, *Corchorus aestuans* and *Tribulus terrestris* were found to provide competition to greengram. Yellow coloured flowering creeper *C. callosus* L. of family *Cucurbitaceae* which has a depressive influence on crop growth under rainfed conditions by way of releasing toxins although with low density (0.96 plants/m<sup>2</sup>) also occurred at 34% locations surveyed in greengram. Similar weed flora of *Kharif* pulses has been documented in extensive surveys made under AICRP on Weed Control during 1978-1991 (AICRP-WC, 1978-84)

Eleven weed species (5 grassy, 1 sedge and 5 broad-leaved) belonging to 7 families were found to be dominant weed species in blackgram crop in Ambala, Panchkula and Yamuna Nagar districts of the state (Table 2). *Digera arvensis* with a relative density of 38.2% and IVI value of 86.7 was the most dominant weed occurring at 46% of

**Table 1. Weed flora of greengram in Haryana**

Weed species	Family	Density (no./m <sup>2</sup> )	RD (%)	Frequency (%)	R F (%)	IVI
<i>Grassy</i>						
<i>Dactyloctenium aegyptium</i> L. Beauv.	Gramineae poaceae	10.1	10.7	78	14.4	24.5
<i>Digitaria sanguinalis</i> L. Scop.	Gramineae poaceae	0.2	0.3	20	3.7	3.9
<i>Echinochloa colona</i> L.	Gramineae poaceae	0.2	0.2	6	1.1	1.3
<i>Brachiaria reptans</i> L. Lamk.	Gramineae poaceae	0.9	0.9	8	1.5	2.4
<i>Cenchrus echinatus</i> L.	Gramineae poaceae	0.7	0.7	8	1.5	2.0
<i>Sedges</i>						
<i>Cyperus rotundus</i> L.	Cyperaceae	7.8	8.1	60	8.0	15.8
<i>Bulbostylis barbata</i> L.	Cyperaceae	0.8	0.8	12	2.2	3.0
<i>Cyperus compressus</i> L.	Cyperaceae	0.8	0.8	12	2.2	3.0
<i>Broad-leaved</i>						
<i>Digera arvensis</i> L.	Amaranthaceae	47.9	50.7	86	15.9	63.8
<i>T. portulacastrum</i> L.	Aizoaceae	6.3	6.7	24	4.4	10.8
<i>Molluga distachya</i> L.	Mollugonaceae	4.9	5.1	26	4.8	9.7
<i>Giesekia pharnacoides</i> L.	Gisekiaceae	3.4	3.6	32	5.9	9.3
<i>Cleome viscosa</i> L.	Capparidaceae	2.2	2.4	26	4.8	7.1
<i>Cucumis callosus</i> L. Roxb.	Cucurbitaceae	1.0	1.0	34	6.3	7.3
<i>Tribulus terrestris</i> L.	Zygophyllaceae	0.7	0.8	32	5.9	6.7
<i>Corchorus aestuans</i> L.	Tiliaceae	1.7	1.8	24	4.4	6.1
<i>Corchorus tridens</i> L.	Tiliaceae	0.7	0.7	18	3.3	4.0
<i>Crotalaria medicaginea</i> L. Lamk.	Papilionaceae	2.9	3.0	12	2.2	5.1
<i>Corchorus olitorius</i> L.	Tiliaceae	0.2	0.2	6	1.1	1.3
<i>Amaranthus spinosus</i> L.	Amaranthaceae	0.8	0.9	6	1.1	2.0
<i>Convolvulus arvensis</i> L.	Convolvulaceae	0.3	0.4	4	0.7	1.1
<i>Commelina kurzi</i> L.	Commelinaceae	0.2	0.2	6	1.1	1.3

**Table 2. Weed flora of blackgram in Haryana (11 weeds)**

Weed species	Family	Density (no./m <sup>2</sup> )	RD (%)	Frequency (%)	RF (%)	IV
<i>Grassy</i>						
<i>Dactyloctenium aegyptium</i> L. Beauv	Poaceae	2.56	11.68	74	10.78	22.
<i>Digitaria sanguinalis</i> L. Scop	Poaceae	1.21	5.54	52	5.58	11.
<i>Echinochloa colona</i> L.	Poaceae	0.95	4.36	48	5.11	9.
<i>Eleusine indica</i> L.	Poaceae	1.39	6.33	48	5.51	11.
<i>Eragrotis tenella</i> L.	Poaceae	2.04	9.30	52	5.11	14.
<i>Sedges</i>						
<i>Cyperus rotundus</i> L.	Cyperaceae	0.30	1.38	52	5.11	6.
<i>Broadleaf</i>						
<i>Digera arvensis</i> L.	Amaranthaceae	8.39	38.20	96	46.51	84.
<i>Physalis minima</i> L.	Solanaceae	1.56	7.12	43	4.65	11.
<i>Corchorus olitorius</i> L.	Tiliaceae	0.34	1.58	80	0.93	2.
<i>Solanum nigrum</i> L.	Solanaceae	1.52	6.93	52	4.65	11.
<i>Commelina benghalensis</i> L.	Commelinaceae	1.65	7.52	52	5.11	12.

sites surveyed in all districts. *D. aegyptium* L. was most dominant grassy weed with 11.7% RD and IVI value of 22.63 followed by *Eragrotis tenella* and *Eleusine indica*. Perennial sedge *Cyperus rotundus*, with relative density of 1.38%, also showed infestation at 52% locations surveyed in blackgram crop with IVI value of 22.6. Other broad-leaf weeds found to compete with this crop were *Commelina benghalensis*, *Physallis minima* and *Solanum nigrum*. Similar composition of weeds was reported in blackgram fields in Haryana (Hooda *et al.* 1993) and in Tarai region of Uttaranchal (Mishra and Singh 1993). Nandan *et al.* (2011) also reported presence of *C. benghalensis* L. in blackgram fields of Shiwalik region of Jammu.

#### REFERENCES

- AICRP-WC. 1978-84. *Consolidated Report* (1st phase). All India Research Programme on Weed Control, ICAR, Central Rice Research Institute, Cuttack, West Bengal, India.
- Balyan RS. 1985. *Studies on biology and competitive behaviour of horse purslane (Trianthema portulacastrum)*. PhD Thesis. Haryana Agricultural University, Hisar (India).
- Misra OP and Singh Govindra. 1993. Weed management in black gram (*Vigna mungo*), p. 154. In: Proceedings of International Seminar on "Weed Management for Sustainable Agriculture" Indian Society of Weed Science, Hisar, Vol.III, 18-20 November, 1993.
- Nandan Brij, Sharma BC, Kumar Anil and Sharma Vikas. 2011. Efficacy of pre and post-emergence herbicides on weed flora of black gram under rainfed subtropical foot hills of Jammu & Kashmir. *Indian Journal of Weed Science* **43**(3&4): 172-174.
- Raju RA. 1977. Field manual for *Weed Ecology and Herbicide Research*. Agrotech Publishing Academy. Udaipur, 288 p.
- Sarswat VN and Mishra JS. 1993. Weed management in pulse crops, 137-140 p. In: *Proceedings of International Seminar on "Weed Management for Sustainable Agriculture"* Indian Society of Weed Science, Hisar, Vol.III, 18-20 November, 1993.