

## Weed Flora of Chickpea (*Cicer arietinum* L.) in Haryana

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Chickpea (*Cicer arietinum* L.) is one of the major winter season pulse crops of South-Western Haryana. This crop is grown mainly under conserved moisture. Recently, area under cultivation of chickpea has also picked up due to availability of high yielding varieties under irrigated conditions. Crop-weed competition has been established as major deterrent for its low productivity causing yield reductions to the extent of 40-80% depending upon type and density of weed species present (Singh and Singh, 1992; Vaishya *et al.*, 1996). Crop type and soil properties had greatest influence on the occurrence of weed species (Streibig *et al.*, 1984; Andreasen *et al.*, 1991). The type of irrigation, cropping pattern, weed control measures and environmental factors had a significant influence on the intensity and infestation of weeds (Saavedra *et al.*, 1990). So, knowledge of weed species associated with crops in a region is, therefore, pivotal and necessary to plan and execute a sound and economical weed management strategy depending upon various factors affecting weed distribution in different areas. The present survey was, therefore, an attempt to study the composition of the weed flora of chickpea

crop in all chickpea growing districts of Haryana state.

To study the floristic composition of weeds in chickpea in South-Western Haryana, 68 fields were surveyed in Hisar and Bhiwani districts of the Haryana state during January-February, 2008, where chickpea is the predominant crop. This period depicted most appropriate representation of majority of weed species as the weeds had cumulative effects of all agronomic practices, soil type, fertilizer and irrigation application and weed control measures adopted during initial crop growing period. The road map of Haryana state was followed and routes were planned to establish sampling localities as equidistantly as possible (about 10 Kms) avoiding inhabited areas. Four observations on density of individual weeds were recorded per field from four spots by using quadrates of (0.5 x 0.5 m), 100 metre deep inside the fields to have a uniform and true representation of the area. Pooled average values of observations of weed density and per cent occurrence of individual weeds were thus calculated as per method suggested by Misra (1968) and Raju (1977) given as under :

$$(a) \text{ Weed density/m}^2 = \frac{\text{Total number of individuals of sp. A in all the quadrates}}{\text{Total number of quadrates plotted}}$$

$$(b) \text{ Relative density (\%)} = \frac{\text{Density of species A}}{\text{Sum density of all species}} \times 100$$

$$(c) \text{ Frequency (\%)} = \frac{\text{Number of quadrates where the species A occurred}}{\text{Total number of quadrates plotted}} \times 100$$

$$(d) \text{ Relative frequency (\%)} = \frac{\text{Frequency of species A}}{\text{Sum frequency of all species}} \times 100$$

$$(e) \text{ Importance value index (IVI)} = \text{Relative density} + \text{Relative frequency}$$

As major area under chickpea crop is under rainfed conditions or sprinkler irrigation in light texture

soil, so mainly broadleaf weeds were recorded. In all 17 weed species belonging to 13 families were observed

with predominance of Chenopodiaceae and Liliaceae. Major weeds which were found to provide strong competition to gram crop were *Asphodelus tenuifolius*, *Chenopodium album*, *Trigonella polycerata*, *C. murale*, *Convolvulus arvensis* and *Euphorbia dracunculoides* (Table 1). *E. dracunculoides* was present only in crop grown in sandy loam soils under rainfed conditions. In addition to these major weed species, other weeds present were *Sisymbrium irio*, *Fumaria parviflora*, *Vicia sativa*,

*Aerva javanica*, *Launaea procumbens* and *Melilotus indica* with IVI values of 7.6-3.4. Based on IVI values *A. tenuifolius* was the most competitive weed with IVI value of 51.4% followed by *C. album* (42.5%), *T. polycerata* (37.2%), *C. murale* (15.8%), *C. arvensis* (5.5%), *E. dracunculoides* (8.6%) and *S. irio* (7.8%). Malik and Singh (1994) also reported dominance of *A. tenuifolius*, *C. album* and *E. dracunculoides* in chickpea during the survey conducted earlier in 1990.

Table 1. Weed flora of chickpea in Bhiwani and Hisar districts of Haryana state

Weed species	Weed density/m <sup>2</sup>	Relative density (%)	Relative frequency (%)	Importance value index (%)	Family
<i>Asphodelus tenuifolius</i>	82.3	35.70	15.70	51.00	Liliaceae
<i>Chenopodium album</i>	58.1	25.20	17.30	42.50	Chenopodiaceae
<i>Trigonella polycerata</i>	49.7	21.50	15.70	37.20	Leguminosae
<i>Chenopodium murale</i>	9.9	4.30	10.52	15.82	Chenopodiaceae
<i>Convolvulus arvensis</i>	1.4	0.60	4.95	5.56	Convolvulaceae
<i>Euphorbia dracunculoides</i>	12.6	5.50	3.12	8.62	Euphorbiaceae
<i>Sisymbrium irio</i>	3.4	1.50	6.32	7.82	Cruciferae
<i>Fumaria parviflora</i>	1.4	0.67	3.71	4.31	Fumariaceae
<i>Aerva javanica</i>	0.7	0.34	3.11	3.45	Amarantaceae
<i>Melilotus indica</i>	1.2	0.53	3.11	3.64	Leguminosae
<i>Spergula arvensis</i>	0.4	0.17	1.25	1.42	Caryophyllaceae
<i>Rumex spinosus</i>	5.0	2.17	0.63	2.80	Polygonaceae
<i>Launaea procumbens</i>	1.0	0.43	3.20	3.63	Compositae
<i>Ziziphus rotundifolia</i>	0.6	0.26	3.11	3.37	Rhamnaceae
<i>Avena ludoviciana</i>	0.4	0.17	1.85	2.02	Gramineae
<i>Vicia sativa</i>	0.8	0.35	1.85	2.20	Leguminosae
<i>Cynodon dactylon</i>	0.3	0.20	1.85	2.05	Gramineae

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