E-ISSN: 2706-8927
P-ISSN: 2706-8919
www.allstudyjournal.com
IJAAS 2025; 7(1): 211-214
Received: 25-11-2024
Accepted: 29-12-2024

Dr. Chandra Prabha Devi
Guest Faculty, Maharaja Chhatrasal Bundelkhand University, Chhatarpur, Madhya Pradesh, India

Corresponding Author:
Dr. Chandra Prabha Devi
Guest Faculty, Maharaja Chhatrasal Bundelkhand University, Chhatarpur, Madhya Pradesh, India

Weed dynamics and phytosociological studies in crop-chickpea at Rewa district, Madhya Pradesh

Chandra Prabha Devi

DOI: https://doi.org/10.33545/27068919.2025.v7.i1c.1353

Abstract
The present study was conducted to investigate weed flora diversity in crop-Chickpea weeds of Rewa district. This study identified and quantified the floristic composition of crop-Chickpea weeds. The number of monocot species recorded in the study was 5 (35.71%), while the number of dicot species was 9 (64.29%). Out of 14 weed species 11 were annual and remaining 3 were perennial. The frequency, density, abundance and their relative values were studied. The results obtained indicated that *Cyperus rotundus*, *Euphorbia hirta* and *Cynodon dactylon* were the most important weed of Chickpea. Importance Value Index (IVI) value of *Cyperus rotundus* in chickpea was 107.74 respectively. Results obtained from this study would be useful in making an efficient weed management strategy and further research towards new or improved weed control measures.

Keywords: Rewa district, chickpea crop, weed diversity, weed survey

1. Introductions
Globally, chickpeas (*Cicer arietinum* L.) are the third most popular pulse legume (Rawal and Navarro, 2019) [7]. Three times as much protein than cereals (18.24%), it is regarded as a cost-effective source of high-quality protein for human diets. In terms of chickpea output and acreage, Madhya Pradesh leads the nation, accounting for around 33.92% and 40.92% of the nation's total area and production, respectively (Annonymous, 2018) [1]. Weeds are a major limiting factor in the cultivation of chickpeas. Broad leaf weeds, not grassy weeds, are the primary pests of the chickpea crop. C*henopodium album*, *Melilotus alba*, *Melilotus indica*, *Vicia sativa*, *Lathyrus aphaca* and *Anagallis arvensis* are among the broad-leaved weeds that infiltrate chickpeas (Upadhyaya and Bhalla, 2002) [9]. However, new weed species are also becoming a danger to chickpea farming due to climate change, changes in cropping systems, and changes in agricultural techniques. These species compete with *Chenopodium album* and *Anagalis arvensis* (Sharma *et al*., 1995) [8]. Dicot weeds made up a larger portion of the Jabalpur weed flora than monocots, and *Anagallis arvensis* predominated (73.37 and 83.70%) in the chickpea because to its higher density and relative density, whereas *Chenopodium album* was less common (Chaurasia, 2018) [2].
The study of weeds' nature and habitat is now crucial for the sustainable production of chickpeas and for developing effective control measures against the various weed flora during crucial crop growth stages, as the dominance of weed flora after a certain amount of time may negatively impact both the crop and the environment. The current experiment was carried out in the Rewa area of Madhya Pradesh to identify the troublesome weeds in the chickpea crop at the moment, keeping the aforementioned facts in mind.

2. Materials and Methods
The study was conducted at the Rewa district, Madhya Pradesh, India. Rewa is located at 24°32’ N 81°18’ E. It has an average elevation of 275 meters (902 feet). The climate of region is typical subtropical with long dry season from late September to late June and wet season from July to September with hot desiccating winds in summer (May-June) with intensive evapotranspiration losses.
This field-based survey was carried out in February month of 2020 within the 2019-2020 cropping season. At this stage, approximately two months would have gone after weeding. This time chosen for observation because, most of the weeds were well established, most of them were in flowering or seed setting stages.

Frequent visits were made to the crop fields and the specimens collected were identified with the help of available literature.

Weed species compositions in the fields were assessed by throwing 1.0 m^2 quadrate randomly in 10 different locations in each field. The structure and composition of vegetation in the agricultural fields have been compared in terms of frequency, density, abundance and their relative values were derived from the primary data (Curtis 1959).

$$\text{Frequency (F)} = \frac{\text{Number of quadrates in which the species occurs}}{\text{Number of quadrates studied Relative Frequency}}$$

$$\text{Relative Frequency (RF)} = \frac{\text{Frequency value for a species}}{\text{Total of Frequency value for all the species}} \times 100$$

$$\text{Density (D)} = \frac{\text{Total number of individuals of a species in all the quadrates}}{\text{Number of quadrates studied}}$$

$$\text{Relative Density (RD)} = \frac{\text{Density value for a species}}{\text{Total of Density value for all the species}} \times 100$$

$$\text{Abundance (A)} = \frac{\text{Total number of individuals of a species}}{\text{Number of quadrate in which the species occurs}}$$

$$\text{Relative Abundance (RA)} = \frac{\text{Abundance value for a species}}{\text{Total of abundance value for all the species}} \times 100$$

Important Value Index is valuable statistical measures for the analysis of phytosociology and plant community and it provides an overall idea of a species and its importance in the plant community. It is derived by Phillips (1959) [5] summing up Relative Frequency, Relative Density and Relative Abundance.

Importance Value Index (IVI) = RA + RD+ RF

3. Results and Discussion

Fourteen weed species belonging to 09 families were found in all the chickpea crop fields. The type and number of weeds vary in the different crops studied. The floristic composition of recorded weed species was grouped into Monocotyledons and Dicotyledons. The number of monocot species recorded in the study was 5 (35.71%), while the number of dicot species was 9 (64.29%). Out of 14 weed species 11 were annual and remaining 3 viz. *Convolvulus arvensis*, *Cynodon dactylon* and *Cyperus rotundus* were perennial. Family Poaceae were represented by 3 species, Asteraceae, Euphorbiaceae, Polygonaceae were represented by 2 species each; the other remaining 5 families were represented by 1 species (Table 2).

The frequency, density and abundance of various weed species under the prevailing environmental set up presented in Table 3. In chickpea field, highest frequency (5.4) of weed population was recorded for *Cyperus rotundus*, followed by 3.6 for *Eclipta alba* and 3.1 for *Euphorbia hirta* while 2.8 for *Euphorbia dracunculoides*. Minimum frequency of 0.2 was associated with *Asphodelus tenuifolius*.

Weed species *Cyperus rotundus* showed highest density (34) which was followed by *Eclipta alba* (16) in chickpea while *Polygonum erectum* showed lowest density (0.3).

The weeds with maximum abundance in chickpea crop was *Cyperus rotundus* with abundance value 36 respectively.

Values represented in Table 3 reflect considerable variation among the different observed Crop-Chickpea weed species. The lower relative frequency values represent less occurrence and higher frequency values represent more occurrence of Crop-Chickpea weed species. In chickpea crop, highest relative frequency was noticed with *Cyperus rotundus* (21.26) and minimum (0.79) with *Asphodelus tenuifolius*. Maximum relative density (47.35), relative abundance (39.12) and IVI value 107.74 found with *Cyperus rotundus* was most dominant among the observed chickpea weed community. Weed species *Asphodelus tenuifolius* proved less important weed species with minimum IVI value (3.51). Observations described above clearly indicate that *Cyperus rotundus* in chickpea crop. Rathod *et al.* (2017) [6] also found *Cynodon dactylon* as major weed among grasses and *Cyperus rotundus* as major sedge weed of chickpea in Karnataka. Patidar *et al*., (2019) [4] also observed similar IVI in case of wheat at Jabalpur.

Table 1: Land use history of the Chickpea crop fields.

Particulars	Chickpea plot
Field Establishment year	2022-23
Previous crop	Sesame
Plot size (ha)	1ha
Sowing of crop	1st week of November
Cultural practices-/herbicide used	Pendimethalin and Hand weeding
Time- plots were weeded before start of this study	2nd week of December

Table 2: Floristic composition of the weed flora in the Chickpea crop fields

S. No.	Botanical Name	Family	Group	Common name	Life cycle
1.	*Anagallis arvensis* L.	Primulaceae	Dicot	Blue pimpernel	Annual
2.	*Asphodelus tenuifolius* Cav.	Liliaceae	Monocot	Wild onion	Annual
3.	*Avena fatua* L.	Poaceae	Monocot	Wild oat	Annual
4.	*Convolvulus arvensis* L.	Convolvulaceae	Dicot	Field bindweed	Perennial
5.	*Cynodon dactylon* (L.) Pers.	Poaceae	Monocot	Bermuda grass	Perennial
6.	*Cyperus rotundus* L.	Cyperaceae	Monocot	Motha	Perennial
7.	*Digera arvensis* Forssk.	Amaranthaceae	Dicot	False Amaranth	Annual
8.	*Eclipta alba* (L.) Hassk.	Asteraceae	Dicot	False daisy	Annual
9.	*Euphorbia dracunculoides* Lam.	Euphorbiaceae	Dicot	Dragon Spurge	Annual
10.	*Euphorbia hirta* L.	Euphorbiaceae	Dicot	Snake weed	Annual
11.	*Phalaris minor* Retz.	Poaceae	Monocot	small canary grass	Annual
12.	*Polygonum erectum* L.	Polygonaceae	Dicot	Erect knot weed	Annual
13.	*Rumex crispus* L.	Polygonaceae	Dicot	Curly Dock	Annual
14.	*Vernonia cinerea* Less	Asteraceae	Dicot	Fleambane	Annual

Table 3: Phytosociological study of Crop-Chickpea weeds.

S. No.	Weed species	Frequency	Density	Abundance	Relative Frequency	Relative Density	Relative Abundance	IVI
1.	*Anagallis arvensis* L.	1.5	1.6	2.29	5.91	2.23	2.49	10.62
2.	*Asphodelus tenuifolius* Cav.	0.2	0.6	1.74	0.79	0.84	1.89	3.51
3.	*Avena fatua* L.	1.1	2.6	4.1	4.33	3.62	4.46	12.41
4.	*Convolvulus arvensis* L.	1.6	1.8	2.7	6.30	2.51	2.93	11.74
5.	*Cynodon dactylon* (L.) Pers.	2.4	3.7	6.6	9.45	5.15	7.17	21.77
6.	*Cyperus rotundus* L.	5.4	34	36	21.26	47.35	39.12	107.74
7.	*Digera arvensis* Forssk.	1.2	1	2.5	4.72	1.39	2.72	8.83
8.	*Eclipta alba* (L.) Hassk.	3.6	16	20.2	14.17	22.28	21.95	58.41
9.	*Euphorbia dracunculoides* Lam.	2.8	2.2	2.9	11.02	3.06	3.15	17.24
10.	*Euphorbia hirta* L.	3.1	4.7	4.89	12.20	6.55	5.31	24.06
11.	*Phalaris minor* Retz.	0.5	0.6	1.2	1.97	0.84	1.30	4.11
12.	*Polygonum erectum* L.	0.6	0.3	1.1	2.36	0.42	1.20	3.98
13.	*Rumex crispus* L.	0.4	1.5	3.6	1.57	2.09	3.91	7.58
14	*Vernonia cinerea* Less	1	1.2	2.2	3.94	1.67	2.39	8.00

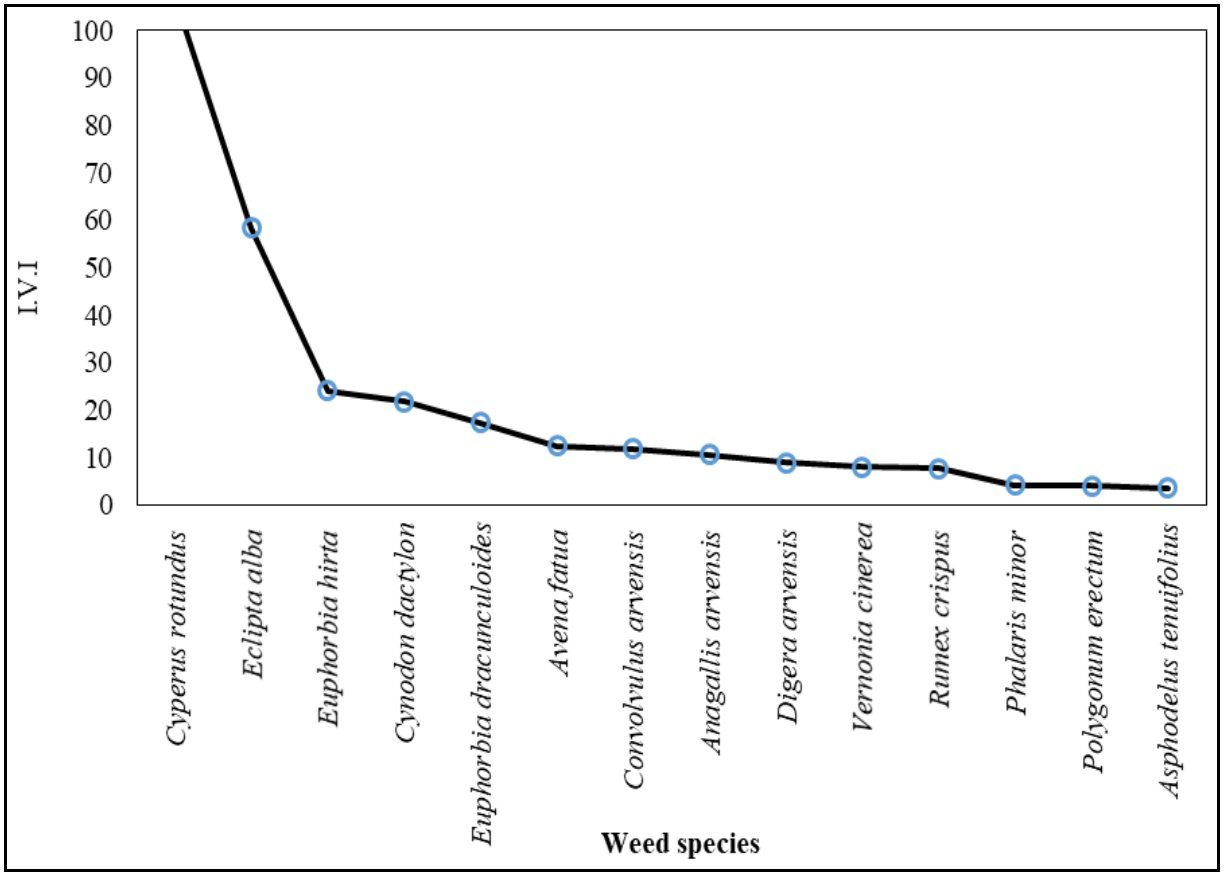

Fig 1: Graph analysis in descending order IVI value of Crop-Chickpea weeds in Rewa district

4. Conclusion

It was concluded that the land use such as cultivation practices, use of inputs, crops and cropping systems, weed management practices and other cultural practices affects the weed flora composition. The presence of some weeds in two or three crops indicates their wider adoptability while restriction of some weeds to particular crop shows their requirement for special condition in order to grow. This survey will provide a base for future weed surveys. However, extensive field studies would be necessary to quantify the abundance and diversity of weeds under various cropping systems of Rewa district.

5. Acknowledgement

The author is thankful to authorities of Agriculture department of Rewa district who helps in ways more than one.

6. References

1. Anonymous. Agricultural statistics at a glance. Government of India. Ministry of Agriculture and Co-operation and Farmer Welfare. Directorate of Economics and Statistics; 2018. p. 68, 97.
2. Chaurasia A. Studies on Irrigation Scheduling and Weed Management in Chickpea under Different Land Configurations [PhD Thesis]. JNKVV Jabalpur, Madhya Pradesh; 2018.
3. Curtis JT. The vegetation of Wisconsin: an ordination of plant community. Madison: University of Wisconsin Press; 1959.
4. Patidar J, Kewat ML, Jha AK. Present status of weed flora in soybean crop in Jabalpur district of Kymore plateau & Satpura Hills Zone of Madhya Pradesh. The Pharma Innovation Journal. 2019;8(7):717-720.

5. Phillips EA. Methods of vegetation study. New York: Henry Holt and Company; 1959.
6. Rathod PS, Patil DH, Dodamani BM. Integrated weed management of chickpea under rainfed conditions of Karnataka, India. Legume Research. 2017;40(3):580-585.
7. Rawal V, Navarro DK, editors. The Global Economy of Pulses. Rome: FAO; 2019.
8. Sharma RS, Kewat ML, Jain KK. Identification of problematic weeds in Jabalpur region of Madhya Pradesh. Indian Journal of Weed Science. 1995;27(1 & 2):19-23.
9. Upadhyaya VB, Bhalla CS. Efficacy of cultural, mechanical and chemical weed control in chickpea. Indian Journal of Weed Science. 2002;34(1-2):141-142.