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Check list of weeds in major kharif crops (maize) in tribal district Dhar, M.P. India

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Abstract

The present study deals with weeds associated with maize (*Zea mays* L.) fields of Dhar district, Madhya Pradesh, India. The study was based on extensive and intensive field surveys made in different months of kharif seasons from 2019. During the study period authors selected 5 important agricultural blocks in Dhar districts i.e. Dhar, Dharampuri, Kukshi, Manawar and Sardarpur. The plant exploration work was carried in different seasons. Two sites were selected in each block for survey of weed flora and Periodic field trips were made twice a month in each site for collection of weed species. Weeds Seeds spread into natural environments grow faster than native plants and successfully compete for crops. Farmers and agriculturists of each site were interviewed about seasonal weeds and their vegetation and distribution pattern of were studied. In the study period the authors have reported a total of 136 weeds belonging to 35 Families 136 species and 109 Genera. 128 herbs and 8 species is climbers are found in the study area. Poaceae having 24 weeds species followed by family Compositae (17), Malvaceae (16 species), Leguminosae (13 species), Cyperaceae (9 species), Convolvulaceae and Amaranthaceae (5 species) weeds.

Key words: Kharif crops, maize, tribal, Dhar, Malwa plateau, Agro climatic zone, Narmada River

Introduction

Weeds have been defined as undesirable, generally obnoxious plants growing in places where they are not wanted. They are a nuisance to agriculture mainly because of their adverse effects on crop plant. *Zea maize* L. is most important cereal crop in tribal district Dhar which contribute nearly 14.5% (Ranjeet et. al. 2018) and provides more than 29.1 % of the total calories required to the Indian people. Maize is the third most important food grain following wheat and rice for Indian population. (Murdia et. al. 2016). Maize has been cultivated within wide ecological range in Dhar district of Madhya Pradesh, India. The state of Madhya Pradesh occupies a total geographical area of 44.348 m ha out of which 55.9 % (24.804 m ha) is under major Kharif and Rabi crops. Madhya Pradesh is predominantly rain fed farming state, whereas irrigated cultivated area is 29.5%. It is blessed with varied agro-climatic conditions which has permits the farmers to cultivate a number of crops across different seasons of the year. Malwa plateau agro climatic zone comprises 8 entire districts and part of Dhar (Dhar, Badnawar, and Sardarpur Tehsil) and Jhabua (Petlawad Tehsil) districts of Madhya Pradesh. Nearly 12% of the total loss of crop yields has been attributed to the weeds alone (Anaya 1999). Weeds in their early growth stage make difficulties to farmers while weeding. Weeds are competitor to crops in the means of, rooting profile, nutrient requirements and growth behavior. weeds are utilize more nutrients than crops and are categories in c_4 plants which are more utilize sunlight's and affect productivity of the plants in respect to photosynthesis. Weeds are reducing the production of crop, growth rate, quality and yields as well as nutrients and moisture and also produce difficulties to harvest the crop (Sainkhediya & Pachaya 2015). All weeds are not harmful to crops. In low density it is not affected the yields of the crop but also stimulate the crop growth (Thijssen 1991). The best way of weed management is to make use of it, to promote it to a level of wanted plants.

Study area

Dhar is known as Dhara Nagari in ancient period. The name Dhar is supposed to base on “Sword Blade” of Vairi singh to have been derived from Dharanagari. Dhar district is situated in the South-western part of Madhya Pradesh. Dhar is located 266 Km East towards State capital Bhopal. Dhar District population is 2184672. Dhar district of Madhya Pradesh, India is located between the latitude of 22° 00 to 23° 10’ North and longitude of 74° 28’ to 75° 42’ East and altitude of 588 m. above sea level. It is bounded by district Ratlam to the North, Ujjain to the Northeast, Indore to the East, Khargone to the Southeast, Barwani to the South, Alirajpur to the Southwest and Jhabua district to the West. The total area of district is 8153 sq. km. of which forest encompasses 1370 sq. km. covering 15.79 percent of its geographical area. The temperature exhibits a great variation. Summer season temperature ranges 41°C to 45°C. Average minimum temperature varies from 22°C to 32°C. Most of the area is drained by Narmada, Chambal, Man, Mahi, Karam, Bag, Hathani rivers. Besides these, small seasonal rivers like Khadi, Khuj, Bagedi, Balwanti, Gangi, Chidi, Nalganga flow only during rainy season. Archaean system, Bijawar group, Vindhyan system and Deccan traps of rocks have been found in Dhar. Major part of the district is covered by the Deccan trap locally called Malwa trap. Granite (70-77% silica, 11-13% alumina, 3-5% potassium oxide, 3-5% soda, 1% lime, 2-3% total iron, and less than 1% magnesia and titania), Mg rocks existing on either side of Narmada area of Archaean age. Dhar District is divided into 13 Tehsils, 472 Panchayats and 1429 Villages. Dhar district Total population is 2184672 according to census 2011. Gandhwani Tehsil is the Smallest Tehsil by population with 122172 populations. Dhar Tehsil is the Biggest Tehsil by population with 431636 populations. Tehsils of Dhar District are Badnawar, Bagh, Dahi, Dhar, Dharamपुरi, Gandhwani, Kukshi, Manawar, Nalchha, Nisarपुर, Sardarpur, Tirla, Umarban.

Methodology

Intensive and extensive plant survey was carried out to find out the weeds flora in maize fields of Dhar district. Present surveys made in different months of karif seasons from 2019. During the study period authors selected 5 important agricultural blocks in Dhar districts i.e. Dhar, Dharamपुरi, Kukshi, Manawar and Sardarpur. The plant exploration work was carried in different seasons. Two sites were selected in each block for survey of weed flora and Periodic field trips were made twice a month in each site for collection of weed species. All habitats of the study area surveyed carefully. The vegetation and distribution pattern of the plants were studied. During the period of study the farmers and agriculturists of each site were interviewed about seasonal weeds and their flowering and fruiting season. Plant collection and herbarium preparation was carried out by standard method (Jain and Rao, 1977). Plant specimens were preserved by dipping the whole specimens in saturated solution of Mercuric chloride and alcohol. Dry and preserved plants mounted on herbarium sheets by adhesive glue and fevicols. Identification of plants done with the help of flora (Verma et.al., 1993; Mudgal et al., 1997; Khanna et al., 2001; Shah, 1978; Duthi, 1960; Hains, 1921-1924; Cook, 1903; Hooker, 1872-1897) and other taxonomic literature. The entire plant specimen was deposited in herbarium of Arts & Science College Ratlam (M.P.), India.

Result & discussion

The present study was conducted as first ever attempt from the study area to explore the weeds in major kharif crops (maize) in tribal district Dhar, M.P. India. Weeds are unwanted plants growing in the crops fields and compete for space, moisture, nutrients, CO₂, sunlight and shaded them. Weeds typically produce large numbers of seeds, assisting their spread. Seeds spread into natural environments, including waterways, via wind, people, vehicles, machinery, birds and other animals. Usually weeds grow faster than native plants and successfully compete for the available nutrients, water, space and sunlight. Our study provide the checklist of identified weeds of the study area that infests the *Zea mays* L. crops and thus help in planning a suitable strategy for their control. The study was based on extensive and intensive field surveys made in different months of karif seasons from 2019. During the study period authors selected 5 important agricultural blocks in Dhar districts i.e. Dhar, Dharamपुरi, Kukshi, Manawar and Sardarpur. The plant exploration work was carried in different seasons. Two sites were selected in each block for survey of weed flora and Periodic field trips were made twice a month in each site for collection of weed species. In the study period the authors have reported a total of 136 weeds belonging to 35 Families 136 species and 109 Genera. 128 herbs and 8 species is climbers are found in the study area. poaceae having 24 weeds species followed by family Compositae (17), Malvaceae (16 species), Leguminosae (13 species), Cyperaceae (9 species), Convolvulaceae & Amaranthaceae (5 species) weeds (Fig.-1 & Table-1).

Conclusion

In conclusions, 136 weed species were recorded in major kharif crops (maize) fields in tribal district Dhar, M.P. India. Number of weeds and their density is high in *Zea maize* L. fields. Weeds are changed soil pH and N: P ratio is also

affected of soil and they are affected germination of *Zea maize* L. The present study will be helpful for the workers involved in exploring the weeds of different agro-ecosystems. Knowledge on critical period of weed competition helps in reducing the labour requirement for weeding operations and maximizes the economic returns.

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Table-1: Dominant family of the area

s. n.	Family	No. of species
	Malvaceae	16
	Leguminosae	13
	Compositae	17
	Convolvulaceae & Amaranthaceae	5
	Cyperaceae	9
	Poaceae	24

Table-2: List of weed flora in *Zea maize* L. crops in Dhar region of M.P., India

S.N.	Families	Botanical name	Habit
1.	Menispermaceae	Cocculus hirsutus (L.) Theob.	C
2.	Papaveraceae	Argemone Mexicana L.	H
3.	Cleomaceae	Cleome gynandra L.	H
4.		Cleome viscosa L.	H
5.	Polygalaceae	Polygala arvensis Willd.	H
6.	Portulacaceae	Portulaca oleraceae L.	H
7.		Portulaca quadrifida L.	H
8.	Malvaceae	Abelmoschus ficulneus (L.) Wight & Arn.	H
9.		Abutilon indicum (L.) Sweet	H
10.		Corchorus fascicularis Lam.	H
11.		Corchorus trilocularis L.	H
12.		Hibiscus caesius Garcke	H

13.		<i>Hibiscus lobatus</i> (Murray) Kuntze	H
14.		<i>Malachra capitata</i> (L.) L.	H
15.		<i>Malvastrum coromandelianum</i> (L.) Garcke	H
16.		<i>Melochia corchorifolia</i> L.	H
17.		<i>Sida acuta</i> Burm. F.	H
18.		<i>Sida cordata</i> (Burm.f.) Borss.Waalk.	H
19.		<i>Sida cordifolia</i> L.	H
20.		<i>Sida rhombifolia</i> L.	H
21.		<i>Triumfetta malebarica</i> J.Koenig ex Rottb.	H
22.		<i>Urena lobata</i> L.	H
23.		<i>Waltheria indica</i> L.	H
24.	Linaceae	<i>Linum mysorensense</i> B.Heyne ex Wall.	H
25.	Zygophyllaceae	<i>Tribulus terrestris</i> L.	H
26.	Oxalidaceae	<i>Biophytum reinwardtii</i> (Zucc.) Klotzsch.	H
27.		<i>Biophytum sensitivum</i> (L.) DC.	H
28.		<i>Oxalis corniculata</i> L.	H
29.	Leguminosae	<i>Alysicarpus monilifer</i> (L.) DC	H
30.		<i>Alysicarpus pubescens</i> J.S.Law	H
31.		<i>Cajanus platycarpus</i> (Benth.) Maesen	H
32.		<i>Clitoria annua</i> Graham	H
33.		<i>Clitoria ternatea</i> L.	C
34.		<i>Crotalaria prostrata</i> Willd.	H
35.		<i>Crotalaria pusilla</i> DC.	H
36.		<i>Desmodium dichotomum</i> (Willd.) DC.	H
37.		<i>Desmodium triflorum</i> (L.) DC.	H
38.		<i>Galactia longifolia</i> (Jacq.) Benth	H
39.		<i>Rhynchosia bracteata</i> Baker	H
40.		<i>Rhynchosia minima</i> (L.) DC.	C
41.		<i>Senna tora</i> (L.) Roxb.	H
42.		<i>Tephrosia pumila</i> (Lam.) Pers.	H
43.	Onagraceae	<i>Ludwigia octovalvis</i> (Jacq.) Raven	H
44.	Cucurbitaceae	<i>Citrullus colocynthis</i> (L.) Schrad.	H
45.		<i>Diplocyclos palmatus</i> (L.) C.Jeffrey	C
46.		<i>Luffa tuberosa</i> Roxb.	C
47.	Apiaceae	<i>Centella asiatica</i> (L.) Urb.	H
48.	Compositae	<i>Acanthospermum hispidum</i> DC.	H
49.		<i>Ageratum conyzoides</i> (L.) L.	H
50.		<i>Bidens biternata</i> (Lour.) Merr. & Sherff	H
51.		<i>Blumea lacera</i> (Burm.f.) DC	H
52.		<i>Blumea oxyodonta</i> DC.	H
53.		<i>Caesulia axillaris</i> Roxb.	H
54.		<i>Conyza japonica</i> (Thunb.) Less. ex Less.	H
55.		<i>Eclipta prostrata</i> (L.) L.	H
56.		<i>Elephantopus scaber</i> L.	H
57.		<i>Emilia sonchifolia</i> (L.) DC. ex DC.	H
58.		<i>Lagascea mollis</i> Cav.	H
59.		<i>Parthenium hysterophorus</i> L.	H
60.		<i>Pulicaria angustifolia</i> DC.	H
61.		<i>Pulicaria crispa</i> Sch.Bip.	H
62.		<i>Sonchus asper</i> (L.) Hill	H
63.		<i>Tridax procumbens</i> (L.) L.	H

64.		Xanthium strumarium L.	H
65.	Primulaceae	Anagallis arvensis L.	H
66.	Gentianaceae	Canscora diffusa (Vahl) R.Br. ex Roem. & Schult.	H
67.		Enicostema axillare (Poir. ex Lam.) A.Raynal	H
68.		Exacum pedunculatum L.	H
69.	Convolvulaceae	Convolvulus prostratus Forssk.	H
70.		Evolvulus alsinoides (L.) L.	H
71.		Ipomoea hederifolia L.	C
72.		Ipomoea obscura (L.) Ker Gawl.	C
73.		Ipomoea pes-tigridis L.	C
74.	Solanaceae	Physalis minima L.	H
75.		Solanum americanum Mill.	H
76.	Plantaginaceae	Stemodia viscosa Roxb.	H
77.	Orobanchaceae	Striga gesnerioides (Willd.) Vatke	H
78.	Scrophulariaceae	Verbascum chinense (L.) Santapau	H
79.	Lentibulariaceae	Utricularia aurea Lour.	H
80.	Gesneriaceae	Didymocarpus pygmaeus C.B.Clarke	H
81.	Martyniaceae	Martynia annua L.	H
82.	Acanthaceae	Andrographis paniculata (Burm.f.) Nees	H
83.		Hemigraphis hirta (Vahl.) Anderson	H
84.		Lepidagathis cristata Willd.	H
85.		Rungia repens (L.) Nees	H
86.	Verbenaceae	Phyla nodiflora (L.) Greene	H
87.	Lamiaceae	Hyptis suaveolens (L.) Poit.	H
88.		Leucas aspera (Willd.) Link	H
89.		Ocimum basilicum L.	H
90.	Nyctaginaceae	Boerhavia diffusa L.	H
91.	Amaranthaceae	Achyranthes aspera L.	H
92.		Amaranthus tricolor L.	H
93.		Amaranthus viridis L.	H
94.		Celosia argentea L.	H
95.		Chenopodium murale L.	H
96.	Polygonaceae	Persicaria barbata (L.) H.Hara	H
97.	Euphorbiaceae	Acalypha indica L.	H
98.		Euphorbia chamaesyce L.	H
99.		Euphorbia hirta L.	H
100.		Euphorbia thymifolia L.	H
101.	Phyllanthaceae	Phyllanthus amarus Schumach. & Thonn.	H
102.	Commelinaceae	Commelina benghalensis L.	H
103.		Commelina forsskalii Vahl	H
104.	Cyperaceae	Cyperus alulatus Kern	H
105.		Cyperus dubius Rottb.	H
106.		Cyperus esculentus L.	H
107.		Cyperus exaltatus Retz.	H
108.		Cyperus haspan L.	H
109.		Cyperus iria L.	H
110.		Cyperus laevigatus L.	H
111.		Eleocharis dulcis (Burm.f.) Trin. ex Hensch.	H
112.		Pycnus pumilus (L.) Nees.	H
113.	Poaceae	Apluda mutica L.	H
114.		Aristida adscensionis L.	H

5.		<i>Avena sterilis L.</i>	H
6.		<i>Brachiaria reptans (L.) C.A.Gardner & C.E.Hubb.</i>	H
7.		<i>Cymbopogon martini (Roxb.) W.Watson</i>	H
8.		<i>Cynodon barberi Rang. & Tadul.</i>	H
9.		<i>Cynodon dactylon (L.) Pers.</i>	H
20.		<i>Dactyloctenium aegyptium (L.) Willd.</i>	H
21.		<i>Digitaria ciliaris (Retz.) Koeler</i>	H
22.		<i>Echinochloa colona (L.) Link</i>	H
23.		<i>Eragrostis ciliaris (L.) R.Br.</i>	H
24.		<i>Heteropogon contortus (L.) Beauv. ex Roem. & Schult.</i>	H
25.		<i>Isachne globosa (Thunb.) Kuntze</i>	H
26.		<i>Ischaemum rugosum Salisb.</i>	H
27.		<i>Lophopogon tridentatus (Roxb.) Hack.</i>	H
28.		<i>Oplismenus burmanni (Retz.) Beauv</i>	H
29.		<i>Panicum humile Steud.</i>	H
30.		<i>Paspalidium geminatum (Forssk.) Stapf</i>	H
31.		<i>Phalaris minor Retz.</i>	H
32.		<i>Setaria intermedia Roem. & Schult.</i>	H
33.		<i>Sporobolus capillaris Miq.</i>	H
34.		<i>Thelepogon elegans Roth</i>	H
35.		<i>Themeda laxa (Andersson) A.Camus</i>	H
36.		<i>Tripogon jacquemontii Stapf</i>	H

Table-3: Number wise distribution of families in the Dhar district of Madhya Pradesh

SN	Dicotyledons			Monocotyledons				
	Families	No. of species	Sn	Families	No. of species	Sn	Families	No. of species
1	Menispermaceae	1	17	Convolvulaceae	5	1	Commelinaceae	2
2	Papaveraceae	1	18	Solanaceae	2	2	Cyperaceae	9
3	Cleomaceae	2	19	Plantaginaceae	1	3	Poaceae	24
4	Polygalaceae	1	20	Orobanchaceae	1			
5	Portulacaceae	2	21	Scrophulariaceae	1			
6	Malvaceae	16	22	Lentibulariaceae	1			
7	Linaceae	1	23	Gesneriaceae	1			
8	Zygophyllaceae	1	24	Martyniaceae	1			
9	Oxalidaceae	3	25	Acanthaceae	4			
10	Leguminosae	13	26	Verbenaceae	1			
11	Onagraceae	1	27	Lamiaceae	3			
12	Cucurbitaceae	3	28	Nyctaginaceae	1			
13	Apiaceae	1	29	Amaranthaceae	5			
14	Compositae	17	30	Polygonaceae	1			
15	Primulaceae	1	31	Euphorbiaceae	4			
16	Gentianaceae	3	32	Phyllanthaceae	1			

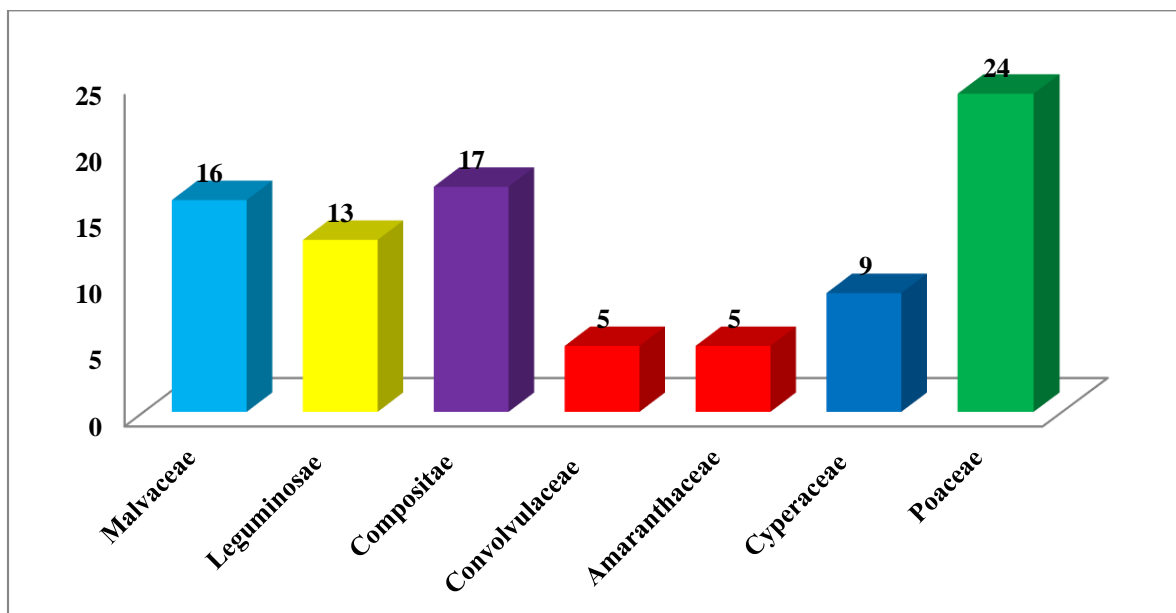


Fig.:1- Dominant family of the area

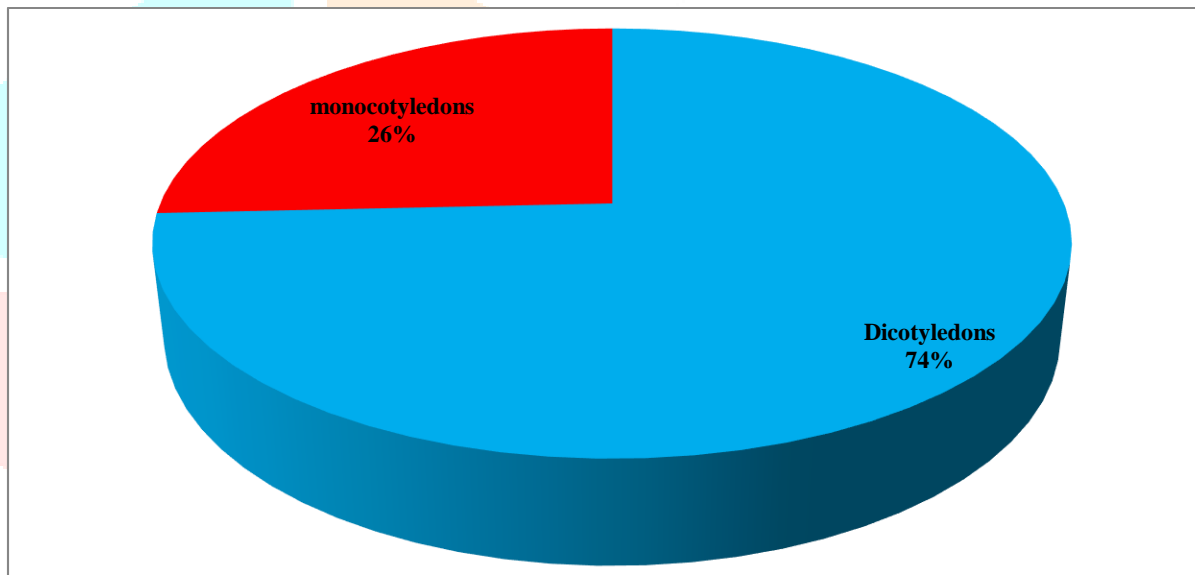


Fig-2: Percentage of different types of weed flora recorded from the major kharif crops (maize) in tribal district Dhar

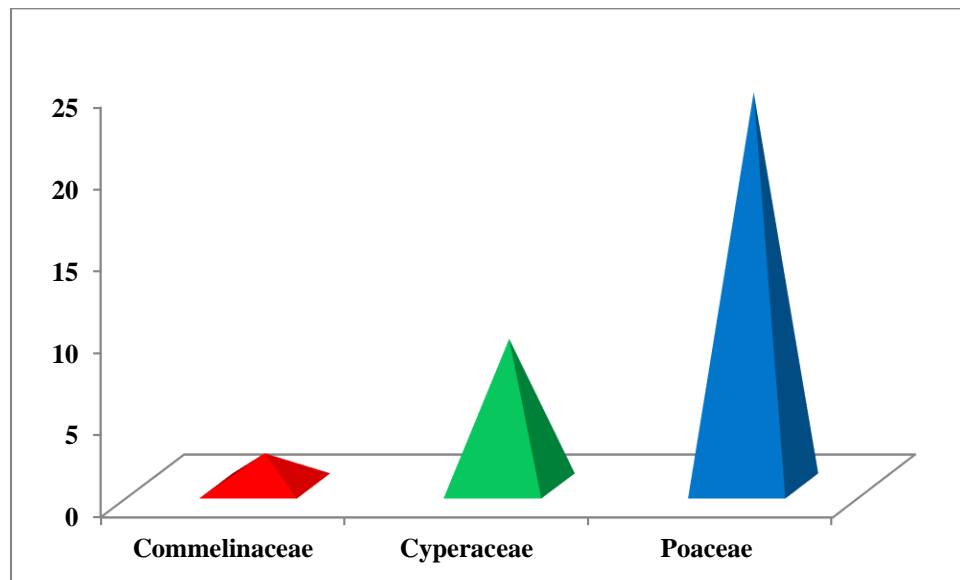


Fig.5: species level distribution of different monocotyledons families of weed recorded from the from Dhar district



STUDY AREA MAP