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Survey on weed diversity in two major crop fields, rice and wheat in Sonbhadra district, Uttar Pradesh, India

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ABSTRACT

The present study enumerates the floristic diversity of weeds growing in the fields of two major crops rice and wheat in Sonbhadra district of Uttar Pradesh. The survey conducted during 2012-2017 recorded 78 angiospermic weed species which belong to 70 genera and 36 families. Of these, dicotyledonous weeds are represented by 50 species under 50 genera and 29 families whereas monocotyledonous weeds are represented by 28 species under 20 genera and 7 families. Out of total species found in the district in these two crops, 37 species are native to India, 36 species are exotic and for remaining 5 species the nativity is not clear. During kharif season in the rice crop 57 species under 47 genera and 28 families and during rabi season in the wheat crop 21 species under 19 genera and 12 families were observed. Only six species have been found growing in both crops in both seasons. During the survey it was also observed that about 14 species were used by local people as vegetables and about 32 species as fodder for animals. Apart from this, about 64 species considered as medicinal are also found in these two crops. Most of the species were found common and as per IUCN, 25 species have been listed under 'least concern' category. For each species correct name with family, local name, nativity, flowering and fruiting periods and reference to voucher specimens have been provided.

***Keywords*:** crop fields, diversity, rice, weeds, wheat

Weeds are the plants which grow where they are not desired or unwanted plant species growing spontaneously in crop ecosystem and also on open land areas. It has been estimated that out of 2, 50,000 flowering plants, about 8000 species are weeds in the world (Singh *et al*., 2012). They are harmful for plants, animals and microorganism and cause vast reductions in crop yields quantitatively as well as qualitatively, increase cost of cultivation, interfere with agricultural operations and act as alternate hosts for several insect and pests diseases. Some weeds discharge the poisonous substances or growth inhibitors into the soil which are injurious to plants, human beings and live-stocks (Patil and Jadhav, 2013). They also compete with crops for one or more plant growth factors such as mineral nutrients, water, solar energy and space (Anon., 2009). On the other hands, the beneficial effects of weeds have also been reported. When the leaves and stems of weeds are buried in the soil as green manure, they add significant amount of organic matters and plant nutrients. The long weeds which grow on desert lands, waste lands or sloppy fields, reduce wind and water erosion and also help for protection of the environment. Some of the weeds are used as fodder for animals and as leafy vegetables by human beings. Sometimes they are utilized as ornamental and hedge plants. Even, certain weeds have nematicidal properties also. In view of this, the study of weed composition of an area or crop fields is crucial for its economically and ecologically sustainable management.

Sonbhadra district is very rich in plant diversity as about 36.05 per cent of the whole area is covered by forests. However, except some scattered work (Bhattacharyya, 1963, 1964; Srivastava, 1955; Kushwaha *et al.*, 2016), no comprehensive study so far has been taken to enumerate the plant diversity of the entire area. Similarly, the study on weed diversity found in different cropping systems is also lacking, while various crops are grown in the district in different seasons of *kharif*, *rabi* and *zaid*, in which wheat and paddy (rice) are two major crops, besides maize, millets, pulses and oil seeds. Only some references on weeds of the area are available in some ethnobotanical work carried out in the area (Singh *et al*., 2002; Chaudhary, 2010; Singh *et al*., 2012; Singh *et al*., 2012; Singh and Dubey, 2012; Mishra *et al*., 2012). Unless or until the diversity of the natural weeds growing in the fields of major crops is not documented properly, the study on plant diversity of the whole area will not we considered completed. Hence, to document the weeds from wheat and rice fields is the first study of its kind from the study area.

Wheat (*Triticum aestivum* L.) and rice (*Oryza sativa* L.) are two main food grains in India. Both crops belong to the family Poaceae and collectively account for over 58 per cent of the area and over 77 per cent of the

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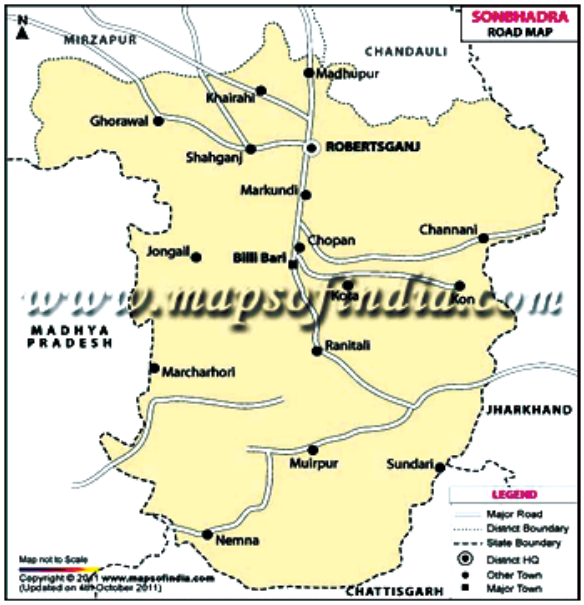

Fig. 1: Map of Sonbhadra district (Photo Courtesy: www.mapsofindia.com)

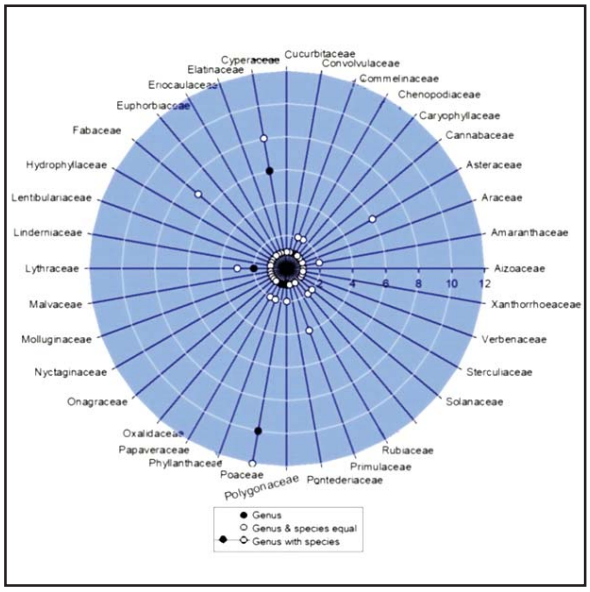

Fig. 2: Radar diagram showing the total diversity of weeds growing in both rice and wheat fields

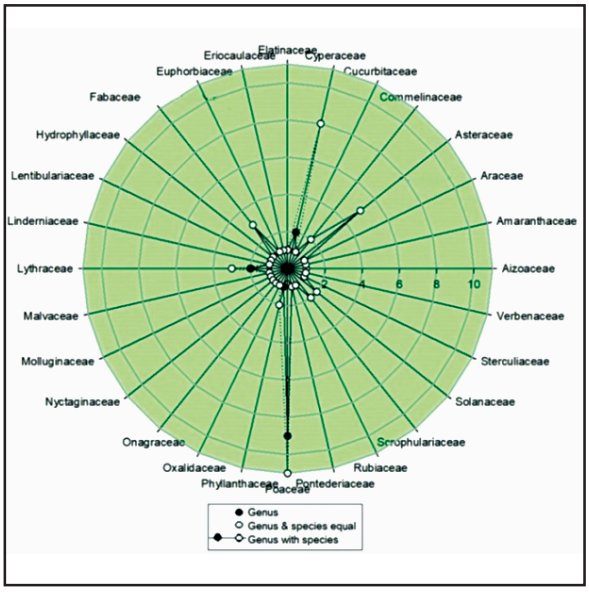

Fig. 3: Radar diagram showing diversity of weeds in the rice fields

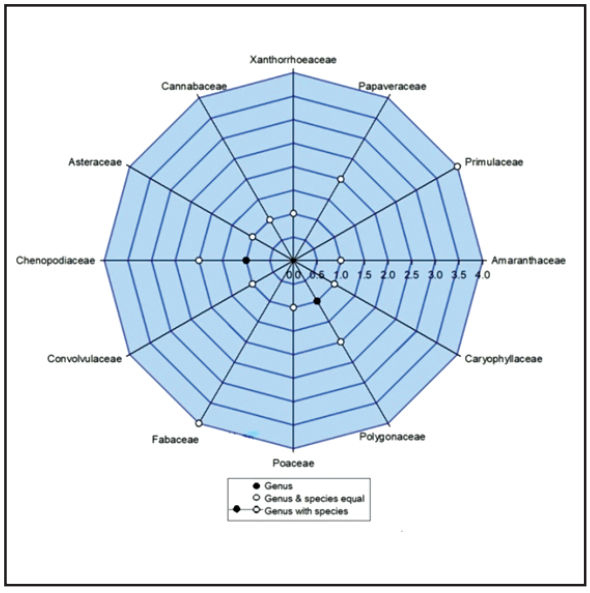

Fig. 4: Radar diagram showing diversity of weeds in the wheat fields

production of food grains in the country (Singh, 2011). Rice is a widely grown *kharif* crop throughout the world and is one of the major food crops cultivated extensively in India which is the second largest producer of rice in the world. Rice is native to Asia and certain parts of Africa, but due to long trade and exportation since ancient time, it has become common to many places throughout the worldwide. The production of rice in Uttar Pradesh was 12167.9 thousand tons in 2014-15 (Anon., 2014-15). About 30582 hectares of paddy fields of Sonbhadra district produce about 3440.8 tons rice (Krishi Vigyan Kendra, Sonbhadra, 2015). After rice, wheat is the second most important cultivated food crop in India and feeds hundreds of millions of Indians on a daily basis. According to archaeological record wheat was first cultivated in the regions of the Fertile Crescent around 9600 BCE. India and Uttar Pradesh produced 693.50 and 240.70 lakh tons of wheat respectively in 2005-06

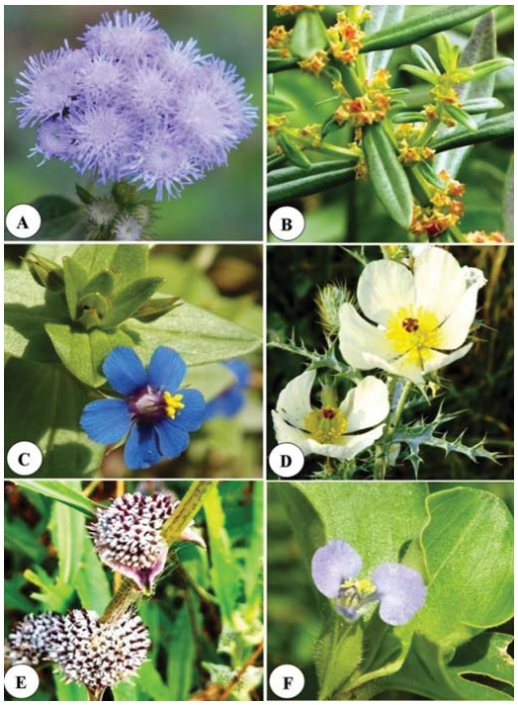

Fig. 5: A. *Ageratum conyzoides* (L.) L;
B. *Ammannia multiflora* Roxb.;
C. *Anagallis arvensis* L.;
D. *Argemone mexicana* L.;
E. *Caesulia axillaris* Roxb.;
F. *Commelina benghalensis* L.

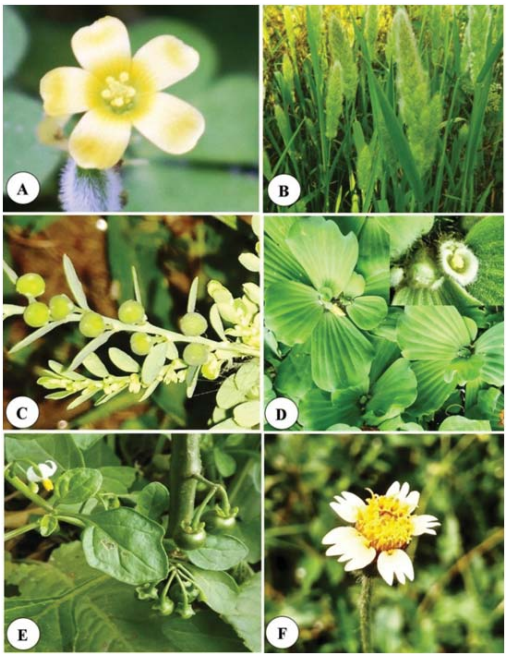

Fig. 7: A. *Oxalis corniculata* L.;
B. *Phalaris minor* Retz.;
C. *Phyllanthus amarus* Schumach. & Thonn.;
D. *Pistia stratiotes* L.; E. *Solanum nigrum* L.;
F. *Tridax procumbens* L.

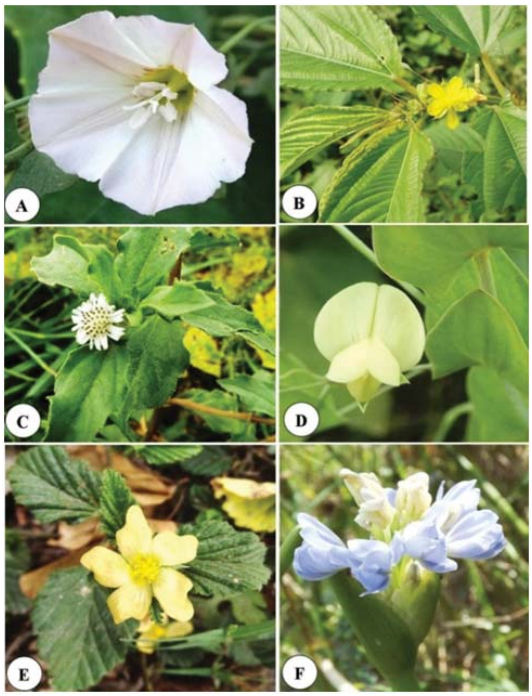

Fig. 6: A. *Convolvulus arvensis* L.;
B. *Corchorus aestuans* L.;
C. *Eclipta prostrata* L.;
D. *Lathyrus aphaca* L.;
E. *Malvastrum coromandelianum* (L.) Garcke.;
F. *Monochoria vaginalis* (Burm.f.) C. Presl

(Comprehensive-District Agriculture Plan, 2007). About 56692 hectares of areas of Sonbhadra district produce about 10792.4 tons wheat (Krishi Vigyan Kendra, Sonbhadra, 2015).

Study area

Uttar Pradesh, one of the largest states of India with an area of about 24092800 hectares, has been divided into 75 districts. Sonbhadra district is situated in vindhyan range of the state between 24° 412 233 N and 83° 32 553 E at elevations that range from 315-485 m, This district is located in the extreme south-east of the state and is bounded by Mirzapur district in the north-west, Chandauli district in the north, Kaimur and Rohtas districts of Bihar state in the north-east, Garhwa district of Jharkhand state in the east, Koriya and Surguja districts of Chhattisgarh state in the south and Singrauli district of Madhya Pradesh state in the west (Fig. 1). The whole district comprises about 678800 hectares geographical area, of which about 152529 hectares area comes under agricultural land and about 460087 hectare under non-agricultural land. The district is chiefly covered by forest which constitutes about 36.05 per cent of total area. The temperature of the area varies from

Table 1: **List of weed species found in the rice and wheat fields in Sonbhadra district**

Taxa and Family	Local name (in Hindi)	Native place	Associated crop	Flowering and fruiting periods	Voucher number
Aeschynomene indica L. •* Fabaceae	Phulan	Unclear	Rice	August–December	Kushwaha 259784 (LWG)
Ageratum conyzoides (L.)L.* (Fig. 5A); Asteraceae	Mahkuwa	Tropical America and Brazil	Rice	September–March	Kushwaha 304198 (LWG)
Alternanthera sessilis (L.) R.Br. ex DC. # *; Amaranthaceae	Guroo	Pantropical	Rice	Throughout the year	Kushwaha 259235 (LWG)
Amaranthus viridis L. •* Amaranthaceae	Jangali Chaurai	Pantropical	Wheat	Throughout the year	Kushwaha 254700 (LWG)
Ammannia baccifera L. * Lythraceae	Ban Marach	Tropical regions of Asia, America and Africa	Rice	November–April	Kushwaha 304146 (LWG)
Ammannia multiflora Roxb. # (Fig. 5B), Lythraceae	Ban mirich	Asia	Rice	September–December	Kushwaha 259786 (LWG)
Anagallis arvensis L. *#(Fig. 5C), Primulaceae	Neel	Europe, Western Asia and North Africa	Wheat	December–March	Kushwaha 254470 (LWG)
Argemone mexicana L. *(Fig. 5D), Papaveraceae	Satyanashi	Mexico	Wheat	January–December	Kushwaha 304169 (LWG)
Asphodelus tenuifolius Cav. Xanthorrhoeaceae	Jungli piyaz	India	Wheat	January –March	Kushwaha 259788 (LWG)
Avena sterilis subsp. *ludoviciana* (Durieu) Gillet & Magne*#Primulaceae	————	Unclear	Wheat	February–April	Kushwaha 259792 (LWG)
Bacopa monnieri (L.) Wettst. *#• Scrophulariaceae	Brahmi	Australia, Europe, Africa, Asia and North and South America	Rice	May–October	Kushwaha 254472 (LWG)
Bergia ammannioides Roxb. ex Roth *, Elatinaceae	————	Asia	Rice	August–April	Kushwaha 259795 (LWG)
Blumea lacera DC. *, Asteraceae	Kakronda	India	Rice	Throughout the year	Kushwaha 259778 (LWG)
Boerhavia diffusa L. # Nyctaginaceae	Punarnava	Asia, Africa	Rice	January–April	Kushwaha 259762 (LWG)
Caesulia axillaris Roxb. *# (Fig. 5E), Asteraceae	Thukjhag	India and Bangladesh	Rice	September–November	Kushwaha 259797 (LWG)
Cannabis sativa L. * Cannabaceae	Bhang	India and Europe	Wheat	February–June	Kushwaha 254269 (LWG)
Carthamus oxyacantha M.Bieb. * Asteraceae	katila	Asia	Wheat	January–February	Kushwaha 254599 (LWG)
Chenopodium album L. *#•Chenopodiaceae	Bathuwa	Europe	Wheat	December–March	Kushwaha 259771 (LWG)
Chenopodium murale L. * Chenopodiaceae	Jangali bathuwa	Europe & Asia	Wheat	December–March	Kushwaha 254273 (LWG)
Commelina benghalensis L. *• (Fig. 5F) Commelinaceae	Kanchara	Tropical and subtropical Asia and Africa	Rice	November–February	Kushwaha 304126 (LWG)
Convolvulus arvensis L. *#• (Fig. 6A) Convolvulaceae	Hiranpag	Europe and Asia	Wheat	December–February	Kushwaha 259292 (LWG)
Corchorus aestuans L. *# (Fig. 6B) Malvaceae	Chonch	Pantropical	Rice	September–February	Kushwaha 264769 (LWG)

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Table 1 Contd.

Taxa and Family	Local name (in Hindi)	Native place	Associated crop	Flowering and fruiting periods	Voucher number
Cynodon dactylon (L.) Pers. *# Poaceae	Doob ghaas	Bermuda	Rice and Wheat	March to September	Kushwaha 254607 (LWG)
Cyperus compactus Retz. *# Cyperaceae	————	Asia	Rice	March to September	Kushwaha 259779 (LWG)
Cyperus compressus L. *#Cyperaceae	Motha Ghas	United States	Rice	August–December	Kushwaha 259774 (LWG)
Cyperus cyperoides (L.) Kuntze*# Cyperaceae	————	Asia	Rice	July–November	Kushwaha 259790 (LWG)
Cyperus difformis L. *# Cyperaceae	————	Tropical, Subtropical and temperate regions	Rice	August–December	Kushwaha 259763 (LWG)
Cyperus iria L. *Cyperaceae	————	Tropical Asia and East Africa	Rice	July–November	Kushwaha 254380 (LWG)
Cyperus rotundus L. *#	Motha	Africa, southern and central Europe and southern Asia	Rice and Wheat	January to December	Kushwaha 254667 (LWG)
Dactyloctenium aegyptium (L.) Willd. *• Poaceae	————	South America	Rice	August to December	Kushwaha 254665 (LWG)
Desmodium triflorum (L.) DC. * Fabaceae	Kudaliya	Indo to Malaysia and Australia	Rice	September–April	Kushwaha 259780 (LWG)
Digitaria ciliaris (Retz.) Koeler Poaceae	————	Paleotropics	Rice	June–November	Kushwaha 254490 (LWG)
Echinochloa colona (L.)• Link Poaceae	Jharwa	Tropical Asia & Africa	Rice	June to October	Kushwaha 259886 (LWG)
Echinochloa crus-galli (L.) P. Beauv. *•· Poaceae	Samak	Unclear	Rice	July–November	Kushwaha 259794 (LWG)
Echinochloa stagnina (Retz.) P. Beauv. #•, Poaceae	————	Tropical Asia and Africa	Rice	June to October	Kushwaha 254798 (LWG)
Eclipta prostrata L. * (Fig. 6C), Asteraceae	Ujla Bhangra	Pantropical	Rice and Wheat	Throughout the year	Kushwaha 254361 (LWG)
Eriocaulon guinguangulare L.*#•· Eriocaulaceae	————	Unclear	Rice	August to November	Kushwaha 254698 (LWG)
Euphorbia hirta L. #• Euphorbiaceae	Dudhi	Tropical America	Rice	August–October	Kushwaha 304189 (LWG)
Fimbristylis miliacea (L.) Vahl * Cyperaceae	————	Coastal tropical Asia	Rice	July–November	Kushwaha 259765(LWG)
Fimbristylis tetragona R. Br. * Cyperaceae	————	Tropics	Rice	October to December	Kushwaha 259789 (LWG)
Fumaria indica (Hausskn.) Pugsley *#, Papaveraceae	Papara	Asia	Wheat	December–May	Kushwaha 304176 (LWG)
Glinus oppositifolius (L.) Aug. DC. *•, Molluginaceae		Jima	Pantropical	Rice	February to April
Kushwaha 259789 (LWG)					
Hydrolea zeylanica (L.) Vahl• Hydrophyllaceae	Koliary	Pantropical	Rice	November–February	Kushwaha 259791(LWG)
Ischaemum rugosum Salisb. *# Poaceae	————	Tropical Africa and Asia	Rice	November to February	Kushwaha 259796 (LWG)
Lathyrus aphaca L. *#•(Fig. 6D), Fabaceae	Jangali matar	Western Europe, west Asia to India	Wheat	August–September	Kushwaha 259798 (LWG)
Leptochloa panicea (Retz.) Ohwi #, Poaceae	Jira ghas	Africa and Asia	Rice	July–November	Kushwaha 254488 (LWG)
Limnophila indica (L.) Druce#• Scrophulariaceae	Papri	Pantropical	Rice	March to November.	Kushwaha 259884 (LWG)
Lindernia crustacea (L.) F.Muell. * Linderniaceae	————	Africa, America and Tropical and Subtropical Asia	Rice	July–November	Kushwaha 304145 (LWG)
Ludwigia perennis L. #• Onagraceae	————	Tropical Africa, Asia and Australia	Rice	August–May	Kushwaha 254466 (LWG)
Malvastrum coromandelianum (L.) Garcke * (Fig. 6E) Lythraceae	Kharenti	Pantropical	Rice	October–January	Kushwaha 304142 (LWG)
Medicago polymorpha L. #• Fabaceae	Jangali methi	Mediterranean region and Asia	Wheat	February–March	Kushwaha 254375 (LWG)

Contd.

Table 1 Contd.

Taxa and Family	Local name (in Hindi)	Native place	Associated crop	Flowering and fruiting periods	Voucher number
Melilotus indicus (L.) All. *#• Fabaceae	Ban Methi	Mediterranean region	Wheat	December–April	Kushwaha 259797 (LWG)
Melochia corchorifolia L. *#• Sterculiaceae	Bundava	Pantropical	Rice	May–September	Kushwaha 254483 (LWG)
Monochoria vaginalis (Burm.f.) C. Presl *• (Fig. 6F) Pontederiaceae	Jal phulai	India to China, Malesia & Japan	Rice	September–November	Kushwaha 304141 (LWG)
Mukia maderaspatana (L.) M. Roem. *, Cucurbitaceae	Ghugri	Paleotropics	Rice	April–October	Kushwaha 254310 (LWG)
Murdannia nudiflora (L.) Brenan*, Commelinaceae	Kansura	Indo to Malaysia and Africa	Rice	September to November	Kushwaha 304130 (LWG)
Nicotiana plumbaginifolia Viv. * Solanaceae	Ban tamakhu	Argentina to Ecuador, Mexico, west Indies	Rice & Wheat	November–March	Kushwaha 254476 (LWG)
Oldenlandia corymbosa L. *• Rubiaceae	Pappad	Pantropical	Rice	April to September	Kushwaha 304168 (LWG)
Oryza rufipogon Griff. •Poaceae	Banchawal	India, Sri Lanka and Tropical Australia	Rice	July–November	Kushwaha 259785 (LWG)
Oxalis corniculata L. #• (Fig. 7A), Oxalidaceae	Amrit Sak	Cosmopolitan	Rice & Wheat	January–December	Kushwaha 254463 (LWG)
Paspalidium flavidum (Retz.) A.Camus*# Poaceae	Sawaghas	Tropical Asia	Rice	July–November	Kushwaha 259798 (LWG)
Paspalum scrobiculatum L. • Poaceae	Dhanghas	India and Pakistan	Rice	Throughout the year	Kushwaha 254594 (LWG)
Phalaris minor Retz. # (Figure-7B), Primulaceae	Guli danda	Mediterranean region, eastwards to northwest Himalaya	Wheat	February–March	Kushwaha 259777 (LWG)
Phyla nodiflora (L.) Greene *Verbenaceae	Jal Buti	Tropics and Subtropics	Rice	Throughout the year	Kushwaha 254600 (LWG)
Phyllanthus amarus Schumach. & Thonn. * (Fig. 7C) Phyllanthaceae	Hajarmani	Tropical East Asia	Rice	August–November	Kushwaha 259799 (LWG)
Phyllanthus virgatus G. Forst. * Phyllanthaceae	Amli	Unclear	Rice	August–November	Kushwaha 304172 (LWG)
Pistia stratiotes L. *•(Fig. 7D) Araceae		Pantropical	Rice	June to September	Kushwaha 304124 (LWG)
Polygonum plebeium R.Br. *• Poaceae	Machechi	Pantropical	Wheat	March–April	Kushwaha 254467 (LWG)
Polypogon monspeliensis (L.) Desf. *• Primulaceae	————	Europe and Temperate Asia.	Wheat	February–June	Kushwaha 259780 (LWG)
Rumex retroflexus Lag. ex Schult. & Schult.f. * Polygonaceae	————	Europe and southwestern Asia	Wheat	January–May	Kushwaha 259793 (LWG)
Rumex dentatus L. *, Polygonaceae	Ambavah	Europe, Mediterranean region, Asia	Wheat	January–May	Kushwaha 304179 (LWG)
Sesbania bispinosa (Jacq.) W. Wight *•, Fabaceae	Dhaincha	Pantropical	Rice	September–January	Kushwaha 254340 (LWG)
Solanum nigrum L. *•(Fig. 7E **),** Solanaceae	Mokoi	Eurasia	Rice & Wheat	Throughout the year	Kushwaha 254489 (LWG)
Spergula arvensis L. Caryophyllaceae	Khandilal	Asia, Europe and North America	Wheat	Throughout the year	Kushwaha 254476 (LWG)
Trianthema portulacastrum L. *• Aizoaceae	Saagghas	Tropics of the World	Rice	April–June	Kushwaha 304102 (LWG)
Tridax procumbens (L.) L. *• (Fig. 7F), Asteraceae	Khal to muriya	Tropical America	Rice	Throughout the year	Kushwaha 254597 (LWG)
Utricularia aurea Lour. Lentibulariaceae		Indo to Malaysia to Australia & East Asia	Rice	October–December	Kushwaha 259800 (LWG)
Vicia sativa L. *•, Fabaceae	Ban Matar	Temperate and many subtropical and tropical regions of the world	Wheat	December–April	Kushwaha 259784 (LWG)

*Note: *Medicinal species, # Species used as fodder, • Species used as vegetables*

32°C-42°C in the summer and 2°C-15°C in the winter. The topography of the area varies from plains to slopes to uneven hillocks to ridges and to rock outcrops. The entire area is covered with alluvial and colluvial soils and rocks.

MATERIALS AND METHODS

In this study, 4 field tours in *kharif* and *rabi* seasons have so far been conducted between 2012-2017 to survey the area. The plant materials were collected either in flowering or fruiting or in both stages with detailed taxonomic information such as habit, habitat, colour of flowers, GPS data *etc*. The herbarium specimens were prepared following standard procedure out lined by Lawrence (1951) and Jain and Rao (1977). The identification of weed species was made with the help of 'Handbook on Weed Identification' (Naidu, 2012), different floras and important taxonomic works (Duthie, 1903-1929; Singh, 1997; Rana and Datt, 2016) and also by matching the collected materials with the authentic specimens housed at various Indian herbaria like BSA, BSD, CAL, DD and LWG. All specimens collected in the present study have been deposited at LWG for future records. In the present study, all species have been alphabetically enumerated in the table 1 with botanical name along with family, vernacular name in Hindi, nativity, associated crops, flowering and fruiting periods and reference to voucher specimens. The photographs of some of the plants have also been provided (Fig. 5-7).

RESULTS AND DISCUSSION

The survey conducted during 2012-17 in the field of rice and wheat throughout the district revealed 78 angiospermic weed species which belong to 70 genera and 36 families (Fig. 2, Table 1). Of these, dicotyledonous weeds are represented by 50 species under 50 genera and 29 families whereas monocotyledonous weeds are represented by 28 species under 20 genera and 7 families. Out of total species found in the district in these two crops, 37 species are native to India, 36 species are exotic and for remaining 5 species nativity is not clear (Table 1). During *kharif* season in the rice crop 57 species under 47 genera and 28 families (Fig. 3) and during *rabi* season in the wheat crop 21 species under 19 genera and 12 families (Fig. 4) were observed. Only six species (*i.e*. *Cynodon dactylon* (L.) Pers., *Cyperus rotundus* L., *Eclipta prostrata* L., *Nicotiana plumbaginifolia* Viv., *Oxalis corniculata* L., *Solanum nigrum* L.) have been found growing in both crops in both seasons. During the survey it was also observed that about 14 species were used by local people as vegetables and about 32 species as fodder for animals (Table 1). Apart from this, about 64 species considered as medicinal are also found in these two crops (Table 1). *Anagallis arvensis* L., *Argemone mexicana* L. and *Spergula arvensis* L. are treated as poisonous plants among the studied taxa.

About 25 species (*i.e*. *Aeschynomene indica* L. , *Ammannia baccifera* L., *Ammannia multiflora* Roxb., *Caesulia axillaris* Roxb., *Commelina benghalensis* L., *Cyperus compressus* L. *Cyperus cyperoides* (L.) Kuntze, *Cyperus difformis* L., *Cyperus iria* L., *Cyperus rotundus* L., *Echinochloa colona* (L.) Link, *Fimbristylis tetragona* R. Br., *Hydrolea zeylanica* (L.) Vahl, *Leptochloa panicea* (Retz.) Ohwi, *Ludwigia perennis* L., *Monochoria vaginalis* (Burm.f.) C. Presl, *Oryza rufipogon* Griff., *Paspalidium flavidum* (Retz.) A. Camus, *Paspalum scrobiculatum* L., *Phyla nodiflora* (L.) Greene, *Pistia stratiotes* L., *Polygonum plebeium* R. Br., *Polypogon monspeliensis* (L.) Desf., *Sesbania bispinosa* (Jacq.) W. Wight, *Utricularia aurea* Lour). have been listed under 'least concern' category of IUCN (IUCN, 2016). Some of the dominant and co-dominant weeds in the rice fields are: *Ageratum conyzoides* (L.) L., *Blumea lacera* DC., *Commelina benghalensis* L., *Cynodon dactylon* (L.) Pers., *Cyperus cyperoides* (L.) Kuntze, *Cyperus rotundus* L., *Euphorbia hirta* L., *Fimbristylis miliacea* (L.) Vahl, *Oxalis corniculata* L., *Oryza rufipogon* Griff., *Tridax procumbens* (L.) L. *etc*. Similarly, in wheat fields the dominant and co-dominant elements are : *Amaranthus viridis* L., *Anagallis arvensis* L., *Avena sterilis* subsp. *ludoviciana* (Durieu) Gillet & Magne, *Cannabis sativa* L., *Chenopodium murale* L., *Convolvulus arvensis* L, *Fumaria indica* (Hausskn.) Pugsley, *Lathyrus aphaca* L., *Melilotus indicus* (L.) All., *Phalaris minor* Retz., *Vicia sativa* L. *etc*.

The eradication and management of weeds from the cropping systems are major issues for farmers. Different chemical, biological and mechanical techniques are applied to eradicate the weeds from the agriculture farms. The successful weed management is only possible when proper identification, characterization and life cycle of weeds are extensively studied. Even, the identification of weeds in seedling stage is also important for proper implementation of eradication programme. The harmful and useful, both aspects of weeds must be considered in any eradication scheme. For example, the leguminous weeds may increase the soil fertility by nitrogen fixation. Similarly, we must think for proper utilization of eradicated weeds in various uses. The weeds with medicinal properties may be supplied to pharmaceutical companies for further utilization. Directly or indirectly it will enhance the income of the farmers. Therefore, the present study provides a base line data which may be utilized by many people involved in weed research.

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