Original Research Article

<https://doi.org/10.20546/ijcmas.2020.904.147>

Inventorizations of Weed Species from Wheat Crop Fields of District Fatehgarh Sahib, Punjab (India)

Yadvinder Singh^{1*} and Rai Singh²

¹Department of Botany and Environmental Science, Sri Guru Granth Sahib World University, Fatehgarh Sahib-140406, Punjab, India

²Pesently at Department of Botany, Panjab University, Chandigarh -160014, Punjab, India

*Corresponding author

ABSTRACT

Keywords

Fatehgarh Sahib, Inventorization, Punjab, Weed, Wheat Crop

Article Info

Accepted:
10 March 2020
Available Online:
10 April 2020

The present work is based on survey and data collection during November 2017 to April 2018 in Fatehgarh Sahib District of Punjab, India. During the survey, 51 weed species (42 dicots and 9 monocots) were identified on the basis of their morphological features from wheat crop fields in different regions of study area. These identified weed species were belongs to 48 genera of 22 families. The members of Families Asteraceae and Poaceae were dominant in the crop field with 8 species each followed by Family Fabaceae with 5 species. This study will be helpful in the sustainable management of weeds from wheat crop fields.

Introduction

Wheat (*Triticum aestivum* L.) is an important staple food crop of the world. It offers high content of proteins and also contains carbohydrates in the form of starch (Singh *et al.*, 2015). Sometimes, Wheat crop suffers a severe loss due to heavy weed infestation. Weeds are nuisance in crop fields as they compete with the main crop for light, space and nutrients (Singh and Singh 2019). Weeds also reduce crop yield quality and also interfere in harvesting. The species like *Avena*

sativa, *Chenopodium album*, *Fumaria indica* and *Phalaris minor* etc are common weeds in wheat crop fields (Ahmed and Shaikh, 2003; Khobragad and Sathawane, 2014).

Weeds are those plants with harmful or objectionable habits or characteristics which grow where they are not wanted, usually in places where it is desired that something else should grow (Zimdahl, 2007; Walia, 2009). Weed is a plant which shares the nutrients, space and light of main crop (Singh *et al.*, 2015). Weeds are found inside the crop and

surroundings also. Weeds like *Convolvulus microphyllus* root system is coiled to increase surface area and length for increased absorption efficiency. Grasses such as *Cyanodon dactylon*, *Cyperus rotundus* are known to survive under very dry conditions. Some weeds have ecotypes with differential resistance to insect attack and varied nutrient absorbing capacities (Zimdahl, 2007). The study of weed plants also provides knowledge about the importance of weed because some weeds have large number of ethnobotanical values (Shah *et al.*, 2016).

It can help us develop new products in pharmaceuticals and food industries (Kendler *et al.*, 1992; Anjalam *et al.*, 2016). Some weeds commonly used by local peoples for food, medicine and fodder etc. For better management of weeds, it is necessary to study their morphology, physiology, systematics, ecology, and ethnobotany (Singh and Singh 2019).

Complete destruction of weeds from the crops by physically, chemically or biologically are dangerous alarming in the loss of biodiversity. Management of weed plants is also important because without management weeds affect the yield and quality of the main crop. So, there is a need of integrated management of weed species without any loss of biodiversity. The main objectives of the present study is to prepare an inventory of weed species growing in wheat crop fields of Fatehgarh Sahib to helps the farmers for designing a suitable management strategies without any harming the plant diversity of the study area.

Materials and Methods

Study area

Wheat crop fields of different localities (Mandi Gobindgarh, Amloh, Chunnikalan, Sirhind, Khamanon, Bassi Pathana and

Charnarthal) in District Fatehgarh Sahib, Punjab were surveyed (Fig. 1).

Collection

The study was conducted during November 2017 to April 2018 to explore weed diversity. Standard methods were followed for collection of weed species. The species were collected depending upon their requirement and availability. Small plants were collected in whole form with root, stem, leaves, flowers and fruits. For collection of large shrubs it is impossible to collect in whole form therefore only twig of plant which includes stem, leaves, flowers and fruits were collected.

Herbarium preparation

After collection of plant specimens they were pressed using herbarium press. The plant specimens were placed in between three to five layers of papers. The paper sheets were changed at regular interval of 8 days. After proper drying and pressing, the plant specimens were mounted on herbarium sheets for preparation of herbarium. Herbarium sheets were protected against damages from insect and fungal attack by poison treating them with 1% mercuric chloride solution. Naphthalene balls were also used to protect herbarium from insects.

Identification

The collected plants species were identified on the basis of available literature like Nair (1978); Meenakshi and Sharma (1985); Sidhu and Bir (1991); Rawat *et al.*, (2013); Kaur *et al.*, (2017). The herbarium specimens of identified plant species were submitted to the Herbarium, Department of Botany and Environmental Science, Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab.

Results and Discussion

During the survey, 51 weed species were collected from wheat crop fields of different regions of district Fatehgarh Sahib. These weed species belongs to 48 genera of 22 families. Out of 51 Species 42 species were belonging to dicot (Ranunculaceae, Papaveraceae, Fumariaceae, Brassicaceae, Caryophyllaceae, Malvaceae, Geraniaceae, Fabaceae, Asteraceae, Primulaceae, Asclepidaceae, Convolvulaceae, Solanaceae, Scrophulariaceae, Lamiaceae, Chenopodiaceae, Amaranthaceae, Polygonaceae, Euphorbiaceae and Cannabaceae) and 09 species belongs to monocot (Cyperaceae and Poaceae).

Family Poaceae and Asteraceae dominate in the study area with 8 species each followed by family Fabaceae with 5 species, Caryophyllaceae and Polygonaceae with 03 species each, Brassicaceae, Malvaceae, Solanaceae, Chenopodiaceae, Amaranthaceae, Convolvulaceae and Polygonaceae 02 species each.

Whereas family Ranunculaceae, Papaveraceae, Fumariaceae, Geraniaceae, Primulaceae, Asclepidaceae, Convolvulaceae, Scrophulariaceae, Lamiaceae, Euphorbiaceae, Cannabaceae and Cyperaceae were monotypic and represented by only 01 species from study area (Table 1).

Genus *Convolvulus*, *Veronica* and *Rumex* are represented by 02 species each whereas *Ranunculus*, *Argemone*, *Fumaria*, *Sisymbrium*, *Cronopus*, *Stellaria*, *Spergula*, *Silene*, *Malva*, *Malvastrum*, *Oxalis*, *Medicago*, *Lathyrus*, *Vicia*, *Melilotus*, *Trifolium*, *Ageratum*, *Gnaphalium*, *Parthenium*, *Artemisia*, *Cirsium*, *Sonchus*, *Conyza*, *Launaea*, *Anagallis*, *Calotropis*, *Solanum*, *Nicotiana*, *Salvia*, *Chenopodium*, *Chenopodiastrum*, *Achyranthes*,

Alternanthera, *Polygonum*, *Euphorbia*, *Cannabis*, *Cyperus*, *Poa*, *Cyanodon*, *Lolium*, *Avena*, *Dichanthium*, *Polypogon*, *Cenchrus* and *Phalaris* were represented by only 01 species each (Table 2 and Image 2-3).

The various studies have been conducted on the weed flora of wheat by different works. These studies determined weed species composition and the level of weed infestation in wheat crop (Salonen *et al.*, 2001).

Kirec and Yarci (1999) recorded 93 weeds occurring in wheat from the agricultural areas of Enez (Edirne), Turkey. Dhole *et al.*, (2013) studied 30 weed species which were related to 15 families and 26 genera from the rabi wheat field in the Marathwada region. Alhasi *et al.*, (2017) studied Weed Flora of the Barley (*Hordeum vulgare* L.) and Wheat (*Triticum aestivum* L.) fields in Al-Marj Plain Libya. Kumar and Duggal (2017) reported 54 weed species of 50 genera belonging to 22 families from wheat crop field of Narwana region of Haryana. During present study, *Phalaris minor* was reported in all localities followed by *Rumex dentatus* and *Fumaria indica*. Other dominant species were *Cronopus didyma*, *Chenopodium album*, *Spergula arvensis* etc. *Phalaris minor* was dominant species of irrigated soil during rabi season in Punjab.

Phalaris minor were more dominant and founds in all the wheat crop fields and may decrease the grain yields of wheat if occurs dense in growth. There is large habitat difference in occurrence between one weed species to another like *Veronica anagaliis-aquatica* and *Anagallis arvensis* etc. are reported only from the water canals. Large number of weed species founds on the bunds of wheat crop fields like *Argemone mexicana*, *Ageratum conyzoides*, *Solanum nigrum* and *Nicotiana plumbinifolia* etc. *Chenopodium album*, *chenopodium murale* and *Cronopus didymus* were also founds densely in the crop.

Some of the weeds reported from the study area having ethnobotanical values which were used for different purposes like food, fodder and for diagnosis of some diseases by native peoples. *Melilotus indicus* have large number of medicinal properties and therefore this is commonly used by the local peoples to cure

some skin diseases. *Chenopodium album* is commonly used as a vegetable. *Cyanodon dactylon*, *Lolium temulentum* and *Avena sativa* were commonly used as a fodder for animals. *Melilotus indicus*, *Calotropis procera* and *Rumex dentatus* were commonly used by local peoples to cure some diseases.

Table.1 Name of family with number of genera and species identified from study area

S. No.	Family	Genera	Species
1	Ranunculaceae	01	01
2	Papaveraceae	01	01
3	Fumariaceae	01	01
4	Brassicaceae	02	02
5	Caryophyllaceae	03	03
6	Malvaceae	02	02
7	Geraniaceae	01	01
8	Fabaceae	05	05
9	Asteraceae	08	08
10	Primulaceae	01	01
11	Asclepidaceae	01	01
12	Convolvulaceae	01	02
13	Solanaceae	02	02
14	Scrophulariaceae	01	02
15	Lamiaceae	01	01
16	Chenopodiaceae	02	02
17	Amaranthaceae	02	02
18	Polygonaceae	02	03
19	Euphorbiaceae	01	01
20	Cannabaceae	01	01
21	Cyperaceae	01	01
22	Poaceae	08	08
Total		48	51

Table.2 Taxonomic position, life form, and habit of weeds identified from study area

S. No.	Botanical Name	Family	Local Name	Life Form	Habit	Image	Voucher number
1.	<i>Ranunculus sceleratus</i> L.	Ranunculaceae	Crowfoot	Annual	Herb	1a	WU-132
2.	<i>Argemone maxicana</i> L.	Papaveraceae	Satyanashi	Annual	Herb	1b	WU-133
3.	<i>Fumaria indica</i> Pugsl.	Fumariaceae	Gajar ghas	Annual	Herb	1c	WU-134
4.	<i>Sisymbrium irio</i> L.	Brassicaceae	Khubkala	Annual	Herb	1d	WU-135
5.	<i>Cronopus didymum</i> L.		Jungli Hallon	Annual	Herb	1e	WU-136
6.	<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	Phul booti	Annual	Herb	1f	WU-137

7.	<i>Spergula arvensis</i> L.	Malvaceae	Kalri booti	Annual	Herb	1g	WU-138
8.	<i>Silene conoidea</i> L.		Takla	Annual	Herb	1h	WU-139
9.	<i>Malva parviflora</i> L.		Mallow	Annual	Herb	1i	WU-140
10.	<i>Malvastrum coromandelianum</i> (Linn) Garcke		Kharenti	Annual	Herb	1j	WU-141
11.	<i>Oxalis corniculata</i> Linn.	Geraniaceae	Khatti booti	Perennial	Herb	1k	WU-142
12.	<i>Medicago polymorpha</i> L.	Fabaceae	Maina	Annual	Herb	1l	WU-143
13.	<i>Lathyrus aphaca</i> L.		Jangli matter	Annual	Herb	1m	WU-144
14.	<i>Vicia sativa</i> L.		Bakla	Annual	Herb	1n	WU-145
15.	<i>Melilotus indicus</i> L		Senji	Annual	Herb	1o	WU-146
16.	<i>Trifolium fragiferum</i> L		Jangli barseem	Annual	Herb	1p	WU-147
17.	<i>Ageratum conyzoides</i> L.	Asteraceae	Neelam	Annual	Herb	1q	WU-148
18.	<i>Gnaphalium polycephalum</i> L		-	Annual	Herb	1r	WU-149
19.	<i>Parthenium hysterophorus</i> L.		Congress grass	Perennial	Herb to shrub	1s	WU-150
20.	<i>Artemisia scoparia</i> Waldest & Kit		Gazer booti	Perennial	Herb to shrub	1t	WU-151
21.	<i>Cirsium arvense</i> (L.) Scop		Leh	Annual	Herb to shrub	1u	WU-152
22.	<i>Sonchus arvensis</i> L.		-	Annual	Herb	1v	WU-153
23.	<i>Conyza bonariensis</i> (L.) Cronquist		-	Annual	Herb	1w	WU-154
24.	<i>Launaea nudicaulis</i> Hook. f.		Hundwaya	Perennial	Herb	1x	WU-155
25.	<i>Anagallis arvensis</i> L.	Primulaceae	Billi booti	Annual	Herb	1y	WU-156
26.	<i>Calotropis procera</i> (Willd) R.Br.	Asclepidaceae	Ak	Perennial	Shrub	2a	WU-157
27.	<i>Convolvulus arvensis</i> L.	Convolvulaceae	Hirankhuri	Annual	Herb	2b	WU-158
28.	<i>Convolvulus pluricaulis</i> Choisy		Shunkhpashpi	Annual	Herb	2c	WU-159
29.	<i>Solanum nigrum</i> L.	Solanaceae	Makoi	Perennial	Herb to Shrub	2d	WU-160
30.	<i>Nicotiana plumbaginifolia</i> Viv.		Jungli tobacco	Annual	Herb	2e	WU-161
31.	<i>Veronica anagallis-aquatica</i> L.	Scrophulariaceae	-	Annual	Herb	2f	WU-162
32.	<i>Veronica agrestis</i> L.		-	Annual	Herb	2g	WU-163
33.	<i>Salvia plebeia</i> R. Br.	Lamiaceae	-	Annual	Herb	2h	WU-164
34.	<i>Chenopodium album</i> L.	Chenopodiaceae	Bathu	Annual	Herb	2i	WU-165
35.	<i>Chenopodium murale</i> L.		Khartua	Annual	Herb	2j	WU-166
36.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Puthkanda	Annual	Herb	2k	WU-167
37.	<i>Alternanthera philoxeroides</i> Griseb		-	Annual	Herb	2l	WU-168
38.	<i>Polygonum plebeium</i> R. Br.	Polygonaceae	Gulabi booti	Annual	Herb	2m	WU-169
39.	<i>Rumex dentatus</i> L.		Jungli palak	Annual	Herb	2n	WU-170
40.	<i>Rumex spinosus</i> L		Kandiali	Annual	Herb	2o	WU-171
41.	<i>Euphorbia helioscopia</i> L	Euphorbiaceae	Kour Gandhal	Annual	Herb	2p	WU-172
42.	<i>Cannabis sativa</i> L.	Cannabinaceae	Bhung	Perennial	Herb to shrub	2q	WU-173
43.	<i>Cyperus rotundus</i> L	Cyperaceae	Murk	Perennial	Herb	2r	WU-174

44.	<i>Poa annua</i> L	Poaceae	Bueen	Annual	Herb	2s	WU-175
45.	<i>Cyanodon dactylon</i> (L.) Pers		Dhub Ghass	Perennial	Herb	2t	WU-176
46.	<i>Lolium temulentum</i> L.		Rye Ghass	Annual	Herb	2u	WU-177
47.	<i>Avena sativa</i> L.		Jungli jai	Annual	Herb	2v	WU-178
48.	<i>Dichanthium annulatum</i> (Forssk.) Stapf		-	Perennial	Herb	2w	WU-179
49.	<i>Polypogon monspeliensis</i> (L.) Desf		Loomber ghas	Annual	Herb	2x	WU-180
50.	<i>Cenchrus ciliaris</i> .L		Kutta ghas	Annual	Herb	2y	WU-181
51.	<i>Phalaris minor</i> Retz.		Gulli danda	Annual	Herb	2z	WU-182

Fig.1 Plant collection sites of district Fatehgarh Sahib, Punjab, India. (Source: www.google.com)

Image.1 Weed plants of wheat crop fields in Fatehgarh Sahib District, Punjab, India:
a- *Ranunculus sceleratus* | b- *Argemone maxicana* | c- *Fumaria indica* | d- *Sisymbrium irio* | e- *Cronopus didymum* | f- *Stellaria media* | g- *Spergula arvensis* | h- *Silene conoidea* | i- *Malva parviflora* | j- *Malvastrum coromandelianum* | k- *Oxalis corniculata* | l- *Medicago polymorpha* | m- *Lathyrus aphaca* | n- *Vicia sativa* | o- *Melilotus indicus* | p- *Trifolium fragiferum* | q- *Ageratum conyzoides* | r- *Gnaphalium polycephalum* | s- *Parthenium hysterophorus* | t- *Artemisia scoparia* | u- *Cirsium arvense* | v- *Sonchus arvensis* | w- *Conyza bonariensis* | x- *Launaea nudicaulis* | y- *Anagallis arvensis*

Image.2 Weed plants of wheat crop fields in Fatehgarh Sahib District, Punjab, India: a- *Calotropis procera* / b- *Convolvulus arvensis* / c- *Convolvulus pluricaulis* / d- *Solanum nigrum* / e- *Nicotiana glauca* / f- *Veronica anagallis-aquatica* / g- *Veronica agrestis* / h- *Salvia plebeia* / i- *Chenopodium album* / j- *Chenopodium murale* / k- *Achyranthes aspera* / l- *Alternanthera philoxeroides* / m- *Polygonum plebeium* / n- *Rumex dentatus* / o- *Rumex spinosus* / p- *Euphorbia helioscopia* / q- *Cannabis sativa* / r- *Cyperus rotundus* / s- *Poa annua* / t- *Cyanodon dactylon* / u- *Lolium temulentum* / v- *Avena sativa* / w- *Dichanthium annulatum* / x- *Polypogon monspeliensis* / y- *Cenchrus ciliaris* / z- *Phalaris minor*

The present study was conducted as a first ever attempt from the study area to explore and identify the weeds from wheat crop fields. The present work gives the idea about the total weed diversity of the wheat crop fields of District Fatehgarh Sahib, Punjab. The results obtained from this study clearly established the fact that the diversity of weeds was high and significant. This study will help the farmers and agriculturists of the study area to identify the weeds and thus help in planning a suitable strategy for their control and sustainable management.

Acknowledgements

Authors wish to express their sincere thanks to the Vice-Chancellor, Sri Guru Granth Sahib World University, Fatehgarh Sahib for providing necessary facilities for the this work.

References

- Ahmed, R. and Shaikh, A.S. 2003. Common weeds of wheat and their control. *Pakistan Journal of Water Resources*. 7: 73-76.
- Alhasi, S.M., El-Barasi, Y.M., Rahil, R.O. and Barrani, M.W. 2017. Weed Flora of the Barley (*Hordeum vulgare* L.) and Wheat (*Triticum aestivum* L.) fields in Al-Marj Plain, Libya, *ContROL*, 1: 0005. DOI: <https://dx.doi.org/10.28915/control.0005.1>
- Anjalamb, A., Kalpana, S., Vijai, D. and Premalatha, S. 2016. Documentation of medicinal plants used by malayali tribes in Kolli hills. *International Journal of Advanced Research in Biology Sciences*. 3(3): 101-107.
- Dhole, J.A., Lone, K.D., Dhole, N.A. and Bodke, S.S. 2013. Studies on weed diversity of Wheat (*Triticum aestivum* L.) crop fields of Marathwada Region, *International Journal of Current Microbiology and Applied Sciences*. 2(6): 293-298.
- Kaur, K., Sidhu, M.C. and Ahluwalia, A.S. 2017. Angiospermic diversity in Doaba region of Punjab, India. *Journal of Threatened Taxa*. 9(8): 10551–10564.
- Kendler, B.S., Koritz, H.G. and Gibaldi, A. 1992. Introducing students to ethnobotany. *The American Biology Teacher* 54(1): 46–50.
- Khobragad, D.P. and Sathawane, K.N. 2014. Weed diversity in rabi wheat crop of bhandara District (M.S.) India. *International Journal of Life Sciences*. Spl. Issues A2: 128-131.
- Kirec, M. and Yarci, C. 1999. The flora of the agricultural areas in Enez (Enirne) and environs. *Turkish Journal of Botany*. 23(1): 53- 62.
- Kumar, S. and Duggal, S. 2017. A survey of weed of wheat crops fields in Narwana region, India. *International Journal of Scientific Research and Management*. 5(8): 6664-6669.
- Meenakshi and Sharma, M. 1985. *Flora of Ropar District*. Dev Publishers, Patiala, Punjab, 267 P.
- Nair, N.C. 1978. *Flora of Punjab Plains. Botanical Survey of India*, Howrah. 326 p.
- Rawat, L, Manhas, R.K., Kholiya, D. and Kamboj, S.K. 2013. Floristic diversity of Kandi region of Hoshiarpur, Punjab, India. *Applied Ecology and Environmental Sciences*. 1(4): 49-54.
- Salonen, J., Hyvonen, T. and Jalli, H. 2001. Weed flora in organically grown spring cereals in Finland. *Agricultural and Food Science*. 10 (3): 231-242.
- Shah, A.A., Khan, Z., Ramzan, M. and Saba, R. 2016. Ethnoecology of Miani Sahib Graveyard, Lahore City, Punjab, Pakistan. *Journal of Bio-resource Management*. 3(2): 33-44.
- Sidhu, M. and Bir, S.S. 1993. Karyological

- studies on weeds on cultivable lands in Punjab, India. *Tropical Plant Science Research*. 1: 1–13.
- Singh, Y. and Singh, R. 2019. Weed diversity in Rice crop fields of Fatehgarh Sahib District, Punjab, India. *Journal of Threatened Taxa*. 11(5): 13611–13616.
- Singh, C., Singh, P. and Singh, R. 2015. *Modern Techniques of Raising Field Crops*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 596 p.
- Walia, U.S. 2018. *Weed Management*. 5th ed. Kalyani Publishers, 425 p.
- Zimdahl, R.L. 2007. *Fundamentals of Weed Science*. Academic Press is an imprint of Elsevier, 665 p.

How to cite this article:

Yadvinder Singh and Rai Singh. 2020. Inventorizations of Weed Species from Wheat Crop Fields of District Fatehgarh Sahib, Punjab (India). *Int.J.Curr.Microbiol.App.Sci*. 9(04): 1245-1254. doi: <https://doi.org/10.20546/ijcmas.2020.904.147>