Research Article

Ethnobotanical Profile of Diverse Weed Flora in Maize and Wheat Crops of Tehsil Sarai Naurang, Khyber Pakhtunkhwa, Pakistan

Mushtaq Ahmad[1], Hikmat Ullah Jan[2], Kanwal Raina[3], Nazara Shafiq[3], Syed Mukarram Shah[1], Muhammad Ibrahim[4], Shaha Buddin[1] and Gulnaz Parveen[3]*

[1]Centre of Plant Biodiversity, University of Peshawar, Peshawar, Khyber Pakhtunkhwa, Pakistan; [2]Department of Botany, Government Superior Science College Peshawar, Higher Education Department, Khyber Pakhtunkhwa, Pakistan; [3]Department of Botany, Women University, Swabi, Khyber Pakhtunkhwa, Pakistan; [4]Department of Botany, Government Post Graduate College Dargai, Malakand, Khyber Pakhtunkhwa, Pakistan.

Abstract | Th aim and objectives of this study was to conduct an ethnobotanical survey of the diverse weed flora found in maize and wheat crops of Tehsil Sarai Naurang, Khyber Pakhtunkhwa, Pakistan. Wheat and maize are staple crops that form the backbone of global food systems, providing essential nutrition for billions of people worldwide. The ethnobotanical survey was conducted by interviewing local people and farmers to document traditional knowledge on weed species in maize and wheat crops. A semi-structured questionnaire along with group discussion and interviews were used to gather ethnobotanical data. A total of 93 weed species were collected from wheat and maize crops which belonged to 31 families and 77 genera. Among these 31 families 29 families were of Dicots and only 2 families were of monocots. The 71 (76%) species collected were dicots whereas, 22 (24%) species belonged to monocots. Among the Dicots, Asteraceae were the dominant family having 9 weed species followed by, Solanaceae 8 species, Amaranthaceae 7 species, Euphorbiaceae 6 species and Chenopodiaceae with 5 species. The remaining families have less than 5 species each. Among the monocots Poaceae family has 20 weed species whereas, Cyperaceae family has 2 weed species The present study conducted revealed that 46 (49.46%) species were used as fodder followed by, 30 (32.27%) weed species were used as medicinal and 17 (18.27%) species were utilized as vegetables. The collection and documentation of weed flora from the area highlights the rich weed diversity in maize and wheat agroecosystems.

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***Correspondence** | Gulnaz Parveen, Department of Botany, Women University, Swabi, Khyber Pakhtunkhwa, Pakistan; **Email:** gulnaz.parveen@wus.edu.pk
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Introduction

The study area Tehsil Sarai Naurang, district Lakki Marwat is located in the southern region of Khyber Pakhtunkhwa, Pakistan. It has a rain-fed area with little irrigated portions. Tehsil Sarai Naurang consists of many towns and villages (Khan *et al.*, 2013) and located in the south about 22 km

away from Bannu. It is the main center of trade and commercial spot for the people of Lakki Marwat (Calvino-Cancela, 2011). During summer season, the level of humidity is very low, and the temperature is measured up to 45°C, while in winter, it falls up to 0°C. The average rain recorded is 82 mm usually in July and August (GOP, 1998).

The undesired plant species grow everywhere, particularly in crop fields (Dangwal, 2011). Weeds cause increase in farming practices, disturb fertility, and even disturb the water flow in canals during irrigation practices (Iqbal *et al*., 2015). Weeds compete with crops for available water, nutrients, light, and soil resources (Rajcan and Swanton, 2001; Khan *et al*., 2004) by reducing harvest and deterioration. They reduce the market value of many crops. They cause crop failure in huge areas (Arif *et al*., 2006).

The Maize crop is essential to human food and is used as fodder for livestock (Kumar and Jharia, 2013). Weeds have been a problematic cause in maize fields and have decreased the production of maize yield up to a tremendous level (Khan *et al*., 2009). Due to their short span of life, rapid germination, and adaptation to every environment, weeds compete with crops for many reasons, such as moisture and soil (Iqbal *et al*., 2015). Weed invasion can affect the global production of crops and also the economy of Pakistan (Ghanizadeh *et al*., 2014). Controlling weeds has a direct effect on the development and growth of maize crops (Baghestani and Zand, 2007), where the maize crop is usually characterized by diverse flora of weeds as broad-leaved plants and grasses (Kolarova *et al*., 2014; Pannacci and Tei, 2014; Lehoczky *et al*., 2014). The maize crop is sensitive to weeds flora, and the water supply also determines the composition of weeds (Ma, 2005).

Wheat is the major crop worldwide (Qureshi *et al*., 2009). It is produced in a very large area, and about 2% of the worldwide wheat stock is due to Pakistan (Harrington *et al*., 1992). In rice-wheat fields, weeds cause crucial yield loss (Waheed *et al*., 1992; Hassan and Marwat, 2004). In Pakistan, weeds reduce the yield of wheat crops to a tremendous level and also reduce the market price of wheat harvest (Suryavanshi *et al*., 2011).

Traditionally, plants are still used locally for various traditional purposes (Khan *et al*., 2004). Wild plants are dangerous, but some of the weeds are very important in nature, and local people use them and have medicinal value. They are used for the treatment of many diseases. These are required for the pharmaceutical industries as raw materials for ayurvedic production. Thus, weeds identification is very important, farmers may organize to collect weeds from fields to get traditional benefits. So, for the ethnobotany, the first step is to identify and then document the medicinal weeds in an area (Razzaq *et al*., 2013). Weeds have been used by local people since ancient times as vegetables, medicine, and fodder (Ullah and Rashid, 2007; Ibrar, 2003). In District Abbottabad different weed species were utilized and used locally to treat various diseases (Nasir and Ali 2003).

While ethnobotanical studies have focused on traditional uses of wild plants in various regions, there is a lack of comprehensive documentation on the diverse weed flora found in Tehsil Sarai Naurang, district Lakki Marwat, Khyber Pakhtunkhwa, Pakistan. Existing studies have primarily concentrated on the agricultural and ecological aspects of weeds, overlooking their cultural significance and potential uses. This knowledge gap hinders the appreciation and utilization of these plant resources, potentially leading to the loss of valuable traditional knowledge and cultural heritage.

The primary objectives of this study are to conduct an ethnobotanical survey of the diverse weed flora found in maize and wheat crops, the traditional uses and cultural significance and to identify and prioritize weed species with potential uses for food, medicine, fodder and other purposes in Tehsil Sarai Naurang, district Lakki Marwat, Khyber Pakhtunkhwa, Pakistan.

Materials and Methods

Fieldwork, collection, identification and preservation of weeds:

Nine localities with landscape variations were selected to collect weed species in maize and wheat crop fields in tehsil Sarai Naurang, Lakki Marwat. Ninety-three weed species were collected from the fields of maize and wheat crops. These specimens were shade dried and fixed on standard herbarium sheets and deposited at the herbarium of Centre of Plant Biodiversity, University of Peshawar for future reference. The

collected weed species were identified with the help of Flora of Pakistan and available literature (Ali and Nasir, 1989-1991; Ali and Qaiser, 1993-2021; Khan *et al*., 2019-2020).

Ethnobotanical profile of weed flora

The ethnobotanical data about weed flora were collected from the local people mostly farmers. Plant species were enlisted into different classes according to their local uses based on their utilization values, and such data were collected through a semi-structured questionnaire. Nine localities were visited for the data collection in the research area where 100 respondents of different age groups including both men and women were interviewed. The interviewed respondents were primarily farmers and local people (Ullah, 2014; Bajwa *et al*., 2016).

Results and Discussion

Floristic composition of weed flora

A total of 93 angiosperms weed species were collected in the study area of Tehsil Serai Naurang, in which 22 (24%) species were monocots and 71(76%) species were dicots. Monocots have two families with 22 species, and dicots have 29 families and 71 species. Among monocots the leading family was Poaceae with 20 weed species, followed by Cyperaceae with 2 weed species. The leading family among dicots was Asteraceae with 9 weed species, followed by Solanaceae with 8 species, Amaranthaceae 7 species, Euphorbiaceae with 6 species, Chenopodiaceae with 5 species, Papilionaceae and Polygonaceae with 4 species each. Aizoaceae, Apocynaceae, Apiaceae, Asclepiadaceae, Brassicaceae, Boraginaceae, Caryophyllaceae, Capparidceae, Convolvulaceae, Cucurbitaceae, Fumariaceae, Lamiaceae, Malvaceae, Mimosaceae, Oxalidaceae Plantaginaceae, Primulaceae, Ranunculaceae, Scrophulariaceae, Tiliaceae, Verbenaceae and Zygophyllaceae have less than 3 species each as shown in (Table 1, Figure 1).

Weeds in maize fields

In maize fields a total of 80 weed species which belonged to 60 genera were collected. The leading family was Poaceae with 19 weed species followed by, Asteraceae was represented by 8 species, Amaranthaceae and Solanaceae have 7 species each, Euphorbiaceae has 6 species, Chenopodiaceae has 5 species, Polygonaceae has 4 species, Zygophyllaceae has 3 species whereas, the rest of the families such as Aizoaceae, Apocynaceae, Asclepiadaceae Boraginaceae, Brassicaceae, Capparidaceae, Convolvulaceae, Cucurbitaceae, Cyperaceae, Malvaceae, Tiliaceae, Lamiaceae, Mimosaceae, Oxalidaceae, Papalionaceae, Plantaginaceae and Verbenaceae have less than 3 species each.

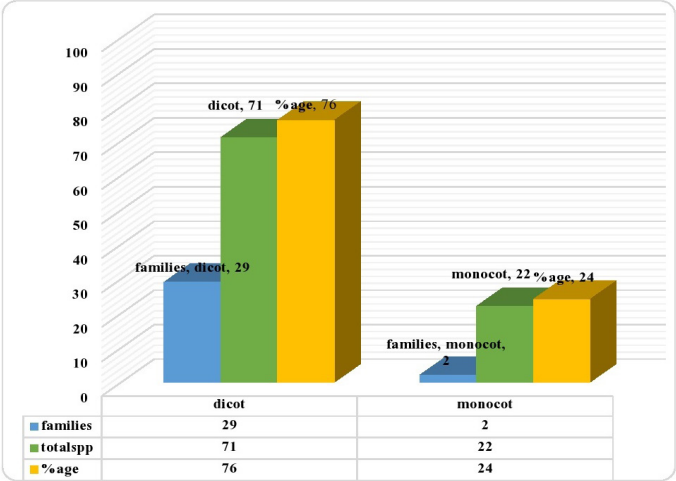

Figure 1: *Total plant species collected in the study area tehsil Sarai Naurang.*

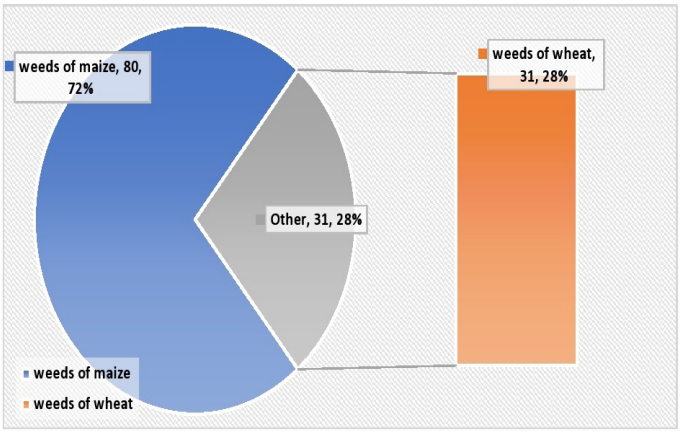

Figure 2: *Weed plants in the fields of maize and wheat crops collected from tehsil Sarai Naurang, Pakistan.*

Weeds in wheat fields

In the wheat fields a total of 31 weed species were collected which belonged to 29 genera. The leading families were Poaceae and Papilionaceae, with 4 species each followed by Asteraceae and Solanaceae having 3 species each. Apiaceae, Asclepiadaceae, Brassicaceae, Caryophyllaceae, Convolvulaceae, Chenopodiaceae, Euphorbiaceae, Fumariaceae, Lamiaceae, Plantaginaceae, Polygonaceae, Primulaceae, Ranunculaceae, Scrophulariaceae and Tiliaceae were represented by less than 3 species each (Figure 2).

Table 1: *Ethnobotanical profile of weed flora collected from maize and wheat crops in tehsil Sarai Naurang, Pakistan.*

S. No.	Family/ species names	Maize	Wheat	Local names	Part used	Ethnobotanical uses		
A.	**Monocots**					**1**	**2**	**3**
1.	**Cyperaceae**							
1	*Cyperus rotundus* L.	+	-	Deelai	Whole plant	-	+	-
2	*Cyperus esculentus* L.	+	-	Deelai	Whole plant	-	+	-
2.	**Poaceae**							
3	*Acrachne racemosa* (Roxb.) Lindl. ex Chiov.	+	-	Khwar	Whole plant	-	+	-
4	*Avena fatua* L.	-	+	Karyanna	Whole plant	-	+	-
5	*Brachiaria remosa* (L.) Stepf.	+	-	Babarghwaxai	Whole plant	-	+	-
6	*Brachiaria reptans* L.	+	-	Babarghwaxai	Whole plant	-	+	-
7	*Cenchrus ciliaris* L.	+	-	Khwar	Whole plant	-	+	-
8	*Cenchrus longispinus* (Hack.) Fern.	+	-	Spiny burr grass	Leaves and stem	-	+	-
9	*Cymbopogon citratus* (DC.) Stapf	+	-	Lemon grass	Whole plant	+	+	-
10	*Cymbopogon martini* (Roxb.) Wats.	+	-	Palm rose grass	Whole plant	+	+	-
11	*Cynodon ductylon* (L.) Pers.	+	+	Drabb	Whole plant	-	+	-
12	*Desmostachya bipinnata* (L.) Stepf.	+	-	Sarmal	Whole plant	-	+	-
13	*Dichanthium annulatum* (Forssk.) Stapf	+	-	Marvel grass	Whole plant	-	+	-
14	*Dactyloctenium aegyptium* (L.) Willd.	+	-	Crow foot grass	Whole plant	-	+	-
15	*Echinochloa colonum* (L.) Link.	+	+	Dandy samokhai	Whole plant	-	+	-
16	*Eragrotus minor* (L.) Wolf.	+	-	Little love grass	Whole plant	-	+	-
17	*Imperata cylindrica* (L.) P. Beauv.	+	-	Deely	Whole plant	-	+	-
18	*Leptochloa panacea* (Retz.) Ohwi.	+	-	Watani samokha	Whole plant	-	+	-
19	*Paspalum dilatatum* Poir.	+	-	Dalla grass	Whole plant	-	+	-
20	*Phalaris minor* Retz.	+	+	Khwar	Whole plant	-	+	-
21	*Phragmites karka* (Retz.) Trin. ex Steud.	+	-	Nall	leaves and newly emerged parts	-	+	-
22	*Sorghum halepense* (L.) Pers.	+	-	Johnson grass	Whole plant	-	+	-
B.	**Dicots**							
3.	**Aizoaceae**							
23	*Portulaca oleracea* L.	+	-	Warkhari Saag	Whole plant	-	+	+
24	*Trianthema portulacastrum* L.	+	-	Pandrawosh	Whole plant	-	+	+
4.	**Amaranthaceae**							
25	*Achyranthes aspera* L.	+	-	Babr ghwaxai	Whole plant	-	+	-
26	*Aerva javanica* (Burm.f.) Shult.	+	-	Kharh botai	Whole plant	-	+	-
27	*Alternanthera sessilis* (L.) R. Br. ex Dc.	+	-	sessile joyweed	Whole plant	-	-	+
28	*Amaranthus spinosus* L.	+	-	Saarma saag	Whole especially leaves	-	+	+
29	*Amaranthus viridis* L.	+	-	Sarma, Ranjaka	Whole especially leaves	-	+	+
30	*Bassia indica* All.	+	-	Shurakai, Kharbotai	Whole plant	-	-	-
31	*Digera muricata* (L.) Mart.	+	-	Sor gullai	Whole plant	-	+	-
5.	**Apiaceae**							
32	*Foeniculum vulgare* Mill.	-	+	Sperkai	Whole plant	+	-	-
6.	**Asclepiadaceae**							
33	*Calotropis procera* (Alton.) W.T Alton.	+	+	Spalmaka	Especially latex, leaves	+	-	-
7.	**Apocynaceae**							
34	*Nerium oleander* L.	+	-	Ganderai, Zerawonai	Seeds and leaves	+	-	-

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S. No.	Family/ species names	Maize	Wheat	Local names	Part used	Ethnobotanical uses		
						1	2	3
8.	**Asteraceae**							
35	*Cirsium arvense* (L.) Scop.	+	+	Creeping thistle	Leaves	-	+	+
36	*Conyza canadensis* L.	+	-	Horseweed	Arial parts	+	-	-
37	*Eclipta erecta* (L.) L.	+	-	False daisy	Dried whole plant	+	-	-
38	*Parthenium hysterophorus* L.	+	+	Gharbotai	Whole plant	+	+	-
39	*Sonchus arvensus* L.	+	-	Payo derawonai	Whole plant	-	+	-
40	*Symphyotrichum subulatum* (Michx.) G.L. Nesom.	+	-	Aster subulatus	Whole plant	+	-	-
41	*Taraxacum officinale* (L.) Weber ex F.H.Wigg.	-	+	Maasala	Whole plant	-	+	-
42	*Verbesina encelioides* (Cav.) Benth. and Hook.f. ex A. Gray.	+	-	Zer gullai, wild sunflower	Arial parts, Crushed leaves	+	-	-
43	*Xanthium strumarium* L.	+	-	Babr aghzai	Seeds and leaves	+	-	-
9.	**Boraginaceae**							
44	*Heliotropium europaeum* L.	+	-	Hathi sundh	Extract of whole plant	+	-	-
10.	**Brassicaceae**							
45	*Brassica campestris* L.	+	-	Wairai	Whole arial parts	+	+	+
46	*Coronopus didymus* L.	-	+	Kaxbeerai, Deedam	Whole plant	-	+	-
11.	**Caryophyllaceae**							
47	*Stellaria media* (L.) Vill.	-	+	Chick weed	Whole plant	-	+	+
12.	**Chenopodiaceae**							
48	*Chenopodium album* L.	+	+	Speena sarma, Ranjaka saag	Whole plant	-	+	+
49	*Chenopodium vulvaria* L.	+	-	Tora saarma, ranjaka	Whole plant	-	+	+
50	*Chenopodium murale* L.	+	+	Ranjaka saag	Whole plant	-	+	+
51	*Chenopodium ambrosioides* L.	+	-	Ranjaka	Whole plant	-	+	+
52	Suaeda aegyptica (Hassen). Zohry	+	-	Zamai	Whole plant	-	+	-
13.	**Capparidaceae**							
53	*Cleome viscosa* L.	+	-	Thick weed	Leaves, seeds and roots	+	-	-
14.	**Convolvulaceae**							
54	*Convolvulus arvensis* L.	+	+	Perkhatai, Perkhatonai	Whole plant	+	+	+
15.	**Cucurbitaceae**							
55	*Citrullus colocynthis* (L.) Schrad.	+	-	Maraghona	Whole plant but specially fruits	+	+	-
16.	**Euphorbiaceae**							
56	*Euphorbia prostrata* Aiton.	+	+	Perwata, Daal	Whole plant	-	+	-
57	*Chrozophora tinctoria* (L.) A.Juss.	+	-	Turnsole	Fruit, leaves, root ashes	+	-	-
58	*Euphorbia indica* Lam.	+	-	Parparai	Whole plant	+	+	-
59	*Croton bonplandianum* L.	+	-	Rushfoil or coroton	Whole plant	+	-	-
60	*Ricinus communis* L.	+	-	Arand, false castor oil bean or castor oil plant	Whole plant but specially seeds extracts	+	-	-
61	*Euphorbia helioscopia* L.	+	-	Parprai	Arial parts	+	-	-
17.	**Fumariaceae**							
62	*Fumaria indica* L.	-	+	Lewanai gazara	Whole plant	+	+	-
18.	**Lamiaceae**							
63	*Mentha longifolia* (L.) Huds.	+	+	Welanai	Whole plant	+	+	+

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S. No.	Family/ species names	Maize	Wheat	Local names	Part used	Ethnobotanical uses		
						1	2	3
19.	**Malvaceae**							
64	*Malvastrum coromandelianum* (L.) Garcke.	+	-	Three lobe false mallow	Leaves	+	-	-
65	*Malva parviflora* L.	+	-	Poskai	Whole plant body	-	+	+
20.	**Mimosaceae**							
66	*Prosopis juliflora* (Sw.) DC.	+	-	Kikrai	Paste, gum and smoke from leaves	+	+	-
21.	**Oxalidaceae**							
67	*Oxalis corniculata* L.	+	-	Tharwakai	Whole plant	+	+	-
22.	**Papilionaceae**							
68	*Alhegi marrurum* Medik.	+	+	Thandu	Soft terminal parts	-	+	-
69	*Lathyrus aphaca* L.	-	+	Lewanai matar	Whole plant	-	+	-
70	*Medicago polymorpha* L.	-	+	Malkunda	Whole plant	-	+	+
71	*Vicia sativa* L.	-	+	Vetch or garden vetch	whole plant	-	+	-
23.	**Plantaginaceae**							
72	*Plantago lanceolata* L.	+	+	Chapar panrhai	Whole plant	-	+	-
24.	**Polygonaceae**							
73	*Polygonum barbatum* (Michx.) Small.	+	+	Swamp smartweed	Seeds and Leaf extract	+	-	-
74	*Rumex crispus* L.	+	-	Patawar, Saag	Leaves	-	+	+
75	*Polygonum aviculare* L.	+	+	Common knot grass	Whole plant	+	-	-
76	*Rumex dentatus* L.	+	-	Tharwakai, curly dock	Leaves	-	+	+
25.	**Primulaceae**							
77	*Anagallis arvensis* L.	-	+	Shinstargai khwar	Whole plant	+	+	-
26.	**Ranunculaceae**							
78	*Ranunculus muricatus* L.	-	+	Rough fruited buttercup	Whole plant	-	+	-
27.	**Scrophulariaceae**							
79	*Veronica biloba* L.	-	+	Speedwell, bird's eye	Whole plant	+	-	-
28.	**Solanaceae**							
80	*Datura innoxia* Mill.	+	+	Barbaka	Seeds and juice of fruits	+	-	-
81	*Datura stramonium* L.	+	-	Barhbaaka	Fruit and seeds	+	-	-
82	*Nicotiana plumbaginifolia* Viv.	+	-	Tasawonai botai	leaves	+	-	-
83	*Physalis peruviana* L.	+	-	Koti lal	Fruits	+	-	-
84	*Solanum sarrachoides* Sendtn.	-	+	Lewanai guguray	Extract of roots and fruits	+	-	-
85	*Solanum xanthocarpum* L.	+	-	Yellow fruit nightshade	Extract of roots and juice of fruits	+	-	-
86	*Withania coagulans* (Stocks) Dunal.	+	-	Shapyanga, khamazora	Fruit	+	-	-
87	*Withania somnifera* (L.) Dunal.	+	+	Kotilal, skand, tama-terkai	Fruits and root powder	+	-	-
29.	**Tiliaceae**							
88	*Corchorus olitorius* L.	+	-	Jute mallow	Seeds and leaves	+	-	+
89	*Corchorus hirtus* L.	+	+	Lewanai kunzal	Leaves	-	+	-
30.	**Verbenaceae**							
90	*Verbena officinalis* L.	+	-	Common verbena	Leaves	+	-	-
31.	**Zygophyllaceae**							
91	*Fagonia indica* L.	+	-	Spelaghazai	Whole plant	+	-	-
92	*Peganum harmala* L.	+	-	Spelanai, Spanda	Whole plant especially fruits	+	-	-
93	*Tribulus terrestris* L.	+	-	Dre kundai Aghzai	Leaves and stem	-	+	+

Key: 1= Medicinal, 2=Fodder, 3=Vegetable.

Table 2: *Ethnomedicinal uses of weeds collected from maize and wheat crops in tehsil Sarai Naurang, Pakistan.*

S. No.	Plant species	Part used	Ethnomedicinal uses
1	*Anagallis arvensis* L.	Whole plant	Dropsy, Skin infections
2	*Brassica campestris* L.	Whole arial parts	Inflammation, skin allergic diseases, worm infestation
3	*Calotropis procera* (Alton.) W.T Alton.	Latex, leaves	Snacke bite, burn injuries, body pain, mumps, sinus fistula
4	*Chrozophora tinctoria* (L.) A. Juss.	Fruit, leaves, root powder	Fever, cough, cathartic and emetic
5	*Citrullus colocynthis* (L.) Schrad.	Whole plant but specially fruits	Gestroenteritis, indigestion, intestinal parasites, diabetes, obstruction, weak bowel movement, liver problem
6	*Cleome viscosa* L.	Leaves, seeds and roots	Rheumatic arthritis, hypertension, neurasthenia, wound healing and malaria,
7	*Convolvulus arvensis* L.	Whole plant	Fever, fungal infection, intestinal and uterine pain
8	*Conyza canadensis* L.	Arial parts	Bronchitis, sore throat, inflammation, fever, bleading from uterus, diarrhea, UTI
9	*Corchorus olitorius* L.	Seeds and leaves	Gonorrhea, dysuria, cystitis,
10	*Croton bonplandianum* L.	Whole plant	Cancer, skin infection, wounds, dysentery, constipation, diabetes, digestive problems, fever.
11	*Cymbopogon citratus* (DC.) Stapf	Whole plant	Fever, gastrointestinal disorders, cough, stomachache.
12	*Cymbopogon martini* (Roxb.) Wats.	Whole plant	Joint pain, respiratory disorders, intestinal warms.
13	*Datura innoxia* Mill.	Seeds. Leaves and juice of fruits	Toothache, fever, dandruff and falling hairs.
14	*Datura stramonium* L.	Leaves, Fruit and seeds	Ulcer, fever, asthma, bronchitis, inflammation, wound healing.
15	*Eclipta erecta* (L.) L.	Dried whole plant	Skin diseases, hair fall, stomach problems.
16	*Euphorbia helioscopia* L.	Arial parts	Cough, edema, malaria, dysentery, osteomyelitis, cancer.
17	*Euphorbia indica* Lam.	Whole plant	Breathing disorders, digestive problems, dengue fever.
18	*Fagonia indica* L.	Whole plant	Skin diseases, snake bite, small pox and swelling of neck.
19	*Foeniculum vulgare* Mill.	Whole plant	Digestive problems, intestinal gas, colic in infants, cough, cholera.
20	*Fumaria indica* L.	Whole plant	Skin diseases, diarrhea, and fever.
21	*Heliotropium europaeum* L.	Extract of whole plant	Inflamation, skin diseases, poisonous bites, wound healing.
22	*Malvastrum coromandelianum* (L.) Garcke.	Leaves	Bacterial infections, inflammation
23	*Mentha longifolia* (L.) Huds.	Whole plant	Colic, indigestion, coughs, pulmonary infections, headaches, fever, urinary tract infections, menstrual disorders.
24	*Nerium oleander* L.	Seeds and leaves	Asthma, epilepsy, painful menstrual periods, leprosy, cancer, malaria.
25	*Nicotiana plumbaginifolia* Viv.	leaves	Wounds, inflammation, toothache.
26	*Oxalis corniculata* L.	Whole plant	Influenza, fever, urinary tract infections, diarrhea, traumatic injuries, sprains, poisonous bites, enteritis.
27	*Parthenium hysterophorus* L.	Whole plant	Malaria, fever, diarrhoea, neurologic disorders, urinary tract infections, dysentery, urinary tract infections.
28	*Peganum harmala* L.	Whole plant especially fruits	Pain, skin and hair deseases, inflammation, cardiovascular, gasterointestinal diseases, nervous, neoplasm and tumors, diabetes, respiratory infections, ulcers, arthritis.
29	*Physalis peruviana* L.	Fruits	Malaria, asthma, dermatitis, malaria, asthma, hepatitis, hepatitis, Rheumatic diseases, cancer.
30	*Polygonum aviculare* L.	Whole plant	Cough, gum disease (gingivitis), bronchitis, sore mouth and throat.

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S. No.	Plant species	Part used	Ethnomedicinal uses
31	*Polygonum barbatum* (Michx.) Small.	Seeds and Leaf extract	Ulcer and griping pains of colic.
32	*Prosopis juliflora* (Sw.) DC.	Paste, gum and smoke from leaves	Painkiller, asthma and cough, galactagogue, expectorant, body tonic, eye inflammation, kidney stones, toothache, breast cancer.
33	*Ricinus communis* L.	Whole plant but specially seeds extracts	Abdominal disorders, arthritis, backache, expulsion of placenta, bilharziasis, chronic backache, sciatica, constipation, gall bladder pain, menstrual cramps, insomnia.
34	*Solanum sarrachoides* Sendtn.	Extract of roots and fruits	stomach irritation, pain, psoriasis, cramps, spasms, nervousness,
35	*Solanum xanthocarpum* L.	Extract of roots and juice of fruits	cough, fever, heart diseases
36	*Symphyotrichum subulatum* (Michx.) G.L. Nesom.	Whole plant	Fever, Inflammation
37	*Verbena officinalis* L.	Leaves	Cough, sore throat, respiratory diseases, depression, and inflammation.
38	*Verbesina encelioides* (Cav.) Benth. and Hook.f. ex A. Gray.	Arial parts, Crushed leaves	Skin problems, gum sores, cancer, spider bites, gastro-intestinal diseases, hemorrhoid,
39	*Veronica biloba* L.	Whole plant	Respiratory diseases, stomach and intestinal diseases, bladder and kidneys infections.
40	*Withania coagulans* (Stocks) Dunal.	Fruit	Dyspepsia, skin diseases, insomnia, asthama, wasting diseases, abdominal pain, intestinal diseases
41	*Withania somnifera* (L.) Dunal.	Fruits and root powder	Asthma, diabetes, arthritic diseases, hypertension, cancer.
42	*Xanthium strumarium* L.	Seeds and leaves	Headache, rhinitis, gastric ulcer, bacterial and fungal infections, arthritis, urticarial, nasal sinusitis.

Ethnobotanical profile

The present ethnobotanical study revealed that 42 (34.14%) species were used as medicinal herbs by the local people of research area such as *Mentha longifolia*, which was used for indigestion and cough treatments. Similarly, *Calotropis procera* weed was used to cure snake bites. *Brassica campestris* oil was used to treat skin allergies. *Citrullus colocynthis* was used for intestinal parasites and diabetes. *Cymbopogon citratus* were used to cure fever and cough as shown in (Table 2). The 61 (49.59%) plant species or weeds were used as fodder for cattles such as *Avena fatua*, *Amaranthus viridis, Brachiaria reptans, Cyperus rotundus, Dactyloctenium aegyptium, Eragrotus minor* and *Taraxacum officinale*. Similarly, 20 (16.26%) weed species were used as vegetables in the study area by the local people which includes *Amaranthus viridis*, *Chenopodium vulvuaria*, *Chenopodium album, Medicago polymorpha* and *Portulaca oleracea* as shown in (Table 1, Figure 3).

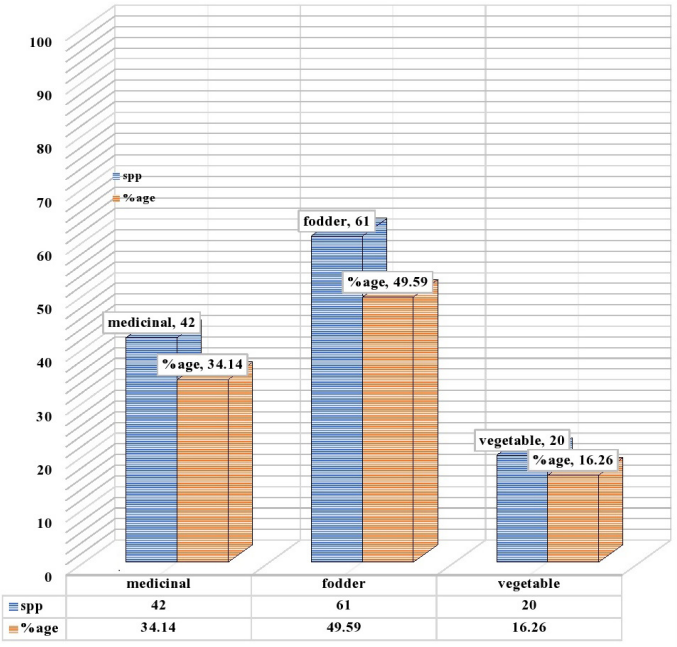

Figure 3: *Ethnobotanical uses of weeds in Maize and wheat crops collected from Tehsil Sarai Naurang, Pakistan.*

The current study conducted was similar and analogous to previous studies performed in other research regions. The results obtained in the present study are parallel and compatible with previous research studies on weeds. The results of this current study were found to be in agreement with the findings and outcomes of other studies such as those of (Khan *et al.*, 2018, 2020; Bano *et al.*, 2016; Hayat *et al.*, 2019).

Likewise, the floristic composition and ecological study were conducted on weeds in Tehsil Razar, district Sawabi where 165 weed species were reported from such fields (Hussain *et al*., 2020). A similar study like this on weeds was carried out by (Anjum *et al*., 2020) from the said range and recorded 654 species. Similarly, (Haq and Badshah, 2021) carried out the research study on the floristic description and ecological characteristics of the plants of Pashat Valley, Pak-Afghan border, district Bajaur, Pakistan.

From the maize crop 29 weed species were also collected by (Khan *et al*., 2018). Similarly, fifty two (52) weeds species from wheat crops were collected and the dominant families reported were Asteraceae, Papilionaceae, and Poaceae, respectively by (Shuaib *et al*., 2019) from district Dir, tehsil Timergara, Khyber Pakhtunkhwa, Pakistan.

Similar and parallel to the present study an ethnobotanical study was carried out in Tehsil Timergara district Dir Lower Khyber Pakhtunkhwa Pakistan, and weed plants were recorded that were used in the treatment of different diseases by the local people of the area (Amjad *et al*., 2020). A study of 150 medicinal plants belonging to 98 genera and 60 families was conducted in Azad Jammu and Kashmir (Iqbal *et al*., 2021). An ethnobotanical study which listed 143 species of plants which were used as fodder, vegetables, for medicinal purposes and other ethnobotanical uses were conducted by (Khan *et al*., 2018).

The traditional practices and cultural significance of local medicinal weeds include traditional medicines, spiritual and ritual uses and association with ancestors and supernatural powers, passed down through generations and are deeply connected to indigenous knowledge, land, place and identity highlighting their importance beyond just their medicinal value.

These results emphasize the need to reconsider our perception of weeds as solely pests and recognize their multifaceted benefits. By integrating traditional knowledge with modern agricultural practices, we can develop more sustainable and inclusive approaches to weed management.

Furthermore, this research underscores the importance of preserving traditional knowledge and promoting ethnobotanical research to uncover the hidden values of weeds. By doing so, we can ensure the conservation of biodiversity, support local livelihoods and foster a more holistic understanding of agroecosystems.

Conclusions and Recommendations

In conclusion, this study highlights the significance of weeds in wheat and maize crops, not only as competitors for resources but also as valuables resources themselves. The ethnobotanical survey revealed that local people have been utilizing these weeds for centuries as medicines , vegetables and fodder, showcasing their importance in traditional knowledge systems.

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Novelty Statement

This study reveals the unprecedented impact of weed diversity on maize and wheat crop yields, highlighting the need for tailored management strategies to optimize productivity.

Author's Contribution

Mushtaq Ahmad: Performed Research.
Hikmat Ullah Jan: Technical review.
Kanwal Raina: Helped in research.
Nazara Shafiq: Helped in paper research.
Syed Mukarram Shah: Supervisor.
Muhammad Ibrahim: Wrote the manuscript.
Shaha Buddin: Helped in statistics and graph making.
Gulnaz Parveen: Provided technical support.

Availability of data
The datasets generated and analyzed during the current study are available from the first author upon reasonable request.

Conflict of interest
The authors declare that they have no conflict

of interest. They have no financial, personal or professional interests that could influence the design, execution or interpretation of the study.

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