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Important ethnomedicinal weeds of Noornagar and Shakarpur region of Muzaffarnagar, Uttar Pradesh, India

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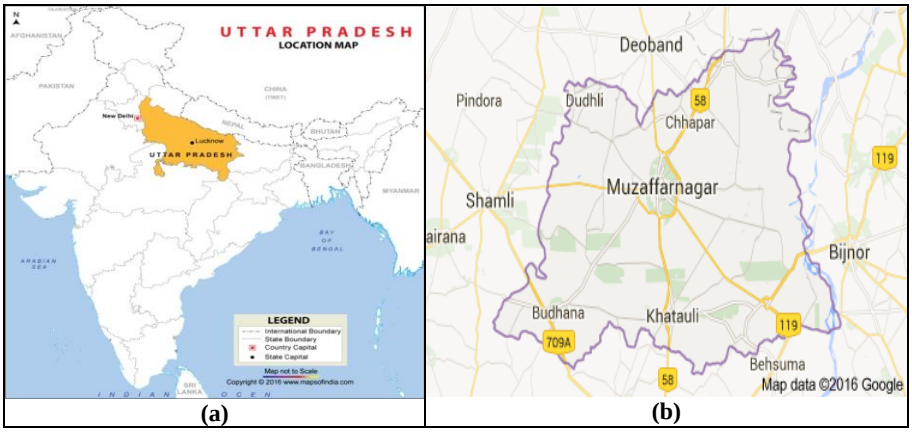
Abstract
The Noornagar and Shakarpur region of Muzaffarnagar is very rich in biological diversity. The present study was an attempt for the identification, documentation and exploration of unexplored Ethnomedicinal weeds used of this region. In this study, a total of 42weed species belonging to 22 families and 38 genera were identified. All the identified weeds were tabulated in the form of botanical name, local name, family, Habit, plant parts used, their medicinal uses and were used to cure different ailments. Therefore, documentation of this knowledge is valuable for the communities and special attention should be paid to conserve these medicinal weeds for future generation.

Keywords: ethnomedicinal, diseases, medicinal uses, Muzaffarnagar, weeds

Introduction
India is gifted with a rich wealth of medicinal plants, and known as the Botanical garden of the world (Dubey, *et al*., 2004) [1]. Out of the estimated 4, 22,000 flowering plants reported from the world (Govaerts, 2001) [2], more than 50,000 are used for medicinal purposes (Schippmann, *et al*., 2002) [3]. In India, more than 43% of the total flowering plants are reported to be of medicinal importance (Pushpangadan, 1995) [4]. The earliest mention of medicinal plants is found in Rigveda (67 medicinal plants), Yajurveda (81 medicinal plants) and Atharvaveda (290 medicinal plant species) (Sinha, 2002) [5]. At this time one can observe a global trend in the traditional system of medicines as well as ethno-botanical studies have become increasingly highly valuable in the development of healthcare system in different areas of the world by (Ahmed, 2007) [6]. Ethno-botanical surveys have been found to be one of the consistent approaches to drug discovery (Fabricant & Fornsworth, 2001) [7]. (Mulay & Sharma, 2012) [8], described weeds as "any plant growing where it is not wanted". (Tiwari, *et al*. 2012) [9], Studied the economic potential of plants growing as weed, (Upadhyay, 2013) [10], reported Ethno-botanically important plants in the parts of Shivalik hills of Kangra district, Himachal Pradesh. (Mathur & Joshi 2013) [11] Studied 206 ethnomedicinal plants including weeds of Tarai region of Kumaun, Uttarakhand. (Tiwari, *et al*. 2016) [12] Conducted a detailed study on diversity of weed flora of Bharsar, Pauri Garhwal (Uttarakhand), India. (Thirumala, & Kiran 2017) [13] Studied ethno-botanical values of 33 weed plants occurring in B.R. Project area of Karnataka. According to (Prachi, 2009) [14], Muzaffarnagar district lies in the extreme Northwest of Uttar Pradesh (UP) in the semi-arid region of upper Ganga-Yamuna Doab. It is bounded by rivers Ganga and Yamuna in East and West, respectively. The present study provides the information about some weed plants and their medicinal uses found Noornagar and Shakarpur region of Muzaffarnagar. It will be highly beneficial for the researchers and local people in informing their knowledge and finding out some other medicinal uses of these plants.

Material and Methods
Study area
The Noornagar and Shakarpur village lies indistrict of Muzaffarnagar,Uttar Pradesh (UP) situated between the North latitudes 29011' to 29043' and East longitudes 77004' to 78077', bounded by rivers Ganga and Yamuna in East and West respectively.



(a) **(b)**

Fig 1: a Map of India and b Map of the study area

Medicinal plant survey and data collection

Ethnobotanical survey was carried out in Noornagar and Shakarpur villages of the district Muzaffarnagar from December 2020 to March 2021 for collection of information. Information was gathered by conducting interviews and group discussions on the indigenous uses of plant species as medicine. Knowledge about their interests and skills were obtained through discussion with the local peoples in their local language. The information collected included common conditions or ailments or diseases occurring in humans, who are curable by plants, local name of plant species, plant-part used, Habit, and ethnomedicinal use.

Identification of ethnomedicinal plants

The weeds were identified by their local name through group discussion with the local peoples, and Vaids having much more knowledge of ethnomedicinal plants. The final identification by their scientific name was done with the help of available literature and flora of Uttar Pradesh.

Result and Discussion

During the present study about 42 weed species belonging to 38 genera and 22 families were identified. A list of Ethno-medicinal weeds with their botanical name, family, local / English name, habit, plant parts used and medicinal uses is presented in (Table-1). Out of 22 families, Asteraceae found dominant with 5 species followed by Amaranthaceae, Solanaceae, Euphorbiaceae (4 species each), Polygonaceae (3 species), Fabaceae, Ranunculaceae, Oxalidaceae, Papaveraceae, Verbenaceae, (2 species each), Acanthaceae, Apiaceae, Apocynaceae, Brassicaceae, Cannabaceae, Caryophyllaceae, Lamiaceae, Malvaceae, Nyctaginaceae, Pontederiaceae Phyllanthaceae, Plantaginaceae, (one species each) respectively (Fig. 2). Further, Out of 42 weed species, 32 herbs (76%), 7 under-shrubs (17%) and 03 shrubs (7%) (Fig. 3). The various plant parts such as Whole plant, root, leaves, inflorescence, flower, fruit and seed are used for the treatment of various diseases (Fig. 4).

The plant parts are effective against asthma, fever, dysentery, diarrhea, diabetes, cough, cold, headache, heart disease, itches, jaundice, piles, skin diseases, snakebite, toothache, vomiting, worm, wound and others diseases. It has been realized that medicinal weed plants play an important role in traditional medicinal system and used in the preparation of many medicines to cure the various diseases and other medicinal purposes.

Table 1: List of medicinal weeds with their botanical name, family, local/English name, habit, parts used, and medicinal Uses

S. N	Botanical Name	Family	Local/English Name	Habit	Parts Used	Medicinal Uses
1	*Achyranthes aspera L.*	Amaranthaceae	Chirchita, Apamarg	Under Shrub	Whole Plant	Joint pain, cramp, toothache, asthma indigestion, fever
2	*Acmella oleracea (L.) R.K. Jansen*	Asteraceae	Akarkara, Pipulka	Herb	Flower	Toothache, and gum infections.
3	*Alternanthera pungens Kunth*	Amaranthaceae	Khaki Weed	Herb	Whole Plant	Urinary tract infection, cough, and cold.
4	*Amaranthus viridis L.*	Amaranthaceae	Jungali Chaulayi	Herb	Whole Plant	Worm infestation and snake-bite.
5	*Argemone ochroleuca Sweet*	Papaveraceae	Pale Mexican Poppy	Under Shrub	Whole Plant	Eye and skin disorders.
6	*Boerhavia diffusa L.*	Nyctaginaceae	Punarnava	Herb	Root	Skin disease Asthma, jaundice, and inflammation.
7	*Calotropis procera W.T. Aiton*	Apocynaceae	Aak, Madar	Shrub	Leaves, Root	Asthma, cough, inflammation, rheumatism and skin disorders.
8	*Cannabis sativa L*	Cannabaceae	Bhang	Under Shrub	Leaves, Seed	Insomnia, cough, bronchial disorders, muscle pain, skin disease and wounds.
9	*Centella asiatica (L.) Urb.*	Apiaceae	Mandukparni, Brahmi	Herb	Whole Plant	Fever, dysentery, anxiety, stress.
10	*Cerastium glomeratum Thuill.*	Caryophyllaceae	Sticky Chickweed	Herb	Whole plant	Renal disorders.
11	*Chenopodium album L.*	Amaranthaceae	Bathuwa	Herb	Leaves	Anemia and constipation.
12	*Cirsium arvense (L.) Scop.*	Asteraceae	Field Thistle	Herb	Inflorescence	Used for inducing vomiting.
13	*Croton bonplandianus Baill.*	Euphorbiaceae	Kala Bhangra	Under Shrub	Whole plant	Cholera, diarrhea, dysentery, cold, cough, and headache
14	*Datura stramonium L.*	Solanaceae	Jimson-weed, Datura	Under Shrub	Whole Plant	Diarrhea.
15	*Eclipta prostrata L.*	Asteraceae	Bhringaraj, Kesharaj	Herb	Whole Plant	Skin disorders, headache, toothache, chronic fever, bronchial disorders, cut and wounds.
16	*Euphorbia granulata Forssk.*	Euphorbiaceae	Dhudili	Herb	Leaves	Dysentery, jaundice, digestive problems, cough and asthma.
17	*Euphorbia hirta L.*	Euphorbiaceae	Bari Dudhi	Herb	Whole Plant	Wounds, warts, cold, asthma, stomach disorders.
18	*Euphorbia parviflora L.*	Euphorbiaceae	Choti Dudhi	Herb	Leaves	Diarrhea, and dysentery
19	*Fumaria indica (Hausskn.) Pugsley*	Papaveraceae	Papara	Herb	Whole Plant	Worm infestation
20	*Justicia adhatoda L.*	Acanthaceae	Vasa, Adusa	Shrub	Whole Plant	Fever and respiratory disorders.
21	*Lantana camara L.*	Verbenaceae	Kuri	Shrub	Leaves, Root	Wounds and malarial fever.
22	*Lathyrus aphaca L.*	Fabaceae	Jangli Mattar	Herb	Flowers, Seed	Skin infections
23	*Lepidium didymum L.*	Brassicaceae	Bitter Cress	Herb	Whole Plant	Renal problems and scabies.
24	*Malvastrum coromandelianum (L.) Garcke*	Malvaceae	Kharenti	Under Shrub	Leaves	Rheumatism and pain.
25	*Mecardonia procumbens (Mill.) Small*	Plantaginaceae	Makardana	Herb	Whole Plant	Anxiety and stress.
26	*Melilotus indicus (L.) All.*	Fabaceae	Methi	Herb	Seed	Bowel complaints and diarrhea.
27	*Nicotiana plumbaginifolia Viv.*	Solanaceae	Ban Tamaku	Herb	Whole Plant	Cuts, headache, stomachache, hypertension,
28	*Oxalis corniculata L.*	Oxalidaceae	Amrul, Congeri	Herb	Whole Plant	Diarrhea, dysentery, cuts, wounds, eye infection.
29	*Oxalis debilis Kunth*	Oxalidaceae	Large-Flowered Pink-sorrel	Herb	Whole Plant	Used for dandruff.

30	*Parthenium hysterophorus L.*	Asteraceae	Gajar Ghas	Herb	Root	Dysentery.
31	*Persicaria barbata (L.) H. Hara*	Polygonaceae	Bearded Knotweed, Water Milkwort	Herb	Root, Seed	Used for colic pain.
32	*Phyla nodiflora (L.) Greene*	Verbenaceae	Jal Buti	Herb	Whole plant	Joint pain and ulcer.
33	*Phyllanthus urinaria L.*	Phyllanthaceae	Lal Bhuinanwalah	Herb	Flower	Diarrhea and dysentery.
34	*Polygonum plebeium R. Br.*	Polygonaceae	Machechi	Herb	Whole Plant	Used for bowl complaint.
35	*Pontederia crassipes Mart.*	Pontederiaceae	Jal Kumbhi	Herb	Whole Plant.	Used for Goiter and wounds healing.
36	*Ranunculus muricatus L.*	Ranunculaceae	Spinyfruit Buttercup,	Herb	Whole Plant	Fever and asthma.
37	*Ranunculus sceleratus L.*	Ranunculaceae	Jal dhaniya	Herb	Whole plant	Relieving swelling and removing excessive heat from liver and gall bladder.
38	*Rumex dentatus L.*	Polygonaceae	Jangli Palak,	Herb	Root	Diarrhea and constipation.
39	*Salvia plebeia R. Br.*	Lamiaceae	Kamrkash, Samundarsok	Herb	Seed	Used for toothache.
40	*Solanum nigrum L.*	Solanaceae	Makoi, Kakamachi	Herb	Whole plant	Used to Cardiac disorders, diarrhea, coughs, inflammation, fever, burns, itching and ear disorders.
41	*Tridax procumbens L.*	Asteraceae	Khal-Muriya	Herb	Leaves	Wounds, cuts, bronchial disorders, fever and boils.
42	*Withania somnifera (L.) Dunal*	Solanaceae	Ashwagandha	Under Shrub	Whole plant	Used for Bronchial disorders, rheumatism. Diabetes, hypertension, and skin disorders.

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Chandra & Rawat, 2015 [15], Dogra *et al*. 2015 [16], Gambhire & Biradar, 2016 [17], Patro, 2016 [18], Sharma, 2016[19], Tripathy *et al*. 2017 [20], Ali *et al*. 2018 [21], Balkrishna *et al*. 2018 [22], Pandey *et al*, 2018 [23], Dwivedi *et al* 2019 [24], Fatima *et al*. 2019 [25], Sai Prasanna *et al*. 2019 [26]

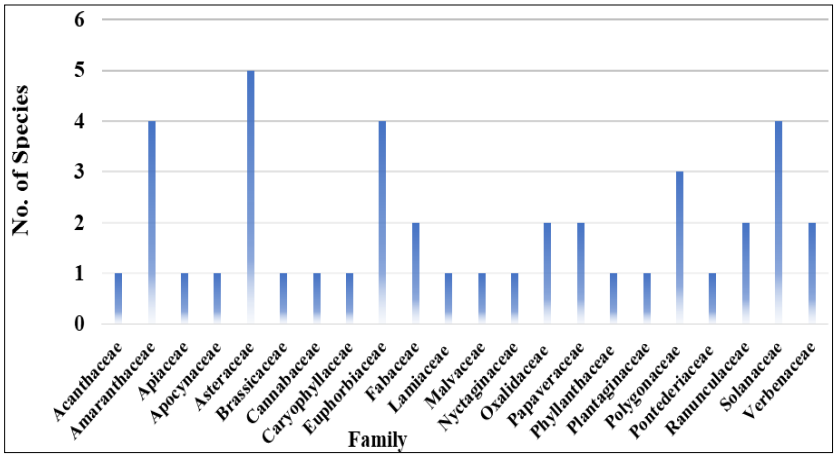

Fig 2: Number of plant species under different families

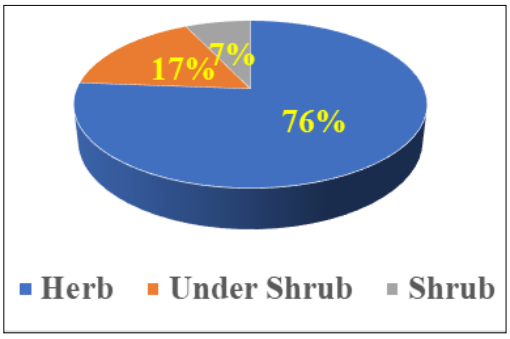

Fig 3: Percentage of plant under different habits

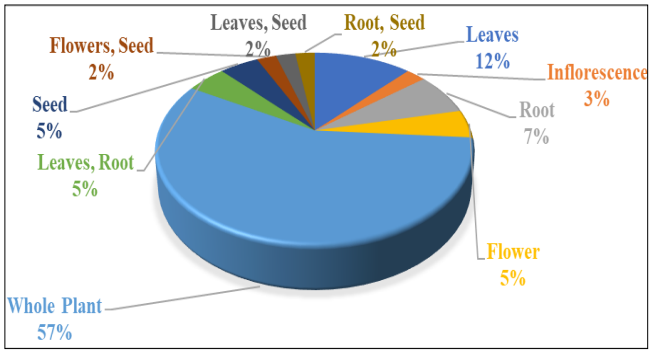

Fig 4: Percentage of plant parts used for medicinal purpose

Conclusion

The paper provides inclusive information on the most common and valued medicinal weeds around Noornagar and Shakarpur villages of the district Muzaffarnagar. Due to less interest of young generation towards traditional knowledge, these valuable knowledge as well as plant species are getting depleted leading to their extinction. Therefore, it is necessary to collect and document such precious knowledge from the local peoples and remote areas before their complete depletion and also increase awareness among the people for sustainable use of plant wealth and their conservation.

Asteraceae found dominant with 5 species followed by Amaranthaceae, Solanaceae, Euphorbiaceae, (4 species each) etc. having medicinal value to cure different ailments. This paper is data base for pharmaceutical industries and research organizations to select valuable plant species for further screenings to discover new drugs.

Acknowledgement

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