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RESEARCH ARTICLE

Ethnoveterinary utilization of ruderal and agrestal weeds in livestock treatments

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ABSTRACT

In Moradabad District of Uttar Pradesh (India), livestock is an important agricultural industry that provides financial revenue to farmers and rural communities. Weeds, or undesired plants that compete with agricultural plants, have an impact on crops both in terms of quantity and quality. From October 2021 to December 2022, the current research work investigates the ethno-veterinary practices of 58 weed species from various blocks of Moradabad, focusing on rural regions. The data came from locals such as owners of land, elderly people, agricultural workers, veterinary professionals, vaidyas (ayurved medicines doctor and hakims (Unani doctors). A wide range of agricultural locations were studied with the assistance of local intermediate and degree college students in the concern areas. The current method of classification, the Angiosperm Phylogeny Group-IV system for plant taxonomy, classified weed species into several APG-IV families and grades were followed. Poaceae, Apocynaceae, Asteraceae, Amaranthaceae, and Euphorbiaceae were categorised among the top five APG-IV weed families. Weeds were mostly connected to Lamiids, Fabids, Commelinids, Superasterids, Campanulids, Malvids, Rosids, Eudicots, Monocots, and the ANA Grade of the APG-IV. The most common livestock ailments were skin, galactogogue, dysentery, diarrhea, eye complications, placenta ectomy, constipation, maggot, and mouth infection, for which different weed species were used. The majority of weeds were herb, shrub, undershrub, creeper, and climber life forms.

Keywords: Ailments, Ethno-veterinary, Livestock, Weeds

INTRODUCTION

Livestock in Indian agriculture provide farm economy, transportation, milk, and meat, while also providing a source of income and jobs to farmers and underprivileged groups. The ethnoveterinary knowledge in the area is at risk of deterioration due to socioeconomic shifts, environmental changes, and technological advancements (Lans *et al.* 2007). Typically, generations pass down this priceless indigenous wisdom without appropriate recording or preservation (Bullitta *et al.* 2018). Ethnoveterinary medicines are highly active, versatile, and cost-effective; they are able to treat various livestock illnesses, making them accessible in remote areas as well (Ullah *et al.* 2013). The use of trial-and-error methods led to the development of ethno-veterinary medicine as it is known today (Upadhyay *et al.* 2010). Rural residents commonly treat their pets with indigenous herbal remedies, and there is no denying the importance of ethno-veterinary treatment in the advancement of livestock (Lalit and Pande 2009, Mallik *et al.* 2012, Adedeji *et al.* 2013, Galav *et al.* 2013). Atharvaveda emphasises medicine's effectiveness in treating ailments, while Yajurveda emphasises the significance of medicinal plant development. Shalihotra is the earliest known veterinarian from ancient times (Somvanshi 2002). Due to the rapid changes occurring in societies around the world, ethno-veterinary knowledge is in danger of disappearing (Kubkomawa *et al.* 2013). It has been shown that elderly people and traditional healers have a stronger understanding of traditional remedies than younger people (Yadav *et al.* 2010). Ethnoveterinary knowledge is in danger of extinction due to the present rate of change in social communities throughout the world (Kubkomawa *et al.* 2013).

About one-third of all agricultural pest losses are caused by weeds (DWR 2015). Weeds, along with other animal pests like insects, rodents, nematodes, and birds, are the most significant threat to declining agricultural output (Oerke 2006). In just 10 agricultural crops in India, weeds were responsible for more than 11 billion dollars in economic losses (Gharde *et al.* 2018). Invasive species like weeds reduce agricultural yields, raise farming costs, and

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cause major ecological damage (Sinden *et al.* 2004, Rao *et al.* 2020).

Ruderals are weed plants that thrive in waste dumps, urban wastelands, docks, footpaths, railroads, roadsides, and other areas extensively influenced by human occupation, industry, and trade (Frenkel 1977). Traditional remedies are still used by over 80% of worldwide agriculturalists, sheep farmers, and animal owners to treat livestock illnesses, demonstrating their critical role in healthcare (Lulekal *et al.* 2008, Devi *et al.* 2010).

MATERIALS AND METHODS

The study site is located in western Uttar Pradesh (IndiA) between 28°-21´ and 28°-16´ latitude north and 78°-4´ and 79° longitude east (**Figure 1**). Moradabad represents the Gangetic plain, which is divided into three portions by the rivers Ramganga and Sot.

From October 2021 to December 2022, an ethnobotanical research survey was conducted in Moradabad district blocks (8) to investigate the ethnoveterinary potential of ruderals and agrestals. The study collected data from knowledgeable locals, including landowners, elders, shepherds, veterinarians, vaidyas, and hakims, following the International Society of Ethnobiology's (2008). We collected data from intimate animal contacts, but despite thorough informing and verbal agreement, most informants did not provide written consent due to illiteracy. The study involved outdoor interviews to avoid misunderstandings about therapeutic plants' identities, and explored field locations with farmers. Using the documentation that is presently accessible and morphological analysis, collected grassy weeds have been identified (Singh and Beena 2018). Weed plant specimens were identified on-site, while unidentifiable plants were identified using available documentation, including Flora of Uttar Pradesh vol. I (Singh *et al.* 2016) and vol. II, (Sinha *et al.* 2020), 'Handbook on Weed Identification' (Naidu 2012), weeds just reported from the Global Compendium of Weeds (Randall 2017), and also, weeds were cross-verified with the help of virtual herbarium of B.S.I. Kolkata (https://ivh.bsi.gov.in/), Virtual Herbarium of the (ICAR-DWR),(https://dwr.icar.gov.in/Weeds_Herbarium.aspx) and the citation of plant name was checked with the help of www.ipni.org.in. Based on the modern Angiosperm Phylogeny Group-IV system for plant taxonomy, the weed species were put into different families and grades (A.P.G., Chase, M. *et al.* 2016). Plant collections were handled, toxoid with 5% HgCl, and mounted on herbarium sheets with specific identification for future considerations. S. K. Jain (1977). The collected weed plant specimens were preserved and submitted to the department for further use.

RESULTS AND DISCUSSION

31 families and 58 weed plants' ethnobotanical applications (**Table 1**) have been noted in the current study for their intriguing medicinal potential in treating a wide range of veterinary conditions like fever, diarrhea, coughing, and foot-and-mouth disease. Studies have also demonstrated their ability to eliminate intestinal worms, stimulate labour, control placenta retention, treat eye issues, and alleviate joint implications. In the current research work (14%), weeds are used for skin ailments, (14%) milk production ailments, (11%) eye ailments, (11%) diarrhea ailments, (11%) dysentery, (11%) fever, (9%) placenta removal, (7%) constipation, (7%) maggot infection, and (5%) mouth infection. In this study, 71% of weeds are herbs, shrubs (16%),

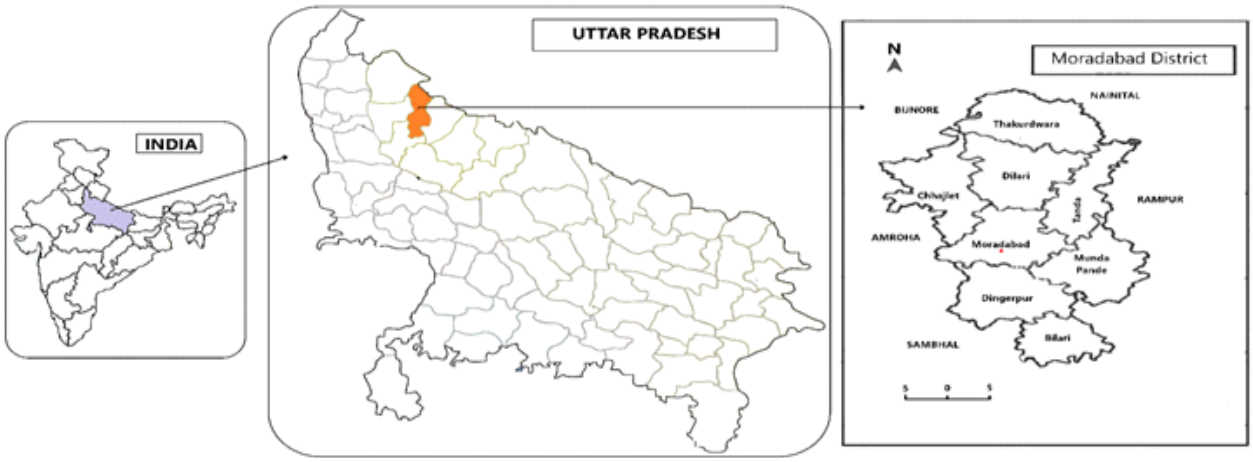

Figure 1. Map of study area

Table 1. Weeds utilization in livestock's ailments and methods of utilization

Botanical Name	APG-IV Family	Local name	Life form	Part used	APG-IV grade	Ailments	Administration
Abutilon indicum (L.) Sweet	Malvaceae	Kanghi	US	LF	Malvids	Skin problems.	(1) Animals with lice are treated twice daily by applying a paste made of fresh leaves to the afflicted areas of their bodies.
Acalypha indica L.	Euphorbiaceae	Kuppi	H	LF	Fabids	Constipation, Maggot wound, Skin diseases.	(1) An extract of fresh leaves twice a day is used to check for constipation and wounds or infections due to the maggot. (2) For skin problems, use fresh leaf paste with pepper.
Achyranthes aspera L.	Amaranthaceae	Chirchita	H	RT	Superasterids	Diarrhea, Bone fracture, Delivery and placenta expulsion.	(1) Diarrhea is treated with a root decoction twice a day. (2) To treat a bone fracture, fresh root is crushed up, and the paste is administered. (3) To make the application of contact therapeutic interventions simple and secure, roots are connected to buffalo horns. The buffaloes' genitalia are filled with fresh roots to help the placenta pass.
Acorus calamus L.	Acoraceae	……..	H	RT	Monocots	External parasites.	(1) Freshly prepared hot water extract is administered topically twice daily to ward off external parasites.
Aerva javanica (Burm.f.) Juss. Ex Schult.	Amaranthaceae	safed buti	US	RT	Superasterids	Mouth infection.	(1) For the cure of a mouth disease, boiled root extract is administered orally twice a day for 7-8 days.
Alternanthera sessilis (L.) R.Br	Amaranthaceae	Jala-jambe	H	LF	Superasterids	Galactogogue.	(1) Fresh leaves from plants are used for lactation in cattle.
Amaranthus viridis L.	Amaranthaceae	Chaulai	H	SD	Superasterids	Tympany.	(1) For the treatment of the tympany, use seeds with fresh water twice a day.
Andrographis paniculata (Burm.f.) Nees	Acanthaceae	Kal-megh	H	WP	Lamiids	Dysentery, Fever and cough.	(1) We check for dysentery twice a day using a freshly prepared entire plant extract. Freshly collected decoction is used to treat fever and cough.
Argemone mexicana L.	Papaveraceae	Pili-kateli	H	WP LX,SD	Eudicots	Constipation, Removal of retained placenta ,Chronic ulcer ,wound, Intestinal parasites.	(1) Once a day, 100 g of the entire plant is administered along with any available local grass to remove the placenta. (2) For the treatment of a persistent ulcer, latex and seed oil are employed. (3) To eradicate parasitic insects, apply vegetation juice and onion bulb juice to the surface.
Boerhavia diffusa L.	Nyctaginaceae	Punar-nava	H	WP LF	Superasterids	Removal of retained placenta ,Dysentery and dropsy.	(1) For the purpose of removing the delayed placenta in cows and buffaloes, 1500 g of fresh, complete plant is provided twice daily. (2) For the treatment of dropsy and bleeding dysentery, take fresh leaf juice three times daily.
Bothriochloa pertusa (L.) A.Camus	Poaceae	……	H	WP	Commelinids	Galactogogue.	(1) To make more milk.
Calotropis gigantea (L.) W.T.Aiton	Apocynaceae	Madar	S	LF	Lamiids	Septic wound.	(1) To cure infectious infections, fresh leaves and mustard oil are administered twice daily.
Calotropis procera (Aiton) W.T.Aiton	Apocynaceae	Aak	S	LF LX	Lamiids	Removal of retained placenta, To kill the intestinal worm,	(1) After delivery, a buffalo spends 4-5 minutes dipping its tail into latex to remove the residual placenta. (2) To eliminate the gastrointestinal parasite in sheep, 250 g of green leaf extract are fed daily as feed.

Continue on the next page...

Botanical Name	APG-IV Family	Local name	Life form	Part used	APG-IV grade	Ailments	Administration
						To increase the milk quantity, To cure mouth and eye watering, Tumour.	(3) Goats, in particular, add dried leaves to their diet to increase milk production. (4) Fed fresh leaves and black salt for 1-2 days. (5) Tumors are treated by using latex and peanut seed oil twice daily.
Cannabis sativa L.	Cannabaceae	Bhang	H	LF	Fabids	Blood in excreta, Loose motion.	(1) To prevents the reproduction of cows and buffaloes using the excrement of fresh leaf paste, is applied. (2) To treat loose motion, take whey-infused leaf powder orally twice daily.
Centella asiatica (L.) Urb.	Apiaceae	Brahmi-buti	H	LF	Campanulids	Fever and dysentery.	(1) Dysentery is treated with a decoction of fresh leaves. When animals have a fever, apply green leaf paste to your forehead.
Cissus quadrangularis L.	Vitaceae	Har-jora	H	ST	Rosids	Dog bite, To retain the placenta, Fracture healing.	(1) For the treatment of dog bites and placenta retention, crushed stem is employed. (2) The fracture uses a freshly crushed stem.
Citrullus colocynthis (L.) Schrad.	Cucurbitaceae	Indra-yani	CR	FR	Fabids	Dysentery, Weak Digestion.	(1) To treat dysentery, 100 g of fruits and 50 g from the complete plant of *Solanum surratense* are combined. (2) Cattle are fed fruits to help with digestion.
Cleome viscosa L.	Cleomaceae	Hur-hur	H	LF	Malvids	Wound healing, Microbial growth.	(1) Fresh leaf paste. (2)On the lesion, fresh leaf juice is administered to check for microbiological growth.
Commelina benghalensis L.	Commelinaceae	Konkoa	H	WP	Commelinids	Galactogogue.	(1) Fresh feed is useful in lactation.
Cucumis callosus (Rotteler) Cogn.	Cucurbitaceae	Bislumbha	H	FR	Fabids	Stomach-ache.	(1) For a few days, crush 50 g of fruits with fresh whey twice daily.
Cuscuta reflexa Roxb.	Convolvulaceae	Amar-bel	CL	WP	Lamiids	Bitten by poisonous worm, Diarrhea.	(1) Cuscuta decoction is given to the affected area. (2) A fresh plant decoction is used twice daily for a successful outcome in diarrhea.
Cyanthillium cinereum (L.) H.Rob.	Asteraceae	Sahadevi	H	SD	Campanulids	Appetite.	(1) Kali Jiri, 2 kg. garlic, 20 g. To boost the appetite of cattle, 200 g of jaggery is combined with 100 g of onion and 20 g of ginger.
Cynodon dactylon (L.) Pers.	Poaceae	Brahma ghash	H	WP	Commelinids	Digestion and mastitis, Wound healing.	(1) For proper digestion and lactation, fresh plant material is treated with mustard oil. (2) Fresh plant paste was applied directly to the skin for two to three days.
Cyperus rotundus L.	Cyperaceae	Motha	H	RZ	Commelinids	Fever, Diarrhea, Galactogogue.	(1) Fever and diarrhea are treated by making a decoction from freshly crushed rhizomes. (2) Fresh feed from the plant is useful to increase lactation.
Datura metel L.	Solanaceae	Dhatura	S	LF, RT	Lamiids	Rheumatism, Maggot infection.	(1) To treat rheumatism, a solution made from newly harvested leaves is taken twice a day. (2) Fresh root powder is used twice a day to check for bleeding due to a maggot infection.
Dendrocalamus strictus (Roxb.) Nees	Poaceae	nar bans	H	WP	Commelinids	Galactogogue	(1) Fresh feed is useful in lactation.
Eclipta prostrata (L.) L.	Asteraceae	Bhrang-raj	H	LF	Campanulids	Septic wound.	(1) Fresh paste is used twice a day.

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Botanical Name	APG-IV Family	Local name	Life form	Part used	APG-IV grade	Ailments	Administration
Euphorbia heterophylla L.	Euphorbiaceae	……..	H	LF SD	Fabids	Food poisoning.	(1) Leaves and seeds are combined with water and fed to livestock.
Euphorbia hirta L.	Euphorbiaceae	Badi-duddhi	H	LX	Fabids	Wound healing,	(1) The latex of the fresh plant is used twice a day.
Gymnema sylvestre (Retz.) R.Br. ex Sm.	Apocynaceae	Gud-mar	US	LF	Lamiids	Eye problems, Ephemeral fever, Opacity of cornea.	(1) Fresh leaves extract. (2) To treat ephemeral fever, a combination of fresh leaves, pepper, garlic, and black salt is taken orally. (3) Fresh leaf juice twice a day is used to cure the opacity of the cornea.
Hemidesmus indicus (L.) R.Br.	Apocynaceae	anantamul	S	LF	Lamiids	Convulsive seizure.	(1) To treat convulsive seizures, apply a fresh leaf extract twice daily.
Justicia adhatoda L.	Acanthaceae	Bisanta	US	LF, RT, FL	Lamiids	Cough and cold, Dysentery, ecto-parasite and skin disease, Wound healing; Foetus discharge & cough, and cold.	(1) A decoction of leaves is useful for coughs and colds. (2) In dysentery, leaves are with grass and fed to animals for two to three days. (3) Fresh leaf extract is applied to the afflicted skin area. (4) Fresh leaf paste is applied in wound healing. (5) For the safe delivery of the fetus, root bark extract and black pepper paste (5:2) are administered. Burning flower fumes is used to cure cold and cough symptoms.
Lantana camara L.	Verbenaceae	Ghaneri	S	LF	Lamiids	Joint pain.	(1) The decoction of fresh leaves is given to cattle.
Launaea procumbens (Roxb.) Ramayya & Rajagopal	Asteraceae	van gobhi	H	LF	Campanulids	Skin infection.	(1) Fresh leaf paste is topically applied for 3–4 days.
Lepidium sativum L.	Brassicaceae	Halim	H	WP	Malvids	Galactogogue.	(1) Good for the lactation.
Leucas aspera (Willd.) Link	Lamiaceae	Gummi	H	WP	Lamiids	Ephemeral fever.	(1) Fresh plant decoction
Mimosa pudica L.	Fabaceae	Lajbanti	H	LF	Fabids	Maggot infection.	(1) Eating freshly made leaf chapatti twice a day treats the maggot infection.
Mirabilis jalapa L.	Nyctaginaceae	Gulabaans	H	RT	Superasterids	Neck-sore.	(1) The aching neck receives fresh root paste twice daily.
Nymphaea nouchali Burm.f.	Nymphaeaceae	Kumudini	CR	RZ	ANA	Stop mastication.	(1) Crushed parts of the rhizome
Ocimum tenuiflorum L.	Lamiaceae	Tulsi	H	LF	Lamiids	Cough and cold.	(1) A decoction of fresh leaves twice a day is used to cure coughs and colds.
Oxallis corniculata L.	Oxalidaceae	Khatti-buti	H	LF	Fabids	Eye problems.	(1) The juice from the leaves treats white rashes.
Plumbago zeylanica L.	Plumbaginaceae	Chitrak	H	LF	Superasterids	Appetite.	(1) To increase hunger, 250 g of dry leaves powdered with meetha soda are taken orally for two to three days.
Portulaca oleracea L.	Portulacaceae	Kulfa	H	WP	Superasterids	Excessive bleeding.	(1) To reduce excessive bleeding in buffaloes during and after birth, the entire plant is fed to them as feed.
Ricinus communis L.	Euphorbiaceae	Anduaa	S	SD, LF	Fabids	Stomach problem,	(1) For a few days, take seed oil twice a day for gastrointestinal issues.

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Botanical Name	APG-IV Family	Local name	Life form	Part used	APG-IV grade	Ailments	Administration
						Constipation and rheumatism, Ulcer.	(2) Ulcers are treated with a poultice made of green leaves. (3) Constipation is frequently treated with seed oil.
Rubia cordifolia subsp. cordifolia	Rubiaceae	Majith	CL	LF	Lamiids	Foot problems.	(1) Apply leaf juice externally to the foot's troublesome areas.
Saccharum spontaneum L.	Poaceae	Kaans	H	WP	Commelinids	Heat production.	(1) Buffaloes receive daily oral feedings of 2 kg of plant to help them produce heat.
Senna occidentalis (L.) Link	Fabaceae	Kasaundi	H	LF	Fabids	Wound healing, Skin disease.	(1) In skin and wound issues, fresh leaf paste is applied twice daily.
Senna tora (L.) Roxb.	Fabaceae	Chakunda	H	SD	Fabids	Skin Disease.	(1) Apply seed paste to the affected area of skin.
Solanum nigrum L.	Solanaceae	Makoi	H	LF	Lamiids	Pterygium.	(1) Decoction of fresh leaves.
Solanum virginianum L.	Solanaceae	Bhatkataiya	H	LF	Lamiids	Eye problems.	(1) Decoction of fresh leaves.
Sorghum bicolor (L.) Moench	Poaceae	Jowar	H	SD	Commelinids	Loose motion.	(1) Twice a day, use seed flour with whey.
Strychnos nux-vomica L.	Loganiaceae	Kuchla	S	RT	Lamiids	Wound healing.	(1) Crushed root paste.
Tribulus terrestris L.	Zygophyllaceae	Chhota-Gokhru	H	WP,	Fabids	Diarrhea.	(1) Oral water extract of the entire plant twice daily for 2–3 days.
Tridax procumbens L.	Asteraceae	kanphuli,	H	LF	Campanulids	Wound healing.	(1) Fresh leaf extract.
Tripidium bengalense (Retz.) H.Scholz	Poaceae	……	H	LF	Commelinids	Removal of retained placenta.	(1) Young leaves to remove retained placenta, particularly in buffaloes.
Vitex negundo L.	Lamiaceae	Malla	S	LF	Lamiids	Antibacterial and insecticide.	(1) Fresh leaf decoction is ingested orally.
Withania somnifera (L.) Dunal	Solanaceae	Ashwagandha	H	RT	Lamiids	Cold and cough.	(1) To treat colds and coughs, camels and buffaloes are given daily dosages of a root infusion.
Ziziphus nummularia (Burm.f.) Wight & Arn.	Rhamnaceae	Jharberi	S	WP, FR, RT,	Fabids	Intestinal worms, Diarrhea, Cold and cough, Mouth and foot diseases.	(1) You administer leaves twice daily for 5–6 days to get rid of intestinal worms. (2) For two days, fruits and tea are used to treat diarrhea. (3) For 3–4 days, a camel is given a daily dose of 200 g of root decoction and 350 g of jiggery to treat a cold and cough.

Life forms. (H) = Herb, (S) = Shrub, (US) = under shrub, (CR) = Creeper & (CL) = Climber. Part used (LF) = Leaf, (RT) = Root, (FR) = Fruit, (FL) = Flower, (LX) = Latex, (SD) = Seed, (WP) = Whole plant, (RZ) = Rhizome & (ST) = Stem.

under shrubs (7%), climbers (3%), and creepers (3%). The leaves were the most often used weed plant component (42%), followed by entire plants (20%), roots (13%), fruit (4%), seeds (10%), latex (4%), flowers (2%), rhizomes (3%), and stems (2%). The plants that were studied mostly belonged to the following families: Poaceae (6 species), Apocynaceae (4 species), Euphorbiaceae (4 species), Asteraceae (4 species), Amaranthaceae (4 species), Solanaceae (4 species), Lamiaceae (3 species), Fabaceae (3 species), Acanthaceae (2 species), and Nyctaginaceae (2 species). The rest of the species belonged to the Malvaceae, Acoraceae, Papaveraceae, Cannabaceae, Apiaceae, Vitaceae, Cucurbitaceae, Cleomaceae, Commelinaceae, Convolvulaceae, Cyperaceae, Verbenaceae, Brassicaceae, Nymphaeaceae, Oxalidaceae, Plumbaginaceae, Portulacaceae, Rubiaceae, Loganiaceae, Zygophyllaceae, and Rhamnaceae families. In this study (17), reported weed species belong to Lamiids, (13) Fabids, (8) Superasterids, (8) Commelinids, (5) Campanulids, (3) Malvids, (1) Rosids, (1) Eudicots, (1) Monocots, and (1) ANA grade of APG-IV. The data gained is substantially equivalent to findings from

research of a similar nature carried out in a few other areas of Uttar Pradesh. *Justicia adhotoda* leaves are used to treat constipation, fever, water loss, diarrhea, dysentery, and discomfort in the stomach. The medicinal benefits of *Achyranthes aspera* are well known for treating a variety of gastrointestinal and respiratory issues as well as skin conditions. To cure constipation, *Ricinus communis* seed oil is used. Many ethno-cultural and rural people employ some ethno-veterinary weed plants that grow in the study area because they have impressive medicinal characteristics. Plants often used by them are *Justicia adhatoda, Argemone mexicana, Boerhavia diffusa, Calotropis procera* and *Ziziphus nummularia etc*. This investigation explores indigenous practices using locally occurring wild medicinal herbs for various ailments, demonstrating the potential of these plants as affordable and recyclable alternatives to synthetic medications.

Conclusion

The excessive use of wild plants endangers plant variety, necessitating sustainable utilization and study to enhance animal health, promote indigenous knowledge, and demand further scientific inquiry and intellectual property rights protection.

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