

A PRELIMINARY SURVEY OF ETHNOMEDICINAL FLORA ALONG PIR PANJAL GRADIENT (KASHMIR-HIMALAYAS), AHARBAL KULGAM (J&K UT), INDIA

Shakir Ahmad Mochi¹ and Muzafar Riyaz^{2*}

¹Department of Botany, School of Life Sciences, Central University of Kashmir, Ganderbal- 191201, Jammu & Kashmir, India

²Division of Taxonomy & Biodiversity, Entomology Research Institute, Loyola College, Chennai- 600034, Tamil Nadu, India

Email: bhatmuzaffar471@gmail.com

Received-29.11.2021, Revised-16.12.2021, Accepted-25.12.2021

Abstract: The present study is a preliminary survey to assess the medicinal flora of Aharbal, Kulgam. The area is located at the foothills of Pir Panjal Mountain Range (North-western Himalayas, India). The survey was carried out from April to July 2021. A total number of 42 plant species having medicinal value were observed, collected and photographed. The identification was done using morphological characters, identification keys, relevant literature and expert suggestions. The collected 42 plant species belong to 29 different families and the highest number of plants were collected belong to the family Asteraceae. The collected specimens are kept in the herbarium of the Department of Botany, School of Life Sciences, Central University of Kashmir, Ganderbal, Jammu & Kashmir, India. The present study is the first documentation of the medicinal flora from the region (Aharbal, Kulgam) and will support in the conservation of the endangered medicinal flora.

Keywords: Aharbal, Ethnomedicine, Himalayas, Kashmir, Kulgam, Medicinal Flora, Survey

INTRODUCTION

Kashmir is located in the north most part of India surrounded by the snowclad mountains of the North-western Himalayan range. Kashmir valley is ecologically very sensitive due to its unique weather and climate. The rich floral diversity is the main characteristic feature and ecological heritage of the region (Riyaz *et al.*, 2021). The medicinal flora has been used by the local tribes as well as the people from rural and urban areas of Kashmir valley for the treatment of many diseases and health ailments for ages. The local forest tribes (Gujar's and Bakkerwals) which reside in the forest ecosystems of the Kashmir valley are mostly depend on the medicinal herbs for curing the health ailments.

Plant-based medicines have no side effects and are cheaper as compared to allopathic drugs. Plant-based medicines are more effective since most of the people from countries such as India, Pakistan, Bangladesh and Nepal have a very strong belief in Ayurvedic, Siddha and Unani medicines which are mostly derived from medicinal plants (Kar & Barthakur, 2008). Man has known the importance of plants and is using them since time immemorial. In the present era of technological advancements where unlimited chemical drugs are being discovered, however, most of the people across the globe still use medicinal plants as their primary health care¹. People of all communities of the world are using natural plant-based medicines for decades and have knowledge about the therapeutic properties of their native flora⁸. India homes for over 17,500 native plants among which 34% are known to have medicinal importance (Ved & Goraya, 2008).

Kashmir is located at the north-western tip of the Himalayan biodiversity hot spot and is often referred to as paradise on earth since the region has a unique floral diversity and covers a rich and abundance of plant species.

A number of studies on biodiversity, taxonomy and ethnomedicinal properties have been reported from different locations of the Kashmir Valley. A number of detailed studies about the diversity of medicinal flora and their applications from the Kashmir valley have been reported by a number of authors (Riyaz *et al.*, 2021; Malik *et al.*, 2011; Jeelani *et al.*, 2013; Shaheen *et al.*, 2014; Farooq *et al.*, 2014; Dar *et al.*, 2007; Khuroo *et al.*, 2007; Bhattacharyya, 1991; Tali *et al.*, 2019). On the contrary, a number of medicinal plant surveys and medicinal plant uses among the people from different areas of the Kashmir valley have also been reported and documented (Khan *et al.*, 2004; Mir & John, 2014; Pant & Wani, 2020; Shah *et al.*, 2015; Akhtar *et al.*, 2018; Mir *et al.*, 2021; Chak *et al.*, 2009; Bhat *et al.*, 2012; Rashid, 2013; Mir, 2014; Wagay, 2014; Lone & Bhardwaj, 2013; Tariq & Tantry, 2012).

Kashmir valley exhibits a rich floral diversity. A number of surveys have been reported to explore the medicinal flora of Kashmir Valley in the recent past. However, many areas are still unexplored and many species are awaiting discovery. In the present study, we investigated the medicinal flora of the Aharbal which comes under the jurisdiction of Kulgam district. The present study is a compilation in the form of a preliminary checklist of medicinal flora which will probably serve as a baseline for extending the surveys to the upper areas of the study area for researchers.

*Corresponding Author

MATERIALS AND METHODS

The study area is located between 33°38'45.4560"N 74°46'50.4696"E (Fig. 1) at an altitude of 2266m. The average temperature lies in between 20 ° C to 25° C during summers and autumn, while the minimum temperatures lie in between -15 ° C to 10 ° C during winter and early spring. The images of the specimen were taken using Redmi Note 8 Pro Mobile Camera (Xiaomi Communications Co., Ltd. China) with an external 20 mm macro lens attached.

Regular field trips were conducted to collect plant samples during this study course from April to July 2021 from different sites (33°38'59"N 74°47'16"E; 33°38'50"N 74°47'06"E; 33°38'55"N 74°47'21"E). The sites chosen for the sample collections were mostly forest type. A sufficient number of plant specimens were collected except those which are rare. Basic information like identification using morphological characters of some species was done on the collection spot and was further noted on the field labels attached to the collected plant sample.

The local/vernacular names and information about the medicinal value and plant part used was also collected from the local and tribal people. The plants were identified using standard protocols such as identification keys, standard reference keys and available literature (Hooker, 1879; Navchoo & Kachroo, 1995; Singh & Kachroo, 1995; Singh *et al.*, 2002; Tomar & Singh, 2005; Tomar & Singh, 2006; Tomar, 2007; Tomar, 2008; Tomar, 2009; Tomar, 2011; Tomar, 2012; Tomar, 2013; Tomar, 2014; Tomar, 2015; Tomar, 2016; Tomar, 2017; Tomar, 2018; Tomar, 2019; Tomar, 2020 and Tomar, 2021). The collected plants were properly dried, pressed and later mounted on the herbarium sheets. Further identification was done by experts and online data repositories and identification web-portals such as E flora of India, Flora of Pakistan, Inaturalist, India Biodiversity Portal, Plants of world online and Flowers of India. The plants samples collected were assigned voucher numbers and submitted to the Central University of Kashmir Herbarium.

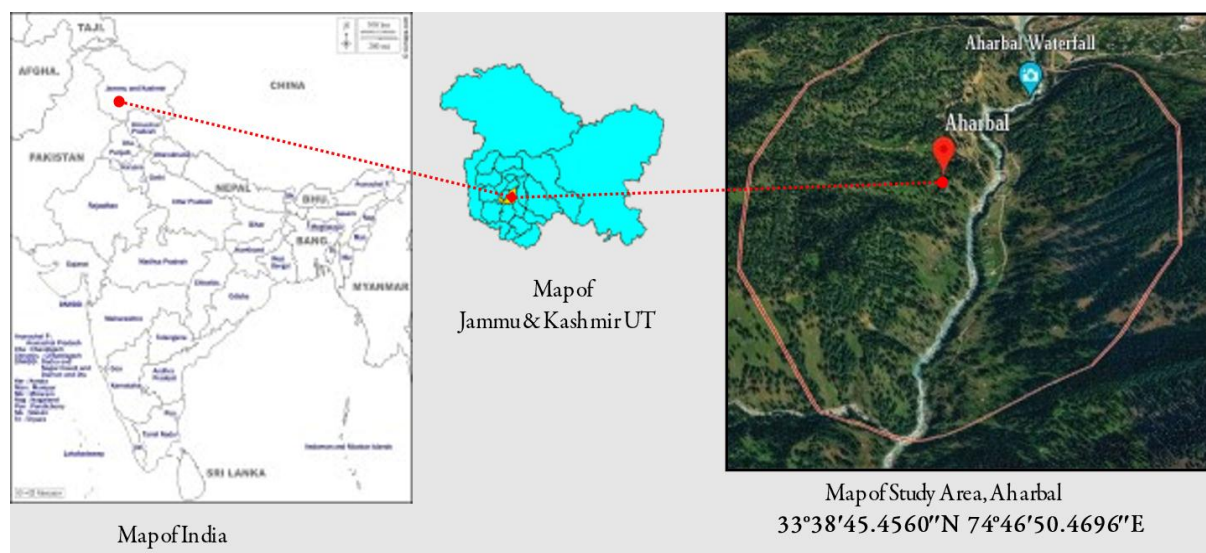


Fig. 1. Map of study area

RESULTS

During this study, a total number of 42 plant samples were collected based on the information of their medicinal importance gathered by both the local people and tribal people. These 42 plant species (Fig. 2) collected are belonging to 29 different families and 39 genera respectively. The highest number of

species were collected from the family Asteraceae (07) followed by Lamiaceae (04), Berberidaceae (02), Fabaceae (02), Rosaceae (02), Viburnaceae (02) and one each specimen from the rest of the families (Fig. 3).

All the plant species are having medicinal value and are used by the local and tribals for curing health ailments (Table 1).

Table 1. Summary of plant species collected from the study area

S. No.	Scientific Name	Common Name	Local name	Family	Medicinal uses	Life Form
1	<i>Achillea millefolium</i> L.	Common Yarrow	Paheil Ghaase	Asteraceae	Roots are used to cure Tooth ache.	Herb
2	<i>Adiantum capillus-</i>	Maidenhair	Gyav Theer	Pteridaceae	Leaves are used to cure	Herb

	<i>veneris</i> L.	fern			Fever.	
3	<i>Alcea rosea</i> L.	Common Hollyhock		Malvaceae	Flower paste is applied externally to cure inflammation caused by tonsillitis	Herb
4	<i>Anemone tschernjaewi</i> Regel.	Turkistan Anemone	Tyeank Batein	Ranunculaceae	Powder of bulb mixed with oil is used to cure skin infection.	Herb
5	<i>Angelica glauca</i> Edgew.	Smooth Angelica	Chihur	Apiaceae	Seeds are used to cure Nocturia.	Herb
6	<i>Arisaema jacquemontii</i> Blume.	Jacquemont's Cobra Lily	Haapat Guagij	Araceae	Leaves are used to cure Dermatological Disorders.	Herb
7	<i>Artemisia absinthium</i> L.	Wormwood	Tyeth ven	Asteraceae	Leaves have anti helminthic properties.	Herb
8	<i>Artemisia vestita</i> Wall ex Besser.	Russian wormwood	Roosi Tyethven	Asteraceae	Dried leaves are used to cure inflammatory diseases.	Herb
9	<i>Astragalus grahmanus</i> Benth.	Grahmas Milk-Vetch	Draabih kaend	Fabaceae	Roots are used in the treatment of skin problems.	Shrub
10	<i>Berberis lycium</i> Royle.	Indian Barberry	Kaav Da'tchh	Berberidaceae	Leaves are used to Treat Jaundice.	Shrub
11	<i>Campanula latifolia</i> L.	Large Bellflower		Campanulaceae	Flowers are Emetic.	Herb
12	<i>Capsella bursa-pastoris</i> (L.) Medik.	Shepherd's Purse	Kraal Mond	Brassicaceae	It is used to stop bleeding from internal organs.	Herb
13	<i>Cichorium intybus</i> L.	Chicory	Kaasne hundh	Asteraceae	Crushed leaves are used to purify blood.	Herb
14	<i>Colchicum luteum</i> Baker.	Yellow Colchicum	Veir Keoum	Colchicaceae	Dried and powdered root are mixed with oil and are applied externally to treat Gout Swelling.	Herb
15	<i>Carpesium abrotanoides</i> L.	Pig's Head	-	Asteraceae	The whole plant is Febrifuge.	Herb
16	<i>Cynoglossum wallichii</i> var. <i>glochidiatum</i> G.Don	Barbed Forget-Me- Not		Boraginaceae		Herb
17	<i>Daphne mucronata</i> Royle.	Kashmir Daphne		Thymelaeaceae	Fruits are edible and can be used as a Dye.	Shrub
18	<i>Dipsacus inermis</i> Wall.	Himalayan Teasel	Voupal Haakh	Caprifoliaceae	Cooked leaves are used to cure Body Ache.	Herb

19	<i>Filipendula vestita</i> (Wall. ex G.Don.) Maxim.	Himalayan Meadowsweet	Chitpava	Rosaceae	Flowers and Leaves have wound healing properties.	Herb
20	<i>Hypericum perforatum</i> L.	Perforate St. John's-wort		Hypericaceae	Flowers are mixed with oil and is applied externally for sores and Wounds.	Herb
21	<i>Indigofera heterantha</i> Wall	Himalayan Indigo	Kisczz	Fabaceae	Twigs are used in wicker work	Shrub
22	<i>Iris kashmiriana</i> Baker.	Kashmir iris	Soasan Mond	Iridaceae	Paste of Roots are applied externally to cure Rheumatism.	Herb
23	<i>Lysimachia arvensis</i> subsp. Arvensis L.	Scarlet Pimpernel	Czarre Saaban	Primulaceae	An infusion is used in the treatment of dropsy.	Herb
24	<i>Oxalis corniculata</i> L.		Tsokk cxein	Oxalidaceae	Leaves are used in the treatment of scurvy	Herb
25	<i>Phytolacca acinosa</i> Roxb.	Indian Pokeweed	Haapat Makaei	Phytolaccaceae	Whole plant is Diuretic.	Herb
26	<i>Podophyllum</i> <i>hexandrum</i> Royle.	Himalayan May Apple	Van Vaangun	Berberidaceae	Whole plant is used to remove warts on skin	Herb
27	<i>Prunella vulgaris</i> L.	Self-Heal	Kalle veouth	Lamiaceae	Boiled extract of this plant is used to cure minor bone injuries	Herb
28	<i>Rheum webbianum</i> Royle.	Indian Rhubarb	Pumb Cxaalan	Polygonaceae	Roots are used to cure Papules and Nodules of Skin	Herb
29	<i>Rubus ulmifolius</i> Schott.	Elm-Leaf Blackberry	Tchaanch	Rosaceae	Berries are used to cure Diahorea	Shrub
30	<i>Salvia moorcroftiana</i> Wall ex Benth.	Kashmir Salvia	Thuth	Lamiaceae	Dried leaves are used in the treatment of cough and Cold.	Herb
31	<i>Salix caprea</i> L.	Goat Willow	Braed Mushq	Salicaceae	Fresh leaves are used in treatment of fever.	Tree
32	<i>Sambucus wightiana</i> Wall.	Kashmir Elder	Haapat Falll	Viburnaceae	Ripened fruits have anti-inflammatory properties	Herb
33	<i>Scutellaria galericulata</i> L.	Common Skull cap		Lamiaceae	The herb is Anti- inflammatory	Herb
34	<i>Silene vulgaris</i> (moench) Garcke	Bladder Campion		Caryophyllaceae	Flowers are leaves are used to treat wounds	Herb
35	<i>Taraxacum officinale</i> Weber ex Wigg.	Dandleion	Hundhh	Asteraceae	Leaves are used to treat various infections and Liver problems.	Herb
36	<i>Thymus linearis</i> Benth.	Himalayan	Jangeil jay	Lamiaceae	Leaves and flowers	Herb

		Thyme	yaan		have antiseptic properties	
37	<i>Tussilago farfara</i> L.	Colt's Foot	Watpan	Asteraceae	Flowers are used in the treatment of cough	Herb
38	<i>Verbascum Thapsus</i> L.	Great Mullein	Van Tamuak	Scrophulariaceae	Flowers and leaves are used to treat Respiratory problems	Herb
39	<i>Viburnum grandiflorum</i> Wall ex DC.	Grand Viburnum	Kul muash	Viburnaceae	Powered leaves are used to relieve abdominal pain	Shrub
40	<i>Vinca major</i> L.	Large Periwinkle		Apocynaceae	Flowers have been used to treat high blood pressure	Herb
41	<i>Viola indica</i> W.Becker.	Indian Violet	Bunafsha	Violaceae	Viola sp. are Antipyretic	Herb
42	<i>Viscum album</i> L.	Common Mistletoe		Santalaceae	Younger branches are used to cure severe cold and Asthmatic conditions.	Shrub



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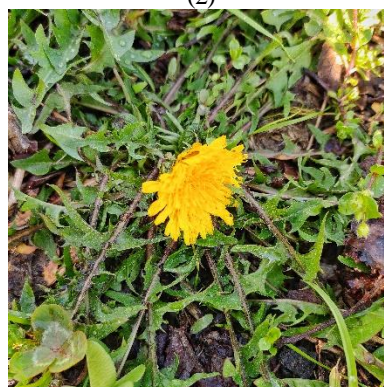
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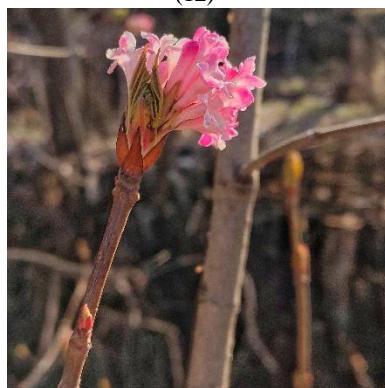
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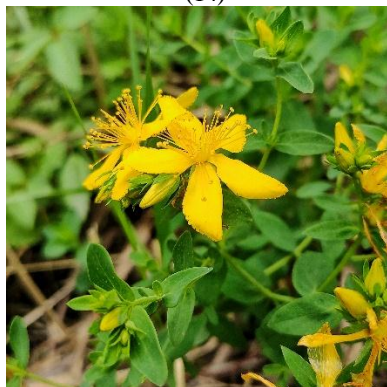
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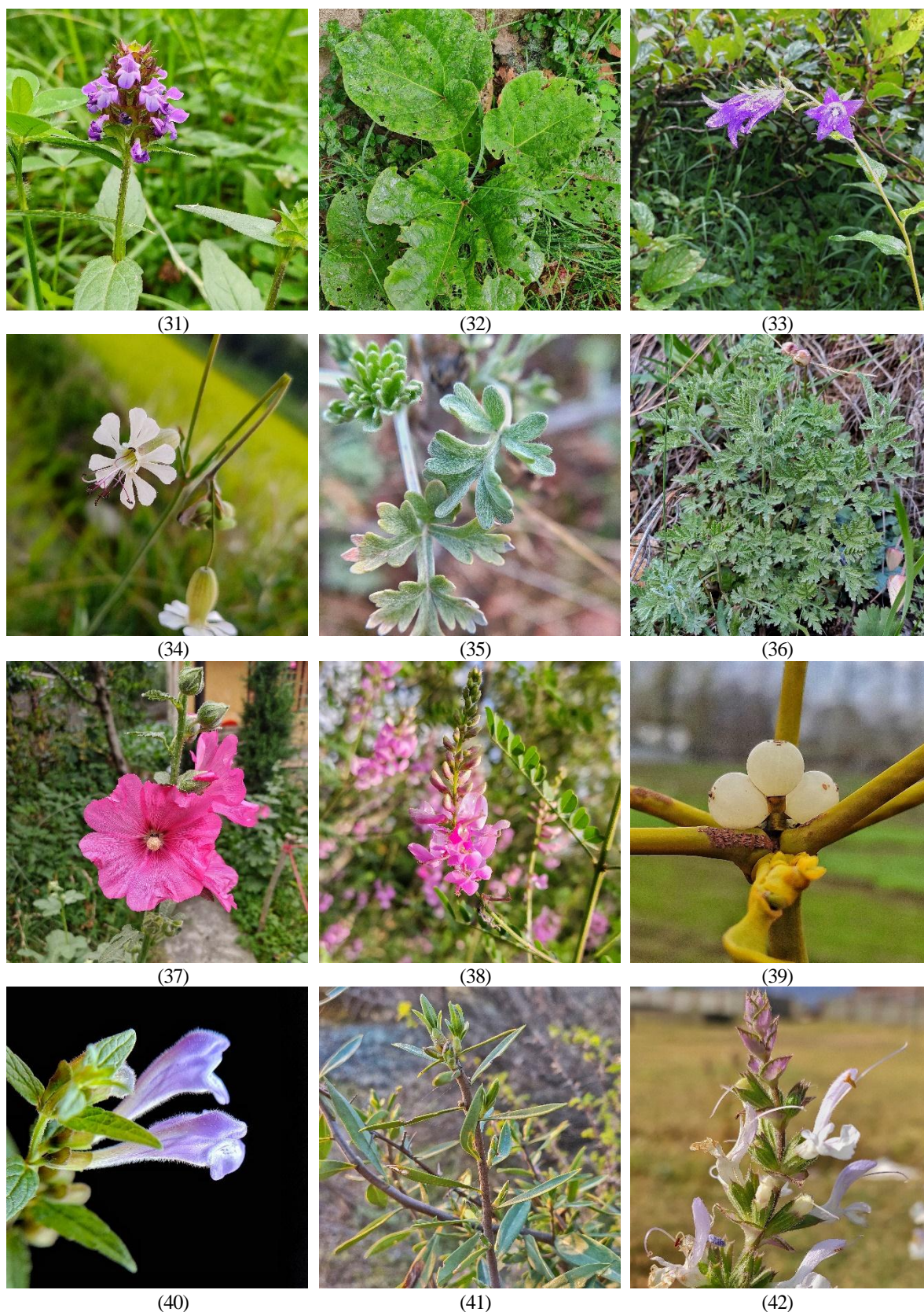


Fig. 2. Photographs of the medicinal plant species presented in this study; (1) *Berberis lycium* (2) *Adiantum capillus-veneris* (3) *Rubus ulmifolius* (4) *Carpesium abrotanoides* (5) *Achillea millefolium* (6) *Althea rosea* (7) *Oxalis corniculata* (8) *Lysimachia arvensis* (9) *Indigofera heterantha* (10) *Podophyllum hexandrum* (11) *Anemone Tschernjaewi* (12) *Artemisia vestita* (13) *Taraxacum officinale* (14) *Phytolacca acinosa* (15) *Dipsacus inermis* (16) *Colchicum luteum* (17) *Sambucus wightiana* (18) *Salvia moorcroftiana* (19) *Iris kashmiriana* (20) *Vinca major* (21) *Artemisia absinthium* (22) *Cichorium intybus* (23) *Angelica glauca* (24) *Prunella vulgaris* (25)

Thymus linearis (26) *Vibrunum grandiflorum* (27) *Tussilago farfara* (28) *Viola indica* (29) *Astragalus grahamianus* (30) *Dapne mucronata* (31) *Arisaema jacquemontii* (32) *Salix caprea* (33) *Scutellaria galericulata* (34) *Filipendula vestita* (35) *Capsella bursa-pastoris* (36) *Viscum album* (37) *Hypericum perforatum* (38) *Verbascum Thapsus* (39) *Rheum webbianum* (40) *Campanula latifolia* (41) *Silene vulgaris* (42) *Cynoglossum wallichii* var. *glochidiatum*.

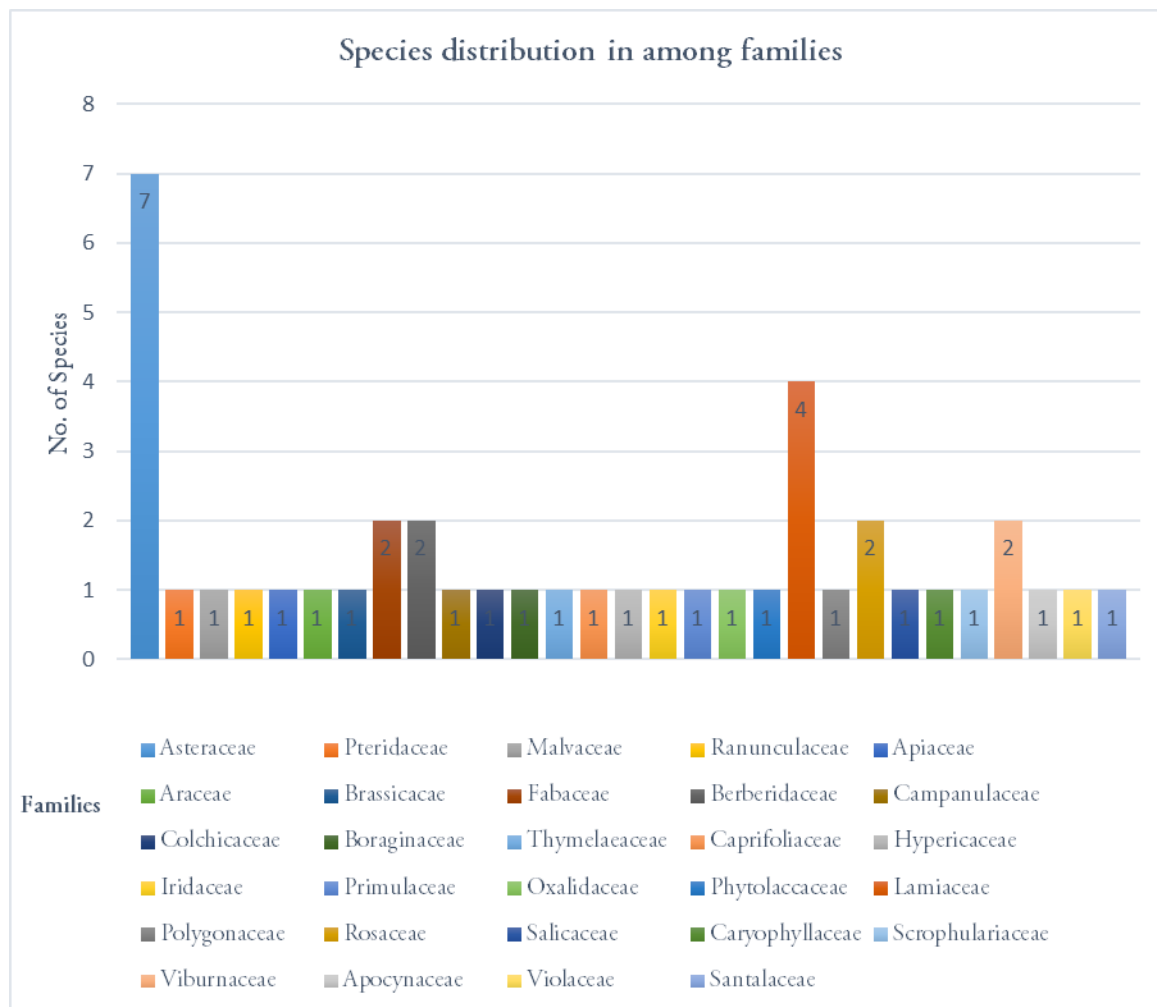


Fig. 3. Distribution of species among 29 different families

DISCUSSION AND CONCLUSION

The present study was aimed to assess the medicinal flora of the area. A number of sites were chosen for the sampling and collection of the medicinal flora. A total number of 42 plant samples were collected and photographed. The highest number of species were collected from the family Asteraceae (07), followed by Lamiaceae (04) and so on. Since, the medicinal plants are having many health benefits, the local people residing in these places are having both traditional knowledge and information of their local flora and they still use local flora as medicines. Medicinal plants are the basic raw materials for the production of Ayurveda and Unani medicines. A bulk demand of the raw material is derived from the forests only because of which most of these species are experiencing tremendous pressure due to over and illegal exploitation and are no longer found

inaccessible habitats in large quantities (Vashistha *et al.*, 2006). Even the plants that were formerly more common have become rare because of changes in their environment. These changes are often brought on directly or indirectly by people’s patterns of settlement, recreation, transportation, and use of natural resources. The loss of these plant species has negative implications for both humankind and natural ecosystems. The present millennium is experiencing a high and fast rate of endangerment and extinction of both plant and animal species and the introduction of species is also contributing a major threat to biodiversity.

CONCLUSION

The present study is a preliminary survey of the Pir Panjal gradient (Aharbal Kulgam) which is situated in north-western Himalayas India. The study reported

42 plant species having medicinal properties and aiming at more investigations and field surveys must be conducted to the unexplored upper reaches of the area.

ACKNOWLEDGEMENTS

The authors wish to thank the local population of Aharbal Kulgam and tribal people of the upper reaches of the region for sharing the valuable traditional knowledge and supporting us during the course of study.

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interests

The authors declare that there are no conflicts of interest related to this article.

REFERENCES

- Akhtar, R., Mir, T. A. and Showkat, S.** (2018). Ethnomedicinal observations among the inhabitants of sarf naar area of Shiekhpora-Kreeri, Baramulla, Jammu and Kashmir. *Journal of Medicinal Plants*, 6(3), 78–81. [Google Scholar](#)
- Bhat, T. A., Nigam, G. and Majaz, M.** (2012). Study of some medicinal plants of the Shopian district, Kashmir (India) with emphasis on their traditional use by Gujjar and Bakerwal tribes. *Asian Journal of Pharmaceutical and Clinical Research*, 5(2), 94–98. [Google Scholar](#)
- Bhattacharyya, A.** (1991). Ethnobotanical observations in the Ladakh region of northern Jammu and Kashmir State, India. *Economic Botany*, 45(3), 305–308. [Google Scholar](#)
- Chak, I., Agarwal, R. K. and Kak, M. A.** (2009). Ethno-medicinal study of some important plants used in the treatment of hair and boils in district Pulwama of Kashmir. *Annals of Forestry*, 17(1), 101–107. [Google Scholar](#)
- Dar, G. H., Khuroo, A. A., Khan, Z. S. and Dar, A. R.** (2007). Medicinal flora of the Kashmir Himalaya: A taxonomic overview. *J. Himalayan Ecology and Sustainable Development*, 2, 13–20. [Google Scholar](#)
- Farooq, U., Abaas, G., Saggo, M. I. and Dar, M. A.** (2014). Ethno botany of some selected Monochlamydeae plant species from the Kashmir Himalaya, India. *Journal of Medicinal Plants Research*, 17(8 (23)), 834–839. [Google Scholar](#)
- Hooker, J. D.** (1879). *The flora of British India*, 2 (pp. 78–99). L. Reeve, and Co. [Google Scholar](#)
- Houghton, P. J.** (1995). The role of plants in traditional medicine and current therapy. *Journal of Alternative and Complementary Medicine*, 1(2), 131–143. [Google Scholar](#)
- Jeelani, S. M., Wani, M. P. and Kumari, S.** (2013). Ch. R. Siddique MA. Ethnobotany of some polypetalous plants from the Kashmir Himalaya. In *Journal of medicinal plants research*, 25(7 (36)) (pp. 2714–2721). [Google Scholar](#)
- Kar, A. and Barthakur, S. K.** (2008). Medicinal Plants used against dysentery, diarrhoea and cholera by the tribes of erstwhile Kameng district of Arunachal Pradesh. *Natural Product Radiance*, 7(2), 176–181. [Google Scholar](#)
- Khan, Z. S., Khuroo, A. A. and Dar, G. H.** (2004). Ethnomedicinal survey of Uri, Kashmir Himalaya. *Indian Journal of Traditional Knowledge*, 3(4), 351–357. [Google Scholar](#)
- Khuroo, A. A., Malik, A. H., Dar, A. R., Dar, G. H. and Khan, Z. S.** (2007). Ethnoveterinary medicinal uses of some plant species by the Gujjar tribe of the Kashmir Himalaya. *Asian Journal of Plant Sciences*, 6(1), 148–152. [Google Scholar](#)
- Lone, P. A. and Bhardwaj, A. K.** (2013). Traditional herbal based disease treatment in some rural areas of Bandipora district of Jammu and Kashmir, India. *Asian Journal of Pharmaceutical and Clinical Research*, 6(4), 162–171. [Google Scholar](#)
- Malik, A. H., Khuroo, A. A., Dar, G. H. and Khan, Z. S.** (2011). Ethnomedicinal uses of some plants in the Kashmir Himalaya. *Indian Journal of Traditional Knowledge*, 10(2), 362–366. [Google Scholar](#)
- Mir, G. M. and John, S. A.** (2014). Ethno-medicinal study of Pulwama tehsil (Jammu and Kashmir). *Journal of Medicinal Plants Studies*, 2(4), 5–8. [Google Scholar](#)
- Mir, M. Y.** (2014). Documentation and ethnobotanical survey of wild edible plants used by the tribals of Kupwara, J and K, India. *International Journal of Herbal Medicine*, 2(4), 11–18. [Google Scholar](#)
- Mir, T. A., Khare, R. K. and Jan, M.** (2021). Medicinal plants used against gastrointestinal complaints in district Budgam of Jammu and Kashmir-An ethnomedicinal study. *Ethnobotany Research and Applications*, 22, 1–16. [Google Scholar](#)
- Navchoo, I. A. and Kachroo, P.** (1995). Flora of Pulwama, Kashmir. *Bishen Singh and Mahendra Pal Singh*. Dehradun, India. [Google Scholar](#)
- Pant, S. and Wani, Z. A.** (2020). Ethnomedicinal study of plants used to cure skin diseases and healing of wounds in Gulmarg Wildlife Sanctuary (GWLS),

Jammu and Kashmir. *Indian Journal of Traditional Knowledge*, 15(19 (2)), 327–334.

[Google Scholar](#)

Rashid, A. (2013). Dye yielding plant diversity of district Rajouri Jammu and Kashmir state-India. *International Journal of Pharmacy and Biological Sciences*, 4(1), 263–266.

[Google Scholar](#)

Riyaz, M., Ignacimuthu, S., Shah, R. A., Sivasankaran, K. and Pandikumar, P. (2021). Ethnobotany of the Himalayas—Kashmir, India. In A. M. Abbasi & R. W. Bussmann (Eds.), *Ethnobiology of mountain communities in Asia* (pp. 27–45). Springer.

[Google Scholar](#)

Shah, A., Bharati, K. A., Ahmad, J. and Sharma, M. P. (2015). New ethnomedicinal claims from Gujjar and Bakerwals tribes of Rajouri and Poonch districts of Jammu and Kashmir, India. *Journal of Ethnopharmacology*, 166, 119–128.

[Google Scholar](#)

Shaheen, H., Nazir, J., Firdous, S. S. and Khalid, A. U. (2014). Cosmetic ethnobotany practiced by tribal women of Kashmir Himalayas. *Avicenna Journal of Phytomedicine*, 4(4), 239–250.

[Google Scholar](#)

Singh, N. P., Singh, D. K. and Uniyal, B. P. (2002). Flora of Jammu and Kashmir: Pteridophytes gymnosperms and angiosperms, *1. Botanical survey of India, New Delhi, India*.

[Google Scholar](#)

Singh, J. B. and Kachroo, P. (1994). *Forest flora of Pir Panjal Range (North Western Himalaya)*. Bishen Singh Mahendra Pal Singh.

[Google Scholar](#)

Tali, B. A., Khuroo, A. A., Ganie, A. H. and Nawchoo, I. A. (2019). Diversity, distribution and traditional uses of medicinal plants in Jammu and Kashmir (J&K) state of Indian Himalayas. *Journal of Herbal Medicine*, 17–18(17).

[Google Scholar](#)

Tariq, K. A. and Tantry, M. A. (2012). Preliminary studies on plants with anthelmintic properties in Kashmir—The north-west temperate Himalayan Region of India. *Chinese Medicine*, 03(2), 106–112.

[Google Scholar](#)

Tomar, A. and Singh, H. (2005). Folk medicinal uses of some indigenous plants of Baghpatt district of Uttar Pradesh, India. *Journal of Non-Timber Forest Products*, 12 (3): 167-170.

[Google Scholar](#)

Tomar, A. and Singh, H. (2006). Ethnomedicinal uses of some weed plants from Baghpatt district (U.P.), India. *Plant Archives*, 6 (2): 691-693.

[Google Scholar](#)

Tomar, A. (2007). Use of some medicinal plants to cure Migraine. *Journal of The Indian Forester*, 133 (2): 275-278.

[Google Scholar](#)

Tomar, A. (2008). Folk medicinal plants in Muzaffarnagar district of Western Uttar Pradesh, India. *Journal of Indian Botanical Society*, 87 (3 & 4): 200-208.

[Google Scholar](#)

Tomar, A. (2009). Folk medicinal uses of plant roots from Meerut district, Uttar Pradesh. *Indian Journal of Traditional Knowledge*, 8 (2): 298-301.

[Google Scholar](#)

Tomar, A. (2011). Sustainable harvesting and conservation of highly utilized medicinal plants from Meerut region (Uttar Pradesh). *Acta Botanica Indica*, 39: 23-28.

[Google Scholar](#)

Tomar, A. (2012). Use of *Gloriosa superbha* Linn. (Kalihari) to cure Arthritis. *The Indian Forester*, 138(12): 1171-1172.

[Google Scholar](#)

Tomar, A. (2013). Method and composition for treatment of Eczema in Uttar Pradesh, India. *Journal of Non-Timber Forest Products*, Vol. 20(4): 281-284.

[Google Scholar](#)

Tomar, A. (2014). Use of *Adenocalymma alliaceum* (Lam.) Miers (Lehsunbel) to cure gastric trouble. *Journal of Non-Timber Forest Products*, 21(2): 127-128.

[Google Scholar](#)

Tomar, A. (2015). Medicinal use of *Calendula officinalis* L. to cure Chronic Urticaria. *Journal of Non-Timber Forest Products*, 22 (4):233-234.

[Google Scholar](#)

Tomar, A. (2016). Medicinal use of *Bryophyllum pinnatum* Kaurz. to cure Cholera. *Journal of Non-Timber Forest Products*, 23(2):109-110.

[Google Scholar](#)

Tomar, A. (2017). Medicinal use of *Abelmoschus esculentus* (Linn.) Moench. (Bhindi) to cure fever. *Journal of Pharmacognosy and Phytochemistry*, 6(4):596-597.

[Google Scholar](#)

Tomar, A. (2018). Swine flu infection inhibition by *Mansoa alliacea* (Lam.) A.H. Gentry (Lehsunbel). *Journal of Non-Timber Forest Products*, 25(3):181-183.

[Google Scholar](#)

Tomar, A. (2019). Antidiabetic activity of *Andrographis paniculata* (Burm. f.) Wall. ex Nees (Kalmegh). *Journal of Non-Timber Forest Products*, 26(4):207-209.

[Google Scholar](#)

Tomar, A. (2020). Covid-19 infection inhibition by *Andrographis paniculata* (Burm.f.) Wall. Ex Nees (Kalmegh) infusion, decoction and tincture. *The Indian Forester*, 146(8): 782-784.

[Google Scholar](#)

Tomar, A. (2021). Covid-19 infection inhibition by *Nimbu* (*Citrus limon* Linn.) infusion, decoction and tincture. *International Journal of Plant and Environment*, 7(2):179-181.

[Google Scholar](#)

Vashistha, R., Nautiyal, B. P. and Nautiyal, M. C. (2006). Conservation status and morphological variations between populations of *Angelica glauca* Edgew. and *Angelica archangelica* Linn. in Garhwal Himalaya. *Current Science*, 91, 1537–1542.

[Google Scholar](#)

Ved, D. K. and Goraya, G. S. (2008). Demand and supply of medicinal plants. *Medplant-ENVIS Newsletter on Medicinal Plants*, 1(1), 2–4.

[Google Scholar](#)

Wagay, N.A. (2014). Medicinal flora and Ethnobotanical knowledge of Baramulla Tehsil in Jammu and Kashmir, India. *International Journal of Advanced Biotechnology and Research*, 5(3):539-546.

[Google Scholar](#)