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**Research Paper**

# Wild extraction patterns of medicinal and aromatic plants from forests of Kashmir

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ABSTRACT

**The UT of Jammu and Kashmir (J&K) harbours rich biodiversity, including a diverse array of medicinal flora, which are vital for ecological balance and rural livelihood. The present study was carried out to determine the medicinal flora extracted from various forest divisions of Kashmir. The documentation on diversity of medicinal flora extracted from various forest divisions of Kashmir can prove pivotal in the conservation of these ecologically and economically precious plant resources. The present study, based on extensive surveys carried out during 2022-2024 and verified records from the forest department, has developed a database on medicinal and aromatic plants found and extracted from various forest divisions of Kashmir. A total of 45 medicinal plant species belonging to 29 families, among which 83% were herbs, 7% shrubs, 4% trees, 2% fungi, 2% climber and 2% fern were recorded. Roots (of 25 species) were the most commonly harvested plant part, followed by leaves (of 23 species), flowers (of 9 species), and rhizomes (of 8 species). The number of species extracted varied across forest divisions, ranging from 4 species in Kamraj to 21 in Kulgam and Shopian divisions, with an overall mean of 13 species per division. Notably, *Morchella esculenta (L.) Pers.*, *Trillium govanianum* Wall, and *Saussurea costus* Lipsch., were found in nearly all forest divisions and are under high extraction pressure. This baseline study not only highlights the significant pressure on high-value medicinal plant species but also provides critical data for policymakers and conservationists to frame effective conservation, sustainable harvesting, and trade regulation strategies for the MAPs of Kashmir valley.**

**Key words:** Conservation strategies, diversity, MAPs, quantity harvested, temperate forests

Kashmir Himalayas, one of the most beautiful parts of the Indian Himalayan Region harbours a large number of medicinal plants (Khan and Kumar, 2012). Kashmir valley has a long history of using herbal medicines. The medicinal use of plants by nomadic tribes such as Gujjar's and Bakerwal's has been documented earlier (Nawchoo and Buth, 1994). Medicinal plants can provide a significant source of income for rural people in developing countries, especially through the sale of wild harvested material, which contributes 15–30 % to the total income of poorer households (Hamilton, 2004). The importance of medicinal plants is increasingly being

recognized in the Himalayan region (Larsen *et al*., 2000; Olsen, 2005) and particularly from ecological, social and economic perspectives (Arnold and Perez, 2001; Negi *et al*., 2011). Estimates suggest the region harbours well over 600 plant species with documented ethno medicinal uses, forming an invaluable resource for local health care and a vital genetic reservoir for modern drug discovery (Mushtaq *et al*., 2025). Medicinal and aromatic plants (MAPs) are traded both as raw materials and as processed final products. The price trends of most Himalayan medicinal plant species traded in the market have been upward over the past three years. However, about 90% of medicinal plants used by the industries are collected from the wild. While over 800 species are used in the industry, less than 20 species of plants are under commercial cultivation (Dawa *et al*., 2018). Earlier, the harvesting of MAPs was mainly practiced by traditional healers but with the high demand of MAPs at regional to international markets, many of the untrained collectors begin to participate in collection (Sharma and Kala, 2016). Presently, a large number of firms are involved in bulk production of herbal medicines in India. As most of these firms do not have their own source of raw materials required for processing, they are dependent on the natural forests. These firms have been engaging the local forest dwellers to collect raw material from the forests. The estimated value of herbs extracted for drug production is over US$ 300 million (Chaudhary and Singh, 2010; Dawa *et al*., 2018). The projected escalating demand of medicinal plants is creating heavy pressure on high-value medicinal plant populations in the wild due to over-harvesting (Nautiyal *et al*., 2002), which subsequently results in the loss of their existing populations. To draw maximum profit out of trade, the local people tend to harvest MAPs without taking care of traditional norms (Uniyal *et al*., 2011). For example, large quantity of Himalayan yew (*Taxus contorta*) has been gathered from the wild since its bioactive compound, taxol has been found effective in the treatment of ovarian cancer. Similarly, *Aconitum heterophyllum, Nardostachys grandiflora, Dactylorhiza hatagirea, Polygonatum verticillatum, Gloriosa superba,* and *Arnebia benthamii* etc. are other examples of north Indian medicinal plant species which have been overexploited for therapeutic uses and have subsequently been placed in different threat categories (Kala *et al*., 2005). Harvesting medicinal plants for commercial use, coupled with the destructive collection of underground parts of slow-growing, slow-reproducing, and habitat-specific species, is a crucial factor affecting the goal of sustainability (Kala *et al*., 2006; Ghimire *et al*., 2005). Furthermore, rising demands with shrinking habitats has not only affected their supply and loss of genetic diversity, but have seriously affected the livelihoods of indigenous people living in the forest margins (Rao *et al*., 2004). The availability of data on the extraction dynamics of medicinal and aromatic plants (MAPs) from forests of Kashmir valley is the basis for this study. This study can be effective for framing various conservation and trade regulation strategies of medicinal plants in the region.

## MATERIALS AND METHODS

The study was conducted in the Kashmir division of UT J&K situated between 32° 16′ to 34° 49′ latitude and 73° 44′-76° 46′ longitude. The climatic condition of Jammu and Kashmir is quite diverse, varying greatly depending on the region and altitude. In the Jammu region, the climate is generally subtropical, with hot summers and relatively milder winters, while as Kashmir Valley has a more temperate climate, characterized by cold winters with heavy snowfall and cool summers. The present study was carried out in eleven forest divisions (Lidder forest division, Kulgam forest division, Shopian forest division, Awantipora forest division, Pirpanjal forest division Budgam, Jehlum Valley Forest division (JV) Baramulla and Kamraj forest division Kupwara) of Kashmir valley during 2022-23 however only 7 forest divisions provided the required information. The study involved interaction with forest personnel and locals. Extensive field survey was carried out with the help of well-structured questionnaire.The information on the target species was also collated from the official records of each forest division.

## RESULTS AND DISCUSSION

The floral composition of medicinal plants extracted from various forest divisions of the Kashmir valley corresponding to different families with the scientific name, common name, plant parts used and their quantity extracted are given in Table 1.

This dominance of herbaceous medicinal plants is in line with studies from the Himalayan region and other parts of India, where herbaceous taxa are often reported as the primary life form used in traditional medicine due to their abundance and easier harvest ability (Alves *et al.*, 2007; Peerzada *et al.*, 2021; Peerzada *et al.*, 2022). The family Asteraceae contributed the highest number of medicinal plant (5 species), followed by Malvaceae (4 species), Lamiaceae (4 species), Polygonaceae (3 species) and Solanaceae (3 species), while Iridaceae and Berberidaceae contributed 2 species each.

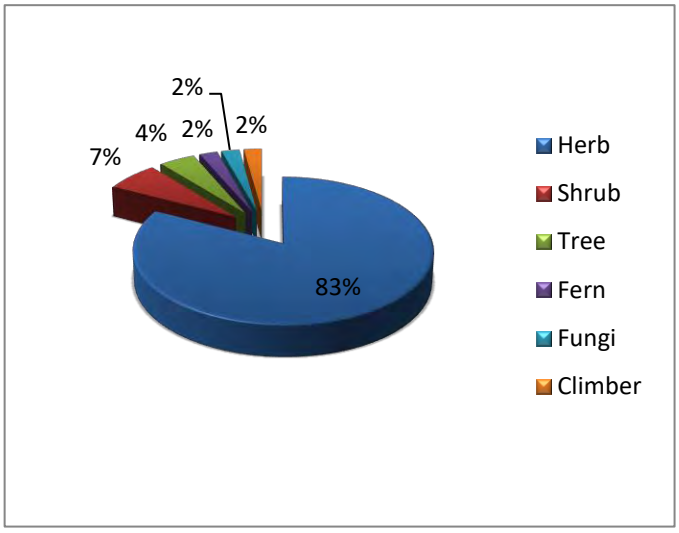


**Fig-1: Lifeforms of extracted medicinal plants**

The study documented 45 medicinal plant species belonging to 29 families, of which 83% of the species belonged to the herbaceous community, while shrubs, trees, fungi, climbers and ferns accounted for 7%, 4%, 2%, 2% and 2% respectively (Fig-1).Twenty-two other families were represented by a single species each (Dioscoreaceae, Scrophulariaceae, Hamamelidaceae, Juglandaceae, Morchellaceae, Valerianaceae, Melanthiaceae, Araceae, Ranunculaceae, Pteridaceae, Cannabaceae, Euphorbiaceae, Geraniaceae, Urticaceae, Violaceae, Adoxaceae, Portulacaceae, Zygophyllaceae, Acoraceae, Saxifragaceae, Boraginaceae, Dipsacaceae) (Fig-2).

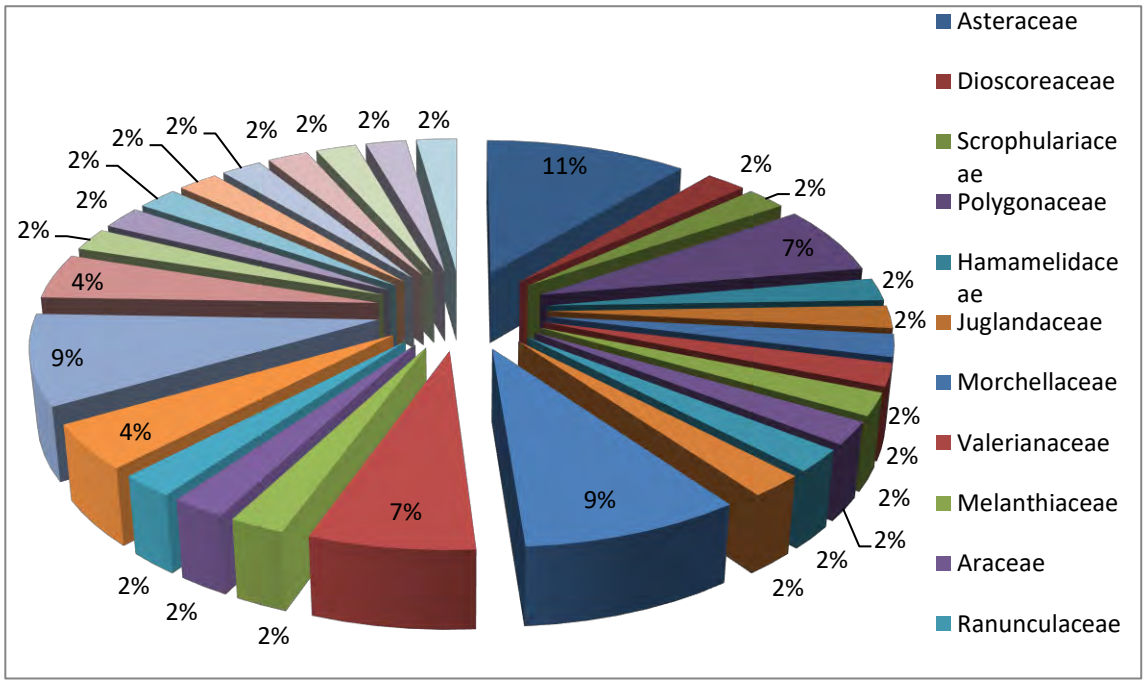


**Fig. 2: Representation of extracted species in different families**

This taxonomic pattern aligns with previous ethnobotanical studies in the region (Lone *et al*., 2014; Peerzada and Sofi, 2017; Peerzada *et al*., 2015), reflecting both the floristic richness and the cultural importance of these families. The recurrent dominance of Asteraceae, for instance, has been frequently reported from other Himalayan regions such as Uttarakhand and Himachal Pradesh (Maurya *et al*., 2021; Singh *et al*., 2022), likely due to its ecological amplitude and presence of bioactive secondary metabolites known for their therapeutic effects. The most commonly used plant part in both traditional use and trade was the root (25 species), followed by leaves (23), flowers (9), rhizomes (8), fruits, stem, and seeds (6 each), bark (5), and other parts like flowering tops (4), tubers (3), fronds (1), and fruit spikes (1). This pattern is consistent with the findings of Peerzada and Sofi (2017) and Ghimire *et al*. (2005), who noted a predominance of underground parts in medicinal plant use, often because they contain concentrated phytochemicals. However, the unsustainable harvesting of roots and rhizomes has raised concerns over the long-term conservation and regeneration of these species (Hamilton, 2004). Extraction frequency varied between Forest Divisions, with Kamraj forest division recording the lowest number of species (4) and Kulgam and Shopian recording the highest (21 species each), with an overall average of 13 species per division. Species such as *Morchella esculenta* (L.), *Trillium govanianum* Wall. ex D. Don, and *Saussurea costus* (Lipsch.) were common across nearly all divisions except Kulgam Forest Division, while *Arisaema jacquemontii* Blume, *Acorus calamus* L., *Cichorium intybus* L., *Euphorbia stracheyi* Boiss., *Geranium wallichianum* D. Don, and *Hyoscyamus niger* L. were highly localized, suggesting site-specific ecological or microclimatic preferences. Furthermore, *Viola odorata* L., *Taraxacum officinale* Weber, *Rheum emodi* Wall., *Prunella vulgaris* L., *Artemisia absinthium* L., and *Podophyllum hexandrum* Royle were found in more than two forest divisions. Such distributional patterns emphasize the ecological niches of these species and the importance of microhabitats, which is supported by findings in other alpine medicinal plant studies (Gairola *et al*., 2014). The abundance of the enumerated 45 medicinal plant species varied considerably across the seven forest divisions. In Lidder Forest Division, *Parrotia persica* (70.5 qtls) was the most abundant species in terms of quantity available. Similarly, *Adiantum capillus-veneris* L., *Prunella vulgaris*, and *Datura stramonium* L. were the dominant species in Kulgam Forest Division, Shopian Forest Division, and Awantipora Forest Division, respectively. In JV Forest Division, Baramulla, Kamraj Forest Division, and Budgam Forest Division, *Morchella esculenta* L. was the dominant species in terms of quantity available. These trends point to species that are not only ethnomedicinally important but also commercially valuable, warranting conservation priority and cultivation initiatives (Ved *et al*., 2003; Sharma and Kala, 2016; Rafeeq *et al*., 2025).

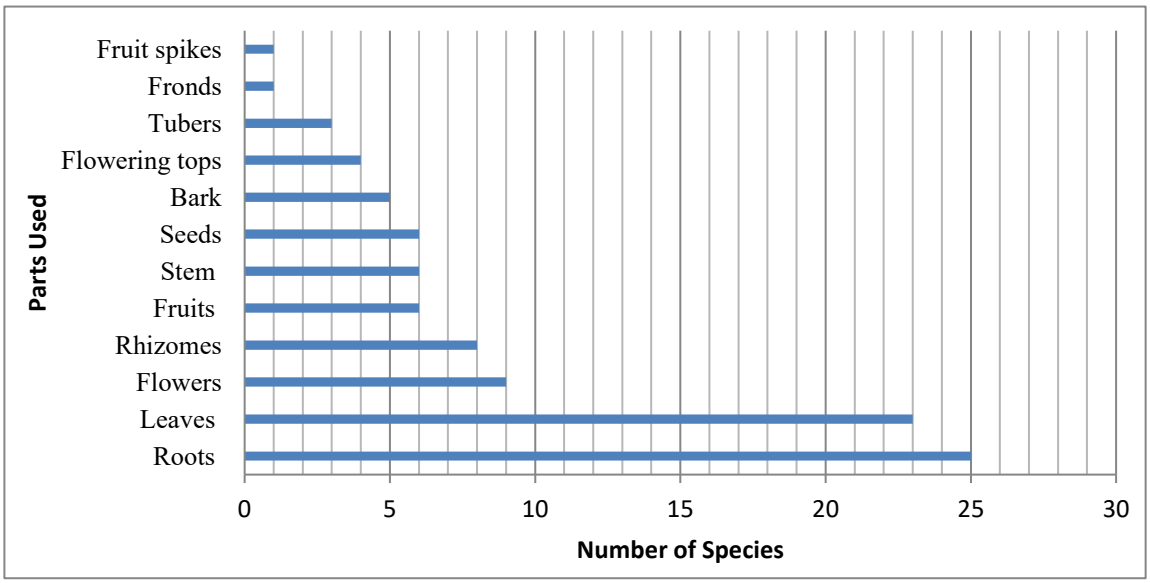


**Fig. 3: Parts of medicinal plants extracted from the forests of Kashmir**

**Table 1: Diversity and yield of MAPs extracted from the surveyed forest divisions of Kashmir valley**

| Division | Scientific name | Common name | Family | Habit | Tradable part | Time of collection | Quantity extracted {Qtls} |
|---|---|---|---|---|---|---|---|
| LIDDER FOREST DIVISION | *Jurinea macrocephala*(DC. ex Royle) Benth. ex C.B.Clarke | Dhup/Dhoop | *Asteraceae* | Herb | Root/tubers | September-October | 25 |
| | *Dioscorea deltoidea* Wall. ex Griseb. | Nepal Yam | Dioscoreaceae | Climber | Tubers | December | 10 |
| | *Saussurea costus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | *September- October or early spring* | 13 |
| | *Picrorhiza kurroa*Royle ex Benth. | Kaud, Kaur, Kutki | *Scrophulariaceae* | Herb | Root/Rhizome | July-September | 05 |
| | *Rheum emodi* Wall. ex Meissn. | Revandchini, Himalayan Rhubarb | Polygonaceae | Herb | Roots/ rhizomes | September-October | 04 |
| | *Parrotia persica* (DC.) C.A.Mey. | Persian ironwood | Hamamelidaceae | Tree | Leaves | April-November | 70.5 |
| | *Juglans regia* L.. | *Persian walnut* | *Juglandaceae* | Tree | Bark, kernel, fruit, leaves, green husk, and flower | October- November | 3.5 |
| | *Morchella esculenta (L.) Pers.* | Morel / *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 8.15 |
| | *Valeriana jatamansi* Jones ex Roxb. | *Muskbala, Tagar*, Jatamansi, Balchhari, Mansi, Nihan | *Valerianaceae* | Herb | Roots | June-September | 1 |
| | *Saussurea costus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September or October or early spring | 01 |
| | *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 01 |
| | *Picrorhiza kurroa* Royle ex Benth. | Kaud, Kaur, Kutki | *Scrophulariaceae* | Herb | Root/Rhizome | July-September | 0.50 |
| | *Arisaema jacquemontii* Blume | Jacquemont's Cobra Lily/HapetGogej | Araceae | Herb | Stem/tuber | *June-July* | 01 |

*Table 1 continued*

| | | | | | | |
|---|---|---|---|---|---|---|
| *Aconitum heterophyllum* Wall ex Royle | Patrees | Ranunculaceae | Herb | Root | August-October | 02 |
| *Adiantum capillus-veneris* L. | Maidenhair fern | Pteridaceae | Fern | Fronds, rhizomes, and roots | June | 04-05 |
| *Althaea officinalis* L. | *Marshmallow* | Malvaceae | Herb | Root, flowers and seeds | *July - September* | 04 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June - September | 1.5 |
| *Atropa acuminate* Royle ex Lindl. | Maitbrand, Indian Belladonna | Solanaceae | Herb | Roots and leaves | Autumn (roots), late spring (leaves) | 0.5 |
| *Cannabis sativa* L. | Marijuana | *Cannabaceae* | Herb | Leaves and flowering tops | August - September | 2.5 |
| *Cichorium intybus* L. | Chicory | *Asteraceae* | Herb | Roots/leaves | October | 0.3 |
| *Datura stramonium* L. | Thorn apple | *Solanaceae* | Sub-shrub | Seeds | *August - October* | 1 |
| *Euphorbia stracheyi* Boiss. | Himalayan Prostrate Spurge | *Euphorbiaceae* | Herb | Roots | August | 0.2 |
| *Hyoscyamus niger* L. | Black henbane/ Stinking nightshade | Solanaceae | Herb | *Roots and leaves* | *June- September* | 0.4 |
| *Geranium wallichianum* D. Don ex Sweet | Wallich Geranium /Ratanjot | Geraniaceae | *Herb* | Rhizome | June - November | 0.65 |
| *Iris ensata* Thunb. | Japanese water iris | Iridaceae | Herb | Roots | October | 0.35 |
| *Malva neglecta* Wallr. | Common mallow | *Malvaceae* | Herb | Leaves and roots | August - September | 01 |
| *Nepeta cataria* L. | Catmint | Lamiaceae | Herb | Flowering tops and leaves | *July - September* | 0.34 |
| *Podophyllum hexandrum* Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 01 |
| *Prunella vulgaris* L. | Self-heal/ carpenter weed | *Lamiaceae* | Herb | Fruitspike | *July - October* | 01 |
| *Rheum emodi* Wall. ex Meissn. | Rhubarb | Polygonaceae | Herb | Roots/ rhizomes | September-October | 04 |
| *Taraxacum officinale* Weber ex F.H. Wigg. | Common Dandelion | Asteraceae | Herb | Root/leaves | April | 03 |
| *Urtica diocia L.* | *Stinging nettle* | *Urticaceae* | Herb | Leaves/Roots | April-September | 02 |
| *Viola odorata* L. | Bnafsha, Wild Violet, Sweet Violet | Violaceae | Herb | Flowers | January- March | 01 |
| *Viburnum grandiflorum* Wall. ex DC. | Grand Viburnum | Adoxaceae | *Shrub* | Wood, leaf, flower, bark, Fruit | *May-August* | 01 |

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|---|---|---|---|---|---|---|
| *Morchella esculenta* (L.) Pers. | Morel / *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 2 |
| *Mentha longifolia* (L.) Huds. | Horsemint | *Lamiaceae* | *Herb* | Leaves, flower, stem, bark, and seeds | June-October | 0.54 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | leaves, flowering tops | June - September | 01 |
| *Datura stramonium L.* | Thorn apple | *Solanaceae* | Sub-shrub | Seeds | *August - October* | 0.65 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Roots | May-August | 1 |
| *Lavatera kashmiriana* Camb. | Kashmir mallow/wild hollyhock | Malvaceae | Herb | Roots, flowers, seeds | June | 0.35 |
| *Prunella vulgaris* L. | Self-heal | *Lamiaceae* | Herb | Fruitspike | *July - October* | 2.0 |
| *Viburnum grandiflorum* Wall. ex DC. | Grand Viburnum | Adoxaceae | *Shrub* | Wood, leaf, flower, bark, Fruit | *May-August* | 1 |
| *Saussurea costus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September -October or early spring | 1.2 |
| *Taraxacum officinale* Weber ex F.H. Wigg. | Common Dandelion | Asteraceae | Herb | Root/leaves | April | 1.3 |
| *Malva sylvestris* L. | Blue mallow/Common mallow | Malvaceae | *Herb* | Leaves, shoots, flowers, and fruits | March-April | 1.5 |
| *Rumex acetosa* Linn. | Common sorrel/ garden sorrel | Polygonaceae | Herb | Flowers, fruits, leaves, roots and seeds | May-August | 1.80 |
| *Portulaca oleracea L.* | Common purslane / little hogweed | Portulacaceae | *Herb* | Leaves/ stem | Aril-June | 1.24 |
| *Viola odorata* L. | *Sweet violet* | Violaceae | Herb | Flowers | January- March | 0.72 |
| Tribulus terrestris L. | Puncture vine | Zygophyllaceae | *Herb* | Leaves, Fruits and roots | August | 0.90 |
| *Morchella esculenta (L.) Pers.* | *Morel/Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 1.5 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June - September | 1.26 |
| *Prunella vulgaris* L. | Self-heal/ carpenter weed | *Lamiaceae* | Herb | Fruitspike | *July - October* | 2 |
| *Taraxacum officinale* Weber ex F.H.Wigg. | Common Dandelion | Asteraceae | Herb | Root/leaves | April | 2 |
| *Rheum emodi* Wall. ex Meissn. | Rhubarb | Polygonaceae | Herb | Roots/ rhizomes | September-October | 1.5 |
| *Viburnum grandiflorum* Wall. ex DC. | Grand Viburnum | Adoxaceae | *Shrub* | Wood, leaf, flower, bark, Fruit | *May-August* | 1.3 |
| *Viola odorata* L. | *Bunfsha/Sweet violet* | Violaceae | Herb | Flowers | January- March | 0.87 |
| *Datura stramonium* L. | Thorn apple | *Solanaceae* | Sub-shrub | Seeds | *August - October* | 2 |

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|---|---|---|---|---|---|---|
| *Berberis lycium* Royle | *Kashmal /Indian barberry* | *Berberidaceae* | Shrub | *Root, bark, stem, leaves and fruits* | November-January | 0.24 |
| *Urtica diocia* L. | *Stinging nettle* | *Urticaceae* | *Herb* | Leaves/Roots | April-September | 1.67 |
| *Cannabis sativa* L. | Marijuana | *Cannabaceae* | *Herb* | Leaves and flowering tops | August - September | 1.65 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | *Herb* | Roots | May-August | 1.44 |
| *Acorus calamus* L. | Sweet flag/muskrat root | Acoraceae | *Herb* | Leaves and rhizomes | *December* | 0.37 |
| *Saussurea costus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September -October or early spring | 1.1 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Roots | May-August | 1.3 |
| *Saussurea costus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 1.8 |
| *Berberis lycium Royle* | *Kashmal /Indian barberry* | *Berberidaceae* | Shrub | *Root, bark, stem, leaves and fruits* | November-January | 0.56 |
| *Taraxacum officinale* Weber ex F.H.Wigg. | Common Dandelion | Asteraceae | Herb | Root/leaves | April | 1 |
| *Datura stramonium L.* | Thorn apple | *Solanaceae* | Sub-shrub | Seeds | *August - October* | 2.94 |
| *Morchella esculenta (L.) Pers.* | *Morel/Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 1.75 |
| *Althaea officinalis* L. | *Marshmallow* | Malvaceae | Herb | Root, flowers and seeds | *July - September* | 0.71 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | leaves, flowering tops | June - September | 0.89 |
| *Bergenia ligulata* (Wall.) Engl. | Prashanbheda,Zakham-e-hiyat, patharchoor, | Saxifragaceae | *Herb* | Root | June-September | 0.32 |
| *Arnebia benthamii*(Wall. ex G. Don) I.M. Johnst. | Gaozaban | Boraginaceae | Herb | Rhizomes, leaves, and flowering stalk | September - October | 0.24 |
| *Iris nepalensis* D. Don | Himalayan iris | Iridaceae | Herb | Rhizome | April-June | 1 |
| *Nepeta cataria* L. | Catmint | Lamiaceae | Herb | flowering tops and leaves | *July - September* | 0.34 |
| *Prunella vulgaris* L. | Self-heal | *Lamiaceae* | Herb | Fruitspike | *July - October* | 1 |
| *Rheum emodi* Wall. ex Meissn. | Rhubarb | Polygonaceae | Herb | Roots/ rhizomes | September-October | 2 |
| *Urtica diocia L.* | *Stinging nettle* | *Urticaceae* | Herb | Leaves/Roots | April-September | 2.2 |
| *Dioscorea deltoidea* Wall. ex Griseb. | Nepal yam | Dioscoreaceae | Climber | Tuber | December | 1 |
| *Dipsacus inermis* Wall ex Roxb. | Himalayan Teasel | Dipsacaceae | Herb | Leaves/Rhizome | October | 0.85 |
| *Jurinea macrocephala* (DC. ex Royle) Benth. ex C.B.Clarke | Dhoop | *Asteraceae* | Herb | Root/tubers | September-October | 1 |

PIR PANJAL FOREST DIVISION BUDGAM

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|---|---|---|---|---|---|---|
| *Podophyllum hexandrum* Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 1.5 |
| *Thymus linearis* L. | Wild thyme/ creeping thyme | *Lamiaceae* | Herb | Flowers, stem, roots, leaves and bark | April-July | 2 |
| *Morchellaesculenta (L.) Pers.* | *Morel/Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 91 |
| *Trillium govanianum* Wall. ex D. Don | Great White Trillium | Melanthiaceae | Herb | Roots | May-August | 42 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March- May* | 23 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 05 |
| *Jurineamacrocephala* (DC. ex Royle) Benth. ex C.B.Clarke | Dhoop | *Asteraceae* | Herb | Root/tubers | September-October | 08 |
| *Viola odorata* L. | *Sweet violet* | Violaceae | Herb | Flowers | January- March | 05 |
| *Rheum emodi*Wall. exMeissn. | Rhubarb | Polygonaceae | Herb | Roots/ rhizomes | September-October | 03 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal yam | Dioscoreaceae | Climber | Tuber | December | 15 |
| *Morchellaesculenta (L.) Pers.* | *Morel/Guchi* | *Morchellaceae* | Fungi | Whole body | February-March | 20 |
| *Viola odorata* L. | *Sweet violet* | Violaceae | Herb | Flowers | January- March | 15 |
| *Adiantumcapillus-veneris*Linn. | Maidenhair fern | Pteridaceae | Fern | Fronds, rhizomes, and roots | June | 15 |
| *Taraxacumofficinale* Weber Ex F.H.Wigg. | Common Dandelion | Asteraceae | Herb | Root/leaves | April | 45 |
| *Bergenialigulata* (Wall.) Engl. | Paashaanbhed/ Prashanbheda | Saxifragaceae | *Herb* | Root | June-September | 35 |
| *Rumexpatientia* L. | Patience Dock /monk's rhubarb | Polygonaceae | Herb | Leaves/Root | April-August | 30 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 10 |
| *Atropaacuminate* Royle ex Lindley | Indian Belladonna | Solanaceae | Herb | Roots and leaves | Autumn (roots), late spring (leaves) | 20 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June - September | 20 |
| *Morchellaesculenta (L.) Pers.* | *Morel/Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 20 |
| *PodophyllumHexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 18 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 15 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal yam | Dioscoreaceae | Climber | Tuber | December | 20 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Toots | May-August | 40 |

JV FOREST DIVISION BARAMULLA

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| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June- September | 30 |
| *Morchellaesculenta (L.) Pers.* | *Morel/Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 03 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 25 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 10 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal yam | Dioscoreaceae | Climber | Tuber | December | 50 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Roots | May-August | 30 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Shrub | leaves, flowering tops | June -September | 25 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 10 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 10 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal yam | Dioscoreaceae | Climber | Tuber | December | 10 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Roots | May-August | 10 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June - September | 30 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 01 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Rootstocks | *March - May* | 20 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 10 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal Yam | Dioscoreaceae | Climber | Tuber | December | 20 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 20 |
| *Artemisia absinthium* L. | Wormwood/Tethwan | Asteraceae | Herb | Leaves, flowering tops | June - September | 10 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 05 |
| *Podophyllumhexandrum*Royle | Bankakri | *Berberidaceae* | Herb | Root | *March - May* | 20 |

KAMRAJ FOREST DIVISION

| | | | | | | |
|---|---|---|---|---|---|---|
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 02 |
| *Dioscoreadeltoidea* Wall. exGriseb. | Nepal Yam | Dioscoreaceae | Climber | Tuber | December | 01 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 90 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 03 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 02 |
| *Aconitum heterophyllum*Wall. ex Royle | Patrees | Ranunculaceae | Herb | Root | August-October | 0.75 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 1.5 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 1.2 |
| *Aconitum heterophyllum*Wall. ex Royle | Patrees | Ranunculaceae | Herb | Root | August-October | 0.5 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 0.80 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 0.5 |
| *Aconitum heterophyllum*Wall. ex Royle | Patrees | Ranunculaceae | Herb | Root | August-October | 0.5 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September - October or early spring | 0.5 |
| *Morchellaesculenta (L.) Pers.* | *Guchhi* | *Morchellaceae* | Fungi | Whole body | February-March | 1.10 |
| *Trillium govanianum* Wall. ex D. Don | *Nag Chhatri* | *Melanthiaceae* | Herb | Root | May-August | 1.5 |
| *Aconitum heterophyllum*Wall. ex Royle | Patrees | Ranunculaceae | Herb | Root | August-October | 0.5 |
| *Saussureacostus* (Falc.) Lipsch. | Costus/Kuth | *Asteraceae* | Herb | Root | September -October or early spring | 01 |

## CONCLUSION

The present study provides a comprehensive assessment of the diversity, distribution, and extraction trends of medicinal and aromatic plants (MAPs) across seven forest divisions of the Kashmir Valley. A total of 45 medicinal plant species representing 29 families were documented, with a predominance of herbaceous species, a pattern consistent with other surveys across the Himalayan region (Peerzada *et al*., 2021; Kala *et al.,* 2006). The family Asteraceae emerged as the most represented, suggesting its ecological dominance and ethno medicinal relevance. Notably, the study highlights the over-dependence on underground plant parts such as roots, rhizomes, and tubers for medicinal use, raising concerns about the sustainability of harvesting practices. Species such as *Morchella esculenta*, *Trillium govanianum*, *Aconitum heterophyllum*, and *Saussurea costus* were identified as the most vulnerable due to their widespread extraction and high trade value, underscoring the urgent need for conservation intervention. The findings underline significant variation in species abundance and extraction intensity among forest divisions, pointing to local ecological conditions, harvesting pressures, and possibly governance-related factors. The documentation of species occurring across multiple divisions, as well as those limited to specific sites, adds valuable insights into their distributional ecology and conservation status. Therefore, regular monitoring of extraction dynamics, supported by ecological and ethnobotanical data, is essential to develop effective conservation strategies. Efforts should be directed towards community-based awareness programs to promote sustainable harvesting and reinforce the importance of traditional knowledge systems. *In-situ* and *ex-situ* conservation strategies, along with government-supported initiatives for cultivation, value addition, and fair-market access, are imperative to ensure the long-term sustainability of these critical plant resources. This study not only adds to the growing body of ethno medicinal literature from the Himalayan region but also offers practical guidance for biodiversity conservation, policy planning, and livelihood enhancement.



## CONFLIT OF INTEREST

All the authors affirm that there is no conflict of interest among them. All research activities comply with relevant legal, institutional and ethical standards.

## AUTHOR CONTRIBUTION

All the authors contributed equally in this review article.

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