



E-ISSN: 2321-2187  
P-ISSN: 2394-0514  
IJHM 2018; 6(6): 81-91  
Received: 01-09-2018  
Accepted: 05-10-2018

**Sardar Irfan Mehmood**  
Department of Botany, Govt.  
Boys Degree College Abbaspur  
Poonch Azad Kashmir, Pakistan

**Sajid Majeed**  
Department of Horticulture  
University of Poonch Rawalakot  
Azad Kashmir, Pakistan

**Zeenat Jannat**  
Department of Zoology  
University of Poonch Rawalakot  
Azad Kashmir, Pakistan

**Tariq Habib**  
Department of Botany,  
University of Muzaffarabad  
Azad Kashmir, Pakistan

## Imaging based ethno botanical studies of district Poonch, Azad Jammu and Kashmir

**Sardar Irfan Mehmood, Sajid Majeed, Zeenat Jannat and Tariq Habib**

### Abstract

Present paper aims to study each plant in natural habitat including live imaging of field plant, leaf dorsal, ventral view and flower. A set of standardized digital images with enough features of a plant represent significant role in unambiguous plant identification, gross morphology of a species and taxon recognition, as a supplement herbarium collection. A total of 24 MAPs species belong to 24 families and 24 genera including 9 herbs 3 shrubs, 4 trees and 8 vines were documented. The important plants *Aster thomsonii* C.B. Clarke., *Aquilegia pubiflora* Wall. ex Royle, *Boerhavia procumbens* Banks ex Roxb., *Bombax ceiba* L., *Clematis orientalis* L., *Dioscorea deltoidea* Wall. ex Griseb., *Hypericum oblongifolium* Choisy, *Hedera nepalensis* K. Koch, Hort., *Ipomoea cairica* (L.) Sweet, *Litsea tomentosa* Heyne ex Wall, *Leycesteria formosa* Wall., *Mucuna pruriens* (L.)DC., *Morina longifolia* Wall. ex DC, *Oxyria digyna* (L.) Hill, *Polemonium caeruleum* L., *Punica granatum* L., *Rubus fruticosus* Loureiro, *Reinwardtia indica* Dumort., *Symplocos paniculata* (Thunb.) Miq., *Solena heterophylla* Loureiro, *Trifolium pratense* L., *Tylophora hirsuta* (Wall.) Wight, *Viola odorata* L., *Ziziphus jujuba* Mill. were investigated. It is an effort to solve privilege identification errors, adulteration and misconception for end users due to routine lists of ethno botanical information solely based on botanical names and interviews. This fundamental ethno botanical study will provide opportunity to re-examine botanical information and paved the way for effective and sustainable utilization of local medicinal flora.

**Keywords:** digital image, ethno botany, medicinal and aromatic plants (MAPs), photography

### 1. Introduction

The Poonch region of Azad Kashmir has diverse climatic attributes with sub-tropical, temperate, humid and sub-alpine ecological regions. Due to unique geographical and climatic conditions, this area is bestowed with valuable medicinal and aromatic plants miscellany. Poonch region is located between 33-36 North latitude and 73-75 East longitude, encompassed by Pir Punjal Mountains on the East, Islamabad on West, Kotli on South and Muzaffarabad capital of AJK on the North. Total area is 8500 hectare having average elevation of 1750-2500 m from sea level, inclining from South North to North East. Yearly rainfall of the area is about 1600mm. Famous mountains like Toli Pir, Haji Pir, Mehmood Gali, Lasdhana, Bedori I and Bedori II are situated in this area <sup>[1]</sup>. Ethno botany is engage in crucial concern about our awareness of the effectual interactions between plant diversity and human social, economical and cultural systems <sup>[2]</sup>. Now a day's many modern medicines are originated from plants and medicinal plants are important source of beneficial drugs <sup>[3]</sup>. Regardless of many new attainments have been taken place in area of new medicines, majority of people in developing countries still feel necessity for traditional folk medicines gained from plant resources. Integrated active constituents of plant manifest good curative outcomes than single extracted constituents <sup>[4]</sup>. Usage of indigenous plants by historical healers has always been a low-cost and affordable resource for the poor people <sup>[5]</sup>.

Azad Jammu Kashmir and northern areas of Pakistan, Khyber Pakhtunkhwa and Baluchistan are natural habitats of medicinal and aromatic plants and herbal medicine is still the basis of healing practices in these regions <sup>[6]</sup>. About six hundred medicinal plants have been reported which are being used in folk medicines in our country <sup>[7]</sup>.

Ethno botanical information in Poonch Valley (an administrative division of Azad Jammu and Kashmir) has been infrequently explored with the exception of a fewer investigations <sup>[8]</sup>. A small piece of efforts has been made to investigate biodiversity of this region including taxonomic description, field collection and the rate of genetic variations among plant species along with their divided communities <sup>[9]</sup>.

The medicinal and aromatic plants (MAPs) along with other plant biodiversity are being evacuated by the human interference and natural disasters. Conservation of traditional knowledge and sustainable utilization of local medicinal plants is touching depleting standards

### Correspondence

**Sardar Irfan Mehmood**  
Department of Botany, Govt.  
Boys Degree College Abbaspur  
Poonch Azad Kashmir, Pakistan

in this region. The conventional usage of plants is as ancient as the history of man, but in this area of the world, traditional knowledge has not been documented and proved scientifically and has given rise to credulity and folk tale, which are promoted through different source media<sup>[10]</sup>. It is very significant to test highest quality medicinal plant, where to grow? Harvesting time, drying, processing, and storing are important parameters for making herbal medicine from medicinal and aromatic plants. Lack of certainty is caused by common names without botanical names. Correct identification, taxonomy description, live collection with flowering and fruiting time rectifies the proper and practical utilization of a plant for human healthcare<sup>[11]</sup>. Too much use of medicinal plants may lead to confusion in identification of medicinal plants and consequently make concessions on quality control methods. Ethno botanical medicine in our region is still a vast field of scientific exploration<sup>[12]</sup>. Updated technological approaches in publishing and computer technology have made instruction more common. Today's modern tools both written and computer consist of demonstration and high-quality images. Photographs are used in concurrence with written descriptions to control obscurity in identifications<sup>[13]</sup>. With the emergence of color photography, taxonomists and foresters developed cluster of few mm slides for teaching purposes and also to report live plant collections<sup>[14]</sup>.

The use of multiple live images allows easier taxon identification as compared to dried herbarium specimens. Electronic keys and guides should allow images to be enlarged so that their morphological details can be observed. A set of field images of the flower, leaves, stem and the whole plant is more convenient way for learners to make correct botanical identifications<sup>[15]</sup>.

Multiple images can be used to demonstrate morphological and taxonomical features to understand plant species. Enough ideas cannot be obtained from single plant image<sup>[16]</sup>.

Only botanical names without live images and exact flowering, fruiting and harvesting time are haphazard in MAPs research that is why natural products industry is not flourishing in country. Harvesting time is very important in medicinal research because chemical composition vary with season. Present study was carried out for resolving misleading ethno botanical knowledge (identification, harvesting time, usage) of medicinal plant, focusing on their study in natural habitats. Taxonomic description along with systematic collection of standardized digital images of plants will address most of these problems.

## 2. Materials and Methods

Ecological zone wise frequent trips were arranged during 2015-2017 for plant collection from Poonch area. During plant excursions all efforts were made at regular intervals in order to take live digital images of each species. Plants were properly sketched by Sony Alpha 77 digital camera in their natural habitat. During survey ethno botanical information were gathered from old peoples, hakeems, students, teachers, doctors and pharmacists through usual methods such as formal and informal interviews from local community and participant remarks<sup>[17, 18]</sup>.

Usage of medicinal plants was also investigated from earlier research articles, books and literature of taxonomy along with pharmacognosy. Gathered information were analyzed and matched with published literature. Collected plant specimens and digital image of each plant were identified with the help of Flora of Pakistan<sup>[19]</sup>. Guidelines were also gathered from

National Herbarium of Pakistan, International Plant Name Index (IPNI), Scopus and The Catalog of Vascular Plants of West Pakistan and Kashmir<sup>[20]</sup> for identification purposes. Taxonomic characteristics were written in easy and simple languages for convenient study. Herbarium specimen were collected, pressed and dried. Prepared specimens were preserved with 30% sodium pentachlorophenate. Voucher specimen's numbers were allotted to each plant according to prescribed procedures<sup>[21]</sup>.

Plants were mounted on herbarium sheets by following standard herbarium techniques<sup>[22]</sup>.

Finally herbarium specimens were deposited at the herbarium of Govt. College Abbaspur Poonch AJK.

## 3. Results and Discussion

Herbal medicine industry with botanical products is growing at a rate of 7-15% yearly. World Health Organization (WHO) recommendations reveal that plants are major source of alternative medicines in developing countries. World trade in plant oriented medicines is of billions dollars. Herbal products market of world is growing at alarming rate. It is creating new opportunities for developing countries to develop herbal drug industry by sustainable utilization and value addition of local medicinal flora<sup>[23]</sup>. Only 5000 plants have been investigated for medical utilization from 25000 plant species. Our brilliant medicinal plant future depends upon proper identification, cultivation of medicinal plant in their specific ecologies. Adulteration and limited documentations of medicinal plants merely based on general information in health systems demands further scientific research<sup>[24]</sup>.

A comprehensive knowledge of medicinal plants includes a number of disciplines, such as plant taxonomy, morphology, phenology, anatomy, pharmacognosy and pharmacology. Descriptions and interpretations of botanical nomenclature and taxonomic features on the base of botanical systems of classification dispense foundation for appropriate usage of plant for healthcare. It is necessary for a researcher to attain ability to understand whole taxonomic and morphological, descriptions as explained in pharmacopeias of different countries to avoid adulteration during utilization processes of medicinal plants. These descriptions are counter stones for medicinal ambitions of any medicinal plant delivery<sup>[25]</sup>. The modern speedy progress of dominant electronic software, network apparatus and the induction of motivated projects express the vast prospective of the web to convey image based superior education<sup>[26, 27]</sup>. Colored images, keys and illustrations are helpful for plant species description along with scientific and common names<sup>[28, 29]</sup>. A set of colored photographs was used to describe morphological characteristics of oak species in Eastern North America<sup>[30]</sup>. Images were also used for giving detail information on ethno botany and native ecologies of tracheophytes and non flowering plants of Wisconsin<sup>[31]</sup>.

The use of progressively more widespread image-based resources such as: ethno botanical data associated with images for each species would complement and make suitable utilization of medicinal plants as a system for basic health care. Attempts of photographing and identifying plants in natural habitat are helpful only through calibration between herbaria and plant researchers. The presence of many detailed images from the same plant allows justification of the taxonomic identity, resulting in the production of reliable ethno botanical information. Twenty four plants under study are presented in Table1.

Each species is documented with botanical name, local name,

family, habit and habitat, taxonomic features, flowering & fruiting time, harvesting time, medicinal value, part used and occurrence. Each plant is also illustrated with 5 images

including field image of each plant, leaf dorsal ventral, leaf ventral view, flower and a herbarium specimen (Figure 1).

**Table 1:** Medicinal and Aromatic plants of District Poonch AJK under study.

<i>Aster thomsonii</i> C.B. Clarke.	<i>Ipomoea cairica</i> (L.) Sweet	<i>Rubus fruticosus</i> Loureiro
<i>Aquilegia pubiflora</i> Wall.ex Royle	<i>Litsea tomentosa</i> Heyne ex Wall	<i>Reinwardtia indica</i> Dumort.
<i>Boerhavia procumbens</i> Banks ex Roxb.	<i>Lycyteria formosa</i> Wall.	<i>Symplocos paniculata</i> (Thunb.) Miq.
<i>Bombax ceiba</i> L.	<i>Mucuna pruriens</i> (L.)DC.	<i>Solena heterophylla</i> Loureiro
<i>Clematis orientalis</i> L.	<i>Morina longifolia</i> Wall.ex DC.	<i>Trifolium pratense</i> L.
<i>Dioscorea deltoidea</i> Wall.ex Griseb.	<i>Oxyria digyna</i> (L.) Hill	<i>Tylophora hirsuta</i> (Wall.) Wight
<i>Hypericum oblongifolium</i> Choisy	<i>Polemonium caeruleum</i> L.	<i>Viola odorata</i> L.
<i>Hedera nepalensis</i> K. Koch, Hort.	<i>Punica granatum</i> L.	<i>Ziziphus jujuba</i> Mill.

• ***Aster thomsonii* C.B. Clarke.**

**Family:** Asteraceae.

**Local Name:** Usmani Tara.

**Habit & habitat:** An annual herb up to 60 tall, found in temperate and sub-alpine zones.

**Taxonomic features:** Leaves simple, ovate-elliptic coarsely tooth. Inflorescence a capitulum. Capitula terminal, solitary, 3-5 cm in diameter. Ray-floret linear-lanceolate, purple. Fruit an achene, hairy.

**Flowering & fruiting:** July-September.

**Harvesting time:** August-November.

**Medicinal value:** Locally paste of leaves and flowers heals inflammation of joints also useful in asthma and ulcer. Review of literature reveals that it has antitumor activities.

**Part used:** Whole plant.

**Occurrence:** Uncommon.

• ***Aquilegia pubiflora* Wall. ex Royle**

**Family:** Ranunculaceae.

**Local Name:** Baz Jari.

**Habit & habitat:** An annual herb up to 65cm tall found in temperate zone.

**Taxonomic features:** Leaves compound, basal leaves biternate, green above, pale and hairy beneath. Inflorescence cymose, 3-6-flowered. Flower purplish blue or lemon, spurred. Fruit a follicle, hairy.

**Flowering & fruiting:** May-August.

**Harvesting time:** May-September.

**Medicinal value:** Externally used for skin disorders. In Homeopathy it is used to treat the problems of nervous system.

**Part used:** Whole plant.

• ***Bombax ceiba* L.**

**Family:** Bombacaceae.

**Local Name:** Kana Simblu.

**Habit & habitat:** A medium sized tree up to 10-15 m tall, found in sub-tropical zone.

**Taxonomic features:** Stem grey with conical prickles. Leaves compound, long stalked. Leaflets elliptic-lanceolate, 5-7 in number. Inflorescence terminal and solitary. Flower large, red, fleshy, showy, appear before leaves. Fruit a capsule, oblong, woody. Seed brown, ovoid in shape.

**Flowering & fruiting:** January-March.

**Harvesting time:** September-December.

**Medicinal value:** A gum called Mocharas in Tibb, is obtained from bark and root. Gum has aphrodisiac properties and locally used in impotency.

**Part used:** Gum.

**Occurrence:** Uncommon.

• ***Clematis orientalis* L.**

**Family:** Ranunculaceae.

**Local Name:** Tootal.

**Habit & habitat:** A perennial climber, found in sub-tropical zone.

**Taxonomic features:** Leaves compound, pinnate-bipinnate. Leaflets lanceolate. Inflorescence in axillary panicles. Flower actinomorphic, yellow. Sepals-5, purplish tinged to the outside. Fruit an achene, hairy.

**Flowering & fruiting:** July-September.

**Harvesting time:** September-November.

**Medicinal value:** Locally leaf extract in water is used for treatment of eczema. The plant is antiseptic and refrigerant. Useful in ulcerated throats and also to treat dog bites.

**Part used:** Leaf.

**Occurrence:** Common.

• ***Dioscorea deltoidea* Wall. ex Griseb.**

**Family:** Dioscoreaceae.

**Local Name:** Saki, Saki Ganda.

**Habit & habitat:** An annual, tuberous and climber found in sub-tropical and temperate zones.

**Taxonomic features:** Leaves simple, alternate ovate-chordate, glabrous above. Inflorescence a spike. Male spike solitary and slender. Female spike solitary few-flowered. Fruit a capsule. Seeds winged all round.

**Flowering & fruiting:** June-September.

**Harvesting time:** August-November.

**Medicinal value:** Locally powder of tuber for indigestion and sore throat is commonly used.

**Part used:** Tuber.

**Occurrence:** Common.

• ***Hypericum oblong folium* Choisy**

Syn.: *Hypericum cernuum* Roxb. Ex D. Don

**Family:** Guttiferae.

**Local Name:** Pinli.

**Habit & habitat:** A much branched shrub up to 1.5 m tall, usually found on steep rocks in sub-tropical and temperate zones.

**Taxonomic features:** Leaves simple, sessile, oblong or ovate, or oblong to elliptic, entire. Inflorescence a cyme, few-flowered. Flower actinomorphic, yellow. Fruit a capsule.

**Flowering & fruiting:** June-November.

**Harvesting time:** July-December.

**Medicinal value:** It has anti-ulcer, anti-inflammatory, anti-microbial properties, treats infection, wound healer. Leaf juice is an antidote against snakebite.

**Part used:** Whole plant.

**Occurrence:** Uncommon.

- ***Hedera nepalensis* K. Koch, Hort.**

**Family:** Araliaceae.

**Local Name:** Harbambal.

**Habit & habitat:** A perennial climber with aerial roots up to 50m tall, found in sub-tropical and temperate zones.

**Taxonomic feature:** Leaves simple, lanceolate-ovate, variously lobed, glabrous. Inflorescence a terminal umbel or small raceme. Flower actinomorphic, yellow. Fruit a globose berry.

**Flowering & fruiting:** October-June.

**Harvesting time:** July- December.

**Medicinal value:** Locally toxic leaves are used as poultice to smooth rheumatism and sciatica.

**Part used:** Leaf.

**Occurrence:** Abundant.

- ***Ipomoea cairica* (L.) Sweet**

**Family:** Convolvulaceae.

**Local Name:** Irari.

**Habit & habitat:** A perennial climber found in sub-tropical zone.

**Taxonomic features:** Stem twining with tuberous root. Leaves compound ovate to orbicular in outline, palmately divided into 5-lobes. Inflorescence 1- few cymes. Flower actinomorphic, purple. Fruit a capsule, subglobose, black.

**Flowering & fruiting:** July-November.

**Harvesting time:** August-December.

**Medicinal value:** Locally leaf and tuber extract is applied on pimples to remove toxic material. Seed oil is used in treatment of rheumatism and inflammation.

**Part used:** Leaf, Tuber, Seed oil.

**Occurrence:** Cultivated.

- ***Litsea tomentosa* Heyne ex Wall**

**Family:** Luraceae.

**Local Name:** Madasak, Meda Lakri.

**Habit & habitat:** A tree up to 8-15m tall, found in dry and sunny places of sub-tropical zone.

**Taxonomic features:** Leaves simple elliptic-obovate. Young branches and leaves with gray-yellow small hairs. Inflorescence composed of umbels solitary or on short branchelets, few flowered. Male flower have 15 or more stamens. Fruit globose.

**Flowering & fruiting:** May-July.

**Harvesting time:** May-December.

**Medicinal value:** Locally powder of leaves and bark is commonly used to hold broken bones and also as aphrodisiacs. It is called Hadi Jor in local area. Its paste is famous in local communities for back bone pain. It is also called hadi jor used on fracture bones, not of humans only but also on animals fractures. It has astringent and aphrodisiac characteristics.

**Part used:** Whole plant.

**Occurrence:** Uncommon.

- ***Leycesteria Formosa* Wall.**

**Family:** Caprifoliaceae.

**Local Name:** Jummar.

**Habit & habitat:** An erect shrub found in temperate and sub-alpine zones.

**Taxonomic features:** Leaves simple, ovate-lanceolate, acuminate, entire, slightly serrate. Inflorescence verticillate, terminal spikes. Flower purplish, zygomorphic. Fruit a subglobose berry.

**Flowering & fruiting:** May-October.

**Harvesting time:** July-November.

**Medicinal value:** Locally leaf paste and extract are used as hair tonic, treats dandruff and kills lice's.

**Part used:** Leaf.

**Occurrence:** Uncommon.

- ***Mucuna pruriens* (L.)DC.**

**Family:** Papilionaceae.

**Local Name:** Kali Mothi, Kali Phali.

**Habit & habitat:** An annual, hairy, vine cultivated in sub-tropical and temperate zones.

**Taxonomic features:** Leaves compound, trifoliate. Leaflets obovate, rhomboid-ovate, hairy on both sides. Inflorescence an axillary raceme. Flower zygomorphic, purple. Fruit a hairy pod. Seed bean-shaped.

**Flowering & fruiting:** May-October.

**Harvesting time:** June-November.

**Medicinal value:** It has aphrodisiac and antidepressant properties and locally used as a vegetable. It is investigated as highly potential medicinal plant in local area.

**Part used:** Seed.

**Occurrence:** Cultivated.

- ***Morina longifolia* Wall.ex DC.**

**Family:** Morinaceae.

**Local Name:** Supcanda.

**Habit and habitat:** Annual herb up to 90cm tall, found in sub-alpine and alpine zones.

**Taxonomic features:** Stem glabrous, longitudinally furrowed, upper shoot hairy. Leaves simple, lanceolate with spiny margin Flower white turning pink. Fruit an achene.

**Flowering & fruiting:** May-July.

**Harvesting time:** June-September.

**Medicinal value:** It has antiseptic properties, locally used as wound and burn healer.

**Part used:** Whole plant.

- ***Oxyria digyna* (L.) Hill**

**Family:** Polygonaceae.

**Local Name:** Khata pat.

**Habit & habitat:** A low growing tufted herb found in sub-alpine and alpine zones.

**Taxonomic features:** Stem grooved. Leaves simple, kidney-shaped, long stalked, more or less fleshy. Flower greenish. Perianth segments pinkish-white, reflexed. Fruit an achene.

**Flowering & fruiting:** May-August.

**Harvesting time:** June-September.

**Medicinal value:** Local people use juice in jaundice, thirst problem, decoction is useful in constipation, stomach and liver disorders.

**Part used:** Whole plant.

**Occurrence:** Uncommon.

- ***Polemonium caeruleum* L.**

**Family:** Polemoniaceae.

**Local Name:** Nall Tand.

**Habit & habitat:** An annual herb up to 1m tall found in sub-alpine zone.

**Taxonomic features:** Leaves pinnately compound. Leaflets acute, sessile, glabrous. Flower actinomorphic, violet to blue-violet, showy. Fruit a capsule.

**Flowering & fruiting:** July-September. **Harvesting time:** July-October. **Medicinal value:** It has astringent and blood purifying properties and treats syphilis and rabies. Boiled in olive oil it makes a hair dressing and a black dye.

**Part used:** Whole plant.  
**Occurrence:** Uncommon.

- ***Punica granatum L.***

**Family:** Punicaceae.

**Local Name:** Daru, Jangli Anar.

**Habit & habitat:** A spiny shrub found in sub-tropical and temperate zones.

**Taxonomic features:** Leaves simple, opposite, elliptic, oblanceolate-obtuse, Exstipulate. Flower solitary, showy, red-orange, Calyx reddish. Petals obovate, wrinkled, alternating with sepals lobes. Fruits with leathery skin, pale red or brownish. Seed juicy, red or pink.

**Flowering & fruiting:** April-June.

**Harvesting time:** May-October.

**Medicinal value:** Rind is used to treat dysentery and root bark to combat tape worm. Locally fruit bark is used as stomach cooler, removes acidity. Root bark is used as worm killer.

**Part used:** Whole plant.

**Occurrence:** Common.

- ***Rubus fruticosus Loureiro***

**Syn:** *Rubus cochinchinensis* Trattinnick.

**Family:** Rosaceae.

**Local Name:** Kanchi.

**Habit & habitat:** A prickly climber, found in sub-tropical and temperate zones.

**Taxonomic features:** Leaves palmately compound. Leaflets 3-5, hairy. Inflorescence terminal cymose paniculate. Flower actinomorphic, pink. Fruit globose aggregate.

**Flowering & fruiting:** May-July.

**Harvesting time:** May-October.

**Medicinal value:** It is useful in anemia and prescribed for kidney problems and bedwetting. Leaf tea is taken to tone uterine and pelvic muscles. Locally fruit is edible.

**Part used:** Whole plant.

**Occurrence:** Common.

- ***Reinwardtia indica Dumort.***

**Family:** Linaceae.

**Local Name:** Basant, Charya.

**Habit & habitat:** A perennial herb found in sub-tropical and temperate zones.

**Taxonomic features:** Leaves simple, elliptic-oblanceolate. Flower actinomorphic, yellow, showy. Fruit a capsule, globose.

**Flowering & fruiting:** April-May.

**Harvesting time:** May-July.

**Medicinal value:** Powder of dried leaves and flowers are used to heal wounds locally.

**Part used:** Flower and leaf.

**Occurrence:** Very common.

- ***Symplocos paniculata (Thunb.) Miq.***

**Family:** Symplocaceae.

**Local Name:** Pona Buti, Lodh pathani.

**Habit & habitat:** A small tree with grayish stem, found in sub-tropical zone.

**Taxonomic features:** Leaves simple, hairy. Inflorescence terminal and axillary panicles. Flower actinomorphic, white. Fruit globose, light blue.

**Flowering & fruiting:** March-June.

**Harvesting time:** April-August.

**Medicinal value:** Bark is astringent and has antioxidant

properties.

**Part used:** Bark and stem.

**Occurrence:** Uncommon.

- ***Solena heterophylla Loureiro***

**Family:** Cucurbitaceae.

**Local Name:** Bhan Kakri.

**Habit & habitat:** An annual climber found in sub-tropical and temperate zones.

**Taxonomic features:** Leaves simple, ovate-triangular 3-5 lobed oblong with thin tendrils. Male flower umbellate. 10-20 flowered. Flower actinomorphic, yellow-white. Female flower solitary. Fruit a berry, green become red on ripening.

**Flowering & fruiting:** May-September.

**Harvesting time:** June-November.

**Medicinal value:** Locally fruit and root are used for treatment of diabetes.

**Part used:** Whole plant.

**Occurrence:** Common.

- ***Trifolium pratense L.***

**Family:** Papilionaceae.

**Local Name:** Janli Satal.

**Habit & habitat:** A herb, found in temperate and sub-alpine zones.

**Taxonomic features:** Leaves compound, leaflets obovate to broadly elliptic. Inflorescence a head, globose. Calyx hairy, lower tooth longer than others. Corolla reddish-purple to pink. Fruit one seeded.

**Flowering & fruiting:** May-July.

**Harvesting time:** June-August.

**Medicinal value:** Locally usage of tea eliminates toxins from body, stimulates immune function, useful in eczema. Flowers are useful whooping cough.

**Part used:** Whole plant.

**Occurrence:** Common at high altitudes.

- ***Tylophora hirsuta (Wall.) Wight***

**Syn.:** *Tylophora jacquemontii* Decne.

**Family:** Asclepiadaceae.

**Local Name:** Choti Kandush.

**Habit & habitat:** A climber up to 1 m tall, found in sub-tropical zone.

**Taxonomic features:** Leaves simple, ovate-lanceolate. Inflorescence in umbelloid clusters. Fruit a follicle tapering at one end. Seed dark brown.

**Flowering & fruiting:** May-July.

**Harvesting time:** June-September.

**Medicinal value:** Its active compounds are tylophorine, tylophorinine which are used for treatment of asthma.

**Part used:** Root.

**Occurrence:** Common.

- ***Viola odorata L.***

**Syn.:** *Viola wiedemannii* Boiss.

**Family:** Violaceae.

**Local Name:** Banafsha.

**Habit & habitat:** A rhizomatous herb, in sub-tropical, temperate and sub-alpine zones.

**Taxonomic features:** Leaf simple, heart shaped-broadly ovate, hairy. Flower zygomorphic, violet-purple. Fruit a globose capsule.

**Flowering & fruiting:** March-August.

**Harvesting time:** March-September.

**Medicinal value:** Flower syrup is antiseptic, mild laxative,

treats cough, headache and insomnia. Leaves are folk remedy for breast and lungs cancer. Local people use it as an expectorant, antipyretic, diuretic and blood-purifier medicine.

**Part used:** Whole plant.

**Occurrence:** Common.

• *Ziziphus jujuba* Mill.

Syn.: *Ziziphus vulgaris* Lam.

**Family:** Rhamnaceae.

**Local Name:** Baruin, Anab.

**Habit & habitat:** A spiny tree tall, found in dry and sunny places of sub-tropical zone.

**Taxonomic features:** Leaves simple, leathery, glabrous, obliquely oblong-ovate, lanceolate, base slightly cordate, Inflorescence composed of axillary clusters. Flower actinomorphic, yellowish-white, small. Fruit a globose drupe become dark-dark on maturity.

**Flowering & fruiting:** May-July.

**Harvesting time:** June- August.

**Medicinal value:** Locally fruit is taken as heart tonic also useful in insomnia, and night sweats. The bark is useful in fever and roots promote hair growth.

**Part used:** Whole plant.

**Occurrence:** Uncommon.



**Fig 1:** (a) *Aster thomsonii* C.B.Clarke., (b) *Aquilegia pubiflora* Wall.ex Royle, (c) *Boerhavia procumbens* Banks ex Roxb.,(d) *Bombax ceiba* L., (e)*Clematis orientalis* L., (f) *Dioscorea deltoidea* Wall.ex Griseb.



**Fig 1:** continued. (g) *Hypericum oblongifolium* Choisy, (h) *Hedera nepalensis* K. Koch, Hort., (i) *Ipomoea cairica* (L.) Sweet, (j) *Litsea tomentosa* Heyne ex Wall., (k) *Leycesteria formosa* Wall., (l) *Mucuna pruriens* (L.) DC.



**Fig 1:** Continued. (m) *Morina longifolia* Wall.ex DC,(n) *Oxyria digyna* (L.) Hill,(o) *Polemonium caeruleum* L., (p) *Punica granatum* L.,(q) *Rubus fruticosus* Loureiro,(r) *Reinwardtia indica* Dumort.





**Fig 1:** Continued. (s) *Symplocos paniculata* (Thunb.) Miq., (t) *Solena heterophylla* Loureiro, (u) *Trifolium pratense* L., (v) *Tylophora hirsuta* (Wall.) Wight, (w) *Viola odorata* L., (x) *Ziziphus jujuba* Mill

Frequency analysis of 24 documented MAPs revealed that whole plant (63%) is commonly used by local people for treatment of different diseases followed by leaf (17%). Other parts used include root (8%), gum (4%), tuber (4%), seed

(4%) respectively (Figure 2). The growth habits of the 24 species of medicinal plants reported include herbs (38%), shrubs (13%), trees (17%) and vines (33%) (Figure3).

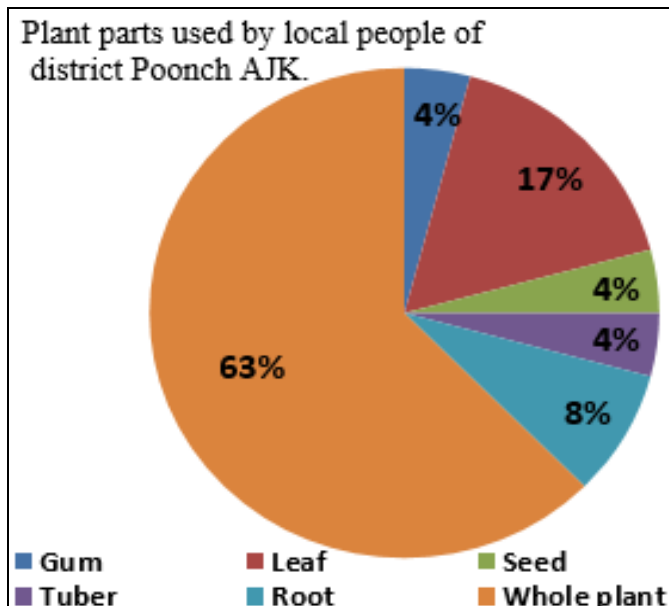


Fig 2: Plant parts used by local communities of district Poonch AJK

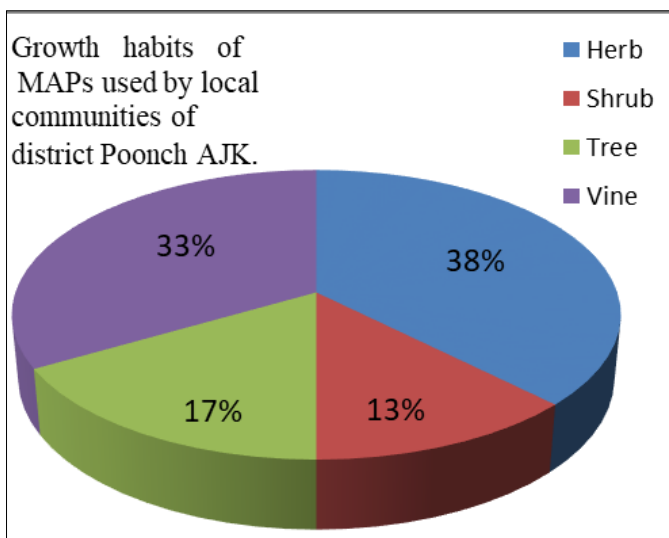


Fig 3: Classification of 24 MAPs on the base of growth habit in district Poonch AJK

#### 4. Conclusion

Utilization of medicinal plants for curing different types of diseases is common in district Poonch AJK. There is a gap between taxonomy and medicinal plants practitioners. Usage of plants needs more scientific accuracy and proper identification of plants using live imaging in natural habits. Color and habit are better represented in images than the impressed specimens. Colored images are good complements of herbarium specimens in field of ethno botany. Data revealed that ethno botanical knowledge ensures more reliability when scientific names of plants are presented with images including field image of a plant, leaf dorsal view, leaf ventral view, a flower, herbarium specimens along with flowering, fruiting and harvesting time is more helpful for correct botanical identification. It is very important for local communities to be aware of proper identification, harvesting and processing skills. It will be helpful for development of high quality and efficacies herbal practices in Poonch Area. In spite of the fact twenty four MAPs are reported during this study, however ethno botany of Poonch based on live images is still far from completion.

#### 5. Acknowledgment

The authors are thankful to Dr Amir Sultan Program leader National Herbarium of Pakistan, National Agricultural Research Council (NARC) Islamabad, for providing necessary facilities and encouragement from time to time.

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