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An ethno-botanical study of medicinal plants of Ghurdauri region, Uttarakhand, India

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Abstract

Uttarakhand has a vast medicinal and floristic wealth making it a centre of attraction for many herbal industries. The vegetation of Uttarakhand includes annual, biennial or perennial herbs, undershrubs and shrubs. Proper identification of the plant species and their importance to the local people can provide useful information and play a pivotal role in efficient utilization of natural wealth. So it is important to scientifically identify and document this natural wealth before they are lost forever. The present study includes the collection and compilation of different plant species of Ghurdauri region. The database provides information on various aspects such as species richness and medicinal use for the different families of plants of Ghurdauri region. Findings of the present investigations, revealed a total of 21 families and 33 species that are used by native communities for treating several ailments.

Keywords: Uttarakhand, medicinal plants, annual, biennial, perennial

Introduction

Himalayas represents one in every of the foremost vital mega centres of the diversity, sharing over one-half of the vegetation wealth of the Indian landmass. Within the recent past there has been a deep concern and awareness about the conservation of the fragile Himalayan ecosystem. Uttarakhand lies between 28°53'24'' and 31°27'50'' N latitudes and 75°34'27'' and 81°02'22'' E longitude and covers an area of 53,483 km square. The state has the great potential to emerge as a model for conservation and development of herbal plants. Since the ancient times, plants have been used for medicinal purposes. Earlier there was no such evidence or sufficient information either concerning the reasons for illness or concerning the plants and how they can be used as a cure. Nowadays, medicinal plants are used extensively for providing herbal medicine to cure several ailments^[1]. The flora of the Himalayas vary with climate, rainfall, altitude and soils. The Garhwal Himalayas form an immense part of the Uttarakhand state in north India. Garhwal region of Himalayas is also considered as the reservoir of enormous natural resource of medicinal wealth. Garhwal Himalayas are considered to have a varied vegetation among chain of mountains regions. Nearly every plant has value from either an organic process or health viewpoint. It is considered as one of the major centers for cultural and traditional diversity, herbal medicines and rich floristic wealth including many endemic and rare plants. The rural communities of this region are very much dependent on biological resources for their sustenance. It has over 3000 species of flowering plants, most of which are in forest and in alpine meadows^[2]. For many centuries, the flora of Himalayan region has been extensively used for various scientific therapeutic uses. The ethnobotanical account of Garhwal Himalaya reveals that many plants have been imported to the market which in turn has resulted in the gradual loss of plants^[3]. In some species, the exploitation pressure have achieved a peak that resulted in extinction of various plant species, thus categorizing them as threatened, rare, extinct, vulnerable or endangered^[4]. In the past few years, several factors accelerated the deterioration of biodiversity of the Himalayan ecosystem. Therefore there is an emergence to conserve the traditional knowledge of these plant species as well as to conserve the medicinal plants. The information related to these plants are not managed and compiled properly and some of them are even at the verge of extinction^[5-12]. Therefore, the present investigation is an effort towards the compilation and documentation of plant species of Ghurdauri region of Uttarakhand.

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Study Area and Methodology

The Pauri district is located at 30.15°N 78.78°E and is 1,814 meter (5,951 feet) above the sea level. After undertaking a survey of various zones in district Pauri, the Ghurdauri area was finally selected for the present investigations. The present investigation was a result of extensive and intensive field surveys, conducted during January to May. The specimens were collected by methods of collection, preservation and maintenance of specimens in the herbarium [13]. In routine botanical explorations in Ghurdauri region, a few interesting specimens were collected and identified with the help of relevant taxonomic literature and by comparing them with authentic specimens housed at the herbaria of Botanical Survey of India (BSI). The families were arranged according to Cronquist system of classification (1981). The genera and species were arranged alphabetically. Medico- ethnobotanical uses have also appended wherever applicable those plants are medicinal used. The collected specimens were identified and information related to them are gathered through personnel interviews with local inhabitants [14-15]. Attempts were made to

collect all the possible data of the Ghurdauri region. The data present in the paper is based on various literature surveys, research papers, short communications, articles etc. and the available information is further recorded. In this paper, information related to each plant found in the Ghurdauri region is provided stating correct name, habit, vernacular name, Hindi, Sanskrit and English names, uses, altitudinal range, flowering and fruiting time. The vernacular or common names are sometimes ambiguous or misleading but significantly for several plants, these names are one of the important evidences of identification, particularly to non- botanists. Therefore inclusion of these names seems to be non-scientific, but have reliability and are of immense value to users in Ayurveda, pharmaceutical or plant based industries. The main objective of the present study was to create the database on various aspects of medicinal and aromatic plants of Ghurdauri region. It is understood that appropriate knowledge about plants of a given region is of immense value for the proper and effective utilization of the resources [16-19].

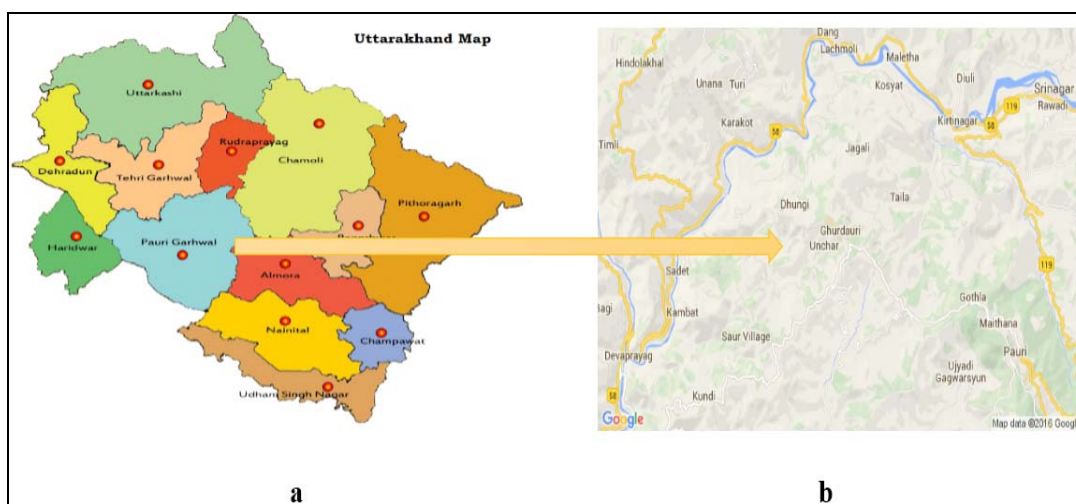


Fig 1: Location map of a) Uttarakhand, b) Ghurdauri (Study area)

Results and Discussion

The present study provides information on 33 species belonging to 21 families. The plant family which is dominated

within the identified region is Asteraceae with 12 species (Figure 2).

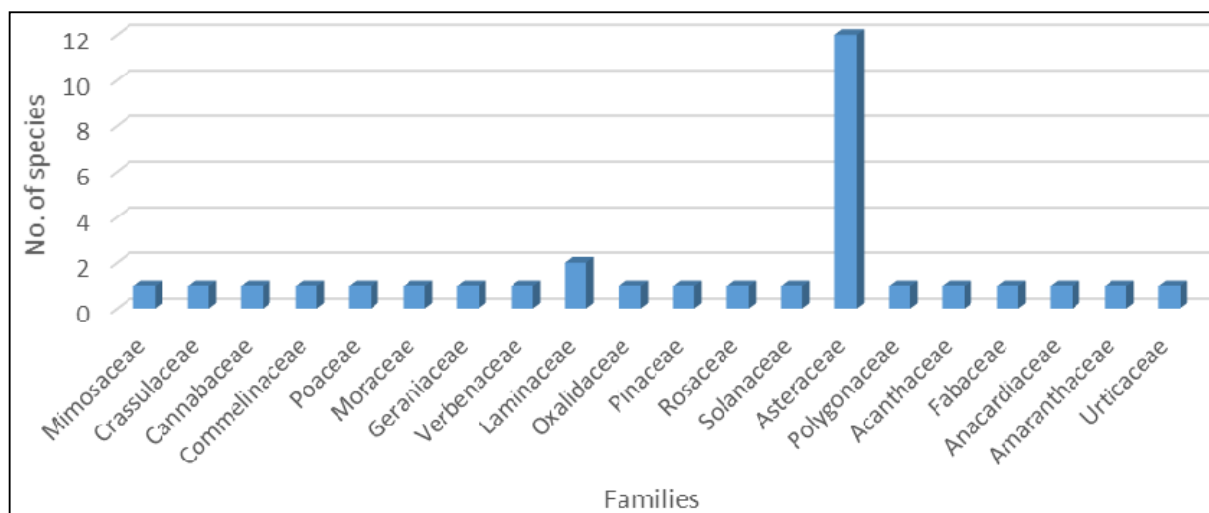


Fig 2: Bar graph showing no. of families and ethno-medicinal plant belonging to different families

The results are provided in form of bar diagram and pie-charts. Out of these plant species 24 species are herb, 06 shrub, 02 tree species and one is climber (Figure-3).

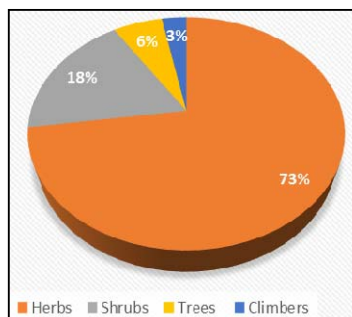


Fig 3: Pie chart showing the percent distribution of medicinal plants contributing different vegetation layers

Many of these plant species have immense importance in traditional and ethno-medico botany to treat different ailments such as arthritis, rheumatism, cough, cold, asthma, diarrhoea, dysentery etc. by locals. It is of great value that the floral resource of Ghurdauri region should be scientifically identified, inventorized and documented so that the local communities can gain sufficient knowledge as well as it also provides sufficient and effective information to academicians, research scholars, industrialists etc. The present study is rich in medicinal plant resources which are mostly herb species and play a vital role in treating various diseases. Most of the plant parts i.e. leaf (*Cannabis sativa*, *Bryophyllum pinnatum*), bark (*Acacia catechu*), roots (*Cynodon dactylon*), fruits (*Solanum surattenses*) are mostly used since ancient times for curing diseases (Figure 4).

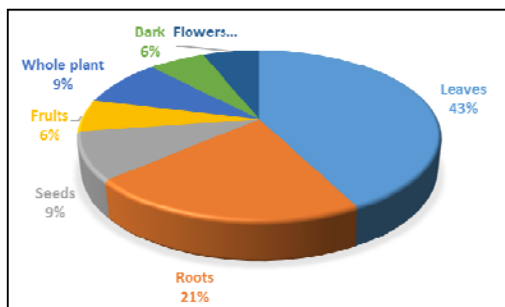


Fig 4: Pie chart showing percentage of plant parts used for medicinal purposes

Mimosaceae

Acacia catechu

Vern. & H. Khair, Katha Sans. Khadira, Gaitri Eng. Cutch Tree. Ht : Herb, A :upto 1500m, Fl: Apr.-Aug.; Fr: Sept.- Feb., U:Wood yields 'Katha' or 'Catechu' of commerce, used for various medicines, particularly in digestive and respiratory diseases. Bark used in diarrhoea, dysentery, bronchitis and menstrual disorders.

Deciduous trees, to 18m high, with glabrous branches and dark coloured bark.

Crassulaceae

Bryophyllum pinnatum

Vern. Bish-Khapru H & Sans. Parn-beej. Ht: Herb, A: 800-1500m, Fl.: Mar.-May; Fr.: Apr.-Jul., U: Leaves supposed to be poisonous; poultice of leaves used to wounds and bruises. Perennial, glabrous, succulent herbs, 30-100cm high. Leaves usually simple, sometimes lobed or compound, with 3 leaflets.

Cannabaceae

Cannabis sativa

Vern. Bhang, Bhangla Sans. Bhang, Vijaya Eng. True Hemp, Marijuana. Ht: Herb, A: upto 2300m, Fl.: may-Aug.; Fr.: Aug.-Oct., U: Seeds are used as condiment; seed-oil edible, besides, its leaves and flowers used as an intoxicating agent.

Annual-perennial, erect, aromatic herbs or undershrubs, to 2.5m high; bark fibrous.

Commelinaceae

Commelina benghalensis

Vern. Kanjula, Kansura H. Kanchara, Kankawa Sans. Kanchana, Ht: Herb, A: upto 2000m, Fl. & Fr.: Jul.-Nov., U: Plant use given in dysentery and paste applied on body swelling and ache. Annual, decumbent-ascending herbs, 20-30cm high, stem branched from the base, creeping, rooting at roots.

Poaceae

Cynodon dactylon

Vern. Dubla H. Doob, Hari Doob, Nili Doob, Ram Ghas Sans. Durva, Haritali Eng. Dhub Grass, Bermuda grass, Ht: Herb, A: upto 1800m, Fl. & Fr.: Jan. - Dec., U: Roots taken in fever and in internal injury.

Perennial, rhizomatous grass; culms prostrate, ascending from the creeping base, branched, 10-30cm long.

Moraceae

Ficus palmata

Vern. Bedu, H. Anjir Sans. Anjira Eng. Common Fig, Ht: Tree, A: upto 1800m, Fl.: May-Jun.; Fr.: Jun.-Aug., U: Fruits medicinal for digestive disorders.

Deciduous trees, to 12m high, bark smooth, gray; young parts tomentose.

Geraniaceae

Geranium ocellatum

Vern. Kaphyla, Ht: Herb, A: upto 1800m, Fl.: Feb. - Apr.; Fr.: Apr.-May, U: Roots supposed to be antiseptic; extract given in liver troubles and fever.

Annual or biennial, diffused ascending, hairy herbs, 5-20cm long; branches reddish purple.

Verbenaceae

Lantana camara

Vern. Kuri-ghas, Laltenya Eng. Wild sage, Lantana, Ht: Shrub, A: upto 2000m, Fl. & Fr.: Throughout the year, U: Leaves insecticidal or germicidal, also used in skin ailments.

Evergreen, straggling shrubs, with characteristic odour, to 3m high, with or without minute prickles on the branches.

Lamiaceae

Colebrookea oppositifolia Sm.

Vern. Binda, Bindu, Bhirmoli H. Pansra, Ht: Shrub, A: upto 1800m, U: Leaf paste applied on wounds.

Evergreen, aromatic, pubescent-villous shrubs, to 3m high.

Mentha arvensis

Vern. & H. Paudina Sans. Pootiha, Ponida Eng. Corn Mint, Ht: Herb, A: upto 2500m, Fl. & Fr.: Jul.-Sept., U: The extract used in vomiting and indigestion.

Perennial, erect or prostrate- ascending herbs, to 90cm high.

Oxalidaceae

Oxalis corniculata

Vern. Bhilmori H. Khati-Buti Sans. Amlalonika, Chukra Eng. Indian Sorrel, Ht: Herb, A: 1800m, Fl. & Fr.: Almost

throughout the year, U: Leaf juice dropped in cataract and conjunctivitis.

Perennial or annual, prostrate, decumbent or suberect herbs, rooting at nodes; stem pubescent, creeping.

Pinaceae

Pinus roxburghii

Vern. Chir, Kulain Sans. Sarala Eng. Chir- Pine, Ht: Tree, A: 900-2500m, Fl. & Fr.: Mar. - Jun., U: Saw-dust with honey used in asthma and bronchitis.

Evergreen trees, to 40m high; bark rough, deeply fissured. Leaves dark or light-green, needle like, on dwarf shoots surrounded by persistent bud-scales.

Rosaceae

Pyracantha crenulata

Vern. Ghingar, Ht: Shrub, A: upto 2600m, Fl.: Mar.-May; Fr.: Jun. - Oct., U: Branches used for walking sticks and tool handles.

Evergreen, spinescent, undershrubs or shrubs, to 5m high; spines straight, stout, 1.2-3cm long; bark ashy grey.

Solanaceae

Solanum surattense

Vern. Bhuiakhanderi, Berkatali H. & Sans. Kantkari, Kateli Eng. Yellow Night Shade, Ht: shrub, A: upto 1500m, Fl. & Fr.: Almost throughout the year, U: Fruits as medicine in fever, cough, asthma, and gonorrhoea; floral buds in eye ailments; fruits garlanded around the neck of infants to get rid off jaundice.

Annual or perennial, prostrate, decumbent – ascending, diffused undershrubs; stem aculeate with straight, yellow prickles, glabrous or hairy on young parts.

Asteraceae

Adenostemma lavenia

Ht: Herb, A: upto 1300m, Fl.: Apr. - May; Fr.: May-Sept., U: Root of the plant is chewed to stop diarrhea, leaves used as an antiseptic. Salted leaves used for sore throats.

Annual, erect or decumbent- ascending herbs, 12-90cm high; often rooting at base; glabrous on lower part, glandular-hairy above.

Ageratum conyzoides

Vern. & H. Gundrya, Semandulw Eng. Goat Weed, Ht: Herb, A: upto 1500m, Fl. & Fr.: Jan.- Dec., U: Plant with the roots of *Thalictrum foliolosum* made into paste and applied on sores, cuts and various skin ailments.

Annual, erect herbs, to 40cm high; stem hairy on nodes and young parts.

Anaphalis busua (Buch. - Ham.) DC.

Vern. Bugla, Buglya, Ht: Herb, Fl. & Fr.: Jan. - Dec., U: Leaf juice applied on bruises, wounds and cuts.

Erect herbs, 30-60cm tall; stem branched at the base, somewhat wingled.

Bidens bipinnata

Vern. Kuru, Mangrinya H. Kuru Eng. Bur- Marigold, Ht: Herb, Fl. & Fr.: Mar.-Dec., U: : Vegetable of leaves supposed to be good at the initial stages of leprosy and keeps away from several ailments ; leaf juice used in cuts.

Annual, much-branched, erect herbs, to 125cm high; stem4-angled.

Bidens pilosa

Vern. & H. Kumur, Kumra, Kurei Eng. Bur-Marigold, Ht: Herb, Fl. & Fr.: Mar.-Dec., U: Plant extract with honey used in cough and bronchitis; the vegetable of the herb considered useful in leucoderma.

Annual, much-branched, erect herbs, to 125cm high, stem 4-angled.

Conyza bonariensis

Ht: Herb, A: upto 1800m, Fl. & Fr.: Feb. - Sept., U: Root is used in treating diarrhoea and cough, leaves are used for treating gastrointestinal problems.

Annual-biennial, erect, hirsute herbs, to 1m high; stem-ribbed, pubescent.

Conyza canadensis

Ht: Herb, A: upto 2000m, Fl. & Fr.: Feb. – Sept.

Annual, erect, much branched herbs, 20-120cm high; stem ribbed, patent hairy. Ray florets pale or rosy-purplish.

Eupatorium adenophorum

Vern. Kharna, Bakura, Ht: shrub, Fl. & Fr.: Feb. - Aug., U: Crushed leaves applied on wounds.

Shrubs or undershrubs, 1-2m high; stem subterete, reddish-brown, clothed with glandular –hairs.

Parthenium hysterophorus

Vern. & H. Gajar ghas, Jhilmil Eng. Congress grass, Ht: Herb, A: upto 1500m, Fl. & Fr.: Almost throughout the year, U: The decoction of *Parthenium hysterophorus* is used to treat fever, diarrhoea, neurologic disorders, urinary tract disorders, dysentery and malaria.

Annual – perennial herbs, 20-100cm high; stem puberulous. An obnoxious weed, widely occupying various localities; believed to cause skin allergies.

Sonchus brachyotus

Vern. Karatu, Choplya H. Sahadevi Eng. Corn Sow Thistle, Ht: Herb, A: upto 2500m, U: Roots used in the folk medicine against cough and bronchitis.

Perennial, viscid – hairy herbs, to 90cm high, with thick rootstock, and hollow stem.

Tagetes erecta

Vern. & H. Genda Sans. Jhandu Eng. Marigold, Ht: Herb, Fl. & Fr.: Throughout the year, U: Flower paste often applied on wounds and cuts; leaf juice dropped in otalgia.

Annual, sparingly – branched, aromatic herbs; branches angular, ribbed. Florets yellow or orange.

Taraxacum officinale

Vern. Kanphuliya, Karatu, Dudhee H. & Sans. Barau, Dugdheni Eng. Common Dandleon, Bitterwort, Ht: Herb, Fl. & Fr.: Feb. - Oct., U: Root extract used in the treatment of migrains, hepatitis and headache.

Perennial herbs, with rhizomatous rootstock and milky latex. Florets ligulate and bright yellow.

Polygonaceae

Rumex hastatus D. Don.

Vern. Almoru, Kilmori, Ht: Herb, A: upto 2000m, Fl.: Feb.-Jun.; Fr.: Jun. - Oct., U: Leaf extract applied on wounds and cuts to check bleeding and also believed to relieve from suffering of nettle sting.

Perennial, erect or scandent, glabrous herbs or undershrubs, 30-120 cm high; stem pale-grey, much branched. Flowers are greenish – white in colour.

Acanthaceae

Dicliptera bupleuroides

Vern. Kulartore, Kuthhi H. Somni, Ht: Herb, A: upto 2000m, Fl. & Fr.: Jan. - Dec., U: Leaf paste applied on wounds to check bleeding; leaf juice useful in cough and gastro-enteritis. Perennial, suberect, pubescent herbs or undershrubs, 30-90cm high with thick woody base. Flowers are pinkish – white or purplish.

Fabaceae

Abrus precatorius

Vern. Ratti, Ratigiri, Gaunchhi H. Gunja Sans. Raktika, Kamboji Eng. Indian Liquorice, Ht: Climbers, A: upto 1000m, Fl.: Aug. - Sept.; Fr.: Oct. - Mar., U: Roaster seed powder used as an abortifacient; seeds paste applied on plaster of bone fracture. Decoction of roots used in fever, cough, rheumatic arthritis and dysentery.

Deciduous, slender, woody climbers, to 5m high; branches glabrous or appressed – hairy. Flowers are generally pale-white.

Anacardiaceae

Rhus parviflora

Vern. Tungla, Saunla H. Tung Sans. Tintideek, Ht: shrubs or small trees, A: upto 1800m, Fl.: May- Jun.; Fr.: Jul. –Nov., U: Infusion of leaves given in cholera.

Evergreen shrubs or small trees, to 4m high young parts covered with rusty tomentum; bark grey, smooth. Flowers are pale-green.

Boraginaceae

Cynoglossum glochidiatum

Vern. Lichkura, Andhahuli Eng. Indian Hound’s Tongue, Ht: Herb, A: upto 2100, Fl.: Jul. - Sept.; Fr.: Oct.-Nov., U: Root extract used in dyspepsia and digestive disorders.

Annual, erect, strigose-hairy herbs, 20-70cm high. Flowers are dark purple-blue.

Amaranthaceae

Amaranthus tricolor

Vern. Chaulai H. Lal Sag Sans. Ariki Sira, Bal Navada, Ht: Herb, A: upto 2000m, Fl.: Aug. - Oct.; Fr.: Oct. - Nov., U: Root infusion used with rice water against food poisoning.

Annual herbs, 50-150cm high; stem obtusely angular, glabrous, pubescent in young parts.

Urticaceae

Urtica dioica

Vern. Kandali, Kali H. Bicchu-ghas Eng. Stinging Neetle, Ht: Herb or shrub, A: upto 3000m, Fl. & Fr.: Aug. – Apr., U: seed oil is medicinal in sciatica, rheumatism and several skin ailments; hair-wash from leaf extract believed to avoid baldness.

Perennial, erect, robust herbs or shrubs, 0.5-3m high; stem branched from the base; bark fibrous; stem, branches, petioles and leaves covered with sharp, irritating stinging hairs. Flowers are small and pale green.

Common Abbreviation

Vern – Vernacular name, H - Hindi name, Sans- Sanskrit name, Eng – English, Ht - Height, A– Altitude, Fl –Flowering, Fr – Fruiting, U -Uses.

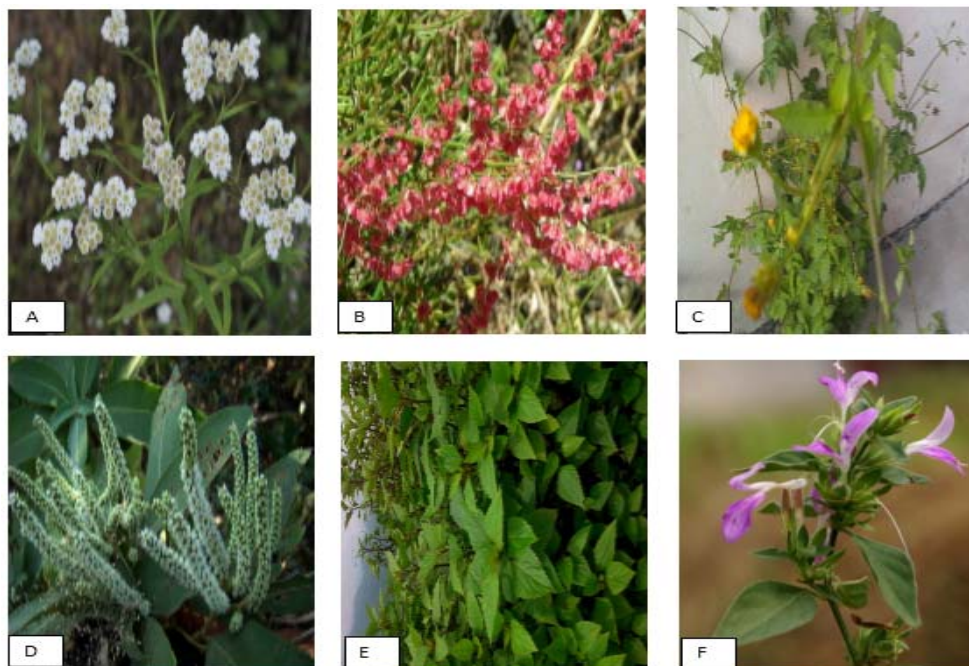


Fig 5: Some medicinally important species of Ghurdauri region of Uttarakhand: A, *Anaphalis busua*; B, *Rumex hastatus*; C, *Bidens bipinnata*; D, *Colebrookea oppositifolia*; E, *Eupatorium adenophorum*; F, *Dicliptera bupleuroides*

Conclusion

Uttarakhand is a very vast and important resource of plants having medicinal properties. The present study has been done for the first time in the Ghurdauri region of Pauri Garhwal. Increased demand of herbal medicines in the market at global

levels has exerted a sufficient pressure on medicinal plants. Proper identification and compilation of the information related to the medicinal plants play a vital role in the efficient utilization of the natural wealth and conservation of biodiversity in the region.

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