

**FLORA
OF
HIMACHAL PRADESH**

Volume 1

**H. J. CHOWDHERY
&
B. M. WADHWA**

BOTANICAL SURVEY OF INDIA

**FLORA OF
HIMACHAL PRADESH
Analysis**

**H. J. Chowdhery
&
B. M. Wadhwa**

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Series 2

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H. J. Chowdhery & B. M. Wadhwa



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FOREWORD

The Botanical Survey of India is presently engaged in the preparation of the Flora of India which is regularly appearing under various series like the 'Fascicles of Flora of India' dealing with the revisionary studies of the families of flowering plants on all India basis, district floras and certain regional floras. It has also undertaken the task to prepare 'State Flora *Analysis*', which deals with the annotated enumerations of the flowering plants of certain selected States which have either, so far remained unexplored or have rich or otherwise interesting flora.

The 'State Flora Analysis of Himachal Pradesh' is one such work. The work covers a large portion of North-western and Western Himalayas having a variety of climatic conditions ranging from tropical, Sub-tropical, and temperate to alpine.

The study of the flora of this region presents many interesting aspects related to phyto-geography. The occurrence of close relatives of some plants of this area in parts of the Pamir, Europe and certain other regions of the world makes analysis of flora fascinating. In spite of these features, we did not have any complete account of the flora or even an exhaustive enumeration of plants for this State so far.

The present work is an outcome of a comprehensive survey of the flora of Himachal Pradesh by botanists of the Botanical Survey of India, and on evaluation of previous collections by a number of eminent plant explorers. Since no concise account of the plants of this whole region is available, this work should prove as a handy reference manual for understanding the diversity in plant wealth of this region.

The work will also be a useful precursor to the preparation of a more detailed and elaborate flora of this region.

Botanical Survey of India
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Howrah -71 1103

S. K. Jain
DIRECTOR

PREFACE

In the late nineteen seventies it was felt that the vast collections made from Himachal Pradesh by various plant explorers since 1821 and the botanists of the Botanical Survey of India, Northern Circle, Dehra Dun, should be identified critically and published in the form of a state flora analysis as there was no complete account of the plants of this region.

The present book is an outcome of a critical study of the plants deposited in the Northern Circle of the Botanical Survey of India (BSD),

Central National Herbarium (CAL) and other herbaria like National Botanical Research Institute, Lucknow (LWG), Central Drug Research Institute, Lucknow (CDRI), Birbal Sahni Institute of Paleobotany, Lucknow (BSIP), Forest Research Institute, Dehra Dun (DD) and Regional Research Laboratory, Jammu, (RRL).

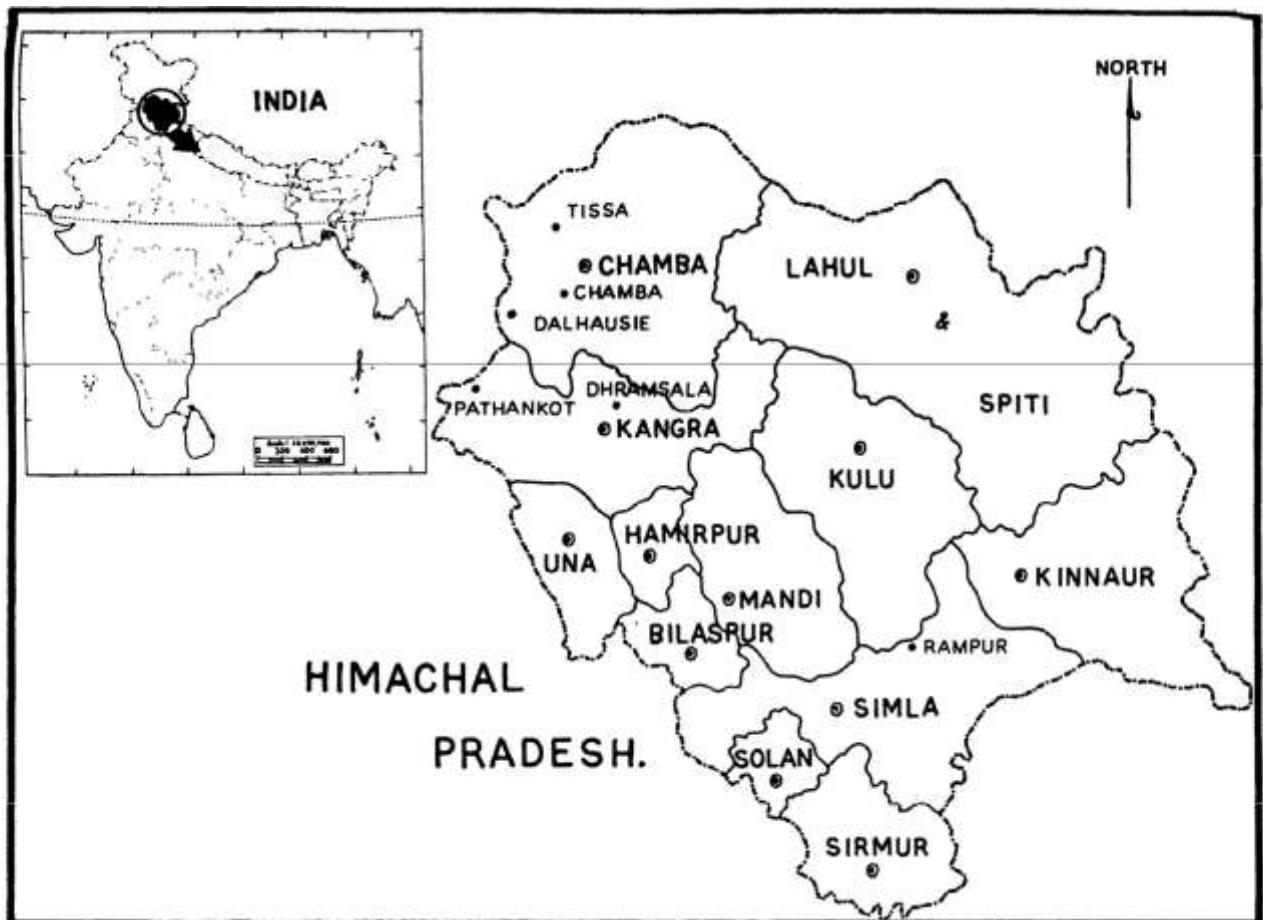
Every attempt has been made to check the correct identity and nomenclature of the plants. It is proposed to bring out the analysis of state flora of Himachal Pradesh in three (3) volumes. In the present volume 1202 species of flowering plants belonging to 85 families have been enumerated (Ranunculaceae to Caprifoliaceae).

It is hoped that the flora will be helpful to the botanists, foresters and to all others interested in plant exploration and research as a reference in several of their research and management programmes in the area and also in the preparation of the District Floras and revisionary works.

We are indebted to Dr. S.K. Jain, F. N.A., Director, Botanical Survey of India for his keen interest in the publication of the present work and constant encouragement throughout the project. We are also indebted to Dr. U.C. Bhattacharyya, Deputy Director, Botanical Survey of India, Northern Circle, Dehra Dun for his constant guidance and suggestions and every possible help in the completion of this book as without his massive contribution to the recent plant collections from Himachal Pradesh it would have been an up-hill task for us. Our appreciation and gratitude goes to Dr. P.K. Hajra for his help and co-operation which was available to us throughout the tenure of this work.

It is our pleasant duty to acknowledge the co-operation received from the Officer-in-charge of the afore mentioned herbaria. We are also thankful to all the officers and staff of the Botanical Survey of India, Northern Circle, Dehra Dun of whom particular mention can be made of Sri S.K. Murthy, M. V. Vishwanathan, B.P. Uniyal, Pritam Lal, R. Prasad and J.P. Sharma.

H.J. CHOWDHERY
and
B.M. WADHWA



INTRODUCTION

It was on November 1, 1966 when different hilly areas of Punjab — the districts of Kulu, Kangra, Simla, Lahul and Spiti, Nalagarh area of Ambala district, parts of Una Tehsil of Hoshiarpur district, Pathankot Tehsil of Gurdaspur district were merged to form the state of Himachal Pradesh. The region was given the full status of an autonomous State in January, 1971, by the then Prime Minister of India as the eighteenth State of the Republic of India.

Himachal Pradesh spreads over an area of 55673 sq. km. comprising of 595 km. of mountain ranges spreading along the Indus-Sutlej river system, their height varying from 244 m to 6750 m. It is bounded on the north by Jammu & Kashmir, on the east by the Chinese territory and Tehri Garhwal, on the south by the different districts of U.P. and Haryana and on the West by the different districts of Punjab.

The area of Himachal Pradesh may be classified broadly under the following altitudinal zones ;

1. Up to 1550 m it includes the Siwaliks and the foot hills of **Himalayas. The rock formation is clay-slate or sometimes micaceous to coarse sand stone with occasional interstratified lime-stone.** The rocks are highly metamorphosed. The climate on the whole is subtropical except on the tops of upper hill ranges. The average annual rainfall is about 1020-1275 mm.

2. 1550 to 3050 m — This region is a mountainous tract which again consists of 2 distinct zones — wet zone and dry zone.

a) Wet zone ; Occupies the outer Himalayas ; the main underlying rocks are slates, schists, shales along with limestone and a little quartzite. Highest rainfall is recorded during June to September ; the average annual rainfall is about 1275 mm ; snow falls between the months of December to March.

b) Dry zone : Occupies the inner valleys of Himalayas and Zanskar where monsoon rarely penetrates and is more or less like a semi-arid zone. Rocks are mainly of gneiss and mica schists frequently veined with quartz ; surface soil is dry and fragile.

3. The alpine pastures are above the tree limits and below the snow-lines.

EARLY BOTANICAL HISTORY (1821-1900)

The earliest attempt to collect plants from Himachal Pradesh was made by William Moorcroft (1765-1825) who collected plants from Kangra, Kulu, Lahul and Spiti in 1821. The collections he made were sent to Wallich. George Govan, a civil surgeon at Saharanpur in charge of the Botanical Garden also collected plants from the state in 1828. He started a nursery at Nahan in Sirmur district of Himachal Pradesh, for growing plants of the hill. He also sent his collections to Wallich.

The countess of Dalhousie was the first to collect plants from Simla in 1829. She collected about 600 species between April and October, which were sent to Sir W. J. Hooker. Dr. J.F. Royal (1800-1858) who succeeded Govan at Saharanpur, trained collectors to collect plants from the Himalaya. He made extensive collections in Basbahr, Kinnaur and Simla around 1830 and sets of his collections are housed at herbaria all over the world which includes the herbarium of the Forest Research Institute, Dehra Dun (DD) and National Academy of Science, Philadelphia (ANSPHILA).

Victor Jacquemont (1801-1832), a French botanist visited the regions of Kinnaur and Spiti on the borders of Tibet and Simla in 1830 and passed through Saharanpur when he first entered the Himalayas.

Mr. R. Inglis of Canton and a member of the Asiatic Society of Bengal also collected plants from Himachal Pradesh during the same year. James Gilbert (1833) who was in the medical service wrote about the plants of Spiti valley and the adjacent area. In 1844 General Walker and his wife made collections from Simla and sent their collections to Sir W.J. Hooker.

Others who collected in and around Simla and contributed to Sir William Hooker's herbarium were Colonel (Lieut. Gen.) Munro (1818-1880), Lt. Colonel Edward Madden (1805-1856). J.E. Winterbottom (1803-54), Richard Strachey (1817-1908). Michael Pakenham Edgeworth (1812-1851), the first ecologist of India, collected plants from Himachal Pradesh while stationed at Ambala. Lord William Hay and Lance **collected** plants from different places of Himachal Pradesh and sent their collections to Edgeworth. R.S. Simpson made collections from Simla in 1847. William Hawtayne Parish made collections from Mandi and Kulu during the same year.

James William Grant made collections from Kinnaur in 1850 and sent his collections to Sir J.D. Hooker. In the last part of the 19th century J.R. Drummond (1851-1921), employed trained men for plant collection,

(i ii)

Sir Henry Collett collected plants from Simla and adjacent areas in 1885. J.S. Gamble made vast collection from Simla and its neighbouring areas in 1877. D. Brandis made collections from Bashahr and other areas in 1881.

J.F. Duthie (1845-1922), Superintendent of the Saharanpur Botanical Garden and then botanist at Dehra Dun, when the herbarium was transferred there, made collection trips to different places in 1892 and 1893. J.H. Lace made collections from Chamba and adjacent area from 1891-1896. G.A. Gammie made collections from Chamba and other areas in 1891-1896.

HISTORY OF MIDDLE PERIOD (1900-1950)

R.N. Parker made extensive collections from Kulu, Bashahr from 1919-1936. In 1934, Parkinson made collections from Parbatti valley and other areas of Himachal Pradesh. During the same period Walter Koelz and Rupchand Thakur also made collections from different places of Himachal Pradesh. N.L. Bor made extensive collections from Lahul and adjacent areas in 1941. Among the other collectors of this century S.P. Sethi, M.v. Laurie, C.R. Brown, G.S. Puri and M.B. Raizada's collections are worthy of mention.

S.K. Jain made collection from Parbatti valley in 1950. All these collections are preserved in the herbarium of the Forest Research Institute, Dehra Dun (DD).

RECENT BOTANICAL STUDIES

In 1956, with the reorganisation of the Botanical Survey of India, the Northern Circle station was set up at Dehra Dun. Since then various officers of the Botanical Survey of India, Northern Circle. M.A. Rau, N.C. Nair, U.C. Bhattacharyya and others have periodically visited different areas of Himachal Pradesh, and collected considerable material which are preserved in the herbarium of Botanical Survey of India, Northern Circle, Dehra Dun (BSD).

Recently scientists of the Regional Research Laboratory, National Botanical Research Institute, Central Drug Research Institute, and teachers (from some of the universities also have made collections from different localities of the state.

WILD LIFE SANCTUARIES AND NATIONAL PARKS

Wild life sanctuaries and national parks are created under the Wildlife Protection Act 1972 to protect the rare and endangered species of plants and animals. In Himachal Pradesh there are about 26 such sanctuaries (Saharia, 1981). They are :

- (a) Sechutun Nallah, Gamgul—Siya Behli ,
Tundah, Kugti and Kelatop & Khajjar in Chamba district.

(iv)

(b) Nergu & Winch Shikari Devi and Bandi in Mandi district. Gobindsagar and Shri Naina Devi in Bilaspur district.

(c) Majathal Harseng, Shilli, Darlaghat and Chail in Solan district. (d) Daranghati, Raksham and Chitkul and Lipa Asrang in Kinnaur district.

(e) Talra and water supply catchment area in Simla district.

(f) Renuka and Simbalbara in Sirmur district.

(g) Manali, Kias, Khokhan, Kanswar and Tirtan in Kulu district.

AGRICULTURAL CROPS

Paddy, wheat, maize, potato, barley, millets, field peas, coriander, buck-wheat and Amaranthus are the principal crops of this state. Apple, pear, peach, apricot, plum and grapes are also cultivated for their fruits. *Prunus armenica* L. is another extensively grown fruit tree.

A number of Cucurbits are grown for vegetables which includes *Lagenaria siceraria*, *Luffa acutangula*; *Luffa cylindrica*, *Momordica charantia* var. *charantia*, *Momordica dioica*, *Sechium edule*, *Trichosanthes anguina*, *Trichosanthes dioica* etc.

FORESTS AND FOREST PRODUCTS

Out of the total area of 55650 sq. km. of Himachal Pradesh, it is covered with forests. This places the state among the most heavily forested Indian states with 38.9% of the area as forest land but this is no reason for complacency as the growth of apple orchards and potato farms, the building of roads and the felling of trees are all taking its toll on the forested land.

Resins (from *Pinus* spp.), timber (from *Cedrus*, *Pinus*, *Betula*) and firewood are some of the major products obtained from the forests of the state.

The area is also rich in medicinal plants like *Artemisia*, *Dioscorea*, *Ephedra*, *Gentiana*, *Podophyllum*, *Berberis*, *Aconitum*, *Arnebia* etc. *Saussurea lappa* which is cultivated in Lahul valley is another such endangered medicinal plant.

The seeds of *Pinus gerardiana* (*Chilgoza*) which are considered a delicacy is gathered from the forest.

VEGETATION

The vegetation of Himachal Pradesh is very varied and its geographical location, climate and topography have all contributed to the characteristic vegetation and flora. As the topography is irregular and disturbed

by valleys and plateaus of various extent, the stratification is not clear. The vegetation of the state is broadly known through the accounts of Collett (1902), Puri (1960), Champion and Seth (1968), M.A. Rau (1975), N.C. Nair (1977), s.K. Jain and A.R.K. sastry (1978) and A.S. Rao (1978).

The vegetation under each category dealt here is mostly according to Champion and Seth (1968) who has given detailed accounts of vegetation types of whole of Himachal Pradesh with necessary modifications. Broadly, the following main vegetational types can be indicated : (i) Thorny scrub of *Acacia* and *Ziziphus*.

(ii) Sub-tropical Pine forests.

(iii) Sub-tropical dry evergreen forests.

(iv) Himalayan moist temperate regions. (v) Himalayan dry temperate regions.

(vi) Sub-alpine forests. (vii)

Moist alpine scrub and

(viii) Dry alpine scrub.

(i) Thorny scrub of *Acacia* and *Ziziphus* : This type of association is generally found at the foot hills near Punjab border.

(ii) Sub-tropical Pine forests: This type occupies the lower areas of all ranges from an altitude of 600 m to ca 1700 m and are dominated by *Pinus roxburghii*, the Chir pine. The undergrowth consists of scattered bushes of *Berberis*, *Rubus*, *Carissa* etc. On exposed slopes in Chir pine belt *Euphorbia royleana* association with *Carissa* SD. are common.

(iii) Sub-tropical dry evergreen forests.

Olea cuspidata, *Acacia modesta*, *Pistacia* sp. and different species of grasses like *Themeda*, *Eulaliopsis*, *Heteropogon*, *Cymbopogon*, *Saccharum* etc. are common. The other associates are *Pyrus pashia*, *Coriaria nepalensis*, *Rhus cotinus*, *R. semialata* etc. The shrubby layer is composed

Indigofera gerardiana, *Desmodium tiliacifolium*,

Prinsepia utilis, *Zanthoxylum alatum* etc.

(iv) Himalayan moist temperate forests :

Cedrus deodara, *Pinus wallichiana*, *Quercus ilex*, *Rhododendron arboreum*, *Juglans regia* etc. are the common tree species in this type of forest.

(vi)

Species of *Symplocos*, *Berberis*, *Spiraea*, *Artemisia*, *Indigofera*, *Daphne*, *Polygonum Cynoglossum* and *Iris kumaonensis* etc. are some of the common shrubby and herbaceous plants in this type of forest. (v) Himalayan dry temperate forest :

Pinus gerardiana, *Cedrus deodara*, species of *Prunus*, *Fraxinus*, *Lonicera*, *Artemisia*, *Daphne*, *Caragana* and *Picea smithiana*, *Acer pictum*, *Aesculus* sp., *Rhododendron arboreum*, *Celtis australis*, *Salix* sp., *Morus serrara*, *Cornus macrophylla* etc. are generally found here.

(vi) Sub alpine forests :

This type of forest is characterised by *Rhododendron campanulatum*, *Betula utilis*, *Abies spectabilis*, *A. pindrow* etc. and occurs between altitudes 2400 m and 3600 m i.e. near tree limit. *Ephedra gernardiana*, *Morina coulteriana*, *Eremurus himalaicus*, *Saxifraga saginoides* are some of the herbaceous plant on the dry rocky edges.

(vii) Moist Alpine scrub ;

Occurs above 3600 m. Species of *Rhododendron*, *Berberis*, *Salix*, *Lonicera*, *Cotoneaster*, *Aconitum*, *Astragalus*, *Cassiope*, *Rheum*, *Potentilla*, *Iris*, *Allium*, *Pedicularis* etc. are common.

(viii) Dry Alpine scrub :

Juniperus sp. is the dominant shrub in this type with many herbaceous plants like species of *Primula*, *Sedum*, *Draba*, *Saussurea*, *Caltha*, *Corydalis*, *Leontopodium*, *Anaphalis*, *Anemone*, *Gentiana*, *Saxifraga*, *Thalictrum*, *Taraxacum*, *Carex*, *Kobresia*, and grasses like *Festuca*, *Poa* spp. etc. are found in the dry alpine regions.

In the present enumeration families are arranged according to Bentham and Hooker's system of classification. The first volume deals with Dicots, from *Ranunculaceae* to *Caprifoliaceae*, the genera and species in the family are arranged alphabetically. The treatment of each species includes the original citation of the correct name followed by basionym and synonyms if any. Reference has also been made to *Flora British India*, and regional floras like, *Collett's Flora Simlensis*, *Parker's Forest Flora*, *Nair's Flora Bashahr Himalaya* and a reference has also been made to *Stewart's Annotated catalogue of Vascular Plants of West Pakistan and Kashmir and Flora West Pakistan*. Each species has been provided with distinguishing characters, its presence in various districts of Himachal Pradesh and the acronym of the herbaria where they are deposited like BSD Botanical Survey of India, Dehra Dun ; DD - Forest Research Institute, Dehra Dun ; CAL - Central National Herbarium, Botanical Survey of India, Howrah ; BSIP Birbal Sahni Institute of Paleo botany, Lucknow ; LWG National Botanical Research Institute, Lucknow ; CDRI Central Drug Research Institute, Lucknow and RRL - Regional Research Laboratory, Jammu.

RANUNCULACEAE

H. J. CHOWDHERY, B. M. WADHWA AND R. PRASAD

Aconitum chasmanthum Stapf ex Holmes Muse Report Pharm. Soc. G. B. 2. 1903 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 257. 1972.
Aconitum napellus L. sp. Pl. 29. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 28. 1872. var. *napellus*.

Stem 60-90 cm, leafy. Raceme densely flowered, bright or dull greenish-blue.

Fl. & Fr. : May-September.
Lahul and Spiti (DD).

Alpine Western Himalaya.

Aconitum deinorrhizum Holmes ex Stapf in Ann. Bot. Gard. Calcutta 10 : 158. 1905 Ann. cat. vas. Pl. W. Pak. & Kash. 257. 1972 ; Rau, High Alt. Fl. Plants 55. 1975. *A. ferox* Wall. ex ser. var. *laciniatum* and var. *atrox* Wall. in Agr. leds. 3 : 96. 1902.

Root biennial, tuberous. Leaves up to 10 or 12, scattered, lower usually decay at the time of flowering. Inflorescence straight, racemose. Sepals blue. Seeds obconic, 3 mm long with numerous small, transverse lamellae.

The root contains a poisonous alkaloid.

Fl. & Fr. : June-October.
Kinnaur, Simla (Rau, 1975). Himalaya, Himachal Pradesh to Nepal.

Aconitum falconeri Stapf var. *latilobum* Stapf in Ann. Bot. Gard. Calcutta 10 : 164. 1905.

Root up to 12 cm long and 2.50 cm thick with few fibres. Upper leaf-blades 3-partite. Inflorescence tomentose with spreading hairs. Carpels quite glabrous.

The root is considered poisonous. Fl. & Fr. : May-October.
Bashahr Himalaya (Mukerjee, 1962).

Aconitum ferox Wall. ex Ser. Mus. Helv. 1 : 160. t. 15. f. 43 & t. 44. 1823 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 28. 1872.

Root biennial, paired, tuberous. Leaves scattered, distant excepting the lowest 2 or 3 which usually decay at the time of flowering. Inflorescence a loose raceme. Sepals blue.

It yields a very effective medicine which acts as a narcotic, sedative.
Fl. & Fr. : July November.

Kinnaur (CAL).

Temperate alpine Himalaya, from Himachal Pradesh to Sikkim.

Aconitum heterophyllum Wall. ex Royle, Ill. Bot. Himal. Mount. 56. t. 13. 1833 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 29. 1872 ; Collett, Fl. Simi. 13. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 258. 1972 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 5. 1977.

Downy herb. Leaves acute or obtuse, cauline, sharply toothed, the lower long petioled and not amplexicaule. Raceme often paniced. Flowers bright blue to greenish blue with purplish veins.

Root is medicinally important.

Fl. & Fr. : May October.

Chamba (CAL, DD), Kangra (DD), Kinnaur (DD), Kulu (BSD), Lahul and spiti (BSD, CAL, RRL), Simia (CAL, DD, LWG.), Sirmur (DD).

Temperate Western Himalaya upto Nepal.

Aconitum laeve Royle, Ill. Bot. Himal. Mount. 56. 1834 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 5. 1977. *A. lycoctonum* auct (non L.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 2 : 28. 1872 ; Collett, Fl. Simi. 13. 1902.

Stem erect, pubescent or glabrous, more than 1 m tall. Leaves deeply lobed, petals pale yellow or dull purple. Roots poisonous.

m. & Fr. : April August.

Chamba (CAL), Kinnaur (DD), Kulu (DD), Lahul and spiti (DD), Mandi (LWG), Simia (CAL), Sirmur (CAL).

Western temperate Himalaya and Nepal.

Aconitum rotundifolium Kar. & Kir. in Bull. Soc. Nat. Mosc. 15. 139. 1842 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 258. 1972 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 6. 1977. *A. napellus* var. *rotundifolium* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 29. 1872.

Erect, tuberous herb. Leaves lobed but not divided to the base. Flowers pale green to grey green.

Fl. & Fr. : July September.

Chamba (CAL), Kinnaur (DD), Lahul and spiti (CAL).

Alpine Himalaya, Kashmir to Nepal.

Aconitum violaceum Jacq. ex Stapf in Ann. Bot. Gard. Calcutta 10. 144. 1905 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 259. 1972 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 6. 1977. *A. napellus* var. *multifidum* & var. *rigidum* (pro parte) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 29. 1872.

Small, erect herb. Root tuberous. Leaves many lobed to the base, lobes cut into linear segments. Flowers violet to blue.

Fl. & Fr. : July October.

Chamba (CAL, DD, RRL), Lahul and spiti (CAL), Simia (CAL, DD).

Temperate alpine Himalaya, Kashmir to Nepal.

Actaea spicata L. sp. Pl. 504. 1753 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 29. 1872 ; Collett, Fl. Simi. 15. 1902 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 9. 1977. *A. acuminata* wall. ex Royle, Ill. Bot. Himal. Mount. 57. 1834.

Pubescent, erect herb with woody root stock. Flowers white, petal shorter than sepals. Berry elliptic or subglobose, black.

The root is an active purgative.

Fl. & Fr. : May August.

Chamba (CAL, DD), Kinnaur (BSD, CAL), Kulu (DD), Lahul and spiti (BSD, CAL), Simia (DD).

Temperate Himalaya, Kashmir to Assam.

Adonis aestivalis L. Sp. Pl. ed. 2. 771. 1763 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 15. 1872 ; Collett, Fl. Simi. 8. 1902 ; Nair, Fl. Bash. Himal. 6. 1977. ssp. *aestivalis*.

Annual, erect herb. Leaves alternate, sessile. Corolla brick red with dark purple spot at the base. Achenes in an ovoid or oblong head, deeply pitted.

The whole plant is used as a cordiotonic and diuretic in Europe.

Fl. & Fr. : May September.

Chamba (CAL, DD), Kinnaur (CAL), Kulu (DD), Lahul and spiti

Western Himalaya and Nepal.

Adonis aestivalis L. ssp. *parviflora* (Fisch. ex DC.) Busch. in Fl. Cauc. Crit. 3 (3) : 201. 1903. *A. parviflorus* Fisch. ex DC. Prodr. 1 : 24. 1824. *A. scrobiculata* Boiss. Diagn. ser. 2 (1) : 6. 1754 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 15. 1872. *A. aestivalis* L. var. *scrobiculata* (Boiss). Finet. et Gagnep. in Bull. Soc. Fr. 50 : 133. 1903 ; Nair Fl. Bash. Himal. 6. 1977.

An annual erect herb. Achenes very variable, similar to *A. aestivalis* but differs in having angled seeds with small tubercles.

Fl. & Fr. : June August.

Chamba (DI), Kinnaur (DD).

Western Himalaya.

Adonis chrysocyathus Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 15. 1872 ; Stewart, Ann. Cat, Vas. Pl. W. Pak. & Kash. 260. 1972 ; Rau, High Alt. Fl. Plants 55. 1975.

Perennial herb. Root stock scaly, horizontal. Stem several, erect, leafy. Flowers golden - yellow. Achenes in dense heads.

Fl. & Fr. : June September.

Chamba (DD).

Alpine Western Himalaya and Nepal.

Anemone coronaria L. Sp. Pl. 539. 1753 var. *biflora* (DC) Finet. et Gagnep. in Bull. Soc. Bot. Fr. 51 : 60. 1906. *A. biflora* DC. Syst. I : 201. 1818 et Prodr. 1 : 19. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 7. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 260. 1972.

Annual or perennial herb. Scape up to 20 cm, slender, usually quite glabrous. Flowers dull red. Achenes with short style, embeded in dense wool.

Fl. & Fr. : June September.

Lahul and spiti (CAL).

Kashmir and Himachal Pradesh, in dry rocky places.

Anemone falconeri Thoms. in Hook. Ic. Pl. t. 899. 1852 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 8. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 260. 1972.

Softly hairy herb. Root stout, fibrous. Radical leaves many, long petioled. Flowers white, short pedicelled. Achenes oblong, angled, silky.

Fl. & Fr. : May August.

Lahul and spiti (DD).

Western Himalaya.

Anemone narcissifolia L. Sp. Pl. 532. 1753 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 261. 1972 ; Nair, Fl. Bash. Himal. 6. 1977. *A. narcissiflora* L. Sp. Pl. ed 2 : 763. 1762 ; Hook. f. & Thoms. in Hook. f. Fl.

Brit. India 1 : 10. 1872.

Hairy herb. Flowers simply umbelled, white. Achenes nearly orbicular with an incurved beak.

Fl. & Fr. : July August.

In Siberia the juice of the plant is used to poison arrows and is also used medically in Europe.

Simia (BSD, CAL), Lahul and spiti (CAL).

Kashmir and Himachal Pradesh.

Anemone obtusiloba D. Don, Prodr. Fl. Nepal. 194. 1825 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 8. 1872 ; Collett, Fl. Simi. 5. 1902 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 7. 1977. *A. obtusiloba* D. Don ssp. *obtusiloba* Brubl in Ann. Bot. Gard. Calcutta 5 : 78. 1896.

Densely tufted herb. Radical leaves 3 parted, hairy. Colour of tepals variable, white, lemon yellow or deep blue, sometimes white with purple bands outside. Achenes glabrous.

The leaves are good in complaints of spleen, kidney and jaundice.

Fl. & Fr. April September.

Chamba (CAL, LWG), Kangra (BSD, CAL), Kinnaur (CAL, DD), Kulu (BSIP, CAL, DD), Lahul and spiti (BSD, CAL), Simia (CAL, LWG).

Temperate and alpine Himalaya, Kashmir to Bhutan.

Anemone polyanthes D. Don, Prodr. Fl. Nepal. 194. 1825 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 9. 1872 ; Collett, Fl. Simi. 6. 1902 ; Stewart, Ann. Cat. Vas. m. W. Pak. & Kash. 261. 1972 ; Nair, Fl. Bash. Himal. 7. 1977. *A. narcissifolia* L. var. *polyanthes* (D. Don) Finet. et Gagnep. in Bull. soc. Fr. 51 : 75. 1904.

Silky herb. Radical leaves 5 7 lobed, silky. Flowers white, achenes broadly oval, glabrous.

Fl. & Fr. : June August.

Chamba (CAL), Kinnaur (CAL, DD), Kangra (BSIP), Kulu (DD), Lahul and spiti (CAL, RRL), Simia (BSD).

Inner Himalaya, Kashmir to Bhutan.

Anemone pulsatilla L. sp. Pl. 539. 1753 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 7. 1977. *A. albana* Stev. in Mem. soc. Hist. Nat. Mosc. 3 : 264. 1820 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 7. 1872. *A. wallichiana* Royle, 111. Bot. Himal. Mount. 52. 1839.

Densely tufted perennial herb. Leaf segments pinnatifid. Flowers solitary, dull red-brown. Sepals with erect tips, about as long as the stamen.

Anemonin is obtained from this plant.

Fl. & Fr. : June September.

Chamba (DD), Lahul and Spiti (DD).

Western Himalaya.

Anemone rivularis Buch. Ham. ex DC. Syst. Nat. 1 : 211. 1817 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 9. 1872 ; Collett, Fl. Simi. 6. 1902 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 251. 1972 ; Nair, Fl. Bash. Himal. 7. 1977.

Erect hairy herb up to 1 m high. Radical leaves long petioled. Cyme compound. Flowers white or bluish outside. Sepals 5-8. Achenes large, oblong, style hooked.

Fl. & Fr. : May September.

Chamba (CAL), Kinnaur (CAL), Kulu (BSIP, CAL), Lahul and spiti (BSD, CAL), Mandi (CAL), Simia (CAL, LWG), Sirmur (CAL). Temperate areas of India.

Anemone rupicola Camb. in Jacquem. Voy. Bot. 4 : 5. t. 2. 1835 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 8. 1872 ; Rau, High Alt. Fl. Plants 55. 1975 ; Nair, Fl. Bash. Himal. 8. 1977.

Root stock long, slender, woody. Radical leaves long petioled, segments more or less petioled, sharply incised or 3-lobed. Flowers showy. Achenes embedded in wool.

Fl. & Fr. : May August.

Kinnaur (CAL, DD), Lahul and spiti (CAL, RRL).

Inner valleys of Himalaya.

Anemone tetrasepala Royle, Ill. Bot. Himal. Mount. 53. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 10. 1872 in part ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 261. 1972 ; Rau, High Alt. Fl. Plants 55. 1975.

Root stock woody, petiole and young leaves woolly. Radical leaves
Involucral leaves large, broadly cuneate, sharply toothed.
 Flowers white.

Fl. & Fr. : July August.

Chamba (CAL, BSD), Mandi (CAL).

Kashmir and Himachal Pradesh.

Anemone vitifolia Buch. Ham. ex DC. Syst. Nat. I : 211. 1817 ;
 Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 8. 1872 ; Collett, Fl. Siml. 4. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 261. 1972 ; Nair, Fl. Bash. Himal. 8. 1977.

Pubescent herb up to 1 m high, Radical leaves deeply 5 lobed, glabrous above densely tomentose beneath. Flowers white. Achenes white, wooly, in globose heads.

Fl. & Fr. : May October.

Chamba (CAL, DD), Kangra (DD), Kinnaur (BSD, CAL), Kulu (BSD), Simia (CAL, DD, LWG), Sirmur (DD).

Temperate Himalaya.

Aquilegia fragrans Benth. in Maund Botanist 4 : t. 181. 1840 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 262. 1972 ; Rau, High Alt. Fl. Plants 59. 1975. *A. glauca* Linde. Bot. Reg. 26. t. 44. 1840. *A. vulgaris* ssp. *pyrenaica* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 24. 1872 in part.

Softly pubescent herb. Flowers white, showy.

Fl. & Fr. : July September.

Chamba (BSIP, DD, LWG), Kinnaur (CAL, DD), Lahul and spiti (BSD, BSIP, CAL), Simia (LWG),

Alpine and temperate Western Himalaya.

Aquilegia moorcroftiana Wall. ex Royle, Ill. Bot. Himal. Mount. 55. t. 21. 1834 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 262. 1972 ; Rau,

High Alt. Fl. Plants 57. 1975. *A. vulgaris* ssp. *pyrenaica* (in part) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 24. 1872.

Perennial, glabrous or slightly pubescent herb. Spur hooked as long as the blade of the petal.

Fl. & Fr. : May August.

Chamba (DD), Kulu (DD), Lahul and spiti (CAL, DD), Simia (DD). Kashmir and Himachal Pradesh upto Nepal.

Aquilegia nivalis Falc. ex Baker in Gard. Chron. 2 (10) : 76. 1878 ; Mukerjee in Bull. Bot. Surv. India. India 2 : 296. 1960. *A. vulgaris* SSP. *jucunda* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 24. 1872 (non Fiscal & L Allen).

Stem simple, leafless or one small leaf. Flowers very large, dark purple. Sepals very broadly ovate.

Fl. & Fr. : June September.

Kashmir and Himachal Pradesh.

Aquilegia pubiflora Wall. ex Royle, Ill. Bot. Himal. Mount. 55. 1834 ; Collett, Fl. Simi. 11.1902 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 252. 1972 ; Rau, High Alt. Fl. Plants 57. 1975 ; Nair, Fl. Bash. Himal. 8. 1977. *A. vulgaris* ssp. *pubiflora* Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 24. 1872. *A. pubiflora* var. *subnuda* Bruhl in Asist. Soc Bengal 61 (2) : 311. 1822.

Softly pubescent herb. Flowers drooping, purplish brown. Petals. with hooked spur. Follicles 5, tipped with styles.

Fl. & Fr. : May August.

Chamba (BSD), Kangra (BSD), Kulu (BSD), Lahul and spiti (BSD), Simia (BSD).

Temperate outer Himalaya, Kashmir to Nepal.

Aquilegia pubiflora Wall. ex Royle var. *mussooriensis* Royle, Ill. Bot. Himal. Mount. 55. 1834 ; Mukerjee in Bull. Bot. Surv. India 2 : 297. 1960 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 162. 1972.

Very variable plant. Flowers usually purple but sometimes white or yellow.

Fl. & Fr. : June August.

Chamba (CAL).

North Western Himalaya.

Callianthemum pimpinelloides (D. Don ex Royle) Hook. f. & Thoms.
Fl. India 26. 1855 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 263. 1972 ;
Rau, High Alt. Fl. Plants 57. 1975 : Nair, Fl. Bash. Himal. 9. 1977. *Ranunculus pimpinelloides* u. Don ex
Royle, Ill. Bot. Himal. Mount. 53. 1834. *Callianthemum cachemirianum*
Camb. in Jacquem. Voy. Bot. 5. t. 3. 1835 ; Hook. f. & Thom. in Hook. f.
Fl. Brit. India I 14. 1872.

Densely tufted annual herb. Leaves numerous, long petioled, segments
rounded, pinnules orbicular, deeply cut. Scape shorter than the leaves.
Flowers white.

Fl. & Fr. : May September.

Chamba (DD), Kinnaur (CAL), Kulu (DD).

Inner ranges of the Himalaya.

Caltha palustris L. sp. Pl. 558. 1753. *C. himalensis* D. Don, ProdrFl.
Nepal. 195. 1825. *C. palustris* L. var. *himalensis* (D. Don) Mukerjee in Bull.
Bot. Surv. India 2 : 105. 1962. *C. elata* Duthie, Gard. Chron. 1 : 178. 1985. *C.*
govaniensis Wall. ex Royle, 111. Bot. Himal. Mount. 54. 1854. var. *palustris*.

An annual herb, along with streams, wet places. Rootstock stout, densely
fibrous. Radical leaves long petioled. Flowers yellow.

The roots are acrid, poisonous.

Fl. & Fr. : April August.

Chamba (CAL), Kangra (BSIP), Kinnaur (CAL), Kulu (CAL), Lahul
and spiti (CAL, RRL).

Temperate Himalaya from Kashmir to Nepal.

Caltha palustris L. Sp. Pl. 558. 1753 var. *alba* (Camb. ex Jacquem.)
Hook. f. & Thoms. in Fl. Ind. 40. 1855 et in Hook. f. Fl. Brit. India 1 : 21.
1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 263. 1972 ; Rau, High
Alt. Fl. Plants 57. 1975 : Nair, Fl. Bash. Himal. 9. 1977. *C. alba* Camb. ex
Jacquem. Voy. 6. t. 4. 1835.

Herb growing along with streams and in wet places. Root stock
densely fibrous. Flowers white. Fl. & Fr. : June September.

Sirmur (DD).

Temperate Himalaya from Kashmir to Nepal.

Ceratosephalus falcatus (L.) Pers. Syn. I : 341. 1805 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 263. 1972. *Ranunculus falcatus* L. sp. Pl. 566. 1753 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 16. 1872.

Annual, glabrous or nearly woolly herb. Leaves all radical, segments narrow linear, entire or 3 fid. Scape longer than the leaves.

Fl. & Fr. : April - June.

Chamba (DD), Lahul and spiti (CAL, DI)).

North Western Himalaya from Kashmir to Himachal Pradesh.

Cimicifuga foetida L. Syst. Nat. ed. 12 : 659. 1767 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 30. 1872 ; Collett, Fl. Simi. 15. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 264. 1972 ; Nair, Fl. Bash. Himal. 9. 1977.

Tall herbs. Branches glabrous below and tomentose above. Raceme rarely simple. Flowers small, yellowish. Follicles 4 8.

The roots have emetic and purgative properties.

Fl. & Fr. : June September.

Sima (CAL, DD).

Temperate Himalaya from Kashmir to Bhutan.

Clematis acuminata DC. Syst. Nat. I : 148. 1817 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 5. 1872 ; Nair, Fl. Bash. Himal. 9. 1977. *C. acuminata* DC. var. *wallichii* Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 6. 1872.

A large woody climber. Sepals erect with recurved tips. Filaments hairy, anthers without prolonged connections. Achenes with long feathery style, silky.

Fl. & Fr. June September.

Simia (DD).

Temperate Himalaya, from Himachal Pradesh to Bhutan.

Clematis barbellata Edgew. in Trans. Linn. Soc. Bot. 20 : 25. 1846 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 3. 1872 ; Collett, Fl. Simi. 2. 1902 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 264. 1972 ; Nair, Fl. Bash. Himal. 9. 1977.

A large climber. Flowers large, solitary on long stalks, dull purple. Filaments hairy. Achenes with feathery style, glabrous.

Fl. & Fr. : July October.

Chamba (DD), Kinnaur (DD), Kulu (DD), Lahul and Spiti (CAL, DD), Simia (DD, LWG), Sirmur (CAL).

Temperate Western Himalaya, from Himachal Pradesh to Nepal.

Clematis buchananiana DC. Syst. Nat. I : 140. 1817 ; Hook. f. & Thoms. in Fl. Ind. 10. 1855 et in Hook. f. Fl. Brit. India I 6. 1872 p. P. ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 264. 1972 ; Nair, Fl. Bash. Himal. 10. 1977. (var. *rugosa* only).

Large woody climbers. Leaves pinnate, hairy. Flowers in panicles, white or purple yellow. Sepals erect, tips curved. Filaments hairy throughout.

Fl. & Fr. : June September.

Chamba (DD, RRL), Kinnaur (BSD), Kulu (DD), Simia (CAL, LWG).

Throughout the temperate Himalaya.

Clematis connata DC. Prodr. 1 : 3. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 6. 1872 ; Collett, Fl. Simi. 4. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 264. 1972 ; Nair, Fl. Bash. Himal. 10. 1977.

Large woody climber, young parts covered with scattered hairs. Flowers yellowish white. Sepals erect, tips recurved. Achenes silky.

Fl. & Fr. : June October.

Chamba (CAL, DD). Kinnaur (BSD, CAL). Kulu (BSD, CAL), Simia (CAL, DD, LWG), Sirmur (DD).

Temperate Himalaya, Kashmir to Bhutan.

Clematis florida Thunb. Fl. Jap. 240. 1784 ; Nair, Fl. Bash. Himal. 10. 1977.

A beautiful climber with deep purple flowers. Cultivated in gardens.

Fl. & Fr. : June October.

Simia (DD).

Western Himalaya.

Clematis gouriana Roxb. ex DC. Syst. Nat. I : 138. 1818 et Prodr. 1 : 3. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 4. 1872 ; Collett, Fl. Simi. 4. 1902 ; Nair, Fl. Bash. Himal. 10. 1977.

An extensive climber. Leaves pinnate or 2 pinnate, leaflets thin, smooth. Flowers yellowish or greenish - white, crowded in panicles. Sepals densely pubescent. Achenes narrow oblong, hairy.

Fl. & Fr. : July November.

Chamba (CAL, DD), Simia (CAL, DD), Solan (DD).

Hilly regions of India.

Clematis grata Wall. Plant. Asiat. Rar. 1 : 83. t. 98. 1830 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 3. 1872 ; Collett, Fl. Simi. 2. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 264. 1972 ; Nair, Fl. Bash. Himal. 11. 1977.

A hairy climber with furrowed stem. Panicles often exceeding the leaves. Flowers cream coloured. Sepals tomentose outside. Achenes densely pubescent.

Fl. & Fr. : July September.

Chamba (BSD, CAL, RRL), Kangra (BSD, RRL), Kinnaur (BSD, CAL), Kulu (BSD, CAL, LWG), Simia (BSD, CAL, LWG), Sirmur (BSD, CAL, DD), Lahul and spiti (CAL.).

Subtropical and temperate western Himalaya.

Clematis graveolens Lindl. in Journ. Hort. Soc. 1 : 307. 1846 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 4. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 265. 1972 ; Nair, Fl. Bash. Himal. 11. 1977.

Slender climber. Leaflets glabrous. Panicles 3 7 flowered, upper flowers often solitary. Flowers yellow. Sepals spreading, slightly purple at the base. Filaments tomentose. Achenes pubescent.

Plants poisonous.

Fl. & Fr. : May August.

Chamba (DD), Kangra (DD), Kinnaur (BSD, CAL), Kulu (DD), Mandi (LWG).

Western temperate Himalaya, Kashmir to Nepal.

Clematis montana Buch. Ham. ex DC. Syst. Nat. I 164. 1817 et Prodr. 1 : 9. 1824 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 2. 1872 ; Collett, Fl. Simi. 2. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 265. 1972 ; Nair, Fl. Bash. Himal. 11. 1977

A large woody climber. Leaves fascicled at the nodes. Flowers white, pinkish or yellowish, often scented. Achenes glabrous.

Fl. & Fr. : April August.

Chamba (CAL, DD, LWG), Kinnaur (BSD, CAL), Kulu (BSD, CAL), Simla (BSD CAI r wc;)

Temperate Himalaya.

Clematis orientalis L. Sp. Pl, 543. 1753 ; Hook. f. & Thoms. in Fl. Ind. 8. 1855 et in Hook. f. Fl. Brit. India 1 : 5. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 265. 1972. var. • *orientalis*.

A large woody climber. Panicles many flowered. Flowers yellow or mottled with purple.

Plant poisonous.

Fl. & Fr. : July September.

Kinnaur (CAL, DD), Lahul and spiti (BSD, BSIP, CAL, DD).

Dry inner valleys of Western Himalaya.

Clematis orientalis L. var. *glauca* (Willd.) Mukerjee in Bull. Bot. Surv. India 1 : 140. 1959. *C. glauca* Willd. Enum. Pl. Horti. Berol. 583. 1809. *C. orientalis* L. var. *obtusifolia* Hook. f. & Thoms. Fl. Ind. 9. 1855 et in Hook. f. Fl. Brit. India 1 : 5. 1872.

Large climber, usually very glaucous. Leaves oblong, obtuse.

Fl. & Fr. : July November.

Kinnaur (CAL, DD).

Western Himalaya, in dry inner valleys.

Clematis orientalis L. var. *globosa* (Royle) Mukerjee in Bull. Bot. Surv. India 1 : 140. 1959. *C. globosa* Royle, Ill. Bot. Himal. Mount. 51. 1834. *C. orientalis* L. var. *latifolia* Hook. f. & Thoms. Fl. Ind. 9. 1855 et in Hook. f. Fl. Brit. India 1 : 5. 1872.

Woody climber. Leaves orbicular or oval, obtusely lobed.

Fl. & Fr. : June November.

Kinnaur (DD).

Western Himalaya, in dry inner valleys.

Clematis orientalis L. var. *isngicaudata* (Ledeb.) Mukerjee in Bull. Bot. Surv. India I . • 139. 1959. *C. longicaudata* Ledeb. Fl. Ross. 1 : 3. 1882. *C. orientalis* L. var. *acutifolia* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 5. 1872.

Large climber. Leaves oblong lanceolate acute or acuminate. Flowers usually large.

Fl. & Fr. : June September.

Layul and spiti (CAL, DD).

Western Himalaya, in dry inner valleys.

Clematis puberula Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 4. 1872 ; Collett, Fl. Siml. 5. 1902. *C. parviloba* Garden et Champ. var. *puberula* O. Ktze. Monogr. *Clematis* 148. 1885.

Climber. Stem deeply grooved, downy. Flowers in leafy panicles, yellow. Achenes silky.

Fl. & Fr. : March September.

Simia (DD).

Temperate Western Hima laya.

Clematis roylei Rehder. in Journ. Arn. Arb. 22 : 575. 1941 ; Mukerjee in Bull. Bot. Surv. India I : 140. 1959. *C. nutans* Royle, Ill. Bot. Himal. Mount. 51. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 5. 1872.

A woody, slender climber. Leaflets 4 5 lobed, rarely entire. Flowers yellow. Sepals silky outside. Achenes silky hairy.

Fl. & Fr. : July November.

Kulu (BSD), Simia (DD).

Temperate Himalaya and Khasia hills.

Clematis tortuosa (Wall. ex Hook. f. & Thoms.) C. E. C. Fischer in Kew Bull. 1929 : 4. 1929 ; Kapoor in Bull. Nat. Bot. Gard. Lucknow no. 78 : 52 55. 1962. *C. buchanania* var. *tortuosa* & *vitifolia* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 6. 1872.

A woody climber. Stem pubescent or with soft fibrous hairs. Flowers sweet scented.

Fl. & Fr. : March - September.

Chamba (BSD), Simia (BSIP).

Throughout in the temperate Himalaya.

Consolida ambigua (L.) Ball. in Fedde Repert. 66 : 151. 1962 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 265. 1972. *Delphinium ambiguum* L. sp. Pl. ed. 2. 744. 1762. Fl. & Fr. : June October.

Chamba (CAL).

Cultivated in Garden.

Delphinium brunonianum Royle, Ill. Bot. Himal. Mount. 56. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 27. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 266. 1972 ; Nair, Fl. Bash. Himal. 12. 1977. *D. jacquemontianum* Camb. in Jacquem. Voy. Bot. 4 : 8. t. 7. 1835. Perennial herb up to 30 cm tall. Leaves fivefid to the middle, lobes sharply cut or toothed. Flowers blue.

Fl. & Fr. : June September.

Chamba (CAL, DD), Kinnaur (CAL), Lahul and spiti (BSD, CAL).
Alpine Himalaya.

Delphinium caeruleum Jacquem. ex Camb. in Jacquem. Voy. Bot. 4 : 7. t. 6. 1835 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India. 1 : 25. 1872 ; Nair, Fl. Bash. Himal. 12. 1977. *D. grandiflorum* L. var. *kunawarensis* Bruhl in Ann. Bot. Gard. Calcutta 5 : 98. 1896.

Herb up to 30 cm, stem branched from the base. Leavs suborbicular, 5 7 lobed. Flowers pale blue

The root is applied to kill the maggots in the wounds of goats.

Fl. & Fr. : August October.

Chamba (CAL) , Kinnaur (DD).

Alpine Himalaya from Himachal Pradesh to sikkim.

Delphinium cashmirianum Royle, Ill. Bot. Himal. Mount. 55. t. 12. f. 1 5. 1834 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 266. 1972 ; Rau, High Alt. Fl. Plants 58. 1975.

Tall or dwarf perennial herb. Leaves palmately 5 7 lobed. Flowers in lax corymbs, purple blue.

Fl. & Fr. : July October.

Chamba (CAL, DD), Kulu (CAL, DD), Lahul and spiti (BSD, CAL).

Himalaya from Kashmir to Kumaon.

Delphinium densiflorum Duthie ex Maxim. Fl. Tangu 24 1889 ; Bruhl, Ann. Bot. Gard. Calcutta 5 : 192 1895 ; Mukerjee in Bull. Bot. Surv. India 2 : 294 1960.

Fl. & Fr : June October.

Kinnaur (CAL)

North Western Himalaya.

Delphinium denudatum Wall. ex. Hook. f. & Thoms. Fl. Ind. 49. 1855 et in Hook. f. Fl. Brit. India 1 : 25. 1872 ; Collett, Fl. Simi. 12. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 266 1972 ; Nair, Fl. Bash. Himal. 12 1977. *D. pauciflorum* Royle, Ill. Bot. Himal. Mount. 55 1834 (non *D. Don*, 1825)

Annual erect herb. Radical leaves 5 7 partite, cauline few, upper most 3 partite Flowers pale blue. Follicles 3.

Fl. & Fr : April September.

Chamba (CAL, DD, RRL), Kinnaur (BSD, CAL), Kulu (BSD, LWG), Simia (CAL, DD, LWG), Sirmur (BSD, CAL), Solan (CAL, DD).

Temperate western Himalaya, from Kashmir to Kumaon

Delphinium kolzii Munz in J. Arn. Arb. 48 : 522. 1967.

Stem slender, lower leaves mostly withered by anthesis. Raceme lax, sepals white coloured to blue.

Fl. & Fr. : June september.

Kangra (Mich.), Kulu (GH).

North Western Himalaya.

Delphinium Jacostie Danguy in Journ: Bot. Morot 21 : 50. 1908 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 267 1972.

Fl. & Fr. : July November.

Chamba (Stewart, 1972)

North - Western Himalaya.

Delphinium pyramidale Royle, Ill. Bot. Himal. Mount. 56 1834 ; Rau, High Alt. Fl. Plants 58 1975. *D. elatum* L. var. *ranunculifolium* Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 26. 1872. *D. speciosum* M. Bieb. var. *pyramidale* (Royle) Mukerjee in Bull. Bot. Surv. India 2 (3 4) : 295 1961.

Glabrous or hairy herb. Leaves 5 lobed, segments broadly cuneate.

Fl. & Fr. : June October.

Kangra (DD).

North Western Himalaya.

Delphinium roylei Munz in J. Arne Arb. 48.292. 1967 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 267. 1972 ; Rau, High Alt. Fl. Plants 58. 1975 ; Nair, Bash. Himal. 12. 1977. *D. incanum* Royle, Ill. Bot. Himal.

Mount. 55. 1834 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 25. 1872.

Hoary herb upto 2 m tall. Radical leaves soon withering. Raceme simple or compound, terminal, long and dense flowered. Flowers bright blue.

Fl. & Fr. : May August.

Chamba (BSD, CAL), Kinnaur (BSD, CAL), Kulu (BSD), Lahul and spiti (RRL), Simia (LWG).

Temperate western Himalaya, Kashmir and Himachal Pradesh.

Delphinium vestitum Wall. ex Royle, Ill. Bot. Himal. Mount. 55. 1834; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 26. 1872 ; Collett, Fl. Simi. 13. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 268 1972 ; Nair, Fl. Bash Himal. 13. 1977. *D. rectivenium* Royle, Ill. Bot. Himal. Mount. 56. 1834.

Erect hairy herb upto 1 m high. Leaves orbicular, 5 7 lobed. Flowers dull blue and purple.

Fl. & Fr. : July September.

Chamba (CAL, RRL), Kinnaur (BSD, CAL), Kulu (CAL), Lahul and spiti (BSD, CAL), Simia (BSD, CAL, LWG).

Western and central temperate Himalaya.

Halerpestes salsuginosa (Pall.) Greene in Pittonia 4 : 208. 1900. *Ranunculus salsuginosus* Pall. Reise 3 : 213 1776. *R. cymbalariae* Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 17. 1872 p. P. (non Pursh, 1814). *Halerpestes sarmentosa* (Adams) Komarove in Komar. et Klob Alisova, Key Pl. Far. East Reg. U. S. S. R. 1 : 550. 1931 ; Rau, High. Alt. Fl. Plants 58 1975. *Ranunculus sarmentosus* Adams in Mem. Soc. Nat. Mosc. 9:244. 1864 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 273. 1972.

Sarmentose herb rooting at nodes. Leaves 3 5 lobed. Flower yellow.

Fl. & Fr. : July September.

Chamba (BSD), Lahul and spiti (BSD).

Himachal Pradesh and Sikkim.

Halerpestes tricuspis (Maxim.) Hand Mzt. in Act. Hort. Gotob. 13 : 135. 1940 ; Rau, High. Alt. Fl. Plants 58. 1975. *Ranunculus tricuspis* Maxim. Fl. Tangut 12. 1889. *R. cymbalariae* Hook. f. & Thoms. in Hook. f. Fl. Brit.

India 1 : 17. 1872. p. p. (non Pursh, 1814). *R. palifolius* Dunn in Kew Bull. 1925. 280. 1925 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Rash. 273. 1972.

Stoloniferous herb rooting at nodes. Leaves usually 3 partite. Flower yellow.

Fl. & Fr. : July October.

Lahul and spiti (BSD, CAL).

Himalaya.

Nigella damascena L. Sp. Pl. 534. 1753 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 268. 1972.

Erect herb. Flowers intricately involucrate. Planted in garden as an ornamental.

Fl. & Fr. : July September.

Kulu (BSD, CAL).

Planted in the garden.

Nigella sativa L. SP. Pl. 534. 1753 ; Davis in Fl. Turkey 1 : 103. 1965. *N. indica* Roxb. ex Flem. in As. Res. 11 : 173. 1810.

Erect annual pubescent or shortly viscid hirsute herb. Flowers not involucrate, greenish or whitish. Fl. & Fr •. March May.

Chamba (DD).

Western Himalaya.

Oxygraphis polypetala (Royle) Hook f. & Thoms. Fl. Ind. 27. 1855 et in Hook. f. Fl. Brit. India I : 21. 1872. *Ranunculus polypetalus* Royle, Ill. Bot. Himal. Mount. 54. t. 11. f. 2. 1933 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 272 1972.

A tiny herb. Leaves orbicular, crenatelobed. Scape usually several. Flowers yellow, sepals persistent, petals 10.

Fl. & Fr. : April August.

Kinnaur (CAL, DD), Kulu (CAL, DD), Lahul and spiti (BSD).

Western Himalaya, from Kashmir to Kumaon.

Paraquilegia grandiflora (Fisch. ex DC.) Drum. & Hutchins. in Kew Bull. 1920 : 156. 1920 ; Mukerjee in Bull. Bot. Surv. India 2 : 107. 1960. *Isopyrium grandiflorum* Fich. ex DC. Prodr. I : 48. 1824 ; Hook. f. & Thorns. Fl. ind. 43. 1855 et in Hook. f. Fl. Brit. India 1 : 23. 1872.

Tufted perennial herbs.

Fl. & Fr. : May September.

Chamba (CAL).

North Western Himalaya.

Paraquilegia microphylla (Royle) Drum. ex Hutchins. in Kew Bull. 157. f. 2. 1920 ; Mukerjee in Bull. Bot. Surv. India 2 : 107. 1960. *Isopyrum microphyllum* Royle, Ill. Bot. Himal. Mount. 54. t. 1 l. f. 4. 1934. *I. grandiflorum* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 23. 1872 (in - part). *Paraquilegia grandiflora* (non Drum. and Hutchin. in Kew Bull. 1920 : 56. 1920) Stewart, Ann. Cat. vas. Pl. W. Pak. & Kash. 269. 1972.

Tufted perennial herbs. Flowers purplish white to purple. Carpels 3 7.

Fl. & Fr. : June - August.

Chamba (BSD, CAL, DD), Lahul and spiti (DD).

Alpine Western Himalaya from Kashmir to Kumaon.

Paraquilegia uniflora (Aitch. & Hemsl.) Drum. & Hutchins. in Kew Bull. 1920 : 158. 1920 ; Mukerjee, Bull. Bot. Surv. India 2 : 107. 1960. *Isopyrum unflorum* Aitch. & Hemsl. J. Linn. Soc. 19 ; 149. 1875. *I. anemonoides* Kar. & Kir. Enum. Pl. Songor. No. 55. 1842. *I. thalictroides* Hook. f. & Thoms. (non L.) Fl. Ind. 43. 1855 et in Hook. f. Fl. Brit. India 1 : 23 .1872.

Delicate or caespitose rigid herbs on rocky surface near streams. Flowers white, carpels 2 - 4.

Fl. & Fr. : June August.

Lahul and spiti (BSD, CAL, DD).

Temperate Western Himalaya, Kashmir and Himachal Pradesh.

Ranunculus arvensis L. Sp. Pl. 555. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 20. 1872 ; Mukerjee in Bull. Bot. Surv. India 2 : 102. 1960 ; Stewarte, Ann. Cat. Vas. Pl. W. Pak. & Kash. 269. 1972 ; Nair, Fl. Bash. Himal. 13. 1977.

Diffuse weed in wheat fields and common in marshy places. Leaves variable. Flowers yellow. Achenes 5 10, usually clothed with hooked spines.

Fl. & Fr. : April July.

Chamba (BSD, CAL), Kangra (RRL), Kinnaur (BSD, CAL), Kulu (BSD, BMP), Simia (BSD, CAL), Una (CAL).

Western Himalaya from Kashmir to Kumaon.

Ranunculus brotherusii Freyn in Bull. Herb. Boiss. 6 : 985. 1898 var. *dasycarpus* (Maxim.) Hand Mazz. Acta Horti. Goteburg. 13 : 149. 1939 ; Mukerjee in Bull. Bot. Surv. India 2 : 102. 1960. *R. afinis* var. *tanguticus* f. *dasycarpus* Maxim. Fl. Tang. 14. 1889. *R. afinis* (auct non R. Br.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 18 1872.

A herb upto 30 cm. Radical leaves reniform, lobed to the middle or base, cauline with narrower segments, upper entire or 3 5 partite. Flowers yellow.

Fl. & Fr. July October.

Chamba (RRL), Kulu (LWG).

Inner ranges of the temperate and alpine Himalaya from Kashmir to Sikkim.

Ranunculus diffusus DC. Proder. 1 : 38. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 19 1872 ; Collett, Fl. Simi. 10 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 270 1972 ; Nair, Fl. Bash. Himal. 13 1977.

Perennial herb. Stem and leaves hairy. Flowers yellow. Achenes glabrous, minutely dotted.

Fl. & Fr. : May October.

Chamba (BSD, CAL), Kangra (BSD), Kinnaur (BSD, CAL), Kulu (BSD, CAL LWG, RRL), Lahul and spiti (BSD, CAL), Simia (CAL, DD, LWG), Mandi (LWG).

Temperate Himalaya from Kashmir to Bhutan.

Ranunculus hirtellus Royle ex. D. Don in Royle, Ill. Bot. Himal. Mount. 53 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 18 1872 ; Collect,

Fl. Simi. 9 1902 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 270 1972 ; Nair, Fl. Bash. Himal. 13 1977.

Erect or decumbent herb. Radical leaves reniform, lateral segments often deeply 2 lobed, cauline palmately 3 partite. Flowers yellow.

Fl. & Fr. : March August.

Chamba (BSD, CAL), Kangra (BSD, BSIP, CAL), Kinnaur (BSD, CAL, DD), Kulu (CAL, RRL), Lahul and spiti (BSD, CAL, RRL), Simia (CAL, DD).

Temperate alpine Himalaya.

Ranunculus hyperboreus Rottb. Skiff. Kgoeb. Selsk 10 : 458. 1770 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 18. 1872 ; Collect, Fl. Simi. 10. 1972 ; Rau, High Alt. Fl. Plants 59. 1975.

Creeping on moist ground. Leaves 3 lobed to the middle, base rounded or cuneate. Flowers yellow.

Er. & Fl. : July October.

Chamba (CAL, DD), Kangra (BSIP), Kinnaur (DD), Lahul and spiti (BSD, BSIP, CAL).

Ranunculus hyperboreus Rottb. var. *natans* (C. A. Meyer) Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 18. 1972 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 270. 1972 ; Rau, High Alt. Fl. Plants 59. 1975. *R. natans* C. A. Meyer in Ledeb. Fl. Act. 2 : 315. 1830.

Aquatic herb with floating reniform, 5 7 lobed leaves, Flowers yellow.

Fl. & Fr. : June November.

Alpine Himalaya.

Ranunculus laetus Wall. ex D. Don in Royle, Ill. Bot. Himal. Mount. 53. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 19. 1872 ; Rau, High Alt. Fl. Plants 59. 1975 ; Nair, Fl. Bash. Himal. 14. 1977. *R. dtstans* Royle, Ill. Bot. Hrmal. Mount. 53. 1834.

Perennial herb. Root stock woody, usually much branched. Basal leaves long stalked. Flowers yellow. Sepals villous.

Fl. & Fr. : April September.

Chamba (BSD, CAL), Kangra (CAL, CDRL, DD, RRI), Kinnaur (BSD, CAL), Kulu (BSD, BSIP, CAL, LWG, RRL), Lahul & spiti (BSD, CAL, RRL), Mandi (BSIP, DD, LWG), Simia (BSIP, CAL, LWG).

Temperate Himalaya.

Ranunculus lingua L. sp. Pl. 549. 1753 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 16. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 271. 1972.

Tall erect, glabrous herb. Root stock creeping stem hollow. Flowers sub panicled.

Fl. & Fr. : July September.

Lahul and spiti (CAL, DD).

Kashmir to Himachal Pradesh.

Ranunculus lobatus Jacq. ex Camb. in Jacq. Voy. Indi. 4. t. 1B. 1844 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 17. 1872 ; Stewart, Ann. Cat. vas. Pl. W. Pak. & Kash. 271. 1972 ; Rau, High Alt. Fl. Plants 59. 1975.

Decumbent herb. Radical leaves long petioled, rounded or cordate at the base, cauline often 3 toothed.

Fl. & Fr. : June September.

Chamba (CAL), Lahul and spiti (DD, RRL).

Alpine Himalaya in the inner valleys from Zanskar to Sikkim.

Ranunculus longicaulis C. A. Meyer in Ledeb. Icon. Pl. 2. t. 3. 1830 ; Stewart Ann. Cat. Vas. Pl. W. Pak. & Kash. 274. 1972. *R. pulchellus* C. A. Meyer var. *longicaulis* (C. A. Meyer) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 17. 1872.

Small herb.

Fl. & Fr. : August - September .

Chamba (DD), Lahul and spiti (DD).

Alpine Himalaya.

Ranunculns meinshausenii Schrenk in Bull. Phys. Maths. Acad. Petersb. 3 : 309. 1845 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 274. 1972.

Fl. & Fr. : June August.

Lahul and spiti (CAL).

Western Himalaya.

Ranunculus munroanus J. R. Drumm. ex Dunn in Kew Bull. 1925. 279. 1925 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 271. 1972 ; Rau, High Alt. Fl. Plants 59. 1975.

Fl. & Fr. : June - September.

Lahul and spiti (DD, RRL).

Western Himalaya and Nepal.

Ranunculus muricatus L. Sp. Pl. 555. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 20. 1872.

Annual herb. Flowers solitary and leaf opposed or terminal and paniced. Sepal reflexed, rather shorter than the petals. Achenes in large globose head.

Fl. & Fr. : May August.

The plants are used in intermittent fever, gout and asthma.

Kangra (RRL), Kulu (LWG), Lahul and spiti (BSD), Una (BSD). North Western Himalaya.

Ranunculus palmatifidus H. Riedl. in Kew Bull. 34 (2) : 362 63. 1979.

Lahul and Spiti (besed on Baksh specimen in J. R. Drummond Herbarium No. 8296.)

Ranunculus pangiensis Wall. in Journ. Linn. Soc. 18 : 337. 1881 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 275. 1972.

Fl. & Fr. : July October.

Chamba (Stewart, 1972).

North Western Himalaya.

Ranunculus pulchellus C. A. Mey. in Ledeb. Fl. Alt. 2 : 333. 1830 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 17. 1872 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 272. 1972 ; Rau, High Alt. Fl. Plants 59. 1975 ; Nair, Fl. Bash. Himal. 14. 1977.

Small herb. Leaves glabrous or slightly pubescent, cauline lanceolate, often entire. Flowers yellow.

Fl. & Fr. : June October.

Chamba (CAL), Kangra (BSIP), Kinnaur (CAL, DD), Kulu (DD), Lahul spiti (BSD, BSIP, CAL), Simia (CAL).

Alpine Himalaya from Kashmir to Sikkim.

Ranunculus pulchellus C. A. Mey. var. *membranaceus* (Royle) Mukerjee in Bull. Bot. Surv. India 2 : 104. 1960. *R. pulchellus* C. A. Mey. var. *sericeus* Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 17. 1872.

Small herb. Leaves densely silky.

Fl. & Fr. : June December.

Kinnaur (CAL, DD).

Alpine Himalaya.

Ranunculus sceleratus L. Sp. Pl. 551. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 • 19. 1872 ; Collett, Fl. Simi. 10. 1902 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 273. 1972 ; Nair, Fl. Bash. Himal. 14. 1977.

Annual, erect herb in moist places. Stem fleshy and branched. Flowers yellow. Sepals reflexed. Receptacle oblong, hairy.

Fl. & Fr. : May October.

The plant is poisonous and produces violent effect if taken internally.

Chamba (BSIP, DD), Kangra (LWG), Kinnaur (BSD, CAL), Kulu (CAL, DD, LWG), Lahul and spiti (DD), Mandi (LWG).

River banks in Northern and Eastern India and warm valleys of Himalaya.

Ranunculus trichophyllus Chaix in Vill. Hist. Pl. Dauph. I : 335. 1786 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 273. 1972. *R. aquatilis* L. var. *trichophyllus* (Chaix) Hook. f. & Thoms. in Hook. f. Fl. Brit. India I 16. 1872 ; Rau, High Alt. Fl. Plants 58. 1975.

A submerged aquatic in fast flowing water. Leaves finely dissected. Tepals creamy white or yellow.

Fl. & Fr. : May August.

Kinnaur (BSD, CAL), Simia (CAL).

North - Western India.

Thalictrum alpinum L. Sp. Pl. 545. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 12. 1872 ; Rau, High Alt. Fl. Plants 59. 1975 ; Nair, Fl. Bash. Himal. 14. 1977. *T. marginatum* Royle, Ill. Bot. Himal. Mount. 51. 1834.

Perennial alpine herb upto 15 cm high. Leaves all radical, pinnate, rarely 2 pinnate. Flowers greenish to purple.

Chamba (BSD, CAL), Kangra (BSIP), Lahul & spiti (BSD, CAL, DD), Simia (BSD, DD).

Alpine Himalaya.

Thalictrum chelidonii DC. Prodr. I : 11. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 11. 1872 ; Stewart, Ann. cat. vas. Pl. W. Pak. & Kash. 275. 1972.

Usually much branched herb. Stem 2-8 flowered. Flowers lilac or purple.

Fl. & Fr. : June September.

Kulu (DD).

Temperate Himalaya from Kashmir to Sikkim.

Thalictrum cultratum Wall. Pl. As. Rar. 2 : 26. 1831 ; Hook. f. & Thoms. in Hook. f. Fl. India I : II 1872. *T. platycarpum* Hook. f. & Thoms. Fl. Ind. 1 : 13. 1855 et in Hook. f. Fl. Brit. India 1 : 11. 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 276. 1972. *T. cultratum* SSP. *platycarpum* (Hook. f. & Thoms.) Bruhl in Ann. Bot. Gard. Calcutta 5 : 72. 1896 ; Nair, Fl. Bash. Himal. 15. 1977. Glabrous herb. Flowers greenish-white.

Fl. & Fr. : July September.

Chamba (RRL), Kangra (BSIP), Kinnaur (BSD, DD), Kulu (DD).
Temperate Himalaya.

Thalictrum elegans Wall. ex Royle, Ill. Bot. Himal. Mount. 51. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 10. 1872 ; Collett, Fl. Simi. 6. 1902 ; Nair, Fl. Bash. Himal. 15. 1977.

Erect herb. Leaves decompose, leaflets small. Flowers green-purple. Achenes laterally compressed.

Fl. & Fr. : August October.

Chamba (CAL, DD), Kinnaur (CAL, DD), Simia (CAL, DD), Sirmur (CAL, DD).

Alpine Himalaya from Kashmir to Sikkim.

Thalictrum foetidum L. sp. Pl. 545. 1753 ; Rau, High Alt. Fl. Paints 59. 1975 ; Nair, Fl. Bash. Himal. 15. 1977. *T. minus* L. var. *foetidum* (L) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 14. 1872. *T. vaginatum* Royle, Ill. Bot. Himal. Mount. 52. 1834 ; Stewart, Ann. Cat. Vas. P. W. Pak. & Kash. 277. 1972.

Erect herb. Leaves pinnately decompose, glandular pubescent beneath. Panicle light purple.

Fl. & Fr. : May September.

Chamba (BSD, CAL, DD), Kinnaur (BSD, CAL, DD), Lahul and spiti (BSD, BSIP, CAL, DD), Simia (CAL).

Temperate and alpine Himalaya.

Thalictrum foliolosum DC. Syst. Nat. I : 175. 1817 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 14. 1872 ; Collett, Fl. Simi. 8. 1902 ; Nair, Fl. Bash. Himal. 15. 1977. *T. falconeri* Lecoyer in Bull. soc. Dot. Belg. 24 : 264. 1885. et Monogr. Thalict. 117 & 196. t. f. 12. 1885.

Purplish-green, tall herb. Leaves pinnately compound. Tepals green or pale-purple.

Fl. & Fr. : June October.

Chamba (CAL, DD), Kangra (DD), Kinnaur (BSD, DD), Kulu (BSD, BMP, CAL, DD), Simia (CAL, DD), Sirmur (DD).

Temperate Himalaya and Khasia hills.

Thalictrum javanicum Blume, Bijdr. 2. 1825 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 13. 1872 ; Collett, Fl. Simi, 8. 1902 ; Nair, Fl. Bash. Himal. 16. 1977. *T. glyphocarpum* Wt. et Arn. Prod. 2. 1834.

Tall, erect herb, panicle branched, many. Tepals green white, white or pink. Achenes strongly ribbed.

Fl. & Fr. : June September.

Chamba (BSD), Kangra (RRL), Kinnaur (BSD, DD), Simla (CAL, DD).

Temperate Himalaya, from Himachal Pradesh to Sikkim.

Thalictrum minus L. Sp. Pl. 546. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 14. 1872. var. *minus*.

Herb. Leaves decompositely pinnate. Achenes tapering at both ends.

Fl. & Fr. : May August.

Chamba (CAL), Kinnaur (DD), Lahul and spiti (DD).

Inner valleys of temperate Himalaya.

Thalictrum minus L. var. *majus* (Crantz.) Crepin, Man. Fl. Belg. ed. 4. 5. 1885. *T. majus* Crantz. strip. Austr. 2 : 80. 1763. *T. minus* SSP. *majus* (Crantz.) Rouy. & Fouc. Fl. Fr. 1 : 16. 1893 ; Stewart, Ann. Cat. vas. Pl. W. Pak. & Kash. 276. 1972. *T. minus* var. *majus* (Jacq.) Hook. f. & Thorns. Fl. Ind. 17. 1855 et in Hook. f. Fl. Brit. India 1 : 14. 1872 ; Rau, High Alt. Fl. Plants 59. 1975 ; Nair, Fl. Bash. Himal. 15. 1977. *T. maxwellii* Royle, Ill. Bot. Himal. Mount 52. 1834. *T. elatum* sensu Boiss. Fl. Orient. 17. 1867.

Erect glabrous herb, often glaucous.

Fl. & Fr. : June October.

Chamba (DD), Kinnaur (DD), Lahul and spiti (DD).

Temperate alpine Himalaya.

Thalictrum pedunculatum Edgew. in Trans. Linn. Soc. 20 : 27. 1846 ; Hook. f. & Thorns. in Hook. f. Fl. Brit. India 1 : 12. 1872 ; Collett, Fl. Simi. 7. 1902 ; Stewart, Ann. cat. vas. Pl. 176. 1972 ; Nair, Fl. Bash. Himal. 16. 1977.

Glabrous herb. Leaves 3 ternate. Flowers white.

Fl. & Fr. : April August.

Chamba (CAL, DD), Kinnaur (CAL, DD), Kula (DD), Simla (DD).

Thalictrum reniforme Wall. Pl. As. Rar. 2 : 26. 1831 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 11. 1872 ; Nair, Fl. Bash. Himal.

16. 1977. T. *neurocarpum* Royle, 111. Bot. Himal. Mount. 51. 1834 .Collett, Fl. Simi. 7. 1902 T. *chelidonii* var *reniforme* Hook. f. & Thomse in Fl. Ind. 13. 1855.

Usually much branched herb. Stem hollow. Panicle lax, decomposed Tepals green.

Fl. & Fr. : June September.

Chamba (CAL), Kangra (DD), Kinnaur (BSD, CAL, DD), Kulu (CAL, DD), Simia (CAL, DD).

Temperate Himalaya from Himachal Pradesh to Sikkim.

Thalictrum rostellatum Hook. f. & Thoms. in Fl. Ind. 13. 1855 et in Hook. f. Fl. Brit. India 1 : 12. 1872 ; Nair, Fl. Bash. Himal. 17. 1977.

Diffusely branched herb upto 1 m high. Tepals white.

Fl. & Fr. : June August.

Simia (CAL, DD).

Temperate Himalaya from Himachal Pradesh to Sikkim.

Thalictrum saniculaefromae DC. Prodr. 1 : 12. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India I : 13. 1872 ; Collett, Fl. Simi. 8. 1902 ; Nair, Fl. Bash. Himal. 17. 1977. T. *radiatum* Royle, Ill. Bot. Himal. Mount 52. 1834.

Small herb. Leaves subsolitary, 3 4 ternate. Tepals white. Achenes sessile, oblong.

Fl. & Fr. : June September.

Kinnaur (CAL), Simia (DD).

Temperate Himalaya, from Himachal Pradesh to Sikkim.

Thalictrum secundum Edgew. in Trnas. Linn. Soc. 20 : 26. 1846 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 277. 1972. *T. pauciflorum* Royle, Ill Bot. Himal. Mount 52. 1834. (non Rafin, 1832) ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 11. 1872 ; Rau, High Alt. Fl. Fl. Plants 59. 1975 ; Nair, Fl. Bash. Himal. 16. 1977.

Glabrous herb. Flowers purple.

Fl. & Fr. : July September.

Chamba (CAL, DD), Kinnaur (CAL, DD), Kulu (BSD, BSIP, DD), Lahul and spiti (CAL, DD), Simia (DD), Sirmur (DD).

Western Himalaya from Kashmir to Kumaon.

Trollius acaulis Lindl. Bot. Reg. 28 : misc. 56. 1842 ; Hook. f. & Thoms. in Fl. Ind. 41 1855 et in Hook. f. Fl. Brit. India 1 : 22 1872 ; Stewart, Ann. Cat. Vas. Pl. W. Pak. & Kash. 277. 1972 ; Rau, High Alt. Fl. Plants 59. 1975. *T. pumilus* Royle, 111. Bot. Himal. Mount. 54. 1834 (non D. Don).

Scapigerous herb. Leaves appearing with or after the flowers. Flowers bright yellow.

Fl. & Fr. : June October.

Chamba (BSD, CAL, DD), Kangra (BSIP), Kinnaur (CAL DD), Kulu (CAL, DD), Lahul and spiti (BSD, DD, RRL).

Western alpine Himalaya, from Kashmir to Kumaon.

PAEONIACEAE

B. M. WADHWA AND H. J. CHOWDHERY

Paeonia emodi Wall. ex Royle, Ill. Bot. Himal. Mount. 57. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 30. 1872 ; Collett, Fl. Simi. 15. 1902 ; Rau in Fl. India Fasc. 1 : 5. 1978 ; Nasir in Flora W. Pak. 121 : 1. 1978. *P. emodi* var. *glabrata* Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 30. 1872 ; Nasir in Fl. W. Pak. 121 : 3. 1978.

Robust, perennial herbs. Flowers white. Follicles strigose with yellow brown hairs.

Fl. & Fr. : April September.

Simia (BSD, DD), Kulu (DD).

Western temperate Himalaya.

MAGNOLIACEAE

H. J. CHOWDHERY, R. PRASAD AND B. M. WADHWA

Liriodendron tulipifera L. sp. Pl. 535. 1753 ; Parker, For. Fl. Punj. ed. 3. 6. 1956 ; Nair, Fl. Bash. Himal. 18. 1977.

Large deciduous tree. Leaves trilobed. Flowers tulip shaped, greenish - yellow, fragrant. Fruit brown, narrow, cone like.

Fl. & Fr. : April August.

Simla (DD).

Indigenous to the United States of America and has been introduced in Simla.

Magnolia hodgsonii (Hook. f. & Thoms.) Keng in Gard. Bull. Singapore 31 (2) : 127 131. 1978. *Talauma hodgsonii* Hook. f. & Thoms. Fl. Ind. : 74. 1855 et in Hook. f. Fl. Brit. India 1 : 40. 1872 ; D. C. S. Raju in Rec. Bot. Surv. India 20 (2) : 29. 1973.

Evergreen Lofty tree. Flowers white, odorous.

Fl. & Fr. : May September.

Kulu (DD)

Sikkim eastwards to Khasis Hills & Himachal Pradesh.

Magnolia hypoleuca Sieb. & Zucc. in Abh. Akad. Muench. 4. 2 : 187. 1843 ; Bailey, Stand. cycl. Hort. 2 : 1967. 1928 29.

Lofty tree with pyramidal head. Leaves obovate -oblong, appressed pubescent beneath. Flowers cup shaped, fragrant.

Fl. & Fr. : April June.

Kulu (DD) .

Planted for beautiful fragrant flowers.

Michelia champaca L. Sp. Pl. 536. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 42. 1872 ; Parker, For. Fl. Punj. ed. 3. 5.

OF

1956 ; Khanzada et Khan in Fl. W. Pakist. 64 : 1. 1974 ; Nair, Fl. Bash. Himal. 18. 1977.

Evergreen lofty tree. Leaves ovate lanceolate. Flowers solitary, axillary, pale or orange, very fragrant.

Fl. & Fr. : May July.

Simia (DD).

Commonly planted and also wild in the temperate Himalayan forests.

CALYCANTHACEAE

B. M. WADHWA AND R. PRASAD

Chimonanthus fragrans Lindl. Bot. Reg. sub. t. 451. 1820 ; Nair, Fl. Bash. Himal. 17. 1977.

Shrub. Flowers sweet fragrant.

Fl. & Fr. : February March.

Simia (DD).

Planted for its flowers.

SCHISANDRACEAE

H. J. CHOWDHERY

Schisandra grandiflora (Wall.) Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 44. 1872 ; Collett, Fl. Siml. 16. 1902 ; Nair, Fl. Bash. Himal. 17. 1977. *Kadsura grahdißora* Wall. Tent. Fl. Nepal. 10. t. 14. 1824.

A woody, glabrous climber. Flowers solitary, pinky - white, odorous.

Fl. & Fr. : May June.

Kinnaur (CAL, DD), *Simia* (CAL, DD).

Temperate Himalaya, from Himachal Pradesh to Bhutan.