



FLORISTIC COMPOSITION OF KAROL-KA-TIBBA, SOLAN, HIMACHAL PRADESH

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ABSTRACT

The paper documents medicinal uses of 35 plant species namely *Allium stracheyi*, *Asplenium laciniatum*, *Carpesium cernuum*, *Chamaecrista fasciculata*, *Cichorium intybus*, *Cotoneaster microphyllus*, *Cynodon dactylon*, *Cyperus cephalotes*, *Cyperus niveus*, *Datura stramonium*, *Duchesnea indica*, *Fimbristylis dichotoma*, *Habenaria intermedia*, *Heracleum candicans*, *Ipomoea eriocarpa*, *Lathyrus sylvestris*, *Lespedeza juncea var. sericea*, *Lindenbergia indica*, *Neottia listeroides*, *Kohautia coccinea*, *Oldenlandia corymbosa*, *Paspalum distichum*, *Pedicularis bifida*, *Phyllanthus urinaria*, *Plantago lanceolata*, *Platanthera aquilonis*, *Polygala abyssinica*, *Polygala persicariifolia*, *Polygala tatarinowii*, *Pyrus pashia*, *Quercus leucotrichophora*, *Rhodiola sinuata*, *Satyrium nepalense*, *Sesamum indicum*, *Spiranthes spiralis* and *Viburnum cotinifolium* from Karol-Ka-Tibba (Solan), District Solan (Himachal Pradesh). Plant collections were made and standard procedures were adopted for identifying plants. The characteristic features of the plants were noted and their photographs were taken in the field. The terminologies followed in describing and identifying the plants are in conformity with IPNI and Plant List (2013). Classification given by Bentham and Hooker (1862-1883) and Hooker (1872-1897) for seed plants and by Fraser-Jenkins et al. (2017, 2018) for pteridophytes with modifications according to the latest rules and knowledge have been adopted.

INTRODUCTION AND OBJECTIVES

Karol-Ka-Tibba Located at 2240 m within Shivalik or lower range Himalayas, it is the highest peak of Solan region. Trek starts from a little town named Chambaghat, which is 5km from Solan. It houses places of immense historical and religious importance, a cave in the Himalayas that was believed to be inhabited by the Pandavas during their exile in the Mahabharatha and ancient Karol temple dedicated to Goddess Kali (Figs. 1-4). The present study is undertaken with the sole objective of identifying the Flora of Karol-Ka-Tibba (Solan) District Solan (Himachal Pradesh) with respect to their systematics, common and vernacular names, citations, morphological details, flowering and fruiting seasons, present places of collection, habitat, distribution in the World, India and Himachal Pradesh, economic and ethnobotanical or local uses and coloured photographs.

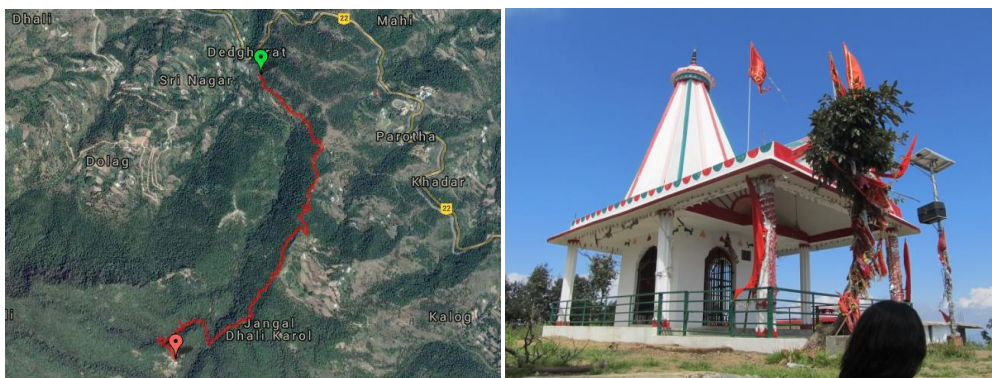


Fig.:1. Map showing the location of Karol-Ka-Tibba Fig.: 2. Karol temple



Fig.: 3. Pandava Cave entrance

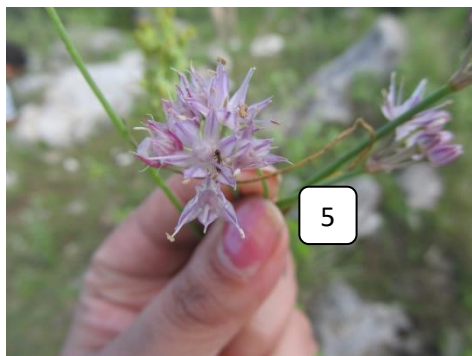
Fig.: 4. Pandava inside view

MATERIALS AND METHODS

Standard procedures were adopted for collecting, preserving and identifying the plants of Karol-Ka-Tibba (Solan), of District Solan of Himachal Pradesh. The characteristic features of the plants were noted and their photographs were taken in the field. Herbarium mounts of these plants were also prepared for record and identification (Harris and Harris, 1994; Jain and Rao, 1977; Polunin and Stainton, 1984; Stainton, 1988; and Womersley, 1981). The terminologies followed in describing and identifying the plants are in conformity with Harris and Harris (1994) Jain and Rao (1977), Polunin and Stainton (1984), Stainton (1988) and Womersley (1981). International Code of Botanical Nomenclature, IPNI, Plant List (2013), Bennet (1987) and several other references have been followed for correctly naming the plants. Classification given by Bentham and Hooker (1862-1883) and Hooker (1872-1897) for seed plants and Fraser-Jenkins et al. (2017, 2018) for pteridophytes with modifications according to the latest rules and knowledge have been adopted. The identified plants have been described alphabetically below:

- 1) **Allium Stracheyi** Baker, J. Bot. 12: 293 (1874). *Allium longistaminum* Royle. **Family Amaryllidaceae** . JAMBU. Vern. : Jamboo, Dhungar, Feren (**Fig. 5**).

Herbaceous, perennial plant producing a flowering scape 35 - 40cm tall from an underground bulb. **Leaves** are 3-4, slender, narrowly linear, blunt-tipped, about a foot long. Flowering stem slender, compressed above. **Flower head** at the top spherical or hemispherical, densely flowered, 2.5 cm in diameter. Flower-stalks shorter than the flowers. **Sepals** oblong, blunt, **filaments** threadlike, much protruding out.



Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: It grows on stony slopes and sandy soils. **Distribution:** E. Asia - Pakistan, Nepal, Jammu & Kashmir. **India:** Uttarkhand, Western Himalaya. **Himachal Pradesh:** Chamba (BSD), Lahaul and Spiti (DD, RRL), Kinnaur, Solan. **Altitude:** 2500-3000m.

Economic and Ethnobotanical Uses: The leaf and bulb parts of this plant are used locally in the alleviation of inflammation and painful conditions. When used in conjunction with aspirin, it potentiated the action of the aspirin. This effect may be due to inhibition of the mediators of inflammation such as histamine, serotonin and prostaglandin (G, kunkel.1984, Shashi Ranjan et al, 2010).

2) **Asplenium laciniatum** D. Don, Prodr. Fl. Nepal 8. 1825. **var. laciniatum**, Beddome Ferns S. India t.145. 1865; Chandra, Fern. Ind. 267. 2007. **Family Asplenaiceae. VARIABLE SPLEENWORT (Fig. 6).**

Rhizome erect, 2–9 mm diameter. **FronDs** tufted, erect or arching. **Stipe** greyish-green when dried, becoming dark brown at the base. **Lamina** 2-pinnatifid to 2-pinnatisect. **Pinna** up to 10 pairs, to 3 × 1.3 cm, pinnules and pinnule lobes obovate or spatulate. **Rachis** greyishgreen when dried with narrow wings, glabrous. **Sori** 2–5 per lobe. **Indusium** linear, almost transparent.



Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: It grows in moist, shady and rocky places. **Distribution:** China Japan, Kenya, Korea, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Tibet, Vietnam, Zimbabwe. **India:** Assam , East Himalaya ,West Himalaya , Kashmir, Sikkim, Meghalaya, S.India, Uttarakhand (Kumaon & Garhwal). **Himachal Pradesh:** Solan. **Altitude:** 4200m.

Economic and Ethnobotanical Uses: It is used in folk medicine.

3) **Carpesium cernuum** L. Sp. Pl. 859. 1753; Hook.f. FBI. **3**: 300. 1881; Rao et al., Fl. Ind. Enum. Asteraceae. 21. 1988. **Family Asteraceae**. NODDING CARPESIUM (**Fig. 7**).

Herbs, perennial. **Stems** 50-100 cm tall, robust, erect, much branched. **Cauline leaves** thin, spatulate-oblong. **Median leaves** slightly smaller, oblong. **Capitula** solitary, 15-18 mm wide, long pedunculate. **Involucre** cupuliform, 7-8 mm; outer phyllaries leaflike, inner ones narrowly oblong. **Corolla** of marginal florets tubular, 1.5 mm; disk florets tubular, 2.5 mm, limb 1 mm. **Fruit** Achene. **Flowering and fruiting**: June-October.



Specimen Examined: Karol-Ka-Tibba, 30.8.2015, Swati Kondal.

Habitat: It grows in waste fields and mountain slopes. **Distribution**: Afghanistan, Indonesia, Japan, Korea, Pakistan, Papua New Guinea, Philippines, Russia, Vietnam, Australia, SW Asia, Europe. **Himachal Pradesh**: Kinnaur (BSD,DD), Kullu (BSD,DD), Shimla (BSD,DD,LWG), Solan. **Altitude**: below 2900 m.

Economic and Ethnobotanical Uses: Roots, leaves, and seeds are considered laxative, anthelmintic, and diuretic (Ambasta,1986).

4) **Chamaecrista Fasciculata** (Michx.) Greene, Pittonia 3(17): 242 (1897). **Family Fabaceae**. PARTRIDGE PEA, SLEEPING PLANT, SENSITIVE PLANT (**Fig. 8**).



Racemes of 2 to 7 flowers arising from leaf axils. **Flowers** are 1 to 1½ inch across, with 5 rounded petals of unequal size, often a single lower one largest, the other 4 similar size with red blotches at base. **Stamens** long. **Style** longer than the stamens, green, slender, and curved. **Sepals** narrow and sharp. **Leaves** compound with 5 to 18 pairs of linear-oblong leaflets. **Stipule** attached at the leaf joint. **Stems** hairless or with short flattened

hairs. **Fruit** flat, straight pea-like pod.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati Kondal.

Habitat: It is found in open woods, disturbed areas and often on sandy soils. **Distribution**: Alabama, Florida, Mississippi, New Mexico, New York, Texas, Virginia. **India**: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Jammu-Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. **Himachal Pradesh**: Solan.

Economic and Ethnobotanical Uses: It is commonly grown as an ornamental. The bright yellow flowers make it a popular choice for use in native gardens. It is considered an excellent species for planting on disturbed areas for erosion control and improving soil fertility. Roots are cooked and eaten (G, kunkel.1984).

5) **Cichorium intybus** L., Sp. Pl. 813. 1753; Hook.f. FBI. 3: 391. 1881 FC. 399. 2006. **Family Asteraceae.** CHICORY, SUCCORY. **Vern.:** Gul, Hand, Kasni, Suchal (**Fig. 9**).

Perennial herb up to 120 cm.tall. **Stem** solitary,erect,subglabrous. **Basal leaves** 7–30 x 1–12 cm., oblanceolate.



9

Stem leaves similar to basal leaves but smaller. **Capitulum** 2.5–3 cm., axillary and terminal, solitary or in clusters. **Involucre** 11 mm. long, cylindrical. **Phyllaries** 2-seriate. **Corolla** 18 mm. long; the lower portion 2 mm. long, cylindrical. **Fruit** Achenes. **Flowering and Fruiting:** April-July.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati Kondal.

Habitat: It grows in open fields, disturbed areas, along cultivated fields and roadsides. **Distribution:** Europe, including Britain, from Scandinavia south and east to N. Africa and W. Asia, South India. **India:** Kashmir, Punjab. **Himachal Pradesh:** Chamba(DD), Una(BSD), Solan. **Altitude:** 2200m.

Economic and Ethnobotanical Uses: The blanched leaves are often used in winter salads (they are known as chicons) and are also cooked. Roots are used in seasoning soups, sauces and gravies, and to impart a rich deep colour. The roasted root is used as a caffeine-free coffee adulterant or substitute (J, Lust.1983). A decoction of the root has proved to be of benefit in the treatment of jaundice, liver enlargement, gout and rheumatism. The latex in the stems is applied to warts in order to destroy them (E, Launert. 1981).

6) **Cotoneaster microphylla** Wall. ex Lindl. Bot. Reg. 13. t.1114. 1827; FSIR. 277. 2004. **Family Rosaceae.** CHINESE ROCKSPRAY. **Vern.:** Res, Luni (**Fig. 10**).



10

Shrubs evergreen. **Branchlets** reddish brown to blackish brown. **Petiole** 1–2 mm to more than 4 mm, pubescent. **Inflorescences** 1-flowered. **Flowers** 8–10 mm in diam. **Pedicel** 2–3 mm, sparsely pubescent. **Sepals** ovate-triangular, apex obtuse. **Petals** white, suborbicular, 4 mm. **Stamens** 15–20, shorter than petals. **Ovary** pubescent apically; **styles** 2, free. **Fruit** scarlet-red, globose. **Flowering and Fruiting:** May-September.

Specimen Examined: Karol- Ka- Tibba,30.8.2015,Swati Kondal.

Habitat: It grows on rocks, slopes, high mountain areas, thickets and roadsides. **Distribution:** Assam, China South-Central, East Himalaya, Myanmar, Nepal, Tibet, West Himalaya. **India:** Tamil Nadu. **Himachal Pradesh:** Solan. **Altitude:** 2000-4200 m.

Economic and Ethnobotanical Uses: The leaves are used for incense. It is a good soil binder. A rose-tan dye is obtained from the fruit. The branches are used for making baskets. The stolons and stem are said to be astringent (Manandhar, N.P. 2002).

7) **Cynodon dactylon** (L.) Pers., Syn. Pl. 1: 85. 1805; FC. 770. 2006. **Family Poaceae nom. alt. Gramineae.** DHUB, BAHAMA GRASS. **Vern. :** Hariali, Talla. (**Fig. 11**).



Perennial, glabrous grass. **Rhizomes** slender, underground. **Culms (Stems)** prostrate, decumbent-ascending, rooting at nodes near the base. **Leaves** 2.5-10 x 0.2-0.7 cm, linear-subulate, acuminate; **sheaths** compressed, hairy on throat; **ligules** very short, 3 mm long, hairy, a ciliated or erose rim. **Inflorescence** of 2-8, green spikes. **Spikelets** 2-2.5 mm long, green or purple, **Glumes** 2, subequal, lanceolate, 1-nerved. **Flowering glume (Lemma)** \pm 2 mm long, boat-shaped. **Palea**

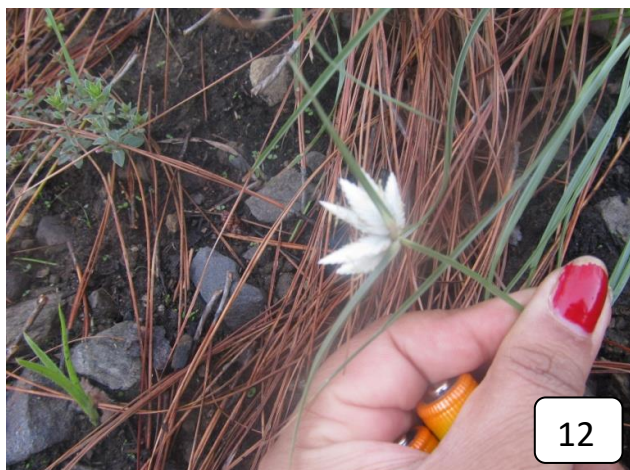
\pm 2 mm long, obtuse, **rachilla** produced as a bristle. **Lodicules** 2. **Stamens** 3; anthers 1 mm long. **Styles** 2, distinct, feathery. **Grain** ellipsoid, 1 mm long. **Flowering and Fruiting:** March-October / throughout the year.

Specimens Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*

Habitat: Very common in grassy, grazing grounds, neglected waste places and fields, commonly cultivated. **Distribution:** Afghanistan, Bangladesh, China, France, Great Britain, Kenya, Korea, Nepal, Pakistan, Sri Lanka, Switzerland, Thailand. **India:** Assam, Kerala. **Himachal Pradesh:** Bilaspur, Mandi, Hamirpur, Solan. **Altitude:** 400-2700 m.

Economic and Ethnobotanical Uses: Important as a pasture and lawn grass. **Rhizomes** used in genitor-urinary troubles. A good soil binder (Ambasta, 1986; Bennet *et al.*, 1992; and Collett, 1902, 1921). The grass is used as a remedy in epitaxis, haematuria, inflamed tumours, cuts, wounds, bleeding piles, cystitis, nephritis and in scabies and other skin diseases. It has astringent, diuretic, antidiarrhoeal, anticatarrhal, styptic and antiseptic properties. 'Riukiu-omote' in Japan (J. C, Uphof. 1959).

8) **Cyperus niveus** Retz., Obs. Bot. 5:12. 1789; FC. 726. 2006. **Family Cyperaceae.** SNOW WHITE SEDGE. **Vern.:** NEPALI: Seto mothe (**Fig. 12**).



Perennial, 10-30 cm; rhizome short. **Stem** 1 mm diam., smooth, grey-green. **Leaves** up to nearly equalling stem, sheaths 20-40 mm. **Inflorescence** a single globose group of 4-10 sessile or subsessile spikes. **Spikes** 10-20 x to 5 mm, narrowly ovoid, with up to 40 glumes. **Stamens** 3, anthers 1.5 mm. **Nut** 1.7 mm, obovoid. **Flowering and Fruiting:** April - June.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Found on rock crevices, road sides. **Distribution:** Afghanistan, Bangladesh, China, Iran, Kenya, Myanmar, Nepal, Nigeria, Pakistan, Saudi Arabia, Thailand, Tibet, Vietnam. **India:** Assam, West Himalaya. **Himachal Pradesh:** Solan. **Altitude:** 2900m.

Economic and Ethnobotanical Uses: It is used as antispasmodic and ant diarrheal.

9) **Datura stramonium L.** Sp. Pl. 179. 1753; FBI. 4: 242. 1883 (incl. var. *tatula*), FSIR. 451. 2004. **Family Solanaceae.** APPLE OF PERU. **Vern. :** Dhouturo, Ummetta (**Fig. 13**).



Stems 0.3-1.3 m high, branched. **Leaves** ramal and cauline, simple, alternate or sub-opposite. **Flowers** solitary, axillary, bisexual, large, erect, white or rarely purple. **Calyx** tubular, sepals 5, gamosepalous. **Corolla** white, funnel shaped, petals 5, gamopetalous. **Stamens** 5, epipetalous, alternipetalous; filaments filiform; anthers linear. **Gynoecium** bicarpellary, syncarpous. **Style** thread like, stigma 2 lobed, oblong. **Fruits (Capsules)** ovoid. **Seeds** many, kidney-shaped. **Flowering and Fruiting:**

April-next January.

Specimens Examined: Karol-Ka-Tibba 30.8,2015, *Swati Kondal*.

Habitat: Common in wastelands, roadsides and village habitations. It is also commonly cultivated in different parts of the world and has also the potentiality of being grown in the gardens. **Distribution:** Native of Asia and tropical America; naturalized in Southern Canada, U.S.A., Africa, Baluchistan, throughout tropical and warm temperate regions of the World. **India:** Himalayas from Kashmir to Sikkim, hilly districts of South and Central India. **Himachal Pradesh:** Bushahr Himalayas (Rampur, Sarahan, Taranda, Wangtoo), Chamba, Kinnaur (Taranda, Wangtoo), Mandi, Solan, Kullu (Bhuntar, Manikaran, Kullu), Shimla (Rampur, Rohru, Sarahan to Taranda, Shimla, Shogi, Taradevi, Hatkoti, Mashobra), Sirmaur (Renuka), Kangra (Kangra, Dharmshala, McCleodganj, Titarcha hills, Palampur, Maranda, Paprola, Chaddihar). **Altitude:** 200-3000 m.

Economic and Ethnobotanical Uses: Datura is toxic, narcotic; aphrodisiac, applied topically it removes pain of tumours and piles. It is demulcent, expectorant, anodyne and antispasmodic, used chiefly to relieve the spasms of the bronchioles in asthma and phthises. Oil medicated with Datura ointment gives relief in headached, boils, skin diseases, haemorrhoides, fissures and other painful diseases of the rectum. "Kanaka Asava", an Ayurvedic drug preparation is mostly used in crude form as anticholinergic agent in case of asthma and intestinal disorders. In Homeopathy it is supereminent for some spasmodic movements and suppressed secretions and excretions; in such cases, absence of pain is a prominent symptom. The leaves, seeds and fruits are used medicinally. The **leaves and flowering tops** contain 0.3-0.5 % of alkaloids, of which hyoscyamine is its chief alkaloid with smaller amounts of hyocine and atropine. It constitutes the drug 'STRAMONIUM'. It is useful in dysmenorrhoea, neuralgia and sciatica and in boils, breast inflammations caused by excessive milk formation, asthma, salivation, travel sickness, diarrhoea, enlarged testicles, insanity and itch. Plant leaves are also applied to boils, sores. The inhalation of the smoke from the burning leaves, used as cigarettes, is recommended for relieving attacks of asthma. It is a better cough remedy than opium, as it does not arrest

secretions. **Flower** juice is used for ear ache. **Seeds** are toxic, employed for homicide. They act similarly to Belladonna, and do not constipate. The young **fruits** are said to be sedative and slightly intoxicating. The fruit juice is applied to scalp for curing dandruff and falling hair. It is also used to relieve pains in haemorrhoids fissures, and diseases of rectum. It is used to control salivation and muscular spasm in paralysis, in post encephalitic parkinsonianism and in travel sickness. (Ambasta, 1986; Chauhan, 1999; Jain, 1968; Joshi, 2000; Pullaiah, 2002; Seth and Jaswal, 2004; Sharma, 2003; Singh and Kumar, 2000; Stewart, 1869; and Swarup, 1967; and Watt, 1889-1893).

10) **Duchesnea indica** (Andrews) Focke in Engler & Prantl, Pflongenf. **3**: 33, 1888; FS. 163. 1902, 1921.

Family Rosaceae. YELLOW STRAWBERRY. **Vern.:** Bhuin, Bhumra, Kiphaliya (**Fig. 14**).



Soft, silky herbs. **Stems** prostrate or nearly erect. **Leaves** mostly radical, tufted, long stalked; digitately compound. **Flowers** yellow, 1.3-2.6 cm in diameter, often polygamous, axillary or few in terminal cyme. **Calyx** 5-6 mm long, 5-lobed. **Petals** 5, yellow, 1-1.5 cm long. **Stamens** numerous, persistent; filaments yellow. **Carpels** numerous, ovule solitary. **Fruits** 0.5-1 cm long, ovoid, insipid, usually red. **Flowering and Fruiting:** April-

August.

Specimens Examined: Karol-Ka-Tibba, 30.8.2015, Swati Kondal.

Habitat: It grows in shady and moist localities of hill slopes and terraces of crop fields. **Distribution:** Afghanistan, China, Japan, Korea, Pakistan, Nepal, Indo-Malaya. **India:** Tropical, temperate forest, throughout the Himalaya. **Himachal Pradesh:** Kullu (Kullu, Sainj valley, Naggur, Manikaran); Sirmaur (Haban, Rajgarh), Shimla (Mashobra, Sarahan, Barogi), Chora-Chamba road, Kinnaur (Urni), Kangra (Multhan, Rerukmar, Dharamshala, Paprola, Baijnath, Palampur, Darini, Dharamkot). **Altitude:** 1000-3000 m.

Economic and Ethnobotanical Uses: The **plant** is considered useful as a low ground cover. The indigenous strawberry yields abundantly a very insipid fruit. **Fruits** are edible. **Leaf** juice is given in diarrhoea and leucorrhoea (Ambasta, 1986; Gaur, 1999; Seth and Jaswal, 2004; Singh and Kumar, 2000; and Watt, 1889-1893).

11) **Fimbristylis dichotoma** (L.) Vahl. Enum. **2**: 287. 1806; FSIR. 639. 2004. **Family Cyperaceae.**



FIMBRY, EIGHT DAY GRASS (Fig.15). **Stem** 0.7-1.2 mm diam., deeply grooved, glabrous. **Leaves** half of stem length; sheaths open. **Inflorescence** 2-6 cm diameter, with 6-50, mostly solitary spikes. **Spikes** 4.5-8 x 2.5-3.5 mm, ovoid. **Stamens** 1; filaments

more than 2 mm long, anthers 0.8 mm, style 1 x 0.2 mm, deciduous, stigma 2, flat. **Nut:** 1-1.2 x 0.8 mm, yellowish, sometimes whitish. **Flowering and Fruiting:** August-October.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati Kondal.

Habitat: Along rivers, also as a weed. **Distribution:** Afghanistan, Bangladesh, Japan, Kenya, Korea, Madagascar, Mauritius, Pakistan, Philippines, Saudi Arabia, South Australia, South Carolina, South China Sea, Sri Lanka, Taiwan, Tanzania, Tasmania, Texas, Thailand, Tibet. **India:** Assam. **Himachal Pradesh:** Solan. **Altitude:** 1500m.

Economic and Ethnobotanical Uses: Inferior matting is made from clumps.

12) **Habenaria intermedia** D. Don Prodr. Fl. Nep. 24: 1825; Polunin & Stainton, Fls. Himal. 397. 1984. **Family Orchidaceae.** REIN ORCHID. **Vern. :** Vriddhi, Riddhi (**Fig. 16**).



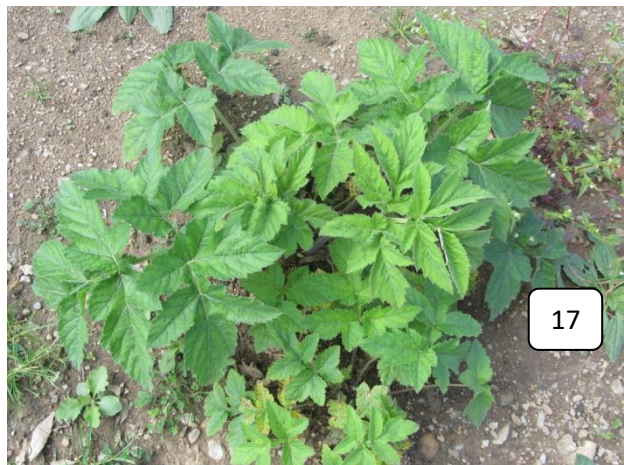
Stem erect, terete. **Leaves** 3-5, ovate-oblong. **Inflorescence** raceme, 1-6 large flowers. **Flowers** large, green and white. **Sepals** green, the dorsal ovate-lanceolate, recurved. **Petals** white, crescent-shaped. **Labellum** pale or yellowish-green, mid-lobe linear-acuminate, side lobes 25-30 mm long, somewhat diverging with 10. Spur green, 6 cm long, flexuous. Column 7 mm high; **anther** canals filiform, directed upward, incurved. **Ovary** 3-4 cm long, slightly twisted. **Flowering and Fruiting:** July-August.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati Kondal.

Habitat: It grows in open grasslands. **Distribution:** Assam, East Himalaya, Myanmar, Nepal, Pakistan, Tibet, E. Asia - Himalayas of Pakistan, Nepal and China. **India:** West Himalaya. **Himachal Pradesh:** Chamba(BSD, DD), Kinnaur(DD), Shimla(DD), Solan. **Altitude:** 1500-2500 m.

Economic and Ethnobotanical Uses: It is an important member of rasayana herbs in Ayurveda. The edible tubers are sweet, emollient, and used as intellect promoting, aphrodisiac, depurative, anthelmintic, rejuvenating and tonic. The plant is an effective antioxidant, mainly due to the presence of various phenolic compounds, such as gallic acid, hydroxyl benzoic acid, catechin, and coumaric acid. Tuber has medicinal importance (Chauhan, 1999).

13) **Heracleum candecans** Wall. ex DC. Prodr. 4: 192. 1830; FSIR. 323. 2004. **Family Apiaceae.** WHITE LEAF HOGWEED. **Vern.:** Chhataya, Raswal (**Fig. 17**).



Plants up to 2 m tall, pubescent. **Leaves** large, 20-40 cm long, pinnate. **Rays** 15-35, pubescent. Involucel of 5-8 linear to lanceolate bractlets. **Calyx** teeth minute, linear. **Style** 1 mm long. **Fruit** 5-10 mm long, pyriform. **Flowering and Fruiting:** July-October.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, Swati Kondal.

Habitat: It is found in slopes of mountains and on rocks.

Distribution: Myanmar, W. Pakistan. **India:** Himalayas.

Himachal Pradesh: Solan. **Altitude:** 4000 m.

Economic and Ethnobotanical Uses: The roots are a very good source of xanthotoxin, which is used in the preparation of suntan lotions and to some extent for the treatment of leucoderma. Decoction of the stem and root is taken during fever. The paste prepared from the root is applied on snake bite.

- 14) ***Ipomoea eriocarpa*** R.Br., Prodr. 484. 1810; FC. 484. 2006. **Family Convolvulaceae.** TINY MORNING GLORY. **Vern.:** buta, bhanwar (**Fig.18**).

Plants twining or prostrate. **Leaves** lanceolate to oblong or linear-lanceolate to ovate. **Flowers** axillary, in sessile



or short-pedunculate cymes. **Sepals** 7-8 mm long, pilose. **Corolla** tubular to slightly longer than sepals, 7-9 mm long, pink or purple. **Fruit** capsular. **Seeds** glabrous. **Flowering and Fruiting:** August to October.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, *Swati Kondal*.

Habitat: It grows near thickets, grassy slopes, open places and floodplains. **Distribution:** Cambodia, Indonesia, Kashmir, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka,

Thailand, Vietnam; Africa, N Australia. **Himachal Pradesh:** Solan. **Altitude:** 1100 m.

Economic and Ethnobotanical Uses: The leaves are eaten in Africa and India as a cooked vegetable, in soups or mixed with other food. In Uganda a root decoction is used to speed up fermentation in the preparation of a local drink called 'kwete'. The plant is a good fodder and in India it is cultivated for this purpose and seeds are eaten. It is also an effective soil binder and cover plant. In Uganda a root decoction is drunk by women to relieve menstrual pain (www.prota.org). In India an oil extract of the plant is used externally against headache, rheumatism, leprosy, epilepsy, ulcers and fever (H.M, Burkil.1985-2004). In veterinary medicine the oil extract is used to cure wounds of cattle.

- 15) ***Kohautia coccinea*** Royle, Ill. Bot. Himal. Mts. 241. 1839; *Oldenlandia debeerstii* De Wild. & T. Durand, Ann. Mus. Congo Belge, Bot. II, 1(2): 27. 1900. **Family Rubiaceae.** SCARLET SNAKE-NEEDLE GRASS (**Fig. 19**).



Erect, annual herb. **Stem** unbranched, slender. **Leaves** opposite, linear or narrowly lanceolate. **Inflorescence** laxly branched. **Flowers** pedicellate, pedicels 0.5-7 mm. **Calyx tube** densely papillose, ellipsoid 1-1.5 mm long. **Corolla** scarlet, pink or purple. **Anthers** 0.8-1.0 mm. **Style** 1-1.5 mm long; stigma 1 mm long. **Fruit** capsule oblong, subglobose or elliptic. **Flowering and Fruiting:** August-October.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, *Swati*

Kondal.

Habitat: It grows in grassland and open woodland as well as in abandoned fields or wasteland.

Distribution: Burundi, Ethiopia, Iran, Kenya, Nepal, Nigeria, Pakistan, Sudan, Tanzania, Uganda, Yemen,

Zambia, Zaïre, Western temperate Himalayas and Pakistan, Kashmir. **India:** West Himalaya. **Himachal Pradesh:** Solan. **Altitude:** 2700m.

Economic and Ethnobotanical Uses: It is extensively used in modern Chinese practice for treatment of viral infections (especially hepatitis) and cancers, as well as for some other syndromes involving "toxic heat," such as acne, boils, and other skin ailments.

16) **Lathyrus sylvestris** L., sp.Pl. 2:733(1753). **Family Fabaceae.** FLAT-PEA, FLAT PEAVINE, NARROW-LEAF EVERLASTING-PEA, PERENNIAL PEA(**Fig. 20**).



Perennial herb. **Stem** limp, flat. **Flower** red, 13–20 mm long, **Petals** 5; the upstanding the 'standard', the lateral two the 'wings', the lower two united to form the 'keel', overall shape of corolla being butterfly-like. **Calyx** 5-lobed. **Stamens** 10, single carpel. **Inflorescence** long-stalked, 3–10-flowered raceme. **Leaves** alternate, stalked, stipulate. **Leaflets** lanceolate–narrowly ovate, 5–15 cm long. **Stipules** narrower than stem. **Fruit** 40–70 mm long, brown. **Flowering and Fruiting:** July-August.

Specimen Examined: Karol-Ka-Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Rich hillside forests, forest margins, hedgerows, roadsides, embankments and waste ground.

Distribution: Austria, Belgium, France, Germany, Italy, Spain, Sweden, Switzerland, Africa, Europe and Asia.

India: Himachal Pradesh: Solan. **Altitude:** 2120 m.

Economic and Ethnobotanical Uses: This plant is sometimes used to control erosion and planted along with a grass species (Wikipedia.org).

17) **Lespedeza juncea** (L.) Pers. **var. sericea** (Thunb.) Lace & Hemsl. in J. Linn. Soc. Bot. **23:** 181. 1887; FS. 127. 1902. **Family Papilionaceae.** CHINESE BUSHCLOVER, JUST SERICEA, PERENNIAL LESPEDEZA. **Vern.:** Khunju (**Fig.21**).



Subshrubs or perennial herbs. **Stems** erect or ascending, hairy. **Leaves** crowded, 3-foliolate; petiole short; leaflets cuneate or linear-cuneate, terminal one 1-3 × 0.2-0.7 cm, abaxially densely adpressed hairy, adaxially subglabrous, base cuneate, apex truncate or subtruncate, mucronate. **Racemes** axillary, 2-4-flowered. **Calyx** narrowly campanulate, 5-lobed. **Corolla** yellowish or white; standard with purple spots at base. **Cleistogamous** flowers clustered in leaf axils. **Fruit** Legume. **Flowering and**

Fruiting: July-October.

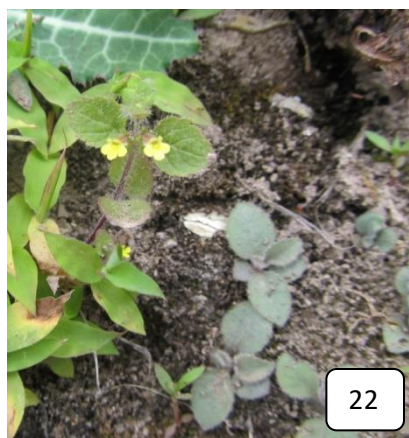
Specimen Examined: Karol-Ka-Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Mountain slopes, roadsides. **Distribution:** Afghanistan, Bhutan, Indonesia, Japan, Korea, Laos, Malaysia, Nepal, Pakistan, Philippines, Thailand, Vietnam; naturalized in North America and Australia.

Himachal Pradesh: Solan. **Altitude:** below 2500 m.

Economic and Ethnobotanical Uses: Young leaves are cooked after soaking and eaten. The whole plant is anthelmintic, depurative and tonic. A decoction is used in the treatment of testicular tuberculosis, hernia, enuresis, dental caries, toothache, infantile marasmus/ ascariasis, snake and dog bites, skin ulcers, dysentery and enteritis. The fibres in the plant stems are made into paper pulp, which is used alone for cheap paper, or is blended with longer fibered pulps. An extract of the whole plant is used as an ingredient in commercial cosmetic preparations as a hair conditioner, antimicrobial, antioxidant, astringent and emollient (G,Kunkel.1984). **Plant** contains tannins. Used both as silage and hay. **Stalks** left after harvesting may be used for paper-pulp. **Seeds** yield a semi-drying oil. (Ambasta, 1986).

18) **Lindenbergia indica** (L.) Vatke, Oes. Bot. Zeitschr. 25: 10. 1875; FS 352. 1902, 1921. **Family Scrophulariaceae. Vern.:** Bhinta chatti, Patthara chatty (**Fig.22**).



Stems erect or ascending, 10-30cm tall. **Leaves** broadly ovate or elliptic. **Flowers** yellow. **Calyx** bell shaped, 4-6mm long, 5-lobed, divided about one third the way down. **Corolla** yellow, more or less hairy outside. **Stamens** 4, in unequal pairs included; anthers 2 celled. **Ovary** ovoid, glabrous when very young; style slender, exceeding the stamens; stigma 2-lobed. **Fruits (Capsules)** ovoid. **Seeds** minute. **Flowering and Fruiting:** April-October.

Specimens Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Distribution: Bangladesh, Djibouti, Egypt, Eritrea, Ethiopia, Gulf States, Iran, Kenya, Oman, Pakistan, Palestine, Saudi Arabia, Somalia, Sudan, Yemen. **India:** West Himalaya. **Himachal Pradesh:** Solan. **Altitude:**800m.

Economic and Ethnobotanical Uses: The **plant** has a faint aromatic odour and a slightly bitter taste. The juice is given in chronic bronchitis, and mixed with that of the coriander, is applied to skin eruptions (Ambasta, 1986; and Kirtikar and Basu, 1935).

19) **Neottia listeroides** Lindl. in Royle, Ill. Bot. Himal. 1:368. 1839; Fl. Brit. Ind. 6:103. 1890. **Family Orchidaceae. LISTERA LIKE NEOTTIA (Fig. 23).**



Plants up to 50 cm. **Stem** with 3-4 rather loose, brownish or brownish-green sheaths **Inflorescence** usually loose. **Sepals** 4.5 mm, spreading or reflexed, greenish-brown or brown. **Labellum** 10 mm, dark green to pale brown. **Column** 4 mm, slender, slightly incurved. **Ovary** elliptic. **Flowering and Fruiting:** July-August.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, *Swati Kondal*.

Habitat: It grows only in the mountains in humid forests. **Distribution:** Assam, China North-Central, China South-Central, East Himalaya, Nepal, Pakistan, Tibet, extending eastwards to Bhutan and S. China. **India:** West Himalaya. **Himachal Pradesh:** Kangra(DD), Kinnaur(BSD, DD), Kullu(BSD,DD), Shimla(DD), Solan. **Altitude:** 3200m.

- 20) **Oldenlandia corymbosa** L., Sp. Pl. 119. 1753. DC., Prodr. l.c.; Hook. E. l.c. 64; Cooke, l.c. 588; Collett, Fl. Simi. 230. 1921; Bremek. in Verb. K. Nederl. Akad. Wet., Afd. Natuurk. Ser. 2, 48 (2): 254. 1952.

Family Rubiaceae. DIAMOND FLOWER, WILD CHAYROOT. **Vern.:** daman pappar, pitpapa (**Fig. 24**).



Annual herb. **Leaves** linear or elliptic-lanceolate. **Flowers** axillary, 1-4, rarely many. **Pedicel** 4-5 mm long, enlarged in fruit. **Flowers** isostylous. **Calyx** 2-2.5 mm long, teeth 1 mm long. **Corolla** white or purplish. **Anthers** sessile, inserted in the mouth of corolla-tube. **Style** glabrous. **Capsule** globose or pyriform. **Flowering and Fruiting:** August-October.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati*

Kondal.

Habitat: It grows on grasslands, shallow soil on rocks and sandy river ridges. **Distribution:** Tropical east Asia-Java, Pakistan (Murree & Hazara), Kashmir, Ceylon, Bangla Desh, Malaysia, tropical Africa and America, Assam, Bangladesh, Egypt, Kenya, Korea, Syria, Myanmar, Nepal, Sri Lanka, Taiwan, Tanzania, Thailand, Vietnam, West Himalaya, Zambia, Zimbabwe. **India:** Assam. **Himachal Pradesh:** Solan. **Altitude:** 2300m.

Economic and Ethnobotanical Uses: Tender young leaves and stems are cooked with other vegetables such as Amaranthus and Cucurbita species, and act as a softener for the other cooked vegetables (Ruffo, C.K.: Birnie, A. & Tengnas, B.2002). Plant decoction is used an anthelmintic, antirheumatic, depurative, diaphoretic, digestive, diuretic, febrifuge, pectoral and stomachic. In India, it is a common ingredient in mixtures used internally to treat remittent fevers, gastric irritation, nervous depression and as a tonic. In Chinese medicine it is used to treat viral infections, cancer, acne, boils, appendicitis, hepatitis, eye problems and bleeding. In Africa it is used to facilitate childbirth. The juice of the plant is applied to the hands and feet to cool them when the patient has a fever (CompleteList.html).

- 21) **Paspalum distichum** L., Syst. Nat., ed. 10. 2: 855. 1759. **Family Poaceae.** (**Fig.25**).



Culms 20–50 cm tall, nodes usually pubescent. Leaf sheaths keeled, ligule 2–3 mm. **Inflorescence** of 2 racemes arising together or separated by a short axis. **Spikelets** pallid, obovate-oblong, plano-convex; lower glume vestigial or a narrow triangular scale up to 1/2 spikelet length or more; upper glume papery, 3–5-veined with distinct middle vein. **Flowering and Fruiting:** May–September.

Specimen Examined: Karol-Ka-Tibba, 30.8.2015, *Swati*

Kondal.

Habitat: Found in fields, roadsides, ditches and other disturbed places, mostly on moist fertile soils. **Distribution:** Algeria, Austria, Bangladesh, Egypt, Fiji, France, Iran, Iraq, Italy, Japan, Korea, Nepal, Pakistan,

Spain, Sri Lanka, Vietnam. **India:** Assam, East Himalaya, West Himalaya. **Himachal Pradesh:** Solan. **Altitude:** 1700m.

Economic and Ethnobotanical Uses: It is used as a fodder and is relished by water buffaloes. On stream banks it is useful as a soil binder.

22) **Pedicularis bifida** (Buch.-Ham. ex D. Don) Pennell Acad. Nat. Sci. Philad. Monogr. **5:** 144. 1943; FS. 362. f.114. 1902, 1921. **Family Orobanchaceae. (Fig. 26).**



Herb. **Leaves** entire, narrow elliptic having coarse rounded teeth. **Flowers** pink, upper lip forming slender straight beak, enlarged below into curved base 2-3 times as long, borne in a lax leafy spike. **Lower lip** of flower shallowly lobed. **Flowering and Fruiting:** August-February.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Found growing on open slopes. **Distribution:** Bhutan, Sikkim, Himalayas. **Himachal Pradesh:**

Solan. **Altitude:** 2700m.

23) **Phyllanthus urinaria** L., Sp. Pl. 982. 1753. Hook. f., Fl. Brit. Ind. **5:** 293. 1887. **Family Phyllanthaceae. CHAMBER BITTER, GRIPEWEED (Fig. 27).**



Annual herbs, erect or procumbent. **Leaves** distichous; stipules ovate-lanceolate, petiole very short; leaf blade papery. Flower fascicles male along distal part of branchlets, 2-4-flowered, female along middle and lower part of branchlets, 1-flowered. **Male flowers** sepals 6, elliptic to oblong-obovate, yellowish white. **Female flowers** pedicels 0.5 mm; sepals 6, ovate to ovate-lanceolate, subequal, 1 mm, yellowish white, persistent in fruit. **Fruit** Capsules globose. **Seed** 3-sided. **Flowering and**

Fruiting: August –September.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Dry fields, roadsides, wastelands and forest margins. **Distribution:** Bhutan, India, Indonesia, Japan, Laos, Malaysia, Nepal, Sri Lanka, Thailand, Vietnam; South America. **India:** Sikkim Himalaya. **Himachal Pradesh:** Solan, Shimla. **Altitude:** 1500m.

Economic and Ethnobotanical Uses: In traditional medicine, the plant is commonly used as a diuretic and purgative to treat a wide variety of uro-genital disorders, diarrhoea and diabetes. Externally, the crushed plant parts, or an infusion, are applied to treat ulcers, sores and tumours. A paste of fresh crushed leaves and kaolin in water is drunk and applied to the body to treat convulsions, colic, constipation and urethral discharges. The bitter leaves are eaten to treat hiccup and cough.

24) **Plantago lanceolata** L. Sp. Pl. 113. 1753; FBI. 4: 706. 1885; FSIR. 529. 2004. **Family Plantaginaceae**. FIGHTING COCKS. Vern .: Baltanga, Isabgol (**Fig. 28**).



Herbs, perennial. **Leaves** basal, glabrous or pubescent. **Spikes** conic-ovoid at first but later capitate to shortly cylindrical, 1-8 cm, densely flowered. **Sepals** 2-3.5 mm, keel narrow and not extending to apex; lower sepals connate to near apex, 2-keeled, margin with sparse trichomes; upper sepals distinct. **Corolla** white, glabrous; lobes ovate-lanceolate. **Stamens** adnate to near middle of corolla tube, anthers white or yellowish. **Pyxis** narrowly ovoid, 3-4 mm. **Seeds** brown to dark brown. **Flowering and Fruiting:** May-August.

Specimen Examined: Karol-Ka-Tibba, 30.8.2015, *Swati Kondal*.

Habitat: It grows on grazing land, lawns, banks, waste ground, beside railway tracks, harbours.

Distribution: Bhutan, Japan, Korea, Mongolia, Nepal, Pakistan, Russia, Tajikistan, N Africa, SW Asia, Europe, North America. **Himachal Pradesh:** Solan. **Altitude:** 900m.

Economical and Ethnobotanical Uses: The plants (**leaves and roots**) are used as an astringent and vulnerary; and useful in cough, asthma and other pulmonary diseases. The plant is useful in rheumatism and griping pain of the bowels. The **leaves** are applied to wounds and inflamed surface of sores. The **seeds** are diuretic, purgative and hemostatic. They are used with sugar as a drastic purgative and cooling remedy to diarrhoea. They contain mucilage and are used as an adulterant of black *Psyllium psyllium*. They also contain tannin and fatty oil. Extract of roots and seeds regulates kidney affections and urinary disorders. Powdered seeds (2-3 g) with a pinch of sugar relieve constipation, once every morning with hot milk for 2-3 days (Ambasta, 1986; Bamber, 1916; Kritikar and Basu, 1935; Seth and Jaswal, 2004; Sharma, 2003; Singh and Kumar, 2000; Stewart, 1869; and Swarup, 1967; and Watt, 1889-1893).

25) **Platanthera aquilonis** Sheviak, Lindleyana. 14: 193.1999. **Family Orchidaceae**. NORTH WIND BOG ORCHID (**Fig. 29**).



Plants 5–60 cm. **Leaves** few–several, ascending to arcuate-spreading. **Spikes** lax to very dense. **Flowers** resupinate, not showy, yellowish green with dull yellowish lip, lateral sepals spreading to reflexed; **petals** rhombic-ovate- to lance-falcate, margins entire; lip descending, projecting, or apex adhering to dorsal sepal and petal apices, rhombic-lanceolate to lanceolate, without basal thickening, base not rounded-dilated, margins entire; spur clavate or sometimes rather cylindrical, apex usually broadly

obtuse; rostellum lobes divergent, directed downward; **ovary** rather slender to stout, mostly 5–13 mm.

Flowering and Fruiting: May-August.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, *Swati Kondal*.

Habitat: It grows on wet meadows, marshes, stream banks, shores, ditches and roadsides.

Distribution: Alaska, Alberta, British Columbia, Colorado, Minnesota, Montana, New Jersey, New Mexico,

New York, Pennsylvania, Washington, Alaska, Europe, North Africa, North America. **Himachal Pradesh:** Solan. **Altitude:** 2500 m.

26) **Polygala abyssinica** R. Br., Mus. Senckenberg, 2: 273. 1837; Bennett in Hook. f., Fl. Br. Ind. 1: 202. 1872; F.S. 44. 1902, 1921; Bamber, l.c. 283. Jafri, l.c. 190; Quraishi and Khan, l.c. 97; Mukerjee in Bull. Bot. Soc. Bengal 12: 41. 1958; M. Iqbal Dar in Fl. West. Pak. 52: 6. 1973; Nair, Fl. Bash. Himal. 32. 1977; FHP. 1: 83.1984; Sharma & Kachroo, Ill. Fl. Jammu 2: t. 26. 1983; FK. 149. 1999; FGHP. 73. 2000; FC. 174. 2006 **Family Polygalaceae Hoffmanns. & Link. MILKWORTS, SNAKERROOTS (Fig. 30).**



Perennial, glabrescent. **Stems** many from base. Lower leaves smaller, upper leaves linear or linear-lanceolate. **Racemes** terminal, lax, 20-30 mm long. **Sepals** persistent, glabrous; outer sepals unequal, inner sepals obovate. Lateral petals much shorter than keel; keel 4 mm long, crest large. **Fruit** capsule obovate. **Seed** oblong, pilose. **Flowering and Fruiting:** March-September.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, Swati Kondal.

Habitat: Found in dry rocky places. **Distribution:** Africa, Afghanistan, and Pakistan. **Himachal Pradesh:** Solan. **Altitude:** 2500m.

Economic and Ethnobotanical Uses: Expectorant action of roots for their possible use as a substitute of Senega (*P. senega* Linn.) has been suggested.

27) **Polygala persicariaefolia** sensu Eyles non DC., Bennett in Fl. Brit. India 1: 202. 1872 (*aspersicariaefolia*); F.S. 44. 1902, 1921; Mukerjee Ioc. cit. 12: 45. 1958; Nair, Fl. Bash. Himal. 33. 1977; FHP. 1: 84. 1984. **Family Polygalaceae Hoffmanns. & Link KNOTWEED LEAVED MILKWORT, SNAKE ROOTS (Fig. 31).**



Leaves 2–8 x 0.5–2 cm, elliptic to very narrowly elliptic. **Flowers** greenish, pink or purplish, pedicels 3–4 mm. long, in many-flowered, terminal and lateral racemes. **Posterior sepal** 3–3.5 mm. long, keel-shaped. **Upper petals** 3 mm. long, obliquely and irregularly elliptic. **Stamens** 8. **Fruit** capsule 5 x 4.5 mm. **Seeds** 3 x 1.5 mm., oblong-ellipsoid, with white silky hairs. **Flowering and Fruiting:** August-

December.

Specimen Examined: Karol-Ka-Tibba, 30.8.2015, Swati Kondal.

Habitat: It grows in shaded places of grassy slopes. **Distribution:** Indo-Malesia, North Australia and Tropical East Africa. **India:** Assam, Bihar, Maharastra. **Himachal Pradesh:** Solan. **Altitude:** 1700m.

Economic and Ethnobotanical Uses: The roots are diuretic, expectorant, haemolytic and sedative. **Using** them lowers the blood pressure. They are used in the treatment of coughs, bronchitis, insomnia, infantile convulsions, amnesia, sexual impotency etc.

28) **Polygala tatarinowii** Regel, Pl. Radd. 1: 278, pl. 7, f. 10-11 278. 1861; FC. 175. 2006. **Family Polygalaceae**. ORIENTAL/ MILKWORT. **Vern.:** xiao bian dou (**Fig. 32**).



Stem very slender. **Leaves** suborbicular-spathulate. **Racemes** terminal, dense, subtended by 2-3 leaves. **Flowers** 3 mm long. **Sepals** deciduous, rugose; outer sepals equal, inner sepals orbicular-spathulate. **Capsule** discoid, 2-2.75 mm long, 2-3 mm broad, rugose, glabrous. **Seeds** pubescent; strophiole 3-lobed. **Flowering and Fruiting:** August-September.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: It is found in open grassy places in forests and roadsides. **Distribution:** Temperate Himalayas, W. Pakistan, India, Burma, China, Philippines, Arunachal Pradesh, Assam, Haryana, Jammu & Kashmir, Madhya Pradesh, Manipur, Meghalaya, Punjab, Sikkim, Uttarakhand. **India:** Uttar Pradesh. **Himachal Pradesh:** Solan. **Altitude:** 1600 m.

29) **Pyrus pashia** Buch.-Ham. ex D.Don. Prodr. Fl. Nep. 236. 1825; FSIR. 284. 2004. **Family Rosaceae**. **Vern.:** Kainth, Mehal, Mol (**Fig. 33**).



A small or medium sized, deciduous tree. **Bark** ashy-grey, rough. **Stems** sometimes spiny. **Branches** dark, woody. **Leaves** simple, variable, ovate, glabrous or woolly beneath, shining. **Stipules** 3-4 mm long, caducous. **Flowers** white, tinged with red or pink. **Bracts** subulate or linear. **Calyx** tube 5-6 mm long, acute lobes. **Corolla** white or pink with dark radiating veins. **Stamens** about 10. **Ovary** 2-5 celled. **Fruits (Pomes)** dark yellow-brown, dark brown or greyish brown. **Seeds** 1 or 2. **Flowering & Fruiting:** February-

October.

Specimens Examined: Karol- Ka- Tibba, 30.8.2015, *Swati Kondal*.

Habitat: It is found on grassy lands in company with Rhododendron and Ban Oak, also lower down with chir pine. **Distribution:** Afghanistan to SW. and N. China through Trans-Indus, Dungagalli, Hazara, Bhutan, Yunan, Burma. **India:** Himachal Pradesh to Kumaon Hills and also in the Khasi and Jaintia hills of Meghalaya, Manipur, Darjeeling, Sikkim, Garhwal, Assam. **Himachal Pradesh:** Bilaspur, Chamba, Hamirpur, Kangra, Kinnaur, Kullu, Shimla, Solan, Jeori, Sarahan, Lower temperate zone of all the valleys in GHNP, Sirmour (Renuka lake, Jamta, Nahan, Nauradhar, Rajgarh), Kangra (Kangra, Palampur, Dharmshala, Paprola, Baijnath, Shahpur, Darini). **Altitude:** 600-2700 m.

Economic and Ethnobotanical Uses: Powdered **bark** and **leaves** (1:2) in combination with a pinch of black pepper are used as blood purifier and to improve circulation, and also for rheumatic pains. **Wood** is used as fuel and for making mortar and walking-sticks. **Fruits** are edible, useful for eye complaints. They may be gathered, dried and ground and mixed with wheat flour or ragi flour. The tender leaf extract is given orally for

treating boils and blisters in the mouth. Leaves and twigs are lopped for fodder (Ambasta, 1986; Singh and Kumar, 2000; and Seth and Jaswal, 2004).

30) **Quercus oblongata** D.Don., *Prodr. Fl. Nepal.* 57 1825. FF. ed. 3. 494. 1956; FBH. 267. 1977. **Family Fagaceae.** BAN OAK, GREY OAK. **Vern.:** Shindar (**Fig. 34**).



Evergreen, large or medium-sized trees. **Leaves** 6-4 × 2.5-6 cm long, alternate, ovate-lanceolate or oblong-lanceolate. **Male Catkins** 3-10 cm long, drooping, usually clustered, softly hairy. **Flowers** 1.5 mm long. **Perianth** campanulate. **Stamens** 3-5, exerted. **Female Spike** Erect, short, few-flowered. **Flowers** sessile. **Perianth** tubular. **Styles** 3, exerted. **Acorns** solitary or in pairs; cup at first almost covering the nut, but only basal half of it when mature. **Nuts** 1-1.6 cm long, smooth, brown.

Flowering and Fruiting: April-February next.

Specimens Examined: Karol-Ka-Tibba, 30.8.2015, *Swati Kondal*.

Habitat: Very common, usually forming pure or mixed forests. **Distribution:** Temperate Himalaya.

India: Himalaya. **Himachal Pradesh:** Chamba (DD, LWG, Dalhausie, Panchpula), Kangra (DD, RRL), Kinnaur (BSD, DD), Mandi (DD), Shimla (BSIP, DD), Sirmaur (Sarahan, Jamta, Nauradhar, Rajgarh, Shillai).

Altitude: 1200-2500 m.

Economic and Ethnobotanical Uses: **Wood** is occasionally used for building, agricultural implement. The wood pulp is used for wrapping papers. Defibrated wood pulp may be used for high grade hard-boards with good strength and water resistance. **Bark** is used for tanning (Tannin 6-23%). **Leaves** are used for cattle fodder. Leaf galls used as hair wash. **Acorns** are used as a diuretic in gonorrhoea; as an astringent in indigestion and diarrhoea, especially in children, and in asthma (Kirtikar & Basu, 1935; Ambasta, 1986; Nayar *et al.*, 1989; Vidyarthi, 1997; Sharma, 2003; and Agarwal, 2003).

31) **Rhodiola sinuata** (Royle ex Edgew.) S. H. Fu, *Acta Phytotax. Sin.*, Addit. 1: 127. 1965; FC. 321. 2006. **Family Crassulaceae.** TRIFID SEDUM (**Fig. 35**).



Perennial monoecious herb. **Rhizome** slender, branched up to 20 cm long. **Flowering stems** 1-5 in each rosette, simple. **Cauline leaves** alternate, sessile, narrowly obovate to linear-obovate. **Inflorescence** terminal, 1-13 flowered cymes or corymb-fascicles. **Bract** similar to the cauline leaves. **Flowers** bisexual, mostly 5-merous, hypogynous. **Calyx** lobes basally connate, glabrous, entire. **Petals** glabrous, entire, obtuse to mucronulate, elliptic. **Stamens** 10, shorter than the petals, in two whorls, alternipetalous.

Carpels 3.5-10 x 0.7-1.5 mm, style straight, **ovary** 3-5 x 0.7-1.5 mm. **Follicles** 5-12 x 1-1.5. **Seeds** ellipsoid, apex elongated. **Flowering and Fruiting:** July – September.

Specimen Examined: Karol-Ka-Tibba 30.8.2015, *Swati Kondal*.

Habitat: Grows on rocks and crevices. **Distribution:** Assam, China, China South-Central, Nepal, Tibet.

India: North East India, Hiamalayas, West Himalaya. **Himachal Pradesh:** Solan. **Altitude:** 1800-3000 m.

Economic and Ethnobotanical Uses: It is most commonly used for increasing energy, endurance, strength, and mental capacity. It is also used as a so-called "adaptogen" to help the body adapt to and resist physical, chemical, and environmental stress.

32) **Satyrium nepalense** D. Don, Prodr. Fl. Nepal. 26. 1825. Hook.f., Fl. Brit. Ind. 6:168. 1890; Duthie, Ann. Roy. Bot. Gard. Calcutta 9: 201. 1906. **Family Orchidaceae (Fig. 36).**



36

Tubers oblong-ellipsoid to ellipsoid. **Stem** with 1-3 membranous sheaths at base. **Leaves** usually basal and subopposite, or sometimes cauline and alternate. **Peduncle** 6-30 cm, slender to stout. **Flowers** fragrant, whitish, pink, or pale purple. Dorsal sepal narrowly oblong-elliptic; lateral sepals oblong to subovate. **Petals** narrowly oblong to narrowly elliptic; lip hooded, subglobose. **Column** incurved, 4-5 mm. **Flowering and Fruiting:** July-November.

Specimen Examined: Karol-Ka-Tibba, 30.8.2015, Swati Kondal.

Habitat: Open forests and alpine slopes. **Distribution:** Bhutan, India, Myanmar, Nepal, Sri Lanka.

Himachal Pradesh: Kinnaur(DD), Shimla (BSD,DD), Solan. **Altitude:**4000 m.

Economic and Ethnobotanical Uses: The Todas of Nilgiris, consume the dried and powdered tubers of the terrestrial orchid *Satyrium nepalense* as an energizing tonic. The tubers are used medicinally.

33) **Sesamum orientale** L. Sp. Pl. 634. 1753; FSIR. 478. 2004. **Family Pedaliaceae.** GINGELLY, SESAME OIL, SESAME. **Vern.:** Tal, Nuvvulu (**Fig. 37**).



37

Stems branched or unbranched, 4-angled. **Leaves** very variable on the same plant, entire, subentire, lobed or 3-partite, acute. **Flowers** white, pink, or mauve-pink with darker markings, pedicel up to 5 mm long. **Calyx** 2-6 mm long, persistent. **Corolla** 1.5-3.3 cm. **Petals** 2-3 cm long, pubescent, obtuse. **Stamens** 1 cm long. **Ovary** 1-2 mm long, pilose, oblong. **Fruit** capsule. **Seeds** black, brown. **Flowering and Fruiting:** June-October.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati

Kondal.

Distribution: Original home uncertain, Asia or Tropical Africa, widely cultivated in Pakistan, India, Ceylon and Tropical Africa. **Himachal Pradesh:** Solan. **Altitude:** 1200m.

Economic and Ethnobotanical Uses: Seeds roasted or stewed, it can also be ground into a powder and used as a flour, added to breads, used to make sweetmeats, or crushed and used as a butter. Leaves - raw or cooked as a potherb. The ash of the stem is used as a substitute for salt, and is viewed as a good source of

minerals (J. C, Uphof. 1959). The leaves are rich in a gummy matter and when mixed with water they form a rich bland mucilage that is used in the treatment of infant cholera, diarrhoea, dysentery, catarrh and bladder troubles (Grieve,1984). The seed is diuretic, emollient, galactagogue and tonic. It is taken internally in the treatment of premature hair loss and greying, chronic dry constipation, dental caries, osteoporosis, stiff joints, dry cough etc has a marked ability to increase milk production in nursing mothers. The oil is laxative and also promotes menstruation (D,Brown.1995).

34) **Spiranthes spiralis** (Pers.) Ames, Orch. 2:53.1908; Nair, Fl. Bash. Himal. 278. 1977; Seidenfaden, Dansk Bot. Ark. 32(2): 105.1978; Seidenfaden & Arora, Nord. J. Bot. 2: 25.1982; Chowdhery & Wadhwa, Fl. Himachal Pradesh 3: 692. 1984;

Plants 13-30 cm tall. **Leaves** 2-5, erect and spreading, broadly linear to broadly linear-lanceolate. **Inflorescence** erect, rachis 4-10 cm, with many spirally arranged flowers. **Flowers** purplish red or pink; ovary pale green.



Dorsal sepal forming a hood with petals, narrowly oblong, cymbiform. **Petals** rhombic-oblong, oblique; lip broadly oblong, shortly clawed. **Column** erect, anther ovoid. **Flowering** : July-August.

Specimen Examined : Karol- Ka- Tibba, 30.8.2015, Swati Kondal.

Habitat: Open and moist areas in forests, thickets, wet grasslands, meadows, marshes; **Distribution**: Afghanistan, Bhutan, India, Japan,

Kashmir, Korea, Malaysia, Mongolia, Myanmar, Nepal, Philippines, Russia, Thailand, Vietnam; Australia.

Altitude: 200-3400 m.

35) **Viburnum cotinifolium** Don. Stewart. PP. 114. 1869; FC. 362. 2006. **Family** Viburnaceae. SMOKETREE LEAVED VIBURNUM. **Vern.:** dab, goniya, (Fig. 39).



Bark gray-brownish. **Leaves** always opposite. **Flowers** appearing with leaves; inflorescence a compound umbel-like cyme, terminal. **Flowers** on rays of 2nd and 3rd orders, pedicel 2-3 mm. **Calyx** greenish; tube tubular-obconical. **Corolla** white, pinkish outside. **Stamens** shorter than corolla, filaments 3 mm; anthers yellow, subglobose. **Styles** taller than calyx lobes. **Fruit** black. **Flowering and Fruiting**: April-August.

Specimen Examined: Karol- Ka- Tibba, 30.8.2015, Swati

Kondal.

Habitat: Found in open sunny places. **Distribution**: Afghanistan, Pakistan, Himalaya, Afghanistan, East Bhutan, North India, Kashmir and Nepal. **Himachal Pradesh**: Solan. **Altitude**: 2600 m.

Economic and Ethnobotanical Uses: Shrub berries are poisonous but when cooked is used as laxative and blood purifier, leaves extract is used for the treatment of menorrhagia, the stem bark is sedative and antispasmodic reducing muscular cramps. **Fruits** are sweet and edible. The decoction of the **bark** is used in urino-genital troubles, menorrhagia and metrorrhagia. **Wood** is white, hard and close-grained and is used as a fuel. The *Viburnum* is really floriferous and a showy shrub for the hills and temperate areas. **Propagation** is

through seeds (Stewart, 1869, Collett, 1902, 1921; Raizada and Saxena, 1978; Ambasta, 1986; Maithani *et al.*, 1991; and Aswal and Mehrotra, 1994).

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