

CHAPTER 4

About the plants

In the present study three endangered medicinal and aromatic plants, including two orchid species were taken into consideration for detailed study. The details of the four plants under study are as follows:

4.1. *Smilax glabra* Roxb.

Smilax glabra Roxb. is widely distributed in the tropical areas throughout the world with a small population in Mediterian areas. It was first described as a medicinal plant in China as ‘Yuyuliang’. This plant species has been mentioned as original plant species of the Chinese medicine ‘Tufuling’ in the Chinese Pharmacopoeia (2005).

4.1.1. Systematic position:

Domain-Eukaryota

Kingdom-Plantae

Class-Liliopsida

Order-Liliales

Family-Smilaceae

Genus-*Smilax*

Species: *Smilax glabra* Roxb.

4.1.2. Synonyms:

Smilax medica

Smilax hookeri Kunth 1850

Smilax trigona Warb 1900

Smilax catophylla var. *maculate* E. Bodinier 1905

Smilax dunniana H.Lev 1914

Smilax mengamaensis R.H.Miao 1982

4.1.3. Vernacular name: China root (English), Chobchini / Chob chini (Hindi), Chuksini (Bengali).

4.1.4. Parts used: Root and Rhizome.

4.1.5. Origin: Mexico and China. It is also the native to South America, Jamaica, the Caribbean, Honduras and the West Indies

4.1.6. Habitat:

Frest, thickets, thinly forested slopes along valleys, river banks at the elevation of about 300-1800m. In North East, it is occurring in Assam, Khasi hills, Garo hills and Barak Valley of Assam.

4.1.7. Morphology:

Smilax glabra Roxb. is a deciduous slender climber growing to 3m (9 ft 10 inch). It is a hard tendril climber with prickles all over the stem. The leaves are heart shaped, simple, alternate, elliptic, lanceolate, and acute. Flowers white, small and many, found in axillary umbels. Fruits red globose, berries. Rhizomes are long, thick and grey colored (Plate No. 1).

4.1.8. Flowering and Fruiting: November to January.

4.1.9. Character for identification:

There are mainly two identifying characters, which distinguish this plant from other species of *Smilax* (Plate No. 1).

1. Absence of spine,
2. White color of powdery forms is seen in the dorsal side of the leaf.

4.1.10. Chemical composition of the rhizome of *Smilax glabra*:

The rhizome of *Smilax glabra* Roxb. contains flavonoids, astilbin, isoastilbine, neoastilbine, neoisoastilbin, smiglabrin, neosmililbin, engetelin, isoengeletin, tufulingoside, 7.6-dihydroxy-3-methoxyisoflavone, smitibin, taxafolinencyphin, phenylpropanoids, glycorides, smiglasides, A, B, C, D, E, steroidal saponins, smilagenin 3-O-B-D glucoside, stilbense, resveratrol, 3.4.5-trihydroxystilbene etc. (Chien and Adam, 1979)

4.1.11. International market value:

The plant has high economic demand for its medicinal values. According to the American Herbal Pharmacopoeia, the international market value of *Smilax glabra* Roxb. (Powdered material of root) are as follows:

1 gm = \$94.00

10 gm = \$169.00

20 gm = \$304.00

4.1.12. Market demand in India:

The trade name of *Smilax glabra* Roxb. in India is Chobchini gulabi which is one of the highly medicinal plants traded among the top 20 medicinal plants in India. The main useful part of this plant is rhizome.

4.1.13. Local market value demand:

The local market value varies from season to season. In summer and winter it may reach Rs 100-250 per kg. But in other times, it may be Rs 20-80 per kg. On the other hand, the price of per bundle of tender branches (weight 200-250 gm) is 500 in Diphu, Karbi Anglong, Assam. (Kar and Borthakur, 2007).

4.1.14. Its present status in Assam:

According to the report of ENVIS Centre on Conservation of Medicinal Plants, FRLHT, Bangalore, the plant *Smilax glabra* Roxb. is identified as Critically Endangered (CR) plant species in Assam especially in Barak Valley. It has also been reported as Critically Endangered (CR) by BSI (Mao *et al.*, 2009) and Critically Endangered, (Anon, 2012).

4.1.15. Uses:

The plant *Smilax glabra* Roxb. is used for curing different diseases. Mainly aerial tubers; rhizome and leaf are used as medicine. It has been used in the treatment of cancer, mercury poisoning, acute bacterial dysentery, rheumatoid arthritis etc (Duke and Ayensu, 1985). It is said to be clinically 90% efficient in the treatment of primary syphilis. The medicinal uses of this plant are given below

Aerial tubers: The aerial tubers of *Smilax glabra* Roxb. is used in the treatment of

1. Abscesses; 2. Boil; 3. Cystitis; 4. Diarrhoea;

Rhizome: The rhizome is the main portion of the *Smilax glabra* Roxb. which is highly used in curing many ailments such as cancer, skin problem, stomachic etc (Duke and Ayensu, 1985).

1. It is used in gout, rheumatism, cold fever and catarrhal problems as well as for relieving flatulence.

2. The rhizome of *Smilax glabra* Roxb. is known to be neutralizing microbes in the blood stream.

3. It is used as flavor for soft drinks like root bear and to treat cough, hypertension, plenisy, wounds, sore and burns.

4. *Smilax glabra* Roxb. rhizome is an alternative pictorial, diaphoretic, sudoribic and is quite distinct in appearance.

5. The indigenous people of the different regions of the world uses rhizome of *Smilax glabra* Roxb. in the treatment of different ailments, such as sexual impotency, rheumatism, skin ailments, and general tonic for physical weakness.

The edible parts of the plant *Smilax glabra* Roxb. is fruit and root (Tanaka ,1976 and Kunkel, 1984) .The root include bulbs, corm, rhizome, tubers etc. The root can be cooked and dried and ground into powder. The root contains nearly 70% starch (Duke and Ayensu 1985).

Smilax glabra Roxb. is a less known wild medicinal plant; therefore ethnobotanical information of this species is less available compared to other medicinal plant species used in Assam and other states of North East India. However some ethno- botanical reports have been published from time to time. Kayang *et al.*, (2005) reported that the Khasi tribe uses the juice of the leaves of *Smilax glabra* Roxb. for skin diseases. Sometimes the leaves are dried, powdered and mixed with oil and applied for skin diseases. Kar and Borthakur (2007) reported that the Karbi tribe uses the tender shoot of this plant as vegetable. The vernacular name of this species in Karbi language is Phelantang. The Mizo name of this species is Tulang-ngil. The Mizo people use the root of this plant for the treatment of uterine and stomach infection, (Rai and Lalramnghinglova, 2010). The Khasi & Garo tribes use the juice and dry powder of leaves of this plant for the treatment of skin diseases, (Rao, 2010). Shankar *et al.*, (2012) reported that the root juice of *Smilax glabra* Roxb. is used in Arunachal Pradesh for the treatment of jaundice, till total recovery from the said ailment is achieved.

4.1.16. CAUSE OF THREAT:

Economic as well as commercial uses and anthropogenic activities.

4.2. *Homalomena aromatic* (Roxb.) Schott.

Homalomena aromatica (Roxb.) Schott. is a rhizomatous aromatic perennial herb, belonging to the family Araceae. It is grows naturally in marshy areas as forest undergrowth of the foot hills of Southern Assam, i.e. wild habitat.

4.2.1. Systematic position:

Domain-Eukaryota

Kingdom-Plantae

Class- Liliopsida

Order-Alismatals

Family: Araceae

Genus- *Homalomena*

Species: *Homalomena aromatica* (Roxb.)Schott.

4.2.2. Synonyms:

1. *Calla aromatica* (Spreng.) Roxb.
2. *Zantedeschia aromatica* Spreng.
3. *Zantedeschia foetida* K. Koch.

4.2.3. Common name:

Gondh-chana kachu (Ass), Gondhi kachu (Beng), Ysopein (Eng).

4.2.4. Habitat:

Hill slopes (tilla land) and foothill areas covered by forests and other vegetation. It is a moisture and shade loving species and grows best under 40-60% shade.

4.2.5. Morphology:

A rhizomatous aromatic herb, leaves radical with sheathing bases, long petioled, sagittate cordate. Flowers in spadices, subcylindric, equating or longer than the pale greenish, yellow spaths, fruits berry. Rhizomes covered with withered dark brown leaf scales, roots many, white and fibrous arising from every part of the rhizome (Plate No. 2).

4.2.6. Flower and Fruiting: July to August.

4.2.6. Present Status in Assam:

The present status is identified as Endangered by Ministry of Environment and Forest (Press Information Bureau, Government of India; 9 February 2012), Endangered by ENVIS Centre on Conservation of Medicinal Plants, FRLHT, Bangalore(22 September 2010) and Vulnerable by BSI (Mao *et al.*, 2009).

4.2.7. Cause of threat:

Economic as well as commercial use and anthropogenic activities (over exploitation).

4.2.8. Uses:

1. The rhizome of *Homalomena aromatica* (Roxb.) Schott. is used as a medicine in the treatment of different diseases, such as to promote urination, piles, stomach ailment, skin disease, anti-inflammatory etc by Dimasa tribe. They also use the leaves and stem as vegetable (Nath, 2013)
2. The rhizome is used in the treatment of conjunctivitis of eye by the Reang tribe of Southern Assam (Dutta Choudhury, 1999).
3. The petiole is used in the preparation of tonic by the Reang tribe of Southern Assam (Dutta Choudhury, 1999).
4. Petiole used as a vegetable (Assam plants.com)
5. The Karbi people use the petiole in the treatment of joint pain. They also use the leaves made into chutney and tuber is eaten after boiling (Kar and Borthakur, 2007).
6. The rhizome is esteemed as an aromatic stimulant. The plant has two trademarks, Sugandhimantri (Dry rhizome) and Montria oil; these are used in Perfume, Cosmetic and Dhup Industry (Ahmed, 2005).

4.3. *Bulbophyllum careyanum* (Hook.) Spreng.

Bulbophyllum (Hook.) Spreng. is the largest genus of the family Orchidaceae. *Bulbophyllum careyanum* (Hook.) Spreng. is one of the most important epiphytic orchid species among the 1803 species of *Bulbophyllum*. It is popularly known as ‘Carey's *Bulbophyllum*’ with the special characters of single noded pseudobulb, basal inflorescence, and mobile lip. The plant has remote, spherical to oblong, lightly grooved pseudobulbs with a single apical, oblong to linear oblong, leaf. The flowering season is observed to be both in winter and summer. It has many hanging flowered inflorescence with lance-shaped floral bracts.

4.3.1. SYSTEMATIC POSITION:

Domain-Eukaryota

Kingdom-Plantae

Division-Magnoliophyta

Class-Liliopsida

Order-Asparagales

Family-Orchidaceae

Genus-*Bulbophyllum*

Species- *Bulbophyllum careyanum* (Hook.) Spreng.

4.3.2. SYNONYM

1. *Anisopetalum careyanum* Hook. 1825
2. *Bulbophyllum careyanum* var. *ochraceum* Hkr. 1890
3. *Bulbophyllum cupreum* auct. no Lindl. 1862
4. *Bulbophyllum cupreum* Hook. Non Lindl. 1862
5. *Phyllorchis purpurea* (Hook.) Kuntze. 1891
6. *Pleurothallis purpurea* D. Don. 1825

7. *Tribrachia purpurea* [D. Don] Lindl. 1826

4.3.3. Common name: Carey's Bulbophyllum (Eng), Ishwarimul (Beng)

4.3.4. Distribution:

Plants are found growing in evergreen lowland forest of Himalayas, Assam, Nepal, Bhutan, Sikkim, Myanmar, Thailand, and Vietnam at the elevation of 200 to 2100 meters.

4.3.5. Morphology:

It is an epiphytic orchid, has remote spherical to oblong, lightly grooved pseudobulb with a single, apical, oblong to linear oblong, tongue shaped leaf. Inflorescence a raceme, at the base of pseudobulb much shorter than petiole, covered with many lance-shaped, brown bracts. Flowers yellowish, purple spotted bracts (Plate No. 3).

4.3.6. Host Plants: *Magnifera indica* L., *Artocarpus heterophyllus* Lamk., *Lagerstroemia speciosa* (L.) Pers., *Albazzia* species, *Ficus benghalensis* L., *Lagerstroemia reginae* Roxb., *Anthocephalus chinensis* (Lamk.) A. Risch. ex. Walp. (Bhattacharjee and Dutta, 2009).

4.3.7. Flower and Fruiting: October to December/ February to March.

4.3.8. Parts used: Pseudobulbs

4.3.9. Present status in Southern Assam:

The present status of this orchid species is rare according to the earlier report (Das *et al.* 2004; Bhattacharjee and Dutta, 2009; Mazumder, 2012).

4.3.10. Medicinal value:

- 1) The tribal/village people of Barak Valley use the extract of pseudobulb as sex stimulant and hormonal deficiency (Bhattacharjee, 2009).
- 2) Liquid obtained by crushing the leaf and bulb is taken for the treatment of different stomach ailments by the people of Southern Assam (Mazumder, 2012).

4.4. *Paphiopedilum spicerianum* (Rchb.f.) Pfitz.

4.4.1. Systematic position:

Domain-Eukaryota

Kingdom-Plantae

Division Magnoliophyta

Class- Liliopsida

Order-Asparagales

Family: Orchidaceae

Genus- *Paphiopedilum*

Species: *Paphiopedilum spicerianum* (Rchb.f.) Pfitz.

4.4.2. Common name: Lady's slipper orchid.

4.4.3. Distribution: Northeast India to Southwest Yunnan in China and Myanmar.

4.4.4. Morphology: Terrestrial herbs stem small, leaves radical, distichous, leathery, monocromaticakky green, flowers are brown or green develops individually, a snow white upper sepal with a pink central stripe and a similarly coloured staminodium (Plate No. 4).

4.4.5. Flowering and fruiting: November to January

4.4.6. Present status: It is an endangered plant species of Indian sub Himalayan region (Nayar and Sastry, 1987) and it is protected under the appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES; CITES, 2013) (ENVIS Centre on Floral Diversity, 2015).