

ETHNOBOTANICAL STUDIES ON KHAMBA AND ADI TRIBES OF TUTING AREA, UPPER SIANG DISTRICT, ARUNACHAL PRADESH

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Abstract

The present paper deals with the ethnobotanical studies of Khamba and Adi tribes of Tuting, Upper Siang District, Arunachal Pradesh. As many as 61 numbers of species were recorded with their local names, part used and usage by the Khamba and Adi tribes.

INTRODUCTION

The Khamba or Khemba people reside in Kugging, Titapuri, Pema Selri, Singa, Riwotala and Gelling areas of Tuting Sub division of Upper Siang district of Arunachal Pradesh. The Kugging, Titapuri, Pema Selri, Singa, Riwotala area is famous as Hills of Pilgrims (Vishnu) which has been described in the book "Heart of the World" by Yen Baker. Khambas are a subgroup of the Monpa people, and speak the Tshangla language. A sizeable population can be found in the above areas where the population is around 5000 to 6000. The religious life of the Khamba revolves around the Tuting Gumpa, similar to the Monpa of West Kameng and Tawang. Local genealogies suggested that they came from Tawang and settled in the region several centuries back. They are Tibetan-Buddhism and influenced by Donyi-Polo faith. They follow the Buddhism.

The Khamba are adherents of Tibetan Buddhism and use Hingna, their own script which is based on the Tibetan script. However, due to relative isolation from Tibet and occasional contact with the Adi tribes, they are somewhat influenced by the Dony- Polo faith in their beliefs. In every village, there is a small Gumpa presided by a Buddhist Lama. As devout Buddhists, they follow all the intricate details of rituals of Buddhist puja,

hoisting at least a Buddhist prayer flag or a string of small Buddhist prayer flags in front of every household. Festivals that are celebrated by the Khamba include Losar, the Tibetan New Year.

Some Adi people also reside in these areas migrated from the Jenging and Yingkiong areas and settled permanently in Tuting, Geling and some nearby areas. Adi is a major tribe of Arunachal Pradesh and inhabitant of East Siang, Upper Siang, Namsai and Lower Dibang Valley district.

The Khamba people live in high altitude areas of Upper Siang district and they use lots of plants for treatment of diseases while the modern treatment system is not accessible to them in such remote areas, as edibles, rituals, fuel, fodder and myths. They collect the plants from the wild habitat only. Due to this wild exploitation, most of the medicinal plants are facing threat or extinct which needs urgent conservation. In the other hand, there is a lack of information, data base also. In addition to these, some of the ethno-medicinal plants used by the people are commercially traded for pharmaceutical uses in different medicine system like Ayurveda, Homoeopathy, Unani, etc.

STUDY AREA

Our study deals with the various plants used by the Khamba and Adi tribe of Tuting area along with its local names, part used and its uses. Study was carried out at Tuting, Lali and Geling village, under the Upper Siang district of Arunachal Pradesh.

The forest types seen in the area are tropical to sub-tropical forests. The Forests are diverse secondary forests mixed with bamboo forests. The main trees seen in the top storey are *Altingia excelsa* (Jutuli), *Albizia lucida* (Moj), *Albizia procera* (Koroi), *Albizia falcataria* (Sirish), *Amoora wallichii* (Amari), *Artocarpus chaplasha* (Sam kathal), *Bischofia javanica* (Uriam), *Bombax ceiba* (Semul), *Castanopsis indica* (Kora/ Hingori), *Chukrasia tabularis* (Bogipoma), *Cinnamomum cecidophne* (Gandhsoroi), *Duabanga grandiflora* (Khokon), *Elaeocarpus aristatus* (Gahorisopa), *Gmelina arborea* (Gamari), *Kydia glabrescens* (Pichola), *Michelia champaca* (Titasopa), *Phoebe goalparensis* (Bonsum), *Stereospermum chelonoides* (Paroli), *Terminalia belerica* (Bohera), *Terminalia chebula* (Hillikha), *Terminalia myriocarpa* (Hollock), *Quercus rex* (Kora/ Singori), *Quercus roxburghii*, *Quercus lamellosa*, etc.

In the middle storey, medium sized trees and tall shrubs like *Macaranga denticulata*, *M peltata*, *Litsea salicifolia*, *Litsea cubeba*, *Micromelum* spp., *Saccharum officinarum*, *Ficus* spp. are found.

MATERIALS AND METHODS

Materials

The materials used during the tour for the studies are GPS, camera, notebook, pen, herbarium sheets, herbarium wooden presser, ropes, polythene bags, secateurs, dao etc.

Methodology

Field tours were undertaken to Tuting and Geling for survey and documentation of ethnomedicinal plants, used by the Khamba and Adi tribes in Upper Siang district. Consulted Shri Yonten Jamtso, Lama of Tuting Gompha; Dr. Phuntsok Wangdue of Tibetan Herbal Hospital; Shri Jurme Khampa, Teacher of Lali village; Shri Norbu Wangdi; Shri Dawa Norby, Secretary, Pema Sambawa Society; Shri Padan Moyong, ex ASM; and discussed with them about ethnobotanical plants and herbal medicines used for treatment of diseases by Khamba and other tribal people. Also consulted with different persons about cultivation and trading of medicinal plants and other NTFPs.

Utilization of the ethnomedicinal plants in modern treatment systems were studied with their commercial prospects. All information was documented and the plants were photographed and collected for herbarium where possible for further study. GPS locations of the visited areas were recorded. Other plants of lower groups like fungi, algae and lichens were also recorded, collected and photographed.

Enumeration of ethnobotanical plants used by the Khamba and Adi tribe of Tuting area

1. *Acmella paniculata* (Wall. ex DC.) R.K. Jansen syn. *Spilanthes paniculata* Wall. ex DC.
Family: Asteraceae
An annual herb, erect, branched, reaches a height of 15 to 60 cm. Leaves opposite, smooth or nearly so, ovate or ovate-lanceolate, 1.5 to 3 cm long, with pointed tip, wedge-shaped base, and with toothed or wavy margins. Conical heads occur singly at the ends of long stalks, about 1 cm in length; floral head yellowish-brown. Achenes flattened, oblong, dark-brown, enclosed separately in scales

- Local name: Marshang (Adi), Marsha (Khamba)
Part used: Leaves
Uses: Treatment of sore tongue and as vegetable
2. *Aconitum ferox* Wall. ex Ser.
Family: Ranunculaceae
Small tuberous perennial herb; flower bluish purple, grows in spiral on a long receptacle; growing above 2000 msl. It contains extremely toxic alkaloid pseudoaconitine also known as nepaline, after Nepal and is considered to be the most poisonous plants found in the Himalaya
Local name: Emoh (Adi), Omo (Khamba)
Part used: Roots
Uses: Arrow poisoning, analgesic
3. *Acorus calamus* L.
Family: Acoraceae
Perennial, rhizomatous semi aquatic herb found in damp and swampy areas; leaves sword- shaped grows up to 6 feet tall.
Local name: Sutta (Khamba)
Part used: Rhizome
Uses: Used to cure stomach and abdominal pain. Rhizome edible
4. *Ageratum conyzoides* (L.)L.
Family: Asteraceae
An erect, branching, slightly aromatic, annual herb upto 1m high; leaves ovate with numerous pale blue or whitish flowerheads
Local name: Paadu eing or Namning eing (Adi), Gondhoa ban (As).
Part used: Leaves
Uses: Leaves are used in cuts and wounds
5. *Allium hookeri* Thwaites
Family: Amaryllidaceae
A bulbous perennial herb with thick, fleshy roots. Bulb in clustered and cylindrical; leaves linear, shorter than or almost equaling the flowering scape, 0.5-1cm wide, midvein distinct. Cape usually arises from base to bulb, 20-60 cm tall.
6. *Amomum subulatum* Roxb. syn *Cardamomum subulatum* (Roxb.) Kuntze
Family: Zingiberaceae
Commonly known as large cardamom. It is a tall perennial herb with sheathed stems reaching 10-12 feet in height. Rhizome tuberous, dull red in colour; leaves long, dark green; flower bud appear in spring from the base of the rhizome; flowers white with blue stripes and yellow borders
Local name: Japo (Adi)
Part used: Pods
Uses: Spice. Also used during burial of dead bodies
7. *Anaphalis busua* (Buch.-Ham.) DC.
Family: Asteraceae
It is commonly known as pearly everlasting, is an erect perennial herb, growing upto about 1.2 m; leaves linear to narrow-lanceshaped; flowers borne in branched domed clusters with tiny round flower-heads
Local name: Parashing
Part used: Inflorescence
Uses: For making fire
8. *Areca catechu* L.
Family: Arecaceae
Cultivated tall palm. It is a medium-sized tree growing to 20 m tall, with a trunk 20-30 cm in diameter; leaves 1.5-2 m long, pinnate, with numerous, crowded leaflets. Fruits yellowish-red, conical with flattened base and brownish in colour externally; internally mottled like a nutmeg. It is grown for its commercially important seed crop, the areca nut. Flower unisexual, creamy white, fragrant; male flower minute, deciduous. Inflorescence crowded, much- branched panicles borne below the leaves
Local name: Tamul (Ass.)

- Part used: Fruits
Uses: Fruits eaten as masticatory
9. *Artemisia nilagirica* (C.B.Clarke) Pamp.
Family: Asteraceae
It is an erect, hairy, aromatic herb upto 1-2 m high; stem leafy, branched; leaves pinnately lobed 5-14 cm long, gray beneath; flowers small, yellow or dark red
Local name : Khambangsang
Part used: Leaves
Uses: Leaves ash filtered and used as soap. Leaves also directly used to wash hands. Ritually used as agarbati (dhoop)
10. *Baccaurea ramiflora* Lour. Syn. *Baccaurea sapida* (Roxb.) Mull. Arg.
Family: Phyllanthaceae
Small, evergreen tree with a dense, spreading crown; usually growing 10-15 m tall but exceptionally upto 25 m. Leaves simple, alternate, spiral-clustered at intervals along the twigs, narrow elliptical or obovate. Petiole swollen at base and top. Flower small grouped in raceme, axillary to cauliflorous, male and female on different trees. Fruit is a berry, ovoid or ellipsoid, hanging along long branches and main trunk, pale orange ripening reddish to purplish
Local name: Bure eshing or Bureng/Mureng (Adi/ Khamba), Leteku (As)
Part used: Fruits
Uses: Fruits edible with sweet test when ripe
11. *Boehmeria macrophylla* Hornem. syn. *Boehmeria platyphylla* D. Don
Family: Urticaceae
Shrubs upto 5 m high, branches soft-wooded. Leaves rough, whitish beneath.
Local name : Ompey (Adi/ Khamba).
Part used: Leaves
Uses: Leaves are use as vegetable, mainly with pork
12. *Calamus acanthospathus* Griffith
Family: Arecaceae
Stems solitary or weakly clustered, climbing, to 30 m, 1.5-5 cm in diam. Leaf sheaths green with brown hairs, with sparsely to densely arranged, sometimes in short rows, brown, flattened spines to 1 cm, with sinuous margins, densely hairy initially; petioles short, broadly lanceolate pinnae per side. Inflorescences to 3 m, flagellate. Fruits yellowish brown, ovoid to ellipsoid.
Part used: Leaves
Uses: Leaves are use for roofing
13. *Canarium strictum* Roxb.
Family: Burseraceae
Large tree upto 40 m high, buttressed; trunk clear bole; bark brownish, lenticellate. Branchlets terete, ferruginous tomentose. Resin dark brown to black oozing from cut end of trunk. Leaves compound, imparipinnate, alternate, spiral, clustered at twig ends. Inflorescence axillary panicles, rusty tomentose. Fruit a drupe, ellipsoid, dark blue
Local name: Siilum pyakak
Part used: Resin
Uses: Insect repellent. Resins are burnt as room freshener
14. *Centella asiatica* (L.) Urb.
Family: Apiaceae
A small, perennial herb, rooting at the nodes. Stems slender, creeping stolons, shallowly grooved, green to reddish green in colour. Leaves round, cordate, solitary or in groups borne on pericladial petioles. Flowers in 2-8-flowered umbels, greenish-white to dark crimson borne in small, rounded umbels. Fruit densely reticulate laterally flattened, round or ellipsoid, ribbed, brown when ripe
Local name: Kiiling Kiiroh (Adi)
Part used: Leaves
Uses: Stomach problem and dysentery
15. *Cinnamomum tamala* (Buch.-Ham.) T. Nees & Eberm.
Family: Lauraceae
It is a medium sized evergreen tree attaining a height of 10-20 m tall, and a girth of 150 cm. The bole can be 20 cm in

- diameter. Its bark produces mucilage. Leaves lanceolate, glabrous; alternately placed, opposite and short stalked, 3-nerved from the base. Flowers tiny, greenish yellow, insignificant
Local name: Raaping eshing (Adi/ Khamba), Tejpat (As)
Part used: Leaves
Uses: Leaves are use as spice and for treatment of diabetes
16. *Cinnamomum verum* J. Presl. Syn. *Cinnamomum zeylanicum* Blume
Family: Lauraceae
Tall evergreen tree grow up to 20-30 feet tall with aromatic bark and leaves. Leaves elongated ovate with a pointed tip, shiny and dark green on the upper surface, lighter below. Flowers inconspicuous, whitish, grow in panicles, which later develop into bluish berries. Bark reddish brown and smooth
Local name: Siiri-porori (Adi/ Khamba), Dalchini (As.)
Part used: Leaves. Inner bark
Uses: Leaves are use as spice and medicine
17. *Clerodendrum colebrookianum* Walp.
Family: Lamiaceae
Evergreen, erect, shrub about 10-15 ft tall characterized by a foetid smell. Branches and branchlets quadrangular, slightly pubescent, glabrescent with prominent leaf scars. Leaves simple, opposite or rarely whorled, broadly ovate, cordate-ovate. Flowers complete, bisexual, numerous, white and borne in 4-6 branched corymbose cymes, at the end of branches. Fruits drupaceous, subglobose, dark blue when mature, with 4 pyrenes
Local name: Ongin (Adi/ Khamba), Nephafu (As)
Part used: Leaves
Uses: Leaves are used as vegetable and for treatment of high blood pressure
18. *Colocasia antiquorum* Schott.
Family: Araceae
Long rhizomatous, fleshy tall, evergreen, perennial herbs producing a cluster of leaves with long, erect petioles, growing from 40-200 cm tall from a tuberous rootstock. Closely related to Taro (*Calocasia esculenta*), but with smaller corms
Local name: Engee (A)
Part used: Rhizomes and tender leaves
Uses: Used as food and vegetable
19. *Coptis teeta* Wall.
Family: Ranunculaceae
Small, stemless perennial evergreen herbs growing to 0.15 m. Rhizome oblique to horizontal with persistent fibrous roots, bitter, yellowish brown externally, golden-yellow internally. Inflorescence paniced; flowers hermaphrodite, small, 1-few flowered, white or yellowish. Fruit a follicle, many seeded. Seeds black
Local name: Ringko eshing (Adi/ Khamba), Mishmi teeta (As)
Part used: Roots
Uses: Malarial fever, diabetes, stomach problem and as tonic
20. *Crassocephalum crepidioides* (Benth.) S. Moore
Family: Asteraceae
Small, erect, smooth and finely hairy herbs growing up to 1 m tall. Leaves fleshy, mucilaginous. Leaves with lamina elliptic to ovate in outline; lowest leaves lyrate-pinnately cut, up to 20 cm long and 10 cm wide, base often with a pair of stipule-like lobes, margins coarsely toothed; upper leaves smaller, not lobed or with a lobe each side towards base; petiole up to 4 cm long. Heads in cymes, few to many, nodding at first, later erect; heads 4 mm diameter. Flowerheads cylindrical, green, with red florets visible on top. Seeds are floating balls of numerous silky white hairs
Local name: Genpo pemo (Adi/ Khamba)
Part used: Leaves
Uses: Leaves are used in cuts and wounds
21. *Dillenia indica* Linn.

- Family: Dilleniaceae
It is an evergreen tree with a rounded crown, grows up to 30 m tall, and though is usually smaller. The bole can be 120 cm in diameter, often branching from low down. Bark red. Leaves 15-36 cm long, with a conspicuously corrugated surface with impressed veins. Flowers large, with five white petals and numerous yellow stamens. Fruits round, globose, large, greenish yellow, have many seeds and are edible
Local name: Sompa eshing (Adi), Outenga (As.)
Part used: Fruits
Uses: Fruits edible, used as prickle and in curry for sour test
22. *Dinochloa maccllellandii* (Munro) Kurz
Family: Poaceae
An evergreen, climbing bamboo. Nodes swollen and white ring above the nodes. Rhizomes short; culms upto 30 m long. Culm-sheaths cylindrical, leathery, persistent, broad at the base, wide at the top
Local name: Taggil, Tagir
Part uses: Culms
Uses: Used in worships as rituals
23. *Diplazium esculentum* (Retz.) Sw.
Family: Athyriaceae
Rhizome erect, up to 15 cm tall, densely scaly; scales brown, narrowly lanceolate, toothed at margin; fronds caespitose.
Local name: Takang (A)
Part used: Leaves
Uses: Vegetable
24. *Embelia ribes* Burm.f.
Family: Myrsinaceae
A large, climbing, creeper shrub with long slender, flexible, brittle stem and terete branches; bark studded with lenticels. Leaves simple, alternate, ovate and sharp at both the ends; Flowers small, greenish yellow to whitish pink colored; Fruits globose, small just like black pepper, green, red when ripe. Roots brownish grey in color
Part used: Fruits
Uses: Tonic, chest and skin diseases
25. *Garcinia cowa* Roxb.ex Choisy
Family: Clusiaceae
Medium sized tree up to 8-12 m tall, 15-20 cm in diam; bark dark brown; branches many, borne toward top of trunk. Dioecious; male flowers 3-8, terminal or axillary, in an umbel; female flowers usually solitary, axillary, larger than male. Fruit opaquely yellow-brown, ovoid-globose, oblique, sulcate, usually apiculate, pinkish red, looking similar to tomato. Seeds 2-4, narrow, fusiform, slightly curved, rough
Local name: Tabing tarak
Part used: Fruits
Uses: Fruits are edible and used as medicine for curing dysentery
26. *Garcinia pedunculata* Roxb.ex Buch.-Ham
Family: Clusiaceae
Medium sized tree with fluted trunk with short spreading branches. Leaves obovate or oblong-lanceolate with prominent midribs. Male flowers are light green in sparsely flowered panicles. The female flowers are solitary. Fruit yellow, large, oblate, concave on both ends when mature, smooth; fruiting pedicel. Seeds reniform
Local name: Dumbo miklang Eshing (A)
Part used: Fruits
Uses: Fruits are edible and used as medicine for curing dysentery
27. *Gynocardia odorata* R. Br.
Family: Achariaceae
Medium sized evergreen tree grow up to 30 m tall, twig tips and branchlets glabrous; bark brown. Fruits berry, yellowish brown, globose. Seeds numerous, variable in shape and size, usually obovoid to ellipsoid
Local name: Tulpi eshing, Chalmougra
Part used: Fruits
Uses: Fruits are used to obtain essential oils known as chalmougra oil

28. *Hedychium densiflorum* Wall.
Family: Zingiberaceae
Semi aquatic, rhizomatous, clump-forming perennials, erect shrubs with elongated leaves. Stem up to 5 m height, unbranched bearing two ranks of lance-shaped leaves, and dense terminal racemes of showy, often fragrant, trumpet-shaped, deep orange flowers in very dense, bottle brush spikes 20 cm long
Local name: Paapii
Part used: New shoots
Uses: As vegetables
29. *Homalomena aromatica* (Spreng.) Schott
Family: Araceae
Small rhizomatous aromatic perennial herb. Stem short, stout, tough, slow growing. Leaves heart-shaped, dark green cordate-sagittate shaped. Inflorescences 1 or 2 together; peduncle erect (developing and floral) to declinate (post-anthesis and fruiting). Berries dull orange yellow, smells of overripe plums.
Local name: Uenge
Part used: Rhizome
Uses: Rhizome edible
30. *Houttuynia cordata* Thunberg
Family: Saururaceae
Perennial creeping herb up to 30-60 cm high, with fleshy stem and thin, spreading rhizomes. Stem green or sometimes purplish red, and either smooth or pubescent on the nodes. The lower parts of the leaf stalks form a sheath round the stem. Leaves heart-shaped, 4-10 cm long and 2.5-6.0 cm wide, and purple underneath. Flowers small, white, crowded into a short spike. Fruits are apomictic, i.e. they develop seeds without being fertilized
Local name: Lorum, Roram (A)
Part used: Whole plant
Uses: Vegetable
31. *Litsea odoratissima* (Nees) Kosterm
Family: Lauraceae
A medium sized tree
Local name: Nya
Part used: Leaves and seeds
Uses: Religious/ ritual. Leaves used as a taste maker in tea and vegetables. Seeds used as chutni and spice
32. *Livistona jenkinsiana* Griff.
Family: Areaceae
A medium sized tree. Stems to 25 m tall, to 30 cm in diam, rough with leaf scars. Leaves palmate; petioles 1.3-2 m, with brown recurved spines along margins, decreasing in density toward distal end. Inflorescences to 2 m, branched to 3 orders, with 3-6 partial inflorescences; rachillae 10-30 cm; flowers bisexual, solitary or borne in clusters of 2-6, yellowish colour. Fruits bluish, globose to ellipsoid or pear-shaped
Local name: Tarek/ Tek, Toko
Part uses: Leaves and fruits
Uses: Religious/ ritual. Leaves used for roofing and peels of fruits are used as pickle and fruits as masticatory
33. *Lycopodium clavatum* L.
Family: Lycopodiaceae
It is a perennial evergreen, spore-bearing vascular plant, growing prostrate along the ground with stems up to 1 m long; stems creeping, much branched, and densely clothed with small, spirally arranged leaves. The branches bearing spore cones turn erect and have fewer leaves than the horizontal branches. Erect shoots can be up to 60 cm tall. The spore cones are yellow-green. The horizontal stems produce roots at frequent intervals along their length, allowing the stem to grow indefinitely along the ground
Local name: Chusingdrom
Part used: Stems
Uses: Decorative purposes
34. *Magnolia champaca* (L) Baill. ex Pierre
syn. *Michelia champaca* L.
Family: Magnoliaceae
Large evergreen tree up to 30 m or taller. Trunk up to 1.9 m (6.2 ft) in diameter. Bark grey, lenticellate; blaze

cream with orange speckles. Branchlets terete with annular scars of caducous stipules, glabrous; apical bud covered by sericeous lanceolate stipules. Leaves simple, alternate, spiral; petiole 1-3 cm long. Flowers solitary, axillary, large, yellow, fragrant. Follicles, warty, 2-3 cm long, arranged as spike, dehiscing dorsally; seeds 1, scarlet

Local name: Singyongpopin

Part used: Flowers and bark

Uses: Flowers used as decorative and fragrance, digestive, stomach ache. Bark for fever and cough

35. *Ophiocordyceps sinensis* (Berk) G.H.Sung, J.M.Sung, Hywel Jones & Spatafora syn. *Cordyceps sinensis* (Berk) Sacc.

Family: Ophiocordycipitaceae

It is a fungus that parasitizes larvae of ghost moths and processes a fruiting body valued as herbal remedy. The fungus germinates in the living larva, kills and mummifies it, and then the stalk-like fruiting body emerges from the corpse. It is known as *Yartsa Gunbu* ("winter worm-summer grass"). It is one of the entomogenous Ascomycetes and parasitizes the larvae of Lepidoptera to form the well-known traditional Tibetan medicine "yartsa gunbu"

Local name: Yarth- gumb (K)

Part used: Whole plant

Uses: Vitality, aphrodisiac

36. *Oxalis corniculata* L.

Family: Oxalidaceae

Creeping herb. It has a narrow, creeping stem that readily roots at the nodes. Branch erect, creeping, about 30 cm long borne with small hairs. Roots fibrous, branching, sometimes with a taproot. Leaves small, trifoliolate, subdivided into three rounded leaflets. Flower yellow growing in cluster of 1-6 and petals are 6-7 mm long. Fruit narrow, cylindrical capsule, 1 to 2 cm long

Local name: Kurum

Part uses: Whole plant

Uses: Edible as chutni. Useful remedy for hookworm and skin rashes

37. *Paederia foetida* L.

Family: Rubiaceae

It is a perennial twining vine arising from a woody rootstock. Stems light green, slender, grow up to 7 m or more, climbing, or prostrate and rooting at the nodes. Leaves ovate to lanceolate with pungent scent. The leaves are also membranous and have long petioles. Flowers found in scorpioid cymes, violet in color, densely hairy, tubular. Fruit a capsule, light brown to yellow or reddish-brown, glossy, nearly globose. Seeds ellipsoidal, plano-convex or convex-concave, without conspicuous wings, black, often covered with raphides

Local name: Epe riong/ Bungka soolut

Part used: Leaves

Uses: Use as vegetable and medicine for stomach problem, to relief body pain

[N.B. Extracts of the leaves of *Paederia foetida* boost testosterone levels of rats. Researchers at the Hari Singh Gour University in India write about this in the *Journal of Men's Health*. The testosterone-boosting effect is big enough to bring about a significant weight gain and to enhance sexual activity]

38. *Pandanus nepalensis* H. St. John

Family: Pandanaceae

They are palm-like dioecious trees with stem 3-17 m tall. Branched aerial roots arise from the lower trunk. Leaves long, dark green, 3-5 m long and 10 cm broad, with sharp curved prickles on the margin and the midrib. Flower spathes are several, leathery, golden yellow. Fruit compound, cone-like made of several drupes, orange red when ripe. Drupes fleshy, 5-6 angled

Local name: Taku

Part used: Leaves

Uses: Leaves are used for roofing and for making mats

39. *Paris polyphylla* Sm.

Family: Melanthiaceae

Perennial rhizomatous herb grows up to 90 cm (3 ft) high and spreads out about

- 30 cm (1 ft) wide; leaves whorled of 6-12. Flowers hermaphrodite, spider-like with long, thread-like, yellowish green colour. Local name: Jamba
Part used: Rhizome
Uses: Boils and ulcers
40. *Persea odoratissima* (Nees) Kosterm
Family: Lauraceae
Tree grows up to 16 m tall and 90 cm in diameter. Bark dark grey. Branchlets glabrous. Terminal bud large with many glabrous, somewhat fimbriate, bud scales. Leaves coriaceous, glabrous, lanceolate to oblong-oblong to elliptic-oblong. Flowers yellow, borne in many-flowered panicles almost at the end of branches, up to 12 cm long. Fruit ellipsoid, up to 7 x 15 mm. Ripe fruit purple, pruinose
Local name: Tulin
Part used: Fruits
Uses: Chutni
41. *Phagopteris aurita* (Hook.) J. Sm.
Family: Thelypteridaceae
Plant grows up to 40 m tall. Rhizome long creeping, with scales at apex; scales brown, narrowly lanceolate. Fronds remote; stipe red-castaneous or brownish at least toward base
Local name: Siiye rukja
Part used: Leaves
Uses: Leaves are used to kill bugs and other insects in cattle and chicken house
42. *Phoebe cooperiana* P.C.Kanjilal & Das
Family: Lauraceae
Medium sized tree with bushy canopy
Local name: Tapil eshing/Sansar (A)
Part used: Fruits
Uses: Fruits edible and used as Chutni
43. *Phrynium pubinerve* Blume
Family: Marantaceae
Herbs with creeping root stock. Its underground rhizome produces dense clusters of broad, glossy green leaves on narrow stalks. Leaves large with long stalk, oblong, acuminate, base rounded or obtuse. Spike globose, sessile on the petiole, 4-6 cm across. Inner bracts ovate-oblong, fimbriate at apex. The inflorescence is produced from the side of the petiole from internodes with the bracts enclosing small inconspicuous pale cream-white. Fruit orange-red, globose.
Local name: Ekkam (Adi)
Part used: Leaves
Uses: Leaves are used as dish and to preserve food and dry meal/ meat etc.
44. *Pinanga gracilis* Blume.
Family: Arecaceae
Clustering palm, to 4-5 m tall, about 1.5 cm in diam., reddish brown. Stem slender. Leaves pinnate, rarely undivided; sheaths closed, forming crownshafts, 21-34 cm, green with reddish brown scales. Inflorescences spicate, pendulous; male flowers to 8 mm, deciduous; female flowers to 2.5 mm. Fruits orange-red, ellipsoid
Part used: Fruits
Uses: Edible, stem use as lathi and sometimes for construction of houses
45. *Piper peepuloides* Roxb.
Family: Piperaceae
Stragling herbs with runners. Fruits round or oval
Local name: Lori (A)
Part used: Fruits/ leaves
Uses: Leaves are used as vegetable; fruits are in cough and bronchitis
46. *Pothos scandens* L.
Family: Araceae
Climbing herbs on the trunk of forest trees. Stem angled rooting at nodes. Leaves, lanceolate, apex acuminate, nerves many, united to form 2-3 narrow ribs, glabrous; petiole broadly winged, wing broaden above. Flowers densely packed. Fruits berry, oblong and are scarlet when ripe
Local name: Looma losot (A)
Part uses: Leaves/stem
Uses: Fracture of bone
[N.B. *Pothos scandens* has quite a few medicinal properties and usages. The bruised

- root of the plant is reportedly applied to promote healing of abscesses, after being fried in oil. The Indian people use an infusion of the leaves of this plant as a bath for curing convulsions and epilepsy. Apart from that, the stem is also reportedly used to treat asthma, after being cut up with camphor and smoked like tobacco]
47. *Pouzolzia viminalis* Gaudich.
Family: Urticaceae
Climbing herbs on the trunk of forest trees. The petioles are semi-amplexicaul and broadly winged
Local name: Looma losot
Part used: Leaves/ stem
Uses: Fracture of bone
48. *Quercus rex* Hemsl.
Family: Fagaceae
Tall trees with dentate leaves; bark rough. Fruits covered with hard scales
Local name: Angke, Kora
Part uses: Fruits and leaves
Uses: Fruits edible and leaves with small branch are used in worship as rituals
49. *Rubia cordifolia* L.
Family: Rubiaceae
Perennial climbing herb that can grow to 1.5 m in height. Stem slender, four angled with woody base. Leaves evergreen, broad, produced in whorls of 4-7 star like around the central stem. Leaves ovate-heart shaped, entire, pointed. Flowers very small, pale yellow. Fruits globose, fleshy, smooth, small, red to purplish black berry when ripe. Roots over 1 m long, up to 12 mm thick and have brownish red bark that gives red dye
Local name: Chey
Part used: Stems
Uses: Dye
50. *Rubus spp.* L.
Family: Rosaceae
Perennial shrub
Local name: Thalsisi (K)
Part used: Fruits
Uses: Fruits edible
51. *Saurauia roxburghii* Wall.
Family: Actinidiaceae
It is an evergreen tree. Leaves large, elliptic with conspicuously rusty-haired beneath. Flowers pink, clusters, numerous; buds looks like pink ball
Local name: Tan (A)
Part used: Leaves and fruits
Uses: Rituals. Fruits edible
52. *Sinopodophyllum hexandrum* (Royle) T.S. Ying syn. *Podophyllum hexandrum* Royle
Family: Berberidaceae
A perennial growing herb to 0.5 m (1ft 8in) by 0.3 m (1ft). Leaves glossy green, drooping, lobed. Flowers pale pink, hermaphrodite (have both male and female organs). Fruits bulbous, bright red-orange
Local name: Bashushu
Part used: Fruits
Uses: Fruits edible
53. *Solanum khasianum* C.B. Clarke
Family: Solanaceae
Short lived perennial shrub. Flowers white. Fruits small, pale yellow
Local name: Sebe Banka (A)
Part used: Seeds
Uses: Toothache
54. *Solanum nigrum* L.
Family: Solanaceae
Short lived common perennial herb, reaches a height of 30 to 120 cm; leaves ovate to heart-shaped, with wavy or large-toothed edges. Flowers small, white with yellow centre. Berries green at early stage and turn dull black or purple-black when ripened
Local name: Horr/ Hili
Part used: Leaves
Uses: Used for hypertension and as vegetable
55. *Solanum torvum* Sw.
Family: Solanaceae
An evergreen, small bushy, erect and spiny perennial shrubs to 2 m tall. Stems

armed with stout, flattened prickles, straight or slightly curved. Leaves and stem spiny. Leaves broadly oval-ovate. Flowers many, white in large branched clusters, with simple, mostly glandular hairs on axes. Fruit an erect, green subglobose berry, yellow when ripe

Local name: Kopi pimik

Part used: Fruits

Uses: Fruits are used as vegetable and some people use for treatment of tonsillitis

56. *Tacca chantrieri* Andre

Family: Dioscoreaceae

It is a clump forming herbaceous perennial bearing exotic, log stemmed flowers, grows from an underground rhizomes. Leaves lanceolate with angular pleats, dark green with an under surface colour of greyish green. Inflorescence bat-like both in shape and color, wide spreading, wing-like bracts of rich maroon-black. Flowers purple-black, up to 30 cm. Scape about 63cm long. The small black 5 petals flowers are succeeded by heavy berries

Local name: Dende nammi

Part used: Leaves and rhizomes

Uses: Leaves are used as gum for making arrow and rhizome is as analgesic

57. *Terminalia bellirica* (Gaertn.)Roxb.

Family: Combretaceae

A large deciduous tree, buttressed, up to 40 m tall. Branchlets terete, glabrous. Leaves about 15 cm long, simple, alternate, spiral, broadly elliptic, clustered at the twig ends. Inflorescence axillary spikes. Flowers sessile, creamy white, with offensive odor. Fruits drupe, globose or ovoid, slightly 5 ridged, 3 cm across; 1-seeded

Local name: Loko eshing (A)

Part used: Fruits

Uses: Fruits edible and good for liver and digestive

58. *Terminalia chebula* Retz.

Family: Combretaceae

It is a large deciduous tree growing to 30 m tall; trunk dark grayish brown up to 1 m in dia. leaves oval, alternate to sub-opposite. Flowers small, dull white to pale yellow, monoecious, with strong, unpleasant odour. They are borne in terminal spikes or short panicles. Fruits drupe-like, broad, round to oval, yellowish green in color, with five longitudinal ridges

Local name: Lokyo eshing (A)

Part used: Fruits

Uses: Fruits edible and good for liver and digestion

59. *Thysanolaena maxima* (Roxb.) Kuntze

Family: Poaceae

It is a fast growing, luxuriant foliage; clumping perennial grass with long brownish panicle grows to 2.5 to 3.5 m in height in a tight clump. It looks like bamboo but is actually a perennial grass

Local name: Kamgang (K)

Part used: Panicles, stem

Uses: As broom (jharu) and stem for making wall

60. *Wallichia disticha* T. Anderson

Family: Arecaceae

A short-lived palm, grows up to 30 feet tall. Trunk solitary, covered in a criss-crossed fibre mat and large, stiff, feathery leaves arranged in opposite rows in the same plane, one leaf on top or opposite the other. Leaves pinnate, arranged in one or a few planes. Leaflets vary considerably in shape, from linear to lanceolate. Crown nearly half the height of the tree; sheaths 40-60 cm long, fibrous, with coarse, overlapping, black fibres, outer layer thicker than the inner ones

Local name: Tashe (A)

Part used: Heart wood

Uses: As an alternate food during poverty and to feed animals

61. *Zanthoxylum armatum* DC.

Family: Rutaceae

A deciduous evergreen, large spiny shrub or small tree. Leaves distinctively

trifoliolate, with leaf-stalk winged. Leaflets stalkless, elliptic to ovate-lance like, entire to slightly toothed, sharp-tipped, base sometimes oblique. Minute yellow flowers arise in leaf axils. Flowers have 6-8 acute sepals. Seed rounded, 3 mm in diameter, shining black
Local name: Yeram/Yurma (K)
Part used: Fruits and leaves
Uses: Spice. Leaves are used as vegetable and as spice

CONCLUSION

A total number of 62 ethnobotanical plants representing 55 genera belonging to 43 families used by the *Khamba* and *Adi* tribes of Tuting area were recorded from the study area and the plants were collected, pressed and processed for herbarium for further study. Due to heavy rain during the tour, collection of plants was least. Further study could help us to collect more information about the ethnobotanical plants used by the tribes.

The awareness campaign on Medicinal Plants, its conservation and sustainable utilization was a great success and it was told that, this is the first of its kind training on medicinal plants organized by us which provided lots of information to the local people. More than 26 man and woman were attended the campaign including ASM and college students. The Addsl. Deputy Commissioner of Tuting also encourages us for such type of activities and request us to conduct full fledge training in future on all non timber forest produces as a whole.

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PLATE-I



Acorus calamus



Ageratum conyzoides



Calamus acanthospathus



Centella asiatica



Clerodendrum colebrookianum



Crassocephallum crepidioides



Diplazium esculentum



Embelia ribes (Baividang)



Homalomena aromatica



Houttuynia cordata



Musa velutina



Livistona jenkinsiana



Paderia foetida



Phagopteris aurita



Piper peepuloide

PLATE-II



Rubia cordifolia



Saurauia roxburghii



Solanum khasianum



Solanum nigrum



Spilanthes paniculata



Tacca chantrieri



Musa uranoscopus



Dendrocalamus calostachyus