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Traditional ethno-medicinal knowledge of *Mishing* tribes residing in the core zone of Dibru-Saikhowa national park, Assam, India

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Abstract
A survey of traditional ethno-medicinal plants used by the *Mishing* community residing inside the Dibru-Saikhowa National Park was conducted during 2016-17. A total of 60 plants belonging to 59 genera and 41 families covering 17 disease/ailments were recorded being used by the *Mishings* of Dibru-Saikhowa National Park. Local name, part used, preparation of herbal medicine and mode of administration is reported in the present paper. *Centella asiatica* Urban and *Piper longum* L. were being used in combination of other plant species to cure maximum number of diseases.

Keywords: *Mishing* Tribes, Ethnobotany, Medicinal plants, Dibru-Saikhowa National Park

1. Introduction
Traditional ecological knowledge (TEK) refers to the kind of knowledge that local/indigenous communities gain in their interaction with ecosystem and its different components [1]. Such knowledge is not only confined to elderly or aboriginals of a particular region, rather it can also be gained by every single being on earth by their personal experience. Basically, traditional knowledge provides a basis for local-level decision making in agriculture, health-care, education, food preparation, natural resource management and a host to several other activities in rural communities. Since, most of it is developed or adapted through various local ways of thinking and doing, TEK can be described as local level of innovation through which individuals or groups discover or develop and apply improved ways of managing the available natural resources, and expand and build on the boundaries of their IK. For example, the preparation and the use of traditional medicine or ethno-medicine is an innovation by local communities. TEK is different for different societies or culture, which is dynamic in nature [2]. Most of the ethnic groups staying in close contact of jungles are having strong inter-linkages with the environment. All the communities have developed their knowledge base regarding to the use of various ecosyetem components for their betterment.

1.1 *Mishing* community of Assam
Mishing community or *Mishings* are an ethnic tribal group, residing in Assam and Arunachal Pradesh. They also have the considerable indigenous knowledge about nature and its various living and non-living components, which they are using and following generations after generations. In Assam *Mishing* tribes inhabit in the Upper Brahmnaputra valley covering Dhemaji, Lakhimpur, Sonitpur, Biswanath Chariali, Jorhat, Majuli, Charaidew, Sibasagar, Golaghat, Dibrugarh and Tinsukia districts. Lakhimpur district has the maximum population of *Mishings* [3, 4]. Various researchers have documented the traditional knowledge of *Mishings* in different parts of Assam [5-13] but no specific study is available on traditional ecological knowledge or on ethnobotany of *Mishings* of Dibru-Sakhowa National Park. Present study was designed to document the traditional ethno-medicinal knowledge of the *Mishing* community residing in the core zone of Dibru-Saikhowa National Park.

2. Material and methods
2.1 Study Area
2.1.1 Dibru-Saikhowa National Park
Dibru-Saikhowa National Park is located (27°30' - 27°45' N, 95°10' - 95°45' E)in Tinsukia and Dibrugarh district of Assam, India.

The terrain of the park is flat and it is situated in between floodplains of the Brahmputra and Lohit rivers. Dibru-Saikhowa was declared a wildlife sanctuary in 1986 and in 1999, it was upgraded to a national park covering an area of 340 km^2 and further upgraded to a biosphere reserve by including the fringe villages spreading in buffer zone of 765 km^2 [14]. The park has the largest Salix swamp forest in North-eastern India. Tropical semi-evergreen, evergreen forests, Salix swamps, reeds and grassland form the main vegetation structure of the park (Fig. 1). The climate is tropical monsoon with a hot and wet summer and a cool and drier winter. The annual rainfall is 2300-3800 mm and the temperature ranges from 7 °C -35 °C. Being a part of Indo-Burma global biodiversity hotspot [15] with a wide variety of flora and fauna, the park offers a suitable habitat for large number of globally threatened faunal and floral species. Dibru-Saikhowa has also been classified as Assam Plain Endemic Bird Area [16]. Feral Horses (True semi-wild free-living horses) and Gangetic Dolphins are a true treasure of the national park [14].

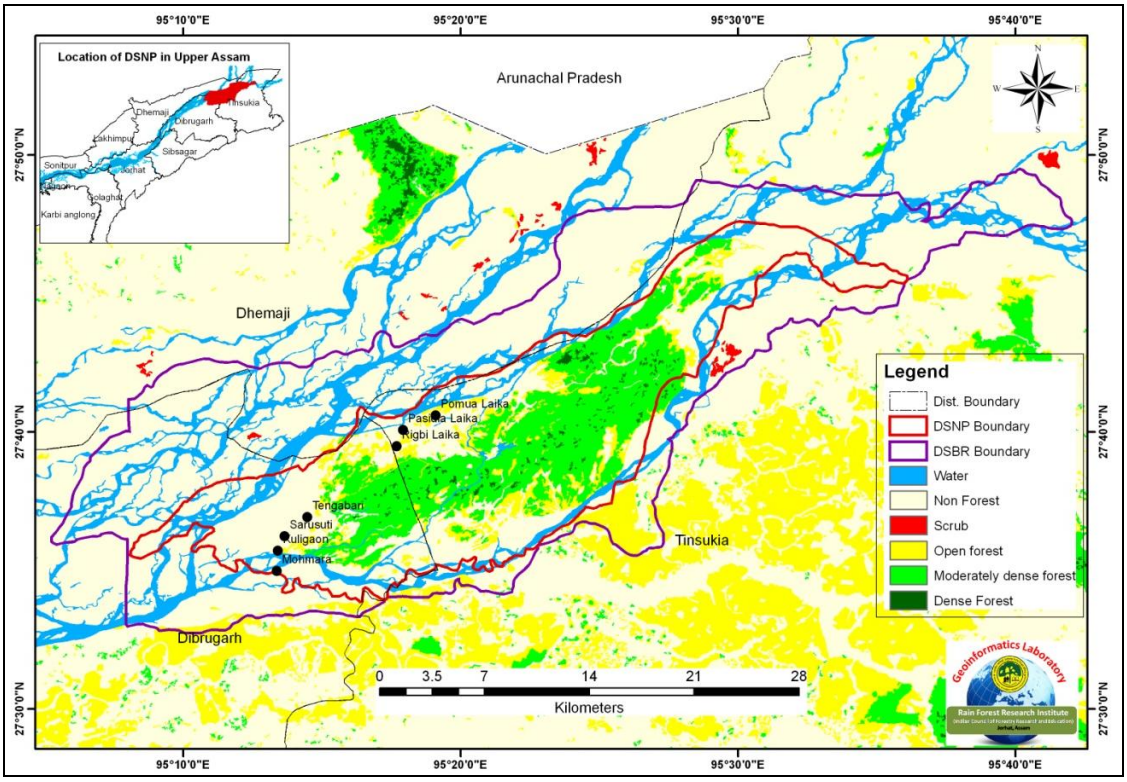

Fig 1: Location map of the study area

2.1.2 *Mishings* of Dibru-Saikhowa

There are two forest villages *i.e.*, Dhadia Forest Village and Laika Forest Village, situated in the core zone of national park. Dadhia forest village falls in Dibrugarh district and Laika forest village falls in Tinsukia District. Dhadia currently occupies an area of 15.71 km^2 while, Laika occupies 11.38 km^2. These villages are completely dependent on forest especially for firewood collection and livestock grazing. These villages are inhabited by the *Mishing* tribal community along with very few families of *Adibasi* (Assamese Tea Tribe) community [14]. These villages were settled inside the forest to get onsite labour to work in the Dibru-Saikhowa Reserve. As per population census, 2011, there are 976 households with a population of 6048 out of which 3379 in Dodhia and 2669 are in Laika. These two villages are further subdivided into following 7 sister villages or hamlets. Rigbi, Pashidia and Pamua are hamlets of Laika, and Mohmar, Sarsuti, Tengabari and Kuligaon are of Dadhia. People of both the villages are having their own traditional identities and culture. The male members of the family mainly go for work while most of the women have no work apart from their household activities and handloom. Livestock rearing and rice cultivation is the main occupation here. As per the estimation done by the forest department in 2011, the cattle population in the villages was around 6500 of which 5500 cows and 1000 are buffaloes. Most of the people are poor and below poverty line and most of them are entirely dependent on forest products. All the villagers construct their huts on the elevated platform with timber, bamboo and thatch. These villages are economically not very sound. However many of the educated people of the villages are in different jobs and business outside the national park.

2.2 Methods

The study was conducted during 2016-17 covering all seven hamlets of both of the forest villages. Traditional practitioners, women folks, elderly persons along with 10% households were selected randomly and interviewed with the help of structure questionnaire. Repeated queries were made to collect the local names and to ascertain the authenticity of the plants used. The plant species were identified consulting available literature and floras. Collected information was compared with the previous works carried out by different scholars for different communities in Assam.

3. Results and discussion

In treatment of different disease/ailment, plants are used either singly or a few taken together for a particular or specific disease. Results are summarized according to the plant used to cure disease/ailment. Family and vernacular (*Mishing*) name is given in parentheses with the name of plant species. Part used, method of preparation and mode of administration is given for each species.

3.1 Asthmatic problem: Decoction of young shoots of *Ranunculus sceleratus* L. (Ranunculaceae; *Marsa*), *Vitex negundo* (Verbinaceae; *Pasotia*), *Croton tiglium* (Euphorbiaceae; *Kanibih*) and *Wedelia calendulacea* (L.) Less (Asteraceae; *Bhimraj*), crushed tuber of *Zingiber officinalis* Roscoe. (Zingiberaceae; *Take*), crushed dried flower buds of *Syzygium aromatium* Merr. (Myrtaceae; *Long*), few seeds of *Piper longum* L. (Peperaceae; *Jaluk*) and a pinch of common salt added to it, is taken orally once a day until the patient is cured.

3.2 Body/muscular pain: Paste of areal parts of *Ranunculus sceleratus* L., *Centella asiatica* Urban (Apiaceae; *Mani-muni*), *Paederia foetida* (Rubiaceae; *Bonkiribo*), *Diplazium esculentum* (Polypodiaceae; Dhekia), *Zingiber officinalis* Roscoe. *Allium sativum* L. (Liilliaceae; *Kampo Talap*) boiled with common salt, powder of *Curcuma domestica* Valet. (Zingiberaceae; *Haldi*) and *Piper longum* L. and eaten with rice- *Oryza sativa* L. (Poacea; *Chawl*) to cure body pain. Paste of *Curcuma domestica* Valet slightly heated and tied over the affected area overnight to cure muscular pain.

3.3 Bone fracture: Stem of *Cissus assamica* (Laws.) Craib (Vitaceae; *Harjora*) or *Cissus quadrangularis* L. (Vitaceae; *Harjora*) or *Cryptolepis indica* Roem and Schult (Asclepediaceae; *Harjora*) is grinded into paste and tied over the affected part with help of bamboo sticks for 2-3 days.

3.4 Burn Injury: Succulent leaves of *Aloe barbadensis* Mill. (Asphodelaceae, *Ghirtkumari*) applied on burned parts. Paste of young leaves of *Cucerbita pepo* DC (Cucerbitaeae; *Tapa*) or *Lagenaria siceraria* Standl. (Cucerbitaeae; *Lao*) or paste of areal part of *Commelina benghalensis* L. (Commelinaceae; *Wangden Khoibi*) tied over the affected part for 3-4 days.

3.5 Cough and Cold: Rhizome juice of *Alpinia nigra* Willd. (Zingiberaceae; *Tora*) is given twice a day till cough is cured. Fried leaves of *Phlogacanthus thyrsiformis* Nees. (Acanthaceae; *Titaphul*) are eaten with rice for three days. Decoction of bark of *Magnolia champaca* (Magnoliaceae; Titasopa) is taken orally twice a day. Leaves of *Ocimum sanctum* L. (Lamiaceae; *Tulakhi*) are eaten raw. Massage of lukewarm oil of *Brassica campestris* L. (Brassicaceae; *Horiaoh*) is applied on chest of children.

3.6 Cuts and wounds: Leaves of *Mikania micrantha* Kunth. (Asteraceae; *Japoni Lata*) are crushed and applied on affected part for few hours. Leaves of *Chromelaena odorata* (L.) R. (Asteraceae; *Parbotiban*), *Ageratun conizoides* L. (Asteraceae; *Namyin*), *Hibiscus rosasinensis* L. (Malvaceae; *Jabaful*) and *Tagetus patula* L. (Asteraceae; *Narji*) are also used for the same purpose with same mode of administration. Green skin of *Bambusa balcooa* Roxb. (Poaceae; *Bhaluka Deiba*) is collected with the help of sharp object and applied on the affected part only for once.

3.7 Dandruff: Paste of the seeds of *Azadirachta indica* A. Juss (Meliaceae; *Mahaneem*) is applied on scalp. Juice of inner part of *Dellenia indica* L. (Dilliniaceae; *Champa*) is applied on the scalp before hair wash.

3.8 Dysentery: Paste of tender leaves of *Punica granatum* L. (Punicaceae; *Dalim*) is eaten raw twice a day. Smoked young areal part of *Houttuynia cordata* Thunb. (Soraceae; *Masandri*) are eaten 2-3 times a day. Leaves of *Psidium guajava* L. (Myrtaceae; *Mudhuri*) and *Bischofia javanica* L. (Bischofiaceae; *Akkir*) and areal part of *Centella asiatica* Urban are boiled in water and paste is made, small amount of salt and *Piper longum* L. powder are added in paste, and eaten with rice for two days. Juice of unripe fruits of *Musa balbiciana* Colla. (Musacese; *Athiya Kopak*) is drunk early in the morning for 3 days. Leaves of *Mentha viridis* L. (Lamiaceae; *Pudina*) are eaten raw or as paste eaten with warm water.

3.9 Hypertension: Young leaves of *Clorodendron colebrookianum* Wall. (Verbinaceae; *Pakom*) are taken as vegetable twice in week. Cloves of *Allium sativum* L. are taken orally in the morning on routine basis.

3.10 Indigestion/Stomach ache: Leaves of *Murraya koenigii* L. (Rutaceae; *Narasingha*) are taken. The aerial part of *Houttuynia cordata* Thunb. or Leucas aspera Spreng. (Lamiaceae; *Duran*) is taken as vegetable with rice. Seeds of *Trachyspermum ammi* (Apiaceae; *Gotajani*) are taken with black salt twice a day. Decoction of bark of *Stereospermum chelonoides* (Bignoniaceae; *Paroli*) is taken once a day to cure stomach ache.

3.11 Jaundice: Stem juice of *Saccharum officinarum* L. (Poaceae; *Kuhiya*) or juice of *Costus pictus* D. Don (Costaceae; Jam-lakhuti) is taken for several days. Fruit juice of *Averrhoa carambola* L. (Oxalidaceae; *Kordoi*) is taken to cure Jaundice. Leaf extract of *Carica papaya* L. (Caricaceae; *Amita*) is also taken orally for few weeks to cure jaundice.

3.12 Leach bite: A mixture of *Brassica campestris* L. oil, *Nicotiana tabacum* L. (Solanaceae; *Dhampata*) leaves, *Capsicum annuam* L. (Solanaceae; *Jalukia*) fruits, Calcium Carbonate; CaCO3 and common salt is applied on affected body part.

3.13 Abdomen pain: Roots of *Cynodon dactylon* Pers. (Poaceae; *Dubori*) are grinded and exudate is orally taken 3 times daily. Entire plant of *Centella asiatica* Urban is grinded and exudates is orally taken early in the morning for 3 days.

3.14 Pneumonia: Decoction of roots of *Acorus calamus* L. (Acoraceae; *Bos*) is orally taken twice a day until cure. Fruits of *Myristica fragrans* Houtt. (Myristicaceae; *Jaifal*) and *Piper longum* L. are grinded and mixed with 2-3 grams of intestine of porcupine and boiled, taken orally twice a day. Paste of fruits of *Solanum indicum* L. (Solanaceae; *Bhekuri*), areal parts of *Centella asiatica* Urban and young leaves of *Ficus hispida* L.f. (Moraceae; *Ombe*) is eaten twice for 2-3 days.

3.15 Sinus infection: Juice obtained from grinding of young shoots of *Drymaria cordata* Willd. (Caryophyllaceae; *Laijabori*) or juice of the leaves of *Ocimum sanctum* L. or *Leucas aspera* Spreng. is applied to the nostrils in drop for several times in a day.

3.16 Worms: Powder (half spoon) of dried leaves of *Andrographis paniculata* (Burm. f.) Wall. (Acanthaceae; *Kalmegh*) and *Azadirachta indica* A. Juss is mixed with honey (half spoon) and fed to the patient in empty stomach. Young shoots of Eclipta *prostrata* L. (Asteraceae; *Keharaj*) are grinded and extracted juice is orally taken in the morning for few days.

3.17 Tooth ache: Bark of *Mimusops elengi* L. (Sapotaceae; *Bakul*) is chewed to get relief from toothache. Flowers of *Spilanthes paniculata* Wall. ex DC. (Asteraceae; *Kulekhara*) are eaten raw.

A total of 60 plants belonging to 59 genera and 41 families covering 17 disease/ailments were recorded being used by the *Mishings* of Dibru-Saikhowa National Park. *Centella asiatica* Urban and *Piper longum* L. were being used in combination of other plant species to cure maximum diseases. Almost all the plant species have been recorded by other authors for *Mishing* tribes residing in different parts of Assam [5, 6, 7, 2, 8, 10, 13].

4. Conclusion

Like other tribal communities of Assam and north-eastern India *Mishing* tribal community residing inside the Dibru-Saikhowa National Park also have been using medicinal plants to cure their health problems. The *Mishings* in northeast have a strong belief that these plant-based medicines are very-very effective and *Mishings* of Dibru-Saikhowa are not an exception to this. *Mishings* firmly believe that the information of the plant medicines should be kept secret or else it loses the efficacy and as such they do not like to reveal this information.

There is no dispensary or primary health centre available for these villages. Nearest town to the population residing inside the Dibru-Saikhowa National Park is Tinsukia in Assam but it is not connected with any type of road. They have to cross the Dibru River, tributary of Brahmputra River, with the help of boats to reach the nearest road-head and further several kilometres to reach medical centre in Tinsukia town. This issue also compelled elderly mishing to use herbal medicine made by locally available natural resources. But there is high chance of diminishing this knowledge of medicinal plants because only few elderly and experienced healers are left in the population young generation is not very keen to conserve their traditional knowledge.

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