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Research article

Biodiversity of a tribal village in Assam with special emphasis on the traditional knowledge of plants

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Abstract: The use of herbal medicinal knowledge in India is famously recognized all over the world. Many people living in remote areas still depend on the indigenous knowledge on plants for years. They use to carry down their knowledge orally from one generation to the other. The Tea Garden Workers of Assam are a mixture of both tribals and backward caste Hindus who were brought by the British colonial planters as labourers from Jharkhand, Odisha, West Bengal, Telangana and Chhattisgarh to Assam during 1860-90s. A total of 58 plant species and 19 bird species belonging to 18 families were recorded in the selected tribal village from the present study. Out of 58 plant species, 14 were used by the tribe as traditional live fencing. The present study shows that the tribe is also good in ethnomedicinal practices. In our study, 67 species of butterflies of 5 different families were also reported.

Keywords: Species, Family, Live fencing, Ethanomedicinal.

INTRODUCTION

The use of herbal medicinal knowledge in India is famously recognized all over the world. Many people living in remote areas still depend on the indigenous knowledge on plants for years. They use to carry down their knowledge orally from one generation to the other. The traditional knowledge of plants should be given proper importance because it can provide potentialities for the discovery of new and potential chemical compounds. Therefore, detailed and systematic documentation of the traditional knowledge of the different tribes is important. In addition to the proper knowledge of plant species in their ecosystems, they also value the ecological interactions of the various components of the ecosystem. The Northeast is one of the most biodiverse regions in the world where almost 150 tribes speaking as many as languages. The Tea Garden Workers of Assam are a mixture of both tribals and backward caste Hindus who were brought by the British colonial planters as labourers from Jharkhand, Odisha, West Bengal, Telangana and Chhattisgarh to Assam during 1860-90s. The active tea garden workers and their dependents who reside in Tea Estates spread across Assam from the tribal community. They are found mainly in the districts of Kokrajhar, Udalguri, Sonitpur, Nagaon, Golaghat, Jorhat, Sivasagar, Dibrugarh, Tinsukia and almost all the districts of Assam. The vast traditional knowledge of the tea community of Assam requires much attention for the sustainable use of biodiversity for various purposes in their day to day life.

MATERIALS AND METHODS

The study was conducted in the Balipara Tea Estate 1 and 2 of Sonitpur district of Assam, India. Line transect method was used to record the floral diversity of the selected area (Barhaum *et al.*, 1980). The identification of flora was done with the help of literature (Barooah & Ahmed, 2014). The information related to floral diversity was collected after discussion with the local inhabitants. Following the belt transect method, the population of bird was recorded (Cunningham *et al.*, 2006). During a transect walk, the observer recorded data on the sightings of the bird species. The bird survey was conducted during morning and evening time zone (Cunningham *et al.*, 2006, Simons *et al.*, 2006). The 'Pollard walk' method (Pollard & Yates, 1993) was followed to record the butterfly diversity of the village. Sampling was carried during the sunlight hour (8:00 to 15:00 hr) mostly on sunny days. Butterflies were identified from photographs and using field guides (Evans, 1932). The samplings were carried out for both flora and fauna of the village covering all the months in different localities during the year 2018. Field notes, photographs and observations of the flora and fauna were taken for all the seasons during the daylight hours.

RESULTS AND DISCUSSIONS

Each plant species found in the village are documented in the table following its local name, family and traditional uses (Table 1 and Table 2). Most of the plant species are used in the day to day life of the tribal people which deserve

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attention for the sustainable use of biodiversity and livelihood. The traditional use of these plants is an essential part of the tea tribes. Out of 58 plant species recorded from the village, 14 plants belonging to 8 families were used by the tribe for live fencing. These plants also have a very strong soil binding capacity which is also helpful for a sustainable soil management (Borkataki *et al.*, 2006).

Table 1. Plant species found in Balipara Tea state 1 and 2, Assam.

S.N.	Scientific name	Common name/ Local name	Family	Conservation status	Plant parts used
1	*Aegle marmelos* (L.) Correa	Wood apple/Bel	Rutaceae	Least concern	Fruit/Edible/Sacred plant
2	*Agave americana* L.	Bon anaras	Agavaceae	Least concern	Live fencing, Soil erosion management, Ornamental plant
3	*Albizia saman* (Jacq.) Merr.	Rain tree/ Sirish- goch	Fabaceae	Least concern	-------
4	*Ananas comosus* (L.) Merr.	Pineapple/ Mati kothal, Anaras	Bromeliaceae	Least concern	Fruit/Edible
5	*Annona squamosal* L.	Custard apple/ Atloch, Atlas	Annonaceae	Not evaluated	Fruit/Edible
6	*Areca catechu* L.	Betel nut/Tamol goch	Arecaceae	Least concern	Fruit/Edible, Sacred plant
7	*Argemone Mexicana* L.	Prickly poppy/ Kuhum-kata, Sial-kanta	Papaveraceae	Least concern	Root, Latex/Chickenpox, Skin diseases, Medicinal purposes
8	*Artocarpus heterophyllus* Lam.	Jackfruit/Kothal	Moraceae	Least concern	Fruit/Edible
9	*Bambusa multiplex* (Lour.) Rausch	Hedge Bambo/ Bans	Poaceae	Least concern	Live fencing, Construction works, Young shoot edible
10	*Bambusa tulda* Roxb.	Bans	Poaceae	Least concern	Live fencing, Soil erosion management and construction
11	*Boehmeria nivea* (L.) Gaudich.	Ramie/Riha, Remi	Urticaceae	Least concern	-------
12	*Bombax ceiba* L.	Silk cotton tree/ Simolu	Malvaceae	Least concern	Extraction of silk cotton
13	*Butea monosperma* (Lam.) Taub.	Forest Flame/ Polash	Fabaceae	Least concern	Bark/ Medicinal purposes
14	*Callistemon citrinus* (Curtis) Skeels	Bottle brush	Myrtaceae	Least concern	-------
15	*Calotropis gigantea* (L.) W. T. Aiton	Crown Flower/Akonda	Apocynaceae	Least concern	-------
16	*Cestrum nocturnum* L.	Night-blooming Jessamine/ Hasnahana	Solanaceae	Least concern	Live fencing, Ornamental plants
17	*Citrus aurantiifolia* (Christm.) Swingle	Key Lime/Gol nemu	Rutaceae	Least concern	Fruit/Edible
18	*Citrus maxima* (Burm. f.) Osbeck	Rabab tenga	Rutaceae	Least concern	Fruit/Edible
19	*Clerodendrum infortunatum* L.	Hill glory bower/ Dhopat-tita, Bhet-tita	Lamiaceae	Least concern	-------
20	*Cocos nucifera* L.	Coconut tree/ Narikol	Arecaceae	Least concern	Fruit/Edible
21	*Cuscuta reflexa* Roxb.	Akashi-lota, Swarna-lota	Cuscutaceae	Least concern	-------
22	*Dactyloctenium aegyptium* (L.) Willd.	Cow foot grass	Poaceae	Least concern	-------
23	*Dendrocalamus longispathus* (Kurz) Kurz	Bamboo/ Bor bhuluka banh	Poaceae	Least concern	Whole plant/Construction Sprouts/Edible
24	*Dillenia indica* L.	Outenga	Dilleniaceae	Least concern	Fruit/Edible
25	*Diplazium esculentum* (Retz.) Sw.	Fiddlehead fern/Dhekia sak	Athyriaceae	Least concern	Tender fronds/Edible
26	*Duranta erecta* L.	Pigeon berry/ Kanakanta	Verbenaceae	Least concern	Live fencing, Ornamental plants
27	*Duranta repens* L.	Kanakanta	Verbenaceae	Least concern	Live fencing, Ornamental plants
28	*Ficus benghalensis* L.	Bayan/Bor-goch, Bot	Moraceae	Least concern	-------
29	*Ficus religiosa* L.	Pepeel tree/ Anhot	Moraceae	Least concern	Sacred plant
30	*Fragaria vesca* L.	Garden Strawberry	Rosaceae	Least concern	Fruits/Edible, Medicinal purposes
31	*Hibiscus rosa-sinensis* L.	Hibiscus, Chinese rose/Rokta-joba	Malvaceae	Least concern	Flower/Ornamental, Medicinal purposes Leaves/Medicinal purposes
32	*Ipomea carnea* Jacq	Paniara	Convolvulaceae	Least concern	Live fencing, Ornamental plants

33	*Jatropha curcus* L.	Purging nut/ Bhotera, Bagbherenda	Euphorbiaceae	Least concern	Live fencing, Ornamental and clean teeth
34	*Jatropha gossypifolia* L.	Puppet seed plant/ Bagbherenda	Euphorbiaceae	Least concern	Live fencing
35	*Lagenaria siceraria* (Molina) Standl.	Bottle gourd/Pani -lao	Cucubitaceae	Least concern	Fruit/Edible
36	*Lantana camara* L.	Common Lantana / Gu-phul	Verbenaceae	Least concern	Young stem/Toothstick
37	*Leonurus japonicus* Houtt.	Siberian mother wort	Lamiaceae	Least concern	-------
38	*Leucas aspera* (Willd.) Link	Thumba, Common Leucas/ Durun	Lamiaceae	Least concern	Leaves/Wounds, Sinusitis, Medicinal purposes
39	*Mangifera indica* L.	Mango/Aam	Anacardiaceae	Least concern	Fruit/Edible
40	*Mesua ferrea* L.	Iron wood tree/ Nahor	Calophylaceae	Least concern	Wood/Timber
41	*Mirabilis jalapa* L.	Gadhuligupal	Nyctaginaceae	Least concern	Flower/Ornamental value
42	*Morus alba* L.	Silkworm mulberry/ Nuni	Moraceae	Least concern	Fruit/Edible Leaf/Rearing silkworm
43	*Musa paradisiaca* L.	Banana/Kol	Musaceae	Least concern	Whole plant /Edible/Various purposes
44	*Nerium oleander* L.	Sweet Scented Oleander/Korobi	Apocynaceae	Least concern	Flower/Ornamental
45	*Nyctanthes arbor-tristis* L.	Night Jasmine/Shewali	Oleaceae	Least concern	Flower/Ornamental, Edible Leaves/Skin disease, Medicinal purposes
46	*Ocimum tenuiflorum* L.	Sacred basil/Kola tulsi	Lamiaceae	Least concern	Whole plant/Medicinal purposes
47	*Phoenix sylvestris* (L.) Roxb.	Date palm/ Khejur	Arecaceae	Least concern	Fruit/Edible
48	*Polyalthia longifolia* (Sonn.) Thwaites	Debodaru	Annonaceae	Least concern	-------
49	*Prunus persica* (L.) Stokes	Peach/ Ahom bogori	Rosaceae	Least concern	Fruit/Edible
50	*Psidium guajava* L.	Guava/ Madhuri [Temrash]	Myrtaceae	Least concern	Fruit/Edible
51	*Pyrostegia venusta* (Ker-Gawl.) Miers	Golden shower	Bignoniaceae	Least concern	Flower/Ornamental plant
52	*Ricinus communis* L.	Castor bean/Era-gach	Euphorbiaceae	Least concern	Leaves, Roots/Medicinal purposes
53	*Saccharum officinarum* L.	Sugar cane/ Kunhiar	Poaceae	Least concern	Stem/Edible
54	*Solanum spirale* Roxb.	Titakuchi, Bagua	Solanaceae	Least concern	Live fencing
55	*Solanum violaceum* Ortega	Indian nightshade, poison berry	Solanaceae	Least concern	Tender shoot/Dysentery Juice/Skin diseases, Medicinal purposes
56	*Syzygium cumini* (L.) Skeels	Jamun/ Kola jamu	Myrtaceae	Least concern	Fruit/Edible
57	*Tamarindus indica* L.	Tamarind/Teteli	Fabaceae	Least concern	Fruit/Edible
58	*Thevetia peruviana* (Pers.) K. Schum.	Yellow Oleander/ Korobi	Apocynaceae	Least concern	Flower/Ornamental, Religious purposes

Table 2. Traditional live fencing plants.

S.N.	Scientific name	Common name /Local name	Family	Conservation status	Plant parts used
1	*Agave americana* L.	Bon anaras	Agavaceae	Least concern	Live fencing, Soil erosion management, Ornamental plants
2	*Bambusa tulda* Roxb.	Bans	Poaceae	Least concern	Live fencing, Soil erosion management and construction
3	*Bambusa multiplex* (Lour.) Rausch	Hedge Bambo/ Bans	Poaceae	Least concern	Live fencing, Construction works, Young shoot edible
4	*Cestrum nocturnum* L.	Night-blooming Jessamine/Hasnahana	Solanaceae	Least concern	Live fencing, Ornamental plants
5	*Duranta repens* L.	Kanakanta	Verbenaceae	Least concern	Live fencing, Ornamental plants
6	*Duranta erecta* L.	Pigeon berry/ Kanakanta	Verbenaceae	Least concern	Live fencing, Ornamental plants
7	*Hibiscus rosa-sinensis* L.	Hibiscus, Chinese rose/Rokta-joba	Malvaceae	Least concern	Flower/ Ornamental, Medicinal, Leaves/ Medicinal, Plant/ Live fencing

8	*Ipomea carnea* Jacq	Paniara	Convolvulaceae	Least concern	Live fencing, Ornamental plants
9	*Jatropha curcus* L.	Purging nut/ Bhotera, Bagbherenda	Euphorbiaceae	Least concern	Live fencing, Ornamental and clean teeth
10	*Jatropha gossypifolia* L.	Puppet seed plant/ Bagbherenda	Euphorbiaceae	Least concern	Live fencing
11	*Lantana camara* L.	Common Lantana / Gu-phul	Verbenaceae	Least concern	Young stem/Toothstick, Plant/Livefencing
12	*Musa paradisiaca* L.	Banana/Kol	Musaceae	Least concern	Whole plant /Edible /Various purposes/Live fencing
13	*Ricinus communis* L.	Castor/ Eri, Arand	Euphorbiaceae	Least concern	Live fencing, Feeding Eri silk worm
14	*Solanum spirale* Roxb.	Titakuchi, Bagua	Solanaceae	Least concern	Live fencing

Table 1 and Table 2 enlist the plant species and parts commonly used for the livelihood and live fencing respectively of the study area. The present study shows that the tribe is also good in ethnomedicinal practices. Most of the plant species are edible following some others using for live fencing, ornamental and medicinal purposes respectively. Most of the plants have traditional medicinal value and many are used as food (Fig. 1).

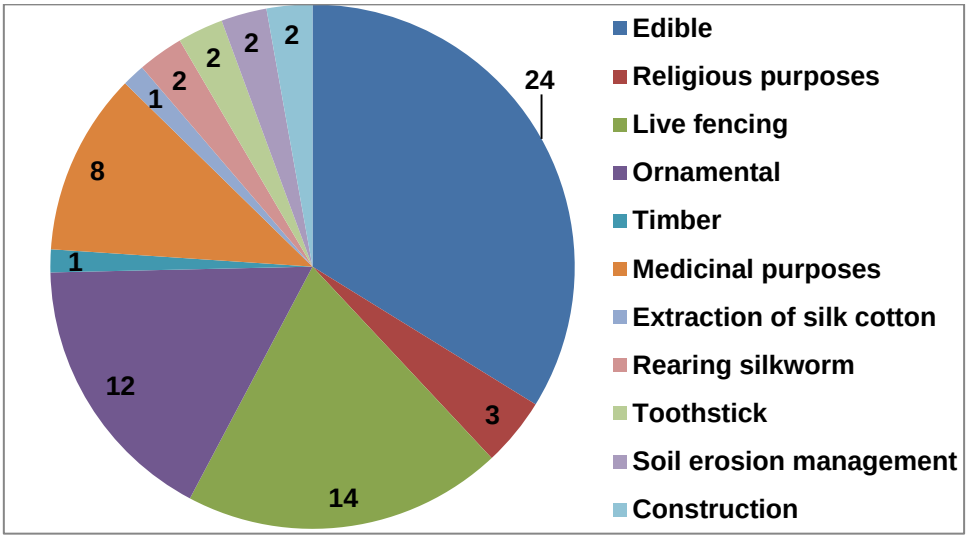

Figure 1. Graphical representation of the plants used in various purposes of the tribal people.

A total of 19 bird as well as 67 butterfly species were recorded in the present study (Table 3 & 4). Among the recorded 19 bird species, *Leptoptilos javanicus* is listed as endangered species in the IUCN red list (BLI, 2017). The swallowtail butterflies occupy an important place and the IUCN has identified the entire NE region as swallowtail rich zone under "Swallowtail Conservation Action Plan". In our study, 67 species of butterflies of 5 different families were also reported from the selected area.

CONCLUSION

From our study it reveals that the selected tribal village is home to a good number of flora and fauna. The villagers also have a good knowledge on plants and they use the locally available species for their day to day life. One important aspects of our finding is that they also used plants as traditional live fencing which is correlated with the sustainable livelihood. The new generation should document this knowledge for the future studies and implementation.

Table 3. Bird species found in Balipara Tea state 1 and 2, Assam.

S.N.	Scientific name	Common name / English name	Conservation status	Family
1	*Acridotheres tristis*	Common Myna	Least concern	Sturnidae
2	*Aethopyga siparaja*	Crimson sunbird	Least concern	Nectariniidae
3	*Amauronis phoenicrus*	The white-breasted waterhen	Least concern	Rallidae
4	*Ardea alba*	Large Egret	Least concern	Ardeidae
5	*Copsychus saularis*	Oriental Magpie robin	Least concern	Muscicapidae
6	*Coracies benghalensis*	Indian Roller	Least concern	Coraciidae
7	*Corvus splendens*	House crow	Least concern	Corvidae
8	*Dendrocitta vagabunda*	Rufous Treepie	Least concern	Corvidae
9	*Dendrocygna javanica*	lesser whistling duck	Least concern	Anatidae
10	*Dicrurus macrocercus*	Black Drongo	Least concern	Dicruridae

11	*Halcyon smyrnensis*	White throated Kingfisher	Least concern	Alcedinidae
12	*Lanius cristatus*	Brown Shrike	Least concern	Laniidae
13	*Leptoptilos javanicus*	Lesser Adjutant	Vulnerable	Ciconiidae
14	*Passer domesticus*	House sparrow	Least concern	Passeridae
15	*Phalacrocorax niger*	Little Cormorant	Least concern	Phalacrocoracidae
16	*Pteropus vampyrus*	Large flying fox	Least concern	Pteropodidae
17	*Pycnonotus cafer*	Red-vented bulbul	Least concern	Pycnonotidae
18	*Streptopelia chinensis*	Spotted dove	Least concern	Columbidae
19	*Vanellus indicus*	Redwattled lapwing	Least concern	Charadriidae

Table 4. Butterfly species found in Baligaon, Assam.

S.N.	Scientific name	Common name	Conservation status	Family
1	*Ariadne ariadne*	Angled Castor	Least concern	Nymphalidae
2	*Athyma nefte*	Colour Sergeant	Least concern	Nymphalidae
3	*Athyma perius*	Common Sergeant	Least concern	Nymphalidae
4	*Castalius rosimon*	Common Pierrot	Least concern	Lycaenidae
5	*Catopsilia Pomona*	Common Emigrant	Least concern	Pieridae
6	*Catopsilia pyranthe*	Mottled Emigrant	Least concern	Pieridae
7	*Celaenorrhinus leucocera*	Common Spotted Flat	Least concern	Hesperiidae
8	*Cepora nadina*	Lesser Gull (Rare)	Least concern	Pieridae
9	*Cepora nerissa*	Common Gull	Least concern	Pieridae
10	*Cethosia biblis*	Red Lacewing	Least concern	Nymphalidae
11	*Cethosia cyane*	Leopard Lacewing	Least concern	Nymphalidae
12	*Cheritra freja*	Common Imperial	Least concern	Lycaenidae
13	*Chilades lajus*	Lime Blue	Least concern	Lycaenidae
14	*Colotis aurora*	Plain Orange Tip	Least concern	Pieridae
15	*Colotis etrida*	Small orange tip	Least concern	Pieridae
16	*Common dartlet*	Oriens gola	Least concern	Hesperiidae
17	*Curetis thetis*	Indian Sunbeam	Least concern	Lycaenidae
18	*Danaus genutia*	Common Tiger	Least concern	Nymphalidae
19	*Delias eucharis*	Common Jezebel	Least concern	Pieridae
20	*Euploea core*	Common Indian Crow	Least concern	Nymphalidae
21	*Eurema brigitta*	Small grass Yellow	Least concern	Pieridae
22	*Eurema hecabe*	Common Grass Yellow	Least concern	Pieridae
23	*Eurema hecabe*	Grass yellow sp.	Least concern	Pieridae
24	*Eurema sari*	Chocolate grass yellow	Least concern	Pieridae
25	*Graphium agamemnon*	Tailed Jay	Least concern	Papilionidae
26	*Graphium doson*	Common Jay	Least concern	Papilionidae
27	*Graphium sarpedon*	Common Bluebottle	Least concern	Papilionidae
28	*Hebomoia glaucippe*	Great Orange Tip	Least concern	Pieridae
29	*Iambrix salsala*	Chestnut Bob	Least concern	Hesperiidae
30	*Ixias marianne*	White Orange Tip	Least concern	Pieridae
31	*Jamides celeno*	Common Cerulan	Least concern	Lycaenidae
32	*Junonia almanac*	Peacock Pansy	Least concern	Nymphalidae
33	*Junonia atlites*	Gray Pancy	Least concern	Nymphalidae
34	*Junonia hierta*	Yellow Pansy	Least concern	Nymphalidae
35	*Junonia iphita*	Chocolate Pansy	Least concern	Nymphalidae
36	*Junonia lemonias*	Lemon Pansy	Least concern	Nymphalidae
37	*Loxura atymnus*	Yamfly	Least concern	Lycaenidae
38	*Melanitis leda*	Common Evening Brown	Least concern	Nymphalidae
39	*Moduza procris*	Commander	Least concern	Nymphalidae
40	*Mycalesis perseus*	Common Bush Brown	Least concern	Nymphalidae
41	*Neptis hylas*	Common Sailer	Least concern	Nymphalidae
42	*Notocrypta curvifascia*	Restricted Demon	Least concern	Hesperiidae
43	*Odontoptilum angulata*	Chestnut Angle	Least concern	Hesperiidae
44	*Orsotriaena medus*	Nigger	Least concern	Nymphalidae
45	*Pachliopta aristolochiae*	Common Rose	Least concern	Papilionidae
46	*Papilio clytia*	Common Mime	Least concern	Papilionidae
47	*Papilio demoleus*	Lime Butterfly	Least concern	Papilionidae
48	*Papilio helenus*	Red Helen	Least concern	Papilionidae
49	*Papilio iswara*	Great Helen	Least concern	Papilionidae
50	*Papilio memnon*	Great Mormon	Least concern	Papilionidae

51	*Papilio polytes*	Common Mormon	Least concern	Papilionidae
52	*Parantica aglea*	Glassy Tiger	Least concern	Nymphalidae
53	*Phalanta phalantha*	Common Leopard	Least concern	Nymphalidae
54	*Pieris brassicae*	Large Cabbage White	Least concern	Pieridae
55	*Pieris canidia*	Indian Cabbage White	Least concern	Pieridae
56	*Pseudocoladenia dan*	Fulvous Pied Flat	Least concern	Hesperiidae
57	*Sarangesa dasahara*	Common Small Flat	Least concern	Hesperiidae
58	*Spialia galba*	Indian Skipper	Least concern	Hesperiidae
59	*Tanaecia lepidea*	Grey Count	Least concern	Nymphalidae
60	*Taractrocera maevius*	Common Grass Dart	Least concern	Hesperiidae
61	*Telicota ancilla*	Dark Palm Dart	Least concern	Hesperiidae
62	*Telicota colon*	Pale Palm Dart	Least concern	Hesperiidae
63	*Troides helena*	Common Birdwing	Least concern	Papilionidae
64	*Udaspes folus*	Grass Demon	Least concern	Hesperiidae
65	*Ypthima baldus*	Common Five Ring	Least concern	Nymphalidae
66	*Ypthima huebneri*	Common Four Ring	Least concern	Nymphalidae
67	*Zizula hylax*	Tiny Grass Blue	Least concern	Lycaenidae

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