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Ethnobotanical studies on the Tea Garden workers of Darjiling Hills

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Abstract

The paper deals with the ethnobotanical studies in six tea gardens of Darjiling hills located within the altitudinal range of 900 – 2200 m amsl. The study documented the use of thirty medicinal plants, nineteen food and fodder plants and eight sacred/ religious plants by the workers of the tea gardens comprising of different traditional communities like Tamang, Limboo, Dukpa and Lepcha. The details have been presented in the form of tables and photographs.

Key words: Ethnobotany, Tea garden workers, Traditional communities, Darjiling hills

INTRODUCTION

Darjiling is the northernmost district of the Indian state of West Bengal and is located between 26° 27' 05" to 27° 13' 10" North latitude and 87° 59' 30" to 88° 53' East longitude. Mt. Kanchenjunga, the second tallest mountain peak of the world, forms the crown of Darjiling Hills. The district is traversed by some important rivers like Teesta, Rangeet, Balasun and Mahananda. The Darjiling district is further divided into four administrative sub-divisions viz. Darjiling, Kurseong, Kalimpong and Siliguri; of which the 4th subdivision is situated on plains (O'Malley 1907).

'Tea, Timber and Tourism' forms the main economic backbone of Darjeeling (Das 2004). Tea cultivation in Darjiling was initiated during British period in the year 1856 (Anonymous 1908) and that has now become the main livelihood for the people of Darjiling Hills and of the adjacent Terai and Duars. At present there are 87 registered tea gardens in Darjiling spreading across the geographical area of 20,200 ha (Khawas 2005). With few exceptions, tea garden workers are solely dependent upon tea companies for their livelihood. Rai & Bhujel (2002) studied the ethnobotany in the fringe areas of Darjiling and have reported a large number of plants with wide ranges of uses among different groups of tribes. Ghosh (2006), Ghosh *et al.* (2004), Ghosh & Das (2007) and Das *et al*. (2007) studied the biology of tea garden weeds in Darjiling district and some aspects of ethnobotany of tea garden workers. However the present area under study was not covered by those previous works. The ration the Tea Garden workers receive from the employers and the salary they usually get are not sufficient to maintain a market based life-style. Although the medical facility is provided to them, the inconvenience in transportation and insufficient medical facility force the workers to be dependent upon the ethnic traditional medicines, which they have been following since decades or centuries. Therefore, the present work has been undertaken to study and to understand their traditional knowledge status on different ethnobotanical aspects.

MATERIALS AND METHODS

The present study was carried out in six Tea Gardens of Darjiling Hills under Darjiling subdivision. The location, altitude and basic demographic information has been provided in Table 1. The distribution on these gardens in Darjiling Hills is shown in Fig. 1.

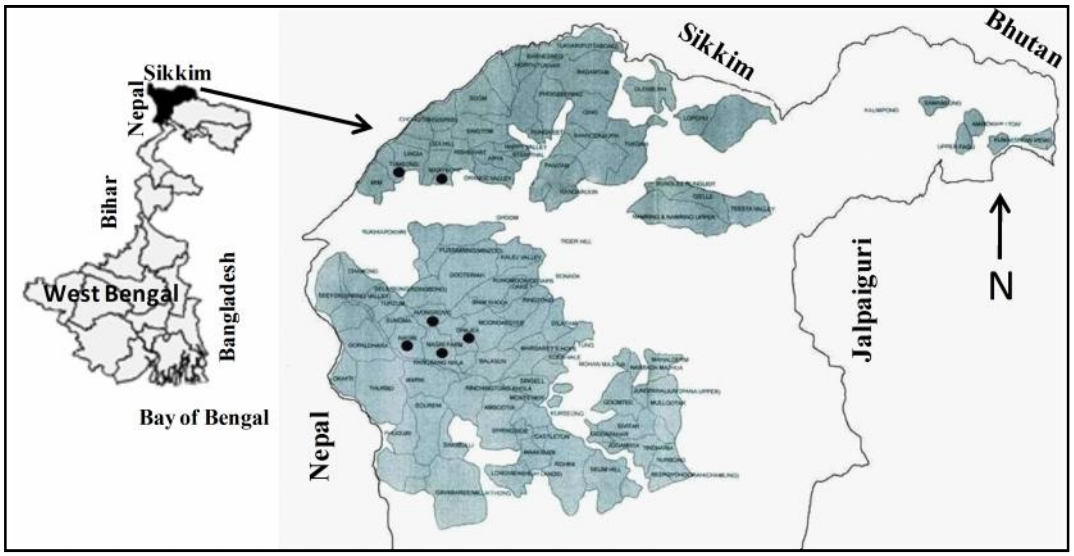

Fig. 1: Map showing the distribution of Tea Garden in Darjiling Hills with study sites marked with dark points

Table 1. The location, altitude and basic demographic information of the selected Tea Gardens

Garden	Central location		Central altitude in m amsl	Population	Ethnic identity
	Longitude	Latitude			
Tumsong	88°10′32″ E	26°02′06″ N	1676	327	Tamang, Limboo, Rai, Dukpa
Marybong	88°12′04″ E	27°02′17″ N	1829	3,078	Tamang, Limboo, Rai, Dukpa
Nagri	88°12′29″ E	26°55′29″ N	2165	934	Tamang, Limboo
Dhajea	88°10′02″ E	26°59′40″ N	914	492	Lepcha,Tamang, Rai, Limboo
Nagri Farm	88°12′4.75″ E	26°55′19″ N	1951	813	Tamang, Lepcha, Limboo
Avongrove	88°12′13″ E	26°56′18″ N	2200	447	Dukpa, Limboo, Tamang

The meteorological data collected from the meteorological units of the concerned tea factories showed that the average monthly temperature in these tea gardens varied from 23.4° C (max.) to 13.8° C (min.) with average monthly rainfall of about 26.56 cm.

Before starting the survey work, formal consent to collect and publish their knowledge was taken. Ethnobotanical survey was conducted from door to door among the garden workers following the structured questionnaire of Jain & Mudgal (1999). Discussions were held in the study area with local medicine practitioners, vendors, spiritual healers (*Jhakri* and *Bijuwas*) and senior people (including ladies) from the community. Informations were collected on various types of uses such as food and fodders, phyto-medicines and sacred/ religious plants. The local people were requested to spot the plants in the vegetation and the

PLATE - I: A. Tea garden workers in action; **B**. *Bergenia ciliata;* **C**. *Astilbe rivularis;* **D**. *Physalis peruviana;* **E**. *Phlogacanthus thyrsiformis;* **F**. *Rhododendron arboreum*; **G.** *Hedyotis scandens* (root in inset); **H.** Collected leaf buds of *Ficus lacor;* **I**. *Aralia leschenaultii;* **J**. *Hydrocotyle himalaica*; **K**. *Clematis buchananiana*; **L.** *Oroxylum indicum*

voucher specimens were collected. The details were recorded in the field note book and were also photographed. The collected specimens were processed into mounted herbarium sheets following the conventional methodology (Jain & Rao 1977) and were identified using local floras including Prain (1903), Hara (1966, 1971), Hara *et al* (1978, 1982), Hara & Williams (1979), Grierson & Long (1983, 1987, 1991, 1999, 2001) and Noltie (1994, 2000). Identified specimens were matched and deposited at the NBU Herbarium. For nomenclature and family delimitation www.theplantlist.org was largely consulted.

RESULTS AND DISCUSSION

The present ethnobotanical survey among the tea garden workers from the study area in Darjiling hills has resulted in the record of thirty medicinal plants, nineteen food and fodder plants and eight sacred/religious plants. In total, 48 species of plants were recorded belonging to 34 families. The Asteraceae consisted of highest number of 6 species followed by Acanthaceae and Araliaceae with 4 species each. 13 species of plants were used as a food by the workers and 7 species as fodder for their cattle. The parts of the plants which were mostly used as medicine were leaves followed by roots and flowers. The garden workers were dependant on the plants especially for curing sore throat, chicken pox, cold, jaundice, and urinary trouble. Three species of plants were used against sore throat and cough and cold, 2 species each were used against chicken pox, asthma, jaundice, urinary trouble, sinusitis and liver troubles and one species each were used against dysentery, diarrhea, tonsillitis, gastric problems and fever (Tables 2 – 4). Species like *Artemisia indica* are used commonly as medicines as well as for fodder and also in traditional rituals. *Cheilocostus speciosus* was found in most of the homestead gardens of the workers as they use it extensively for curing jaundice. The garden workers treat the *Ficus benghalensis* as a holy tree and also consume the young leaf-buds of *Ficus lacor* as chutney. Species like

Table 2. Lists of plants used as traditional medicines by tea garden workers

Scientific name [Family]; Voucher specimen	Local name	Parts used	Uses
Acmella calva (de Candolle) Jensen [Asteraceae]; *D. Chettri & A.P. Das 0034*	*Pahelo tauke*	Inflorescence	Boiled inflorescence taken as soup during chicken pox and measles
Aconogonum molle (D. Don) H. Hara [Polygonaceae]; *D. Chettri & A.P. Das 0037*	*Thotney*	Shoots	Used as an antidote
Acorus calamus Linneaus [Acoraceae]; *D. Chettri & A.P. Das 0010*	*Bojho*	Rhizome	Against cough and cold, asthma
Ageratina adenophora (Sprengel) R.M. King & H. Robinson [Asteraceae]; *D .Chettri & A.P. Das 0030*	*Kalijhar/ Banmara*	Leaves	Smashed leaves applied on cuts and wounds as antibacterial, antiseptic and antifungal agent
Aloe vera (Linnaeus) N.L. Burman [Liliaceae]; *D.Chettri & A.P.Das 0046*	*Ghew kumari*	Leaves	Leaf gel applied in burnt areas
Artemisia indica Willdenow [Asteraceae]; *D .Chettri & A.P. Das 0018*	*Titepati*	Leaves	Smashed leaves used to stop nose bleeding
Astilbe rivularis Buchanon-Hamilton *ex* D. Don [Saxifragaceae]; *D. Chettri & A.P. Das 0038*	*Buro okhati*	Rhizome	Dysentery and diarrhea, tonsillitis
Bergenia ciliata (C.C. Haworth) Sternberg [Saxifragaceae]; *D. Chettri & A.P Das 0053*	*Pakhan beth*	Leaves	Leaf paste along with other ingredients like red soil, *Kaempheria rotunda*, *Viscum album* and *Pilea scripta* (tuber) during leg fracture
Brassaiopsis hainla (Buchanon- Hamilton) Seeman [Araliaceae]; *D. Chettri & A.P.Das 0025*	*Chuletro*	Flowers	Against cough and throat problems

Scientific name [Family]; Voucher specimen	Local name	Parts used	Uses
Calotropis gigantea (Linnaeus) Dryander [Apocynaceae]; *D.Chettri & A.P Das 0052*	*Ankh*	Leaves	Dorsal side of leaf is gently heated and massaged over the pained part; milky latex is applied during joint pain and tied with the fibres obtained from its stem
Capsicum annuum Linnaeus [Solanaceae]; *D. Chettri & A.P .Das 0041*	*Dalley khorsani*	Fruits	Gastric problems, tuberculosis; carminative
Centella asiatica (Linnaeus) Urban [Apiaceae]; *D. Chettri & A.P.Das 0039*	*Ghora taprey*	Leaves	Fever, asthma, mouth sore
Cheilocostus speciosus (J. Koeing) C.D . Specht [Costaceae]; *D. Chettri & A.P. Das 0035*	*Betlauri*	Stem	Stem is chewed and juice swallowed against jaundice; urinary tract infection and burning sensation during urination
Clematis buchananiana de Candolle [Ranunculaceae]; *D. Chettri & A.P.Das 0042*	*Pinasi lahara*	Leaves and roots	Sinusitis, headache
Drymaria cordata (Linnaeus) Willdenow *ex* Schultes [Caryophyllaceae]; *D. Chettri & A.P .Das 0043*	*Abhijalo*	Leafy shoot	Heated plants wrapped in a piece of cotton cloth and then inhaled during headache and sinus pain
Ficus religiosa Leveille [Moraceae]; *D. Chettri & A.P. Das 0016*	*Peepal*	Leaves	Leaf extract used in the treatment of piles
Hedyotis scandens Roxburgh [Rubiaceae]; *D. Chettri & A.P. Das 0047*	*Bakhra kaaney*	Roots	Root decoction is taken during indigestion and liver problems
Hydrocotyle himalaica P.K. Mukherjee [Araliaceae]; *D. Chettri & A.P.Das 0004*	*Gol Patta*	Leaves	Fresh leaves are chewed in throat sore
Litsea cubeba (Loureiro) Persoon [Lauraceae]; *D. Chettri & A.P.Das 0044*	*Sil timbur*	Bark and fruits	Stomachache, indigestion
Mimosa pudica Linnaeus [Leguminosae, Mimosoidae]; *D. Chettri & A.P. Das 0001*	*Buhari jhar/ Lajjawati*	Roots	Small balls prepared from smashed roots used as painkiller in toothache
Nasturtium officinale Robert Brown [Brassicaceae]; *D. Chettri & A.P .Das 0045*	*Simrayo*	Leaves	Leaf decoction is taken against tuberculosis and jaundice
Ocimum tenuiflorum Linnaeus [Lamiaceae]; *D. Chettri & A.P. Das 0029*	*Tulasi, tulasi-manjari*	Leaves and inflorescence	Boiled leaves and inflorescence is taken during cough and fever
Oroxylum indicum (Linnaeus) Kurz [Bignoniaceae]; *D. Chettri & A.P.Das 0024*	*Totola*	Seeds	4 – 5 seeds are chewed and juice swallowed in throat sore
Paederia foetida Linnaeus [Rubiaceae]; *D. Chettri & A.P. Das 0046*	*Padey lahara*	Leaves and roots	Piles and liver troubles
Phlogacanthus thyrsiformis (Roxburgh *ex* Hardwicke) D.J. Mabberley [Acanthaceae]; *D. Chettri & A.P Das 0005*	*Chuwa*	Bark and leaves	Piles, liver cirrhosis, whooping cough
Physalis peruviana Linnaeus [Solanaceae]; *D. Chettri & A.P. Das 0032*	*Phakphake*	Ripe fruits	Taken in throat sore
Rhododendron arboreum Smith [Ericaceae]; *D. Chettri & A.P. Das 0008*	*Lali Gurans*	Flowers	Fresh or dried petals are taken when chocked with fish-spines
Saccharum officinarum Linnaeus [Poaceae]; *D. Chettri & A.P. Das 0027*	*Kalo ukhoo*	Stem	Paste of stem mixed with sugar candy and *Cheilocostus speciosus* in urinary trouble
Urtica dioica Linnaeus [Urticaceae]; *D. Chettri & A.P. Das 0024*	*Sisnu*	Inflorescence	During high blood pressure
Vigna unguiculata (Linnaeus) Walpers [Leguminosae, Papilionoidae]; *D. Chettri & A.P. Das 0031*	*Gath*	Seeds	As soup during chicken pox and measles

Oroxylum indicum are used mostly by the Limboo and the Tamang communities during their marriage and death ceremonies. *Phlogacanthus thyrsiformis* is another medicinal plant on which the people are dependent for curing piles and liver cirrhosis and they also eat its young inflorescence as vegetable. Plants like *Zingiber officinale* were interestingly used by the Rai community to communicate with the spirits. Although small medical dispensaries

Table 3. Lists of plants used as food and fodder by tea garden workers

Scientific name [Family]; Voucher Specimen	Local name	Parts used	Uses
Ageratina adenophora (Sprengel) R.M. King & H. Robinson [Asteraceae]; *D. Chettri & A.P. Das 0014*	*Kali jhar/ Banmara*	Leafy shoot	Fodder
Aralia leschenaultii (D. Don) Hara [Araliaceae]; *D. Chettri & A.P. Das 0033*	*Chinde*	Young shoot	Used to prepare chutney
Artemisia indica Willdenow [Asteraceae]; *D. Chettri & A.P .Das 0018*	*Titepati*	Whole plant	Fodder
Dendrocalamus hamiltonii Nees & Arnott *ex* Munro [Poaceae]; *D. Chettri & A.P. Das 0023*	*Taama*	Young shoot	Cooked as vegetable; used to prepare pickles
Brassaiopsis hainla (Buchanon-Hamilton) Seeman [Araliaceae]; *D. Chettri & A.P. Das 0025*	*Chuletro*	Inflorescence	Cooked as vegetable
Colocasia esculenta (Linnaeus) Schott [Araceae]; *D. Chettri & A.P. Das 0020*	*Kalo Kachhu*	Rhizome	Used as additive when cooked with Kalo daal (*Phaseolus mungo*)
Crotolaria juncea Linnaeus [Fabaceae]; *D. Chettri & A.P. Das 0028*	*Sunhemp*	Flowers	Cooked as vegetable
Ficus lacor Buchanon-Hamilton [Moraceae]; *D. Chettri & A.P. Das 0040*	*Kavro*	Leaf buds	Used to prepare chutney
Justicia adhatoda Linnaeus [Acanthaceae]; *D. Chettri & A.P. Das 0026*	*Asuro*	Inflorescence	Cooked as vegetable
Litsea monopetala (Roxburgh) Persoon [Lauraceae]; D. Chettri & *A.P. Das 0022*	*Kutmero*	Leaves	Fodder
Manihot esculenta Crantz [Euphorbiaceae]; *D. Chettri & A.P. Das 0019*	*Simal tarul*	Root-tuber	*Chapati* is prepared from boiled and smashed tuber; fermented liquor, *jnard,* is prepared from the tuber
Melastoma malabathricum Linnaeus [Melastomataceae]; *D. Chettri & A.P .Das 0017*	*Tulasi*	Leaves and flowers	Fodder
Melia azedarach Linnaeus [Meliaceae]; *D. Chettri & A.P. Das 0015*	*Bagena*	Leaves and fruits	Fodder
Musa balbisiana Colla [Musaceae]; *D. Chettri & A.P. Das 0021*	*Kera, inflorescence-bunga*	Fruits and inflorescence	Ripe fruits taken raw; inflorescence as vegetable and pickled
Oroxylum indicum (Linnaeus) Kurz [Bignoniaceae]; *D. Chettri & A.P. Das 0024*	*Totola*	Inflorescence	Cooked as vegetable
Phlogacanthus thyrsiformis (Roxburgh *ex* Hardwicke) D.J. Mabberley [Acanthaceae]; *D. Chettri & A.P. Das 0005*	*Chuwa*	Inflorescence	Cooked as vegetable
Saurauia napaulensis de Candolle [Actinidiaceae]; *D. Chettri & A.P. Das 0040*	*Gagun*	Leaves and young shoots	As fodder for cows and goats

Scientific name [Family]; Voucher Specimen	Local name	Parts used	Uses
Spondias mombin Linnaeus [Anacardiaceae]; *D. Chettri & A.P. Das 0007*	*Lapshi*	Fruits	Used to prepare pickles and jam
Thysanolaena latifolia Roxburgh *ex* Honda [Poaceae]; *D. Chettri & A.P .Das 0011*	*Amliso*	Leafy shoots	Fodder
Tupistra nutans Wallich *ex* Lindley [Asparagaceae]; *D. Chettri & A.P. Das 0002*	*Nakima*	Inflorescence	Cooked as vegetable

Table 4. List of plants treated as sacred and used religiously by the tea garden workers

Scientific name [Family]; Voucher specimen	Local name	Parts used	Uses
Acorus calamus Linneaus [Acoraceae]; *D. Chettri & A.P. Das 0010*	*Bojho*	Leaves	Driving away the evil spirits
Artemesia indica Willdenow [Asteraceae]; *D. Chettri & A.P. Das 0018*	*Titepati*	Leaves and inflorescence	Symbol of purity; leaves dipped in freshly collected cow urine and sprinkled to purify the environment
Ficus benghalensis Linneaus [Moraceae]; *D .Chettri & A.P. Das 0036*	*Bahr*	Leaves & whole plant	*Ficus benghalensis* and *Ficus religiosa* were treated as couple and worshipped
Ficus religiosa Linnaeus [Moraceae]; *D. Chettri & A.P. Das 0012*	*Peepal*	Leaves and standing tree	Treated as Goddess and worshipped with flowers of *Tagetes petula* and *Hibiscus rosa-sinensis*, water, incense stick especially on Saturdays to get rid from the influence of *Sani graha*
Justicia adhatoda Linnaeus [Acanthaceae]; *D. Chettri &A.P. Das 0013*	*Asuro*	Leaves	Leaves are kept in the cradle to save the infants from evil spirits
Lageneria siceraria (Molina) Standley [Cucurbitaceae]; *D. Chettri & A.P. Das 0006*	*Chindo*	Fruits	Dry fruit shell is used as pot to store fermented liquor (*jnard*) by Rai community during worship of deity
Oroxylum indicum (Linnaeus) Kurz [Bignoniaceae]; *D. Chettri & A.P. Das 0009*	*Totola*	Seeds	Used by Tamang, Lepcha, Sherpa and other Buddhist communities during sacred and marriage ceremonies
Zingiber officinale Roscoe [Zingiberaceae]; *D. Chettri & A.P. Das 0003*	*Aduwa*	Rhizome	Extensively used by *bijuwa* of Rai (kirat) community to worship their ancestral deity and also to communicate with the spirits during *chintah* – the medium through which *jhakris* can communicate the spirits and ask his ultimate desire, complaint etc. for salvation

have been set up at every tea garden, there are not enough facilities for the treatment of various ailments they suffer. Therefore the garden workers had to dependent on their ethnic knowledge which they have trusted since their childhood.

Most of the recorded plants are either growing as weeds of Tea Gardens or in the vegetation on left over garden areas or in the adjacent forest. But, collection from the plantation area might be risky for their health as some of these selected gardens use good amount of

pesticides to control diseases, pests and weeds. These people know it well so, they never collect plants from inside the plantations.

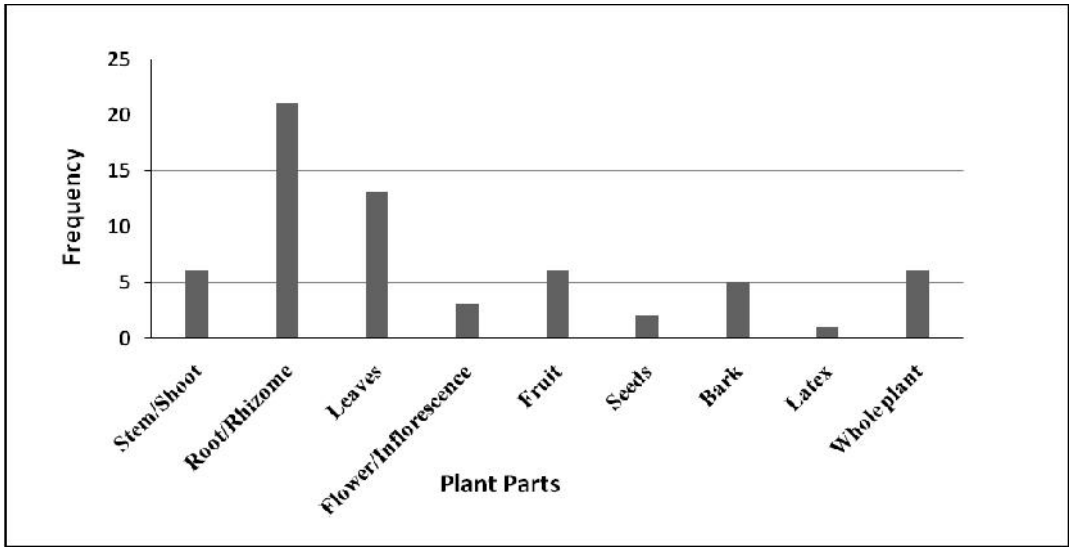

Fig. 2. Frequency of plant parts used by the workers of the study area

In comparison the other areas, the list of recorded plants appear to be little shorter especially in comparison to Ghosh & Das 2007. There are two basic reasons, (i) earlier work covered gardens spreading from tropical to temperate regions, and (ii) the present work did not cover all possible aspects of Ethnobotany.

However, Tables 2 to 4 do not document any RET species and the amount used is so little against their availability that there is no need to express concern relating to the conservation of the fragile ecosystem and rich flora of Darjiling Hills.

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