Short Communication

Ethnobotanical Uses Of Poisonous Plants In Arunachal Pradesh

Hui Tag[1*], Jambey Tsering[1], Baikuntha Jyoti Gogoi[2], Bipul Kalita[1], Pallabi Kalita[3] and Vijay Veer[2]

Department of Botany, Rajiv Gandhi University[1], Rono Hills, Itanagar- 791112, Arunachal Pradesh, India.

Defence Research Laboratory[2], Post Bag No. 2, Tezpur- 784001, Assam, India.

Center with Potential for Excellence in Biodiversity, Faculty of Life Science, Rajiv Gandhi University[3], Rono Hills, Doimukh-791112, Arunachal Pradesh, India.

***Correspondence author:** huitag2008rgu@gmail.com

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Abstract: This paper discusses about the cross cultural ethnobotanical uses of 33 poisonous plant species by three local communities viz Monpa, Nyishi and Adi tribes of Arunachal Pradesh, mainly found in Tawang, W/Kameng, L/Subansiri, U/ Subansiri/ E/Siang and W/Siang Districts. *Aesculus assamica, Derris scandens, Gymnocladus burmanicus, Persicaria hydropiper* and *Zanthoxylum rhetsa* are widely used as fish poison by the Nyishi and Adi whereas the root of *Aconitum ferox* is used for traditional hunting and local warfare by all three communities.

Keywords: Poisonous plants, Ethnobotanical knowledge, Arunachal Pradesh

Introduction

The Eastern Himalayan Region of India is rich in plant bioresources having immense economical, cultural, and medicinal values. This region is exceptionally diverse in topography, varied ecosystems, climate, vegetation pattern, traditional cultural heritage and ethnobotanical knowledge base (Rao and Hajra, 1986). The later encompasses poisonous plants also taken as a whole or part taken or brought into contact with an organism, usually exert harmful effects or cause death either immediately or by reason of cumulative action of the toxic property due to the presence of chemical substances in them and not by mechanical action (Chopra *et al.,* 1949). Poisonous nature of a plant may be due to production of toxic substances such as alkaloids, glucosides, amines, toxalbumins, picrotoxins, resins, saponins, tannins, essentials oils, etc., many of which are harmful to man and animal life, atleast under certain conditions (Katewa *et al.,* 2008).

Poisonous plants have been used by hunter-gatherer peoples worldwide and are still in use among the tribes of South America, Africa and Asia. Arrow poisoning and water poisoning in wells have been the prevalent methods to kill civilians as well as military combatants in many areas of the world. In the tribal predominant regions like the Arunachal Pradesh, poisonous plants are mainly used for fishing and animal hunting (Sundriyal *et al.,* 1998; Tag *et al.,* 2005; Yumnam and Tripathi, 2013). During the food crises, tribal people depend on wild resources including wild plants, fishes, animals and birds, to meet their food needs and States like Arunachal Pradesh with multi-culture groups have rich traditional knowledge about food plants, medicines and poisonous plants.

Perusal of literature has revealed that no specific research has been done on the poisonous plants of the Arunachal Pradesh. In India, limited works have been done on poisonous plants by various workers such as Viswanathan and Joshi (1983); Singh *et al*., (1999); Jain (1991, 1999); Caius (2003) but tribe specific cross-cultural ethnobotanical studies focusing

on the Eastern Himalayan tribes are still lacking. Hence present study focuses on the cross cultural ethnobotanical knowledge on the diversity of various poisonous plants used by the three local communities, Monpa, Nyishi and Adi tribes of the Arunachal Pradesh, which would enable correct diagnosis of the important toxic plants that can be used for the development of pharmacologically active medicinal formulations for the treatment of certain human ailments and also botanical based chemical warfare for strategic defense application through applied biotechnological research.

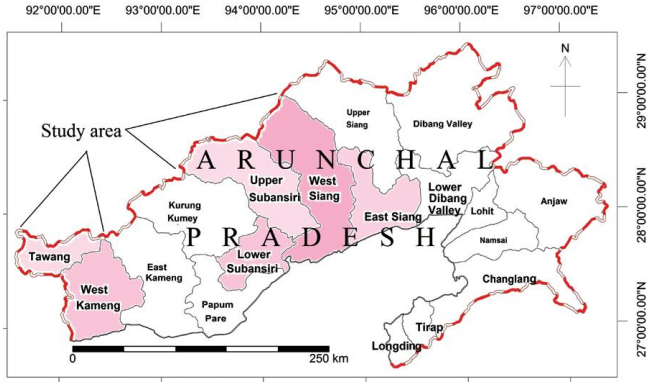

Fig.1. Study areas in Arunachal Pradesh

Materials and methods

Ethnobotanical field surveys were conducted during 2014-2015 in six districts of the Arunachal Pradesh viz. Lower Subansiri, Upper Subansiri, West Siang, East Siang, West Kameng and Tawang, which are located between geographical coordinates 26°28'N - 29°30'N latitude and 91°30' E - 97°30'E longitude (Figure 1). Ethnobotanical field methods of Jain and Rao (1977), and quantitative floristic and cross cultural ethobotanical methods of Begoosi (1996), and Phillips (1996) were followed to assess the diverse uses of the poisonous plants diversity and associated traditional knowledge of the local communities. Around seventy two informants were randomly selected from the six districts during the study period. Indigenous people of both the gender who are actively engaged in traditional forest resource management and traditional agriculture system were given top priority for recording their unique knowledge about the different uses of poisonous plants of the region. Other key informants were hunters, local healers, priests, and village headmen.

Results

Present field investigation has recorded 33 species of poisonous plants belonging to 20 families and 27 genera which are used for different poisoning purposes, traditional hunting, traditional warfare and medicinal purposes by the tribal residents of the Arunachal Pradesh. Fabaceae represented highest number of species (7) followed by Rutaceae (4), Asteraceae (3), Polygonaceae (2), Ranunculaceae (2), and rest of the families were represented by a single species each. The accepted botanical name, local names, habit, part used, and local uses of each species are presented in Table 1.

Out of the total 33 plant species, herbs represents 12 species, trees (10), shrubs (6), and climbers (5). Fruits poison is extracted from (11 spp.) are reported to be widely used by whole plants (10 species), and barks (8 species). Other plant parts which are rarely used as poisons are leaves, roots and seeds. The Nyishi community uses higher number of poisonous plants (20 species) followed by Adi (10 species) and Monpa (3 species). Photographs of six locally valuable poisonous plants are presented in Fig. 2.

Fig.2. Poisonous plants of Arunachal Pradesh

Table 1. Poisonous plants of Arunachal Pradesh and their diverse ethnobotanical uses (A = Adi; M = Monpa; N = Nyishi)

Plant/Family	Local Name	Habit	Part Use	Traditional Use
Acacia pennata (L.) Willd.[Fabaceae]	Tappa-pad (N)	Climber	Bark	Bark is used as fish poison
Acmella oleracea (L.) R.K.Jansen[Asteraceae]	Marshang (A)	Herb	Whole plant	Paste of whole plant is used as fish poison
Acmella paniculata (Wall. ex DC.) R.K.Jansen L. [Asteraceae]	Bud (N)	Herb	Whole plant	Paste of whole plant is used as fish poison
Aconitum ferox Wall. ex Ser.[Ranunculaceae]	Tsandu (M)	Herb	Root	Paste of tuber is applied at the tip of the arrows for hunting animals
Aconitum hookeri Stapf[Ranunculaceae]	Zsa-tsandu (M)	Herb	Root	Whole plant is reported as poisonous
Aesculus assamica Griff.[Sapindaceae]	Sarlok-asing (A)	Tree	Bark	Crude pounded bark is used as fish poison
Ageratum conyzoides (L.) L.[Asteraceae]	Deem-eh (N)	Herb	Whole plant	Whole plant is used as fish poison
Albizia chinensis (Osbeck) Merr.[Fabaceae]	Tatkung-asing (A)	Tree	Bark	Crude pounded bark is used as fish poison
Canarium strictum Roxb.[Burseraceae]	Thekok (A)	Tree	Bark	Crude pounded bark is used as fish poison
Cassia javanica L.[Fabaceae]	Thedang (A)	Tree	Seed	Seed powder is used as fish poison
Cyclosorus extensus (Blume) H.[Thelypteridaceae]	Rubdik (N)	Herb	Whole plant	Whole plant is ground and used as fish poison
Derris scandens (Roxb.) Benth.[Fabaceae]	Toom (N)	Shrub	Root	Crude pounded root is used as fish poison
Euphorbia wallichii Hook.f.[Euphorbiaceae]	Tharnu (M)	Herb	Whole plant	Latex produced from the plant is used as insecticide
Gymnocladus burmanicus C.E. Parkinson [Fabaceae]	Dikang (A)	Tree	Leaf, Bark	Crude pounded bark and leaf are used as fish poison
Gynocardia odorata R.Br.[Achariaceae]	Teeksin (N)	Tree	Fruit	Fruit is used as fish poison
Indorouchera griffithiana (Planch.) Hallier f. [Linaceae]	Terak (N)	Shrub	Bark	Sap from bark is used as dart poison
Mesua assamica (King ex Prain) Kosterm [Clusiaceae]	Sianahar (A)	Tree	Fruit	Crude pounded fruit is used as fish poison
Millettia pachycarpa Benth.[Fabaceae]	Bokoabeh (A)	Climber	Fruit	Crude pounded fruit is used as fish poison
Parthenocissus semicordata (Wall.) Planch. [Vitaceae]	Riiblap (N)	Climber	Fruit	Crude pounded fruit is used as fish poison
Persicaria barbata (L.) H. Hara[Polygonaceae]	Yuru (N)	Herb	Whole plant	Paste of whole plant is used as fish poison
Persicaria hydropiper (L.) Delarbre[Polygonaceae]	Yuru Rudik (N)	Herb	Whole plant	Paste of whole plant is used as fish poison
Phoenix dactylifera L.[Arecaceae]	Peng Ngudik (N)	Tree	Whole plant	Paste of whole plant is used as fish poison
Polygala elongata Klein[Polygalaceae]	Tamu (A)	Herb	Whole plant	Paste of whole plant is used as fish poison
Rhus chinensis Mill.[Anacardiaceae]	Tam (N)	Shrub	Fruit, Bark	Bark and seeds cause skin ulceration. Paste is used for punishing the murder culprits
Senna alata (L.) Roxb.[Fabaceae]	Siitir (N)	Shrub	Bark	Crude pounded bark is used as fish poison
Stipa sibirica (L.) Lam.[Poaceae]	Tapok Puksi (N)	Herb	Leaf, Seed	Crushed seed and leaf are used as fish poison
Tephrosia candida (Roxb.) DC.[Leguminosae]	Mitum-peren (N)	Herb	Whole plant	Whole plant is used as fish poison
Trevesia palmata (Roxb.) Ves.[Araliaceae]	Tago (A)	Tree	Fruit	Crude pounded fruit is used as fish poison
Trichosanthes tricuspidata Lour.[Cucurbitaceae]	Riik (N)	Climber	Fruit	Fruits are considered poisonous
Zanthoxylum armatum DC.[Rutaceae]	Honam (N)	Shrub	Fruit	Crude pounded fruit is used as fish poison
Zanthoxylum nitidum (Roxb.) DC.[Rutaceae]	Honam (N)	Climber	Fruit	Crude pounded fruit used as fish poison
Zanthoxylum oxyphyllum Edgew.[Rutaceae]	Honam (N)	Shrub	Fruit, Leaf	Fruit and leaf are used as fish poison
Zanthoxylum rhetsa (Roxb) DC.[Rutaceae]	Honior (N)	Tree	Fruit	Crude pounded fruit is used as fish poison

Among all, the most promising poisonous plants which can be used for development of botanical based strategic defence warfare are the tubers of *Aconitum ferox* and barks of *Indorouchera griffithiana*. Sap secreted by bark of *Indorouchera griffithiana* is highly poisonous and there are local reports on the use of *Indorouchera griffithiana* in traditional warfare among the tribes in the form of dart poison. Whole plant of *Aconitum ferox* is highly poisonous and commonly used as arrow poison for hunting animals and earlier it was used in traditional warfare during inter-tribal conflicts which occasionally occurred among the local tribes of Arunachal Himalayan region.

Present study provides with only the baseline ethnobotanical information on the diverse use of the poisonous plants by the selected three major tribes of Arunachal Pradesh. It would pave way for further studies in biochemical, pharmacological and molecular aspects of ethnobotanically important species to validate the medicinal and pharmacological potentials which could possibly be developed as botanical based chemical warfare for strategic defence application only and development of noble therapeutic anti-biotics, targeting the pathogenic microbes and diseases that cause affliction in human and animals.

Discussion

In the present study, it was observed that the tribal people of Arunachal Pradesh use a good number of plants for fishing, hunting, traditional warfare and medicine; 27 species out of the total 33 are used as fish poison and effectively used by the Monpa, Nyishi and Adi in Kameng, Subansiri and Siang districts while no such uses are found in the Tawang district. The study also revealed that the species of family Fabaceae are widely used as fish poisoning agents in the form of raw pastes to kill the fish of streams and ponds. Similar results were also reported from other studies from Arunachal Himalayas (Neuwinger, 2004; Yumnam and Tripathi, 2013). Most widely used plants for fishing in small streams include *Aesculus assamica, Derris scandens, Gymnocladus burmanicus, Persicaria hydropiper* and *Zanthoxylum rhetsa* belonging to the tropical riparian vegetation and sub-tropical mixed forest of the six districts of the Arunachal Pradesh. The Nyishi and Adi communities use more number of poisonous plants. The reason for such use of fish poison plants by the Tani tribes (Nyishi and Adi) could be due to their proximity to the river valley as these two tribes have mainly settled in tropical and subtropical low to middle altitudinal ranges between 100m-2000m from MSL where fresh-water ethnofishery activities are predominant (Pallabi *et al.,* 2004).

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