Diversity and Traditional Uses of Some Poisonous Plants of Arunachal Pradesh

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ABSTRACT

Poisonous plants have been used by hunter-gatherer peoples worldwide and are still widely used in countries like South America, Africa and Asia. Arrow poisoning and water poisoning in wells have been the prevalent methods to kill tactic civilians as well as combatants in many areas of the world since ancient period. However, in the present state of global affairs where nuclear and chemical weapons are gaining popularity, there is need to preserve such ancient knowledge on poisonous plants which was earlier used in traditional war tactics for self-defense, territorial and national security. In tribal state like Arunachal Pradesh harboring rich diverse ethnic groups, poisonous plants are mainly used for fishing and animal hunting. Our literature on documentation of ethnomedicinal plants have shown that some plants are highly poisonous, however no specific research has been done on poisonous plants found in Arunachal Pradesh. Even in India, only few works on poisonous plants have been done. A total of 10 districts out of total 18 districts of the state were covered for the present study. Present field investigation has revealed that about 60 plants which are traditionally used as poison and for different purposes by the tribal people of Arunachal Pradesh. Most of the poisonous plants are used for fishing and hunting in Subansiri, Siang, Anjaw, Dibang Valley and Kameng sectors.

Keywords: *Poisonous plants, traditional uses, local communities, Arunachal Pradesh*

1. INTRODUCTION

Plants have been used as food, medicine and poisonous agents throughout the course of human civilization. Poisonous plants have been used by hunter-gatherer peoples worldwide and are still widely used in countries like South America, Africa and Asia. Arrow poisoning and water poisoning in wells have been the prevalent methods to kill tactic civilians as well as combatants in many areas of the world since ancient period. Traditional usage of poisonous plants is highlighted in the classical text like the Charak Samhita, Mahabharata and the Ramayana. However, in the present state of global affairs where nuclear and chemical weapons are gaining popularity, there is need to preserve such ancient knowledge on poisonous plants which was earlier used in traditional war tactics for self-defense, territorial and national security. Arunachal Himalaya is exceptionally diverse in topography, varied ecosystems, climate, vegetation pattern, traditional cultural heritage and ethnobotanical knowledge base [1] The state with rich diverse ethnic groups, most of the documentation work has been done on ethnomedicinal plants, some of which were reported as highly poisonous, but no work has

been done specifically on poisonous plants. Present study has been carried out in different terrains and forest types of Arunachal Himalaya region to document and screen out the poisonous plants and their ethnobotanical use by the local people.

2.LITERATURE REVIEW

Etno-medicine of Arunachal Pradesh was carried out by [2] who mentioned 76 medicinal form Kameng sector. Later [3] and [4] reported medicinal plants from Dibang Valley District. Notable work in the field of ethno-medicine were done by [5]who reported 145 angiosperms, 1 gymnosperm, 7 pteridophytes and 1 fungi species as ethno medicine used by *Nyishi* and *Apatani* tribes which also included few poisonous species; [6] reported 500 species of important medicinal plants used by different tribes of Arunachal Pradesh; [7]had reported 158 species from *Apatani* belt.

In the state of Arunachal Pradesh, poisonous plants are mainly used for fishing and animal hunting by the local people (8 &9).

3. MATERIALS AND METHODS

3.1Study area

Arunachal Pradesh, the land of dawn lit mountains lying in the eastern most tip of northeast India is uniquely situated in the transition zone between the Himalayan and Indo-Burmese regions (26°28' – 29°30' N and 91° 30'– 97°30' E). It covers an area of 83,743 km^2. The people are predominantly tribal, with schedule tribes forming 65% of the population. There are 26 major tribes and more than 120 sub tribes, each with a specific geographic distribution and distinct linguistic, cultural and social identity. Most of the population is engaged in agriculture. Present study has covered a total of 10 districts (Table 1) out of 18 districts of the state for the present study that include tropical moist, tropical deciduous, tropical and subtropical and Temperate forest evergreen forest .

3.2 Herbarium preparation: Herbarium specimens for all collected species were prepared as per the methods of [10] Herbarium of the collected species were deposited in the Department of Botany, Rajiv Gandhi University for future reference.

Figure 1: Map showing the different districts of study area.

3.3 Diversity and Distribution: Information pertaining to specific locality, forest type, altitudinal ranges of the collected poisonous plant species were done through recording the occurrence of species in specific areas through extensive field survey. Field survey and sample collection was done for

those plants with subsequent detailed observation viz. flowering and fruiting season, its habitat, morphology, ethnomedicinal use by the local people and economic importance. The abundance of each of those plants was also taken into consideration as to ascertain any possible threats and cause of its depletion for future effective conservation purposes.

4. RESULTS AND DISCUSSION

A total of 10 districts out of 18 districts of the state were covered for the present study. Present field investigation has revealed that about 60 plant species which are used as poison for different purposes by the tribal people of Arunachal Pradesh. Most of the poisonous plants are used for fishing and hunting in Subansiri, Siang, Anjaw, Dibang Valley and West Kameng district.

4.1 Survey and inventory: Extensive field survey has been conducted in 10 districts as indicated below selecting some specific location and forest types, from March 2015 to January 2016

Table 1: Specific study area and its forest types.

District	Specific Area	Forest type
Anjaw	Hawai	Temperate and Sub-Tropical forest
Changlang	Bordumsa	Tropical forest
East Siang	Pashighat, Ruskin, Mebo and Boleng.	Tropical forest
Lower Dibang Valley	Roing, Hunli and Mayodia	Temperate and Sub-Tropical forest
Lower Subansiri	Ziro	Sub-tropical forest
Lohit	Tezu	Tropical to Subtropical forest
Papum Pare	Poma, Karshingsa, Mengio, Balijan and Sagalee	Tropical forest
Upper Dibang Valley	Anini	Temperate and Sub-Tropical forest
West Kameng	Bomdila, Rupa	Temperate forest
West Siang	Gensii, Sibe-Rite	Tropical forest

4.2 Documentation of poisonous plants

In the present study, 60 poisonous plants were documented from the above mentioned ten districts. Poisonous plant recorded is belonging to 37 families and 55 genera which are used for various poisoning purposes (Figure 2). The most common poisonous plants reported from all study sites were *Aesculus assamica, Derris ellipticus, Gymnocladus burmanicus, Persicaria hydropiper* and *Zanthoxylum rhetsa.* Tuber of *Aconitum ferox* normally collected from alpine region was reported to be used as arrow poison for hunting and the sap secreted from the bark of *Indorouchera griffithiana* as dart poison (Table 2).

Table 2: Poisonous plant of Arunachal Pradesh and their traditional uses.

Plant	Family	Habit	Part Use	Traditional Use
***Acmella paniculata* (Wall. ex DC.) R.K.Jansen**	Asteraceae	H	Wh.	Paste of whole plant is used as fish poison
***Aconitum ferox* Wall. ex Ser.**	Ranunculaceae	H	Rt.	Paste of tuber is applied at the tip of the arrows for hunting animals
***Aconitum hookeri* Stapf**	Ranunculaceae	H	Rt	Whole plant is reported as poisonous
***Aesculus assamica* Griff.**	Sapindaceae	T	Br	Crude pounded bark is used as fish poison
Aesculus flava Sol.	*Sapindaceae*	T	Br, Lf	Parts are ground on stone and thrown into stream.10-12 minute before collection of fish.
***Ageratum conyzoides* (L.) L.**	Asteraceae	H	Wh.	Whole plant is used as fish poison
***Albizia chinensis* (Osbeck) Merr.**	Fabaceae	T	Br	Crude pounded bark as fish poison
***Anamirta cocculus* (L.) Wight & Arn.**	*Menispermaceae*	T	Fr	Small stream after Shiibok Penam operation wait for 30 minute
***Andrographis paniculata* (Burm.f.)Wall. ex Ness**	*Acanthaceae*	H	Sd.	Seed powder is used orally to counter snake poisons
***Aspidopterys indica* (Wild). Hochreat**	*Malpighiaceae*	C	Fr	Fruit extract as adhesive for bird catching
***Barringtonia acutangula* (L.) Gaertn.**	Lecythidaceae	S	Bk,Rt.	Crude pounded bark, roots and seeds as fish poison
***Canarium strictum* Roxb.**	Burseraceae	T	Br	Crude pounded bark as fish poison
***Cassia javanica* L.**	Fabaceae	T	Sd	Seed powder is used as fish poison
***Canthium dicoccum* Merill.**	Rubaceae	S	Br,Lf	Plant parts coarsely ground and thrown into small pond and stream wait for 30-40 minute
***Celtis australis* L.,**	Ulmaceae		Lf	If fed only on its leaves for a prolonged period, animal stops cuddling, becomes weak and body temperature rises
***Cyclosorus extensus* (Blume) H.**	Thelypteridaceae	H	Wh.	Whole plant is ground and used as fish poison
***Croton liglium* Linn.**	Euphorbiaceae	S	Sd., fr	Flowers and seeds are finely ground and thrown into running streams in large quantity wait for 20-30 minutes
Colebrookea oppositifolia Sm	Lamiaceae	H	Lf	Contact causes itching in susceptible individuals. Animals fed solely on it show decreased milk yield
***Derris elliptica* (Wall.) Benth.**	Fabaceae	S	Rt	Crude pounded root is as fish poison
***Dodonaea viscosa (L.)* Jacq.,**	Sapindaceae	S	Lf	Consumption causes nausea, vomiting, shivering, eruptions full of pus on entire body and ultimately death
***Delphinium brunonianum* Royle.**	Ranunculaceae	H	Wh.	Crude pounded root is as fish poison

***Diplocyclos palmatus (L.)* Jeffrey**	Cucurbitaceae		Fr	Intake by animals results in abdominal spasms and gastroenteritis
***Euphorbia wallichii* Hook.f.**	Euphorbiaceae	H	Wh.	Folk medicines for its medicinal properties.
***Eremostachys vicaryi* Benth. ex Hook.f.**	Lamiaceae	S	Wh.	fish poison
***Embelia tsjeriam-cottam* (Roem. Schult.) A.DC.**	*Primulaceae*	T	Lf	Accidental consumption of newly sprouted leaves in large quantity particularly by migratory animals results in shivering followed by death within 2 days.
***Euphorbia hirta* L**	*Euphorbiaceae*	S	Wh.	Livestock fed entirely on it for a prolonged period becomes weak followed by a reduction in its milk yield
***Gymnocladus burmanicus* C.E. Parkinson**	Fabaceae	T	Lf, Br	Crude pounded bark and leaf is used as fish poison
***Gynocardia odorata* R.Br.**	Achariaceae	T	Fr	Fruit is used as fish poisoning
***Indorouchera griffithiana* (Planch.) Hallier f.**	Linaceae	S	Br	Sap from bark are used as dart poison
***Ichnocarpus frutescens* (L.) R. Br.**	Apocynaceae	T	Lf	Ingestion causes vomiting, indigestion and gastrointestinal irritation
***Lasianthus japonicus* Miq.**	Rubiaceae	S	Fr.	Fruit extract as adhesive for bird catching
***Lasianthus aponicas subsp. longicaudus* (Hook.f.) C.Y.Wu H.Zhu**	Rubiaceae	S	Fr	Fruit extract as adhesive for bird catching
***Martynia annua* L.,**	Martyniaceae	S	Lf	Animals usually do not browse upon it except in times of scarcity. Excess consumption results in salivation, bloat and abdominal spasms
***Mesua assamica* (King ex Prain) Kosterm**	Clusiaceae	T	Fr	Crude pounded fruit is used as fish poison
***Millettia pachycarpa* Benth.**	Fabaceae	C	Fr	Crude pounded fruit is used as fish poison
Mimosa pudica L.	Leguminose	H	Wh.	Whole plant used against snake poisons
***Meconopsis aculeata* Royle**	*Papaveraceae*	H	Wh.	The root contains narcotic principles. The entire plant is used in Tibetan medicine, where it is considered to have a bitter taste and a cooling potency.
***Opuntia vulgaris* Mill.,**	Cactaceae	S	Fr	Intake results in diarrhoea
***Parthenocissus semicordata* (Wall.) Planch.**	Vitaceae	C	Fr	Crude pounded fruit is used as fish poison
***Persicaria barbata* (L.) H. Hara**	Polygonaceae	H	Wh.	Paste of whole plant is used as fish poison
***Persicaria hydropiper* (L.) Delarbre**	Polygonaceae	H	Wh.	Paste of whole plant is used as fish poison
***Phyllanthus acidus* (L.) Skeels**	Phyllanthaceae	T	Lf	The root is an active purgative.An infusion of the root is taken to alleviate asthma An extract from the root is used to cure skin diseases especially to bring relief from itching
***Phoenix dactylifera* L.**	Arecaceae	T	Wh.	Paste of whole plant is used as fish poison

***Polygonum pubescens* Bl.**	Polygonaceae	H	Wh.	Whole plant paste as fish poison
***Polygala elonggata* Klein**	Polygalaceae	H	Wh.	Paste of whole plant is used as fish poison
***Punica granatum* L.**	*Lythraceae*	T	Lf	Intake of newly sprouted leaves by livestock causes nausea, vomiting, ulcers in mouth, dysphagia, diarrhoea, immense weakness, extremely high fever, blurred vision and death within one or two days
***Pupalia lappacea* (L.) Juss.**	*Amaranthaceae*		Wh	Consumption causes salivation, pain in throat and dysphagia.
***Prunus persica* (L.) Batsch**	Rosaceae	T	Lf	Intake of newly sprouted leaves by animals affects the brain causing fits, convulsions, chocking of throat, sudden attack of abdominal pain, loss of consciousness and death within few hours
***Psydrax dicoccos* Gaertn.**	Rubiaceae	T	Rt.	Plant parts coarsely ground and thrown into small pond and stream, Wait for 30-40 minute
***Rhus chinensis* Mill.**	Anacardiaceae	S	Fr, Br	Bark and seed highly poisonous and cause skin damaging
***Ranunculus sceleratus* L.**	Ranunculaceae	H	Wh	The celery-leafed buttercup is one of the strongest acting of our native plants. The whole plant is acrid, mildly pain-relieving, and antispasmodic, induces sweating, promotes or assists the flow of menstrual fluid and causes irritation to the skin.
***Rhaphidophora decursiva* (Roxb.) Schott**	Araceae	C	Fr	Fruit as bait for trapping fish
***Rhamnus triquetra* (Wall.) Brandis**	Rhamnaceae	T	Fr, Lf	Excessive consumption of fruits and leaves by livestock affects the brain resulting in loss of mental balance; hence, animal collides with whatsoever comes in its way. It also causes vomiting, nausea, fever, acute diarrhoea, weakness, shivering, impaired vision followed by stupor and irritation
***Senna alata* (L.) Roxb.**	Fabaceae	S	Br	Crude pounded bark is used as fish poison
***Stipa sibirica* (L.) Lam.**	Poaceae	H	Lf, Sd.	Crushed seed and leaf are used as fish poison
***Tephrosia candida* (Roxb.) DC.**	Leguminosae	H	Wh.	Whole plant as fish poision
***Trevesia palmata* (Roxb.) Ves.**	Araliaceae	T	Fr	Crude pounded fruit as fish poison
***Trichosanthes tricuspidata* Lour.**	Cucurbitaceae	C	Fr	Fruits are considered poisonous
***Zanthoxylum rhetsa* DC.**	Rutaceae	S	Fr	Crude pounded fruit as fish poison
***Zanthoxylum nitidum* (Roxb.) DC.**	Rutaceae	C	Fr	Crude pounded fruit as fish poison

Pic. 1: *Aconitum hookeri*

Pic. 2: *Zanthoxyllum armatum*

Pic. 3: *Aconitum ferox*

Pic. 4: *Derris ellipticus*

Pic. 5: *Rhus chinensis*

Pic. 6: *Euphorbia wallichii*

Pic.7: Gynocardia odorata

Pic.8: Urtica dioica

Figure 2: Poisonous wild *Colocasia* species (used in arrow poison with paste of *Aconitum*)

Photo plate: Poisonous plants commonly used by the tribes of Arunachal Pradesh

In this study it was observed that the local community of Arunachal Pradesh use a good number of plants for fishing, hunting, traditional warfare and medicine. Among the total recorded species, a total of 35 species are used as fish poison by the tribes *Adi*, *Apatani*, *Nyishi*, *Monpa, Wancho, Idu-Mishimi* and *Digaru Mishimi* inhabiting Lower Dibang Valley, Upper Dibang Valley, Changlang, Anjaw, West Siang, East Kameng and West Kameng districts of Arunachal Pradesh. Fabaceae and Rutaceae were found to be the most dominant family used as fish poison. Use of various plant parts such as leaves, root, fruit, etc. were common irrespective of its habitat of the plant in case of herb in fishing and hunting by various communities. In case of *Polygonum hydropiper* whole plant paste is used as fish poison by Nyishi (Hill Miri) tribe. *Ageratum conyzoides, Spilanthes olercea, Zanthoxylum* spp. were also found to be used as fish poison by the *Nyishi* (Hill Miri) tribe of Arunachal Pradesh. In the present study, the *Gynocardia odorata* were widely used by the *Adi, Idu Mishimi, Digaru* and *Wancho* tribes as a fish poison due to abundance of raw materials and efficacy.

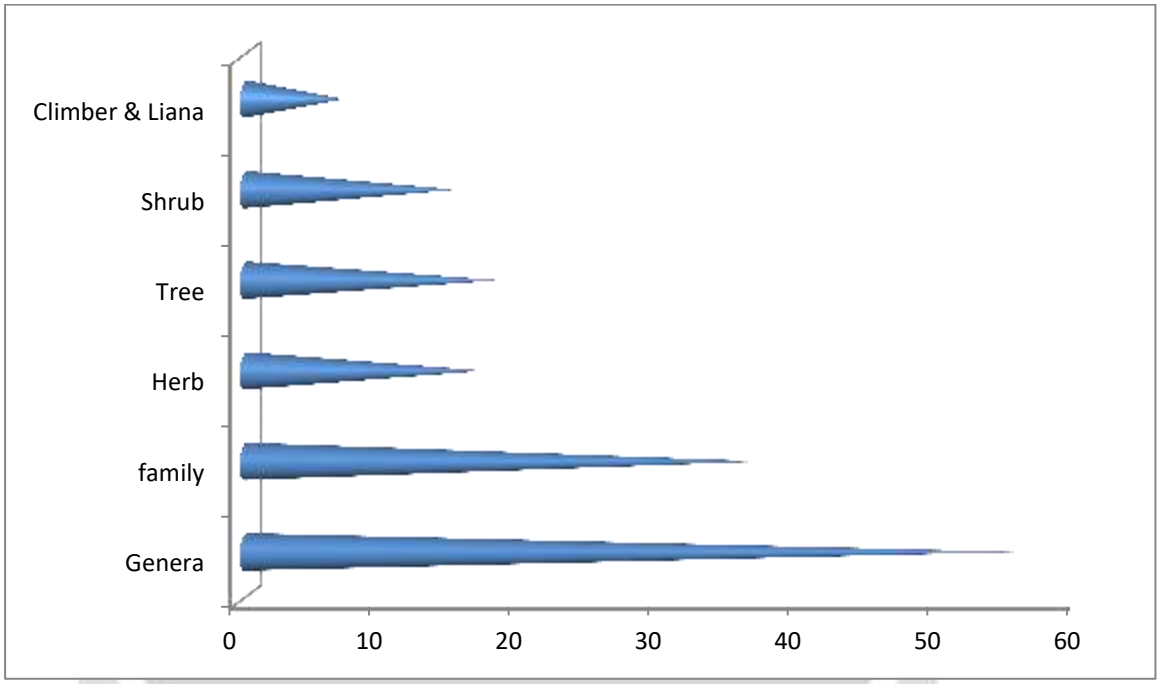

Figure 3. Number of genera, species of Poisonous Plant

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