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Traditional knowledge of herbal medicines practiced by Apatani tribe in the Ziro Valley of Arunachal Pradesh, India

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Abstract

Ethnomedicinal study of medicinal plants was conducted at Ziro, Arunachal Pradesh with an objective to document the ethno-medicinal knowledge of Apatani tribe. Data on medicinal plants were collected using a guided methodology, semi-structured interviews, and field observations. Study documented total of 22 medicinal plant species belonging to 20 genera and 15 families. Rosaceae was dominant family in uses. Total 21 different ailments are treating by using these medicinal plants.

Key words: Herbal medicine, Apatani tribe, Ziro Valley, Arunachal Pradesh

INTRODUCTION

Arunachal Himalayan region is very rich in biodiversity due to varied geographical, physiological and topographical, climatic and ecological aspects (Tsering 2016). It has now 25 districts and inhabited by 26 major tribes and over 110 sub-tribes. These tribes have their own unique tradition, language, culture and lifestyle. They are mostly dependent on forest and wildlife of the state for their day to day sustenance. Traditional medicines are the main Healthcare system in this region which is known to support the treatment of many ailments (Murtem & Chaudary 2016).

Plants are the integral part of day-to-day tribal life-style in Arunachal Pradesh. These tribal communities are mostly dependent on traditional medicinal systems for their health care. The people of Apatani tribe are inhabiting in Lower Subansiri District of Arunachal Pradesh, mostly in the Ziro Valley. The climate of Ziro Valley is diverse, ranging from Sub-Tropical to Temperate. Wide varieties of medicinal plant species are found in wild in this area and some are also grown or cultivated by the folk-medicine practitioners, which includes plants of various habit groups. Apatani people are mainly dependent on agriculture and animal husbandry. They generally practice paddy cum fish culture, which is one of the unique system of cultivation not only in the state but also in India, as well as in Asia (Tilling *et al.* 2015). The Apatani people of Ziro use several local plants in their daily life (Khongsai *et al.* 2011). They are known for using different medicinal plant species in curing different diseases (Danggen *et al.* 2018.) They practice this traditional method due to their easy availability of raw materials, effectiveness without causing any side effects and affordability (Perme *et al.* 2015) at the same time accessibility to modern medicine is extremely remote for most of them.

Time to time different research works have been carried out on ethnomedicinal plants of Lower Subansiri district, Arunachal Pradesh. Kala (2005) recorded 158 medicinal plants

used by the Apatani tribe. Tilling *et al.* (2015) conducted survey on the medicinal plants used by the Apatani tribe of Ziro valley and recorded 34 medicinal plant species used by the tribal people for curing different diseases. Ayam (2017) documented 30 medicinal plant species used by the tribal people of Ziro valley. Yakang *et al.* (2013) worked on non-timber forest produces including medicinal plants used by Apatani people. Kalita *et al.* (2017) surveyed the wild edible and medicinal plants in Ziro valley and documented 41 wild edible and medicinal plant species. After literature survey it was observed that medicinal uses of some more plants were not documented by earlier researchers. Moreover, such documentation of traditional uses is very important because this knowledge is at the risk of extinction due to people's intension to migrate in urban areas where there is little chance to apply such knowledge. Loss of biodiversity and natural habitats along with adaptation to modern lifestyle are also equally responsible. Therefore, the present study aims to document the traditional knowledge relating to uses of medicinal plants by the people of Apatani tribe of Ziro valley, Arunachal Pradesh.

METHODOLOGY

Study area: Administratively Ziro valley is under Lower Subansiri district of Arunachal Pradesh (Plate - I). It is located between $26^{\circ}55'$ - $28^{\circ}21'$ N latitudes and $92^{\circ}40'$ - $94^{\circ}21'$ E longitudes and altitude ranges from 1237 to 1550 m a.m.s.l. The Lower Subansiri District is bounded by Kurung kumey and Upper Subansiri on the North, Papumpare District and Assam on the South, West Siang and some part of Upper Subansiri on the East and Kurung kumey and Papumpare District on the West (Figure 1).

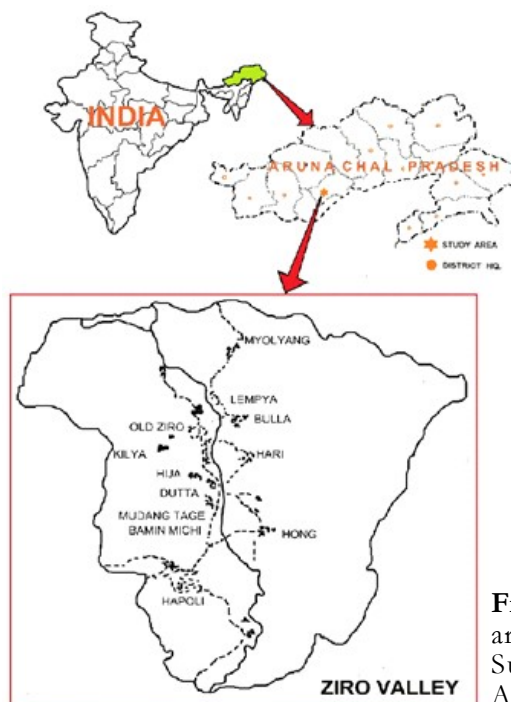


Figure 1: Map of the study area in Ziro Valley, Lower Subansiri District of Arunachal Pradesh

Survey: Before start of the work mandatory PIC was taken from the local healers. The field survey was conducted extensively in Ziro valley of Lower Subansiri District, Arunachal Pradesh during February 2019 to March 2020. The information on medicinal plants were gathered using a structured questionnaires and conversations with old or aged ethnic people (Figures 1,2

& 3). During the interviews, informant's knowledge on local name, parts used, method of preparation, and dosages were documented. Taking assistance of the informants necessary voucher specimens were collected. All the collected plants were recorded in the *Field Note Book* along with the locality and geographical coordinates using a GPS. The collected plant specimens were tagged with the number as per the *Field Note Book*. Voucher specimens were, later on, processed in to mounted herbarium sheets following Jain and Rao (1977). Plants were identified using local flora including *Materials for the Flora of Arunachal Pradesh* (Hajra *et al.* 1996; Giri *et al.* 2008; Chowdhery *et al.* 2009); *Flora of Assam* (Kanjilal *et al.* 1934 – 1940) and *The Flora of British India* (Hooker 1872 – 1897). For updated nomenclature www.plantsoftheworldonline.org and www.theplantlist.org were extensively consulted. The specimen has been deposited at the Herbarium of the Department of Botany, Down Town University, Guwahati. Some photographs of field-survey has been provided in Plate-I.

RESULTS AND DISCUSSION

During the present study, a total of 22 medicinal plant species belong to 20 genera and 15 families used by the Apatani community were documented (Table -1). Out of these 10 species were herbs, 5 species were shrubs and 7 species were trees. Rosaceae was the most dominant family with 5 species, followed by Asteraceae, Berberidaceae and Solanaceae each with 2 species.

Table 1. Medicinal plants used by the Apatani tribes in Ziro valley of Arunachal Pradesh

Botanical name [Family]; Habit; Voucher specimen	Apatani name	Ailment	Mode of preparation and dosage
<i>Acmella paniculata</i> (Wall. ex DC.) R.K.Jansen [Asteraceae]; Herb; <i>Rinya-33/DTU</i>	<i>Yarkbung hamang</i>	Intestinal worm	Five boiled leaves are taken in empty stomach once daily for ten days
<i>Artemisia indica</i> Willd. [Asteraceae]; Shrub; <i>Rinya-25/DTU</i> . [Pl.-I, Fig. D]	<i>Kukuhyu</i>	Wound, minor cuts	Paste of fresh leaves applied on the wound; stops bleeding in minor cuts
<i>Azadirachta indica</i> A.Juss. [Meliaceae]; Tree; <i>Rinya-41/DTU</i>	<i>Neem</i>	Fever, stomach disorder	One cup fruits-decoction given twice daily after meal
<i>Berberis napaulensis</i> (DC.) Spreng. [Berberidaceae]; Shrub; <i>Rinya-19/DTU</i> [Pl.-I, Fig. H]	<i>Taming</i>	Toothache, boils, wounds	Paste of stem bark applied locally in toothache, boils on lips and on wounds
<i>Berberis wallichiana</i> DC. [Berberidaceae]; Shrub; <i>Rinya-29/DTU</i> .	<i>Tiipe tiire</i>	Joint pains, swellings	Leaves boiled in mustard oil; this oil is massaged on affected parts; thrice daily for five to ten minutes
<i>Castanopsis tribuloides</i> (Sm.) DC. [Fagaceae]; Tree; <i>Rinya-30/DTU</i> . [Pl.-I, Fig. E]	<i>Kwra</i>	Cough, indigestion, goiter	Leaves and seeds boiled in water; three table spoon twice daily - morning and evening against cough & indigestion. Half tea-cup every

Botanical name [Family]; Habit; Voucher specimen	Apatani name	Ailment	Mode of preparation and dosage
<i>Castanopsis tribuloides</i> (Contd.)			evening after meal for 15 days in goiter
<i>Curcuma longa</i> L. [Zingiberaceae]; Herb; <i>Rinya-51/DTU</i> . [Pl.-I, Fig. F]	<i>Haldi</i>	Cold, cough.	5 table-spoon full rhizome decoction is taken five times daily in two hours interval till cured
<i>Diplazium esculentum</i> (Retz). Sw. [Athyriaceae]; Herb; <i>Rinya-63/DTU</i>	<i>Hiika</i> <i>Hamang</i>	Constipation	Fronds boiled in water, one cup decoction taken in empty stomach once daily for seven days
<i>Docynia indica</i> (Wall.) Decne. [Rosaceae]; Tree; <i>Rinya-25/DTU</i>	<i>Pecha</i>	Stomachache	Fresh fruits boiled in water, 2 table spoon-full of decoction is taken thrice daily after meal for three days
<i>Elatostema platyphyllum</i> Wedd. [Urticaceae]; Herb; <i>Rinya-24/DTU</i>	<i>Hiipe hamang</i>	Dysentery	One tea-cup of leaf-decoction in water is taken daily for five days
<i>Oxalis corniculata</i> L. [Oxalidaceae]; Herb; <i>Rinya-10/DTU</i>	<i>O-kehui</i> <i>hamang</i>	Snake bite	Plant extract applied on affected part to reduce pain
<i>Pinus roxburghii</i> Sarg. [Pinaceae]; Tree; <i>Rinya-37/DTU</i> , [Pl.-I, Fig. K]	<i>Püsa saan</i>	Kidney disorder	Two table spoon powder of mixed in one cup luke-warm water is taken twice daily for fifteen days
<i>Plantago asiatica</i> subsp. <i>erosa</i> (Wall.) Z.Yu Li, [Plantaginaceae]; Herb; <i>Rinya-06/DTU</i> , (Pl.-I, Fig. J)	<i>Mepi hamang</i>	Indigestion	Boiled leaves are taken along with meal once daily for three days
<i>Prunus cerasus</i> L. [Rosaceae]; Tree; <i>Rinya-23/DTU</i> , [Pl.-I, Fig. L]	<i>Sembo</i>	Good sleep	Five fresh fruits are eaten after dinner for seven days.
<i>Pteridium revolutum</i> (Blume) Nakai [Dennstaedtiaceae]; Herb; <i>Rinya-12/DTU</i>	<i>Taree</i>	Stops bleeding in minor cuts.	Extract of young leaves applied on affected parts
<i>Pterospermum acerifolium</i> (L.) Willd. [Malvaceae]; Tree; <i>Rinya-09/DTU</i>	<i>Taro</i>	Wound	Leaf-paste applied on the wound that prevents bleeding
<i>Pyrus pashia</i> L. [Rosaceae]; Tree; <i>Rinya-16/DTU</i>	<i>Pwta saan</i>	Fever	Two table-spoon full freshly extracted fruit juice is taken twice daily for five days
<i>Ranunculus diffuses</i> DC. [Ranunculaceae]; Herb; <i>Rinya-11/DTU</i>	<i>Yapung gelung</i>	Bleeding wound	Root-paste applied on cuts and wounds
<i>Rubus ellipticus</i> Sm. [Rosaceae]; Shrub; <i>Rinya-44/DTU</i> , [Pl.-I, Fig. I]	<i>Jilyu</i>	Poor health; dysentery; headache	Three table spoon leaf-extract taken as health-tonic twice daily after meals for ten days; fresh fruits are eaten against dysentery; roots-paste is applied on fore-head in headache
<i>Rubus niveus</i> Thunb. [Rosaceae]; Shrub; <i>Rinya-27/DTU</i>	<i>Jilyung</i>	Poor health	Half tea-cup of leaf extract is taken once daily after meal for fifteen days
<i>Solanum lycopersicum</i> L. [Solanaceae]; Herb; <i>Rinya-18/DTU</i>	<i>Byayung</i>	Cardiovascular disorder	Five boiled fruits are taken as such once daily for thirty days
<i>Solanum myriacanthum</i> Dunal [Solanaceae]; Herb; <i>Rinya-13/DTU</i>	<i>Sitü byako</i>	Toothache	Fruit paste is applied on infected teeth once daily for seven days

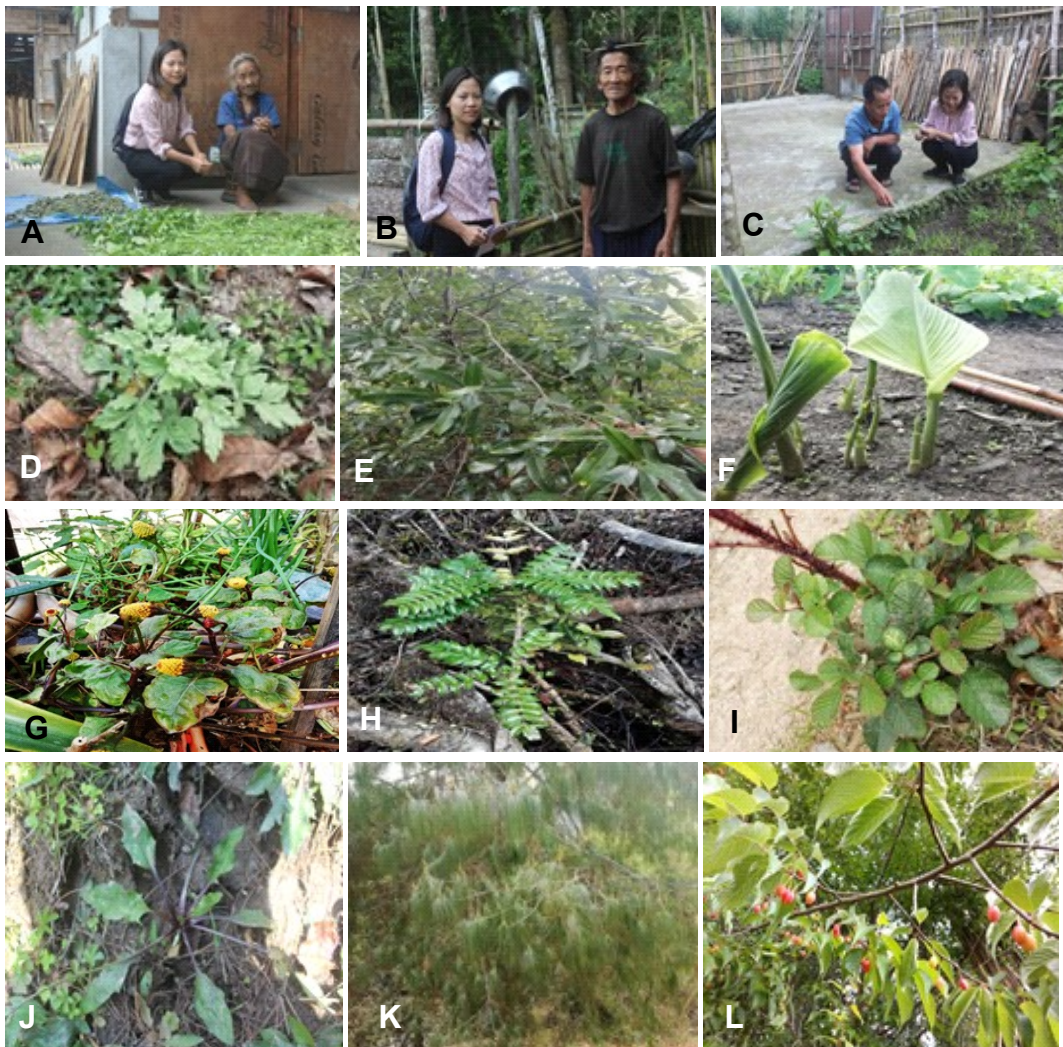


PLATE - I. **A.** Mrs. Tapi Puyang (Hong Village), Processing medicinal plants; **B.** Mr. Mudang Pai (Mudang Tage Village), sharing information on medicinal plants; **C.** Mr. Guro (Hong village), showing medicinal plants in the field; **D.** *Artemisia indica*; **E.** *Castanopsis tribuloides*; **F.** *Cucurma longa*; **G.** *Acemella paniculata*; **H.** *Berberis napaulensis*; **I.** *Rubus ellipticus*; **J.** *Plantago asiatica* subsp. *erosa*; **K.** *Pinus roxburghii*; **L.** *Prunus cerasus*

The recorded plants are used for the treatment of different types of Diseases. Four species used against cuts and wound and 4 species against stomach disorder. Again for cough & cold, minor injuries, fever, health tonic, indigestion, and toothache they use 3 species against each ailment. Two species are used in the treatment of dysentery. And, one species each were recorded against joint pain, muscular swelling, goiter, constipation, boils, snake bite, kidney disorder, insomnia, headache, intestinal worm and cardiovascular disorders.

Mode of preparation of the medicine used by the Apatani people were based on the types of diseases. It can be given in different form like decoction, paste, powder, boiled, juice, chewed, fresh/raw, cooked or in extract form. The medicines are prepared either from freshly collected plant parts or after drying according to their needs. The remedies are taken either orally or used externally as per the disease and demand of the situation.

CONCLUSION

This study has, once again, established that the ethnomedicinal plants are used to treat wide range of ailments in human beings and have a very important role in the primary healthcare system of tribal people. There is need of awareness generation among the younger generation about the importance of preservation and documentation of indigenous knowledge on medicinal plants. The most serious threat to medicinal plant species is the habitat destruction, expansion of agricultural land, over grazing, and over exploitation. The conservation of the important medicinal plants can be enhanced by cultivating them by the Indigenous people of the Area. During the present study it was observed that the information of the indigenous knowledge of medicinal plants was known and practice only by few elders in the community. While the young and present generation of this community knows very little. So, survey, documentation and conservation of such knowledge is to be treated as an immediate need for the policy makers.

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