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ETHNOBOTANICAL USES AND POPULATION STATUS OF SELECTED MEDICINAL PLANTS FOUND IN THE POLO FORESTS OF SABARKANTHA DISTRICT, GUJARAT, INDIA

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ABSTRACT

During the current study, it has been found that all targeted plants species are being used by local forest dwellers for healing various ailments such as fever, common cold, skin ailments, jaundice, headaches, piles, joint pain, cough etc. in human being. A total of 19 plant species belonging to 16 families are showed different habit such as tree (12), herbs (4), climber (2) and orchid (1). The study revealed that local peoples from Polo Forest prefer tree species more than other plants for ethnobotanical purposes and the healing of various ailments. The population study showed that among these selected plants, *P. gangeticum*, *C. tuberosum*, *V. tessellate*, *H. speciosa* were not noted however, it is noted in the qualitative study which indicates the minimum density of these plants. The findings of the study suggest that those plants which showed the least density needs to be special attention to conservation in sustainable manner in the Polo reserve forest.

Keywords: Ethnobotanical, medicinal, Polo forest, Sabarkantha, Gujarat.

INTRODUCTION

In India, there are numerous indigenous and diverse cultures about the use of various plant species (Malabadi *et al.*, 2007). These plant species provide food, shelter, medicine, dye, fiber, oils, resins, waxes, gums etc which are being utilized by people in different ways. The practice of utilization of indigenous plants or its product are called ethnobotany. The ethnobotanical study is considered as the basis for invention of natural and synthetic drugs (Faruque *et al.*, 2018) and those plants that have healing properties are considered as medicinal plants. India is the largest producer of medicinal herbs and is appropriately called the botanical garden of the world (Ahmedullah *et al.*, 1999). About 15,000-20,000 plants have good medicinal value. However, only 7,000-7,500 species are being used by traditional communities for their medicinal values (Joy *et al.*, 1998).

As it is known that the plant kingdom is divided into several groups, but the botanical classification is beyond the scope of medicinal plant section. However, the medicinal plants can be classified as trees, shrubs, woody perennials, annuals and biennials, and climbers etc. Ethno-botanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting and religious ceremonies. There are some important medicinal plant species from Gujarat state which are being utilized by the pharma industries for the preparation of Drugs. Due to market demand of some important medicinal plants, peoples collect them illegally and

the illicit removal of medicinal plants has become common nowadays. Such anthropogenic activities can effect on population of medicinal plants that can be threatened from the wild condition in near future. In Gujarat state, the ethnobotanical study was initiated by Jai Krishna Indraj (1910), wherein he has given details of 684 plant species that are being used by the tribes of Barda hills and its surroundings. Thereafter, many ethnobotanical studies were done by different taxonomist as well some botanists have been attracted toward ethnobotany initially however after the study made by Jain (1963) the work started picking up fast. Later, Yogi (1970) reported a total of 61 species from Mahudi (Mahesana) district, Vora (1980) reported a total of 151 species from Dharampur block (taluka) of Valsad district, Thaker (1974) reported a total of 38 species from Kawant range forest of Vadodara district, Vashi (1985) reported a total of 183 species from Umarpada, forest of Surat district, Gopal (1983) reported a total of 722 species from whole Gujarat, Bhatt (1987) reported a total of 189 species from Navsari district, Contractor (1986) reported a total of 83 species from Vapi and Umargaon forest of Valsad district, Reddy (1987) reported a total of 281 species from Dharampur block (taluka) of Valsad district of ethnobotanical interest (Gopal, 1983; Reddy, 1987; Umadevi, 1988; Joshi, 1994). After few decades plants used by the Rabari tribe in Barda Hills of Gujarat and Ethnomedical plants of Shetrunjaya Hills of Palitana, Gujarat was studied by Jadeja, (1999) and Bhatt *et al* (1999),

respectively. The Gujarat State Forest Development Corporation Ltd. (GSFDC Ltd.) collects some medicinal plant species from the Polo forest area for the preparation of Dashmoolarishta products, Dhanvantri brand products etc. Moreover, the Polo forest is the habitat of various other medicinal plant species which are considered as conservation concerned species due to high demand in the market (Pandey *et al.*, 2005). Therefore, sustainable management of these high demanded medicinal plants is required in wild conditions by knowing its current population status.

MATERIALS AND METHODS

Study area

The Polo forest is a tribal area located in Vijaynagar block (taluka) of Sabarkantha district of North Gujarat region, India as shown in the Figure 1 given below. The Polo forests belong to part of Dholwani and Vijaynagar forest ranges of Sabarkantha (North) forest division of Gujarat state. It is located at 23° 59' 06.2" N latitude and 73 16' 07.5" E longitude. The whole area of Polo forests is spread in approximately 400 ha. of which all the forest area comes under reserve forest under section-20 and don't have un-classed forest under section-4 (Singh, 2003). The forest of Dholwani range belongs to the ancient and historic forest

popularly known as Polo Forest. The forest comes under the Sabarkantha district of Gujarat and having a hilly type of forest area near the range of Aravalli hills. The forest is original to the ancient and historic "Jain Deras Forests" popularly known as "Polo" forests.

Data collection

The current study has been started with an extensive secondary literature survey from available electronic resources and different organizations. To documentation and confirmation, the ethnobotanical study was carried out based on the opportunistic interview survey of local peoples living in the vicinity of Poloforest area. During the opportunistic interview survey, experienced old peoples, *bhuva/bhagat* (traditional healers), folk medicine man and other knowledgeable person were contacted to get indigenous knowledge about ethnobotany of different selected plant species. Moreover, some information of selected plants were extracted from the available secondary literatures also. Later, a phytosociological study was done to know the current status of plant species in different plant communities in which different sizes (i.e. 20m × 20 m for tree, 10m × 10 m for shrub, 1m × 1m for herbaceous vegetation) of quadrats were laid down.

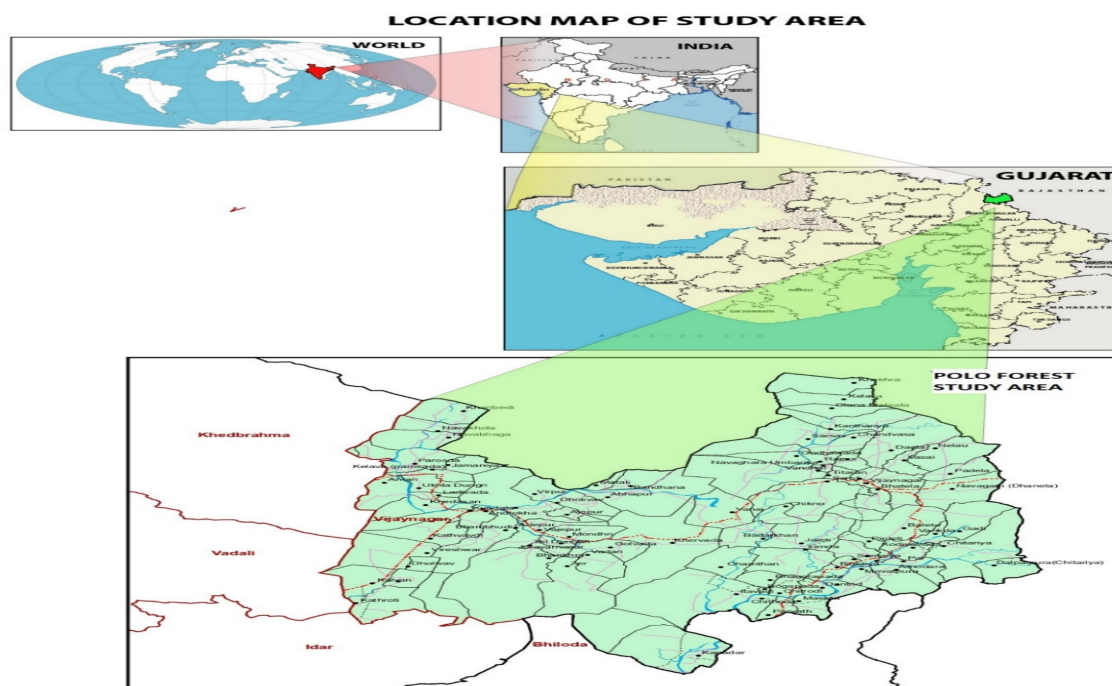


Fig. 1: Location of Polo forest

RESULTS AND DISCUSSION

During the literature survey and household survey, a total of 19 ethnobotanical and medicinal important plant species belonging to 15 families which has been targeted for the study in the Polo forest area. Almost similar kind of ethnobotanical study done by Yadav *et al.* (2013) in which they have reported 18 ethnomedicinal plant species (13 families and 17 genera) from Narmada Forest Division, Gujarat. As per a study done by Pandey *et al.* (2005) in Gujarat state, there are various plant species that are considered as conservation concerned plant species and have

been utilised by GSFDC ltd in preparation of Dashmoolarishta and Dhanvantari products for many years. Many plants are being collected by GSFDC ltd that are available commonly in the Polo reserve forest. During the field visits, in Polo forest, it has been noted that many important plants other than those used by GSFDC ltd are also collected by local peoples for their traditional uses. To further the study, the ethnobotanical uses of all selected plants and their population status in wild conditions have been studied as described in Table 2. The list of selected plants are following (Table 1).

Table 1: List of plant species are being collected from Polo Forest

List of plant species noted from Polo forests used in Dasmula Product			
SN	Scientific Name	Family	Vernacular Name
1	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Gokharu
2	<i>Oroxylum indicum</i> (L.) Kurz	Bignoniaceae	Tentu
3	<i>Aegle marmelos</i> (L.) Correa	Rutaceae	Bili
4	<i>Gmelina arborea</i> Roxb. ex Sm.	Verbenaceae	Seven
5	<i>Pleurolobus gangeticum</i> (L.) J.St.-Hil. ex H.Ohashi & K.Ohashi	Fabaceae	Salwan
Plants used by GSFDC from Polo forest for Dhanvantri brand			
6	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Amla
7	<i>Sapindus emarginatus</i> Vahl	Sapindaceae	Aritha
8	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Behda
9	<i>Boswellia serrata</i> Roxb.	Burseraceae	SalaiGugal
10	<i>Chlorophytum tuberosum</i> (Roxb.) Baker	Liliaceae	Safedmusali
11	<i>Terminalia chebula</i> Retz.	Combretaceae	Herde
12	<i>Vachellia nilotica</i> (L.) P.H. Hurter & Mabb.	Mimosaceae	Desibaval
List of conservation concern plant species from Polo forests			
13	<i>Hellenia speciosa</i> (J.Koenig) S.R dutta	Zingiberaceae	Valakadi
14	<i>Gloriosa superba</i> L.	Liliaceae	Kankasni
15	<i>Sterculia urens</i> Roxb.	Sterculiaceae	Kadai
16	<i>Abrus precatorius</i> L.	Fabaceae	Chanothi
17	<i>Semecarpus anacardium</i> L.f.	Anacardiaceae	Bhilva, Bhilamo
18	<i>Tecomella undulata</i> (Sm.) Seem.	Bignoniaceae	Ragatrohido
19	<i>Vanda tessellata</i> (Roxb.) Hook. Ex.G.Don	Orchidaceae	Vando

During the structured questionnaire survey in tribal area of Polo forest, it has been noted that these selected plant species have been using by local forest dwellers for many years for the treatment of various ailments. However, the administration of uses of such plants are unique and varied from plant species to species as described in Table 2. Table 2 given below also showed different parts used by local people for traditional purposes, medicinal purposes, as well as Table 2, shows the mode of administration and population status of these plants. In the quantitative study of Polo forest area, *A. precatorius* was found with maximum density i.e. 17.00 ind/ha while *T. chebula* showed least density i.e. 0.25 ind/ha. Moreover, *P. gangeticum*, *C. tuberosum*, *V. tessellate*, *H. speciosa* plant species did not fall under quadrat during the study while it is noted in the qualitative study in which it is found in the Polo forest commonly. The study shows, the selected plant species further categorized into tree (12), herbs (4), climber (2) and orchid (1) based on their life form and habit as shown in Table 2. An almost similar type of study was done by Singh and Parabia (2003) in which they have classification all indigenous (wild) medicinal plants into i.e. tree, shrub, climber and herbs.

CONCLUSION

The findings of the study revealed that all 19 selected medicinal and ethnobotanical important plants have been utilized by local peoples for many years. These plants are also being used by GSFDC Ltd in preparation for Dashmoolarishta and Dhanvantari brands which are found in Polo forest area. All these selected ethnobotanical and medicinal plants showed diverse habits and maximum are categorized in the tree (63.15 %), followed by herb (21.05 %), climber (10.52%), and orchid (5.26%). However, as per the current study it has been noted that many plants showed the least density in wild conditions and their population status is not very good even some plants such as *P. gangeticum*, *C. tuberosum*, *V. tessellate*, *H. speciosa* were not found in the quantitative study. It may be due to maximum collection by peoples living in the vicinity of Polo forest. Because nowadays, people became susceptible due to changing food habits and environmental pollution and there is the best remedy to cure the disease without side effects is medicinal plants which are good in terms of fewer side effects as compare to Allopathy. The current study provides, the baseline information and current population status of selected medicinal plants which need to conserve for sustainable utilization of resources for present and future generations.

Table 2: Population status, traditional and ethnobotanical uses of the selected species in Polo Forest

S N	Scientific Name	Family	Vernacular Name	Habit	Parts used	Traditional Uses	Mode of Administration	Population status {Density (ind/ha for trees and ind/sq.m for herbs)}
1	<i>S. anacardium</i>	Anacardiaceae	Bhilva, Bhilamo	Tree	Seeds and nuts	Joint pain, CNS stimulant, antioxidant, antimicrobial, anti-reproductive, hair growth premotor etc.	Seed of plant grind and converted into powder to use it in treatment of joint pain and other diseases.	1.50
2	<i>O. indicum</i>	Bignoniaceae	Tentu	Tree	Root Bark, Stem Bark	Dashmulkwath, Antiallergic, urticaria, jaundice, asthma	Stem bark or root decoction given internally in jaundice, paste from root bark is appetitive, powder of stem bark is given in piles	0.75
3	<i>T. undulata</i>	Bignoniaceae	Ragatrohido	Tree	Stem Bark	Cough, Syphilis	Powdered stem bark usually orally administered once in a day	3.25
4	<i>B. serrata</i>	Burseraceae	SalaiGugal	Tree	Gum	Air (Dhoop), Pitta, Asthma, ulcers, skin diseases and rheumatism	For the collection of Gum, local people make an injured mark on the tree by a single cut and second day collect gum that is used in Air (Dhoop). They directly consume the gum in the treatment for Asthma, ulcers etc	7.25
5	<i>T. bellirica</i>	Combretaceae	Behda	Tree	Bark, Fruits, Seeds	Tonic and laxative, used in Piles and dyspepsia, Common cold, pharyngitis and constipation	Fruit powder is used as tonic and laxative, it is used in dyspepsia, piles, cough and asthma	6.50
6	<i>T. chebula</i>	Combretaceae	Harde	Tree	Fruit Pulp	Diarrhoea of children, Rasayan, Constipation, Skin diseases, an ingredient of Triphala	Fruit pulp prepares and consumed by people for the treatment of constipation, diarrhea etc.	0.25
7	<i>V. nilotica</i>	Mimosaceae	Desi Baval	Tree	Twig, Gum, Bark	Ulcers, Gum as aphrodisiac, Skin diseases	Twigs are used as tooth brush, Bark is used for skin disease, Gum is eaten with sugar as nutritive tonic and as aphrodisiac	4.50
8	<i>P. emblica</i>	Euphorbiaceae	Amla	Tree	Fruits	Fruits are sour, astringent, bitter, acrid, sweet, cooling, anodyne, ophthalmic, carminative, digestive, stomachic, laxative, alterant, aphrodisiac, rejuvenative, diuretic, antipyretic and tonic	Fruits are used in preparation of pickles, Fruit juice is applied to remove dandruff from hair and also to protect from sunstroke	3.75
9	<i>A. precatorius</i>	Fabaceae	Chanoti	Climber	Leaves and Seeds	Hoarseness (Sore throat), mouth ulcers, ornaments (seeds)	Fruit juice is swallowed in sore throat, Seeds are used in making ornaments, Leaves are chewed to cure ulcers in mouth	17.00
10	<i>P. gangeticum</i>	Leguminosae-Papilionoidae	Chapaknovele	Herb	Whole plant	As tonic, febrifuge, digestive, anticatarrhal etc. It is used in Dashmoolarishta and DashmoolaKwaath.	Whole plant boiled and used in cardiac pain. Leaf paste along with Aloe vera used as anti-dandruff.	00.00
11	<i>C. tuberosum</i>	Liliaceae	Safed musali	Herb	Roots and Leaves	As tonic, Diabetes, Boosts the general immune system, Health tonic, Impotency	Root tuber is boiled and given to cure brain disease as well as it is given with milk to improve impotency and weakness	00.00

S N	Scientific Name	Family	Vernacular Name	Habit	Parts used	Traditional Uses	Mode of Administration	Population status {Density (ind/ha for trees and ind/sq.m for herbs)}
12	<i>G. superba</i>	Liliaceae	Kankasni	Climber	Roots and Seeds	Skin disease, Roots are highly poisonous	Paste made from roots and seeds is applied in skin diseases	15.50
13	<i>V. tessellata</i>	Orchidaceae	Vanda	Orchid	Whole Aerial part	It is used as folk medicine in treatment of inflammation, cancer, nervous disorders, rheumatism etc	Whole parts of the plants used by local people in the treatment of cancer, rheumatism etc	00.00
14	<i>A. marmelos</i>	Rutaceae	Bili	Tree	Fruits, Leaves, roots	Foot and mouth disease in cattle, fast healing, leaves in worshipping 'Lord Shiva', Asthma, Anaemia, Fractures, Healing of Wounds, Swollen Joints, High Blood Pressure, Jaundice, Diarrhoea, Making Dashmulkwath	Boiled fruits are edible, paste of fruit pulp or leaves are applied on cattle's mouth ulcers, fresh juice is applied in ear diseases, Fruit pulp is consumed in various disease like dysentery, diarrhea, cholera, etc.	2.00
15	<i>S. emarginata</i>	Sapindaceae	Aritha	Tree	Fruits and Seeds	Anti-inflammatory and antipyretic, seed is intoxicant and the fruit rind has oxytropic action	Pest prepared from fruit apply on hair to remove hair disease	0.25
16	<i>S. urens</i>	Sterculiaceae	Kadai	Tree	Seeds and Gum	Brain tonic, gonorrhea and syphilis	Seeds are brain tonic, gum used in gonorrhea and syphilis	2.50
17	<i>G. arborea</i>	Verbenaceae	Seven	Tree	Fruits and Seeds	Skin disease, leprosy, Ulcers etc, Dashmularishta, DashmulaKwath, Panchmulyadikwath	Oil from the seed apply on joints to relief joint pain and other disease	3.0
18	<i>H. speciosa</i>	Zingiberaceae	Pavuta, Valakadi	Herb	Rhizome and stem	Whole body have antibacterial and antifungal activities and Rhizome is useful in headache, high fever, diarrhea etc.	Juice prepared from Rhizome and stem applied on treatment of headache, fever and diarrhea etc.	00.00
19	<i>T. terrestris</i>	Zygophyllaceae	Gokharu	Herb	Fruits and Seeds, Whole plant	Folk medicine as a tonic, aphrodisiac, palliative, astringent, stomachic, antihypertensive, diuretic, lithon -triptic and urinary anti-infective	Powder or decoction of the whole plant as health tonic	0.01

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