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An ethnomedicinal inventory of knotweeds of Indian Himalaya

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The present study aims to highlight the current knowledge of the usefulness of Knotweeds (*Polygonum* L.) of India as to point out what species need careful consideration for conservation rather than eradication. The present study intends to produce an inventory of the important Polygonums that needs re-evaluation for cultivation and hence increasing our accessibility to natural medicinal products. Out of about 72 species reported to occur in India, we found 34 promising species that could be utilized for medicines, ornamentals, famine food and others. Many ethno-botanical data confined to a very small niche of ethnic people residing in Eastern Himalayan region are being reported here for the first time.

Key words: Ethnomedicine, *Polygonum*, Himalaya, India.

INTRODUCTION

Weeds are those plants that are successful in disturbed environments, are fast growing, and, are often but not always herbaceous (Zimdahl, 1992). They grow generally in human-disturbed habitats but do not depend on human intervention for reproduction and survival. These plants may be found growing on agricultural fields and gardens or as ruderal plants. Many of the top weed family are also the same families that are important for medicines. Among these families are Asteraceae, Fabaceae, Convolvulaceae, Euphorbiaceae, Chenopodiaceae, Malvaceae and Solanaceae (Holm, 1978; Stepp and Daniel, 2001). However, the role of weeds, commonly found in disturbed areas, in traditional medicinal floras has always been overlooked. *Polygonum* L. (*s.l.*) generally known as Knotweed is a large genus consisting of weedy plants. Many of them are virtually ubiquitous and are common in agricultural lands and marshy areas. They can thrive well in disturbed areas and spread very fast by both natural means and human activity. Some of them are confined to isolated geographical niches and narrowly distributed. In spite of their negative impact on

crops through competition and allelopathy, many of them have positive uses, ranging from medicinal, famine food to fodder and others (Figure 2). The genus primarily grows in northern temperate regions and varies widely in their habit from prostrate to erect or annuals to perennials.

Present study aims to highlight the current knowledge of the various uses of Knotweeds (*Polygonum* L., *s.l.*) so as to point out what species need careful consideration for conservation rather than eradication. The study also aims to bring out an inventory of the important Polygonums that needs re-evaluation for cultivation under controlled condition hence increasing our accessibility to natural medicinal products. Moreover, we have tried to cover both indigenous and non-indigenous usage of Polygonums so as to cover the complete spectrum of their utilization patterns.

MATERIALS AND METHODS

Survey and exploration

Ethno-botanical surveys were carried out in north-east and northern parts of India during the period of 2004 to 2008. These areas are considered the main habitat of Polygonums in India (Figure 1). A few samples were also collected from the tropical parts of the

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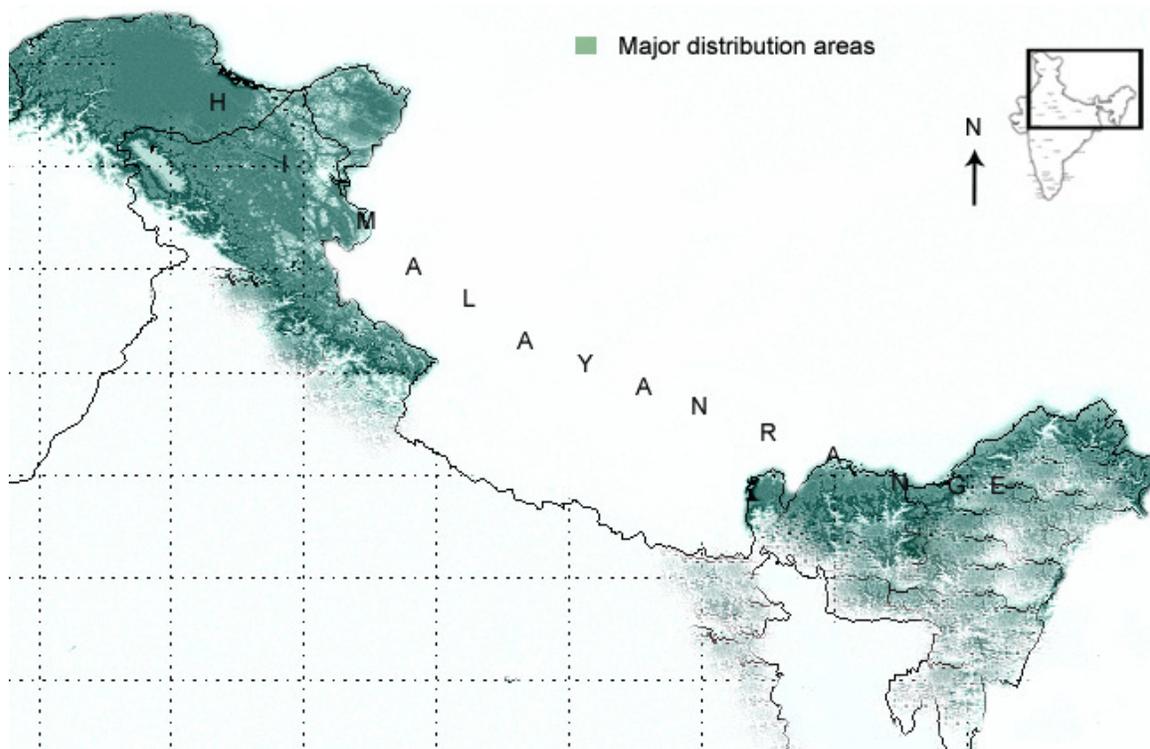


Figure 1. Major distribution areas of *Polygonum* in India.

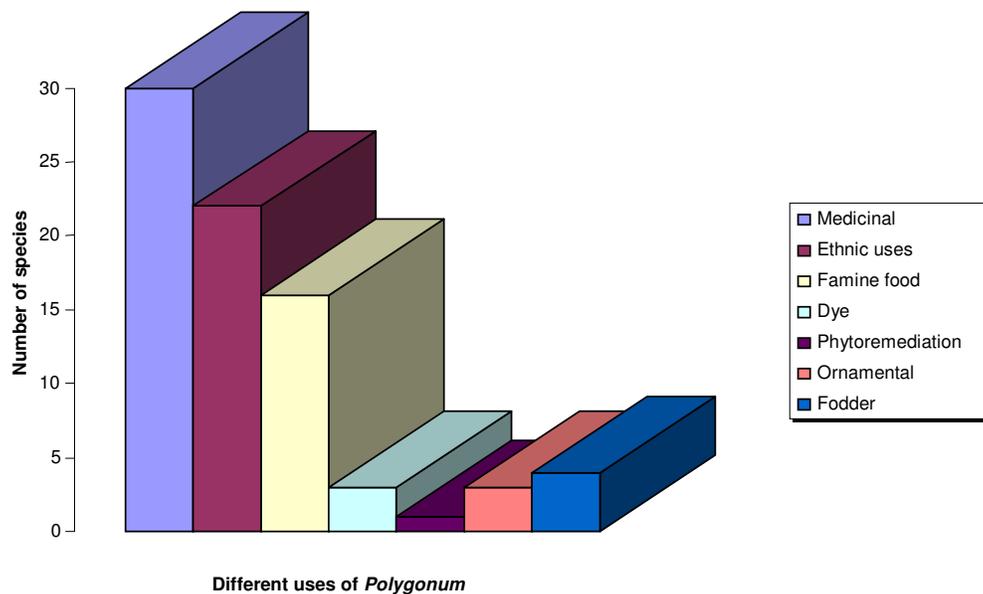


Figure 2. A chart showing different uses of *Polygonum*.

country viz. the states of Bihar and Karnataka. In Arunachal Pradesh of north east India, various tribes like Nyishi, Adi, Apatani and Monpa were interviewed. In Meghalaya, Khasi and Jaintia tribes were mostly interviewed while in Assam, the ethnic people of Lakhimpur, Borpeta and Nalbari were interviewed. Some informants

from Nagaland area also helped us sharing their knowledge about the traditional utilization of *Polygonum*s. In north east India, *Polygonum*s are commonly known as a fish poison or as a vegetable (some other species). But only a limited range of people are aware of its medicinal use. Traditional practitioners, village

heads, women folks, elderly persons were interviewed. Their dependence on plants for various ailments, history of settlement and productive activities were also recorded during the present study. In Western Himalayan region, places adjacent to Dehradun and Shimla were surveyed during the monsoon period. These areas are less inhabited by the tribal people but have a big population of the gypsies. They inhabit inside the forests of Himachal Pradesh for almost 6 months in a year. During the fall, they shift to the lower altitude areas which is less cold and without snowfall. They are well aware of the potential uses of the plants. We interviewed about 50 reputed informants using semi-structured questionnaires about the types of ailments treated using *Polygonum* or with their combination. Most of them resided inside the forests for looking after their cattle. The data were always cross checked with more than three informants on the uses of plants and their mode of preparation.

Various species of *Polygonum* are in bloom generally throughout the year. However some species which are restricted to the Himalayan region blooms for a very short duration. We tried to carry out most of our surveys during pre and post monsoon season so that the flowering samples could be collected and confirmation of their identity can be made with an ease. Collected samples were thoroughly processed following standard herbarium procedure (Jain and Rao, 1977). They were identified with the help of local floras (Hajra et al., 1996; Hooker, 1886; Kanjilal, 1934 to 1940) and consulting ARUN, ASSAM and CAL herbaria at Arunachal Pradesh, Shillong and Howrah respectively. Voucher specimens were deposited at ARUN.

RESULTS AND DISCUSSION

Ethnobotanical uses

Most of the ethnic communities have a well-established system of administration of traditional medicine based mainly on plants for treatment of various ailments. *Polygonum*s are also used by several tribes of India in various ways. However, a few of them are reported to contain oxalic acid which can bind up with other minerals making them available to the body and leading to mineral deficiency. But most of them are nutritious and beneficial to eat in moderate quantities (www.pfaf.org). During our Ethnobotanical surveys in different parts of north and north-east India, we observed various uses of *Polygonum* by ethnic people (Figure 4). Tender leaves of *P. microcephalum* is eaten as vegetable by many tribes in Arunachal Pradesh. In Lakhimpur area of Assam, the powdered form of *P. plebeium* is taken orally to cure pneumonia and bowel complaints. *P. orientale* is called *Bihlongoni* in Assam and its leaf juice is commonly applied by the ethnic people to cure wounds. The leaf juice of *P. hydropiper* is also used in uterine disorders by the same community. It is the most common species of *Polygonum* in India distributed thoroughly in marshy places. The tribal people of Tripura and Bangladesh share an indigenous way to treat headache using this plant. The leaves are crushed with ten black peppers and taken through nose to cure headache (Hanif et al., 2009). Santal and Kumarikatas tribes of Kamrup district of

Assam are reported to use leaf paste of the same (locally called as *Patharua bihlongoni* to get rid of body

pains (Das et al., 2006). Bruised leaves of this plant are also reported to be used as a vesicant like mustard poultice. The leaves are very acrid and hence not eaten by insects or animals. In Upper Siang area of Arunachal Pradesh, dried plants are used as insect repellent for protecting clothes. They are also used as a condiment due to its peppery taste. In Assam, the leaf extract is sprayed against crop pests. It is applied externally to cure scabies (Singh and Jain, 2003). Infusion of leaves of *P. hydropiper* or *P. chinensis* is used in colic pain in Arunachal Pradesh (Choudhary and Srivastava, 2006). *P. glabrum* is also used in Assam as a cure for fever. Young shoots and roots are cooked with vegetables and the fruits are parched and made into a kind of flour while in Berahampur area of Orissa stems are lightly cooked and eaten (Singh and Jain, 2003).

In Arunachal Pradesh, *Polygonum*s can be seen widely utilized to catch fishes. *P. hydropiper*, *P. minus*, *P. pubescens* or *P. orientale* are used to stupefy the fishes by Adi, Nyishi, Mema and other tribes. The plant is grinded and made into paste, and then mixed with water in streams to trap the fishes. *P. persicaria* is used in this region to prepare local wine called *Apung*. Lepcha community of Sikkim calls *P. molle* as *Kandyepani* and use as an astringent. Moreover, the shoot-tip of many species like *P. cuspidatum*, *P. divaricatum*, *P. rigidum*, *P. lapathifolium* and *P. limosum* is eaten by ethnic people in various regions of India. In some areas of Assam, the pungent leaves of *P. glabrum* are cooked in small quantities with other vegetables. While in Arunachal Pradesh, we observed the Nyishi tribes preparing *Chutney* (a kind of spicy sauce) with *P. perfoliatum* and *P. runcinatum* respectively called as *Posikung* and *Ruri*. Adi tribes of the same region use *P. alatum* for the same purpose and refer it by the same name that is *Ruri*. The tender stems of *P. molle* is eaten raw by the people of Nyishi tribes and called as *Bonkung*. Ripen fruits of the same are sweet and edible, a favorite of birds too. *P. minus* is reported to occur throughout the hotter parts of India but no traditional uses have been recorded yet. In Malaysia, the local people use this plant as a remedy for sprains and body pains. They pound it with rice powder and make a paste which is rubbed or applied on the affected area. The plant is taken after childbirth and is also used as a remedy for indigestion. Similarly, the leaves of *P. lapathifolium* are used to invigorate and to purify the blood. In Myanmar, they are used as a remedy for stomachaches in Children (Wiert, 2006). In Himachal Pradesh of India, *P. tortuosum* has been reported to cure Jaundice. Locally it is called *Chhohem* and the whole plant paste is mixed with curd (prepared from Goat's milk) is given in empty stomach for 15 and 22 days (Chandrasekar and Srivastava, 2005). In Meghalaya, the ethnic people have a unique way of drug preparation for leprosy and paralysis. Rhizome of *P. alatum* along with mature leaves of *Zanthoxylum acanthopodium*, *Pteridium aquilinum* rhizome, *Sarcandra glabra* leaves and *P. alatum* leaves are ground together.

The fine mixture is then wrapped into many small packets with *Phrynium pubinerve* leaf and the packets are heated in the fire and covered with ash so that they do not get burnt. After half an hour, all the packets are taken out while it is hot and the contents of each packet is then emptied into a piece of white cloth and tied at one end. It is then fomented on the body of persons suffering from leprosy and also in paralytic patients. This hot mixture is effective in treating various kinds of skin diseases as well. In case of boils, the rhizome paste is applied locally (Hyenniewta and Kumar, 2008). In Assam, *P. strigosum*, which is called as *Mou-sarali* (Assamese) or *Moy-sarali* (Mising) is used for the dysentery of cattles. Tender roasted shoots are given once daily on empty stomach for 2 to 3 days to get rid of the disease (Saikia and Borthakur, 2010). *P. alpinum* which is called *Chitahola* in Kashmir, used in arthritis. Water extract of the dried root powder is used to prepare rice and fed to arthritic patients. Even poultice prepared from the roots along with the crushed seeds of *Medicago falcata* is put on aching joints. The plant is common on alpine slopes in temperate Himalaya (Kaul, 2010). In Arunachal Pradesh, the Bangni tribes of East Kameng district use *P. capitatum* for an effective remedy for dizziness. The black nuts are crushed and paste is applied on the forehead. Locally this plant is called as *Chingma* (Gupta 2006).

Medicinal uses

The Indian, Chinese and Unani systems of medicine have used many species of Polygonums in different ways. Generally, they are good at curing gastrointestinal disturbances, to expel intestinal worms, to allay fever, to regulate menses, to treat skin infections and to soothe inflammation. We report here the medicinal uses of 34 species of Polygonums (Table 1, Figures 3 and 4). The most commonly used one is *P. aviculare* which in India, occurs in W. Himalayan region from Kashmir to Kumaon at the elevations of ca 1800 to 3600 m. The plant yields a glycoside called *Avicularin* which is a good astringent and antipyretic. This is also reported to be used as a demulcent, pectoral, tonic and diuretic (Huang et al., 1999). Various researches have shown this plant possessing considerable antimicrobial, anti-inflammatory, hepatoprotective, hypotensive and anticoagulative properties (Elizabeth, 2002). In Chumba area of the north east India, the dried roots are applied externally as an anodyne (a medicine that relieves or soothes pain). The seeds are aromatic and in Unani system of medicine, these are considered laxative, diuretic; also helpful to cure stomachache and pain in bladder. Decoction of the leaves is given in diarrhea and dysentery and to check excessive menses (Kirtikar and Basu, 1935; Chevallier, 1996).

This useful herb is known by over 40 names in English like all seed, beggar weed, bird's knotgrass, bird's

tongue etc. Further, the root extract of *P. viviparum* are considered a good tonic and styptic; also used in affections of chest and lungs, piles, old diarrhea, rhinitis, vomiting, biliousness, chronic bronchitis, wounds, gripping in the abdomen etc. in Unani system of medicine. The roots are applied as an astringent to abscesses. Decoction of roots (when injected) is useful in inflammation of the urethra and leucorrhoea; and used as gargle to get relief from sore-throat and spongy-gums and applied as lotion on ulcers. They are good astringent and can be used in hemoptysis (Schofield, 1989; Chopra et al., 1986). Infusion of *P. glabrum* leaves are given in colic and as a febrifuge. Root-stocks are used for piles, jaundice, debility and consumption. The peels from stem are placed and burnt over affected parts of the body to treat rheumatism (Hussain et al., 2008). *P. maculatum* is used as a vulnerary and lithontriptic. The plant-juice is introduced into the cavities of decayed grinders to get relief from the pain. It is also used as a cardiac stimulant and in colds, fevers and asthma. Infusion is useful as a gargle in inflammation of pharynx (Launert, 1981; Lust, 1974; Stuart, 1979; Moerman, 1998).

It is also reported to contain a small percentage of volatile oil *Persicariol* with a camphor-like principle used for rheumatism (Singh and Jain, 2003). Plant decoction is mixed with flour, is used as a poultice to relieve pain and for rheumatism. The dried leaves are rubbed to poison ivy rash (Moerman, 1998). The seeds of *P. barbatum* which occurs throughout India are used in griping colic pain in Kalahandi area of Orissa state (Singh and Jain, 2003). The aerial parts possess anticiceptive, anti-inflammatory and diuretic properties (Abdul et al., 2009). Roots are used as an astringent and cooling remedy (Chehregani, 2009). Decoction of leaves and shoots is used as a stimulating wash for ulcers, acting as a good healer of the scarred tissue (Kirtikar and Basu, 1935; Gorski and Sharma, 2002). A paste of the root is used externally in the treatment of scabies (Manandhar, 2002). *Polygonum hydropiper* known as *Pakurmul* in West Bengal and *Pani maricha* in Orissa and by several names in English viz., *Biting Pepper*, *Smartweed*, *Water-pepper*, etc., is diuretic, emmenagogue (inducing menstruation), also useful in amenorrhea etc (Stuart, 1979). This contains an isocoumarin called *Polygonolide* having anti-inflammatory and fertility-regulatory properties (Furuta et al., 1986). Liquid extract of herb used as an oral contraceptive; infusion used in uterine disorders and as a hemostatic. Root is stimulant, diuretic, carminative, tonic, and anthelmintic (Duke and Ayensu, 1985); their juice used for skin affections. Bruised leaves and seeds used as a vesicant like mustard poultice (Moerman, 1998). Whole plant of *P. plebeium* which is known as *Muthisag* in Orissa is used to cure Pneumonia (Singh and Jain, 2003). The leaves of *Polygonum punctatum* are applied to cure swellings. *Polygonum hydropiper*, *P. molle*, *P. bistorta*, *P. sphaerostachyum*, *P. macrophyllum*, *P. persicaria* and *P. alpinum* are considered a good

Table 1. Showing different medicinal uses of *Polygonum*.

Name of the species	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
<i>P. alatum</i> Buch.-Ham. ex D. Don	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. alpinum</i> All.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+
<i>P. amphibium</i> L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. amplexicaule</i> D. Don	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. aviculare</i> L.	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	+	+
<i>P. barbatum</i> L.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>P. bistorta</i> L.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. capitatum</i> Buch.-Ham. ex D. Don	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. chinensis</i> L.	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	+	+
<i>P. cuspidatum</i> Sieb. and Zucc.	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+
<i>P. divaricatum</i> L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. glabrum</i> Willd.	-	-	+	-	-	-	-	-	-	-	-	+	+	-	-	-	+
<i>P. hydropiper</i> L.	-	-	-	-	-	+	-	+	+	-	-	-	-	-	+	-	+
<i>P. lapathifolium</i> L.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>P. limosum</i> Komarov	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. macrophyllum</i> D. Don	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>P. microcephalum</i> D. Don	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. minus</i> Huds.	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	+	-
<i>P. molle</i> D. Don	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>P. multiflorum</i> Thunb.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. orientale</i> L.	-	-	-	-	+	-	-	-	-	-	+	+	-	+	-	-	+
<i>P. perfoliatum</i> L.	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>P. persicaria</i> L.	+	-	+	-	-	-	-	-	-	+	+	-	-	-	+	-	-
<i>P. plebeium</i> R. Br.	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+
<i>P. polystachyum</i> Wall. ex Meisn.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. pubescens</i> Blume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. nepalense</i> Meisn.	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
<i>P. rigidum</i> Skvortz.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. runcinatum</i> Buch.-Ham. ex D. Don	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. sphaerostachyum</i> Meisn.	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>P. strigosum</i> R. Br.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
<i>P. tortuosum</i> D. Don	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
<i>P. virginianum</i> L.	+	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	+
<i>P. viviparum</i> L.	+	-	-	-	+	-	-	-	+	+	+	+	-	-	-	+	-

A: Astringent B: Laxative C: Febrifuge D: Demulcent E: Tonic F: Diuretic G: Gonorrhoea H: Menstrual and other gynecological problems I: Dysentery J: Chest related problems K: Wound healing L: Piles M: Jaundice N: Muscular pain O: Cardiac problems P: Colic Q: Other uses + = Yes; '-' = No.

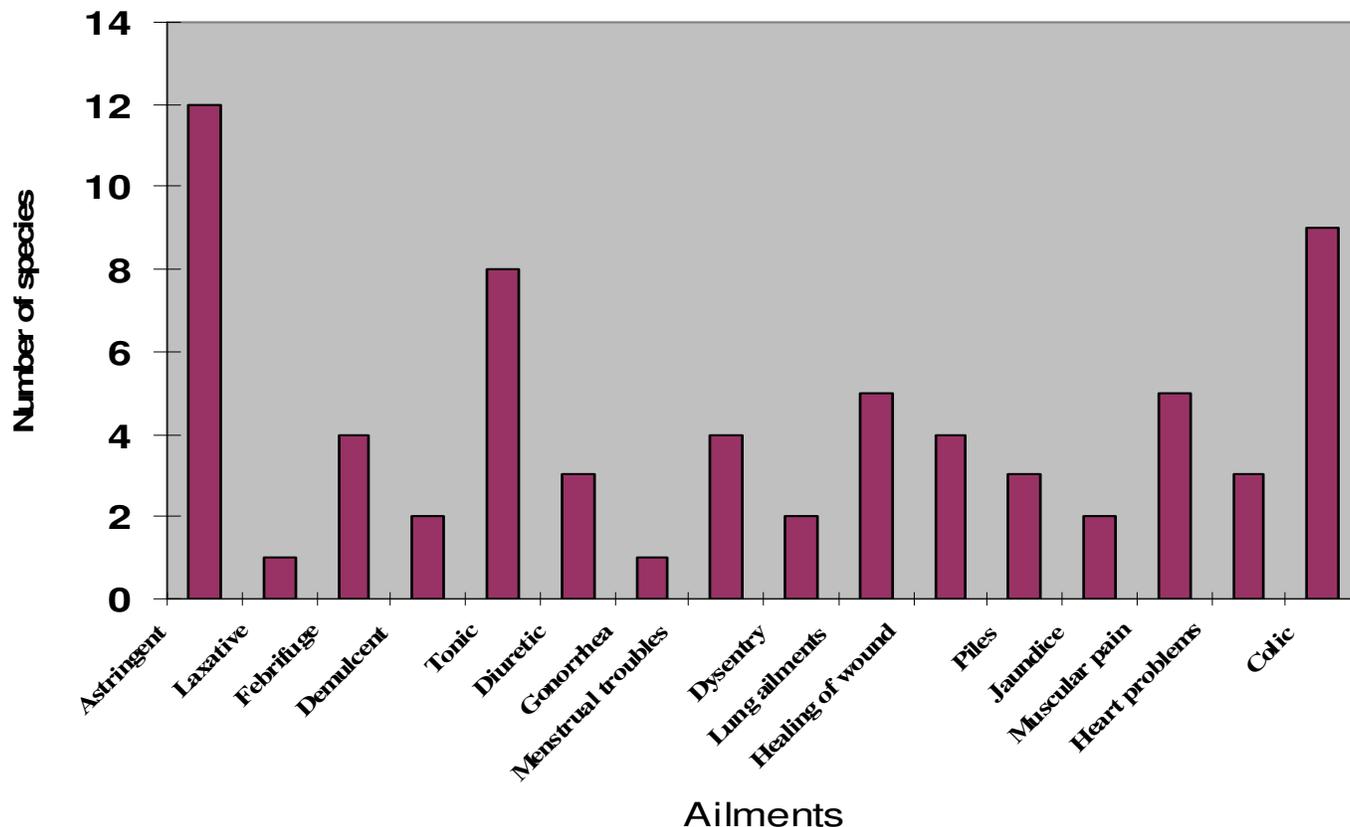


Figure 3. Chart showing various medicinal uses of Polygonum.

astringent (Launert, 1981). *Polygonum chinense* and *P. orientale* is a good tonic and vulnerary, though in China, the roots are used to treat fluxes, to remove intestinal worms, and to counteract scorpion poisoning (Stuart, 1979). *P. virginianum* is a demulcent, pectoral, astringent, tonic and diuretic (Chehregani et al., 2009; Stuart, 1979).

The root stock of *P. alpinum* and *P. amplexicaule* is used in dysentery of calves and fawns (Shahidullah, 2004). *P. lapathifolium* is considered to have anticancer properties (Takasaki et al., 2001). Nuts of *P. orientale* are prescribed for tubercular swellings and flatulence (Manandhar, 2002). The obnoxious *P. perfoliatum*, commonly known as 'mile-a-minute' plant is used as poultice on tumors. Root stocks of *P. lapathifolium* contain an acrid resin which acts as a cardiac depressant. Decoction is also given to cattle in black-gall sickness. *P. cuspidatum* is a proved source of *Resveratrol*, a polyphenolic compound. This works against several cardiovascular diseases and is effectively capable of reducing the signs and symptoms of menopause such as hot flash and skin degradation (Chehregani, 2009; Matsuda et al., 2001). *Trans-resveratrol*, a phenolic compound, has also been extracted from the same working as an anti-depressant (Xu et al., 2010). Recent researches have proved the potential of root extract of *P. cuspidatum* for antiproliferative effect on human lung

cancer cells (Lin et al., 2010). *Polydatin* is the major active principle of this plant to lower the blood cholesterol, increase myocardial contractility, and increase the coronary circulation. It has an anti-free radical effect to protect against ischemic brain and heart injury (Huang and Williams, 1999). *P. amphibium*, a common species in India and reported to be edible in Turkey, has been researched and proved to possess antioxidant properties (Ozen, 2010). Stem and seed extract of *P. orientale* also possess a higher radical scavenging activity (Jiang et al., 2009).

As famine food

Polygonums are also considered an ideal famine food because of its easy availability and high nutritional values. They are predicted to be an important source to combat nutritional deficiency during the scarcity of food. The nutrient compositions of Polygonums have already been discussed in many literatures (Hameed et al., 2008; Potts, 1970; Yildirim et al., 2001). Most of them are inexpensive and readily available. They provide nourishment to the people at the time of poverty or extreme scarcity of food. Polygonums are tested to contain considerable amount of carbohydrate, fat, albuminoides, fibre, Ash, nitrogen and



Figure 4. A, C, D, G and H. Shows different tribes of NE India who use *Polygonum* in their day to day life. B: *P. pubescens*; E: *P. hydropiper*; F: *P. virginianum*; I: *P. chinense*; J: *P. runcinatum*.

phosphoric acid (www.purdue.edu). *P. aviculare* has been generally used as a pot herb and is a very rich source of zinc. The seeds are eaten raw or cooked and could be a potential substitute for *Fagopyrum esculentum* (Buckwheat). During the famine of 1740 to 1742 in

Ireland, bread prepared with the flour of *P. bistorta* saved many lives (Lucas and Szymanski, 2007). *P. plebeium* is also used as a famine food in some tribal areas of Bihar, Jharkhand, Uttar Pradesh and Orissa of India (Singh and Jain, 2003). *P. glabrum*, *P. chinense*, *P. plebeium*,

P. multiflorum and *P. lapathifolium* are also eaten as vegetable or salad by local people in Andhra Pradesh (Singh and Jain, 2003). The roots of *P. bistorta* also said to be very tasty and nutritious because of the presence of a good amount of starch and tannin. They are used in soups and stews and can be dried then ground into a powder and used in making bread (Grieve, 1984).

Other uses

P. aviculare yields a green, yellow and a blue dye similar to indigo whereas *P. hydropiper* yields a yellow dye used in traditional fabric dye. In Manipur, *P. chinense* is called *Angom Yensil* and is utilized as an adhesive for dark colour. Crushed whole plant is soaked in water for 2 to 3 days and the liquid is used as dye (Akimpou et al., 2005). *P. aviculare* has also been proved as a very good source for phytoremediation of petroleum-contaminated soils (Mohsenzade et al., 2009) and as an accumulator of heavy metals (Chehregani et al., 2009). Leaves of *P. hydropiper* are sometimes used as a condiment or flavoring agent in Assam. *P. chinense* contains good nectar and serves a better pollen source for bees.

P. strigosum is a frog friendly plant because they provide a good shelter for them (www.wollicreek.org.au). Young top of *P. microcephalum* is used as a flavoring agent in food. Fruits of *P. perfoliatum* are edible and contain a high amount of sodium and potassium (Bajracharya, 1980). The leaves of *P. bistorta* are the main ingredient in a delicacy in N. England called *Dock Pudding*. The leaves are mixed with oatmeal, egg and other herbs to form a traditional breakfast. But, this species is still very poorly known for its potential utilization though widely distributed throughout the Himalayan region. Many species of *Polygonum* serve as a good source of fodder. Some of them are *P. aviculare*, *P. chinense*, *P. amplexicaule*, *P. polystachyum* etc.

Few of the *Polygonum*s are of considerable ornamental value too. *P. orientale* is popularly known as "Kiss me over the garden gate" and is a spectacular old-fashioned cottage garden favorite. Its pendulous bright pink inflorescence and heart shaped leaves are very pretty. Likewise, *P. bistorta* is also grown as an ornamental garden plant but its large-flowered cultivar 'Subarba' is more popular.

Conclusions

Our study shows that out of about 72 species growing in India (Hooker, 1886), 34 or more may prove useful to the mankind. Hence, we look forward for a thorough study and an intensive investigation on the prospecting for secondary metabolites which could be used as food, ornamentals or most importantly the medicines. Mention may be made of *Catharanthus roseus* that was earlier

thought to be a weed but later proved as a potential source of two important chemotherapy drugs used in cancer treatment, *Vincristine* and *Vinblastine* (Lewin, 1976). Bioprospecting and cultivation of these so called weeds is a suitable option for optimizing resource utilization, as well as decreasing over-dependence on wild habitat. It would be a welcome step if the claimed ethnomedicinal properties of all species of *Polygonum* are clinically evaluated in view of strengthening their validity and for preparations of new formulations too. Expectantly, they will come up as a potential resource for the welfare of mankind.

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