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RESEARCH ARTICLE

Taxonomy and Traditional Medicine Practices of Polygonaceae (Smartweed) Family at Rajshahi, Bangladesh

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Abstract

Taxonomy and traditional medicine practices of the family Polygonaceae growing throughout the Rajshahi, Bangladesh was carried out during September 2012 to August 2013. A total of 8 species under 3 genera belonging to the family Polygonaceae were collected and identified. Out of the total number of species *Persicaria barbata* (L.) Hara, *Persicaria limbata* (Meissn.) Hara, *Persicaria orientalis* (L.) Sach, *Polygonum plebejum* R. Br., *Rumex dentatus* Linn, *Rumex maritimus* L. were common and *Persicaria hydropiper* L., *Rumex vesicarius* L. was rare species in the study area. For each species botanical name, taxonomic description, local name, habit, habitat, flower colour, flowering season, voucher number and medicinal uses have been mentioned.

INTRODUCTION

The Polygonaceae are a family of flowering plants known informally as the knotweed family or smartweed-buckwheat family in the United States. The name is based on the genus *Polygonum*, and was first used by Antoine Laurent de Jussieu in 1789 in his book, Genera Plantarum (Jussieu. 1789). The name refers to the many swollen nodes the stems of some species have. It is derived from Greek; poly means many and goni means knee or joint.

The Polygonaceae comprise about 1200 species (David, 2008) distributed into about 50 genera. The largest genera are *Eriogonum* (240 species), *Rumex* (200 species), *Coccoloba* (120 species), *Persicaria* (100 species) and *Calligonum* (80 species) (Craig et al. (2005, Brandbyge, 1993). The family is present worldwide, but is most diverse in the North Temperate Zone.

Several species are cultivated as ornamentals. A few species of Triplaris provide lumber. The fruit of the sea grape (*Coccoloba uvifera*) is eaten, and in Florida, jelly is made from it and sold commercially (George and Herbst, 2005). The seeds of two species of *Fagopyrum*, known as buckwheat (sarrasin in French), provide grain (its dark flour is known as blé noir (black wheat) in France). The petioles of rhubarb (*Rheum rhabarbarum* and hybrids) are a food item. The leaves of the common sorrel (*Rumex acetosa*) are eaten in salads or as a potherb (Vernon et al, 2007).

The main objectives of this work will be detailed study on the taxonomic and traditional medicinal aspects of the family Polygonaceae occurring Rajshahi, Bangladesh.

Materials and Methods

The present study in based on the intensive field of the area during the period of September 2012 to August 2013. A total of 8 species under 3 genera belonging to the family Polygonaceae were collected and identified. The methods employed during the study were designed with the sole purpose of eliciting the precious wealth of information on the medicinal uses of plants practiced by the local people. Detailed survey has made in gathering information regarding use of medicine has been documented. Usually, the survey in each locality started with the interview of elderly and experienced members, locally known as Hakims. Besides, this the common people of the surveyed localities who themselves have used these plant-based for health treatments were interviewed to prove veracity of.

the curative features of plants. Medicinal uses and data about the treatment of various alignments based on the information gathered by using questionnaires are given subsequently

The collected specimens were identified studying related taxonomic books and booklets from the library of Rajshahi University. The major collected materials were identified and described up to species with the help of Ahmed et al. (2007), Hooker (1961), Prain (1963), Kirtikar and Basu (1987), Rahman et al. (2007, 2008, 2010, 2012, 2013a, 2013b, 2014), Rahman (2013a, 2013b, 2013c, 2013d, 2013e), Rahman (2014), Rahman and Debnath (2014), Rahman and Keya (2014), Rahman and Hossain (2014), Rahman and Rahman (2014) were consulted. For the current name and up to date nomenclature Huq (1986), Ahmed et al. (2007) and Pasha and Uddin (2013) were also consulted. All the collected plant specimens were kept in the Herbarium, Department of Botany, and University of Rajshahi, Bangladesh.

Results and Discussion

The present research work is based on the local knowledge of most commonly used medicinal plants of Polygonaceae family. Each Medicinal plant species is provided with its scientific name, local name, plant parts (Such as leaf, root, stem, fruit, latex, whole plant, seed, inflorescence and bark) mostly used and uses. The result obtained in the investigation need to be rigorously subjected to pharmachemical analysis in order to validate their authenticity and future prospects. The paper has only documented the herbal health remedies presently in vogue in the region and does not prescribe or recommend for their use till further determination by the pharmacologist. Data have been gathered on the traditional uses of plant species, especially for asthma, abscess, anthelmintic, astringent, bronchitis, bedsores, cancer, cough, diuretic, diarrhea, dysentery, eczema, earache, headache, inflammations, jaundice, kidney disease, leprosy, paralysis, skin diseases, scabies, toothache, ulcers, ringworm and others.

By examining the plant materials collected from the study area using the identification methods and medicinal information was accumulated and described below.

1. **Persicaria barbata** (L.) Hara.

Taxonomic description: A stout annual herb, about 0.9 m tall. Leaves 7.5-12.5 cm long, lanceolate or linear-lanceolate, acuminate at both ends; stipules much shorter than the internodes, mouth truncate, stiff-ciliate. Flowers small, white, 4 or more in axils of bract in spiciform racemes, 3.8-5 cm long, rather thick.

Local name: Pani Morich
Habit: Annual herb
Habitat: Moist places
Flower color: White
Flowering season: July to August
Medicinal uses: Seeds possess tonic, purgative and emetic properties; used to relieve the gripping pains of colic. Roots are astringent and cooling. Decoction of the shoots is used to wash ulcers. Powdered leaves are used in ulcers of goats caused by infection due to fly (Yusuf et al. 2009). In China, the juice is used for itch and also as a diuretic, carminative, and anthelmintic Ahmed et al. (2007).
Specimen examined: KU 01, East side of Rajshahi University Campus, 06-08-2012.
Figure (A-P): Diagrammatic sketches showing morphological characters of *Persicaria barbata* (L.) Hara.

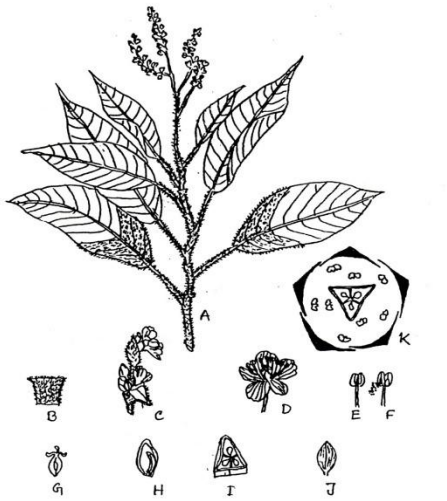
A: Flowering twig; B: Part of stem showing stipulous cilia; Dorsal view of leaf with hairs; D: Ventral view of leaf with hairs; E: Portion of spike; F: Bract with flower; G: Separated bract; H: A flower; I: Flowering showing stamens; J: Flowering showing clear stamens; K: Pollen dispersing from the anther; L: Gynoecium; M: T.S. of ovary; N: Lateral embryo; O: A fruit; P: Floral diagram.

2. **Persicaria orientalis** (L.) Sach.

Taxonomic description: A tall annual, with fistulous branches, 0.9-3 m high, usually softly hairy or silky. Stems robust, grooved. Leaves 15-23 cm long, ovate or ovate cordate, long-pointed; stipules short, truncate, hairy, ciliate at the mouth. Flowers white or red in dense, erect or drooping racemes, 5-10 cm long.

Local name: Pani Morich
Habit: Branching annual herb.
Habitat: Moist places
Flower color: White
Flowering season: July to August
Medicinal uses: It is a good tonic and vulnerary. An infusion of the leaves is used by the country people of Bombay to relieve pain in colic. In Chota Nagpur, it is employed as a for ‘‘stitch in the side” and in Assam as a remedy for fever (Rahman et al, 2007). The plant is a good tonic and vulnerary; used for healing wounds (Yusuf et al. 2009).
Specimen examined: KU 04. Rajshahi University Campus 13. 08. 2012.

Figure (A-K): Diagrammatic sketches showing morphological characters of *Persicaria orientalis* (L.) Sach.



A: Flowering twig; B: Separated stipule with hairs; C: Bract with flowers; D: A flower; E: Stamen; F: Pollen dispersing from the anther, G: Gynoecium; H: Lateral embryo; I: T.S. of ovary; J: A fruit; K:. Floral diagram.

3. **Persicaria hydropiper L.** Synonym: *Polygonum hydropiper* Linn.

Taxonomic description: A stoutish annual, stem decumbent at base and ascending, 30-50 cm long. Leaves linear-lanceolate, 3.8-8 cm long, subsessile; stipules glabrous, with few and usually deciduous bristles mostly under 2.5 mm long. Flowers white, small, in rather lax, very slender or filiform racemes which are erect, flexuous, or decurved.

Local name: Pani Morich
Habit: Annual herb
Habitat: Moist and water logged places.
Flower color: White
Flower season: July to August
Medicinal uses: The plant is stimulant, diuretic and emmenagogue; used principally in Europe for obstructions of the menses and amenorrhoea. Juice of the plant is a common remedy against the body lice of cattle and sheep and as a repellent of flies. It is reported to be used in enlarged liver, wounds, headache, intestinal worms, skin diseases, body pain, loss of appetite, toothache, gastric ulcer, dysentery, dysmenorrhoea, painful carbuncles and for premature abortion. The crushed plant is applied to arrest hemorrhage in Jointiapur of Sylhet. Leaves are given for stomach pain in Rema-Kalenga. Juice of young tender leaves is a popular remedy of liver pain. Roots are stimulant and tonic

(Yusuf et al. 2009). Most of these plants are known to have antibacterial properties. The plant is astringent, styptic, antipyretic. The seeds are lexative, diuretic, good for burning, pain in the stomach, pain in the bladder, erysipelas.
Specimen examined: KU 08. Rajshahi University Campus. 19. 08. 2012
Figure (A-M): Diagrammatic sketches showing morphological characters of *Persicaria hydropiper* L.

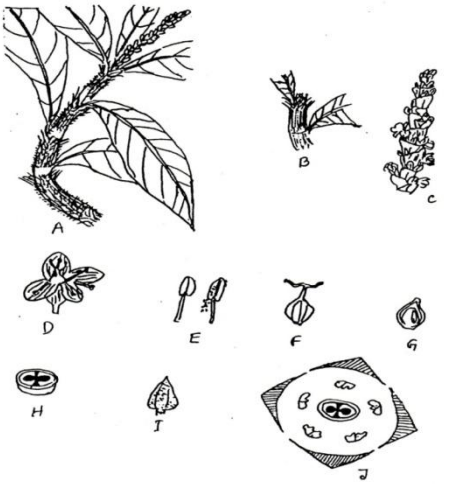
A: Flowering twig; B: Showing hairy stipule with stamen part; C: Separated stipule; D: Silky leaf (Dorsal view); E: Silky leaf (Ventral view); F: Portion of spike; G: A flower; H: Flower showing stamens; I: Stamens; J: Gynoecium; K: T. S. of ovary; L: A fruit; M: Floral diagram.

4. **Persicaria limbata** (Meissn.) Hara.

Taxonomic description: Leaves roughly elliptic or lanceolate, accuminate, entire, scaberulous on both surfaces, stipules tubular, truncate, strigoses, mouth either recurved or spreding, marginal cilia less than half the length of the tube . Axillary, solitary or 2-3 flowers in axil of leaf. Recems 2-4 inch long, peduncle stout, with short bristle. Flowers is a very slender raceme, braeteate, bracts ciliate, oblique, closely placed, hispid, mouth ciliate, hermaphrodite, actinomorphic, hypogynous. Stamens 5 alternating with glands, filament flate at base, basifixed anther. Ovary 2 gonous, styles 2 long. Fruits are Nut, black and shining.

Local name: Pani Morich
Habit: Annual herb
Habitat: Moist places.
Flower colour: White
Flowering season: July to August.

Medicinal uses: The seeds are employed in Malabar and Canada to relive the griping pains of colic. is said to be used as a stimulating wash for ulcers.
Specimen examined: KU 09, Rajshahi University Campus. 22. 08. 2012.
Figure (A-J): Diagrammatic sketches showing morphological characters of *Persicaria limbata* (Meissn) Hara.



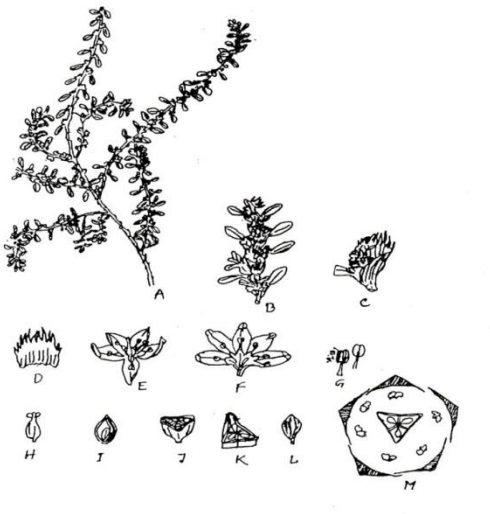
A: Flowering twig; B: Stem part showing stipule; C: Portion of spike; D: A flower; E: Stamens; F: Gynoecium; G: Lateral embryo; H: T. S. ovary; I: A fruit; J: Floral diagram.

5. Polygonum plebejum R. Br.

Taxonomic description: A small prostrate, diffusely branched herb. Leaves 4-17 mm long, oblong, linear, or obovate, sessile or subsessile, stipules hyaline, short, lacerate to the middle, fimbriate. Flowers minute, pink, axillary, solitary or 2-3 together.

Local name: Rani Phul
Habit: Annual herb
Habitat: Moist places
Flower color: Pink
Flowering season: Early July

Medicinal uses: Powdered herb is used internally in pneumonia. Roots are reported to be used in bowel complaints (Yusuf et al. 2009). The plant is dried, powdered, and taken internally in pneumonia. The santals use the root in bowel complaints.
Specimen examined: KU 06. Rajshahi University Campus, 13. 08. 2012
Figure (A-M): Diagrammatic sketches showing morphological characters of *Polygonum plebejum* R. Br.



A: Flowering twig; B: Part of stem showing flowers pattern; C: Bract with hidden flower; D: Separated bract; E: A flower; F: Flowering showing stamens; G: Stamens; H: Gynoecium; I: Lateral embryo; J: L. S. of ovary; K: L. S. of ovary; L: A fruit; M: Floral diagram.

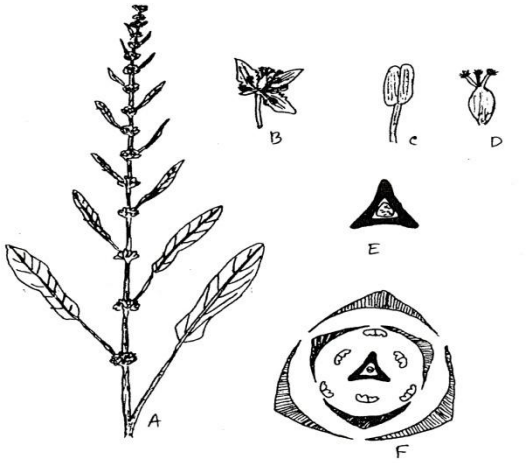
6. **Rumex dentatus** Linn

Taxonomic descrition: Annual herb. Leaves 7.5-10 by 2.5-3.2 cm oblong, obtuse, glaberous the petioles of the radical leaves reaching 6.3 cm, long, base rounded or cordate, alternate, simple. Flowers are arranged in panicled racemose clusters. Embracteate, pedicellote, actinomorphic, hermaphrodite, trimerous, hypogynous and cycle. Stamen 6 in 2 whorls of 3 each, the outer whorls is opposite the outer tepals and the inner whorls is opposite the inner tepal, polyandrous, dichecous,basifixed,introse. Tricarpellary, syncarpous, ovary superior, unilocular, placentation basal, style short, stigma 3 and hanging downward.

Local name: Bon Palong
Habit: Annual herb
Habitat: Moist places.

Flower colour: Yellowish-white.
Flowering season: July-August.
Medicinal uses: The root is used as an astringent in the treatment of cutaneous disorders.
Specimen examined: KU 14, Rajshahi University Campus, 27. 08. 2012

Figure (A-F): Diagrammatic sketches showing morphological characters of *Rumex dentatus* Linn.



A: Flowering twig; B: A flower; C: Stamen; D: Gynoecium; E: T. S. of ovary; F: Floral diagram.

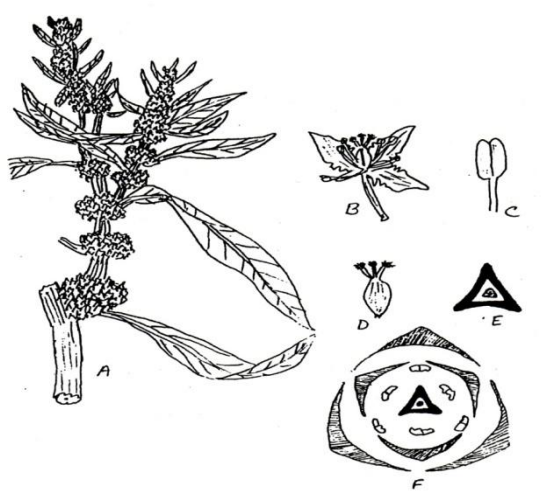
7. **Rumex maritimus Linn.**

Taxonomic description: An erect annual herb, up to 1.2 m high; stem angled and deeply grooved. Leaves 7.5-25 cm, lanceolate, base narrowed into the petiole. Flowers very small, in axillary whorls, lax or dense, arranged in panicled racemes, leafy to the top.

Local name: Bon Palong
Habit: Annual herb
Habitat: Moist places.
Flower colour: Greenish white.
Flowering season: July to August.

Medicinal uses: Plant is refrigerant. Leaves are applied to burns. Seeds are aphrodisiac, tonic to the loins; removes pain from the back and lumber region; cures gleet (Yusuf et al. 2009). Seed are ground into a powder and cooked as porridge. Seeds are said to be aphrodisiac. Crushed paste of leaves is applied to ringworms and skin diseases.
Specimen examined: KU 10, Rajshahi University Campus, 27. 08. 2012.

Figure (A-F): Diagrammatic sketches showing morphological characters of *Rumex maritimus* Linn.



A: Flowering twig; B: A flower; C: Stamens; D: Gynoecium; E: T. S. of ovary; F: Floral diagram.

8. Rumex vesicarius Linn.

Taxonomic description: An annual, pale green, glabrous herb, branched from the root, rather fleshy, 15-30 cm high. Leaves 2.5-7.5 cm, elliptic, ovate or oblong, obtuse or acute, base cuneate. Racemes 2.5-3.8 cm, terminal and leaf-opposed. Flowers sometimes 2-nate and connate, valves large, orbicular, 2-lobed at each end, very membranous and reticulate without a marginal nerve. Fruit 1.3 cm diam., white or pink, valves hyaline.

Local name: Takpalong, Chukapalong, Amlabetom.
Habit: Annual herb
Habitat: Moist places.
Flower colour: Yellowish-white.
Flowering season: July to August.
Medicinal uses: The plant is cooling, tonic, analgesic, laxative and stomachic; useful in heart troubles, tumors, constipation, hiccup, flatulence, asthma, bronchitis and piles. Leaf juice is astringent, cooling, aperients and a strong diuretic; relieves toothache, checks nausea and promotes appetite. Fruits are aperients and diuretic; eaten fresh against jaundice, hepatic conditions, constipation and indigestion. Roasted seeds are prescribed in dysentery (Yusuf et al. 2009). The root is used as an astringent in the treatment of cutaneous disorders.

Specimen examined: KU 14, Katakhali, Rajshahi, 27. 08. 2012.
Figure (A-F): Diagrammatic sketches showing morphological characters of *Rumex vesicarius* Linn.

A: Flowering twig; B: A flower; C: Stamen; D: Gynoecium; E: T. S. of ovary; F: Floral diagram.

Conclusion

Taxonomy and traditional medicinal uses on the family Polygonaceae growing throughout the Rajshahi, Bangladesh was carried out during September 2012 to August 2013. A total of 8 species under 3 genera belonging to the family Polygonaceae were collected and identified. The present study may be a preliminary contribution of this area using standard research methods, focusing on medicinal plants and their local uses for the healthcare. This detailed information will be helpful for the pharmacognosist, botanist, ethno-botanist and pharmacologist for the collection and identification of the plant for their research work and isolation of plant products benefitting human health.

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