Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 1, No. 4, p. 29-34, 2011
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

Taxonomic Studies on the Family Solanaceae in the Rajshahi University Campus

Tanziman Ara*, Emdadul Hoque Khokan, AHM Mahbubur Rahman

Plant Taxonomy Laboratory, Department of Botany, University of Rajshahi, Rajshahi 6205, Bangladesh

Received: 14 June 2011
Revised: 15 July 2011
Accepted: 16 July 2011

Key words: Solanaceae, taxonomic Studies, Rajshahi University Campus.

Abstract

Taxonomic investigation of the family solanaceae growing through out the Rajshahi University campus was carried out. A total of 8 (eight) species under 4 (four) genera of the family Solanaceae were collected and identified by comparing with correctely identified herbarium sheets deposited at Rajshahi University Herbarium and checking with taxonomic literature (khan and Mia, 2002). A complete taxonomic account of each species is given with current nomenclature, local name, Chromosome number, flowering season and uses. Most of the species are distributed all over the study area, (a) *Solanum nigrum,* (b) *Solanum spirale,* (c) *Solanum indicum,*(d) *Solanum xanthocarpum,* (e) *Solanum torvum,* (f) *Datura metel,* (g) *Physalis minima,* (h) *Nicotiana plumbaginifolia*. *Datura metel* which is both cultivated and wild in nature grown in particular area.

***Corresponding Author:** Tanziman Ara ✉ tanziman@yahoo.com

Introduction

Many developed countries even our neighbouring country India have their national Flora. But from this point of view our country is very much needy (Lawrence, 1951). The family Solanaceae is represented by about 90 genera and 2800 species of nearly cosmopoliton distribution. Central and South America are the chief centers of distribution where over 40 genera are found. Khan and Miah (2002) reported 13 genera and 34 species from Bangladesg. Whereas, Rahman (2009) reported 13 genera and 37 species from Bangladesh. The Solanaceae was interpreted by Wettstein as probably of a polyphyletic origin, as evidenced by allicance with several families. It is most closely related to the Scrophulariaceae, The family was divided by Wettstein (1891) in to the tribes: Nicandreae, Solanaeae, Datureae, Cestreae and Salpiglossideae. The family was included by Benthum and Hooker and by Bessey within the polemoniales where as Hallier considered it to be the primitive member of the tubiflorae and (together with the Scrophulariaceae) to have been derived probably from the Linaceae. Hutchinson included it as the primitive taxon of his Solanales, together with the Convolvulaceae, an order ancestral to his personales. The main objective of the present study was to investigate taxonomy of the family solanaceae in the study area.

Materials and methods

Materials

Taxonomic investigation on the family Solanaceae growing throughout the Rajshahi University campus was carried out. Herbarium Specimens held at the Herbarium of Rajshahi University.

Methods

Regular field visits (at two months intervals) were made to collect all the species under the family Solanaceae in flowering and fruting condition. Collected plants materials were processed by following traditional or routine herbarium techniques adopted by Lowrence (1951). These specimen were identified by comparing with correctly identified herbarium sheets and available literatures i.e. Flora of Bangladesh (Solanaceae) and Encyclopedia of Flora and Fauna of Bangladesh, vol-10. The specimen were mounted and deposited in the Rajshahi Universuty Herbarium for future references.

Results and discussion

In the present survey, a total eight (8) fresh plant species under four (4) genera of the family solanaceae have been recorded from Rajshahi University campus. Rajshahi University campus was previously very rich in plant species diversity but due to different development activities and human interfare. Many species either became theatened or extinct from the area. However no taxonomic study has been conducted so far in the study area. Hence, a detail taxonomic study is essential for knowing the species of the campus area. Taxonomic study of solanaceae of the campus area will contribute much toward that study. Taxonomic threatened of the species and their color photograph will help readers much to identify these plant species. Detail taxonomic treatment for all the species occurring in the campus area has been provided bellow.

Description of the study plants

1. *Solanum nigrum* Linn.; Hook, J.D. Fl. Brit. Ind. 4: 229 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:553 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1748 (1987).

Synonym: *Solanum nodiflorum* Jacq (1989).

Local Name: Putibegun, Kakmachi.

English Name: Black Night Shade

Description: A variable annual; stem erect, glabrous or more or less pubescent, much divariacately branched. Leaves numerous, 2.5-9 by 2-5 cm., ovate-

lanceolate, subacute or acuminate, glabrous, thin, entire sinuate toothed, tapering into the petiole; petioles 2 cm. long. Flowers small, in extra-axillary subumbellate 3-8-flowered cymes; peduncles 6-20 mm. long, slender; pedicles 6-10 mm. long, very slender. Calyx 3 mm. long, glabrous or nearly sol; lobes 5, oblong, obtuse, 1.25 mm. long, not enlarged in fruit. Corolla 4-8 mm. long, divided more than ½ - way down in to 5 oblong subacute lobes. Filaments short, flattened, hairy and base; anthers 2.5 mm. long, yellow, oblong, obtuse, notched at the apex. Ovary globose, glabrous; style cylindric, hairy. Berry 6 mm. diam., globose, usually purplish black, but sometimes red or yellow, smooth, shining, seeds discoid, 1.5 mm. diam., minutely pitted, yellow. (Fig. A).

Chromosome Number: 2n=24, 36, 48, 72, 96, 144 (Fedorov, 1969)

Flowering season: July

Uses: Berries are edible. The juice of the plant is given in chronic enlargement of liver

Fig. 1. Different plants of Solanaceae family A. *Solanum nigrum* Linn., B. *Solanum spirale* Roxb., C. *Soalnum indicum* Linn., D. *Solanum xanthocarpun* Schrad & Wendl., E. *Solanum torvum* Swartz., F. *Physalis minima* Linn., G. *Nicotiana plumbaginifolia* Viv., H. *Datura metel* Linn.

2. *Solanum spirale* Roxb.; Hook, J.D. Fl. Brit. Ind. 4: 230 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:553 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1752 (1987).

Synonym: Not Known

Local Name: Bogna

English Name: Spiral Solanum.

Description: An evergreen branched shrub, unarmed, allparts glabrous. Leaves more or less lanceolate or elliptically lanceolate, at the cuneate bare decurrent in a shorter or longer (up to 2.5 mm. long) petiole, 5-10 cm. long, shortly acuminate, entire, membranous, glabrous. Flowers rather small, white, on slender 1.3-2.5 cm. long pedicels forming a leaf-oposed, short-peduncled, slender, lax, glabrous receme 2.9-5 cm. long. Corolla deeply 5-cleft, the lobes oblong, spreading, about 6 min. long. Calyx shallowly cup-shaped, about 5 mm. Wide, truncate, smooth, Berries globular, supported by the explanate shallowly lobed membranous calyx, the size of a large pea or small cherry, smooth and glossy, yellow. Seeds obliquely ovoid-reniform, compressed, smooth. (Fig. B)

Flowering season: January (winter season)

Uses: The root is given in as a narcotic and diuretic.

3. *Solanum indicum* Linn.; Hook, J.D. Fl. Brit. Ind. 4: 234 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:554 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1755 (1987).

Local Name: Tetbegun, Bokoir

Description: A much-branched undershrub 0.3-1.5 m. very prickly; prickly large, with a long compressed bare, sharp, often slightly recurred; stem stout, often, purple; branches covered with minute stellate hairs. Leaves 515 by 2.5-7.5 cm., ovate in outline, cute, subentrie or with a few large triangular-ovate subacute lobes, sparsely prickly on both sides, clothed about with simple hairs from bulbous bare intermixed with small stellate ones, covered below with small stellate hairso; bare cordate, cunete or truncate, often unequalsided; petioles 1.3-2.5 cm. long, prickly. Flowers in racemose extra axillary cymes; peduncles short; pedicels 6-13 mm. long, stellately halry and prickly. Calyx 3 mm. long, stellately hairy; teeth triangular, 1.5 mm. long. Corolla 8 mm. long, pale purple, clothed outside with barker purple stellate hairs; lobes 5 mm. long, deltoid – ovate, acute. Filaments very short, almost o; anthers oblong-lanceolate, opening by small pores. Ovary often hairy at the top; style stellately hairy, curved at rthe apex. Berry 8 mm. diam., globose, dark yellow when ripe, plabrous or sometimes with a few stellate hairs at the apex. Seeds 4 mm. diam., minutely pitted. (Fig. C).

Flowering season: July Particularly throughout the year except cold weather.

Uses: The juice of the leaves, with fresh juice of the ginger, is administered to stop vomiting.

4. *Solanum xanthocarpum* Schrad & Wendl.; Hook, J.D. Fl. Brit. Ind. 4: 236 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:554 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1759 (1987).

Local Name: Kontikari

Description: A very prickly diffuse bright green perennial herb, somewhat woody at the bari; stem somewhat zigzag; branches numerous, the younger ones clothed with dense sellate tomentum; prickles compressed, straight, yellow, glabrous and shining, often erceeding 1.3 cm. long. Leaves 5-10 by 2.5-5.7 cm., ovate or elliptic, sinuate or subpinnatific, obtuse or subacute, stellately hairy on both sides (especially so beneath), sometimes becoming nearly glabrous in age, armed on the midrib and often on nerves with long yellow sharp prickles, bare usually rounded and unequal-sided; petioles 1.3-2.5 cm. long. Stellately hairy and prickly. Flowers in extra-axillary few flowered cymes sometimes reduced to a single flowero; peduncles short; pedicles short, covered stellately hairy. Calyx nearly 1.3 cm. long, densel hairly and prickly; tube short, globose; lobes 11 mm. long, linear-lanceolate, acute, prickly outside. Corolla white, 2 cm. long; lobes deltoid, acute, hairy outside. Filaents 1.5 mm. long, glabrous; anthers 8 mm. long, oblong-glabrous. Berry 1.3-2 cm. diam., yellow or white with green veins, surrounded by the enlarged calyx, seds 2.5 mm. diam., glabrous (Fig. D).

Flowering season: Rainy season

Uses: The plant is much used as a diuretic in dropsy. The leaves are a good application for piles.

5. *Solanum torvum* Swartz.; Hook, J.D. Fl. Brit. Ind. 4: 234 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:554 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1764 (1987).
Synonym: *Solanum ferrugineum* Jack. 1978.
Local Name: Gutabegun
English Name: Plate Brush
Description: A tomentose shrub 1.5-3m. high, in many respects very similar to *S. indicum* but usually taller and more erect with fewer more erect branches. Leaves without prickles or with one only beneath near the bare of midrib. Cymes often bifurcate and denser and flowers always white. Calyx never armed. Fruit 1.3 cm. seated on the calyx which is 9-10 mm. diam. With lanceolate lobes (Fig. E)
Chromosome Number: 2n=24 (Fedorov,1969)
Flowering season: July-September (summer season)
Uses: The fruits are eaten as a vegetable and said to be good for enlargement of the spleen.

6. *Physalis minima* Linn.; Hook, J.D. Fl. Brit. Ind. 4: 238 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:557 (1903, rep.ed. 1963); Kirtikar and Basu, 3:1766 (1987).
Local Name: Ban-tipariya, kapal phutki.
Description: Annual herbaceous; stem erect, 15-30 cm. high striate, more or less (often viscidly) pubescent. Leaves 3.5-6.3 by 1.3-3.8 cm., ovate, acute, shallowly-toothed or lobed, more or less pubescent, thin bare cuneate; petioles 1.3-3.2 cm. long, slender more or less pubescent. Flowers solitary; pedicels flliform, nodding, 3-8 mm. long. Calyx 3-5 mm. long at flowering time, not angular, bare truncate; teeh triangular, acute, nearly equalling the tube, ciliate. Corolla clear yellow, sometimes spotted at the bare within; lobes of the limb very short. Filaments 2.5 mm. long, glabrous; anthers 2mm. long, oblong, obtuse. Ovary ovoid, seated on a large disk; style glabrous, Berry 8 mm. diam., entirely enveloped in the enlarged calyx, which is ovoid or subglobose, 1.3-2.5 cm. long, membranous, 5- or sometimes 10- ribbed, reticulately veined, tipped by the connivent pubescent calyx-teeth. Seeds discoid or subrenfiorm, 2 mm. diam., finely muriculate, orange-yellow. (Fig. F)
Chromosome Number: 2n=48 (Fedorov,1969)
Flowering season: January-March.
Uses: It is considered to be tonic, diuretic and purgative and is an ingredient in a medicinal oil which is given for spleen.

7. *Nicotiana plumbaginifolia* Viv.; Hook, J.D. Fl. Brit. Ind. 4: 246 (1877; rep.ed. 1961); Prain, D. Beng. Pl. 2:559 (1903, rep.ed. 1963).
Local Name: Ban-tamak
Description: Leaves oblong or elliptic bare narrowed, corymb-branches elongated forming very lax racemes calyx-teeth triangular-lanceolate acuminate, corolla narrow-liner, capsole 0.64 cm. (Fig. G)
Chromosome Number: 2n=20 (Fedorov,1969)
Flowering season: March-June
Uses: Not known

8. *Datural metel* Lin.; Hook, J.D. Fl. Brit. Ind. 4: 243 (1877; rep.ed. 1961); Kirtikar and Basu, 3:1791 (1987).
Local Name: Dhutra
English Name: Thorn apple
Description: Whole plant densely clothed with greyish tomentum. Stem erect, 0.9-1.2 m. high, stout, herbaceous, terete. Leaves 15-20 cm. long, ovate, lanceolate or broadly ovate, acute or accominate, unequal at eh bare and often cordate, entire or repand-dentate, densely tomentose on both surfaces and generally glandular, petioles 6.3-9 cm. long, peduncles at first erect, afterwards nodding. Calyx about 7.5 cm. long, inflated towards the middle, persistent and reflexed in fruit; teeth lanceolate, acuminate, unequal. Corolla about twice as long as

the calyx, white tinged with green below, pubescent outside, limb 10-toothed, capsule globose, nodding, covered with long rather slender spines. (Fig. H).
Chromosome Number: 2n=24 (Fedorov,1969)
Flowering season: November- December
Uses: This plant uses in the treatment of asthma and other kabiraji treatment. Alkaloids are found in its fruits.

References

Fedorov AA. 1969. Chromosome number of flowering plants. Academy of Sciences of USSR, Moscow.

Hooker JD. 1877. Flora of British India. L. Reeve and Co. ltd. London, U.K. **4,** 228-246.

Khan MS, Mia C. 2002. Solanaceae, Khan MS and Rahman MM (eds). Flora of Bangladesh. Bangladesh National Herbarium, Dhaka, **53,** 1-48.

Kirtikar RK, Basu BD. 1987. Vol III. Indian Medicinal Plant. Reprinted. Lalit Mohan Basu. Allahabad. India.

Lawrence GHM. 1951. Taxonomy of Vascular Plants. Oxford and IBH Publishing co. Calcutta. India. P. 1-5.

Prain D. 1903. (rep. Ed. 1963) Bengal Plants. Botanical Survey of India, Calcutta. India.

Rahman MM. 2009. Solanaceae. PP. 287-320. In: Ahmed ZU, Hassan MA, Begum ZNT, Khondker M, Kabir SMH, Ahmad M, Ahmed ATA (eds). Encyclopedia of Flora and Fauna of Bangladesh. Vol.10. Angiosperm: Dicotyledones (Ranunculaceae-Zygophyllaceae). Asiatic Society of Bangladesh, Dhaka.

Wettstein WR. 1891. Solanaceae. Nat Planzenfam. **4(3B),** 4-38.