Annals of
Plant Sciences
Volume10, Issue 2 (2021) pp. 4146-4150
ISSN: 2287-688X
Research Article

Samolus valerandi L. (Primulaceae): A new Angiospermic record from Jammu and Kashmir, India

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Abstract: A humid-loving herb *Samolus valerandi* L. is collected for the first time from the union territory Jammu and Kashmir. The reported taxa are found in a wetland near rice fields at Phalni 1411m above mean sea level. The specimen is thoroughly analyzed morphologically live in the field, followed by the collection of specimen for herbarium and deposition of standardized herbarium sheets at the herbarium of Department of Botany, KLDAV PG College Roorkee Haridwar 247667 Uttarakhand India. The detailed taxonomic description and photographs are provided in the manuscript.

Keywords: Primulaceae; *Samolusvalerandi*; J&K; Brookweed; Biodiversity

Introduction

Samolus valerandi L. belongs to order Ericales, family Primulaceae (Samolaceae Jones 2012). It is commonly called seaside brookweed, thin-leaf brookweed, water cabbage, water pimpernel, or water rose. The distribution of *Samolus valerandi* is cosmopolitan, which makes it distinctive in this *Samolus* L. There are a total of 15 species of *Samolus* confined to lesser areas of the Southern Hemisphere (Jones in 2012). *Samolus valerandi* is unique in family Samolaceae from other members by its widespread distribution, rosette leaves, and racemes with small white flowers having long pedicels. Rafinesque (1818), revealed some morphological similarities of *Samolus valerandi* with *S. parviflorus*. Two varieties of *S. valerandi* were narrated by Pax and Knuth's (1905), as *S. valerandi* var. *typicus,* a synonym of *S. valerandi* and *S. valerandi* var. *floribundus*, synonym of *S. parviflorus.* In 2009, Cholewa favored to keep *S. parviflorus* as distinct species from *S. valerandi*. However, a recent systematic study (Jones *et al.* 2012) proposed *S. valerandi* and *S. parviflorus,* including *S. vagans*, belong to the same species complex. In India, only one species *S. valerandi* L. has been reported from Rajasthan, Punjab Plains, Bundelkhand, Western Himalaya, and Himachal Pradesh (Linneaus 1753, Hooker 1890, Duthie 1845-1922, Shetty 1991, and www.indiabiodiversity.org *Samolus valerandi* 24195 accessed on 10 Dec. 2020).

Samolus valerandi grows near water bodies in wet areas, stream banks, and swamps. It tolerates salinity but cannot survive for a longer period in salty water. The young leaves are cooked as a vegetable or eaten raw as a salad and food scarcity. The plant is also used to remedy ringworm, skin rashes, and itch in Southern Africa. Sometimes this species is cultivated as an ornamental in water bodies. Its nutritional composition and medicinal properties need further investigation.

During a field survey in Phalni, Budhal of Rajouri District in Union Territory of J & K, *S. valerandi* was found in wetland surround-ding aquatic body near rice fields at about 1411m.

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The specimen collected, thoroughly analyzed morphologically in natural habitat, systematically collected for mounting, and standardized herbarium sheets were deposited in the herbarium of the Department of Botany, KLDAV, P.G. College Roorkee. The species was identified by studying and comparing the specimen's plant characters with descriptions available in published literature (Jones 2012, Crusio 1984, Chung *et al.* 2018 and Chowdhery and Wadhwa 1984) and from http://plantsoftheworldonline.org. It is confirmed that the species has not been reported from Jammu and Kashmir so far as per the literature available. Hence, this is a new record for *S.valerandi* from the Union Territory of Jammu and Kashmir.

During the field survey in Rajouri district of Jammu and Kashmir, few flowering plants of the genus were collected from Phalni near Koteranka of Rajouri District at 33*21` 37``N 74*37`21``E; 1411.05 msl, on 25th August 2020. The species was photographed in the field using the camera Nikon B500. Measurement and morphological observations of the species were observed on living plant material in the field. The plant is identified through http://plantsoftheworldonline.org. We conducted a careful comparison of the genus and species with the protologues and type material of the genus and all the species belonging to genus *Samolus* and regional flora. The voucher specimen is mounted successfully onto the herbarium sheet, deposited, and preserved in the herbarium of the Department of Botany, KLDAV PG College Roorkee Haridwar 247667 Uttarakhand India.

Taxonomic treatment

Samolusvalerandi L., Sp. Pl. 1: 171 (-172) (1753 *Anagallis aquatica* Erndl ex Ledeb., Fl. Ross. (Ledeb.) 3 (1,8): 31 (1847). *Samolus americanus* Spreng., Syst. Veg., ed. 16 [Sprengel] 1: 702 (1824). *Samolus aquaticus* St.-Lag., Étude Fl., ed. 8 [A. Cariot] 2: 578 (1889). *Samolus aquaticus* Lam., Fl. Franç. (Lamarck) 3: 329 (1779). *Samolus beccabungae-facie* Gilib., Fl. Lit. Inch. i. 60 (1782). *Samolus bracteatus* Stokes, Bot. Mat. Med. i. 344 (1812). *Samolus bracteolosus* Phil., Anales Mus. Nac., Santiago de Chile 1891: 51 (1891). *Samolus caulescens* Willd. ex Roem. & Schult., Syst. Veg., ed. 15 bis [Roemer & Schultes] 5: 4, in obs. (1819) *Samolus geniculatus* Dulac, Fl. Hautes-Pyrénées 422 (1867). *Samolus littoralis* Schrank, in Denkschr. Bot. Ges. Regensb. ii. (1822) 34. *Samolus valerandi* var. *africanus* L., Sp. Pl. 1: 172 (1753). *Samolus valerandi* var. *typicus* R. Knuth, Pflanzenr. (Engler) 4, Fam. 237: 338 (1905). *Samolus valerandi* var. *typicus* R.Knuth *Samolus valerandi* var. *typicus* R. Knuth Pflanzenr. (Engler) 4, Fam. 237: 338 (1905). *Samolus floribundus* Kunth, Nov. Gen. Sp. [H.B.K.] 2(qu.): 224; fol. 181 (1818). *Samolus parviflorus* Raf., Amer. Monthly Mag. & Crit. Rev. 2(3): 176 (1818).

Samolus valerandi is a glabrous annual herb (Fig 1 A-C). The root is simple, short, and fibrous found in the cluster. The stem is erect, simple, or branched in some specimen, up to 65 cm in length, arising from basal rosette leaves. Leaves are found in a well-developed basal rosette, and more or less numerous throughout the stem's length (Fig. 1C). The lowermost are spathulate up to 10 cm long 3 cm wide; those present on the stem are obovate or elliptic, gradually becoming smaller and subsessile. The inflorescence is a terminal raceme (Fig. 1D), 24 cm long; pedicel ascending, up to 25 mm. long, more or less geniculate at the insertion of the bract 1-2 mm at or slightly above the middle. Flowers are small white (Fig. 2A-C), hermaphrodite. Calyx about 3 mm long ovatedeltoid and acute. Corolla about 3 mm long; Stamens are inserted at the base of corolla tube (Figure 2D), about 1 mm. long; staminodes minute, about 0.2 mm long. Ovary globose depressed, semi-inferior, placentation free

central, style simple, inconspicuous stigma is less than 1mm sub capitate. Fruit a globose capsule (Fig. 2E), c.3 mm in diameter, dehiscing with 5, strongly reflexed valves, many-seeded (Figure 2F). Seeds angular, c.0.5 mm long, minutely granular, and dark brown in color. Self-pollinated, seed dispersal is by wind and birds.

Flowering and Fruiting: June – October.

Habitat: It grows in medium loamy and heavy clay soils. It prefers to grow in wet, humid lands near aquariums, at banks of rivers and streams.

Figure 1 A-C. *Samolusvalerandi* in their natural habitat of the area of occurrence in J&K; A. Rosette form; B. Single plant (× 5); C. (× 10.83); D. Specimen mounted on herbarium sheet; E. apical part of the plant showing inflorescence (×4.166).

Figure 2 A-F. Different images of flower & capsule of *S. valerandi;* A. a single flower; B. Flower showing calyx (× 0.5); corolla, pedicel (× 0.714); and bract (× 0.4); C. Mature flowers; D. Corolla with stamens (× 0.0847); E. Capsules (f) Dissected Capsule showing seeds (×0.166).

Distribution: *Samolusvalerandi*is cosmopolitan in distribution, found throughout the world on different continents. Albania, Afghanistan, Angola, Austria, Algeria, Baltic States, Bulgaria, Baleares, Saudi Arabia, Botswana, Turkey in Europe, Belgium, Cape Provinces, Cape Verde, Canary Is., Cyprus, Romania, Poland, China Southeast, China South-Central, Corse,

Czechoslovakia, Yemen, Chad, Denmark, Turkmenistan, East Aegean Is., Eritrea, Egypt, Ethiopia, France, Finland, Greece, Portugal, Great Britain, Tadzhikistan, Germany, Hungary, Iraq, Ireland, Kriti, Kirgizstan, Western Sahara, Uzbekistan, Northern Provinces, Iran, India, Namibia, Mozambique, Kenya, Kwa Zulu-Natal, Lebanon-Syria, Krym, Libya, Madeira, Mauritania, Nigeria, Netherlands, Pakistan, Palestine, Oman, Ukraine, Sardegna, Sicilia, Somalia, Sudan, Spain, Swaziland, Turkey, Yugoslavia, Zimbabwe, Morocco, Zaïre, Sweden, Switzerland, Italy, Tunisia, Sinai, Zambia, http://plantsoftheworldonline.org. In India, it is distributed in Rajasthan, Punjab Plains, Bundelkhand, western Himalaya, Himachal Pradesh, and Jammu and Kashmir (present finding).

Specimens examined: INDIA, Jammu and Kashmir (Present finding) Phalni, Budhal of Rajouri District at 33*21` 37``N 74*37`21``E; 1411.05msl, 25th August 2020, M Ahmed & M Dhiman 001. L. Sp.Pl. 171. 1753. Hook.f. Fl. Brit. India 3;505,1882. Duthie, Fl. Gangetic Plain 2:7,1911. Singh in Journ. Bomb.Nat. Hist. Soc. 77. (2): 360.1980. Chowdhary & Wadhwa Flora of Himachal 2: 447, 1984. Thulin Flora Somalia, Vol 3, (2006).

Acknowledgments

The authors are thankful to MOTA (Ministry of Tribal Affairs) for financial assistance for research work.

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Cite this article as:

Mushtaq Ahmed and Manjul Dhiman. *Samolus valerandi* L. (Primulaceae): A new Angiosperm record for flora of Jammu and Kashmir, India. *Annals of Plant Sciences*.10.2 (2021) pp. 4146-4150.

http://dx.doi.org/10.21746/aps.2021.10.2.1

Source of support: Nil; **Conflict of interest:** Nil.