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Rediscovery of *Pseudoyoungia simulatrix* (Cichorieae-Asteraceae) from India and its taxonomic history

Sentu Kumar Dey and Debabrata Maity*
Taxonomy and Biosystematics Laboratory, Department of Botany, University of Calcutta, Ballygunge Circular Road, Kolkata – 700 019, West Bengal, India.
*E-mail: debmaity@yahoo.com

Abstract

Pseudoyoungia simulatrix (Babc.) D. Maity & Maiti of Cichorieae-Asteraceae, which has been also treated as *Youngia simulatrix* (Babc.) Babc. & Stebb. or *Tibetoseris simulatrix* (Babc.) Sennikov since its description by Babcock as *Crepis simulatrix* Babc. from China, Nepal and India in 1928. In India this species is found only in Sikkim and has been rediscovered after a lapse of more than a century. Detailed description, photographs, notes on distribution and ecology, nomenclatural history are provided. Its threat status (as per IUCN) in India is proposed based on the field observation.

Keywords: Asteraceae, *Pseudoyoungia simulatrix*, rediscovery, Sikkim, taxonomy

Introduction

Pseudoyoungia simulatrix (Babc.) D. Maity & Maiti (Cichorieae-Asteraceae) was originally described by Babcock based on specimens collected by Gyatsko, Sir King's collaborator, Filchner [Tibet (Xizang, Tsodjaranor, China)], Morton [Rapiu (Raphu), Phung Clin (Arun) Valley (Nepal)], and Lepcha collector [Sikkim (India)]. This species is restricted to the high Himalayan mountains of China, Nepal and India. Though it is recorded from both southern and northern Tibet (China) and Nepal, in India the species occurs only in Sikkim (Babcock, 1928; Babcock & Stebbins, 1937; Sennikov & Illarionova, 2008; Zhu & Kilian, 2011; Maity, 2005; Maity & Maiti, 2007, 2010, 2012). The only record of the species from India is a collection (*Lepcha collector* 2711, CAL!) from Lhonak Valley of Himalaya in 1909. Many field trips have been conducted subsequently to this locality by different researchers, but it has never been recollected. After more than a decade of explorations in the Sikkim Himalaya, the authors finally located two populations of this species in the extreme terrain of Lhonak valley (The La, 4200–4500 m).

The species was first described as a member of *Crepis* L. by Babcock (1928). Later Babcock and Stebbins (1937) transferred it to a recircumscribed genus *Youngia* Cass. as *Y. simulatrix* (Babc.) Babc. & Stebbins mainly based on very smaller outer phyllaries, corolla tube being consistantly smaller than the ligule and flattened achenes. They included *Y. simulatrix* along with other four species, viz. *Y. depressa* (Hook.f. & Thomson) Babc. & Stebbins, *Y. gracilipes* (Hook.f.) Babc. & Stebbins, *Y. parva* Babc. & Stebbins, and *Y. conjunctiva* Babc. & Stebbins within the sect. *Desiphylum* Babc. & Stebbins. Later another five species had added by different workers to the section as well as to the genus.

Sennikov (in Tzvelev, 2007) and later Sennikov & Illarionova (2008) had made a drastic change in the generic delimitation of *Youngia* Cass. (*s.l.*) and had established *Tibetoseris* Sennikov based on *Youngia* sect. *Desiphylum* Babc. & Stebbins because the sectional name *Desiphylum* [in Carnegie Inst. Washington Publ. 484:25.1937, *nom. inval*. (Art. 39.1, McNeill *et al.,* 2012)] was invalid, and recognized three sections, viz. i) sect. *Tibetoseris,* ii) sect. *Parvae* Sennikov, and iii) sect. *Simulatrices* Sennikov. Within the sect. *Simulatrices* they placed *Tibetoseris simulatrix* (Babc.) Sennikov [*Crepis simulatrix* Babc.].

Maity and Maiti (2010) illustrated the uniqueness of *Tibetoseris depressa* (Hook.f. & Thomson) Sennikov in detail and based on morpho-anatomical study they advocated diphyletic origin of the species traditionally included within the sect. *Desiphylum*

(*nom. inval.*) or genus *Tibetoseris*; one lineage comprising only *Tibetoseris depressa* and other lineage includes rest of the species. Based on this concept they proposed *Tibetoseris* to be monotypic and established a new genus *Pseudoyoungia* D. Maity & Maiti to accommodate rest of the species of the group. Simultaneously Maity and Maiti (2010) included a new variety under the *Tibetoseris depressa* as *T. depressa* var. *pseudoumbrella* (D. Maity & Maiti) D. Maity & Maiti. In the same year Maity (2010, 2010a) also added another unique species *Tibetoseris gaurii* (D. Maity) D. Maity (=*Tibetoseris depressa* subsp. *gaurii* D. Maity) to the genus.

The genus *Pseudoyoungia* is divided into two sections, viz. sect. *Pseudoyoungia,* and sect. *Simulatrices* (Sennikov) D. Maity & Maiti (Maity & Maiti, 2010). *P. simulatrix* (Babc.) D. Maity & Maiti was included under the later section followed by Sennikov and Illarionova (2008).

The diphyletic theory of Maity and Maiti (2010) of *Tibetoseris* (*sensu* Sennikov, 2007) has been supported by Zhu and Kilian (2011), based on (unpublished) molecular data. However, they transferred *Tibetoseris depressa* to the genus *Soroseris* Stebbins as *S. depressa* (Hook.f. & Thomson) J. W. Zhang, N. Kilian & H. Sun and reinstated all other species either to *Youngia* or to *Crepis.* Their circumscription is largely based on the molecular phylogenetic analysis rather than morphology or anatomy as traditionally and reasonably done particularly at lower hierarchial level (species or infraspecific level).

The present circumscription of the genus follows the concepts of Sennikov (in Tzvelev, 2007), Sennikov and Illarionova (2008) and Maity and Maiti (2010).

Pseudoyoungia simulatrix (Babc.) D. Maity & Maiti, Compositae Newslett. 48:31. 2010; Maity in Pleione 6(1):33.2012. *Crepis simulatrix* Babc., Univ. Calif. Publ. Bot. 14: 329. 1928. *Youngia simulatrix* (Babc.) Babc. & Stebbins, Publ. Carnegie Inst. Wash. 484: 39. 1937. *Tibetoseris simulatrix* (Babc.) Sennikov, Komarovia 5(2): 91. 2008. –TYPE: CHINA. Xizang: Southern Tibet, Ñalamla, sandy place, 4200 m, 1882, *Gyatsko s.n.* (Dr. King's collector) (G, holotype n.v.; B, CAL, GH, P, isotypes n.v.; CAL, paratype!).

Crepis smithiana Hand.-Mazz., Acta Horti Gothob. 12: 357. 1938.

Type: CHINA. **Sichuan**: Taofu (Dawo), Taining (Ngata); in ripa glareosa fluminis, 3600 m, 04.09.1934, *Harry Smith* 11746 (UPS, holotype; A, isotype n.v.).

Taraxacum altune D.T. Zhai & C.H. An, J. August 1 Agric. Coll. 18(3): 1. 1995.

Type: CHINA, **Xinjiang**: Qiemo, *Y. H. Wu* 2644 (HNWP, holotype n.v.). **Fig.1**

Tufted perennial herb, to 5(–8) cm high; caudex short, moderately thick, with old leaf bases; oblanceolate to rarely elliptic, 0.9–6 × 0.2–1.5 cm, apex obtuse or acute, margin entire to sinuate-dentate or denticulate or often pinnatifid, subruncinate, base attenuate into a petiole-like portion, upper surface puberulent, lower surface glabrous or hispidulous; capitula 1–10, clustered, amongst axils of rosette leaves or rare often from a short branched stalk, each with 13–20 florets; peduncles glabrous or rarely pilose; involucre cylindric, 1.2–1.6 × 0.3–0.5 cm; phyllaries biseriate, dark green, abaxially glabrous, margin white scarious; outer phyllaries imbricate, ovate to lanceolate, unequal, less than ½ as long as inners, apex obtuse to acute; inner phyllaries 8–12, lanceolate, apex acute ventrally glabrous, spongy thickened at base at maturity; receptacle areolate, glabrous; ligule 15–17 × 2–3 mm long; teeth *c.* 1 × 0.5 mm, tip glanduliferous; tube small, 5–6.5 mm long, glabrous; anther tube yellow with green tip; style branches yellow; achenes columnar, ca. 4 mm, dark brown, slightly compressed, apex truncate, 14–15–ribbed; ribs unequal, alternately wide and narrow, strongly spiculate; pappus white, 10–11 mm, 3-seriate, persistent.

Flowering & fruiting: July – November

Distribution: INDIA (Sikkim); NEPAL [Rapiu (Raphu) La, Phung Clin (Arun) valley]; CHINA (Tibet, Gansu, Qinghai, Sichuan, Xizang, Xinjiang).

Ecology: Plants grow in open grassy mountain slopes, gravelly areas on flood plains, grassy beaches in river valleys in temperate and alpine forest. In Sikkim the species is commonly associated with species such as *Stellaria uliginosa, Astragalus* sp., *Morina nepalensis* and *Kobresia* sp. at an elevation of 2700–5000 m.

Specimens examined: INDIA, **North Sikkim**, Lhonak valley, Thi La/Tu La (The La), 4800 m, 02.11.1909, *Lepcha collector* 2711[CAL, paratype]; Lhonak valley, Muguthang to The La, 4600 m, 24.07.2014, *Dey* 21456 (CUH); Muguthang, 4400 m, 25.07.2014, *Dey* 21489 (CUH).

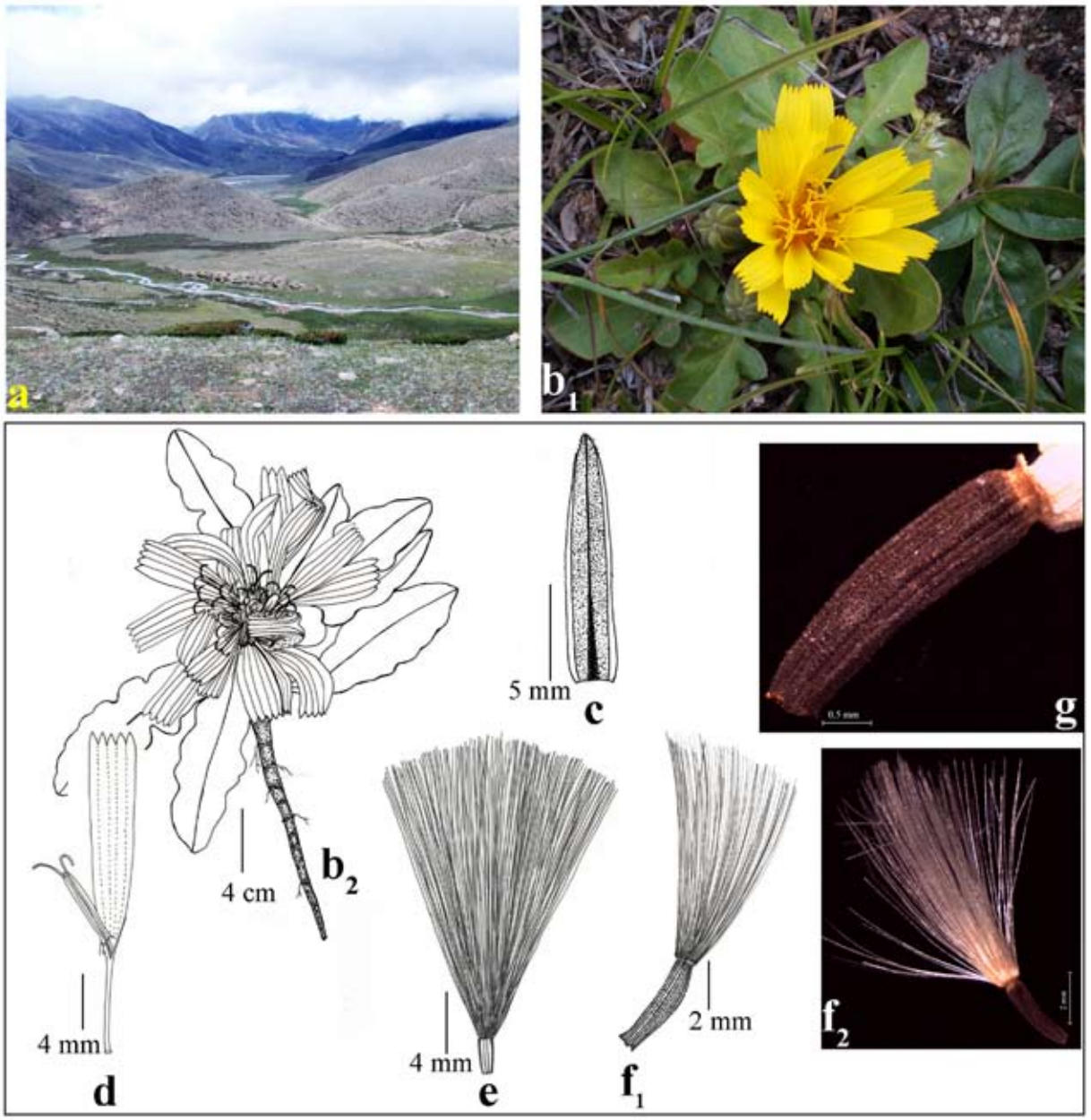

Fig.1. *Pseudoyoungia simulatrix* (Babc.) D. Maity & Maiti: **a.** Habitat; **b1 & b2.** Habit; **c.** Inner involucral bract; **d.** Floret with ovary and pappus removed; **e.** Cypsela (immature) with papus; **f1 & f2.** Mature cypsela with pappus; **g.** Mature cypsela. [a–e : from *Dey* 21456; f1–g : from *Dey* 21489; all at CUH].

Threat status in India: The species is very restricted in distribution to the The La area, an interior difficult terrain of Lhonak Valley.

After a detailed search around the known growing locality we could able to trace two populations, each with 8-10 individuals only. The population sizes are very small and close to each other. The AOO and EOO of the species is <10 km^2 and <100 km^2 respectively .Given this situation, we consider the IUCN category of Critically Endangered (CR) under B and D criteria to be appropriate (IUCN, 2012). However, research and survey should immediately be carried out in this region to determine the size and health of the population so that the criteria can be applied more scrupulously.

Fortunately the populations are within the core zone of Kanchenjunga Biosphere Reserve and in very interior part of the valley.

There are no such major man-made threats to this region and thus it is expected to survive this species in its natural habitat.

Discussion

At the present era biodiversity is in threat. Species becomes extinct every day. At present about 35 Hotspots are recognized throughout the world. Most of the megadiversity centers are concentrated in the third world countries and due to lack of awareness among people these diversity gradually reduces day by day at an alarming rate. India, a megadiversity center, also has four Hotspots. Due to huge anthropogenic activities habitat of different species shrinks and ultimately species becomes extinct.

The Himalaya, one of the Hotspots regions of the world harbors about 3160 endemic plants besides thousands other RET species. In recent years several species [e.g. *Listera alternifolia* – a critically endangered (CR) and Sikkim Himalayan endemic] could not traced in their natural habitat (Maity, 2005; Maity & Maiti, 2007).

P. simulatrix has not yet been assessed throughout its distributional range [India, Tibet (China) and Nepal] for the IUCN Red List till date (http://www.iucnredlist.org/search; searched on 22.06.2014). This species found to grow only in Sikkim in India. The earliest and probably the only documented record in India is a herbarium sheet with five plants mounted on it deposited at CAL. After more than one decade of endeavor, finally we could locate this species in its natural habitat. But unfortunately, we did not found this species in other adjoining areas of the valley. The populations of the species are within the jurisdiction of the Kanchenjunga Biosphere Reserve (core zone), therefore, they are quite protected and hopefully will survive.

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