25. *STEBBINSIA UMBRELLA* (FRANCH.) LIP. (ASTERACEAE): A NEW RECORD FOR INDIA

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Crepis umbrella Franch. had been assigned under different genera by different authors. Stebbins (*l.c.*) first made the combination as *Soroseris umbrella* (Franch.) Stebbins based on the basionym *Crepis umbrella* Franch. – a Chinese species. Later Lipschitz (*l.c.*) proposed another combination as *Stebbinsia umbrella* (Franch.) Lip. based on the same taxon *Crepis umbrella* Franch. This species is quite distinct from the other species of *Soroseris* Stebbins having more than 15 florets per capitulum, and inner involucral bracts more than 10, as compared to the other species of *Soroseris* where only 4-5 florets per capitulum, and only 4 inner involucral bracts are present.

During the course of the study, and identification of some members of the Asteraceae, the authors came across some specimens at the Central National Herbarium, Botanical Survey of India (CAL), which had been collected from the Sikkim Himalaya, and incorporated as *Youngia depressa* (Hook. *f.* Thoms.) Babcock & Stebbins (= *Crepis depressa* Hook. *f.* Thoms.). Critical study revealed that the specimens *Cave* 431 and *Cave* 585 (CAL) are truly *Stebbinsia umbrella*. Thus, this is a new record for India from the Sikkim Himalaya, and an extension of distribution of the Chinese species to the south-west.

A detailed description and its present nomenclatural status, along with the illustrations are presented in order to facilitate its identity.

Stebbinsia umbrella (Franch.) Lip. in 75th Anniv. Vol. Sukatsch. (New Subtr., Gen. & Sp. Fam. Centr. As.). 362-1956. Grierson and Springate in Grierson and Long, Fl. Bhutan 2(3): 1458.2001, Compositae (Fig. 1).

Crepis umbrella Franch. in Morot, Journ. de Bot. 9: 255. 1895.

Soroseris umbrella (Franch.) Stebbins in Mem. Torrey Bot. Club 19 (3): 36.1940.

Stem rhizomatous, 4-18 cm high; lower part covered with cataphylls. Upper leaves rosulate, broadly ovate to orbicular (rarely oblong-elliptic), often lyrate-pinnatifid with 1-2 small lateral lobes; 1.5-9 cm x 1-7 cm, apex obtuse to subacute (younger acuminate), margin laciniate-denticulate, base rounded to weakly cordate, herbaceous, rather fleshy, veins depressed above and raised below with prominent reticulations, more or less hairy, particularly towards base and lower surface; petioles 2-12 cm x 0.2-0.5 cm, thickened

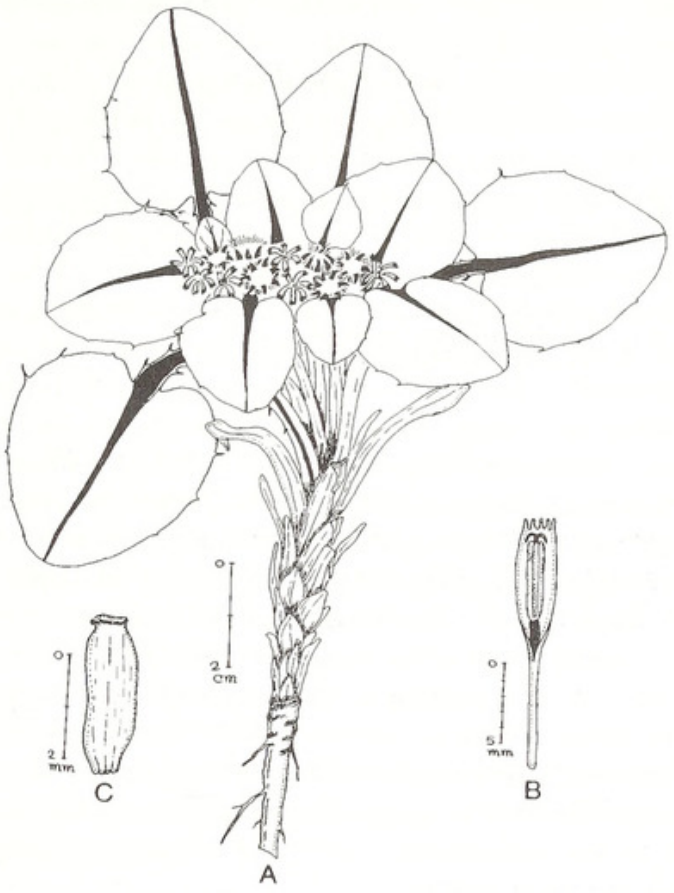

Fig. 1: *Stebbinsia umbrella* (Franch.) Lip.: A. Habitat; B. Floret; C. Cypsela (drawn by D. Maity from *G.H. Cave* 585 – CAL)

dorsally, with winged nature and denticulate edge, hirtellous. Capitula many, up to 50, corymbiform, amongst the rosulate leaves; peduncles slender, 1-10 cm long, bracteate; bracts leafy, but smaller. Heads cylindric to more or less campanulate, about 10 mm in diameter.; involucral bracts biseriate; outer 2-5, linear-lanceolate, 3-10 mm long, imbricate with scarious margins, dull-green to blackish; hirtellous to hispidulous on outer surface along midrib, ciliate at apex. Florets 15-43, all ligulate, 8-20 mm long; ligule 5-toothed; tube slightly shorter than ligule. Pollen echinate. Cypsela oblongoid to somewhat fusiform, 3-6 mm long, apex truncate without neck, but with broadened, flattened annular pappus disc, slightly striate, glabrous. Pappus multiseriate, 8-11 mm long, barbate, golden-yellow to white, deciduous.

Fl. & Fr.: July-September.

Distribution: INDIA: Himalaya: Sikkim; Bhutan; Tibet; China.

Grows on open alpine slopes at 3,640-5,140 m.

Specimens examined: Sikkim, without any precise locality, *s.d.*, *G.H. Cave* 431 (Acc. No. 255171-CAL) and *G.H. Cave* 585 (Acc. No. 255170-CAL).

Note: *Stebbinsia umbrella* resembles *Youngia depressa* (Hook. *f* & Thorns.) Babcock & Stebbins in morphological appearance, ligule and pollen characters, but here our identification is confirmed by the presence of neckless cypsela with a truncate apex. Moreover, the cypsela is distinctly ribbed in *Youngia*, but in *Stebbinsia*, it is smooth to slightly striate.

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26. PASSERINE BIRD-POLLINATION IN THE DRY SEASON BLOOMING *BUTEA SUPERBA* ROXB. (FABACEAE) IN THE EASTERN GHATS[1]

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The genus *Butea*, as the name implies, produces beautiful orange-red or scarlet flowers. There is very little information available on the floral biology and pollinators of *Butea* species. Ali (1932) reported that *B. monosperma* flowers produce a large amount of nectar and that different passerine birds collect this nectar to quench their thirst during the dry season. He also suggested that *B. superba* flowers are structurally similar to *B. monosperma* and would probably also be ornithophilous. But he has not made any observations on the floral characteristics and pollinators of *B. superba*. Therefore, we studied some aspects of the floral biology and pollinators of *B. superba*.

Butea superba is a gigantic woody climbing shrub, occurring in moist localities in the Eastern Ghats forests in the Visakhapatnam and East Godavari districts of Andhra Pradesh. We studied the trees in Lotugedda, Lambasingi and Anantagiri in the Visakhapatnam district and Ramavaram, and in Addateegala in East Godavari district. Floral events – anthesis, anther dehiscence, nectar volume, stigma receptivity and exposure of stamens and stigma were carefully observed according to Dafni (1992), and Solomon Raju and Subba Reddi (1994). Fifty flowers marked on ten different trees were used to observe these events. The flower-visitors included birds, squirrels and monkeys, whose flower-visiting schedules, probing behaviour and role in pollination were observed using binoculars.

B. superba sheds its leaves before the onset of flowering, which occurs during late February-March. The flowers, grouped in threes, are borne on a velvety, dark maroon racemose inflorescence. Their maturation and subsequent anthesis does not show either an acropetal or a basipetal pattern. The flowers are large, 59 mm long, orange-scarlet, bisexual, and zygomorphic. The calyx consists of five sepals, united into a cup-like structure. The corolla has five unequal petals, covered with silky hairs. There are the standard petal, two smaller wing petals and a much curved, beak-shaped keel, formed by the fusion of two petals, which encloses the stamens and stigma. Ten stamens – nine united and one free stamen situated below level of united stamens. Anthers yellow, 3 mm long. Ovary springs up from centre of staminal sheath, style 36 mm long, curved at tip, terminating in a simple greenish-yellow stigma. Curved style and stigma overtop anthers of united bundle of stamens. Ovary unilocular, 4-7 ovules (mostly 4-5).

The flowers open between 0530-0630 hrs. Anther dehiscence is seen thirty minutes after anthesis. Beginning of stigma receptivity is seen one hour after anther dehiscence. Stigma receptivity lasts for 30 hours. A flower produces 30 ± 0.8 µl of nectar. The flowers show signs of withering on the third day, and drop off on the fourth day if not disturbed by flower-visitors.

The flowers were visited by many birds, including passerines – *Acridotheres tristis* (Common Myna), *Chloropsis aurifrons* (Gold-fronted Chloropsis), *Anthus richardi* (Indian Pipit), *Nectarinia zeylonica* (Purple-rumped Sunbird) and *Nectarinia asiatica* (Purple Sunbird), and non-passerines – *Psittacula krameri* (Rose-ringed Parakeet), *Psittacula cyanocephala* (Plum-headed Parakeet), *Loriculus vernalis* (Indian Hanging-Parrot), *Merops orientalis* (Small Bee-eater) and *Dendrocopos nanus* (Brown-capped Pigmy Woodpecker). These birds collected nectar throughout the day, but they showed hectic foraging activity only during the early morning



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