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SHORT COMMUNICATION

NOTES ON THE EXTENDED DISTRIBUTION OF *HUMBOLDTIA BOURDILLONII* (FABALES: FABACEAE), AN ENDANGERED TREE LEGUME IN THE WESTERN GHATS, INDIA

Anoop P. Balan, A.J. Robi & S.V. Predeep

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NOTES ON THE EXTENDED DISTRIBUTION OF *HUMBOLDTIA BOURDILLONII* (FABALES: FABACEAE), AN ENDANGERED TREE LEGUME IN THE WESTERN GHATS, INDIA

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Abstract: *Humboldtia bourdillonii* is an Endangered tree legume; considered endemic to its type locality in the Periyar Tiger Reserve in Idukki District of Kerala State. A new population of this highly threatened endemic species is located in the Vagamon Hills of Kottayam District which is about 70km away from its original locality. The newly located population is drastically affected by the severe floods and landslides that occurred in Kerala state during August 2018. Urgent conservation measures are needed to protect the population from further loss.

Keywords: Adimundan, *Humboldtia*, Fabaceae, Caesalpinioideae, threatened, Vagamon Hills, Western Ghats.

Humboldtia Vahl is a small tree legume genus with seven species and two varieties, all are endemic to southern Western Ghats of Karnataka, Kerala and Tamil Nadu states, except *H. laurifolia*, the type species which is endemic to Sri Lanka. The species of *Humboldtia* inhabits the evergreen forest in the altitudinal range of 200–1,250 m and generally prefer river banks and areas between streamlets. *H. brunonis* Wall., *H. decurrens* Bedd. and *H. laurifolia* Vahl are myrmecophytes that harbour ants and many endemic invertebrate taxa such as bees and arboreal earthworms within swollen hollow

internodes (Krombein et al. 1999). Most of the species of *Humboldtia* are under severe threat especially due to habitat loss and degradation of forest by anthropogenic activities. Among them, *H. unijuga* Bedd. var. *trijuga* J. Joseph & V. Chandras. is Critically Endangered, *H. unijuga* var. *unijuga* and *H. vahliana* Wight are Endangered, *H. laurifolia* is Vulnerable and *H. decurrens* is Near Threatened as per IUCN (2019). *H. bourdillonii* Prain was described by David Prain based on the collections of T.F. Bourdillon from the 'Peermade Ghats' of Idukki District in Kerala State in 1894 with no further information on the species thereafter. After a century, Sasidharan (1998) relocated the species from the Periyar Tiger Reserve of Peermade Ghats. Augustine (2000, 2002) and Ramachandran et al. (2014) also reported the species from the same region. The latter conducted a detailed study on the population status of the species and found that it has a discrete distribution with an area of occupancy of 0.06km² and area of occurrence of approximately 2km² and the population is estimated to have 1,310 individuals only. Ramachandran et al. (2014) assessed *H. bourdillonii* as Critically Endangered status

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against the Endangered status on the IUCN Red List (World Conservation Monitoring Centre 1998).

During a botanical exploration conducted to Vagamon Hills in the Kottayam-Idukki district border in June 2018, the authors accidentally found a small patch of *H. bourdillonii* in the margins of a reserve forest near a tributary of Meenachil River. The species in this small patch is represented by about 20 individuals of different ages and girth classes. Few trees were with irregular flowers while majority were in fruiting stage. This is the first report of occurrence of this threatened species outside its type locality. Detailed description, illustration, images, distribution map and notes on habitat, ecology and conservation status are provided for easy identification and a better understanding of the species.

TAXONOMIC TREATMENT

Humboldtia bourdillonii Prain, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 73(5): 200. 1904; Gamble, Fl. Madras 411. 1919; Sanjappa, Blumea 31: 331. 1986 & Legumes India 30. 1992; Sasidh., Higher Plants of Indian Sub-Continent 8: 209. 1998; T.S. Nayar et al., Fl. Pl. Kerala 319. 2006; V.S. Ramach. et al., Trop. Ecol. 55(1): 85. 2014; Sanjappa in G.V.S. Murthy & V.J. Nair (ed.) Flora of Kerala 2: 236. 2016 (Figure 1, Image 1)

Small to medium-sized trees, up to 15m high, bark smooth; branchlets woody. Stipules appendaged, 2–3.5 × 1–1.5 cm, ovate, acuminate, prominently parallel-veined, glabrous, persistent; appendages falcate-reniform, divergently veined, persistent. Leaves 6–8 foliolate; petioles ca 1cm long; rachis 10–16 cm long, narrowly, obcordately winged between the leaflets; petiolules 3–4 mm long, stout, glabrous; leaflets 12–25 × 3–4 cm, linear-lanceolate to narrowly ovate or elliptic, acuminate at apex, obtuse and unequal at base, thick-chartaceous, glabrous; veins prominently reticulate beneath. Flowers in 4–6 cm long corymbs on tubercles on stem and old branches, tawny velvety; pedicels 1–1.5 cm long, velvety; bracts 3–4 × 1.5 mm, ovate, brown tomentose, deciduous; bracteoles connate when young, splitting down at maturity, 5–6 × 3 mm, ovate, obtuse, brown tomentose and gland-dotted, deciduous. Calyx brown tomentose; tube ca 6mm long; lobes 4, crimson, 9–11 × 3–5 mm, subequal, ovate-oblong, obtuse-rounded at apex, tomentose. Petals 5, white, 3 larger ones 11–12 × 6–7 mm, others 8–9 × 3–4 mm, obovate, obtuse at apex, sparsely pilose inside, shortly clawed, caducous. Stamens 5, filaments 2.5–3 cm long, reddish, broad and pilose at base; anthers versatile, ca 4 × 1.5 mm, oblong. Ovary stipitate, 6–7 × 3 mm, obliquely oblong, densely pilose, 5–6-ovuled; style 1.6–1.8 cm long, narrowing

towards the tip; stigma capitate. Pods 10–14 × 3–3.5 cm, dolabriform, falcate, velvety, bright red or crimson, sutures thick, prominently veined, 3–5 seeded. Seeds ca 2.5 × 2 cm, suborbicular, pale red when young and dark brown when matured.

Local name: 'Adimundan' (Malayalam)

Flowering & Fruiting: January–July.

Habitat & Ecology: Grows in steep, slippery terrain in wet evergreen forest at ca. 1,100m, in an isolated patch of about 0.5ha area. The population is located near to a stream and comprises eight mature individuals (10–70 cm gbh) and 12 seedlings (<10cm gbh). *Aglaia tomentosa* Teijsm. & Binn., *Antidesma montanum* Blume, *Aporosa acuminata* Thwaites, *Artabotrys zeylanicus* Hook. f. & Thomson, *Casearia graveolens* Dalz., *Drypetes venusta* (Wight) Pax & K. Hoffm., *Goniothalamus keralensis* E.S.S. Kumar, Shaju, Roy et Raj Kumar, *Litsea bourdillonii* Gamble, *Schefflera racemosa* (Wight) Harms, *Vernonia arborea* Buch.-Ham., etc. are the major associates of *H. bourdillonii*.

Specimens examined: Kerala, Idukki District, Peermade Ghats, 07 February 1894, *Bourdillon* 906 (CAL, MH), Peermade road, 853m (2800ft), 06 March 1907, *Bourdillon* 1614 (University College Herbarium, Thiruvananthapuram); Arjunankotta, 25 February 1994, Sasidharan & Jomy 13378 (CAL); 14 February 2007, S.V. Predeep & Anoop P.B. 20531 (MBGH); Kottayam District, Vagamon Hills, 16 June 2018, Anoop P.B. & A.J. Robi 15548 (MBGH – Image 2).

THREATS AND CONSERVATION

Peermade Hills and Vagamon Hills were once covered by continuous dense evergreen forests and was home to several Western Ghats endemic species. Extensive forest clearance especially for the cultivation of Cardamom and Tea during 19th century under British rule have caused serious decline in population of several threatened plants including *H. bourdillonii*. At present, the evergreen forests in Vagamon Hills are restricted to certain pockets and are under severe threat due to tourism related activities, since Vagamon is one of the major tourist destinations in Kerala state. The newly located population of *H. bourdillonii* is also facing serious threat from human intervention and natural calamities like landslides and soil erosion. Both locations of the species are in landslide prone areas identified by the Kerala State Disaster Management Authority – KSDMA (Figure 2). Between 1 June and 18 August 2018 Kerala State received 36% excess rainfall than normal levels, leading to widespread floods and the torrential rains triggered a number of landslides that devastated innumerable infrastructure

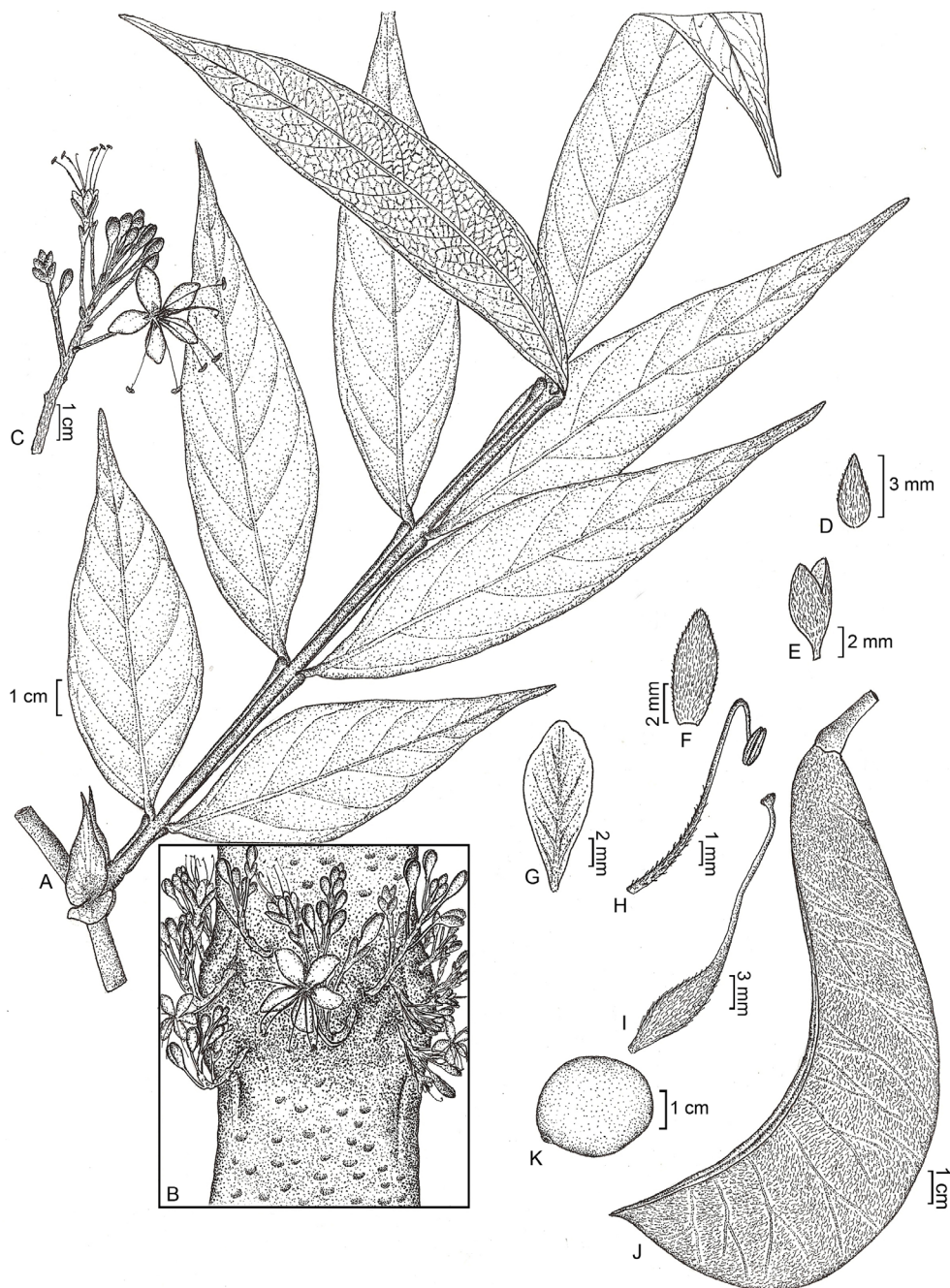


Figure 1. *Humboldtia bourdillonii* Prain: A—leaf | B—cauline inflorescence | C—corymb | D—bract | E—bracteoles | F—sepal | G—petal | H—stamen | I—pistil | J—pod | K—seed. © Anoop P. Balan.

facilities and washed away a vast variety of Biodiversity. Vagamon Hills also experienced heavy precipitation and large-scale landslides during that period and a massive landslide occurred near to the population of *H. bourdillonii*, washed away four to five mature trees of the species along with its associated endemic taxa (Image 3).

Immediate intervention is required from the forest department to protect the extant population from further

damage, since the land is in their custody. Actions are also needed to raise the seedlings in nurseries (ex situ conservation) and further reintroduction to adjacent localities in Vagamon Hills. Mass multiplication through vegetative/ tissue culture techniques should also be attempted to prevent the extinction of this highly threatened species.



Image 1. *Humboldtia bourdillonii* Prain: A—tree trunk | B—stipules | C—leaves | D—pods | E—pod, split-opened | F—seed, young and matured.
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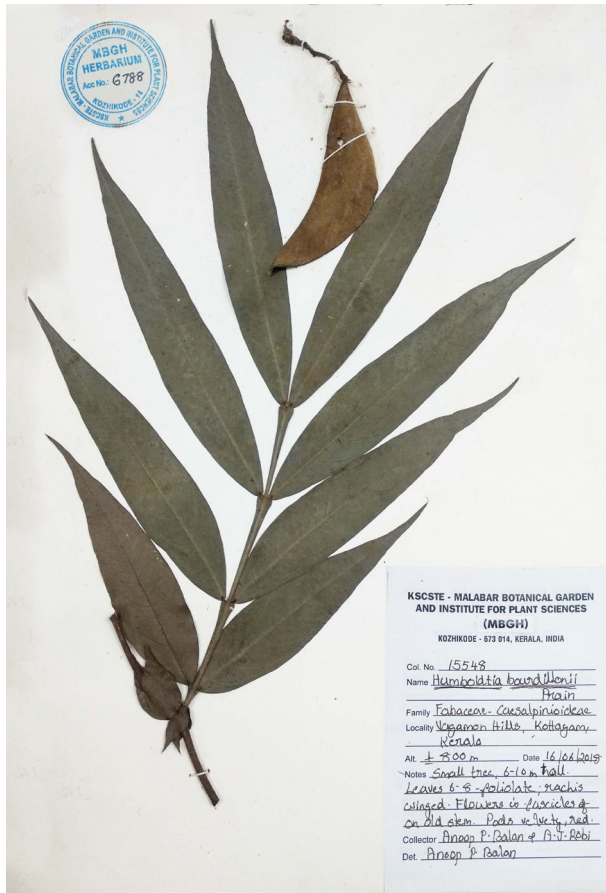


Image 2. Herbarium of *Humboldtia bourdillonii* (MBGH Acc. No. 6788).



Image 3. A & B—location of *Humboldtia bourdillonii* in Vagamon Hills, before and after the landslide. © Anoop P. Balan.

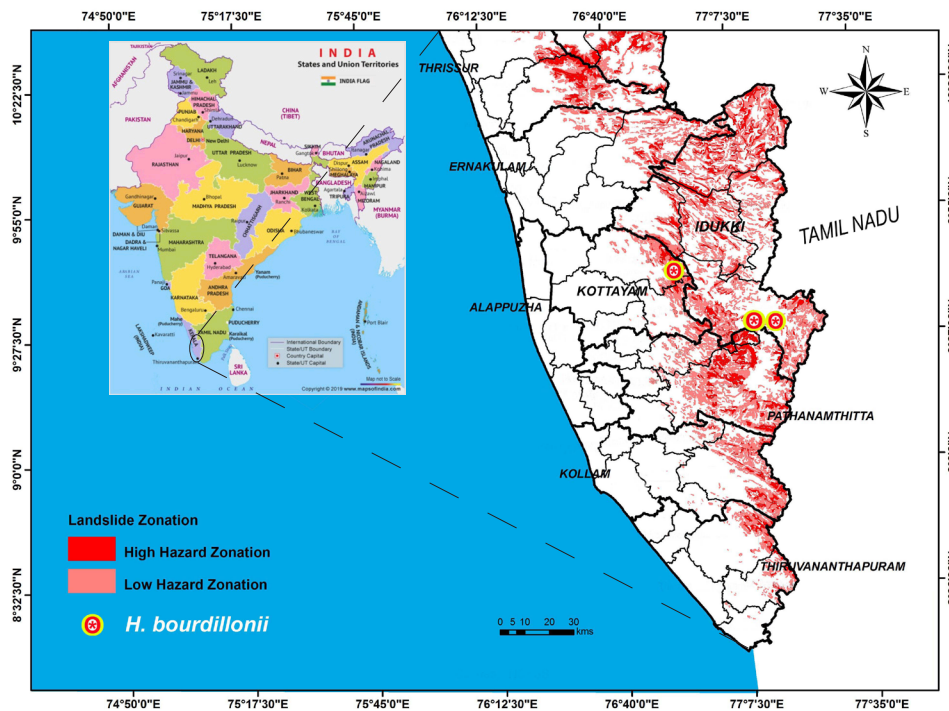


Figure 2. Location of *Humboldtia bourdillonii* in landslide prone areas of Kerala (Map courtesy Kerala State Disaster Management Authority).



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