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Article in *Phytotaxa* · September 2012

DOI: 10.11646/phytotaxa.66.1.3

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Article

Notes on the identity and status of two Legumes (Fabaceae: Papilionoideae) from India

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Abstract

Indigofera karaiyarensis and *Mucuna pruriens* var. *thekkadiensis* are synonymized under *Indigofera astragalina* and *Mucuna pruriens* var. *hirsuta* respectively.

Key words: *Indigofera*, *Mucuna*, new synonym

Introduction

As part of revisionary studies on legumes of Kerala, India, we examined two recently described taxa [*Indigofera karaiyarensis* Rajakumar *et al.* (2011: 485), and *Mucuna pruriens* var. *thekkadiensis* Thothathri & Ravi Kumar (1997: 703)] and evaluated the taxonomic status which is discussed below.

Indigofera Linnaeus (1753:751)

Gillett (1960), Sanjappa (1995), and Murthy & Sanjappa (2002) discussed the status of *Indigofera hirsuta* Linnaeus (1753: 751) and *Indigofera astragalina* Candolle (1825: 228) based on morphology and SEM analysis of seed coat, and they retained them at specific level. According to Sanjappa (1985, 1995), *I. astragalina* shows continuous variation in size of the plant, nature of leaflets, length of peduncle, color of flowers, indumentum of pods, and number of seeds/pods, and he followed Gillett (1960) to separate it from the closely allied *I. hirsuta* at specific level. However, the diversity in seed types and its importance in evolution as argued by Corner (1951) in Leguminosae prompted Murthy & Sanjappa (2002) to evaluate the seed morphology of 51 species of *Indigofera* in India. Their analysis again emphasized the differences between *I. hirsuta* and *I. astragalina*. The seed coat is granulate in *I. astragalina* and striate-rugose in *I. hirsuta* at high magnification. Even after much taxonomic studies in these two taxa, there continue to be problems (as revealed by innumerable misidentified specimens in various herbaria in India) with the identity at morphological level due to close affinity. Recently Rajakumar *et al.* (2011) proposed a new species, *Indigofera karaiyarensis* Rajakumar *et al.* (2011: 485) from South India. While going through the protologue of *I. karaiyarensis*, we did not observe any progressive character states that could clearly distinguish *I. karaiyarensis* from allied *I. astragalina*. It is also evident that the authors did not consult relevant publications (Gillett 1960, Murthy & Sanjappa 2002), and type specimens [e.g., type of *I. hirsuta*:—SRI LANKA. Herbarium Hermann Vol. 1, fol. 60, no. 172 (lectotype BM!), designated by De Kort & Thijssse 1984; see figure 1], before describing their new species. According to Rajakumar *et al.*, (2011) *I. karaiyarensis* is allied

to *I. astragalina* but differs from the later in having smaller size, short rachis, black dotted leaflets, shorter raceme and fruit shape (“*amplitudine parva, rachidi curta, foliolis atro-punctatis, racemo curto et forma fructus differt*”). These character states occur within the circumscriptional range of *I. astragalina* rather than that of *I. hirsuta* (Sanjappa 1985, 1995, De Kort & Thijssse 1984). Therefore we synonymize *I. karaiyarensis* under *I. astragalina* to avoid further confusion.

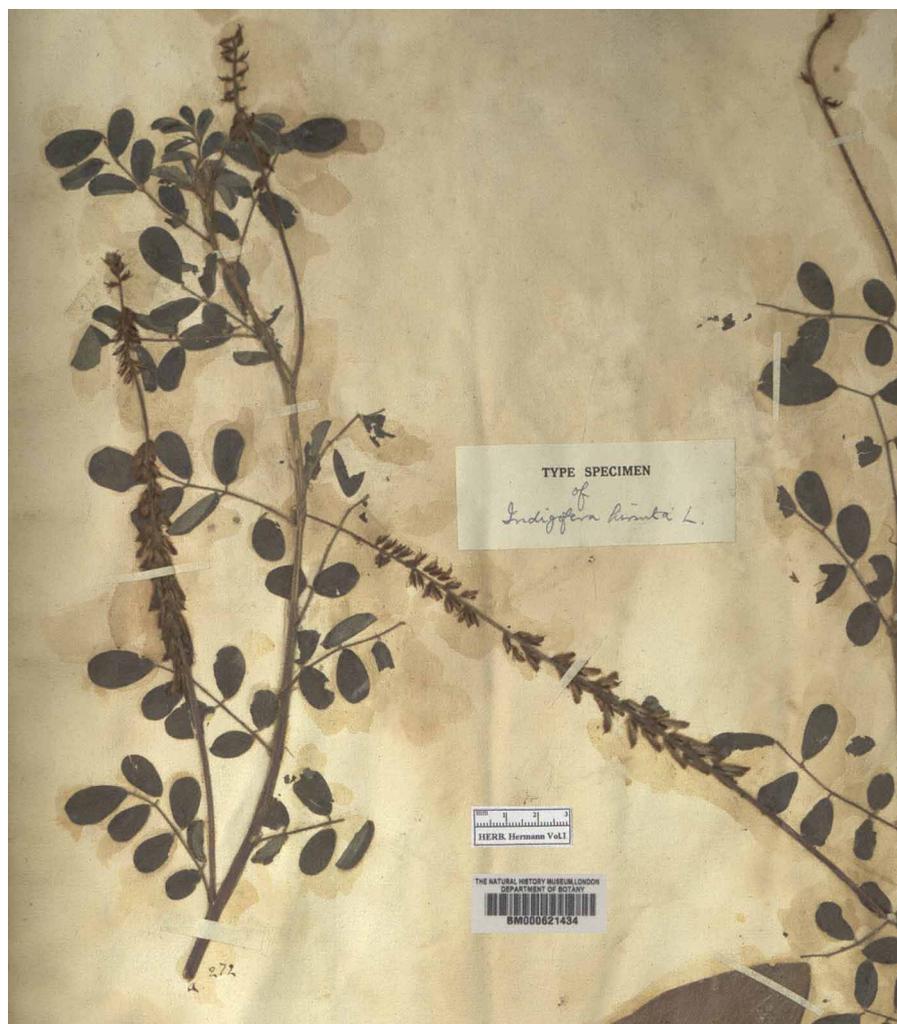


FIGURE 1. Lectotype of *Indigofera hirsuta* L., *Hermann Herb.* Vol. 1, fol. 60. no. 172 (BM, Barcode no. 000621434) © Natural History Museum, London.

Indigofera astragalina Candolle (1825: 228)

Type:—SENEGAL. Without further locality, *Perrottet 134* (lectotype G–DC! barcode no. 00316221), designated by De Kort & Thijssse (1984); see figure 2.

Indigofera karaiyarensis Rajakumar, Selvakumari, Murugesan & Chellaperumal (2011: 485), *syn. nov.*

Type:—INDIA. Tamil Nadu: Thirunelveli District, Karaiyar, Thambaraparni upper dam, 450 m, 25 September 2010, *Rajakumar et al. 2218 A* (holotype JCH!; isotypes MH, JCH).

Distribution:—Paleotropical, naturalized in South America.

Specimens examined:—INDIA. Andhra Pradesh: Kurnool district, Chelama, 16 October 1964, *Ellis 22033* (MH); Karnataka: Bangalore district, Bannerghatta, 15 December 1980, *Sanjappa 725*(CAL); Kerala: Kottayam, Changanacherry, 17 March 1984, *Antony 353* (MH); Wyanadu, 15 August 2005, *Antony 4569* (MH & RHK); Kollam, Hill temple, 20 October 1976, *Chandrabose 49147* (TBGT); Palakkadu, Olavakkottu,

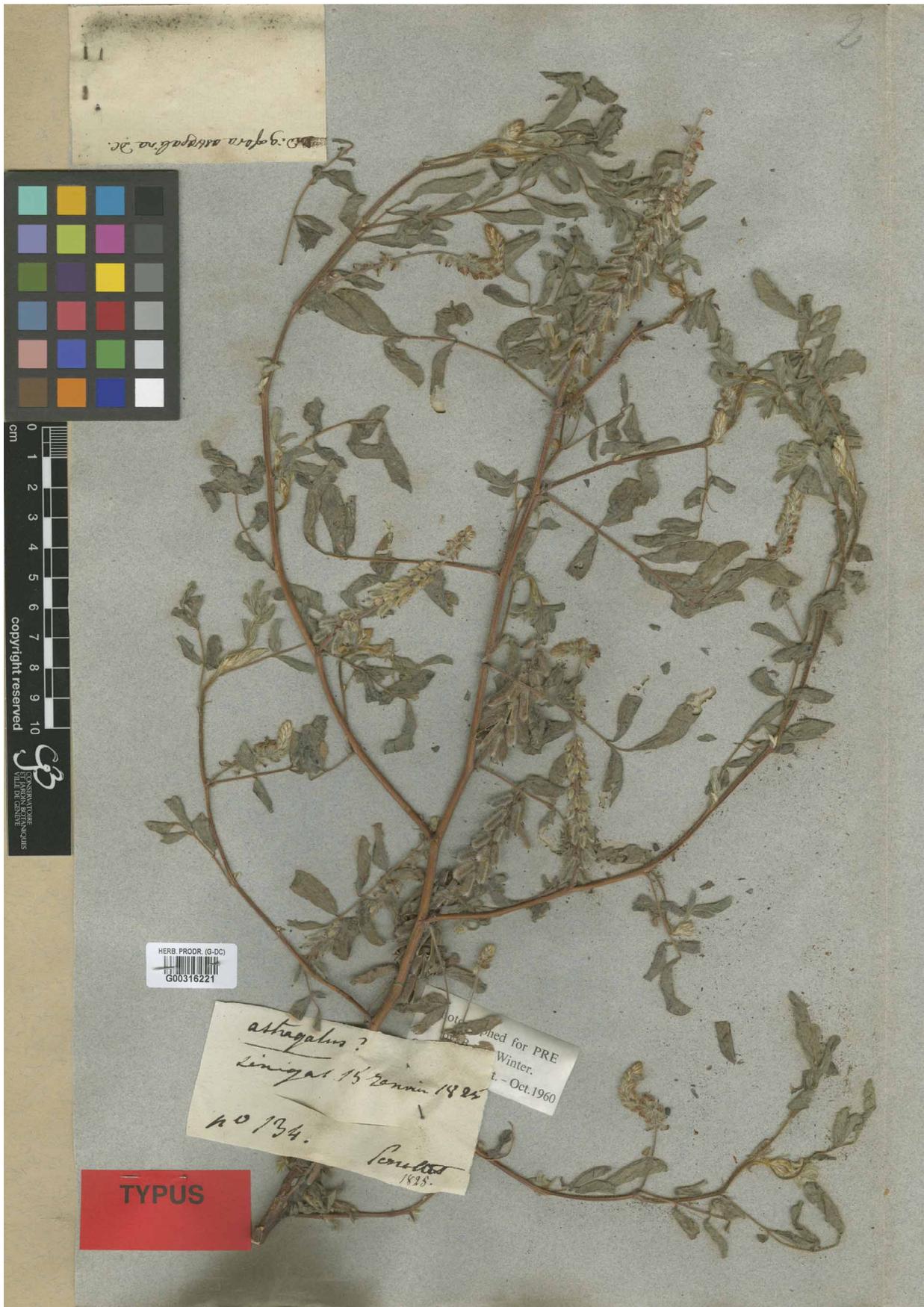


FIGURE 2. Lectotype of *Indigofera astragalina* DC., Perrotet 134 (G-DC, Barcode no. 00316221) © Conservatoire Botanique de la Ville de Genève.

17 October 1963, *Joseph 17762* (MH); Alappuzha, Vandanum, 28 March 2008, *Krishnaraj 61825* (TBGT); Alappuzha, Ramankary, 12 April 2008, *Krishnaraj 61858* (TBGT); Palakkadu, Nelliampathy, 10 December 2007, *Krishnaraj 61908* (TBGT); Palakkadu, Mannarkadu, 7 March 2008, *Krishnaraj 67454* (TBGT); Meenmutty, 28 March 1993, *Mohanan 11528* (TBGT); Kompa, Meenmutty, 28 October 1993, *Mohanan 11512* (TBGT); Without locality, without date, *Narayana Iyer s.n.* (TBGT Acc. No. 01124); Thiruvananthapuram, Vellayani, 15 January 1977, *Predeep Kumar s.n.* (TBGT Acc. No. 00301); Kannur, way to Govt. fish farm, 18 November 1977, *Ramachandran 52188* (MH); Thrissur, Kodungalloor to Iringalakkuda 25 September 1982, *Ramamoorthy 74825* (MH); Palakkadu, Mukkali forest, 15 October 1965, *Vajravelu 26258* (MH).

Notes:—De Kort & Thijssse (120: 1984) and Sanjappa (20: 1995), while revising the genus *Indigofera* for South-East Asia and India, wrongly gave the collection number of the lectotype specimen of *I. astragalina* as *Perrottet 143* (G–DC). It is corrected here as 134.

Rajakumar *et al.* cited the type of *I. karaiyarensis* as follows: INDIA. Tamil Nadu. Thirunelveli district, Karaiyar, Thambaraparni upper dam, 450 m, 25 August 2010, *Rajakumar et al. 2218 A, B & C* (holotype JCH!; isotype MH, JCH). Even though 2218 A, B & C appear as different collection numbers, authors of the taxon personally communicated that 2218 A refers to the holotype and B & C are suffixes to the same collection number.

Key to *I. astragalina* and *I. hirsuta* in India

- 1a. Leaflets 7–11(–15); peduncles ca. 2.5 cm long; pods 3–6-seeded, 3–3.5 mm broad, seed coat granulate
 *I. astragalina*
- 1b. Leaflets (3–)5–7; peduncles 4.5–6.5 cm long; pods 5–9-seeded, 1.5–2.5 mm broad, seed coat striate–rugose
 *I. hirsuta*

Mucuna Adanson (1763: 325)

Thothathri & Ravikumar reported a new variety, *Mucuna pruriens* var. *thekkadiensis* Thothathri & Ravikumar (1997: 703) from Thekkady forest, Idukki district of Kerala. They described their new variety as follows: “*foliolis anguste rotundatis ad apicem, albido-brunneo sericeo tomentosis, leguminibusque non-plicatisque*” [leaflets narrowly rounded at apex, whitish brown silky tomentose and without plaited pods]. Our study revealed that the above characters are varying continuously. The leaf apex is rounded or sometimes shortly acuminate at apex. The nature of the indumentum in pods varies during the post maturity periods and therefore these character states does not hold up. The whitish brown silky nature of the indumentum is present at pre-maturity periods and gradually turns to brown color and finally become ferruginous hirsute or blackish. The floral parts (vexillum, wing petals, keel petals, androecium and gynoecium) are similar to those of *M. pruriens* var. *hirsuta* (Wight & Arnott 1834: 254) Wilmot-Dear (1987: 42) and *M. pruriens* (Linnaeus 1754: 23) Candolle (1825: 405) var. *pruriens*. Moreover in the subgenus *Stizolobium* (Browne 1756: 290) Prain (1897: 404), the pods are never plaited. Some of the species may have (inconspicuous) rounded ribs or ridges. The pods are either S-shaped or curved at base or apex, and straight pods are rare in the subgenus. Therefore the observations given by Thothathri & Ravi Kumar (1997) in *M. pruriens* var. *thekkadiensis* are questionable. After examining both the type specimens of *Mucuna pruriens* var. *hirsuta* and of *Mucuna pruriens* var. *thekkadiensis*, as well as specimens housed at MH, RHK and TBGT and our own collections of living plants, we synonymize *M. pruriens* var. *thekkadiensis* under *M. pruriens* var. *hirsuta*.



FIGURE 3. Isolectotype of *Mucuna pruriens* var. *hirsuta* (Wight & Arn.) Wilmot-Dear, Wight 750 (E, Barcode no. E00174529) © Royal Botanic Garden Edinburgh.

***Mucuna pruriens* var. *hirsuta* (Wight & Arn.) Wilmot-Dear (1987: 44)**

Mucuna hirsuta Wight & Arnott (1834: 254).

Type:—INDIA. 'Peninsular India', without date, Wight 750 (lectotype K; isolectotypes E! MH!), designated by Wilmot-Dear 1987; see figure 3.

Mucuna pruriens var. *thekkadiensis* Thothathri & Ravi Kumar (1997: 703), *syn. nov.* Type:—INDIA. Kerala: Thekkady forest, Periyar Tiger Reserve, 23 February 1996, Ravikumar & Muralidharan 535 A (holotype MH! isotypes MUH, CAL); see figure 4.

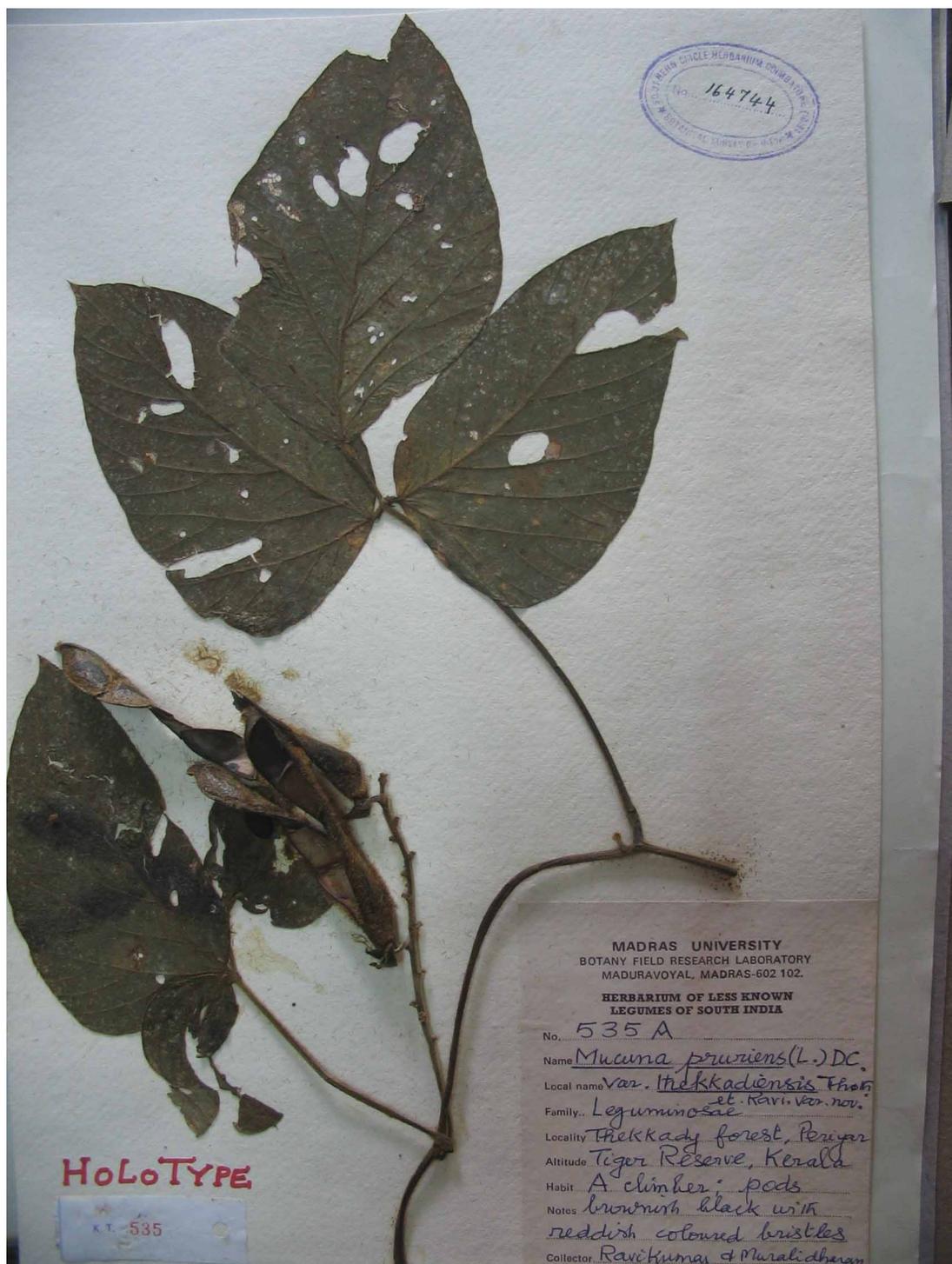


FIGURE 4. Holotype of *Mucuna pruriens* var. *thekkadiensis* Thothathri & Ravikumar, Ravikumar & Muralidharan 535 A (MH). © Botanical Survey of India, Southern Circle, Coimbatore.

Distribution:—Endemic to Western Peninsular India (compare also the note given below).

Specimens examined:—INDIA. Kerala: Palakkadu, Parambikulam, 14 December 2007, *Krishnaraj 61938* (TBGT); Idukki, Ramakkalmedu, 31 January 2012, *Krishnaraj 71523* (TBGT); Kottayam, Melukavu, 850 m, 11 December 1985, *Luckose 1680B* (RHK); Kannur, Nedumpoil, 550 m, 27 February 1979, *Ramachandran 61964* (MH); Idukki, Vallakkadavu, 4th mile, 29 October 2009, *Renjith & Haridas 60974* (TBGT); Idukki, Thekkady, 850 m, 16 November 1975, *Vivekanandan 46680* (MH).

Note:—Wilmot-Dear (1987: 44) designated a lectotype for *M. hirsuta* from the duplicates of Wight's collections at the Kew herbarium, however published it as holotype. The Wight material at K falls into two major groups. The Wight specimens with Kew distribution numbers (KD) have been remounted, are poorly annotated and often represent post-1834 collections. The second collection is Wight's own "top set" (Herb. Robert Wight Prop.), given to Kew just before his death, and including the duplicates of the 'Prodrum' species. This top set at Kew is not as complete as Arnott's set at the Edinburgh herbarium (E). The "top set" at Kew is rather scrappily annotated, usually in pencil, often with minimal localities and few numbers. Some annotations are erased and substituted by Wight or later workers with similar handwriting. Therefore it is difficult to identify which are Wight's Prodrum specimens at Kew (Noltie 2005: 133). However, according to Noltie (2005: 131), 'there has been a presumption against the use of the word 'holotype', but in some of Wight's solo works, it seems reasonable to identify a specimen as the single one used by Wight in describing a new species. Knowingly or unknowingly, this is the reason why Wilmot-Dear designated WC 750 at K as holotype of *M. hirsuta*, which qualifies as syntype (original material) following Art. 9.10 ICBN (McNeill *et al.* 2006). So there is no case to reject the choice made by Wilmot-Dear.

Key to the varieties of *Mucuna pruriens* in India

- 1a. Pods with dense white, yellow or brownish straight or curved hairs, not glabrescent; hairs rigid, irritant..... 2
- 1b. Pods with dense pale appressed silky hairs, later glabrescent; hairs not rigid or irritant
.....*M. pruriens* var. *utilis* (Wall. ex Wight) Baker ex Burck
- 2a. Pods slightly curved at base with white hairs initially, turning brown or even blackish; leaflets subcoriaceous, dorsal and ventral side densely silky hairy throughout.....*M. pruriens* var. *hirsuta*
- 2b. Pods curved, S-shaped with brownish irritant hairs; leaflets membranous, glabrous or rarely hairy on ventral surface only*M. pruriens* var. *pruriens*

Backer in Heyne (1916) reduced *Mucuna hirsuta* to a forma under *M. pruriens* and recorded it for Eastern Java. Nomenclaturally this combination is valid because of the indirect reference to the basionym as *M. hirsuta* Wight & Arn. However Wilmot-Dear (1987) restricted *M. hirsuta* to Western Peninsular India. Sanjappa (1992) also followed the same and reported it as endemic to India. Later Wilmot-Dear (2008) extended its distribution to Vietnam in Thailand.

Acknowledgements

We are grateful to Dr. L. Gautier (G-DC) and Dr. E. M. Haston (E) for type specimen images; Dr. H. J. Noltie (E) for a fruitful discussion and providing us with literature; Dr. V. Sampath Kumar, IBLO, Kew for checking Wight collections at Kew (K) and comments; Dr. G. V. S. Murthy (MH) for allowing us to consult the herbarium; Dr. J. F. Veldkamp (L) for valuable comments and critical reading; Dr. T. J. S. Rajakumar, St. Johns College, Thirunelveli for answering the queries; the curators of CAL, RHK, and TBGT for the use of herbarium facilities; Dr. P. G. Latha (JNTBGRI) for constant encouragements throughout the period of study; and we are thankful to the critical comments of anonymous reviewers.

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