

TAXONOMY

A new species of *Mucuna* Adans. (Leguminosae, Papilionoideae, Phaseoleae) from southeastern Brazil, with a key to Brazilian species

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A new species, *Mucuna japira* A. M. G. Azevedo, Agostini & Sazima, is described from Brazil. It has features similar to *M. sloanei* Fawc. & Rendle, but has pseudo-racemose inflorescences and the standard petal measures $\frac{3}{4}$ of the length of the keel, whereas *M. sloanei* has umbellate inflorescences and the standard petal measures $\frac{1}{2}$ of the length of the keel. This new species is restricted to the Atlantic forest of coastal São Paulo, Southeastern Brazil. A key to Brazilian species is provided.

KEYWORDS: *Mucuna*, new species, Leguminosae, Atlantic forest, southeastern Brazil.

INTRODUCTION

The genus *Mucuna* was described by Adanson (1763), and it is characterized by multi-seeded, two-valved fruits covered with irritant bristles. All species are trifoliolate climbers, with pseudo-racemose or umbelliform, axillary or nodose inflorescences; the calyces are campanulate, four-lobed and the resupinate explosive corollas are showy, purple, red, greenish, white or yellow. Most *Mucuna* species are pollinated by bats, but there are some records of bird pollination (van Leuween, 1938; van der Pijl, 1941; Baker, 1970; Sazima & Sazima, 1978; Arroyo, 1981; Hopkins & Hopkins, 1992; von Helversen & von Helversen, 1999; Pennington & al., 2000).

According to Lackey (1981), *Mucuna* includes about 100 species distributed in tropical and subtropical regions around the world, particularly in the Old World, but only 45 taxa are accepted as valid by ILDIS (Bisby & al., 2002).

The Old World taxa of *Mucuna* have been revised (Wilmot-Dear, 1983, 1989, 1990, 1991), but studies on this genus in America, especially in South America, are scarce (Macbride, 1943; Cowan, 1953; Burkart, 1970; Brako & Zarucchi, 1993). Seven validly published species of *Mucuna* occur in Brazil: *M. eriocarpa* Barb. Rodr., *M. huberi* Ducke, *M. pluricostata* Barb. Rodr., *M. pruriens* (L.) DC., *M. rostrata* Benth., *M. sloanei*, and *M. urens* (L.) Medikus (Bentham, 1870; Barbosa-Rodrigues, 1898; Bisby & al., 2002). *Mucuna* is divided into two subgenera (Wilmot-Dear, 1991), and the Brazilian species are placed in subgenus *Mucuna*, the exception being *M. pruriens*, which is included in subgenus

Stizolobium (P. Br.) Prain.

Three *Mucuna* species are recorded for southeastern Brazil: *M. pruriens*, *M. sloanei*, and *M. urens* (Barroso, 1965; Garcia & Monteiro, 1997; Moreira, pers. comm.). These species are distinguished based on the presence or absence of stipules on the leaves, leaflets which are glabrous or sericeous at least on the lower surface, the length of the inflorescence, the indumentum on the calyx, colour of the corolla, relative length of the stamen filaments, arrangement of the anthers, and size and shape of the legume.

Mucuna pruriens is completely different from the other two and is easily recognized, especially due to seed and fruit features, and corolla size.

Although the name *M. urens* has been applied in the literature to two species, it currently refers to the plant described as *Dolichos urens* by Linnaeus (1759) and subsequently transferred to *Mucuna* by Medikus in 1787 (Burkart, 1970). The other species also called *M. urens* was described by Linnaeus (1763) and latter transferred to *Mucuna* by Candolle (1825), but the name was illegitimate because it was a latter homonym. Currently this species is named *M. sloanei* Fawc. & Rendle.

Several *Mucuna* specimens collected in Ubatuba, São Paulo, southeastern Brazil, were originally identified as *M. sloanei*. However, they differ from the latter in several morphological features, such as large size of flowers and the inflorescence type. Doubts as to the correct identity of this *Mucuna* species were raised by Garcia & Monteiro (1997). According to Prof. Stefan Vogel (pers. comm.), the plants from Ubatuba are very different from *M. sloanei* that he knows from Colombia. We herein describe this taxon as a new species.

NEW SPECIES

Mucuna japira A. M. G. Azevedo, Agostini & Sazima, sp. nov. – Holotype: Brazil, São Paulo, Mun. Ubatuba (23°20' S, 44°52' W), 5 Jun 2002, *Agostini 1* (UEC 126881). (Figs. 1, 2).

Mucuna japira sp. nov. *M. sloanei* affinis, praecipue distinguitur inflorescentiis pseudoracemosis in quoque nodo trifloris et 4–5 (–7) nodos ferentibus, longitudine vexilli 3/4 partem carinae aequanti, floribus flavis robustioribus cum apice carinae lignea flavaque (non ut in *M. sloanei* inflorescentiis umbellatis floribus angustioribus apice rubescenti et longitudine vexilli dimidiam partem carinae aequanti).

Woody liana with cylindrical branches which bear woody, longitudinal ridges. Leaf trifoliolate; stipules 3 × 2 mm, triangular, apex acuminate, base truncate, caducous; stipels¹ absent; petiole 5.3–9.7 cm long, monosulcate on upper surface, ridged, sericeous; rachis 0.9–1.8 cm long, monosulcate, sericeous; terminal petiolule 5–8 mm, lateral petiolule 6–7 mm, hirsute; terminal leaflet 9.3–14.5 × 5.5–7.6 cm, obovate, apex acuminate, base obtuse, lateral leaflets 8.8–13.3 × 5.8–7.5 cm, oval, asymmetrical, chartaceous, discolorous, gold-sericeous on both surfaces. Pseudo-raceme 4.7–6.4 cm long, pendant, axillary, 4–7 nodes arranged in a zigzag pattern; peduncles 4.4–25.3 cm long, angular, ridged, sericeous; 3 flowers per node; floral pedicel 0.6–1.2 cm long, hirsute to canescent-sericeous; calyx campanulate, densely gold-sericeous on inner and outer surfaces, tube 1.4–1.5 cm long, with 4 teeth, carinal tooth 1.4–1.5 cm long, lateral teeth 0.9–1 cm long, vexillary tooth 0.6 cm long, sericeous, apex emarginate; corolla deep yellow or curry yellow, standard petal 5–5.3 × 4.4–4.5 cm, elliptic, apex obtuse, base with claw and auricle region fleshy, glabrous; wings 6.4–7 × 1.9–2.3 cm, oblong, apex obtuse, base with auricle, adhering along the lower surface to the keel, sericeous on the adhesion region and along the lower margin, fleshy at the base; keel 6.7–7.4 cm × 2–2.4 cm, oblong, apex acute, base with auricle, sericeous in the adhesion region to the wings and along the basal part of both margins, base fleshy and apex curved, horny in texture. Staminal tube 7.7–8 cm long, vexillary stamen free 7–7.3 cm long, 5 glabrous, basifixed anthers alternating with 5 sericeous, dorsifixed ones; style 6.5–7.8 cm long, base hirsute, stigma peltate, hairy; ovary 0.9–1.3 cm long, hirsute, 5-ovulate. Fruit oblong, 10–18.5 × 3.5–4.2 cm, pericarp with transverse ridges and appearing wrinkled, ferruginous-hirsute, 1–3 (–5)-seeded.

Paratypes: Brazil. São Paulo: Ubatuba, Estação Experimental do IAC, 3 Jun 1995, *L. C. Bernacci & al. 1918* (SP, UEC); *L. C. Bernacci & al. 1917* (SP); *L. C. Bernacci 1920* (UEC); Ubatuba, Picinguaba, May 1990, *R. Romero & al. 35* (HRCB, SPSF), 12 Nov 1989, *A. Furlan & al. 969* (HRCB); 5 Nov 1988, *A. Furlan & al. 556* (HRCB); 7 Aug 1988, *J. E. L. S. Ribeiro 518* (SPSF); 4 Jun 1988, *J. E. L. S. Ribeiro & al. 299* (HRCB); 3 May 1989, *F. C. P. Garcia & al. 355* (HRCB); 5 May 1968, *H. F. Leitão Filho 440* (IAC); 22 May 1989, *M. Kirizawa & J. A. Correa 2151* (UEC).

The specific epithet given to this *Mucuna* species is an allusion to the Amerindian native name of its main pollinator, “japira” or “japuira”, the Red-rumped Cacique (*Cacicus haemorrhous*). We propose herein the English common name Yellow Duckbill for *Mucuna japira*, an allusion of the flowers’ showy colour and the local name “bico-de-patinho” (duckbill).

The new species grows in the restinga (coastal shrubby vegetation) and lowland Atlantic forest, mainly along river banks and in periodically flooded areas. To date it is only known from Ubatuba, southeastern Brazil. This locality belongs to an area which is known for its rich biodiversity as several new taxa, including some Leguminosae species, have been described from there in the recent past (Tozzi, 1994, 1995; Mansano & Tozzi, 1999, 2001), moreover according to Lima & al. (1997), this area is an important center of endemism.

Mucuna japira is similar to *M. sloanei* but differs in



Fig. 1. Inflorescence of *Mucuna japira* A.M.G. Azevedo, Agostini & Sazima, showing the pseudo-racemose flower arrangement and part of the peduncle. Photo by K. Agostini.

¹ similar to stipules, occurring at the base of a leaflet or its petiolule and much smaller (Lewis, 1987).

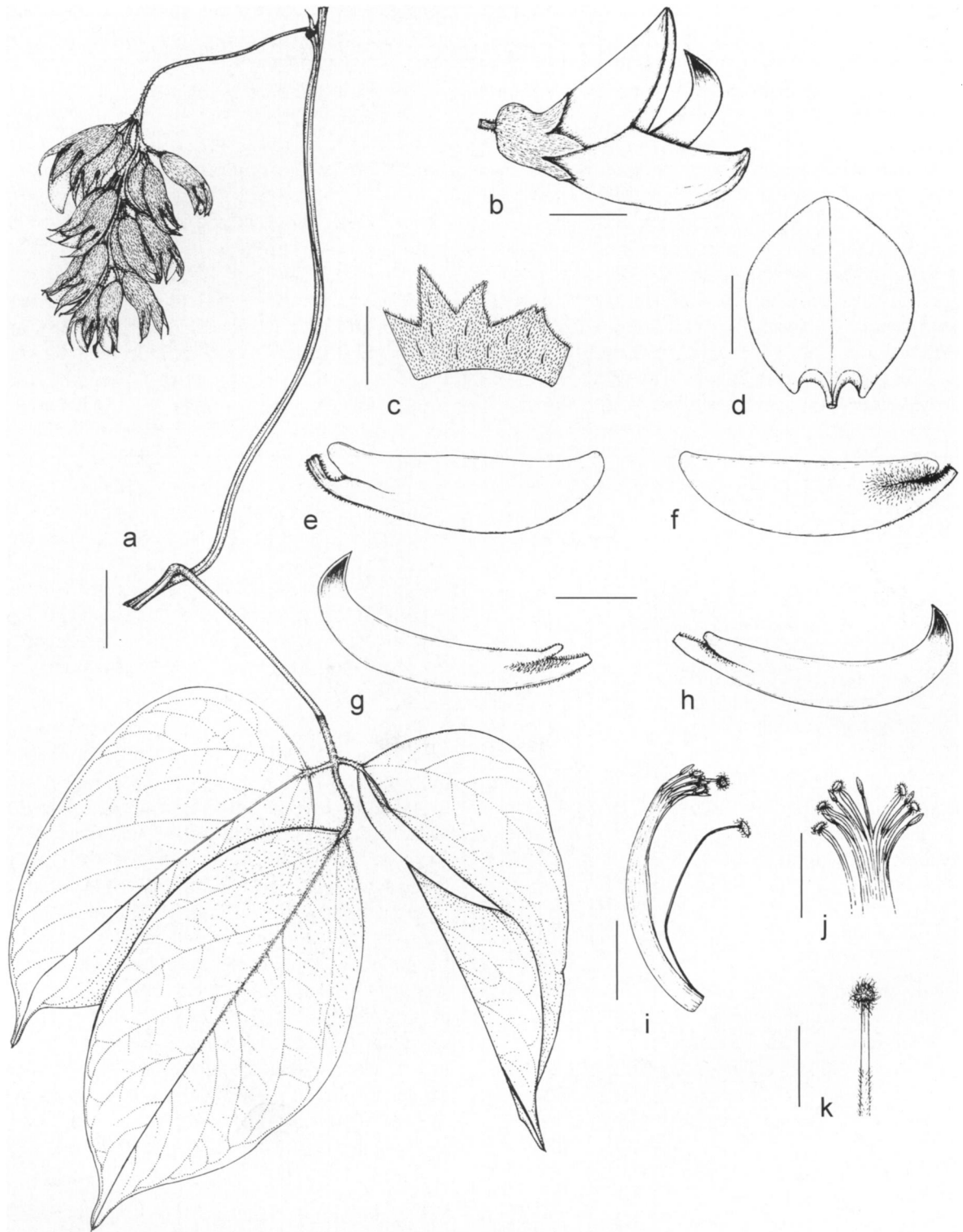


Fig. 2. *Mucuna japira* A.M.G. Azevedo, Agostini & Sazima (Romero 35 & al. (SPSF). a, branch with inflorescence; b, flower; c, calyx; d, standard; e, and f, wings; g and h, keel with horny apex (arrows); i, androecium; j, details of anthers; k, style and stigma. Bar = 2 cm. Drawing by E. Z. Borghi.

Table 1. Morphological features of six Brazilian *Mucuna* species. Data are from Ducke (1925; marked with an asterisk) and herbarium material. + presence, - absence, -- no information.

Features	Subg. <i>Mucuna</i> <i>M. huberi</i>	<i>M. japira</i>	<i>M. rostrata</i>	<i>M. sloanei</i>	<i>M. urens</i>	Subg. <i>Stizolobium</i> <i>M. pruriens</i>
Stipules	as in <i>M. rostrata</i> *	+	-	-	-	+
Stipels	as in <i>M. rostrata</i> *	-	-	+	-	+
Terminal leaflet form	as in <i>M. rostrata</i> *	obovate	ovate	elliptic to ovate	ovate to oblong	rhombic
Inflorescence type	umbelliform	pseudo-racemose	pseudo-racemose	umbelliform	pseudo-racemose	pseudo-racemose
Nodes / inflorescence	--	4–7	7	3–4	12	16
Calyx base form	acute	truncate	rounded-obtuse	rounded	acute	truncate
Vexillar tooth apex	--	bidentate	bidentate	obtuse	truncate	truncate
Corolla colour	yellow	yellow	red	yellow	greenish	purple
Standard size	> 4 cm	> 4 cm	> 4 cm	> 3 cm	> 3 cm	> 2 cm
Wing pilosity	+	+	+	+	+	-
Wing form	falcate	oblong	arcuate	semi-obovate	obovate	falcate
Anther pilosity	+	+	+	+	+	-
Ovules / ovary	--	5	3–5	3	5–7	5–6
Endocarp surface	smooth	smooth	smooth	smooth	smooth	transversely septate
Seed form	discoïd and flat	discoïd and flat	discoïd and flat	discoïd and flat	discoïd and flat	oblong-ovoid and compressed
Seed size	--	1.7–2.9 cm	--	2.6–3.1 cm	2.0–3.4 cm	1.3–1.7 × 0.9–1.3 cm
Hilum extension	--	3/4 of the circumference	--	3/4 to 4/5 of the circumference	3/4 of the circumference	1/8 of the circumference
Aril	-	-	-	-	-	+

many features (Table 1). Furthermore, in the new species leaves are gold-sericeous and in *M. sloanei* they are canescent-sericeous below, and lateral veins in the former show an angle of less than 45° whereas in the latter it is more than 45°. The flowers of *M. japira* are thicker than those of *M. sloanei* due to the fleshy texture of the petals, the outer surface of the calyx in the former is densely gold-sericeous being sparse and canescent in the latter, and the size of the standard petal measures 3/4 of the length of the keel in the new species, whereas in *M. sloanei* it is 1/2 of the length of the keel.

The descriptions and illustrations of *M. pluricostata* and *M. eriocarpa* (Barbosa Rodrigues, 1898a, b), especially the features of the fruit, show that *M. pluricostata* is synonymous with *M. pruriens*, and *M. eriocarpa* is a species of *Dioclea*. Thus, we now accept six species of the genus *Mucuna* for Brazil: *M. huberi*, *M. japira*, *M. pruriens*, *M. rostrata*, *M. sloanei*, and *M. urens* (Table 1).

Key to the species of *Mucuna* from Brazil:

1. Inflorescence umbelliform; corolla yellow 2
1. Inflorescence pseudo-racemose 3
2. Flowers less than 6 cm long; standard 2.5–3 cm long. *M. sloanei*
2. Flowers 8–9.5 cm long; standard 4–5.5 cm long. *M. huberi*
3. Flowers less than 5 cm long 4
3. Flowers more than 6 cm long 5
4. Terminal leaflet oval, apex acute, mucronate, pilose beneath; corolla purple; fruit linear; hilum short. *M. pruriens*
4. Terminal leaflet elliptic to oblong-elliptic, apex acuminate, glabrous; corolla cream-greenish at anthesis and purple after it; fruit oblong; hilum long. *M. urens*

5. Leaflet discolorous; petiole sericeous; calyx tube less than 1.5 cm long; corolla yellow. *M. japira*
5. Leaflet concolorous; petiole glabrous; calyx tube more than 2 cm long, corolla red. *M. rostrata*

The distribution of these species in Brazil is based on Bisby & al. (2001) and herbarium information: *M. pruriens* occurs all over the country; *M. rostrata* and *M. huberi*, only in the Amazon region; *M. urens*, in the Amazon region, and in São Paulo, Santa Catarina, Rio de Janeiro states; and *M. sloanei*, from the northern region of the country to Goiás, Bahia and São Paulo states.

Mucuna pruriens differs from the other species especially by the longitudinally ribbed pods, transversely septate endocarp and the compressed seeds with a very short hilum surrounded by a conspicuous white aril; these and other morphological features of subgenus *Stizolobium* are solid and divergent from subgenus type (Table 1). In Leguminosae, some of these features have been used to segregate genera, such as the transversely septate endocarp recorded for *M. pruriens*. The boundaries of the natural groups in the genus *Mucuna* need to be better established. More suitable characters are needed to provide greater resolution of relationships both in analyses of species of *Mucuna* and sister group relationships, as aptly pointed out by Doyle & al. (2000).

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