

**Notes on New World Salacioideae (Celastraceae  
incl. Hippocrateaceae). I****New species of *Salacia***

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Communicated by Prof. F.A. Stafleu at the meeting of May 30, 1983

**ABSTRACT**

Three new species of *Salacia* are described.

*Salacia bullata* spec. nov., a liana, characterized by bullate leaves, was collected in Brazil, Territorio Amapa. It comes closest to *S. amplexens*. A.C. Smith's key (1940) should be amended to include a new group 'Amplexentes'. This group, containing *S. bullata* and *S. amplexens* would be near 'Arboreae'.

*Salacia alwynii*, spec. nov., a vining species comes from Peru, Maynas, and is characterized by very large leaves and large cauliflorous flowers. It belongs to the species group 'Ellipticae' sensu Smith. It was also collected in Venezuela.

*Salacia paradoxa* spec. nov. is a liana collected in Brazil along the Manaus-Caracarai road. Its long leaves are narrowly elliptic, its flowers are extremely small. In leaf characters it is strikingly similar to *S. solimoesensis* of Smith's species group 'Ellipticae', the shape of the disk, however, suggests the species group 'Crassifoliae'. Specimens with fruits, collected in western Brazil may belong either to *S. paradoxa* or to *S. solimoesensis*.

**Salacia bullata** A.M.W. Mennega spec. nov. Plate I; Fig. 1-Type: J. Murça Pires & P.B. Cavalcante no. 52235 (holotype IAN; isotypes MG, NY, U), Brazil, Territoria Amapa, Igarape do Paia, coastal region; liana, rare in open tree savanna; flow. June 1962. Other collection: Nilo T. Silva no. 1035 (IPEAN, NY, U), Brazil, Rio Jari, Monte Dourado, Planalto A; cipo on mata de terra firme; flow. September 1968.

Liana, the branchlets slender, glabrous, purplish brown with longitudinal striations, opposite or sub-opposite at right angles with the main branch. Leaves opposite, the petioles in sicco greyish green, c. 1 cm long, canaliculate,

transversely wrinkled; the leaf blades thinly coriaceous, strongly bullate, greyish green above, brownish beneath, elliptic-oblong, (8-)11–19 cm long, (3-)5–9 cm broad, acute at the base and decurrent on the petiole, abruptly short-cuspidate at apex, the tip blunt and callose, acumen c. 10 mm long, the margin slightly thickened, recurved, entire. The costa prominent above, strongly so beneath, the secondary veins 10–11 per side, arcuately ascending, anastomosing at about 2 mm from the margin, impressed or slightly prominulous above, strongly prominent beneath, the veinlet-reticulation conspicuous on both sides. Inflorescences axillary, slender, elongate, relatively few-flowered, 3–14 cm long, 3 to 4 times dichotomously branched, closely

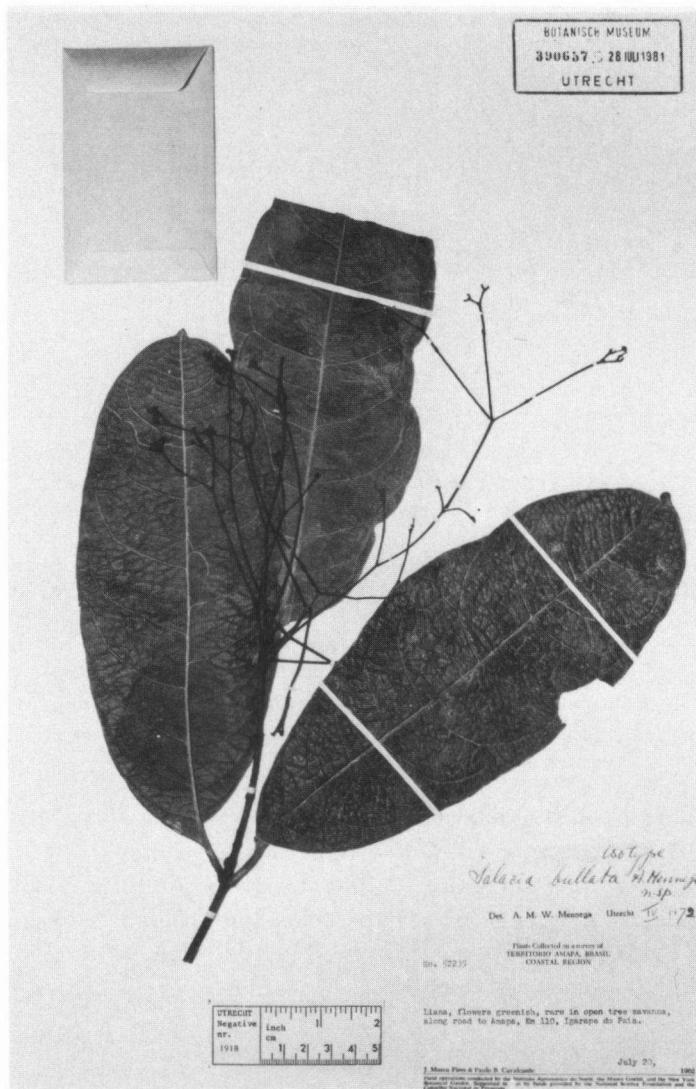


Plate I. *Salacia bullata* A. Mennega sp. nov.

brown-tomentellous throughout. The peduncle 2–4(–7) cm long, the bracts and bracteoles appressed, deltoid, acute, 0.5–1 mm long, almost entire. Mature flowers 2–3.5 mm in diameter, greenish or yellowish green, paired or clustered at the end of the ultimate branchlets; the pedicels slender, 2–3.5 mm long. Sepals deltoid, carnose, erect, acute at apex, 1 mm long, 1.3 mm broad at base, tomentellous. Petals carnose, thickened in the middle, obliquely erect, ovate, apex rounded, c. 1.8 mm long, 1 mm broad, fimbriate at the margin, tomentellous without, minutely glandular tuberculate proximally within. Disk diameter 1 mm, truncate at the central part, 0.6 mm high, dark brown, abruptly flattened into a thinner, light-coloured peripheral part with an upturned margin. Stamens in the young flower erect, recurved in the adult flower, filaments ligulate, 0.7 mm long, 0.2 mm broad, the anthers transversely oblong, 0.15 mm high, 0.3 mm broad, the locules distinct, slightly oblique, dehiscing by lateral, oblique, non-confluent clefts. Ovary conical, 0.5 mm high, the style short, subulate, with three minute stigmatic knobs; ovules 2 per locule.

*Salacia amplectentis* A.C. Smith similis quoad formam disci et indumentum

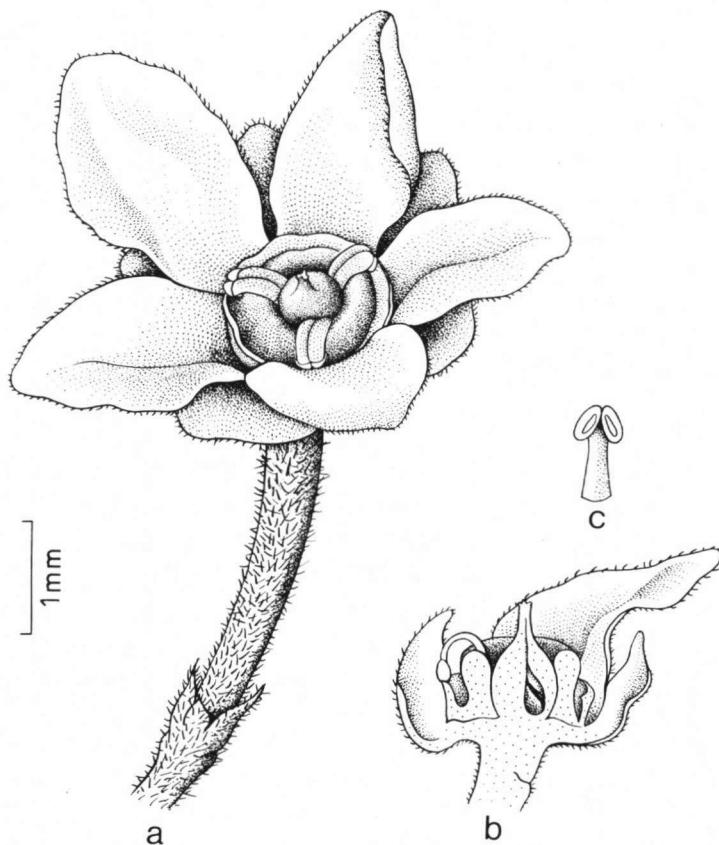


Fig. 1. *Salacia bullata*. a. open flower, b. lgt. section showing the shape of the disk with its upturned margin, c. stamen.

inflorescentiarum, ab ea differt foliis bullatis, inflorescentia pedunculo primarioque multo longiore.

#### REMARKS

*Salacia bullata* is unusual in several respects. The bullate leaf blades are not known in any other New World species of *Salacia*. The shape of the disk of the new species is also noteworthy, even when taking into account the great variation that exists in disk shape within the genus. A disk consisting of a high central part flattened towards the peripheral part which covers the petal bases often occurs, but in the new species this flattened outer part has the margin upturned leaving the petal bases free (fig. 1b). A similar disk is only found in *S. amplexens* A.C. Smith from Guiana. The close, brown-tomentellous indumentum is another feature that both species have in common. The bullate leaves and the much longer, lax and few-flowered inflorescences of *S. bullata* are characters by which this species can be distinguished from *S. amplexens*.

Smith placed *S. amplexens* in his species group 'Arboreae' notwithstanding the difference in disk shape, but, as he remarked on p. 433 it could well be placed in a species group of its own. Now, with a second species in which the same type of disk occurs, I think that both should be placed in a new group 'Amplexentes' between the groups 'Arboreae' and 'Opacifoliae'.

**Salacia alwynii** A.M.W. Mennega spec. nov. Plate II.-Type: A. Gentry & N. Jaramillo no. 28049 (holotype U; isotype MO), Peru, Maynas, Quebrado Yanomono, Rio Amazonas above mouth of Rio Napo, liana in non-inundated forest on lateritic soil, alt. 130 m; flow. November 1979.

Other collection: J.A. Steyermark, R. Liesner & A. González no. 119786 (VEN, MO, U), Venezuela, Estado Tachira on ridge top of forested steep sandstone slopes of Cerro de Cuite, along Quebrada La Colorada, lat. 7° 29', 30"N, long. 72° 05' 30"W; alt. 450–630 m; flow. November 1979.

Liana, low growing or growing up on a high tree, stem diameter 5 cm. Branches with a light greyish brown, grooved and cracked bark, with tiny, oval, black lenticels. Leaves opposite, the petioles stout, 4–5 mm in diameter, 25–30 mm long, of the same colour as the branches, transversely wrinkled. The leaves ovate to elliptic, 24–28 cm long, 9–11.5 cm broad, entire, the base rounded to slightly cordate, the tip either obtuse or shortly and obtusely acuminate, dark green and shining above, silvery green below (in sicco dull greyish green above and slightly paler olive-green below), coriaceous, smooth above, finely puncticulate beneath. The primary vein prominent above in the lower half of the leaf, strongly prominent below, secondary veins 8–10 pairs, at an angle of 70° with the primary vein, gradually arcuating near the margin, almost equidistant, but with somewhat wider gaps between the third and fourth, and the fourth and fifth pairs, impressed above and below; tertiary venation invisible. Inflorescence fasciculate, few-flowered. The pedicels 12–15 (20) mm long, 1 mm thick, yellowish to greenish. Open flowers 25–30 mm wide, the corolla

orangish, the calyx buff, the disk dark brown. Calyx lobes coriaceous, unequal, the largest lobes 5.5 mm long, 7–10 mm broad, rounded at the apex, entire or slightly erosulous. Petals coriaceous, entire, recurved, parallel-nerved, 12–16 mm long, 10–14 mm broad, obovate, the base covered by the flattened part of the disk. Disk 10–12 mm in diameter, in the central part 1 mm high, gradually flattened into the carnose undulate margin, 5-angular, the margin with large, irregular, clumps of yellow, glandular tissue. Stamens strongly recurved, the filaments ligulate, widened towards the base, 3.5 mm long, c. 2 mm wide, the ellipsoid anthers 1–2 mm broad, 0.5–1 mm high, dehiscing by oblique con-

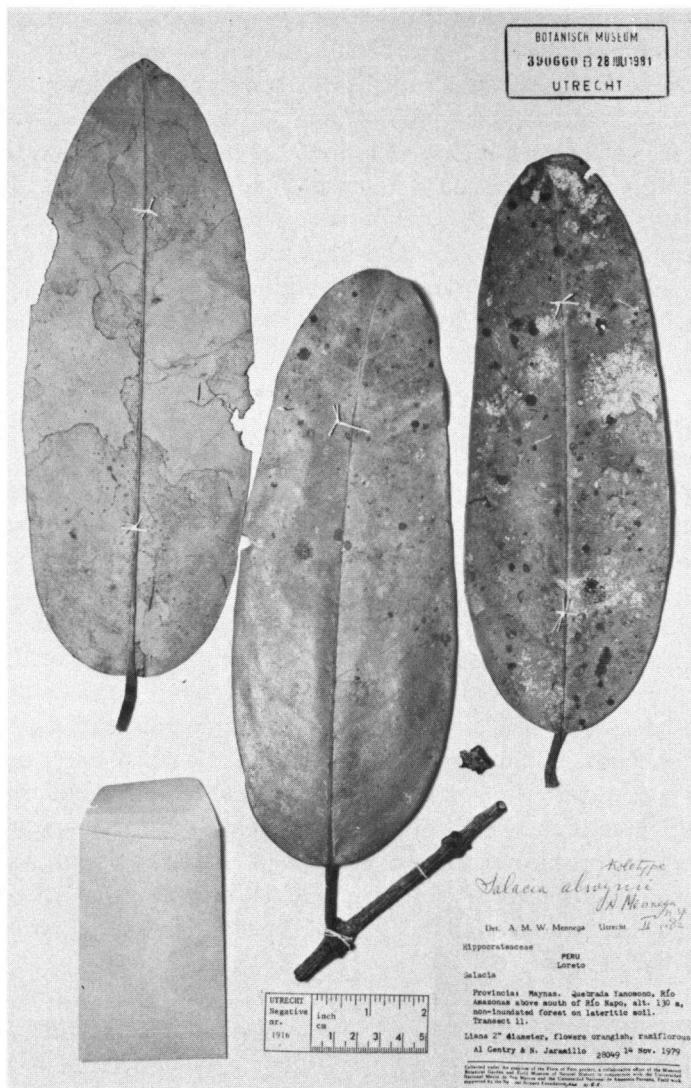


Plate II. *Salacia alwynii* A. Mennega sp. nov. The strongly recurved petals suggest a much smaller flower than it is in reality.

fluent clefts. Ovary pyramid-shaped, 4 mm in diameter, 3-locular, with 4–6 superposed ovules per locule; style short, subulate. Fruit unknown.

*Salaciae impressifoliae* (Miers) A.C. Smith affinis, ab ea foliis et floribus multo minoribus diversa; *Salacia macrantha* A.C. Smith similis quoad flores, ab ea differt petiolus minoribus, foliis basi acutis et nervis secundariis subtus prominentibus.

*Salacia alwynii* is named in honour of Dr. Alwyn Gentry whose numerous collections from the Amazonian region, particularly Amazonian Peru, greatly contributed to the study of Hippocrateaceae.

#### WOOD ANATOMY

Specimen: Steyermark et al. no. 119786, diameter 7 mm.  
Vessels mostly solitary, some in radial or diagonal pairs, diameter 20–40  $\mu\text{m}$ , round to oval, intervacular pits 3–4  $\mu\text{m}$ , perforations simple, vessel wall striate. Fibres partly thick-walled with bordered pits on radial and tangential walls, and partly thin-walled and septate with simple pits, the latter type arranged in tangential complexes. Rays uniseriate, occasionally 2-celled or a central cell doubled; strongly heterogeneous with a preponderance of tall erect cells, 2–30 cells high (100–700  $\mu\text{m}$ ); rhombic crystals numerous; pits to vessels similar to intervacular pits; number 26 per mm. Parenchyma absent.

#### REMARKS

*Salacia alwynii* is a new species in the group of *Salacias* with fasciculate inflorescences. According to A.C. Smith's (1940) key in his treatment of the New World Hippocrateaceae, it belongs in his group 'Ellipticae' and within this group, by the size of the flowers and the form of the disk with its conspicuously flattened outer margin, it joins a group of five species which have several features in common. These species are *S. macrantha*, *S. grandifolia*, *S. impressifolia*, *S. juruana* and *S. gigantea*. All of them are difficult to characterize, and to tell apart, a statement made already by Smith. With the availability of much additional material from Andean and Amazonian regions the difficulties in defining the species have augmented rather than diminished. Therefore it is with some hesitation that a new species is introduced here. A close comparison of the new species with the types and additional collections of the five species listed above revealed, however, sufficient differences in the shape, venation, size and texture of the leaves, in size of the petioles, and in size of the flowers, to justify the establishment of a new species. Furthermore, the occurrence of an almost identical specimen in the State of Tachira, Venezuela, strongly supported this decision.

From the group of five related species mentioned above, *S. macrantha* from Peru has the greatest overall similarity with *S. alwynii*. Although in *S. macrantha* the yellow flowers are also large – up to 25 mm in diameter –, and of identical structure, the leaves differ by the attenuate base, the narrow, elliptic shape, the prominulous venation, particularly beneath, and the petioles that are half as long as those of *S. alwynii*.

*S. grandifolia\** (Mart.) G. Don, from Rio de Janeiro, comes more close to *S. alwynii* in leaf and petiole characters, but in that species the yellow flowers are smaller, c. 16 mm in diameter, and the pedicels are short, 6–8 mm.

*S. impressifolia* (Miers) A.C. Smith known from Amazonian Brazil, Peru, Bolivia, and Venezuela, has leaves with the same texture and venation as *S. alwynii*, but the size is much smaller, and so is the size of the yellowish flowers with a brown centre.

In *S. juruana* Loes. occurring in almost the same region as *S. impressifolia*, the leaves are about 15–20 cm long, elliptic with an obtuse base, the secondary veins are prominulous below, the yellowish green flowers have long and slender pedicels, and they are about 13 mm in diameter.

*S. gigantea* Loes. based on a tree collected by Ule near Marary on the R. Jurua, and collected recently in the same region in several localities, is characterized by very long (up to 43 cm), broad elliptic leaves, decurrent on the petiole, with prominent secondary veins on the lower side of the leaves, short pedicels, and yellowish green flowers of c. 16 mm diameter.

The foregoing suggests a close relationship between the species. The new species bearing the closest relationship to *S. macrantha* and to *S. impressifolia*.

**Salacia paradoxa** A.M.W. Mennega spec. nov. Plate III; Fig. 2.-Type: F. Bisby, W.C. Steward & J.F. Ramos, distributed under no. P 18079 (holotype INPA; isotype NY, U). Brazil, Amazonia, Manaus-Caracarai road, km 146; terra firma, flow. September.

Liana, 8 m tall. Branches dark greyish brown, the bark transversely wrinkled, lenticels smooth and unobtrusive. Leaves opposite, the petioles moderately thick, sulcate, dark brown, 2.5 mm broad, 18–20 mm long. Leaves elliptic to ovate-elliptic, 8–14 cm broad, 21–39 cm long, entire, thin coriaceous, the base rounded or obtuse, apex rounded, olivaceous and shining above, slightly more brownish green and dull beneath. Primary vein on both surfaces prominent, secondary veins 7–9 pairs, strongly curved, anastomosing about 5 mm from the margin, almost equidistant, impressed above, prominulous beneath, tertiary venation nearly horizontal, prominulous above, impressed beneath. Inflorescences fasciculate, peduncles gemmiform. Bracts very small, acute, 2 mm long. Pedicels very slender, dark brown, about 5 mm long. Flowers with erect pedicels, 2.2 mm long and wide, cream-coloured. Calyx lobes reflexed, deltoid to orbicular, erosulous or entire, 1 mm broad, 0.6 mm long, sub-carnose, the margin thinner. Petals almost round, 1.5 mm broad, 1.8 mm long, membranaceous with brown glandular striations, the margin entire, undulate. Disk cupuliform, 1.7 mm in diameter, 0.2 mm high, coriaceous, stamens erect with short filaments, 0.3 mm long, anthers 0.4 mm broad, 0.2 mm high, opening by

\* The specimen in the München Herbarium bears the name *Pyramidostylis grandiflorus* Mart. (observ. N. 48). The species was probably by error published as *Anthodon grandifolius* Mart. in Roemer & Schultes, Mantissa, Vol. I (1822). This error in the orthography of the specific name was perpetuated by all subsequent authors except Sprengel (*Systema vegetabilium*, Vol. I, 1825).

wide, extrorse, slightly oblique, confluent clefts. Ovary pyramid-shaped, 0.2 mm high, 3-locular with two superposed ovules per locule, the style very short, subulate, with 3 minute stigmatic knobs alternating with the stamens. Fruit unknown; see paragraph below, however.

Liana, *S. solimoesensis* A.C. Smith affinis; ab ea floribus minoribus disco crasso cupuliformi staminibus erectis thecis fissurae pauco obliquae extrorsis differt.

#### REMARKS

The new species is characterized by minute flowers to which stand in great



Plate III. *Salacia paradoxa* A. Mennega sp. nov. A few loose flowers in the upper part of the photograph illustrate their extremely small size.

contrast large leaves, hence the name. It belongs to *Salacia* because of the glomerulate inflorescences, the mode of dehiscence of the stamens, and the absence of well defined stigmas, but the cupuliform disk is more suggestive of *Tontelea*. However, Smith included in his concept of *Salacia* also two species: *S. crassifolia* and *S. glomerata*, with a cupuliform disk rather than an annular-pulvinate disk. In his survey of *Salacia* he discussed at some length the transitional disk-form of the two species, which he placed in the species group Crassifoliae, *S. paradoxa* differs in other respects too much from the Crassifoliae to include it in that group.

*S. paradoxa* is strikingly similar to *S. solimoesensis* A.C. Smith in the form, texture and general aspect of the leaves and petioles. In *S. solimoesensis* the flowers are also relatively small, yet still twice as large as in *S. paradoxa*, the ovate petals are spreading, the disk is low, cushion-like, the anthers open by apical horizontal clefts. The latter species belongs in Smith's species group 'Ellipticae'.

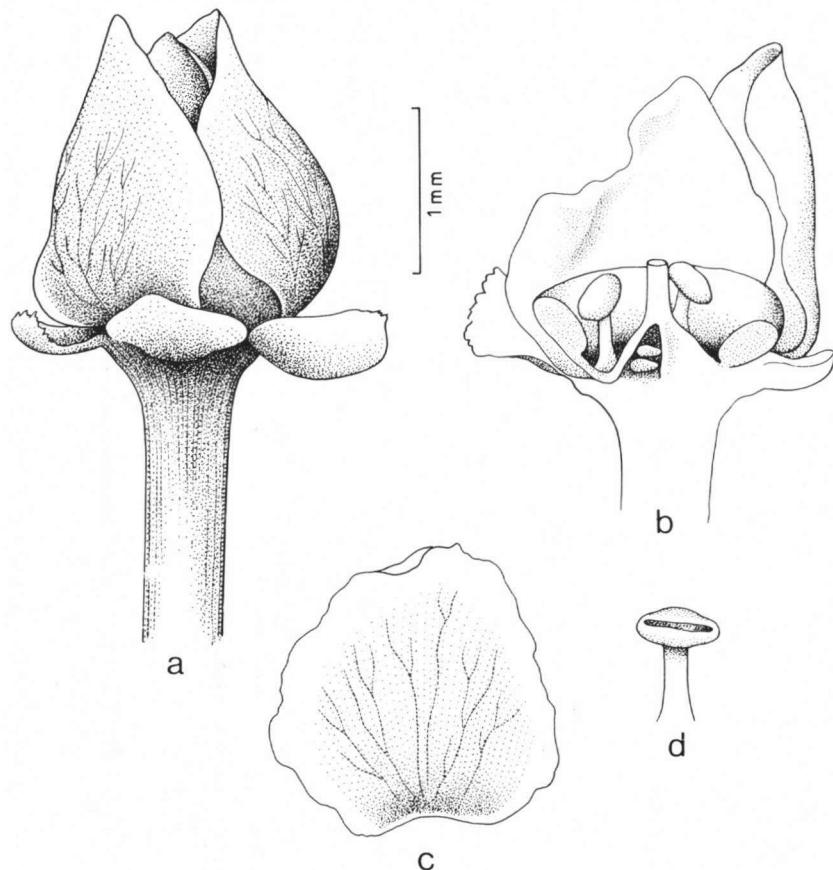


Fig. 2. *Salacia paradoxa*. a. flower with erect petals, b., lgt. section of the flower, c. petal, d. stamen.

## FRUITS

Among collections from Brazil\*, terr. Rondonia and Acre, there are fruiting specimens with leaves very closely resembling those of *S. solimoesensis* and *S. paradoxa*. Just because of this similarity in the leaf shape, it is impossible to determine whether these fruiting plants are referable to the one species or to the other. A single petal still adhering to a fruit by its round shape suggested *S. paradoxa*, but this evidence alone cannot be relied upon for identification.

The fruits are roundish, about 2 cm in diameter, the thin-walled woody pericarp has a smooth surface. The mature fruits are yellow, the thin fruit stalks are 3–6 mm long. The one to three seeds are round or slightly angled, and covered by a layer of very thin reddish brown lamellae.

## ACKNOWLEDGEMENTS

I should like to express my gratitude to the Directors and Curators of the following herbaria for either their hospitality during my visits, and/or for the loan of material: BR, F, G, IAN, INPA, K, M, MO, NY, P, W, VEN. I am also much indebted to my colleagues from various institutes who sent me their interesting collections over the years for identification. I am most grateful to Drs. L.Y.Th. Westra for critically reading the manuscript and for providing the Latin descriptions as well as providing stylistic improvements of the English text. Finally I thank Mr. T. Schipper for the fine illustrations.

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Sprengel, C. Systema vegetabilium, 1, classis 1–6, 178 (1825).

\* Maguire et al. no. 56687, Brazil, Terr. Rondonia, Porto Velho, liana in high forest, fruiting Sept. (IAN, NY, U); Cid, C.A. & Souza no. 2973, Brazil, Terr. Acre, Municipio de Rio Branco BR 317, estrada para Xapuri, arbusto de 5 m de altura de mata de terra firme, October (INPA, NY, U).