

Studies in Annonaceae. XI
Monograph of *Rollinia*: preliminary notes

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SUMMARY

In this precursory paper to the forthcoming Flora Neotropica monograph of *Rollinia* 12 new species are described. One new combination is made, and there is a note on the correct author citation for *Rollinia dolabripetala*. Mr. E. J. van Marle, a former student at the University of Utrecht, contributed the description of one of the new species.

***Rollinia andicola* P. Maas & Westra, sp. nov.** – Type: Ecuador. Azuay: between Río Gamolotal and Río Huigra on road to Molleturo, alt. 1220–1520 m, 10 Jun 1943 (fr), *J. A. Steyermark 52903* (holotype, F). Figs. 1, 2.

Arbor ad 16 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis albis vel brunneis ad 0.5 mm longis (sat) dense obtecti vel glabri. Foliorum petioli 10–20 mm longi; lamina elliptica, chartacea, (10–)12–25 cm longa et 4–11 cm lata, subtus pilis simplicibus erectis ad 1 mm longis sat dense vestita, basi obtusa vel rotundata, apice acuta vel obtusa, nervis secundariis utrinque (8–)10–20. Inflorescentiae 1(–2)-florae. Pedicelli post anthesin c. 20 mm longi, fructiferi ad 50 mm longi. Flores desiderantur. Fructus ovoideus vel oblongoideus, ad 3.5 cm longus et 2.5(–3) cm in diametro, carpidiis 80–120, areolis pulvinatis (an potius semiellipsoideis vel subglobosis), basi 2–4 × 1.5–3 mm metientibus ad 2 mm altis (saltem in sicco!) inapiculatis, seminibus c. 10 × 6 mm.

Tree, to 16 m tall and 18 cm in diam. Leafy twigs and petioles (rather) densely covered with whitish to brownish, appressed simple hairs to 0.5 mm long to glabrous. Petioles 10–20 mm long, (1–)1.5–2 mm in diam. Lamina elliptic, char-

taceous, (10-)12-25 cm long, 4-11 cm wide, rather densely covered along large veins, otherwise (very) sparsely covered (or glabrous), with whitish to brownish, straight to curved or crisped, erect (to appressed), simple hairs to 0.5(-1) mm long above, rather densely covered with whitish to brownish, straight to curved, erect, simple (to rarely furcate) hairs to 1 mm long below, base obtuse to rounded, apex (acute to) acuminate, the extreme tip acute to obtuse; secondary veins curved to slightly curved (to straight), (8-)10-20 on either side of primary vein, without intersecondaries or with some short intersecondaries (to sometimes almost 1/2 of the length of the secondary veins), flat (to slightly impressed) above, angles with primary vein (40-)50-70°, loop-forming under the apex, at (acute to) right to obtuse angles, loops indistinct to distinct, smallest distance between loops and margin (0-)1-2(-3) mm, tertiary veins more or less percurrent to more or less reticulate, tertiary and higher-order venation prominulous above.

Inflorescences leaf-opposed (to infra-axillary), occasionally near the base of lateral shoots, 1(-2)-flowered, peduncles, pedicels, outer side of bracts, and outer side of sepals (rather) densely covered (peduncles, pedicels becoming glabrous) with whitish to brownish, appressed (to erect), simple hairs to 0.5 mm long. Fruiting peduncles to 4 mm long, to 4 mm in diam. Pedicels ca. 20 mm long, 1 mm in diam., fruiting pedicels 20-50 mm long, 1.5-4 mm in diam. Bracts triangular, 1-2 mm long, upper bract inserted in the lower 1/5th to 1/3rd of the pedicel.

No flowers seen, only material in various fruiting stages. Sepals (persisting) free to connate at the base, appressed, triangular, 2-2.5 mm long, 2 mm wide, acute, not gibbous.

Fruit ovoid to oblongoid, to 3.5 cm long and 2.5(-3) cm in diam., green turning yellow (with black seeds) (*in vivo*), grey to blackish when dry, composed of 80-120 carpels, rather densely covered with brown, appressed (to more or less erect), simple hairs, glabrescent, free part of carpels pulvinate (semiellipsoid to semiglobose), to ca. 2 mm high, 2-4 × 1.5-3 mm at the base, without apicule, surface finely verrucose; wall to 1 mm thick. Seeds to 10 × 6 mm.

Distribution. Ecuador and Peru; in montane forest at altitudes of 1200-1900 m. Fruiting in May, June, and September.

Specimens examined: ECUADOR. Chimborazo: Cañon of Río Chanchan, about 5 km N of Huigra, alt. 1600-1800 m, 19-28 May 1945 (fr), *Camp E-3318* (AAU, U).

PERU. Amazonas: Prov. Bongará, distr. Sipabamba, Shilla, alt. ca. 1850-1900 m, 6 May 1981 (fr), *Young & Eisenberg 380* (ex MO, U). Pasco: Prov. Oxapampa, road Oxapampa-Villa Rica, alt. 1900 m, 29 Sep 1983 (fr), *D.N. Smith & Brack E. 5326* (ex MO, U).

Local names: Anonilla, Cherimoya, Chirimoya de monte.

Very similar to *Rollinia ulei* Diels. Both species have a fruit which shrivels in a very characteristic way making the dried fruit resemble a black raspberry or

a mulberry. Both species also occur up to high altitude levels. *R. andicola* is distinct from *R. ulei* mainly by a rather dense indument of erect hairs on the lower side of the leaves.

Rollinia bahiensis P. Maas & Westra, sp. nov – Type: Brazil. Bahia: Município de Uruçuca, road from Uruçuca to Serra Grande at 25 km from Uruçuca, 14 Apr 1978 (fl), S.A. Mori & J. Kallunki 9888 (holotype, CEPEC; isotype, U). Figs. 3, 4.

Arbor ad 8 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis vel erectis ferrugineis ad 0.5(-1) mm longis dense obtecti. Foliorum petioli 8-12 mm longi; lamina vulgo elliptica vel anguste elliptica, coriacea, 9-18 cm longa et 3-7.5 cm lata, subtus pilis simplicibus erectis (vel plusminusve appressis) ferrugineis ad 1 mm longis sat dense vestita, basi acuta (vel cuneata) vel rotundata, apice acuminata, nervis secundariis utrinque (8-)12-16. Inflorescentiae ad 8-florae. Pedicelli 15-20 mm longi, fructiferi ad 25 mm longi. Sepala libera vel basi connata, triangulari-ovata vel late triangularia, 3-5 mm longa, acuta vel acuminata. Corolla tubo 3-4{* -6} mm alto et 5{-9} mm in diametro, alis late elliptico-ovatis ascendentibus 4-5{-10} mm longis, 4-5{-9} mm altis, 3-5{-6} mm crassis. Fructus late ovoideus, 2.5-3 cm longus et 3-3.5 cm in diametro, carpidiis 30-50 planis vel leviter elevatis haud vel minute apiculatis 8-13 × 5-7 mm metientibus, seminibus, c. 10 × 6 mm. Measurements taken from material preserved in spirit.

Small tree, to 8 m tall and 10 cm in diam. Leafy twigs and petioles densely covered with appressed to erect, brown, simple hairs to 0.5(-1) mm long. Petioles 8-12 mm long, 1.5-3 mm in diam., with conspicuously thickened articulation at the base. Lamina elliptic (or elliptic-obovate) to narrowly elliptic, coriaceous, often with slightly revolute margin, 9-18 cm long, 3-7.5 cm wide, rather densely to very sparsely covered with erect, whitish to brownish, simple hairs to 0.5(-1) mm long mainly on large nerves, otherwise glabrous above, rather densely covered with erect (to more or less appressed), straight to somewhat crisped, brownish, simple hairs to 1 mm long below, base acute (or cuneate) to rounded, apex (short to rather long) acuminate, the extreme tip acute to obtuse; secondary veins (8-)12-16 on either side of primary vein, curved (to straight), angles with primary vein 40-60°, loop-forming below the apex at acute to obtuse angles, loops mostly indistinct, smallest distance between loops and margin (0-)0.5-1.5 mm, flat to slightly impressed above, tertiary veins percurrent to reticulate, tertiary and higher order venation prominulous to slightly impressed above.

Inflorescences leaf-opposed to infra-axillary, up to 8(-more?)-flowered, densely covered with erect, brown to orange-brown hairs to 1 mm long. Peduncles 2-3 mm long, to 1.5-2 mm in diam., with sympodially elongating rachis. Pedicels 15-20 mm long, 1.5-2{-4} mm in diam., fruiting pedicels to 25 mm long, to 3 mm (to 5 mm under the fruit) in diam. Bracts broadly ovate to

* Measurements taken from material preserved in spirit

broadly triangular-ovate, 1.5–3{–5} mm long, upper bract inserted in the lower to upper 1/3rd of the pedicel, or possibly lacking (or caducous).

Flowers yellow to creamy with rusty indument, inner base of petals deep purple (*in vivo*). Sepals free, to slightly connate at the base, appressed, triangular-ovate to (very) broadly triangular, 3–5{–6} mm long, 4–5{–8} mm wide, acute to acuminate, not gibbous. Corolla tube 3–4{–6} mm high, 5{–9} mm in diam., wings broadly elliptic-ovate, ascending, 4–5{–10} mm long, 4–5{–9} mm high, 3–5{–6} mm thick. Stamens 200–300.

Fruit very broadly ovoid, 2.5–3 cm long, 3–3.5 cm in diam., dark grey to blackish when dry, composed of 30–50 carpels, densely to rather densely covered with tiny brown hairs intermixed with larger, appressed hairs ≤ 0.5 mm long, eventually glabrescent, areoles flat to slightly protruding, without apicule or with weakly developed apicule, 8–13 \times 5–7 mm, surface (almost) smooth; wall 3–6 mm thick. Seeds ca. 10 \times 6 mm.

Distribution. Brazil, State of Bahia; in forest (“Mata Higrofila Sul Baiana”) at altitude to 100 m. Flowering from January to April, fruiting in July and August.

Material examined. BRAZIL. Bahia: Município de Agua Preta, Ilheus, 7 Feb 1938 (fl), *Bondar 155 = 3003* (F, RB); 6 km SW of Itacaré, S of mouth of Rio de Contas, alt. 0–100 m, 31 Jan 1977 (fl), *Harley et al. 18451* (CEPEC); Município de Santa Cruz de Cabrália, Estação Ecológica do Pau-Brasil and surroundings, ca. 16 km W of Porto Seguro, 21 Mar 1978 (fl), *Mori et al. 9808* (CEPEC, NY), 26 Jul 1978 (fr), *Mori et al. 10315* (CEPEC, U); ibidem, old road from Estação Ecológica do Pau-Brasil to Santa Cruz, 7 km NE from the station and ca. 12 km NW from Porto Seguro, alt. 80–100 m, 14 Aug 1979 (fr), *Mori et al. 12709* (CEPEC, RB, U).

Local name: Pinha do mato.

A species distinct by coriaceous leaves with an indument of brown, erect, simple hairs on the lower side (occasionally hairs may appear more or less appressed). It comes perhaps closest to *Rollinia sylvatica* (A. St.Hil.) Mart.

Rollinia chrysocarpa P. Maas & Westra, sp. nov. – Type: Peru. Amazonas: S of Río Cenepa, SE of Quebrada Kayamas, alt. 250–300 m, 28 Dec 1972 (fr), *B. Berlin 738* (holotype, MO; isotype, U). Fig. 5.

Arbor 5–6 m alta. Ramuli novelli cum petiolis pilis simplicibus vel furcatis erectis ad 1 mm (vel ultra) longis dense hirsuti. Foliorum petioli 10–15 mm longi; lamina obovata vel elliptica, chartacea, 32–35 cm longa et 16–18 cm lata, subtus pilis simplicibus vel stellatis radiis ad 4 gerentibus erectis albidis ad 1.5 mm longis sat dense oblecta (hirsuta), basi obtusa, apice breviter acuminata, nervis secundariis utrinque c. 17. Pedicelli fructiferi (flores non visi) c. 30 mm longi, lignescentes. Fructus subglobosus, 3–3.5 cm in diametro, carpidiis c. 50, areolis (hexagono-)pulvinatis basi 6–8 \times 10–15 mm metientibus (plerumque) apiculo

obtus 1.2–2 mm alto in (extremo) dimidio superiore ornatis, seminibus, c. 10 × 5 mm.

Tree, 5–6 m tall. Leafy twigs and petioles hirsute, densely covered with erect, pale brown, simple and furcate hairs to > 1 mm long. Petioles 10–15 mm long, 1–2 mm in diam. Lamina obovate to elliptic, chartaceous, 32–35 cm long, 16–18 cm wide, sparsely covered with appressed (needle-like), whitish, simple to furcate hairs 0.5–1 mm long above, rather densely covered (hirsute) with erect, whitish, simple to 4-armed stellate hairs to 1.5 mm long below, base obtuse, apex shortly acuminate, the extreme tip acute; secondary veins (slightly) curved, ca. 17 on either side of primary vein, no intersecondaries seen, angles with primary vein 40–60°, loop-forming in the apical part down to ca. 1/5 of the length at (acute to) right to obtuse angles, loops indistinct to distinct, smallest distance between loops and margin (1–)1.5–3 mm, mostly flat above, tertiary veins percurrent (to more or less reticulate), tertiary and higher order venation mostly flat above.

Inflorescences infra-axillary, only seen in fruiting stage, the pedicels rather densely covered (hirsute) with erect, simple hairs to 2 mm long, fruiting pedicels 30 mm long, 3 mm in diam., lignified.

Fruit subglobose, 3–3.5 cm in diam., black, with yellowish hairs, when dry, composed of ca. 50 carpels, densely covered with yellow, appressed to erect, simple hairs to 1 mm long, areoles (hexagonal-)pulvinate, (mostly) with apicule in (extreme part of) upper half, 6–8 × 10–15 mm, apicule obtuse, 1.2–2 mm high, surface smooth; wall 1–2 mm thick. Seeds ca. 10 × 5 mm.

Distribution. Only known from the type collection, from the Peruvian department of Amazonas, in secondary forest; fruiting in December (“seeds black with clear edible pulp”).

Clearly distinguished from any *Rollinia* species by the conspicuous yellow-coloured fruit indument. Moreover, it has very large leaves up to ca. 35 cm long and about half as wide. Young twigs, petioles, and the lower side of leaves are densely hirsute.

Rollinia dolabripetala (Raddi) R.E. Fries, Kongl. Svenska Vetenskapsakad. Handl. n.s. 34(5): 45. 1900.

Annona dolabripetala Raddi, Mem. Mat. Fis. Soc. Ital. Sci. Modena, Pt. Mem. Fis. 18 : 394. 1820 (“*Anona*”).

R.E. Fries himself wrongly attributed the new combination to de Saint-Hilaire (1825). As a matter of fact, de Saint-Hilaire merely indicated that the species belonged under *Rollinia*. His phrasing runs as follows: “*Quelque concise qui soit la description de l’Anona dolabripetala due à l’estimable M. Raddi, il me paraît evident que cette espèce doit être rapportée au genre Rollinia (1).*” Fries actually made the combination in 1900.

Rollinia ferruginea (R.E. Fries) P. Maas & Westra, comb. nov.

Rolliniopsis ferruginea R.E. Fries, Acta Horti Berg. 12(1): 196. 1934. – Type: Brazil. Rio de Janeiro: “cueilli par Gaudichaud dans les montagnes près R. de J.”, 1833 (fr), *Gaudichaud* (ascribed to *Sellow* by Fries) 801 (holotype, B, lost; lectotype, P; isotypes, G, P: 2 sheets: photographs of a P specimen in F, MO).

Fries's typification is as follows: “Sellow n. 801; Gaudichaud misit 1835; Hb. Berl.!; Par.!”. The Berlin specimen could not be traced and may be presumed lost in war action. The Paris specimen labelled “Gaudichaud 801 – cueilli par Gaudichaud dans les montagnes près Rio de Janeiro 1831–1833.” is now chosen as the lectotype.

It should be remarked that it is unlikely that the specimens with number “801” were collected by Sellow, who had died in 1831.

Rollinia fosteri P. Maas & Westra, sp. nov. – Type: Peru. Madre de Dios: Parque Nacional de Manú, Cocha Cashu station, alt. 350 m, 19 Jul 1984 (fl, fr), *R.B. Foster 9657B* (holotype, U; isotypes, F, ex MO). Fig. 6.

Frutex vel arbor 3–20 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis (vel erectis) albis vel pallide brunneis ad 0.2 mm longis dense obtecti, demum glabrescentes. Foliorum petioli 5–10 mm longi; lamina anguste elliptica vel anguste ovata, chartacea, 8–14 cm longa et 2–4.5(–5.5) cm lata, subtus pilis simplicibus appressis albis ad 0.2(–0.5) mm longis sparse vel sat dense vestita, basi cuneata, apice acuta vel acuminata, nervis secundariis utrinque 6–10. Inflorescentiae 1–2-florae. Pedicelli 20–25 mm longi, fructiferi ad 35 mm longi. Sepala libera, deltata, 1.5–3 mm longa, acuta. Corolla tubo c. 4 mm alto et c. 5 mm in diametro, alis oblongo-ellipticis horizontalibus vel leviter incurvatis, c. 8 mm longis, 3–4 mm altis, 1–2 mm crassis. Fructus globosus vel (in maturitate) late ovoideus ellipsoideusve, 1–3.5 cm longus et 1–2.5(–3) cm in diametro, carpidiis 10–20, areolis haud prominentibus indistinctisque vel pulvinatis, basi 5–15 × 5–8 mm metientibus (0–)1–3 mm altis, inapiculatis, verrucosis, seminibus 7–8 × 5 mm.

Shrub or tree, 3–20 m tall, 5–10 cm in diam. Leafy twigs and petioles densely covered with white to pale brown, appressed (to erect), simple hairs to 0.2 mm long, soon becoming glabrous. Petioles 5–10 mm long, 1 mm in diam. Lamina narrowly elliptic to narrowly ovate, 8–14 cm long, 2–4.5(–5.5) cm wide, chartaceous, glabrous to sparsely covered with hairs on primary vein above, sparsely to rather densely covered with white, appressed, simple hairs to 0.2(–0.5) mm long below, base cuneate, apex acute to acuminate; secondary veins (mostly) curved, 6–10 on either side of primary vein, mostly without, occasionally with few intersecondaries to 1/2 of the length of the secondary veins, flat to distinctly raised above, angles with primary vein 40–60(–70)°, loop-forming in the apical part, occasionally down to > 1/2 of the length, at mostly right (to obtuse) angles, loops mostly indistinct, smallest distance between loops and margin 0.5–2(–3) mm, tertiary veins more or less percurrent to reticulate, tertiary and higher-order venation flat to prominulous above.

Inflorescences supra-axillary (sometimes approaching leaf-opposed, rarely

terminal), 1–2-flowered, peduncles, pedicels, outer side of bracts and sepals, and corolla rather densely covered with appressed, simple hairs to 0.2 mm long, sooner or later becoming glabrous, inner side of bracts and sepals glabrous. Peduncles 0–1(–2) mm long, 1 mm in diam., fruiting peduncles to 2 mm in diam. Pedicels 20–25 mm long, 1 mm in diam., fruiting pedicels to 35 mm long, to 3 mm in diam. Bracts triangular to broadly triangular or broadly ovate, to 1(–2) mm long, upper bract inserted in the lower to upper 1/3rd of the pedicel.

Flowers greenish-yellow or pale yellow (*in vivo*). Sepals free, patent, deltate, 1.5–3 mm long, 2–3 mm wide, acute, not gibbous. Corolla tube ca. 4 mm high, ca. 5 mm in diam., wings oblong-elliptic, horizontal to slightly incurved, ca. 8 mm long, 3–4 mm high, 1–2 mm thick.

Fruit globose to (when mature:) broadly ovoid or ellipsoid, 1–3.5 cm long, 1–2.5(–3) cm in diam., green, maturing yellow to red (*in vivo*), black to brown when dry, composed of ca. 10–20 carpels, sparsely covered with greyish, appressed hairs, to glabrous, areoles not protruding to pulvinate with mostly indistinct demarcations, without apicule, 5–15 × 5–8 mm, (0–)1–3 mm high, not apiculate, surface verrucose; wall ca. 1 mm thick. Seeds 7–8 × 5 mm.

Distribution. Largely found in Amazonian Peru, one collection from (?) the Province of Guayas, Ecuador; in forest at altitudes below 500 m. Flowering from May through July. Fruiting from March through August.

Material examined. ECUADOR. (“Peru”). Guayas: Guayaquil (“Native of Peru about Guayaquil.”), (yfl), *Ruiz & Pavón s.n.* (OXF: “*Annona* sp. nova de Huayaquil”).

PERU. Amazonas: Quebrada de Apigkagentsa, Río Cenepa, alt. 250 m, 9 Apr 1973 (fr), *Kayap 587* (ex MO, U); Quebrada Huampami, near Huampami, alt. 310 m, 14 Apr 1973 (fr), *Kayap 641* (ex MO, U); Quebrada Pujaim, Río Cenepa, alt. 250 m, 12 May 1973 (fr), *Kayap 739* (ex MO, U). Madre de Dios: Parque Nacional de Manú, (near) Cocha Cashu station, 13 Aug 1973 (fr), *Foster et al. 2618* (F); ibidem, 17–24 Aug 1974 (fr), *Foster et al. 3378* (F); ibidem, alt. 350 m, 24 Mar 1981 (fr), *Foster & Janson 8322* (ex F, U); ibidem, alt. 350 m, 30 Jun 1984 (fr), *Foster 9551* (F, ex MO, U); ibidem, alt. 350 m, 10 Jul 1984 (defl), *Foster 9604* (ex MO, U); Parque Nacional de Manú, Cocha Juarez, Río Manú, alt. 400 m, 3–5 May 1987 (fl), *Nuñez et al. 8020* (ex MO, U).

Local name: Yais.

This species is named in honour of Dr. Robin Foster, eminent botanist, engaged for many years in an inventory of the Parque Nacional de Manú in Peru.

Rollinia fosteri is characterized by comparatively small, narrow leaves (mostly under 4 cm wide) with minute, appressed hairs on the lower side, rather long and slender pedicels, and fruits with few, mostly indistinct areoles.

***Rollinia glomerulifera* P. Maas & Westra, sp. nov.** – Type: Peru. Loreto: Prov. Alto Amazonas, Andoas, campamento petrolero, Río Pastaza, NW of Iquitos,

alt. 210 m, 20 Nov 1980 (yf1, fr), *R. Vásquez & N. Jaramillo* 790 (holotype, MO). Fig. 7.

Frutex vel arbor, 1–10 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis ad 0.5 mm longis sat dense obtecti, mox glabrescentes. Foliorum petioli 5–10 mm longi; lamina elliptica, chartacea, 12–17 cm longa et 4.5–6.5 cm lata, subtus pilis appressis simplicibus (vel furcatis) ad 0.2 mm longis sparse vel sat dense vestita, basi late cuneata vel obtusa, apice acuminata, nervis secundariis utrinque 5–10. Inflorescentiae 1–3-florae. Pedicelli c. 10 mm longi, fructiferi ad 20 mm longi. Sepala (solum flos unico valde juvenilis nobis suppetebat) basi connata, deltata, 3 mm longa, acuta. Corolla alis oblongo-ellipticis horizontalibus, 4 mm longis, 2–2.5 mm altis, 1–1.5 mm crassis. Fructus in ambitu subglobosus, 3–4 cm in diametro, apocarpus vel carpidiis usque ad 1/4 alte connatis; carpidia 10–15, ellipsoidea vel ovoidea, 13–18 mm longa et ad 8 mm in diametro, seminibus 10–12 × 5–6 mm.

Shrub or tree, 1–10 m tall. Leafy twigs and petioles rather densely covered with brownish, appressed, simple hairs to 0.5 mm long, the twigs soon becoming glabrous. Petioles 5–10 mm long, 1 mm in diam. Lamina elliptic, 12–17 cm long, 4.5–6.5 cm wide, chartaceous, rather densely covered on primary vein, to rather sparsely covered on secondary veins, with pale brown to white, erect, simple (to furcate) hairs to 0.5 mm long, otherwise glabrous above, sparsely to rather densely covered with white, appressed, simple (to furcate) hairs to 0.2 mm long below, base broadly cuneate to obtuse, apex acuminate (acumen 5–15 mm long) (to acute), the extreme tip acute; secondary veins curved to slightly curved, 5–10 on either side of primary vein, without, or rarely with intersecondaries (up to ca. 1/2 of the length of the secondary veins), flat to slightly raised above, angles with primary vein 40–50°, loop-forming under the apex or down to 1/5(–1/4) of the length, at acute to right (to obtuse) angles, loops mostly indistinct, smallest distance between loops and margin (0.5–)1–2(–3) mm, tertiary veins percurrent to more or less reticulate, tertiary and higher order venation mostly prominulous above.

Inflorescences leaf-opposed, 1–3-flowered, pedicels, bracts, and outer side of sepals, and wings densely covered with brown, appressed, simple hairs (0.2–0.3 mm long), the pedicels becoming sparsely hairy in fruit. Peduncles 1–2 mm long, 1 mm in diam., fruiting peduncles to 5 mm long, to 3 mm in diam. Pedicels ca. 10 mm long, 1 mm in diam., fruiting pedicels to 20 mm long, to 2 mm in diam. Bracts triangular, 2.5–4 mm long, upper bract inserted in about the lower 1/4th of the pedicel.

Flowers: only one juvenile flower seen. Sepals (? free to) connate at the base, patent at the base, the apex erect, deltate, 3 mm long, 3 mm wide, acute, not gibbous. Corolla wings oblong-elliptic, horizontal, 4 mm long, 2–2.5 mm high, 1–1.5 mm thick.

Fruit subglobose in outline, 3–4 cm in overall diameter, apocarpous, or carpels connate over 1/4 of the length at most, green, maturing yellow (*in vivo*), grey-black when dry, carpels 10–15, ellipsoid to ovoid, 13–18 mm long, to 8 mm

in diam., sparsely to rather densely covered with white to pale brown, appressed, simple hairs (0.1–0.2 mm long), rounded at the apex, surface slightly verrucose; wall ca. 1 mm thick. Seeds 10–12 × 5–6 mm.

Distribution. Amazonian regions of Peru and Ecuador. In high forest at altitudes from 180–600 m. Flowering in November (only once observed), fruiting from May through November.

Material examined. ECUADOR. Napo: Reserva Biológica Jatun Sacha, 8 km E of Misahuallí, alt. 450 m, 21–25 May 1987 (fr), *Cerón M. 1463* (ex MO, U); ibidem, 3 Jul 1987 (fr), *Palacios 1687* (ex MO, U); Misahuallí, left bank of Río Misahuallí, alt. 600 m, 23 Aug 1980 (fr), *Jaramillo & Coello 3810* (AAU); Via Loreto, 4 km W of Río Payamino, alt. 250 m, 3–4 Aug 1986 (fr), *Neill et al. 7175* (ex MO, U).

PERU. Amazonas: Río Santiago, 1 km below la Poza, alt. 180 m, 21 Aug 1979 (fr), *Dominguez Peña 112* (ex MO, U); ibidem, alt. 180 m, 12 Nov 1979 (fr), *Tunqui 23* (MO); Río Santiago, vicinity of Caterpiza, alt. 200 m, 4 Sep 1979 (fr), *Huashikat 366* (MO); ibidem, alt. 200 m, 11 Nov 1979 (fr), *Huashikat 534* (MO). Loreto: Prov. Alto Amazonas, Shucushuyacu, Río Huallaga, alt. 250 m, 13 Sep 1981 (fr), *Vásquez & Jaramillo 2451* (ex MO, U).

Local names: Yugkuanim (Peru).

This species resembles *Rollinia mammifera* P. Maas & Westra especially in the fruit. However, in *R. mammifera* the carpels are still manifestly connate, whereas in the present species they are almost free. In this respect *R. glomerulifera* comes closest to *R. parviflora* A. St. Hil. and a few other species from southeastern Brazil with truly apocarpous fruit. Apart from the fruit shape, *R. glomerulifera* and *R. mammifera* also differ in leaf indument.

Rollinia helosoides P. Maas & Westra, sp. nov. – Type: Ecuador. Napo: Reserva Biológica “Jatun Sacha”, Río Napo, 8 km river below Misahuallí, alt. 450 m, 2 Oct 1986 (fl, fr), *W. Palacios 1295* (holotype, MO). Fig. 8.

Arbor 10–20 m alta. Ramuli novelli cum petiolis pilis simplicibus erectis crispatis ferrugineis ad 1 mm longis obtecti, ramuli demum glabrescentes. Foliorum petioli 15–20 mm longi; lamina anguste obovata vel anguste elliptica, coriacea, (22–)28–44 cm longa et (7–)11–16 cm lata, subtus pilis simplicibus erectis crispatis albis ad 1 mm longis dense vestita (villosa), basi obtusa, apice acuminata, nervis secundariis utrinque (20–)25–30. Inflorescentiae ad c. 10-florae. Pedicelli 10–30 mm longi, fructiferi 30–40 mm longi. Sepala libera, depresso triangulari-ovata, 5–7 mm longa, acuminata. Corolla tubo 6–7 mm alto et 7–10 mm in diametro, alis ascendentibus 14–18 mm longis, 8–10 mm altis, 1–2 mm crassis. Fructus ovoideus vel cylindricus, 4–8 cm longus et ad 3–5 cm in diametro, carpidiis c. 300, areolis hexagono-pulvinatis basi 5–7 × 3.5 mm metientibus in dimidio superiore apiculo acuto vel obtuso ad 1 mm alto ornatis, seminibus 8–10 × 4–5 mm.

Tree, 10–20 m tall, 20 cm in diam. Leafy twigs and petioles rather densely covered with erect, brownish, crisped, simple hairs to 1 mm long, twigs becoming glabrous. Petioles 15–20 mm long, 3–5 mm in diam. Lamina narrowly obovate to narrowly elliptic, (22–)28–44 cm long, (7–)11–16 cm wide, coriaceous, subglabrous above except for large veins with rather dense to sparse cover of appressed to erect, white, simple hairs, densely covered (villous) with erect, white, crisped, simple hairs to 1 mm long below, base obtuse, apex shortly to long-acuminate, the extreme tip acute to obtuse; secondary veins slightly curved to curved, (20–)25–30 on either side of primary vein, with fairly numerous, generally short intersecondaries, impressed above, angles with primary vein 50–60(–80)°, loop-forming under the apex (down to 1/6 of the length) at acute to obtuse angles, loops mostly indistinct, smallest distance between loops and margin 0–0.5(–1) mm, tertiary veins percurrent (to more or less reticulate), impressed above, higher-order venation flat to slightly impressed above, inconspicuous.

Inflorescences terminal, with up to ca. 20 flowers in succession, on sympodially elongating rachis to ca. 50 mm long, peduncles, rachis, pedicels, outer side of bracts and sepals, and corolla densely covered with brownish, erect to (mainly on the wings:) appressed, crisped, simple hairs to 1 mm long, inner side of sepals glabrous. Peduncles to 5 mm long, to 5 mm in diam., fruiting peduncles to 7 mm in diam. Pedicels 10–30 mm long (as far as seen), 3–4 mm in diam., fruiting pedicels 30–40 mm long, to 6 mm in diam, to 10 mm just below the flower, lignified. Bracts very broadly ovate, caducous, 5–8 mm long and 7–8 mm wide, upper bract inserted in up to about 1/3rd of the pedicel.

Flowers brownish (*in vivo*). Sepals free, appressed to patent, depressed triangular-ovate, 5–7 mm long, 7–10 mm wide, shortly acuminate, not gibbous. Corolla tube 6–7 mm high, 7–10 mm in diam., wings obovate-oblong, ascending, 14–18 mm long, 8–10 mm high, 1–2 mm thick.

Fruit ovoid to cylindrical, 6–8 cm long, 3.5–5 cm in diam., on conspicuously elevated torus ca. 5 mm high and 10 mm in diam, green, maturing yellow (*in vivo*), brownish to black when dry, pendent, composed of ca. 300 carpels, sparsely covered with hairs as on the pedicel, becoming glabrous, areoles hexagonal-pulvinate with (tiny) apicule in the upper half, 5–7 × 3–5 mm at the base, apicule acute to obtuse, 1 mm high, surface irregularly wrinkled; wall 2–3 mm thick. Seeds 8–10 × 4–5 mm.

Distribution. Only known from the vicinity of Misahuallí in the Province of Napo, Ecuador; in forest at altitudes of 400–450 m. Collected in flower in May and October, fruiting collections made in March, May, September and October.

Material examined. ECUADOR. Napo: Reserva Biológica “Jatun Sacha”, 8 km below Misahuallí, 21–25 May 1987 (fl, fr), *Céron M. 1467* (ex MO, U); ibidem, 1–15 Sep 1987 (fr), *Palacios 1996* (ex MO, U); 8 km along river below Puerto Misahuallí, alt. 400 m, 31 Mar 1985 (fr), *Neill et al. 6184* (MO, U); ibidem, alt. 450 m, 27–29 May 1985 (fl, fr), *J. Zaruma et al. 242* (ex MO, U).

A large-leaved species highly characteristic by the strongly immersed secondary veins on the upper side and the relatively long, and fairly large, fruits with rather numerous carpels. It does not seem to come near any other species of *Rollinia*.

The name of this species indicates a certain likeness of the fruit with the inflorescence of the genus *Helosis* (Balanophoraceae).

Rollinia hispida P. Maas & Westra, sp. nov. – Type: Peru. Loreto: Bosque Nacional de Iparía, trail to Tabacoa, W of Iparía, alt. 250–300 m, 22 Aug 1968 (fr), *J. Schunke V. 2657* (holotype, F; isotypes, COL, G, GH, NY, K, P, S). Fig. 9.

Frutex vel arbor parva, 3–5 m alta. Ramuli novelli cum petiolis hispidi pilis erectis simplicibus vel stellatis usque ad 4-radiatis ad 3 mm longis. Foliorum petioli 5–8 mm longi; lamina anguste elliptica vel anguste obovata, chartacea, 13–27 cm longa et 5.5–10 cm lata, subtus pilis erectis stellatis plerumque 2–4 radiatis pallide brunneis ad 0.5–3 mm longis sat dense vestita, basi obtusa, apice acuta vel leviter acuminata, nervis secundariis utrinque 14–20. Inflorescentiae 1(–2)-florae. Pedicelli 25–35 mm longi, fructiferi ad 45 mm longi. Sepala basi leviter connata, late ovata, 4–6 mm longa, caudata. Corolla tubo 3–4 mm alto et 5–6 mm in diametro, alis oblique obovatis ascendentibus 7–9 mm longis, 5–6 mm altis, c. 1.5 mm crassis. Fructus in ambitu subglobosus, 2.5–3.5 cm in diametro, carpidiis c. 15, usque ad 1/3 alte coalitis, ellipsoideis vel obovoideis, 13–17 mm longis et 6–10 mm in diametro, dense hispidus pilis acicularibus 1–1.5 mm longis, seminibus carpello fere aequimagnis.

Shrub or small tree, 3–5 m tall. Leafy twigs and petioles densely hispid with brown, erect, stiff, simple to 4-armed stellate hairs to 3 mm long. Petioles 5–8 mm long, 2–3 mm in diam. Lamina narrowly elliptic to narrowly obovate (to ovate or elliptic: see remark), 13–27 cm long, 5.5–10 cm wide, chartaceous, sparsely covered with erect, simple to furcate hairs above, rather densely covered with erect, pale brown, (simple to) 2–4(–8)-armed stellate hairs to 0.5–3 mm long below, base obtuse, apex acute to slightly acuminate, the extreme tip acute; secondary veins slightly curved (to almost straight), 14–20 on either side of primary vein, mostly without, rarely with intersecondaries $> 1/2$ of the length of the secondary veins, mostly flat (occasionally somewhat raised, or impressed) above, angles with primary vein 40–60°, loop-forming under the apex only, or extending down to 1/4 (or more) of the length, at acute to obtuse angles, loops mostly indistinct, smallest distance between loops and margin (0–)0.5–2.5(–3) mm, tertiary veins percurrent (to more or less reticulate), tertiary and higher-order venation mostly flat, inconspicuous above.

Inflorescences supra-axillary, 1(–2)-flowered, pedicels with indument as on the twigs, outer side of sepals and corolla same, but with whitish hairs, inner side of sepals glabrous except for the margins. Peduncles (almost) wanting. Pedicels 25–35 mm long, 1{–2} mm in diam., fruiting pedicels to 45 mm long, to 2 mm in diam. Bracts narrowly triangular, ca. 1 mm long, upper bract inserted in up to about 1/3rd of the the pedicel, or not visible.

Flowers green to yellow (*in vivo*). Sepals slightly connate at the base, patent, broadly ovate, to 5{–6} long and 5{–6} mm wide, caudate, not gibbous. Corolla tube 3–4{–7} mm high, 5–6{–10} mm in diam., wings obliquely obovate, ascending, 7–8{–15} mm long, 5–6{–10} mm high, ca. 1.5{–3} mm thick.

Fruit subglobose, 2.5–3.5 cm in outline, bronze green, maturing yellow (*in vivo*), carpels ca. 15, connate from at the base only up to 1/3(–1/2) of the length, ellipsoid to obovoid, 13–17 mm long, 6–10 mm in diam., densely covered with erect, needle-like, mostly simple hairs 1–1.5 mm long, with obtuse apex; wall \leq 1 mm thick. Seeds almost the size of the carpel.

Distribution. Amazonian Peru and Ecuador; in high forest at altitudes of ca. 200–400 m; flowering in August and October, fruiting in August and September.

Material examined. ECUADOR. Pastaza: Río Curaray, mouth of Río Queramo, alt. 230 m, 29–31 Aug 1985 (yfl), *Palacios & Neill 751* (ex MO, U).

PERU. Loreto: Bosque Nacional de Iparía, Quebrada de Shahuinto, 4 km from Campamento de Iparía, alt. 300–400 m, 20 Sep 1967 (fr), *Schunke V. 2165* (COL, F, G, NY, S). Huánuco: SE of Pucallpa, next to the junction of the Río Pachitea and Río Yuyapichis, near village of Panguana, alt. 260 m, 27 Oct 1980 (fl), *Morawetz & Wallnöfer 17–271085* (U, ex WU), *ibidem*, 30 Sep 1985 (fr), *Morawetz & Wallnöfer 111–30985* (U, ex WU).

This species is quite distinct by hispid twigs, undersides of leaves, inflorescences, and fruit due to stiff, simple or stellate hairs to over 2 mm long. The fruit is very peculiar in having few carpels (about 15) which are connate only up to 1/3 of the length. The collection *Morawetz & Wallnöfer 111–30985* has rather wide leaves (to 15 cm) and carpels connate over ca. 2/3 of their length, but otherwise seems to match well enough to be included here. *Palacios & Neill 751* deserves mention because of up to 8-armed stellate hairs on the leaves. *Rollinia hispida* resembles *R. chrysocarpa* in its indument, but is easily distinct by the fruit. The only species with a fruit similar to that of *R. hispida* is *R. mammifera*. The latter, in comparison, has a much scantier indument and is totally devoid of long stiff hairs.

Rollinia mammifera P. Maas & Westra, sp. nov. – Type: Peru. San Martín: Chazuta, E of Tarapoto, alt. 200 m, 9 Oct 1984 (fr), *P.J.M. Maas, H. Maas, J. Schunke V. & L.Y. Th. Westra 6025* (holotype, U; isotypes, COL, K, MO, NY, USM). Fig. 10.

Frutex, arbor, vel frutex scandens. Ramuli novelli cum petiolis pilis simplicibus appressis vel erectis simplicibus ad 0.5 mm longis dense obiecti, mox glabrescentes. Foliorum petioli 5–10 mm longi; lamina elliptica, ovata vel oblongo-elliptica, chartacea, 7–17 cm longa et 2–7.5 cm lata, subtus pilis simplicibus vel stellatis radiis ad 5 gerentibus erectis albis ad 0.5 mm longis sat dense vestita, basi anguste vel late cuneata, apice (breviter vel longe) acuminata, nervis secundariis utrinque 5–12. Inflorescentiae 1–2-florae. Pedicelli ad 12 mm

longi, fructiferi 15–25 mm longi. Sepala (solum juvenilia in alabastro visa) libera, triangularia, 4 mm longa, acuta. Fructus in ambitu depresso ovoideus 2.5–3.5 cm longus et 3–4 cm in diametro, carpidiis 3–15(–20) ad 1/4–2/3 alte connatis parte libera ovoidea 8–13 mm alta et 7–11 mm in diametro, seminibus 12 × 6 mm.

Shrub, (medium-sized) tree, or liana, to 18 m long (liana), to 11 cm in diam. Leafy twigs and petioles densely covered with brown, appressed to erect, simple hairs to 0.5 mm long, soon becoming glabrous. Petioles 5–10 mm long, ca. 1 mm in diam. Lamina elliptic, ovate, or oblong-elliptic, 7–17 cm long, 2–7.5 cm wide, chartaceous, glabrous except for few scattered hairs on primary vein above, rather densely covered (particularly along primary vein) with white, erect, simple to 5-armed-stellate hairs to 0.5 mm long below, base narrowly to broadly cuneate, apex shortly to long-acuminate; secondary veins curved, (5–)6–12 on either side of primary vein, without, rarely with intersecondaries (to ca. 1/2 of the length of the secondary veins), flat to slightly raised above, angles with primary vein 40–50°, loop-forming in the apical part, sometimes down to 1/4 of the length, at acute to right (to obtuse) angles, loops mostly indistinct, smallest distance between loops and margin 0.5–2(–2.5) mm, tertiary veins percurrent to more or less reticulate, tertiary and higher-order venation flat (inconspicuous) to prominulous above.

Inflorescences leaf-opposed or terminal on short lateral branch, 1–2-flowered. Peduncles 1–2 mm long, fruiting peduncles to 2 mm in diam. Pedicels ca. 12 mm long, 1 mm in diam., fruiting pedicels 15–25 mm long, 1–3 mm in diam. Bracts not observable.

Flowers: only one very young bud seen. Sepals free, (erect), triangular, 4 mm long, 3 mm wide, with acute apex, not gibbous.

Fruit depressed ovoid in outline, 2.5–3.5 cm long, 3–4 cm in diam., orange-brown (*in vivo*), blackish- to greyish-brown when dry, composed of 3–15(–20) carpels, rather densely covered with whitish to brownish, erect to appressed, simple hairs of 0.1–0.3 mm long, carpels connate over ca. 1/4–2/3 of the length, the free part broadly ovoid, 8–13 mm high, 7–11{–13} mm in diam., with rounded to acute apex, surface smooth; wall 1–2 mm thick. Seeds ca. 12 × 6 mm.

Distribution. Department of San Martín, Peru, and State of Acre, Brazil; in forest at low altitude (–200 m); fruiting from September through December. Fruit reported to be edible (*Maas et al. 6025*).

Material examined. PERU. San Martín: Tarapoto, 20 Dec 1929 (fr), *Ll. Williams 6538* (F).

BRAZIL. Acre: Fazenda Bom Sossego, between Igarapé do Cujubim and Igarapé Jacamin, 27 Sep–7 Oct 1985 (yf, fr), *Campbell et al. 9002* (ex NY, U), and (st) *Campbell et al. 9317* (ex NY, U).

This species is one of the two within *Rollinia* with documented occurrence of lianas (*Maas et al. 6025*). The material from Acre tends to have oblong-elliptic,

rather than elliptic, leaves with rather more secondary veins. Noteworthy in the specimens from San Martín, on the other hand, is the frequent occurrence of pocket domatia, not found in the material from Acre.

Rollinia pachyantha P. Maas & Westra, sp. nov. – Type: Colombia. El Valle: Bahía Malaga (4°02'N, 76°15'W), alt. ca. 0 m, 16 Dec 1985 (fl), *A.L. Gentry et al.* 53389 (holotype, MO; isotype, U). Fig. 11.

Arbor ad 30 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis albis vel brunneis ad 0.2(–0.5) mm longis (sat) dense obtecti. Foliorum petioli 10–15 mm longi; lamina elliptica, anguste elliptica vel obovata, coriacea, 11–26 cm longa et 6–12 cm lata, subtus pilis simplicibus appressis albis ad 0.3 mm longis sparse vestita, basi obtusa vel rotundata, apice breviter acuminata, nervis secundariis utrinque 13–16(–20?). Inflorescentiae uniflorae vel pluriflorae. Pedicelli 20–30 mm longi, fructiferi ad 40 mm longi. Sepala libera, triangularia, c. 5 mm longa, acuta, (valde) gibbosa. Corolla tubo 5–6 mm alto et 11–13 mm in diametro, alis ellipticis vel oblongis horizontalibus vel leviter reflexis, 15–20 mm longis, 10–12 mm altis, c. 3 mm crassis. Fructus (solum in statu juvenili visus) carpidiis 100–150, areolibus hexagono-pulvinatis in dimidio superiore apiculatis.

Tree, to 30 m tall. Leafy twigs and petioles (rather) densely covered with whitish to brownish, appressed, simple hairs to 0.2(–0.5) mm long. Petioles 10–15 mm long, 2–4 mm in diam. Lamina elliptic to narrowly elliptic or obovate, coriaceous, 11–26 cm long, 6–12 cm wide, glabrous above, sparsely covered with whitish, appressed, simple hairs to 0.3 mm long below, base obtuse to rounded, apex shortly acuminate, the extreme tip (mostly) acute; secondary veins slightly curved (to almost straight), 13–16(–20?) on either side of primary vein, without, or with intersecondaries up to 1/2 of the length of the secondary veins, flat above, angles with primary vein (40–)50–60°, loop-forming under the apex only at (right to) obtuse angles, loops indistinct to distinct, smallest distance between loops and margin 0.5–1.5 mm, tertiary veins percurrent to more or less reticulate, tertiary and higher-order venation flat above.

Inflorescences supra-axillary (to leaf-opposed), 1–several-flowered, all inflorescence parts including flowers densely covered with whitish to brownish, mostly appressed, simple hairs to 0.3(–0.7) mm long. Peduncles 1–2 mm long, 2–5 mm in diam. Pedicels 20–30 mm long, 2–3 mm in diam., to 5 mm in diam. below flower, pedicels in young fruiting stage to 40 mm long and 7 mm in diam. below the flower. Bracts (very) broadly triangular-ovate, 1.5–2 mm long, upper bract inserted in the lower 1/4th to halfway (?) the pedicel.

Flowers yellow-green to tan (*in vivo*). Sepals free (or nearly so), appressed, triangular, 4–5 mm long and wide, acute, (strongly) gibbous. Corolla tube 5–6 mm high, 10–13 mm in diam., wings elliptic to oblong, horizontal to slightly reflexed (at maturity), (7–)11–20 mm long, (4–)9–12 mm high, (1.5–)2–3 mm thick. Torus slightly elevated.

Only very young fruit seen, composed of ca. 100–150 carpels, areoles hexagonal-pulvinate with apicule in upper half.

Distribution. Colombia, only known from Department of El Valle.

Material examined. COLOMBIA. El Valle: Quebrada Algeria, Bahía Malaga, trail from creek along proposed route of new road to Military Base, alt. 50 m, 15 Dec 1985 (fl, yfr), *Gentry et al. 53331* (MO); Bajo Calima, 15 km NW of Buenaventura, behind Pulpapel camp, alt. 50 m, 12 Apr 1987 (st), *Gentry et al. 56804* (ex MO, U); Bajo Calima, Concesión Pulpapel/Buenaventura, alt. ca. 100 m, 30 Aug 1984 (fl), *Monsalve B. 287* (MO, U); ibidem, 4 Jun 1987 (fl), *Monsalve B. & Rentería 1537* (ex MO, U).

Local name: Cargadero.

This new species is distinct by the rather large and succulent-looking flowers, and stiff, rather thick leaves. It is probably near to *R. pittieri* Saff.

Rollinia schunkei P. Maas & Westra, sp. nov. – Type: Peru. San Martín: Quebrada de Huaquisha, near Fundo of Sr. Julio Ortiz Rengifo, alt. 500–600 m, 18 Aug 1984 (fl, fr juv), *J. Schunke V. 14117* (holotype, U; isotypes, F, K, MO, NY, P, U, USM, WU). Figs. 12, 13.

Frutex vel arbor 4–12 m alta. Ramuli novelli cum petiolis pilis simplicibus (vel furcatis) erectis vel appressis ferrugineis ad 1 mm longis dense obtecti. Foliorum petiolī 5–15(–20) mm longi; lamina anguste ovata vel anguste elliptica, chartacea, (8–)15–23(–28) cm longa et (5–)7–10(–13) cm lata, subtus pilis erectis albis vel pallide brunneis simplicibus vel stellatis usque ad 5(–7)-radiatis ad 0.5(–1) mm longis sat dense vestita, basi obtusa vel cuneata, apice breviter vel longe acuminata, nervis secundariis utrinque (8–)10–12. Inflorescentiae 1–2-florae. Pedicelli 10–30 mm longi, fructiferi ad 40 mm longi. Sepala libera, depresso ovato-triangularia, 4–5 mm longa, acuta vel breviter acuminata. Corolla tubo 7 mm alto et c. 10 mm in diametro, alis primo latissime ovatis deinde oblongo-ovatis vel oblongis horizontalibus vel leviter reflexis ad 10 mm longis, 4–6 mm altis, 1–2 mm crassis. Fructus ellipsoideus, 2–5 cm longus et 2–3.5 cm in diametro, carpidiis 20–30, areolis hexagonis vel (hexagono-)pulvinatis basi plerumque 15–18 × 8–10 mm metientibus in dimidio superiore apiculum egentibus vel apiculo acuto vel obtuso ad 2 mm alto ornatis, seminibus 15–19 × 7–8 mm.

Shrub or tree, 4–12 m tall, to 14 cm in diam. Leafy twigs and petioles densely covered with erect and appressed, ferruginous, simple (and furcate) hairs to 1 mm long. Petioles 5–15(–20) mm long, 1–2 mm in diam. Lamina narrowly ovate to narrowly elliptic, chartaceous, (8–)15–23(–28) cm long, (5–)7–10(–13) cm wide, densely to rather densely covered with hairs on large veins, otherwise sparsely so to glabrous above, rather densely covered with white to pale brown, erect, simple or up to 5(–7)-armed stellate hairs to 0.5(–1) mm long below, base obtuse to cuneate, apex shortly to long-acuminate, (with cusp to 40 mm long), the extreme tip acute; secondary veins curved to (almost) straight, (8–)10–12 on either side of primary vein, without or with some, mostly short intersecondaries,

slightly impressed to flat above, angles with primary vein (25-)40-50°, loop-forming in the apical part (or just under the apex only), at acute to obtuse angles, loops indistinct to distinct, smallest distance between loops and margin 0.5-3 mm, tertiary veins percurrent or more or less reticulate, tertiary and higher-order venation mostly prominulous above.

Inflorescences ± leaf-opposed, 1-2-flowered, peduncles and pedicels rather densely covered with erect, ferruginous hairs, to glabrescent, outer side of bracts and sepals same, but hairs mainly appressed, corolla densely covered with appressed and erect, gray hairs, inner side of bracts and sepals glabrous. Peduncles to 5 mm long, to 2 mm in diam. Pedicels 10-30 mm long, 1 mm in diam., fruiting pedicels to 40 mm long, to 2{-3} mm in diam. Bracts ca. 1 mm long, upper bract inserted in about the lower 1/3rd of the pedicel.

Flowers greenish-yellow to brilliant yellow with dark red inner base (*in vivo*), greyish when dry. Sepals free, appressed, depressed ovate-triangular, 4-5{-6} mm long, 5-9 mm wide, acute to very shortly acuminate, not gibbous. Corolla tube 7 mm high, ca. 10 mm in diam., wings very broadly ovate, becoming very broadly oblong-ovate to oblong, horizontal to slightly reflexed, to ca. 10 mm long {19-20 mm when mature}, 4-6 {8-9} mm high {12 mm when mature}, 1-2{-5} mm thick.

Fruit ellipsoid, 2-5 cm long, 2-3.5 cm in diam., green, maturing yellow (*in vivo*), blackish when dry, fleshy, composed of ca. 20-30 carpels, densely covered with erect and appressed, ferruginous hairs, becoming glabrescent, areoles hexagonal to (hexagonal-)pulvinate, without apicule or with straight apicule in the upper half, 15-18(-25) × 8-10 mm at the base, apicule acute to obtuse, 1-2 mm high; wall ca. 1 {-3} mm thick. Seeds 15-19 × 7-8 mm.

Distribution. Amazonian Peru and the State of Acre, Brazil; in rainforest at up to about 600 m alt. Both flowering and fruiting material collected in February, and from July to December.

Specimens examined: PERU. Huánuco: S of Pucallpa, next to the junction of the Río Pachitea and the Río Yuyapichis, village of Panguana and surroundings, alt. 260 m, 29 Sep 1985 (fl), *Morawetz & Wallnöfer 116-29985* (U, ex WU); ibidem, 27 Oct 1985 (fr), *Morawetz & Wallnöfer 11-271085* (U, ex WU). Loreto: Prov. Maynas, Yanomono, Explorama Tourist Camp, Río Amazonas, halfway between Indiana and mouth of Río Napo, alt. 130 m, 25 Jul 1982 (fl), *Gentry & Alfaro 37941* (MO). San Martín: Prov. Mariscal Cáceres, Distrito Tocache Nuevo, Quebrada de Huaquisha, right bank of Río Huallaga, alt. 400 m, 15 Aug 1969 (fl), *Schunke V. 3338* (G, GH, U); Prov. Mariscal Cáceres, Distrito Tocache Nuevo, trail to Shunté, 22 Feb 1970 (fl, fr), *Schunke V. 3820* (COL, F, G, NY); Prov. Mariscal Cáceres, Distrito Tocache Nuevo, Challua Yacu, left bank of Río Huallaga, 9 Dec 1970 (fr juv), *Schunke V. 4558* (COL, F, G, S); Prov. Mariscal Cáceres, Distrito Tocache Nuevo, Fundo La Campina, E of Tocache, alt. 500-600 m, 27 Oct 1984 (fl, fr), *Schunke V. 14141* (AAU, COL, F, U, US, USM). Ucayali: Prov. Coronel Portillo, Carr. Marginal (under

construction), 22 km S of km 86 on Pucallpa-Tingo Maria Highway, alt. 250 m, 11 Feb 1981 (fr), *Gentry et al. 31206* (MO).

BRAZIL. Acre: Fazenda Bom Sossego, between Igarapé do Cujubim and Igarapé Jacamin, 27 Sep–7 Oct 1985 (fl), *Campbell et al. 8665* (ex NY, U).

Local names: Anonita, Anonilla negra.

This species is named in honour of José Schunke Vigo, Peru, one of the best plant collectors of South America. He was a guide and member of the team from the University of Utrecht that explored several parts of Peru for Annonaceae in 1984.

R. schunkei may be recognized by leaves (densely) pubescent below with rather large simple to stellate hairs, and rather large fruits (to 5 cm long) with 20–30 hardly protruding areoles. *Gentry et al. 31206* is somewhat aberrant with leaves sparsely hairy below.

Rollinia ubatubensis P. Maas & Westra, sp. nov. – Type: Brazil. São Paulo: road from Ubatuba to Caraguatuba, Nov 1976 (fl), *P.E. Gibbs et al. 3501* (holotype, SP; isotypes, E, NY). Figs. 14, 15.

Arbor 3–20 m alta. Ramuli novelli cum petiolis pilis simplicibus appressis vel erectis brunneis ad 0.5–1 mm longis dense obtecti. Foliorum petioli 5–10 mm longi; lamina elliptica, anguste elliptica vel anguste elliptico-oblonga, chartacea vel subcoriacea, (4–)8–22 cm longa et (2–)3–8 cm lata, subtus pilis simplicibus (vel furcatis) erectis albis vel brunneis ad 1 mm longis sat dense vestita, basi acuta, cuneata vel obtusa, apice acuta vel acuminata, nervis secundariis utrinque 14–22. Inflorescentiae 1(–2)-florae. Pedicelli c. 35 mm longi, fructiferi ad 60 mm longi. Sepala libera vel basi connata, (late) triangularia, 3 mm longa, acuta vel acuminata, leviter vel manifeste gibbosa. Corolla tubo 3–4 mm alto et c. 8 mm in diametro, alis elliptico-obovatis vel elliptico-oblongis ascendentibus, 12–16 mm longis, 6–10 mm altis, c. 1.5 mm crassis. Fructus late ellipsoideus vel ovoideus, 3.5–4 cm longus et 2.5–3.5 cm in diametro, carpidiis 120–170, areolis pyramidalibus erectis vel leviter recurvis basi 5–8 × 2–4 mm metientibus et 2–3 mm altis, seminibus c. 10 × 5 mm.

Tree, 3–20 m tall, to 45 cm in diam. Leafy twigs and petioles densely covered with appressed to erect, brown hairs to 0.5–1 mm long. Petioles 5–10 mm long, (1–)1.5–2.5 mm in diam. Lamina elliptic, narrowly elliptic, or narrowly elliptic-oblong, chartaceous to subcoriaceous, (4–)8–22 cm long, (2–)3–8 cm wide, rather densely to sparsely hairy on/near large(r) veins, otherwise glabrous above with whitish, often crisped hairs mostly <0.5 mm long, rather densely covered with whitish to brown, erect, simple (to furcate) hairs to 1 mm long below, lower epidermal surface whitish reticulate to farinose in appearance, base acute, cuneate, to obtuse, apex acute to (shortly) acuminate, the extreme tip acute to obtuse; secondary veins 14–22 on either side of primary vein, straight to slightly curved, slightly prominent to flat above, angles with primary vein 45–70°, loop-

forming in the apical part (rarely down to ca. 1/2 of the length) at acute to obtuse angles, loops (mostly) indistinct, shortest distance between loops and margin 0.5–1.5 mm, tertiary veins percurrent to more or less reticulate, tertiary and higher-order venation slightly raised above.

Inflorescences leaf-opposed, 1(–2)-flowered, peduncles, pedicels, outer side of bracts, outer side of sepals, and corolla, densely covered with erect (to appressed), brown hairs to 0.5(–1) mm long. Peduncles to 2 mm long, 2 mm in diam., fruiting peduncles to 4 mm in diam. Pedicels ca. 35 mm long, 2–2.5 mm in diam. (to 3 mm under the flower), fruiting pedicels to 60 mm long, 3–5 mm in diam. (to 6 mm under the fruit). Bracts triangular-ovate, 1.5–3 mm long, upper bract inserted up to in the lower 1/6th of the pedicel, caducous (or absent?).

Flowers yellow-ferruginous (*in vivo*). Sepals free to connate just at the base, appressed, (broadly) triangular, 3 mm long, 3–4 mm wide, with acute to acuminate apex, weakly to manifestly gibbous. Corolla tube 3–4 mm high, ca. 8 mm in diam., wings elliptic-obovate to elliptic-oblong, ascending, 12–16 mm long, 6–10 mm high, ca. 1.5 mm thick. Torus elevated. Stamens 200–300.

Fruit broadly ellipsoid to ovoid, 3.5–4 cm long, 2.5–3.5 cm in diam., sometimes on conspicuously elevated torus, green (*in vivo*), brownish-grey when dry, composed of 120–170 carpels, densely covered with tiny brownish hairs, eventually glabrescent, areoles pyramidal, erect to slightly recurved, 5–8 × 2–4 mm at the base, 2–3 mm high, with surface smooth; wall ca. 2 mm thick. Seeds to ca. 10 × 5 mm.

Distribution. Endemic to the municipality of Ubatuba in the State of São Paulo, Brazil; in forest, at altitudes from almost sea level to 850 m. Flowering in December–March, fruiting in October–November.

Specimens examined. BRAZIL. São Paulo: Ubatuba, Agricultural Experiment Station, along Rio Comprido, alt. 100 m, 8 Jan 1985 (fr), *Gentry & Zardini 49356* (ex MO, U); Mun. Ubatuba, Serra do Mar, km 78–79 of road Ubatuba-Taubaté, alt. 50 m, 28 Dec 1980 (fr), *Morawetz 14–281280* (U, ex WU); ibidem, alt. 850 m, 24 Mar 1981 (fr), *Morawetz 12–24381* (K, U, ex WU); Mun. Ubatuba, Praia do Lambert, 21 Oct 1981 (fl), *Peixoto et al. 13069* (E).

This new species is near to *R. dolabripetala* (Raddi) R.E. Fries, but is distinct from that by a denser, almost velutinous leaf indument and longer and thicker pedicels. *R. ubatubensis* also shows resemblance to *R. sylvatica* (A. St.Hil.) Mart., but it lacks the few-armed stellate hairs found among the leaf indument of the latter. Moreover, *R. sylvatica* has far less, and larger, carpels than *R. ubatubensis*.

Rollinia velutina Van Marle, sp. nov. – Type: Venezuela. Barinas: rainforest along Highway 5, between La Esmeralda and El Curito, 4 km SW of Río Capitanejo, alt. 175 m. 25–26 Aug 1966 (fr), *J.A. Steyermark & F. Rabe 96554* (holotype, VEN; isotypes, NY, S). Fig. 16.

Arbor ad 20 m alta. Ramuli novelli cum petiolis pilis simplicibus erectis vel

appressis crispatis pallide brunneis dense obtecti, demum glabrescentes. Foliorum petioli 8–13 mm longi; lamina elliptica, chartacea, 8–19 cm longa et 4–7 cm lata, subtus velutina (dense vestita si mavis) pilis simplicibus erectis crispatis albis ad 1 mm longis, basi late cuneata vel obtusa, apice breviter acuminata, nervis secundariis utrinque 15–22(-25). Inflorescentiae 1–4-florae. Pedicelli 10–15 mm longi, fructiferi ad 20 mm longi. Sepala libera, triangulari-elliptica vel triangularia, 1–2 mm longa, acuminata, gibbosa. Corolla tubo 3–4 mm alto et 5–7 mm in diametro, alis obovatis ascendentibus 9–13 mm longis, 4–6 mm altis, 1–2 mm crassis. Fructus (solum in statu juvenili nobis cognitus) globosus, 1.4–1.6 cm in diametro, carpidiis c. 50, areolis pyramidalibus vel hexagonalipulvinatis basi 3–4 mm longis et totidem latis apice vel apiculo acuto et c. 1 mm alto munitis; semina non visa.

Tree, to 20 m tall. Leafy twigs and petioles densely covered with erect and appressed, crisped, pale brown, simple hairs, becoming glabrous. Petioles 8–13 mm long, 1–1.5 mm in diam. Lamina elliptic, chartaceous, 8–19 cm long, 4–7 cm wide, sparsely covered above with crisped, white, simple hairs particularly along primary and secondary veins, densely covered below especially on large veins with erect, crisped, white, very brittle simple hairs to 1 mm long, base broadly cuneate to obtuse, apex shortly acuminate, the extreme tip acute to obtuse; secondary veins straight to slightly curved, 15–22(-25) on either side of primary vein, without or with few short intersecondaries, occasionally with fairly numerous intersecondaries up to 1/2 of the length, slightly impressed to flat above, angles with primary vein 40–70(-90)°, loop-forming under the apex, sometimes down to 1/4 of the length, at (acute to) right to obtuse angles, loops mostly indistinct, smallest distance between loops and margin 0.5–1(-1.5) mm, tertiary veins (mostly) percurrent, tertiary and higher-order venation flat to slightly impressed above.

Inflorescences supra-axillary, leaf-opposed, to infra-axillary, occasionally terminal, 1–4-flowered, peduncles, pedicels, outer side of bracts and sepals, and corolla densely covered with erect and appressed, pale brown, simple hairs, inner side of bracts and sepals densely whitish sericeous. Peduncles 3–4 mm long, 2 mm in diam., fruiting peduncles to 3 mm in diam. Pedicels 10–15 mm long, 1–2 mm in diam., fruiting pedicels to 20(-22) mm long, to 3(-4) mm in diam. Bracts deltate to (broadly) triangular, 1–3(-4) mm long, upper bract inserted in the lower 1/4th to halfway the pedicel.

Flowers broken white (*in vivo*). Sepals free, appressed, triangular-elliptic to triangular, 1–2 mm long, 3–4 mm wide, with acuminate apex, gibbous. Corolla tube 3–4 mm high, 5–7 mm in diam., wings obovate, ascending, 9–13 mm long, 4–6 mm high, 1–2 mm thick. Torus flat to slightly convex, 1–1.5 mm long, white to pale brown hirsute. Stamens ca. 1 mm long. Carpels 1–1.5 mm long, white sericeous.

Fruit only seen in young stage, globose, 1.4–1.6 cm in diam., grey-green (*in vivo*), pale brown when dry, composed of ca. 50 carpels, pale brown sericeous, areoles very shallowly pyramidal to hexagonal-pulvinate with straight apicule in

upper half (or about the middle), 3–4 mm at the base, apex or apicule acute, ca. 1 mm high, surface smooth; wall ca. 1 mm thick.

Distribution. State of Boyacá in Colombia and States of Apure and Barinas in Venezuela; in forest, at altitudes up to 500 m. Flowering from February through July, fruiting from July through August.

Specimens examined: COLOMBIA. Boyacá: E of El Yopal, S of Río Cravo Sur, 11 Jul 1963 (fl), *Blydenstein & Saravia T. 1241* (COL); S of Yopal, 25 Feb 1964 (fl), *Blydenstein 1856* (COL, MO); San Luis de Gaceno, alt. 500 m, 22 Apr 1964 (fl), *Espinal T. & Montenegro M. 1665* (COL).

VENEZUELA. Apure: Distr. Paéz, Parcela # 3, ca. 2 hrs. = 25 km by car E of El Nula, 2 Jul 1983 (fr), *Van der Werff & González 4747* (MO, U).

Rollinia velutina comes close to *R. fendleri* R.E. Fries, but is easily distinguished by a dense indument on the lower side of the leaves with hairs to 1 mm long, whereas in *R. fendleri* leaves have a more sparse indument with hairs not exceeding 0.5 mm.

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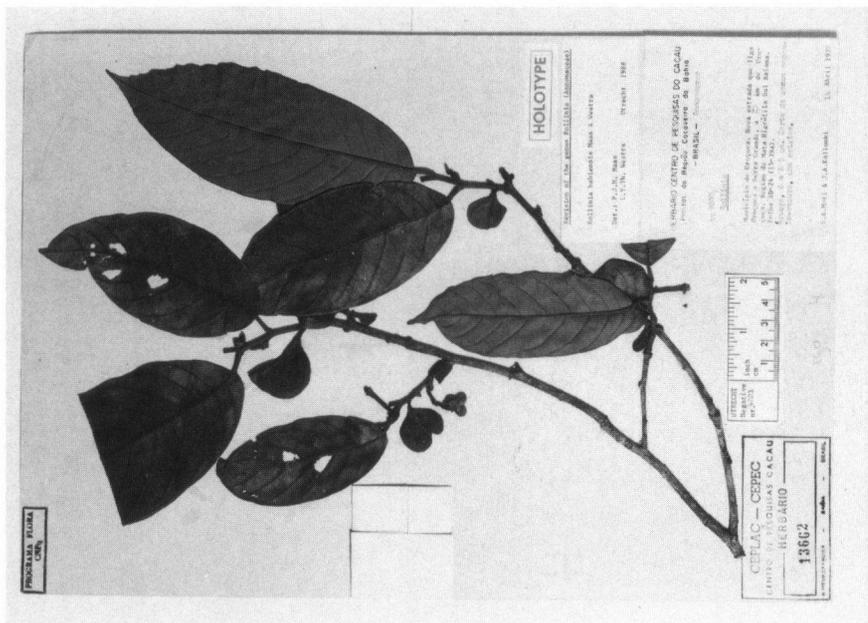
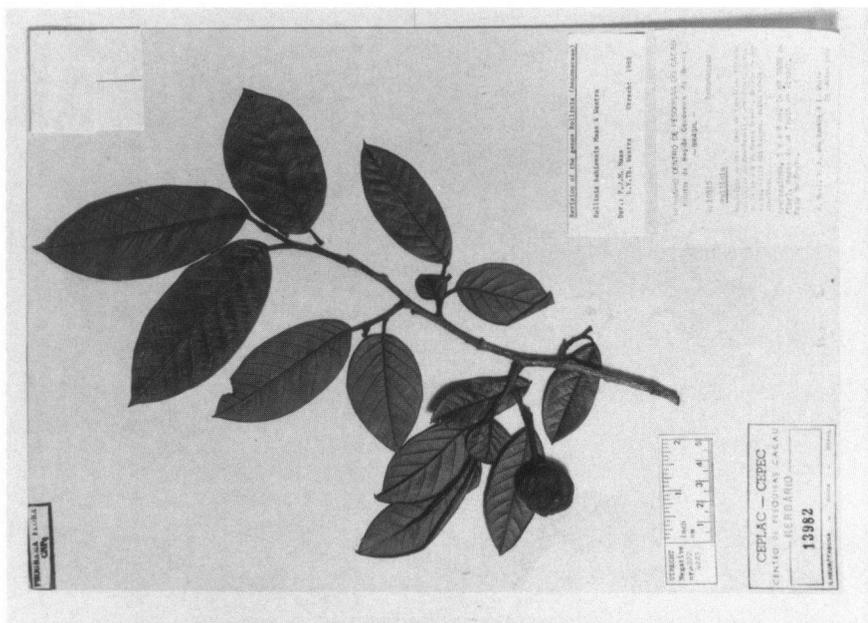


Fig. 3. *Rollinia bahiensis*, holotype specimen (S.A. Mori & J. Kallunki 9888, CEPEC).
 Fig. 4. *Rollinia bahiensis*, fruiting collection (S.A. Mori et al. 10315, CEPEC).

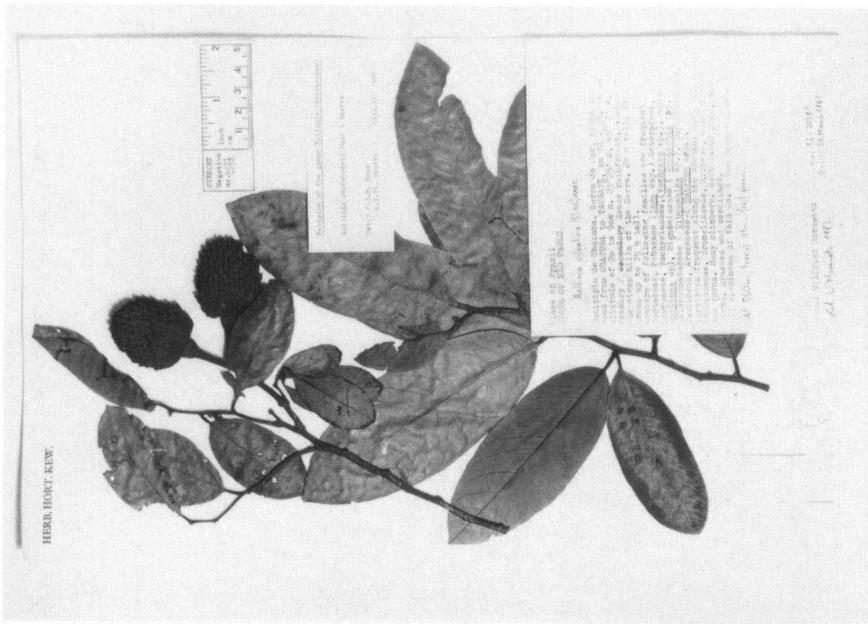


Fig. 15. *Rollinia ubatubensis*, fruiting specimen (W. Morawetz 12-24381, K).

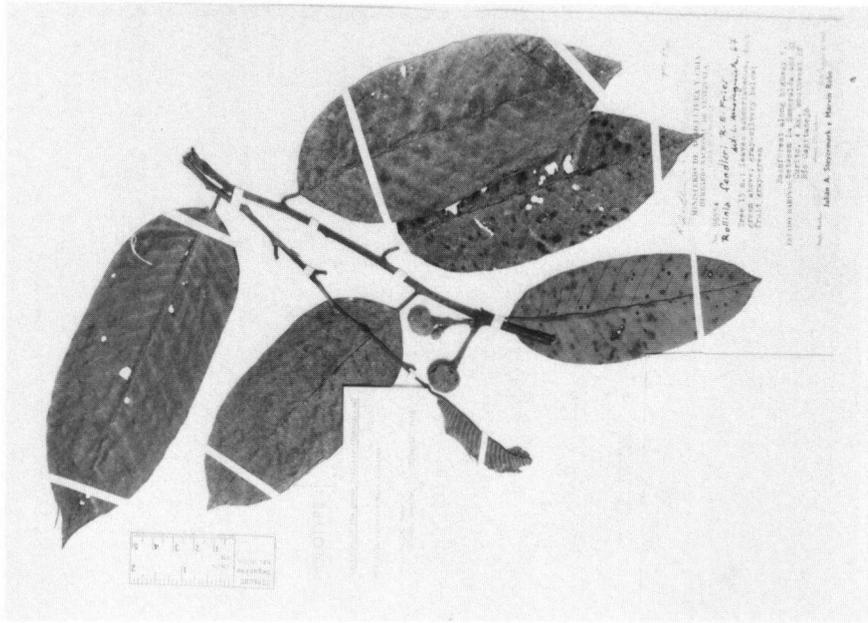


Fig. 16. *Rollinia velutina*, holotype specimen (J.A. Steyermark & F. Rabe 96554, VEN).