

Monographic studies in the genus *Annona* L. (Annonaceae): Inclusion of the genus *Rollinia* A.ST.-HIL.

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Abstract

Recent molecular studies in the genus *Annona*, which included two species of *Rollinia* and one, formerly placed in *Raimondia*, revealed the very close relationship of these genera. If *Rollinia* would be kept as a separate entity, *Annona* would become polyphyletic. No satisfactory possibility was found to split up *Annona* for maintaining *Rollinia* as a distinct genus. On the basis of these findings the necessary nomenclatural changes are presented here.

Key words: Annonaceae, *Annona*, *Rollinia*, Flora Neotropica, new combinations, new names, nomenclature, systematics.

Zusammenfassung

Neueste molekulare Untersuchungen in der Gattung *Annona*, unter Einbeziehung von zwei Arten der Gattung *Rollinia* und einer Art, die früher zu *Raimondia* gestellt wurde, haben die sehr engen Beziehungen der Gattungen untereinander verdeutlicht. Wenn man *Rollinia* als eigenständige Gattung beibehalten würde, wäre das Ergebnis eine polyphyletische Gattung *Annona*. Es wurde keine befriedigende Möglichkeit gefunden, *Annona* so abzugrenzen, dass *Rollinia* als eigenständige Gattung erhalten bleiben könnte. Aufgrund dieser Ergebnisse werden die dadurch notwendig gewordenen nomenklatorischen Änderungen in dieser Arbeit präsentiert.

Introduction

The genus *Rollinia* was established by Antoine de SAINT-HILAIRE in the "Flora Brasiliae meridionalis" (1825: 28 - 29, tab. 5) as a result of his collecting activities in the early 19th century in south eastern Brazil. The genus was subsequently expanded by SCHLECHTENDAL (1834), MARTIUS (1841), TRIANA & PLANCHON (1862), and SAFFORD (1916b). SAFFORD (1916a) segregated the new genus *Rolliniopsis* because some species show a peculiar fruit morphological pattern, namely almost free but sessile carpidia in ripe fruiting stage. FRIES (1934) gave a first comprehensive overview in the series "Monographien der Arten einiger Annonaceen-Gattungen", keeping *Rolliniopsis* as a separate genus, even until his treatment of the family for ENGLER & PRANTL's "Natürliche Pflanzenfamilien" (FRIES 1959). In MAAS & WESTRA (1989) *Rolliniopsis* was sunk into synonymy of *Rollinia*. The monographic treatment by MAAS et al. (1992), in which 42 species were listed, with two more taxa mentioned as new but not formally described, represents the up to date state of knowledge. In this monograph MAAS though did not discuss taxa placed in *Annona*, but mentioned by FRIES (1934: 113) as being closely

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related or even representing the group within *Annona* from where *Rollinia* might have derived (FRIES 1943: 8). Some very closely related taxa described in *Annona*, e.g., *Annona amazonica* R.E.FR. *A. duckei* DIELS, *A. neglecta* R.E.FR., and *A. symphyocarpa* SANDWITH, all of which show *Rollinia*-characters (baccate outer petals, though not dorsally winged, inner petals connate and adnate to outer ones, fruits with a comparatively long and thin pedicel, pollen in monads) have been omitted from the discussion on the systematic position of *Rollinia* by KOEK-NOORMAN & MAAS (1992).

Results and discussion

On the basis of recent molecular studies in the genus *Annona* (RAINER et al. in prep.), in which two taxa of *Rollinia* (*R. cuspidata* and *R. mucosa*) and one of *Raimondia* (*R. deceptrix*) were included, and a phylogenetic analysis (RAINER et al. in prep.) revealed that *Rollinia* and *Raimondia* are nested within *Annona*. These findings are in full accordance with recently published results on biogeographic aspects in the family Annonaceae (RICHARDSON et al. 2004).

As a result of morphological, karyological, and palynological studies, and evidence from numerous additional publications on seed anatomy (VAN DER HEIJDEN & BOUMAN 1988), palynology (WALKER 1971), and chapters on wood anatomy (TER WELLE 1992), palynology (LE THOMAS et al. 1992) and karyology (MORAWETZ & HEMMER 1992) included in the revision of the genus *Rollinia* by MAAS et al. (1992), it becomes clear that *Rollinia* and *Raimondia* cannot be maintained as separate genera. The genus *Raimondia* was already placed in synonymy of *Annona* in an earlier paper (RAINER 2001) and the necessary changes in *Rollinia* are presented in this paper to provide the basis for the monographic treatment of *Annona* (RAINER in prep.).

In the following new combinations, new names, and reestablishment of names originally published under *Annona* are provided. Actually accepted names are given in bold face. Citation of the type material is added where known, the “!” sign is added after citation of herbarium acronyms for specimens seen by the author. Herbarium acronyms follow the Index Herbariorum (HOLMGREN & HOLMGREN 1998-2007).

Annona L., Sp. pl. 536 - 537 (1753)

Type species: *Annona muricata* L., Sp. pl. 536 (1753).

= *Raimondia* SAFF., Contr. U. S. Natl. Herb. 16 (5): 217 - 219, pl. 52, 53 (1913).

Type species: *Raimondia monoica* SAFF. (= *Annona cherimolioides* TRIANA & PLANCH.)

= *Rollinia* A.ST.-HIL., Fl. Bras. merid. 1 (1): 28, tab. 5 (1825)

Lectotype species (designated by HUTCHINSON 1923: 260): *Rollinia longifolia* A.ST.-HIL. (= *Annona dolabripetala* RADDI)

Contrary to the citation of *Annona dolabripetala* RADDI [= *Rollinia dolabripetala* (RADDI) R.E.FR.] as the lectotype for the genus (MAAS 1992: 65; GREUTER et al. 1993: 1000), which follows the citation of *Annona dolabripetala* RADDI in PFEIFFER (1874: 984) the latter did neither make the new combination for “*Rollinia dolabripetala*” nor selected this taxon as the type species for the genus *Rollinia* but merely listed “*Annona dolabripetala* RADDI” in brackets without any comments.

RAINER: Monographic studies in the genus *Annona* L. (Annonaceae): Inclusion of the genus *Rollinia* 193

- = *Rolliniopsis* SAFF., J. Wash. Acad. Sci. 6: 198 - 204, fig. 1 - 2 (1916)
Type species (SAFFORD 1916a): *Rolliniopsis discreta* SAFF. (= *Annona leptopetala*
(R.E.FR.) H.RAINER)

New combinations

***Annona andicola* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia andicola* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 297, fig. 1, 2 (1989)
Type: J.A. Steyermark 52903 [holotype: F]

***Annona bahiensis* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia bahiensis* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 299, fig. 3, 4 (1989)
Type: S.A. Mori & J.A. Kallunki 9888 [holotype: CEPEC; isotype: U!]

***Annona boliviana* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia boliviana* R.E.FR., Acta Horti Berg. 13 (3): 115 (1941)
Type: B.A. Krukoff 11258 [holotype: S!; isotypes: A!, F!, G!, MO!, NY!, S!, U!]

***Annona calcarata* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia calcarata* R.E.FR., Acta Horti Berg. 12 (2): 279 - 280 (1937)
Type: B.A. Krukoff 5315 [holotype: S!; isotypes: A!, B!, BM!, F!, G!, M!, MICH, MO!, NY!, U!, UC]

***Annona centrantha* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia centrantha* R. E. FR., Acta Horti Berg. 12 (1): 181 - 182, fig. 13c - f (1934)
Type: E.P. Killip & A.C. Smith 27073 [holotype: US!; isotypes: B!, F!, NY!, S!]

***Annona cuspidata* (MART.) H.RAINER, comb.n.**

- ≡ *Rollinia cuspidata* MART., Fl. bras. 13 (1): 20, tab. 6: fig. 2 (1841)
Type: C.F.P. von Martius 2725 [lectotype (selected by MAAS 1992: 80): M!; isotypes: B (fragm.)!, M!]
- = *Rollinia cardiantha* DIELS in PILGER, Verh. Bot. Vereins Prov. Brandenburg 47: 134 (1905)
Type: E. Ule 5002 [holotype: B!; isotypes: G!, MG, S!]
- = *Rollinia pachyptera* DIELS in MILDBRAED, Notizbl. bot. Gart. Berlin-Dahlem 10: 176 (1927)
Type: G. Tessmann 4704 [holotype: B!; isotypes: F!, G!, S!]
- = *Rollinia uniflora* R.E.FR., Acta Horti Berg. 12 (1): 182 - 184, fig. 12c - d (1934)
Type: R. Spruce s.n., Nov. 1856 [holotype: K!; isotypes: K!, S!]
- = *Rollinia sphaerantha* R.E.FR., Acta Horti Berg. 12 (1): 184, fig. 13a - b (1934)
Type: E.P. Killip & A.C. Smith 27650 [holotype: US!; isotypes: B!, F, NY!, S!]

***Annona danforthii* (STANDL.) H.RAINER, comb.n.**

- ≡ *Rollinia danforthii* STANDL., Publ. Field Mus. Nat. Hist., Bot. Ser. 18 (2): 444 (1937)
Type: R.E. Danforth 30 [holotype: F; isotypes: BM!, GH!, S!]
- = *Rollinia chocoensis* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl., ser. 3, 24 (10): 18 (1948)
Type: E.P. Killip 35501 [holotype: S!; isotypes: NY!, UC, US!]

***Annona dolichopetala* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia dolichopetala* R.E.FR., Ark. Bot., n. s. 4 (2): 26, tab. 3 (1959)
- ≡ *Rollinia dolichopetala* var. *suberecta* R.E.FR., Ark. Bot., n. s. 4 (2): 27, tab. 3 p.p. (1959)
Type: E. Asplund 19768 [holotype: S!; isotypes: C, G, K!, NY!, P!, S!]
- = *Rollinia dolichopetala* var. *divergens* R.E.FR., Ark. Bot., n. s. 4 (2): 27, tab. 3 p.p. (1959)
Type: E. Asplund 18467 [holotype: S!; isotypes: C, G, K!, NY!, P!, S!]

***Annona edulis* (TRIANA & PLANCH.) H.RAINER, comb.n.**

- ≡ *Rollinia edulis* TRIANA & PLANCH., Ann. Sci. Nat., Bot., sér. 4, 17: 30 (1862)
Type: J.J. Triana s.n., s.d. [holotype: P!; isotypes: BM!, G, K!]
- = *Rollinia edulis* var. *acuta* R.E.FR., Ark. Bot., n. s. 1 (6): 346 (1950)
Type: J. Cuatrecasas 4665-A [holotype: US]
- = *Rollinia edulis* var. *macropus* R.E.FR., Ark. Bot., n. s. 1 (6): 346 (1950)
Type: J. Cuatrecasas 11095 [syntypes: COL, US]; J. Cuatrecasas 11140 [syntypes: COL, US]

***Annona emarginata* (SCHLTDL.) H.RAINER, comb.n.**

- ≡ *Rollinia emarginata* SCHLTDL., Linnaea 9 (3): 318 (1834)
Type: F. Sellow s.n., s.d. [lectotype (selected by MAAS 1992: 95): B!]; F. Sellow 2137 [syntype: B (photos: F, GH!, MO!, NY!)]; F. Sellow 4899 [syntypes: G, LE!]; F. Sellow 5866 [syntypes: G, HAL!, L!, LE!]
- = *Rollinia glaucescens* SOND., Linnaea 22: 557 (1849)
≡ *Rollinia sonderiana* WALP., Ann. bot. syst. 3 (5): 813 (1852), nom. illeg.
Type: A.F. Regnell II 5 b [syntypes: S (6 sheets)!]
- = *Rollinia longifolia* var. *paraguariensis* CHODAT, Bull. Herb. Boissier 6, App. 1: 11 (1898)
Type: E. Hassler 1720 [holotype: G; isotypes: K!, NY!]
- = *Rollinia hassleriana* R.E.FR. in CHODAT & HASSLER, Bull. Herb. Boissier, sér. 2, 4: 1172 (1904)
Type: E. Hassler 7862 [holotype: G]
- = *Rollinia intermedia* R.E.FR. in CHODAT & HASSLER, Bull. Herb. Boissier, sér. 2, 4: 1172 (1904)
Type: E. Hassler 3475 [lectotype (selected by FRIES 1934: 172): G; isolectotypes: A!, B!, K!, MICH, NY!]; E. Hassler 4797 [syntypes: F, G, K!]; E. Hassler 5202 [syntypes: G, GH!, K!, NY!, UC]

RAINER: Monographic studies in the genus *Annona* L. (Annonaceae): Inclusion of the genus *Rollinia* 195

- = *Rollinia longipetala* R.E.FR., in CHODAT & HASSLER: Bull. Herb. Boissier, sér. 2, 4: 1173 (1904)
 - ≡ *Rollinia emarginata* SCHLTDL. var. *longipetala* (R.E.FR.) R.E.FR., Acta Horti Berg. 12 (1): 169 - 170, fig. 6 (1934)
- Type: E. Hassler 7407 [holotype: G; isotypes: A!, B!, F, G, K!, MO!, NY!, S!, U!, UC]
- = *Rollinia odoriflora* ROJAS ACOSTA, Bull. Acad. Int. Géogr. Bot. 26: 163 (1918)
- Type: Anonymous collector s.n., s.d. [type not located]
- = *Rollinia occidentalis* R.E.FR., Acta Horti Berg. 12 (1): 165 - 166, tab. 18 (1934)
- Type: R.W. Pearce s.n., Nov. 1866 [holotype: K!]
- = *Rollinia glaziovii* R.E.FR., Acta Horti Berg. 12 (1): 166, 168, fig. 10a - c (1934)
- Type: A.F.M. Glaziou 12407 [holotype: B!; isotypes: A!, C, K!, LE!, MG, P!, S!]
- = *Rollinia hassleriana* var. *vestita* R.E.FR., Acta Horti Berg. 12 (1): 171 (1934)
- Type: T.C.J. Herzog 1283 [holotype: L!; isotype: S (fragm.)!]

***Annona fendleri* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia fendleri* R.E.FR., Acta Horti Berg. 12 (1): 152, tab. 15 (1934)
- Type: A. Fendler 196 [holotype: K!; isotypes: G!, GH!, GOET, MO!, OXF!]
- = *Rollinia subracemosa* PITTIER, Bol. Soc. Venez. Ci. Nat. 4: 349 (1938)
- Type: Ll. Williams 10011 [holotype: VEN!; isotypes: A!, F, MICH, S (fragm.)!]

***Annona ferruginea* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rolliniopsis ferruginea* R.E.FR., Acta Horti Berg. 12 (1): 196 (1934)
- ≡ *Rollinia ferruginea* (R.E.FR.) MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 301 (1989)
- Type: C. Gaudichaud 801 [holotype: B (destr.), lectotype (selected by MAAS & WESTRA 1989: 301): P!; isotypes: G, P!]

***Annona fosteri* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia fosteri* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 302, fig. 6 (1989)
- Type: R.B. Foster 9657 B [holotype: U!; isotypes: F, MO!]

***Annona glomerulifera* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia glomerulifera* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 303, fig. 7 (1989)
- Type: R. Vásquez & N. Jaramillo 790 [holotype: MO!]

***Annona helosioides* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia helosioides* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 305, fig. 8 (1989)
- Type: W. Palacios 1295 [holotype: MO!; isotype: QCNE!]

***Annona herzogii* (R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia herzogii* R.E.FR., Acta Horti Berg. 12 (1): 177 - 178 (1934)
- Type: T.C.J. Herzog 1368 [holotype: L!; isotypes: G, S!]

***Annona hispida* (MAAS & WESTRA) H.RAINER, comb.n.**

≡ *Rollinia hispida* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 307, fig. 9 (1989)

Type: J. Schunke V. 2657 [holotype: F; isotypes: COL, G, GH!, NY!, K!, P!, S!]

***Annona jucunda* (DIELS) H.RAINER, comb.n.**

≡ *Rollinia jucunda* DIELS in MILDBRAED, Notizbl. bot. Gart. Berlin-Dahlem 10: 177 (1927)

Type: G. Tessmann 5341 [holotype: B!; isotypes: F, G, NY!, S!]

= *Rollinia peruviana* DIELS in PILGER, Verh. Bot. Vereins Prov. Brandenburg 47: 135 (1905)

Type: E. Ule 6426 [holotype: B!; isotypes: F, G, K!, L!, MG, S!]

non: *Annona peruviana* HUMB. & BONPL. ex DUNAL, Monogr. Anonac. 67 (1817), (= *Annona glabra* L.)

= *Rollinia rigidiflora* R.E.FR., Acta Horti Berg. 12 (1): 154, fig. 9 (1934)

Type: Ll. Williams 3886 [holotype: F; isotype: S (fragm.)!]

***Annona leptopetala* (R.E.FR.) H.RAINER, comb.n.**

≡ *Rollinia leptopetala* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 50 - 51, tab. 7: fig. 3 - 4 (1900)

≡ *Rolliniopsis leptopetala* (R.E.FR.) SAFF., J. Wash. Acad. Sci. 6: 191 (1916)

Type: G. Gardner 2033 [lectotype (selected by FRIES 1934: 191): B!; isolectotypes: BM!, G, GH!, K!, MG, NY!, OXF!, P!]; J. Blanchet 3101 [syntypes: BM!, BR, C, F, G, GH!, K!, MG, NY!, OXF!, P!]

= *Rolliniopsis discreta* SAFF., J. Wash. Acad. Sci. 6: 199, fig. 1 - 2 (1916)

Type: P.H. Dorsett 371 b [holotype: US!]

= *Rolliniopsis simiarum* SAFF., J. Wash. Acad. Sci. 6: 201 (1916)

Type: J.N. Rose & P.G. Russell 19963 [holotype: US!; isotype: GH!]

= *Rollinia leptopetala* var. *angustifolia* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 51, tab. 7: fig. 5 (1900)

Type: A.F.M. Glaziou 13508 [holotype: B!; isotypes: C, K!, LE!, P!]

***Annona mammifera* (MAAS & WESTRA) H.RAINER, comb.n.**

≡ *Rollinia mammifera* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 308, fig. 10 (1989)

Type: P.J.M. Maas et al. 6025 [holotype: U!; isotypes: COL, K!, MO!, NY!, USM!]

***Annona maritima* (ZÁCHIA) H.RAINER, comb.n.**

≡ *Rollinia maritima* ZÁCHIA, Bradea 6 (28): 242 - 247, fig. (1993)

Type: B. Rambo s.n. (= PACA 54826) [holotype: B!; isotypes: HBR!, PACA]

***Annona pachyantha* (MAAS & WESTRA) H.RAINER, comb.n.**

≡ *Rollinia pachyantha* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 310, fig. 11 (1989)

Type: A.H. Gentry et al. 53389 [holotype: MO!; isotype: U!]

***Annona papilionella* (DIELS) H.RAINER, comb.n.**

- ≡ *Rollinia papilionella* DIELS, in MILDBRAED, Notizbl. bot. Gart. Berlin-Dahlem 10: 176 (1927)
Type: G. Tessmann 4664 [holotype: B!; isotypes: G, F (fragm.), GH (fragm.)!, NY (fragm.)!]
- = *Rollinia pittieri* SAFF., J. Wash. Acad. Sci. 6: 376 (1916)
Type: H.F. Pittier 4358 [holotype: US!]
non: *Annona pittieri* DONN.SM., Bot. Gaz. (Crawfordsville) 24 (6): 389 (1897)
- = *Rollinia microsepala* STANDL., Publ. Field Columbian Mus. Bot. Ser. 4 (8): 205 (1929)
Type: G.P. Cooper & G.M. Slater 102 [holotype: F; isotypes: G (fragm.), S (fragm.)!]

***Annona parviflora* (A.ST.-HIL.) H.RAINER, comb.n.**

- ≡ *Rollinia parviflora* A.ST.-HIL., Fl. Bras. merid. 1 (1): 30 (1825)
- ≡ *Rolliniopsis parviflora* (A.ST.-HIL.) SAFF., J. Wash. Acad. Sci. 6: 202 (1916)
- ≡ *Rollinia parviflora* var. *angustifolia* MART., Fl. bras. 13 (1): 19 (1841)
- ≡ *Rolliniopsis parviflora* var. *angustifolia* (MART.) R.E.FR., Acta Horti Berg. 12 (1): 195 - 196 (1934)
Type: A.F.C.P. de Saint-Hilaire 454 [holotype: P!]
non: *Annona parviflora* RUIZ & PAV. in LÓPEZ, Anales Inst. Bot. Cavanilles 17 (1): 427 - 428, tab. 485 (1959), nom.inval.; cf. MCNEILL et al. 2006: § 37. 1, (= *Annona mucosa* JACQ.)
- = *Guatteria apodocarpa* MART., Fl. bras. 13 (1): 30 (1841)
Type: C.F.P. von Martius s.n., Aug. 1817 [holotype: M!; isotype: B (fragm.)!]
- = *Rollinia parviflora* var. *latifolia* MART., Fl. bras. 13 (1): 19 (1841)
≡ *Rolliniopsis parviflora* var. *latifolia* (MART.) R.E.FR., Acta Horti Berg. 12 (1): 195 (1934)
Type: J. Lhotsky s.n., s.d. [syntypes: B! (photos: F, GH!, MO!, NY!, U!), G, HAL!]

***Annona pickelii* (DIELS) H.RAINER, comb.n.**

- ≡ *Rollinia pickelii* DIELS in PILGER, Notizbl. bot. Gart. Berlin-Dahlem 11: 783 (1933)
Type: B.D. Pickel 3004 p.p. [holotype: B!, isotype: SPSF (?)]

***Annona rensoniana* (STANDL.) H.RAINER, comb.n.**

- ≡ *Rollinia rensoniana* STANDL., J. Wash. Acad. Sci. 13: 351 (1923)
Type: P.C. Standley 23022 [holotype: US!; isotypes: GH!, NY!]
- = *Rollinia membranacea* TRIANA & PLANCH., Ann. Sci. Nat., Bot., sér. 4, 17: 31 (1862)
Type: J. Goudot s.n., Mar. 1844 [lectotype (selected by MAAS 1992: 124): P!; isolecotype: K!]; J.J. Triana s.n., s.d. [syntype: COL]
non: *Annona membranacea* R.E.FR., Acta Horti Berg. 13 (3): 115, fig. 2a (1941)
- = *Rollinia standleyi* R.E.FR., Acta Horti Berg. 12 (1): 128 - 129 (1934)
Type: P.C. Standley & J. Valerio 45920 [holotype: US!; isotype: S!]
- = *Rollinia cherimolioides* R.E.FR., Acta Horti Berg. 12 (1): 133 - 134 (1934)
Type: H. Karsten s.n., s.d. [holotype: W (destr., photos: A, F, MO!); isotype: S!]

- = *Rollinia mexicana* STANDL., Publ. Field Mus. Nat. Hist., Bot. Ser. 11 (5): 155 (1936)
Type: E. Bourgeau 2448 [holotype: LE!; isotypes: BR, F, G, GH!, L!, P!, S!]
- = *Rollinia rensoniana* var. *granatensis* R.E.FR., Acta Horti Berg. 12 (1): 130 (1934)
Type: J. Mutis 3842 [holotype: US!; isotypes: MA!, S (fragm.)!]

***Annona rufinervis* (TRIANA & PLANCH.) H.RAINER, comb.n.**

- ≡ *Rollinia rufinervis* TRIANA & PLANCH., Ann. Sci. Nat., Bot., sér. 4, 17: 30 (1862)
Type: J. Goudot s.n., Sep. 1844 or Sep. 1845 [holotype: P!; isotypes: G, K!]

***Annona rugulosa* (SCHLTDL.) H.RAINER, comb.n.**

- ≡ *Rollinia rugulosa* SCHLTDL., Linnaea 9 (3): 316 (1834)
Type: F. Sellow s.n., s.d. [holotype: B!]
- = *Rollinia rugulosa* subsp. *australis* R.E.FR., Acta Horti Berg. 12 (1): 164 - 165 (1934)
Type: J. Tweedie s.n., s.d. [holotype: K!; isotypes: E, S (fragm.)!]

***Annona schunkei* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia schunkei* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 311 - 313, fig. 12 - 13 (1989)
Type: J. Schunke V. 14117 [holotype: U!; isotypes: F, K!, MO!, NY!, P!, U!, USM!, WU!]

***Annona ubatubensis* (MAAS & WESTRA) H.RAINER, comb.n.**

- ≡ *Rollinia ubatubensis* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 313, fig. 14 - 15 (1989)
Type: P.E. Gibbs et al. 3501 [holotype: SP!; isotypes: E, NY!]

***Annona williamsii* (RUSBY ex R.E.FR.) H.RAINER, comb.n.**

- ≡ *Rollinia williamsii* RUSBY ex R.E.FR., Acta Horti Berg. 12 (1): 186 - 187 (1934)
- ≡ *Rollinia williamsii* RUSBY, Proc. Intern. Congr. Pl. Sci. Ithaca 2: 1373 (1929), nom. nud.
- Type: R.S. Williams 370 [lectotype (cited by MAAS 1992: 156): NY!; isotypes: K!, S!]

New names

***Annona neoamazonica* H.RAINER, nom.n.**

- ≡ *Rollinia amazonica* R.E.FR. Ark. Bot., n. s. 3 (18): 602 (1957)
Type: R.E. Schultes 6758 [holotype: US!; isotype: S (fragm.)!]
non: *Annona amazonica* R.E.FR., Acta Horti Berg. 10 (2): 266 (1931)

***Annona neochrysocarpa* H.RAINER, nom.n.**

- ≡ *Rollinia chrysocarpa* MAAS & WESTRA, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 300, fig. 5 (1989)
Type: B. Berlin 738 [holotype: MO!; isotype: U!]
non: *Annona chrysocarpa* LEPR. ex GUILL. & PERR., Fl. Seneg. tent. 1: 6 (1831), (= *Annona glabra* L.)

***Annona neoecuadorensis* H.RAINER, nom.n.**

- ≡ *Rollinia ecuadorensis* R.E.FR., Acta Horti Berg. 12 (3): 566 (1939)
 Type: H. Schultze-Rhonhof 2155 [holotype: B (destr.?); isotype: S!]
non: *Annona ecuadorensis* R.E.FR., Ark. Bot., n. s. 4 (2): 25 (1959)

***Annona neoelliptica* H.RAINER & MAAS, nom.n.**

- ≡ *Rollinia elliptica* R.E.FR., Acta Horti Berg. 12 (1): 160 (1934)
 Type: BW (Boschwezen Suriname) 6507 [holotype: U!; isotypes: BM!, BR, COL, K!, NY!, RB!, S!, U!, VEN!]
non: *Annona elliptica* R.E.FR., Ark. Bot. 21A (9): 13, fig. 3: 1 - 3 (1927), (= *Annona cascarilloides* C.WRIGHT ex GRISEB.)

***Annona neoinsignis* H.RAINER, nom.n.**

- ≡ *Rollinia insignis* R.E.FR., Acta Horti Berg. 12 (1): 161 - 162, tab. 17 (1934)
 Type: Ll. Williams 2685 [holotype: F; isotypes: B!, S!]
non: *Annona insignis* R.E.FR., Acta Horti Berg. 12 (1): 214 - 215 (1934)
 = *Rollinia insignis* var. *pallida* R.E.FR., Acta Horti Berg. 12 (3): 565 (1939)
 Type: A. Ducke 141 [holotype: S!; isotypes: A!, F, K!, MO!, NY!, RB!, S!]

***Annona neolaurifolia* H.RAINER, nom.n.**

- ≡ *Rollinia laurifolia* SCHLTDL., Linnaea 9 (3): 319 (1834)
 ≡ *Rollinia laurifolia* var. *erecta* R.E.FR., Acta Horti Berg. 12 (1): 150, fig. 6e (1934)
 Type: F. Sellow 1190 [lectotype (selected by FRIES 1934: 149): B!]; F. Sellow 809 [syntype: LE!]
non: *Annona laurifolia* DUNAL, Monogr. Anonac. 65 (1817), (= *Annona glabra* L.)
 = *Rollinia laurifolia* var. *divergens* R.E.FR., Acta Horti Berg. 12 (1): 150, fig. 6f - g (1934)
 Type: Y. Mexía 5311 [holotype: S!; isotypes: A!, BM!, F, G, GB, K!, MICH, MO!, NY!, S!, U!, UC]
 = *Rollinia laurifolia* var. *longipes* R.E.FR., Ark. Bot. 5 (4): 20, tab. 1: fig. 3 - 4 (1905)
 ≡ *Rollinia laurifolia* forma *longipes* (R.E.FR.) R.E.FR., Acta Horti Berg. 12 (1): 150 (1934)
 Type: L. Riedel s.n., Oct. 1823 [holotype: S!; isotypes: A!, K!, LE!]
 = *Rollinia laurifolia* var. *reflexa* R.E.FR., Acta Horti Berg. 12 (1): 150 - 151, fig. 6h (1934)
 Type: Y. Mexía 5350 [holotype: S!; isotypes: A!, BM!, F, G, GB, MICH, MO!, NY!, S!, U!]

***Annona neosalicifolia* H.RAINER, nom.n.**

- ≡ *Rollinia salicifolia* SCHLTDL., Linnaea 9 (3): 317 (1834)
 Type: F. Sellow s.n., s.d. [lectotype (selected by RAINER 2003: 4): HAL!; isolectotypes: B!, G, HAL!, L!, LE!]; F. Sellow 1498 [syntype: B!]; L.C. von Chamisso s.n., s.d. [syntype: B?]
non: *Annona salicifolia* EKMAN & R.E.FR., Ark. Bot. 22B (2): 2, fig. 1a - i (1929)

***Annona neosericea* H.RAINER, nom.n.**

- ≡ *Rollinia dolabripetala* var. *sericea* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 45 (1900)
- ≡ *Rollinia sericea* (R.E.FR.) R.E.FR., Acta Horti Berg. 12 (1): 152 - 154 (1934)
Type: F. Sellow 684 [lectotype (selected by MAAS 1992: 145): B!]; F. Sellow 489 [syntypes: B!, UC]; F. Sellow 490 [syntypes: B!, UC]
non: *Annona sericea* DUNAL, Monogr. Anonac. 69, tab. 5 (1817)
- = *Rollinia sericea* var. *longisepala* R.E.FR., Acta Horti Berg. 12 (1): 153 - 154 (1934)
Type: A. von Luederwaldt 8900 [holotype: S!; isotype: SP!]

***Annona neoulei* H.RAINER, nom.n.**

- ≡ *Rollinia ulei* DIELS in PILGER, Verh. Bot. Vereins Prov. Brandenburg 47: 136 (1905)
Type: E. Ule 6425 [holotype: B!; isotypes: F (fragm.), G, L!, MG, S (fragm.)!]
non: *Annona ulei* R.E.FR., Acta Horti Berg. 10 (2): 243, tab. 15 (1931), (= *Annona jahnii* SAFF.)
- = *Annona microcarpa* RUIZ & PAV. ex G.DON, Gen. hist. 1: 90 (1831)
≡ *Rollinia microcarpa* (RUIZ & PAV. ex G.DON) R.E.FR., Acta Horti Berg. 12 (1): 187 - 188, tab. 20 (1934)
Type: H. Ruiz s.n., s.d. [lectotype (selected by MAAS 1992: 153): B! (photo K!); isotypes: G, MA!]
non: *Annona microcarpa* JACQ., Fragm. bot. 6: 40, tab. 44: fig. 7 (1809), (= *Diospyros cargillia* F. MUELL.)

***Annona neovelutina* H.RAINER, nom.n.**

- ≡ *Rollinia velutina* VAN MARLE, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 92 (3): 314, fig. 16 (1989)
Type: J.A. Steyermark & M. Rabe 96554 [holotype: VEN!; isotypes: NY!, S!]
non: *Annona velutina* A.ST.-HIL. & TUL., Ann. Sci. Nat., Bot., sér. 2, 17: 132 (1842), (= *Annona crotonifolia* MART.)

Reestablished names***Annona dolabripetala* RADDI, Mem. Mat. Fis. Soc. Ital. Sci. Modena, Pt. Mem. Fis. 18 (2): 394 (1820)**

- ≡ *Rollinia dolabripetala* (RADDI) R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 45 (1900)
- ≡ *Annona xestropetala* SPRENG., Syst. veg., ed. 16 (Sprengel) 2: 641 (1825), nom. illeg.
Type: neotype (designated by MAAS 1992: 85, 88): tab. 5, in SAINT-HILAIRE, Fl. Bras. merid., vol. 1(1) (1825)
- = *Rollinia longifolia* A.ST.-HIL., Fl. Bras. merid. 1 (1): 29, tab. 5 (1825)
Type: A.F.C.P. de Saint-Hilaire s.n., s.d. [syntypes: F, G, P!]
- = *Annona minensis* GLAZ., Mém. Soc. Bot. Fr. 3 (a): 14 (1905)
≡ *Rollinia minensis* (GLAZ.) R.E.FR., Acta Horti Berg. 12 (1): 151 - 152, tab. 14 (1934)
Type: A.F.M. Glaziou 14467 [holotype: P!; isotypes: C, K!, P!, S!]

***Annona exsucca* DC.** in DUNAL, Monogr. Anonac. 77 (1817)

- ≡ *Rollinia exsucca* (DC.) A.DC., Mém. Soc. Phys. Genève 5: 199, tab. 2: fig. A (1832)
Type: A. Anderson s.n., s.d. [holotype: G; isotypes: B!, BM!]
- = *Rollinia puberula* A.DC., Mém. Soc. Phys. Genève 5: 200, tab. 1 (1832)
Type: Anonymous collector s.n., s.d. [holotype: G!; isotype: B (fragm.)!]
- = *Rollinia multiflora* SPLITG., Tijdschr. Natuurl. Gesch. Physiol. 9: 97 (1842)
Type: F.L. Splitgerber 595 [holotype: L!; isotypes: K!, L!, S (fragm.)!]
- = *Rollinia tinifolia* KLOTZSCH in SCHOMBURGK, Reis. Br.-Guiana 3: 1163 (1849)
Type: M.R. Schomburgk 1302 [holotype: B!]
- = *Rollinia glaucescens* MIQ., Stirp. surinam. select. 108 (1850)
≡ *Rollinia resinosa* SPRUCE ex BENTH., Hooker's J. Bot. Kew Gard. Misc. 5: 9 (1853)
≡ *Rollinia exsucca* subsp. *resinosa* (SPRUCE ex BENTH.) R.E.FR., Acta Horti Berg. 12 (1): 144 - 145 (1934)
Type: H.C. Focke 642 [holotype: U; isotypes: K, S (fragm.)]
- = *Rollinia incurva* S.MOORE, Trans. Linn. Soc. London, Bot. 4 (3): 303 (1895)
Type: S.L.M. Moore 522 [holotype: BM!; isotypes: B!, K!, NY!, P!, WU!]
- = *Rollinia broadwayi* R.E.FR., Acta Horti Berg. 12 (1): 145 - 147 (1934)
Type: W.E. Broadway 7580 [holotype: S!; isotypes: F, G, K!, MO!, S!, US!]
- = *Rollinia brevipes* R.E.FR., Acta Horti Berg. 12 (1): 147 (1934)
Type: F.C. Hoehne 5129 [holotype: S!]
- = *Rollinia gardneri* R.E.FR., Acta Horti Berg. 12 (1): 157 - 158, tab. 16 (1934)
Type: G. Gardner 1914 [holotype: W (destr.); lectotype (**selected here**): BM!; isotypes: F, G, K!, NY!, OXF!, P!]
- = *Rollinia surinamensis* R.E.FR., Acta Horti Berg. 12 (1): 147, 149, fig. 8a - b (1934)
Type: A.A. Pulle 230 [holotype: U!; isotype: S!]
- = *Rollinia procera* R.E.FR., Acta Horti Berg. 12 (3): 565 (1939)
Type: B.A. Krukoff 6881 [holotype: S!; isotypes: A!, BM!, BR, F, G, K!, MICH, MO!, NY!, U!, US!]
- = *Rollinia exsucca* subsp. *elongata* R.E.FR., Acta Horti Berg. 12 (1): 145 (1934)
Type: A. Ducke s.n. (= RB 19645) [holotype: S!; isotypes: K!, RB!, US!]
- = *Rollinia broadwayi* var. *cuneata* R.E.FR., Acta Horti Berg. 12 (1): 146 - 147 (1934)
Type: H.A. Gleason 576 [holotype: US!; isotypes: GH, K!, NY!, S (fragm.)!]

***Annona mucosa* JACQ.**, Observ. bot. (Jacquin) 1: 16 (1764)

- ≡ *Annona muscosa* JACQ. in AUBLET, Hist. pl. Guiane 1: 618 (1775), orth. err.
- ≡ *Rollinia mucosa* (JACQ.) BAILL., Adansonia 8: 268 (1868)
- ≡ *Annona reticulata* var. *mucosa* (JACQ.) WILLD., Sp. pl., ed. 4., 2 (2): 1266 (1799)
Type: N. von Jacquin s.n., s.d. (not located); P. Duss 4620 [neotype (designated by MAAS 1992: 126): NY!]

- = *Annona obtusiflora* TUSSAC, Fl. Antill. 1: 191, tab. 28 (1813)
 ≡ *Annona obtusifolia* DC., Prodr. (DC.) 1: 84 (1824), orth. err.
 Type: tab. 28 in TUSSAC, Fl. Antill. (1813)
- = *Rollinia biflora* RUIZ & PAV. ex G.DON, Gen. hist. 1: 91 (1831)
 ≡ *Annona biflora* RUIZ & PAV. ex G.DON, Gen. hist. 1: 91 (1831), nom.nud.
 Type: J.A. Pavón s.n., s.d. [lectotype (**selected here**): MA!; isotypes: G, OXF!]
- = *Rollinia pterocarpa* G.DON, Gen. hist. 1: 91 (1831)
 ≡ *Annona pterocarpa* RUIZ & PAV. ex G.DON, Gen. hist. 1: 91 (1831), nom.nud.
 ≡ *Annona pteropetala* RUIZ & PAV. ex R.E.FR., Acta Horti Berg. 10 (2): 314 (1931), nom.nud.
 ≡ *Annona pteropetala* RUIZ & PAV. in LÓPEZ, Anales Inst. Bot. Cavanilles 17 (1): 426 - 427, tab. 484 (1959), nom.inval.
 Type: H. Ruiz s.n., s.d. [lectotype (**selected here**): MA!; isotypes: B!, G, P!]
- = *Rollinia micrantha* G.DON, Gen. hist. 1: 91 (1831)
 ≡ *Annona parviflora* RUIZ & PAV. ex G.DON, Gen. hist. 1: 91 (1831), nom.nud.
 ≡ *Annona parviflora* RUIZ & PAV. ex R.E.FR., Acta Horti Berg. 12 (1): 189 (1934), nom.nud.
 ≡ *Annona parviflora* RUIZ & PAV. in LÓPEZ, Anales Inst. Bot. Cavanilles 17 (1): 427 - 428, tab. 485 (1959), nom.inval.
 Type: H. Ruiz s.n., s.d. [type: MA!]
- = *Rollinia orthopetala* A.DC., Mém. Soc. Phys. Genève 5: 200 (1832)
 Type: C.S. Parker 238 [holotype: G; isotype: E]
- = *Rollinia sieberi* A.DC., Mém. Soc. Phys. Genève 5: 200, tab. 2: fig. B (1832)
 Type: Franz W. Sieber, Fl. Trinitatis 96 [holotype: G-DC; isotypes: BP (3 sheets)!, E, G, L!, LE!, M!, MO!, P!, PRC (4 sheets)!, S!, WU!]
- = *Rollinia pulchrinervia* A.DC., Mém. Soc. Phys. Genève 5: 201 (1832)
 Type: Anonymous collector s.n., s.d. [holotype: G-DC]
- = *Annona biflora* SESSÉ & MOÇ., Fl. mexic., ed. 2, 133 (1894)
 Type: M. Sessé & J.M. Moçifio 2310 [holotype: MA!; isotypes: F, G, OXF!]
- = *Rollinia deliciosa* SAFF., J. Wash. Acad. Sci. 6: 375, fig. 2 (1916)
 Type: J.H. Simmonds s.n., 11 Mar. 1903 [syntype: US 8765973!]; J.H. Simmonds s.n., 30 Aug. 1912 [syntype: US 8765976!]
- = *Rollinia jimenezii* SAFF., J. Wash. Acad. Sci. 6: 378 (1916)
 Type: A.M. Jiménez 427 [syntype: US!]; A.M. Jiménez 543 [syntype: US!]
- = *Rollinia permensis* STANDL., Publ. Field Columbian Mus., Bot. Ser. 4 (8): 208 (1929)
 Type: G.P. Cooper 645 [holotype: F; isotypes: G, K]
- = *Rollinia neglecta* R.E.FR., Acta Horti Berg. 12 (1): 124 - 125 (1934)
 ≡ *Rollinia mucosa* var. *neglecta* (R.E.FR.) R.E.FR., Field Mus. Nat. Hist., Bot. Ser. 13 (2): 760 (1938)
 Type: G. Klug 333 [holotype: US!; isotypes: F, NY!, S!]
- = *Rollinia curvipetala* R.E.FR., Acta Horti Berg. 12 (1): 178 - 179, fig. 11a - c (1934)
 Type: E. Ule 9371 [holotype: B!; isotypes: G, K!, MG, S!]

- = *Rollinia mucosa* subsp. *aequatorialis* R.E.FR., Acta Horti Berg. 12 (1): 123 - 124 (1934)
Type: R. Spruce 2403 [holotype: B!; isotypes: BM!, E, G, GH!, GOET, K!, M!, OXF!, P!]
- = *Rollinia mucosa* subsp. *portoricensis* R.E.FR., Acta Horti Berg. 12 (1): 124 (1934)
Type: P. Sintenis, Pl. portoricenses 4170 [holotype: S!; isotypes: B!, BM!, BP!, E, F, G, GH!, GOET, HAC!, L!, LE!, M!, MO!, NY!, P!, S!, UC, WU!]
- = *Rollinia mucosa* var. *macropoda* R.E.FR., Acta Horti Berg. 12 (1): 122 - 123 (1934)
Type: E.L. Ekman H12420 [holotype: S!; isotype: NY!]
- = *Rollinia jimenezii* var. *nelsonii* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl., ser. 3, 24 (10): 18 (1948)
Type: E.W. Nelson 406 [holotype: US!]

***Annona sylvatica* A.ST.-HIL., Pl. usuel. bras. 6: tab. 29 (1825)**

- ≡ *Rollinia sylvatica* (A.ST.-HIL.) MART., Fl. bras. 13 (1): 18 (1841)
Type: A.F.C.P. de Saint-Hilaire s.n., s.d. [lectotype (selected by MAAS 1992: 148): P!; isotype: P!]
- = *Rollinia fagifolia* A.ST.-HIL., Fl. Bras. merid. 1 (1): 29 (1825)
Type: A.F.C.P. de Saint-Hilaire s.n., s.d. [holotype: P!; isotype: P!]
- = *Annona silvestris* VELL., Fl. flumin. 239 (1829), Fl. flumin. icon. 5: tab. 128 (1831)
Type: tab. 128, in VELLOZO, Fl. flumin. icon. 5 (1831)
- = *Annona exalbida* VELL., Fl. flumin. 240 (1829), Fl. flumin. icon. 5: tab. 131 (1831)
≡ *Rollinia exalbida* (VELL.) MART., Fl. bras. 13 (1): 19 (1841)
Type: tab. 131, in VELLOZO, Fl. flumin. icon. 5 (1831)
- = *Annona fagifolia* A.ST.-HIL. & TUL., Ann. Sci. Nat., Bot., sér. 2, 17: 132 (1842)
Type: C. Gaudichaud s.n. (= Herbarium Impérial du Brésil 636) [holotype: P!; isotype: P (fragm.)!]

***Annona xylopiifolia* A.ST.-HIL. & TUL., Ann. Sci. Nat., Bot., sér. 2, 17: 132 (1842)**

- ≡ *Rollinia xylopiifolia* (A.ST.-HIL. & TUL.) R.E.FR., Acta Horti Berg. 10 (2): 315 (1931)
Type: A. Richard s.n., s.d. [holotype: P!]
- = *Rollinia lanceolata* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 49 - 50, tab. 6: fig. 6 (1900)
≡ *Rollinia xylopiifolia* var. *lanceolata* (R.E.FR.) R.E.FR., Acta Horti Berg. 12 (1): 176 - 177 (1934)
Type: A.F.M. Glaziou 13509 [lectotype (selected by FRIES 1934: 176): C; isolectotypes: B!, BR, C, G, K!, LE!, P!]; A.F.M. Glaziou 16691 [syntypes: BR, C, F, LE!, P!]
- = *Rollinia warmingii* R.E.FR., Kongl. Svenska Vetensk.-Akad. Handl. 34 (5): 49, tab. 6: fig. 7 (1900)
Type: A.F.M. Glaziou 6079 [holotype: B!; isotypes: C, K!]

Acknowledgments

Special thanks go to Paul Maas and Lubbert Westra, Utrecht University, for continuous discussions on taxonomic evaluation of generic concepts in Annonaceae, particularly concerning *Annona*, furthermore Bernhard von Hagen, Bärbel Hildebrandt, and Martin Röser, Martin-Luther University Halle-Wittenberg, for help with molecular analyses, thus providing the main trigger for this paper; to Walter Till, University of Vienna, and to Bruno Wallnöfer, Natural History Museum Vienna, for critical comments on the manuscript, as well as to the curators of the herbaria A, B, BM, BP, C, E, F, FHO, G, GH, GUAY, HAC, HAL, HBR, JE, K, L, LE, LOJA, M, MA, MG, MO, NY, OXF, QCA, QCNE, P, PRC, RB, S, SP, U, UPS, US, USM, W, WU for borrowing herbarium specimens or providing the facilities to study the specimens at their institutions.

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Zeitschrift/Journal: [Annalen des Naturhistorischen Museums in Wien](#)

Jahr/Year: 2007

Band/Volume: [108B](#)

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Artikel/Article: [Monographic studies in the genus Annona L. \(Annonaceae\):
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