

# Six New Species of *Adenocalymna* (Bignoniaceae) from Eastern South America

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**ABSTRACT.** Six new species of *Adenocalymna* are described from Brazil and French Guiana.

*Adenocalymna* is one of the genera of Bignoniaceae tribe Bignonieae that is most prone to local endemism (Sutherland, 1983). Six new species of the genus are included in recent collections from eastern South America.

***Adenocalymna dichilum*** A. Gentry, sp. nov.

TYPE: Brazil. Piauí: Bom Jesus-São Raimundo Nonato, caatinga, 11 May 1979 (fl), A. Fernandes s.n. (EAC 6185), (holotype, EAC; isotype, MO).

Frutex scandens, ramulis teretibus. Folia 2(–3?)-foliolata, interdum cirrho simplici, foliolis ovatis vel ellipticis, infra valde villosis. Inflorescentia floribus in racemo terminali dispositis. Calyx cupulatus, 5-dentatus, 12–14 mm longus; corolla lutea, valde bilabiata, extus puberula. Capsula ignota.

Liana; branchlets terete, longitudinally striate, with scattered small inconspicuous lenticels, finely puberulous with small suberect whitish trichomes; pseudostipules ovate, 3–4 mm long; interpetiolar glandular fields absent. Leaves 2(–3?)-foliolate, the terminal leaflet sometimes replaced by a simple tendril, the leaflets ovate to elliptic, obtuse to emarginate at apex, rounded to distinctly cordate at base, 2–4 cm long, 1.5–3.5 cm wide, above  $\pm$  glabrescently puberulous with short erect trichomes, below persistently villous, coriaceous, drying brownish above, olive below, the tertiary venation prominulous below, finer venation obscured by the indumentum; petiole 1.5–2.5 cm long, petiolules 0.2–0.9 cm long, rather densely tomentose with multicelled trichomes. Inflorescence a terminal raceme, densely tannish tomentose, with pair of caducous obovate coriaceous bracts ca. 1.5 cm long subtending each node, each bract with several large plate-shaped glands, the pedicels 1–1.5 cm long, with pair of ca. 1-cm-long elliptic bracteoles near apex subtending calyx. Flowers with the calyx cupular, shallowly 5-dentate, 12–14 mm long, 9–10 mm wide, tannish puberulous, with conspicuous plate-shaped glands near margin; corolla yellow,  $\pm$  tubular, strongly bilabiate split

almost to middle, ca. 3.5 cm long, ca. 1 cm wide at mouth of tube, the tube ca. 1.8 cm to base of split, the lower lobes narrow, ca. 1 cm long, the upper two lobes with free part ca. 3 mm long but basally fused to form 1.5-cm-long upper lip, densely puberulous outside except for base of tube; stamens subexserted, the thecae subparallel, pendulous, ca. 6 mm long; pistil and disk not examined. Fruit not seen.

*Distribution.* Known only from the type from the caatinga of northeastern Brazil.

This species is most similar to *A. bracteatum* (Chamisso) DC. in its large bracts and coriaceous, densely puberulous calyx and keys out with that species in *Flora Brasiliensis* (Bureau & K. Schumann, 1896–1897). The most striking difference from *A. bracteatum* is in the deeply bilabiate split corolla that looks more like an overgrown *Tynanthus* flower than like that of other species of *Adenocalymna*. Curiously, several quite unrelated species of Bignoniaceae share this unusual floral morphology in northeastern Brazil. In addition to *A. dichilum*, they are *Arrabidaea tynanthoides* A. Gentry, and *Arrabidaea crassa* Sprague (not closely related to each other), and to a lesser extent, *Mansoa ventricosa* A. Gentry.

***Adenocalymna fruticosum*** A. Gentry, sp. nov.

TYPE: Brazil. Bahia: Serra do Sincora, 6 km N of Cascavel on road to Mucugé, alt. 1,200 m, 41°25'W, 13°6'S, 25 Mar. 1980 (fl), R. M. Harley, G. L. Bromley, A. M. de Carvalho & G. Martinelli 29043 (holotype, CEPEC; isotypes, K not seen, MO).

Suffrutex, ramulis teretibus. Folia 2–3-foliolata, ecirrhata, foliolis ovalibus vel subrotundatis, glabris. Inflorescentia floribus in racemo terminali dispositis, pedicellis bracteis 1–1.5 cm longis subtentis. Calyx campanulatus, minute 5-denticulatus, 8–11 mm longus; corolla lutea pallida, tubulo-campanulata, tubo extus glabro. Capsula ignota.

Spindly shrub to 1 m tall; branchlets terete, longitudinally striate-ridged, sparsely minutely puberulous; pseudostipules subulate, ca. 1 mm long, in-



terpetiolar glandular fields lacking, a ridge connecting the opposite petiole pairs. Leaves 2–3-foliolate, without tendrils, the leaflets oval to almost suborbicular, rounded to truncate or emarginate at base and apex, 3–5.5 cm long, 2.3–4 cm wide, completely glabrous, the lower surface appearing somewhat glandular lepidote, coriaceous, drying olive, the venation raised above and below, the margin cartilaginous; petioles 1–3 cm long, the petiolules mostly very short, 0.1–1 cm long, glabrous except for a few tiny lepidote trichomes on flattened upper surface. Inflorescence a terminal raceme, minutely puberulous with simple and thick-stellate trichomes, with a pair of olive-drying longitudinally ribbed foliaceous bracts 1–1.5 cm long subtending each pair of pedicels, the pedicels ca. 5 mm long, densely dendroid puberulous, with a pair of ca. 1-mm-long bracteoles near base. Flowers with the calyx campanulate, truncate, minutely 5-denticulate, 8–11 mm long, 8–11 mm wide, densely minutely tannish puberulous with dendroid trichomes, also with dark-drying glandular areas; corolla (only 1 seen) creamy yellow, tubular-campanulate, 5 cm long, 1.2 cm wide at mouth of tube, the tube 4 cm long, the lobes 1 cm long, the tube glabrous, the lobes densely capitate-glandular; stamens included; pistil 3.5 cm long, the ovary oblong, 2 mm long, 1 mm wide, glandular surfaced; disk thick-pulvinate, 1.5 mm long, 3 mm wide. Fruit not seen.

*Distribution.* Known only from the type collected in “campo geral” grassland rich in dicot herbs and shrubs and acaulous palms.

This species is unusual in the genus in having an erect shrubby habit. Although there are a few erect species of *Adenocalymna* in the forest understory of coastal Brazil, this is the first member of its genus known to adopt the characteristic suffrutescent form so typical of the plants of the open cerrado and allied vegetations. *Adenocalymna fruticosum* is related to *A. apparicianum* J. C. Gomes by its similar calyx, but that species differs in lacking persistent foliaceous bracts, climbing habit, and different leaves with a very different dull rough-reticulate texture and trichomes on the undersurface. *Adenocalymna apparicianum* occurs further north in the caatinga of Ceara and Rio Grande do Norte.

***Adenocalymna graciellae* A. Gentry, sp. nov.**

TYPE: Brazil. Pará: Senador Jose Porfirio (Sozel), Rio Xingu, 3 Dec. 1991 (fl), *G. dos Santos, N. A. Rosa & M. R. dos Santos* 276 (holotype, MG; isotypes, MO, MAD).

Frutex scandens, ramulis teretibus, minute puberulis. Folia 2–3-foliolata, interdum cirrho simplicia, foliolis ellip-

ticis vel anguste ellipticis, infra sparsim puberulis saltem costa. Inflorescentia floribus in racemo terminali dispositis. Calyx cupulatus, minute 5-denticulatus, 3–6 mm longus; corolla lutea vel cremosa, anguste tubulo-campanulata, extus puberula. Capsula oblonga, haud compressa, valvis valde bialatis, puberulis, seminibus non alatis.

Liana, the branchlets terete, minutely puberulous with small erect trichomes, at length glabrescent, inconspicuously striate, drying brown, with minute lenticels when older, the pseudostipules blunt-conical, 2–3 mm long. Leaves 3-foliolate or 2-foliolate with a simple tendril or tendril scar, the leaflets elliptic to narrowly elliptic, obtuse to acuminate, the base rounded, 3–21 cm long, 1.5–8.5 cm wide, chartaceous to subcoriaceous, main veins  $\pm$  plane above, noticeably raised below, veinlets very slightly raised above and below, drying olive to olive brown above, yellowish olive to grayish olive below, usually rather shiny and varnish-surfaced, especially above, glandular-lepidote above and below, above glabrous except for short crisped trichomes on midvein, below puberulous with short crisped trichomes at least scattered along base of main veins and sometimes sparsely over surface; petiolules 0.5–2.5 cm long, petiole 1–4 cm long, puberulous. Inflorescence a contracted terminal raceme, densely puberulous, drying tannish, a pair of small early caducous lanceolate bracts 1–2 mm long subtending each pair of pedicels in young bud, the pedicels 3–5 mm long, each with a pair of small caducous 1–2 mm long triangular bracteoles near its base, the bracteoles puberulous and sometimes glandular. Flowers with the calyx cupular, minutely 5-denticulate, 3–6 mm long, 3–5 mm wide, finely and uniformly puberulous, with a few conspicuous scattered raised hollow-centered, pustulelike glands; corolla yellow to greenish cream, tubular-campanulate above a 2–3-cm-long narrowly tubular base, 5–7 cm long, 1–1.3 cm wide at mouth of tube, the tube 3.5–6 cm long, the lobes 0.5–1 cm long, the lobes and tube outside puberulous with thick-stellate trichomes, the tube outside also with conspicuous glands at base of lobes, inside glandular villous at level of stamen insertion; stamens didynamous, inserted 25–30 mm from base of corolla tube, the anthers included or the longest pair subexserted, the thecae divergent to subparallel, 4–5 mm long, the staminode ca. 7 mm long; pistil 5–5.5 cm long, the ovary linear with conspicuously raised angles, 3–4 mm long, < 1 mm wide, glabrous, becoming densely puberulous with glandular angles in young fruit; disk annular-pulvinate, 1.5 mm long, 1.5–2 mm wide. Capsule oblong or oblong-ellipsoid, not at all compressed, the valves woody, with pair of prominent thick wings along each valve, the fruit thus somewhat tetragonal in cross section, 10–18



cm long, 5–7 cm thick and wide (including wings), drying light grayish, the midrib not visible, densely minutely puberulous, the surface slightly wrinkled-striate, the wrinkles making an acute angle with axis of fruit; seeds thick and wingless, 2–3 cm long, 2–3.5 cm wide.

*Distribution.* Restricted to the margins of the Rio Xingu and its tributaries, where it mostly occurs in restingas or riverside scrub forest.

This species is closely related to *A. purpurascens* Rusby, which is widespread in Amazonia, and to *A. divaricatum* Miers, which occurs in the caatinga and deciduous forest of eastern Brazil. These are the only other *Adenocalymna* species to have the distinctive winged fruit that characterizes the new species. *Adenocalymna gracielzae* differs dramatically from these species in the thick wingless seeds, presumably representing a water-dispersed derivative of one of these widespread wind-dispersed species. It also differs in the unusual flower shape with a relatively long narrow corolla having the narrow basal part of the tube much elongated. It is likely that *A. gracielzae* represents incipient hawkmoth pollination in this otherwise mostly bee-pollinated genus.

*Paratypes.* BRAZIL. **Pará:** Porto de Moz, Rio Acai, 2 Dec. 1991 (fl), G. dos Santos, N. A. Rosa & M. dos Santos 260 (MG, MO), 2 Dec. 1991 (fr), G. dos Santos et al. 260 (MG, MO), 2 Dec. 1991 (st), G. dos Santos et al. 261 (MG, MO); Senador Jose Porfirio (Sozel), Rio Xingu, 3 Dec. 1991 (fr), G. dos Santos et al. 280 (MG, MO), 5 Dec. 1991 (fl), G. dos Santos et al. 311 (MG, MO); Parauapebas, Reserva Biológica da Serra dos Carajas, 650 m, 21 Nov. 1991 (st), G. dos Santos et al. 199 (MG, MO), 21 Nov. 1991 (fr), G. dos Santos et al. 200 (MG, MO).

***Adenocalymna hatschbachii* A. Gentry, sp. nov.**

TYPE: Brazil. Paraná: Morro do Arrastão, Município Morretes, mata pluvial encosta de morro, 200 m, 18 July 1981 (fl), *Hatschbach* 43956 (holotype, MO; isotype, MBM).

Frutex scandens, ramulis teretibus, minute puberulis. Folia 2–3-foliolata, interdum cirrho simplici, foliolis lanceolatis vel elliptico-lanceolatis, membranaceis, plerumque fere glabris. Inflorescentia floribus in racemo axillari dispositis. Calyx campanulatus, 5-dentatus, 8–12 mm longus; corolla lutea, tubo-campanulata, extus puberula; stamina subexserta. Capsula anguste oblonga, haud compressa, puberula, seminibus non alatis.

Liana (rarely treelet?), the branchlets terete, sparsely to densely minutely puberulous with crisped trichomes, not obviously lenticellate, longitudinally minutely striate, the pseudostipules subulate, to 5 mm long. Leaves 3-foliolate or 2-foliolate with an unbranched terminal tendril or tendril scar, the leaf-

lets lanceolate to lanceolate-elliptic, long acuminate, broadly cuneate to rounded at base, 3–17 cm long, 10.8–4.5 cm wide, membranaceous, drying gray-green with the venation light tannish below, the tertiary venation prominulously raised above and below, glabrous below or with a few trichomes at base of midvein or scattered along main veins, above puberulous along midvein; petiole 0.8–6 cm long, puberulous, the petiolules 0.3–4.5 cm long. Inflorescence an axillary or apparently terminal raceme, finely puberulous with whitish trichomes, the bracts caducous, linear to narrowly lanceolate, eglandular, to 1.5 cm long, the bracteoles linear, mostly ca. 0.5 cm long. Flowers with the calyx campanulate, shallowly and broadly 5-dentate, 8–12 mm long, 5–10 mm wide, densely minutely puberulous, drying tannish to brownish, thin and eglandular or with few inconspicuous glands; corolla yellow, tubular-campanulate above the 1–1.5-cm-long basal tube, 5–6.5 cm long, 1–2 cm wide at mouth of tube, the lobes ca. 1 cm long, the tube 4.5–5.5 cm long, rather densely minutely puberulous outside and on lobes inside, villous with long multicellular trichomes at level of stamen insertion; stamens didynamous, the anthers divaricate, 4–5 mm long, at least the longest pair exserted or subexserted; pistil with the ovary narrowly oblong, strongly tetragonal with raised angles, 4–5 mm long, ca. 1 mm wide, glabrous; disk pulvinate-patelliform, 1 mm long, 2–3 mm wide. Fruit narrowly oblong, the valves woody, strongly convex, 9–17 cm long, 3.5–4.5 cm wide, finely tannish puberulous, the surface usually minutely longitudinally striate, also with a few irregular widely scattered warty projections; seeds thick, wingless, 1.5–2 cm long, 2–2.5 cm wide.

*Distribution.* Restricted to the wet subtropical forests of southern coastal Brazil, occurring near sea level from Paraná to southern São Paulo, and perhaps north to Rio de Janeiro at higher altitudes.

This species is most closely related to *A. dusenii* Kränzlin, which has similar thin calyces and pale intricately prominulous venation on the leaf under-surface, but differs in larger bracts and bracteoles, usual presence of conspicuous calyx glands, thicker distinctly coriaceous leaves, and the corolla more infundibuliform-campanulate with included anthers. It is also closely related to *A. comosum* (Chamisso) DC., and the Neuwied collection, consisting of a single leaflet and flower, was identified as “*Adenocalymna* spec. fors *comosum* var. *lanceolata*” (after an original determination with an unpublished name “*Bignonia divergens*”). *Adenocalymna hatschbachii* differs from *A. comosum* in the much narrower long-acuminate membranaceous leaflets



with a very different less prominulous-veined surface texture.

The Brade collection from Rio de Janeiro was identified by Laroche as *A. guilleminii* (i.e., *A. grandifolium* var. *guilleminii*), a taxon that is vegetatively rather similar but has a completely different, much larger and thicker calyx. This specimen, which has thicker calyces, nonexserted anthers, and was described as a 3-m treelet, may not be conspecific with the material from Paraná.

One specimen that may be referable to this species is not included in the above description. This is *Hatschbach 19251* (MBM, MO) from Rio Cambara, Mun. Paranagua, Paraná, 50 m elev., which differs in more long-exserted anthers and more elliptic leaflets. It is possible that the corolla is also somewhat more zygomorphic than in typical *A. hatschbachii*. Whether this collection represents an extreme form of *A. hatschbachii* or a closely related, undescribed taxon cannot be determined without additional material.

**Paratypes.** BRAZIL. **Paraná:** Reserva Biológica de Sapitanduva, Mun. Antonina, 40 m, 25°30'S, 48°45'W, 24 Jan. 1985 (fr), *Gentry & Zardini 49788* (MBM, MO), 4 Apr. 1982 (fl), *Hatschbach 45193* (MO); Rio Canaveiras, Mun. Guaratuba, 20–50 m, 21 July 1987 (fl), *Hatschbach & Cordeiro 51271*, 2 Oct. 1986 (fr), *Silva & Cervi 193* (MBM, MO); Rio Brumado, Mun. Morretes, 4 July 1984 (fl), *Hatschbach 48076* (MBM, MO). **Rio de Janeiro:** Angra dos Reis, Serra do Mar, 600 m, 29 June 1935 (fl), *Brade 14910* (B, MO, RB); sin. loc. "Brasília," *Neuwied 479* (P). **São Paulo:** Sete Barras, S entrance to Carlos Botelho State Park, 70 m, 46°55'W, 24°22'S, 4 Sep. 1987 (st), *Gentry, Dias & Franco 59037* (MO, SPF).

**Adenocalymna saulense** A. Gentry, sp. nov.

TYPE: French Guiana. Saül, 3°37'N, 53°12'W, between Carbet and "steep, mean hill," 250–350 m, 27 Aug. 1988 (fl), *Mori et al.* (10 collectors) 19192 (holotype, MO; isotypes, CAY, NY not seen).

Frutex scandens, ramulis teretibus. Folia 2–3-foliolata, interdum cirrho simplici, foliolis ellipticis vel oblongo-ellipticis, coriaceis, infra valde aspris. Inflorescentia floribus in racemo ramifloro dispositis. Calyx campanulatus, 2–3-labiatus, 8–10 mm longus; corolla alba, tubo extus glabra, lobis puberulis. Capsula ignota.

Liana, the branchlets terete, minutely puberulous, conspicuously swollen at nodes. Leaves 3-foliolate or 2-foliolate with a terminal tendril or tendril scar, the leaflets elliptic to oblong-elliptic, obtuse to acutish at apex, rounded to truncate at base, 7–17 cm long, 3–7.7 cm wide, coriaceous, drying gray above, gray to gray-green below, glabrous above or with a very few minute trichomes at base of midvein, below

strongly asperous from the scattered very short suberect trichomes, these occasionally in part forked; petiole 2–3 cm long, the petiolules 1–3 cm long, puberulous with minute erect trichomes, distinctly subwoody. Inflorescence a ramiflorous raceme (7-flowered in type), finely grayish puberulous with a mixture of simple and stellate trichomes, each pedicel subtended by a minute bract < 1 mm long, bracteoles absent. Flowers with the calyx campanulate, irregularly 2–3-labiate, 8–10 mm long, 5–7 mm wide, densely minutely puberulous with mixture of stellate and simple trichomes, drying grayish with few striking, large (nearly 1 mm long), black elliptic glands near middle; corolla white, yellow in bud, tubular (?), only in bud in holotype), the tube glabrous except toward apex, tube apex and lobes puberulous outside; ovary oblong,  $\pm$  tetragonal, 2.5 mm long, 1 mm wide, the surface papillate; disk destroyed in only flower dissected. Fruit unknown.

**Distribution.** Known only from the Saül area of French Guiana (see Mori, 1987) where it occurs in well-drained moist forest on lateritic soil.

This species is well-marked vegetatively by the strikingly scabrous leaflet undersurface, and in flower by the reduced bracts, absence of bracteoles, and the unusually large plate-shaped glands on the irregularly bilabiate gray-drying calyx. Its closest relatives are *A. prancei* A. Gentry and *A. subincanum* Huber, which have nonasperous leaves with the venation more raised-reticulate below and tan-drying, 5-denticulate calyces with much smaller glands. Another noteworthy character of *A. saulense* is the strongly swollen woody nodes and subwoody strongly articulated petioles and petiolules. The material available to me has only buds and calyces of fallen flowers, so the corollas at anthesis cannot be described.

**Paratype.** FRENCH GUIANA: **Saül**, second growth near airport, 220 m, 24 June 1988 (st), *Gentry 63176* (CAY, MO).

**Adenocalymna subspicatum** A. Gentry, sp. nov.

TYPE: Brazil. Ceará: Sitio Para, Viçosa do Ceará, carrasco, 14 June 1979 (fl), *A. Fernandes, P. Martins & Matos s.n.* (EAC 6501), (holotype, EAC; isotype, MO).

Frutex scandens, ramulis teretibus, minute puberulis. Folia 2–3-foliolata, interdum cirrho simplici, foliolis lanceolatis vel anguste ovatis, chartaceis vel subcoriaceis, plerumque fere glabris. Inflorescentia floribus in racemo subspicato terminali dispositis, pedicellis 0.1–0.3 cm longis, bracteis 1.5–2.5 cm longis subtentis. Calyx tubulocampanulatus, 5-dentatus, 9–14 mm longus; corolla extus alba, intra lutea, tubulo-infundibuliformis, extus puberula. Capsula ignota.



Liana, the branchlets terete, distinctly longitudinally ridged, glabrous to minutely puberulous with crisped trichomes, pseudostipules subulate, tan, 2–4 mm long. Leaves 3-foliolate or 2-foliolate with a simple tendril, the leaflets lanceolate to narrowly ovate, acute to acuminate but with the apex ultimately minutely emarginate, the base usually asymmetric, rounded to truncate or subcordate on one side, 2.5–10 cm long, 1–3.5 cm wide, chartaceous to subcoriaceous, scattered lepidote-glandular above and below,  $\pm$  inconspicuously and minutely puberulous along midvein above and/or below, otherwise glabrous, drying olive above and below, the venation not prominently raised, the margin inconspicuously and minutely cartilaginous; petiole 0.7–2.5 cm long, petiolules 0.3–1.4 cm long, flattened above, sparsely lepidote and puberulous, especially above. Inflorescence a very narrow terminal raceme, sparsely to conspicuously lepidote and puberulous with rather long bent trichomes, the bracts foliaceous, membranaceous, lanceolate, mostly 1.5–2.5 cm long, 6–8 mm wide,  $\pm$  puberulous, essentially reduced leaves and occasionally  $\pm$  trifid, the pedicels 0.1–0.3 cm long, usually with pair of thin 1–1.5-cm-long bracteoles near middle. Flowers with the calyx tubular-campanulate, broadly and shallowly 5-dentate, 9–14 mm long, 5–6 mm wide, minutely and rather sparsely puberulous, the margin more densely puberulous and whitish, prominently 5-ribbed; corolla white outside, yellow inside, tubular-infundibuliform, 5–6 cm long, 1.2–1.5 cm wide at mouth of tube, the tube 4–5 cm long, the lobes ca. 1.5 cm long, puberulous outside with multicellular kinky trichomes, the lobes densely ciliate, lobes inside glandular-lepidote, tube mostly glabrous inside except at level of stamen insertion; anther thecae divaricate, 3–4 mm long; ovary cylindric, 2.3 mm long, ca. 0.8 mm wide, minutely lepidote; disk patelliform, 1 mm long, 2–3 mm wide. Fruit unknown.

*Distribution.* Apparently endemic to the “carasco” vegetation of the caatinga region of northeast Brazil.

The outstanding feature of this species is its long, rather thin, tubular calyx with five prominent longitudinal ribs. Despite its large bracts, this species is probably most closely related to *A. divaricatum* Miers, which has similar branchlets and pseudostipules, but differs in having minute inconspicuous inflorescence bracts, a shorter, thicker, dark-drying unridged calyx, usually longer pedicels, yellow corolla, and the leaflets prominently reticulate beneath. *Adenocalymna divaricatum* occurs further east in the caatinga and dry habitats nearer the coast. *Adenocalymna subspicatum* occurs in the transition zone between the dry caatinga vegetation and easternmost Amazonian forests. Vegetatively, *A. subspicatum* is also reminiscent of *A. flavum* in the color and texture of its leaves and bracts, but that species has a much smaller, nonribbed calyx.

*Paratypes.* BRAZIL. **Maranhão:** Km 380–375, Belem-Brasília, beira da estrada, terra firme, 28 Aug. 1960 (fl), E. Oliveira 1067 (UB, fragment MO). **Ceará:** Ibipina (?), *Allemao de Cysneiros* 1045 (P).

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