



A new species of *Renealmia* (Zingiberaceae) from Colombia

JUAN C. OSPINA & RAÚL E. POZNER

Instituto de Botánica Darwinion (IBODA), casilla de correo 22, B1642HYD San Isidro, Buenos Aires, Argentina;
jgonzalez@darwin.edu.ar

Abstract

Renealmia elianae (Zingiberaceae), a new species from the Central Andes of Colombia is described and illustrated. *Renealmia elianae* is morphologically close to *R. puberula*, differing by the inflorescence position, corolla size, labellum texture, surface and color, and size of the epigynous glands.

Introduction

Renealmia Linnaeus f. (1781: 79) currently includes about 85 species of medium to large sized, rhizomatous herbs with a pantropical distribution: 23 species are native to Africa (Schumann 1904, Koechlin 1965, Dhetchuvi 1996); about 62 species are found in the Neotropics (Maas 1975, 1977, 1979, 1982, Maas & Maas 1987, 1990). A phylogenetic analysis by Särkinen *et al.* (2007) suggested that *Renealmia* is monophyletic. The taxonomy of *Renealmia* is covered by regional floristic studies (Maas 1975, 1977, 1979, 1982, Bolaños *et al.* 2010, Idarraga & Callejas 2011) and later additions of new species (Maas & Maas 1987, 1990, Dhetchuvi 1996). The taxonomy of neotropical species of *Renealmia* is complex and has been reviewed only once by Maas (1977), after which a number of additional species were described. During the study of the species of *Renealmia* from the western slopes of the Central Andes (“Cordillera Central”) of Colombia, a specimen similar to *R. puberula* Steyermark (1964: 340) was found. However, its leaf morphology and apical inflorescence suggest a clear difference from any of the species of *Renealmia* recorded from the Cordillera Central of Colombia (Vargas 2002, Idarraga & Callejas 2011). After a study of herbarium collections, a bibliographic revision of the Neotropical species of *Renealmia* and several fieldtrips to locate natural populations, we are confidently presenting a new species.

Material and Methods

Collections from COL, CHO, FAUC, HUA, HUQ, JAUM, and MEDEL were morphologically studied and compared with floristic and taxonomical studies of the Neotropical species of *Renealmia* (Maas 1975, 1977, 1979, 1982, Maas & Maas 1987, 1990, Bolaños *et al.* 2010, Idarraga & Callejas 2011). Several fieldtrips to Circasia and Armenia (Quindío) were undertaken, where the first author sampled populations of *Renealmia*, made herbarium vouchers and fixed rhizomes, flowers and fruits in FAA (formalin : acetic acid : 70% ethyl alcohol, 1:1:18, Johansen 1940). Photographs and field observations of growing patterns, rhizomes, and the position of the inflorescence on the plants were also taken.

Taxonomy

Renealmia elianae J.C. Ospina & Pozner, *sp. nov.*, Fig. 1

Renealmia elianae is morphologically similar to *R. puberula* in its plant size, plicate leaves, inflorescences a thyrse, similar indument of reproductive structures, and color of both seeds and arils. It differs from that species in its apical inflorescence on leafy stems (basal on short bracteate shoots in *R. puberula*), labellae 3.0–3.6(–4.0) mm (versus 9–10 mm in *R. puberula*), whitish to translucent, smooth and membranaceous (versus white to yellow, herbaceous, wrinkled in *R. puberula*), corolla 5.0–6.0(–6.5) mm (versus ca. 12 mm in *R. puberula*), and epigynous glands 2.0–2.5 mm (versus 0.8–1.5 mm in *R. puberula*). *Renealmia elianae* shares with *R. cernua* Macbride (1931: 14) the apical inflorescence on leafy stems, but it differs by the leaf blades obovate, plicate (narrowly elliptic, non-plicate in *R. cernua*), inflorescence thyrsoïd (spiciform in *R. cernua*), bracteoles widely divided, green (entire, yellow in *R. cernua*), calyx urceolate and flowers whitish to translucent (calyx tubular and flowers yellow to red-orange in *R. cernua*).

Type:—COLOMBIA. Quindío: Circasia, Vereda Rio Bamba, finca La Secreta, 1600 m, May 2009, *J. C. Ospina González 255* (holotype COL!, isotypes FAUC!, HUQ!, SI!).

Plants rhizomatous, growing in dense groups, 70–100 cm, with ginger-like fragrance. **Stems** erect, herbaceous, 1.5–2.5 cm in diameter. **Sheaths** (8–)10–25 × 3.8–5.0 cm, light green to whitish, coriaceous to herbaceous, abaxial surfaces sparsely with malpighian (T-shaped) trichomes at the distal end. **Ligules** 2.90–9.61 mm, membranaceous, with sparse trichomes. **Petioles** absent. **Blades** obovate, 40–55 × 33–35 cm, coriaceous, bases attenuate, apices acuminate; adaxial sides dark shiny green, glabrous, secondary nerves prominent (plicate blade); abaxial sides light green, pubescent. **Inflorescences** oblong, 15–20 × 7–10 cm, apical thyrses crowning every foliose stem, subtended by a bract 15–20 cm, narrowly oblong, acuminate; **bracts of the inflorescence rachises** narrowly triangular, subtending 3–4 flowered cincinnae (base and median zone of the inflorescence) or 1–2-flowered cincinnae (at the apex of the inflorescence), **bracteoles** tubular, margins open. **Calices** urceolate, 6–7 mm, dark green, coriaceous, with malpighian (T-shaped) trichomes. **Corollas** lobulate, 5.0–6.0(–6.5) mm, whitish, with malpighian (T-shaped) trichomes and glandular dots; **labellae** widely spatulate, 3.0–3.6(–4.0) mm, smooth, translucent to whitish at base, membranaceous, revolute margins sinuate, with malpighian (T-shaped) trichomes. **Staminodia** 2, linear, minute, lateral, 0.7–1.2 mm, green to purple, with malpighian (T-shaped) trichomes; **Stamens** 1, appressed to the style, filament long, **anthers** oblong, 1.3–1.5(–1.8) mm, white with red dots. **Stigmas** capitate, 0.6–1.0 mm, yellow to greenish, papillose; **styles** terete, 9.0–9.5 mm, white, smooth, glabrous; **ovaries** ovoid, 2.8–3.0 mm, dark green, densely pubescent; **epigynous glands** 2.0–2.5 mm, white, surrounding the style base. **Fruits** capsules ellipsoid, 5.3–7.8 × 7.0–8.5 mm, dark red to black, pericarp 1.0–1.5 mm thick, densely pubescent. **Seeds** ovoid- asymmetrical, 3.0–3.6 mm in diameter, yellow to black. **Arils** orange.

Etymology:—Dedicated to Eliana K. Quintana Ángel, the biologist who first found a population of this species.

Distribution:—*Renealmia elianae* grows in a relictual premontane forest, surrounded by an agricultural area with cattle grazing, from the median zone of the Central Andes (“Cordillera Central”) of Colombia, along the western slopes, in Municipio Circasia, between 1500 and 1700 m elevation.

Additional specimens examined (paratypes):—COLOMBIA. Quindío: Vereda Rio Bamba, finca La Secreta, 1600 m, 11 October 2005, *E. Méndez 3987* (COL, HUQ); 3 June 2008, *J. C. Ospina & E. Méndez 164* (COL, HUA, HUQ); 15 August 2010, *G. D. Cano & J. C. Ospina s.n.* (COL, FAUC, HUA). Vereda Mesopotamia, Finca Mesopotamia, 1650 m, April 2009, *J. C. Ospina 215, 216* (COL, FAUC, HUA); May 2009, *J. C. Ospina 256* (COL, FAUC, HUA).

Discussion

Among the characters usually used to discern and characterize the species of *Renealmia*, the position of the inflorescence on the plant, traditionally described as apical (on long leafy stems) or basal (on short, bracteate

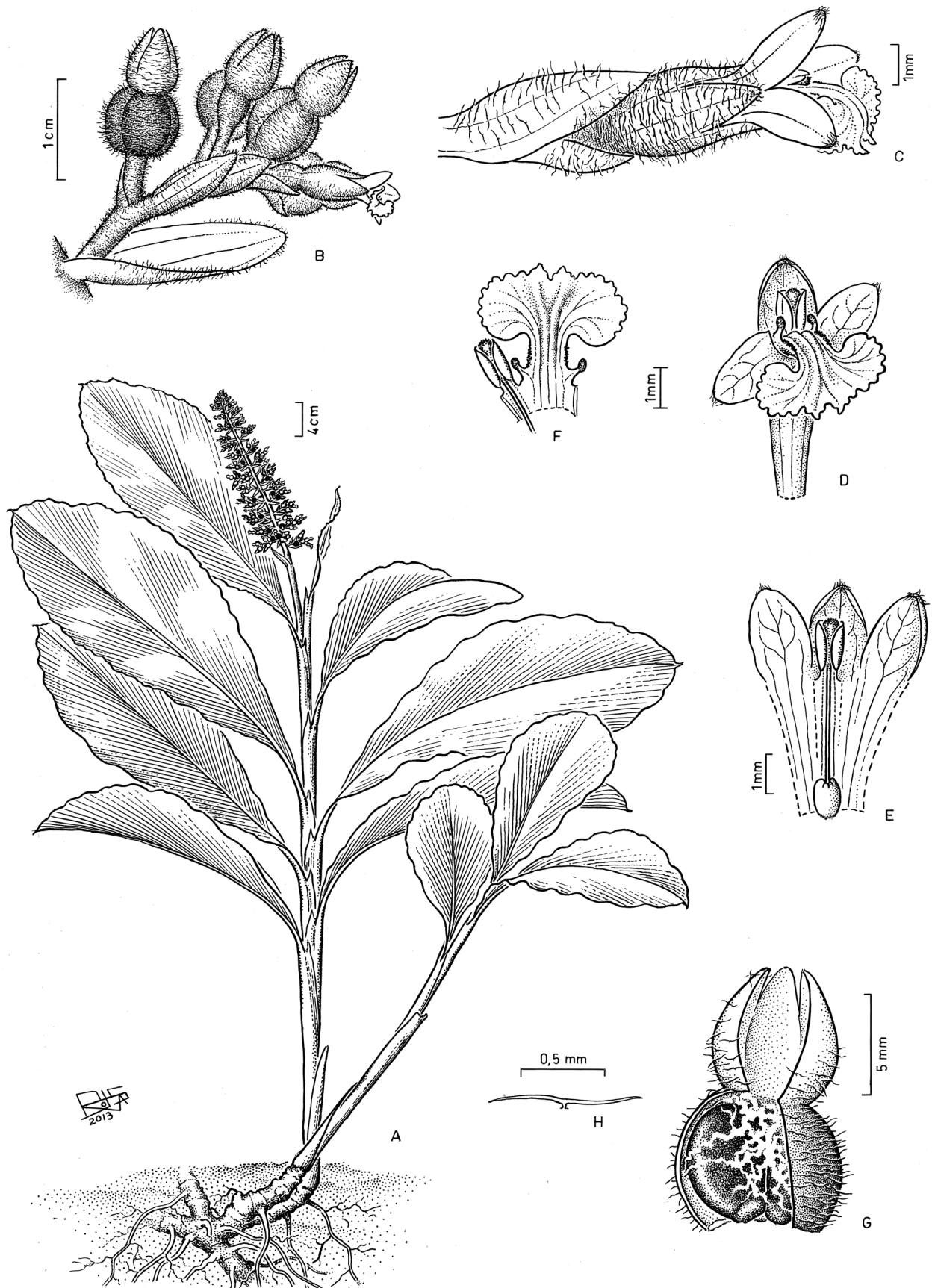


FIGURE 1. *Renealmia elianae*. A, habit. B, cincinnus with bract of the rachis. C, flower, lateral view with bracteole. D, flower, front view. E, epigynous glands, style, stigma, and fertile stamen (corolla partially removed). F, labellum and staminodia (style and fertile stamen on the left). G, fruit with persistent sepals, part of pericarp has been removed to show the seeds. H, malpighian T-shaped trichome. Drawn by Francisco Rojas from *J. C. Ospina González 255* (holotype COL).

shoots close to the rhizome), deserves particular interest. Field observations by the first author revealed that this change in the inflorescence position is the consequence of two different types of growth. In species of *Renealmia* with apical inflorescences, every aerial shoot produces normal leaves and ends its growth with a terminal inflorescence, well exposed above the foliage, being at the same time vegetative and reproductive shoots [e.g. *R. cernua*, *R. densiflora* Urban (1921: 18), *R. pyramidalis* Maas (1975: 479) and our new species *R. elianae*]. On the other hand, in those species with basal inflorescences, the rhizomes produce two types of aerial shoots: leafy, relatively long, vegetative shoots, and short, bracteate, reproductive shoots, with a terminal inflorescence close to ground level [e.g. *R. aromatica* Grisebach (1864: 601), *R. ferruginea* Maas (1975: 476), *R. ligulata* Maas (1975: 477), *R. nicolaioides* Loesener (1927: 65), *R. thyrsoides* Poeppig & Endlicher (1838: 26), *R. puberula*, *R. concinna* Standley (1927: 249)]. Therefore, the position of the inflorescence in the plant could not only be a key character to discern *R. elianae* from *R. puberula*, but also a valuable taxonomical feature to identify other species of *Renealmia*.

Key to the species of *Renealmia* from the Central Andes of Colombia

1. Inflorescence apical, e.g. every aerial shoot leafy, ending in a terminal inflorescence, well exposed above the foliage of the plant 2
- Inflorescence basal, e.g. two types of aerial shoots, foliose-vegetative and floriferous-reproductive. Floriferous shoots, short, bracteate, bearing inflorescences close to ground level, well below the foliage of the plant 3
2. Leaf blades narrowly elliptic, non-plicate; inflorescence spiciform; bracteoles tubular, entire, yellow; calyx tubular; flowers yellow to red-orange *R. cernua*
- Leaf blades obovate, plicate; inflorescence thyrsoïd; bracteoles tubular, widely divided, green; calyx urceolate; flowers whitish to translucent *R. elianae*
3. Leaf blades obovate, plicate, herbaceous *R. puberula*
- Leaf blades narrowly elliptic, non-plicate, coriaceous 4
4. Scapes 50–70(–100) cm, dry forests below 1000 m elevation *R. aromatica*
- Scapes 10–20(–35) cm, premontane and montane moist forests between 1600–2500 m elevation 5
5. Inflorescences spiciform or racemiform; bracts of the rachis whitish to pink; flowers yellow to yellowish-red 6
- Inflorescences thyrsoïd; bracts of the rachis red to orange; flowers white 7
6. Petioles present (2.0–12.5 mm); leaf blades (80–)90–130 cm; bracts of the rachis narrowly triangular to ovate-triangular; floral structures densely pubescent with brown appressed trichomes *R. nicolaioides*
- Petioles absent; leaf blades 20–50(–60) cm; bracts of the rachis obovate; floral structures glabrous or with sparse white malpighian (T-shaped) trichomes *R. thyrsoides*
7. Calyx tubular, (18–)20–30 mm; floral structures densely pubescent [velvety ferruginous indument, with malpighian (T-shaped) trichomes] *R. ferruginea*
- Calyx turbinate, 8–13(–15) mm; floral structures glabrous or with sparse, simple, white trichomes [rarely malpighian (T-shaped)] *R. ligulata*

Acknowledgements

We thank Red Latinoamericana de Botánica and the Andrew W. Mellon foundation for their financial support through the fellowship RLB2010–P06. We also thank Dr. Fernando Zuloaga for allowing us to use the facilities at Instituto de Botánica Darwinion and we thank Francisco Rojas for the botanical illustration.

References

- Bolaños, R.G.Y., Feuillet, H.C., Chito, C.E., Muñoz, E.E. & Ramírez, P.B.R. (2010) Vegetación, estructura y composición de un área boscosa en el jardín botánico "Álvaro José Negret", vereda La Rejota, Popayán (Cauca, Colombia). *Boletín Científico del Centro de Museos de Historia Natural de la Universidad de Caldas* 14: 19–38.
- Dhetchuvi, M.M. (1996) *Taxonomie et phytogéographie des Marantaceae et des Zingiberaceae de l'Afrique centrale (Gabon, Congo, Zaïre, Rwanda et Burundi)*. Ph.D. Thesis. Brussels: Laboratoire de botanique systématique et de phytosociologie, Université Libre de Bruxelles, 438 pp.
- Grisebach, A.H.R. (1864) *Flora of the British West Indian Islands*. London: Lovell Reeve & Co., 789 pp.

- Idárraga P., A. & Callejas P., R. (2011) Análisis florístico de la vegetación del Departamento de Antioquia, pp. 9–939 In: Idárraga, A., del C. Ortiz, R., Callejas, R. & Merello, M. (eds.). *Flora de Antioquia: catálogo de las plantas vasculares. vol. II. Listado de las plantas vasculares del departamento de Antioquia*. Bogota: Programa Expedición Antioquia–2103. Series Biodiversidad y Recursos Naturales. Universidad de Antioquia, Missouri Botanical Garden & Oficina de planeación departamental de la gobernación de Antioquia, Editorial D’Vinni.
- Johansen, D. A. (1940) *Plant Microtechnique*. New York: McGraw-Hill, 523 pp.
- Koechlin, J. (1965) Scitaminales: Musacées, Stréltiziacées, Zingibéracées, Cannacées, Marantacées. In: Aubreville, A. (ed.) *Flore du Cameroun, part 4*, Paris: Museum d’Histoire Naturelle, 9: 1–172.
- Linnaeus f., C. (1781) *Supplementum Plantarum Systematis vegetabilium editionis decimae tertiae, generum plantarum editiones sextae, et specierum plantarum editionis secundae*. Editum a Carolo a Linné. Braunschweig: by the author, 468 pp.
- Loesener, T. (1927) Zingiberaceae novae vel minus cognitae. *Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem*. 10: 66–68.
- Maas, P.J.M. (1975) Notes on New World Zingiberaceae. *Acta Botanica Neerlandica* 24: 469–480.
- Maas, P.J.M. (1977) *Renealmia* (Zingiberaceae–Zingiberoideae) Costoideae (additions) (Zingiberaceae). *Flora neotropica monograph* 18: 1–161. New York: New York Botanical Garden for Organization of Flora Neotropica.
- Maas, P.J.M. (1979) Notes on New World Zingiberaceae: 2. *Acta Botanica Neerlandica* 28: 90.
- Maas, P.J.M. (1982) Zingiberaceae. In: de Febres, Z. L. & Steyermark, J. A. (eds.) *Flora de Venezuela* 11(2): 205–256.
- Maas, P.J.M. & Maas, H. (1987) Notes on New World Zingiberaceae: 3. Some new species in *Renealmia*. *Notes from the Royal Botanic Garden, Edinburgh* 44: 237–248.
- Maas, P.J.M. & Maas, H. (1990) Notes on New World Zingiberaceae: 4. Some new species of *Costus* and *Renealmia*. *Notes from the Royal Botanic Garden, Edinburgh* 46: 307–320.
- Macbride, J.F. (1931). Zingiberaceae. In: Macbride, J.F. (ed) *Flora of Peru. Publications of the Field Museum of Natural History, Botanical Series* 11(1): 1–507.
- Poeppig, E.F. & Endlicher, S.F.L. (1838) *Nova Genera ac Species Plantarum, quas in regno chilensi peruviano et in terra amazonica annis MDCCCXXVII ad MDCCCXXXII*, vol. 2(9–10): 61–74. Leipzig: F. Hofmeister.
<http://dx.doi.org/10.5962/bhl.title.453>
- Särkinen, T.E., Newman, M.F., Maas, P.J.M., Maas, H., Poulsen, A.D., Harris, D.J., Richardson, J.E., Clark, A., Hollingsworth, M. & Pennington, R.T. (2007) Recent oceanic long-distance dispersal and divergence in the amphiatlantic rain forest genus *Renealmia* L.f. (Zingiberaceae). *Molecular Phylogenetics and Evolution* 44: 968–980.
<http://dx.doi.org/10.1016/j.ympev.2007.06.007>
- Schumann, K. (1904) Zingiberaceae. In: Engler, A. (ed.) *Das Pflanzenreich* 4/46: 1–458. Leipzig: Engelmann.
- Standley, P.C. (1927) New plants from Central America. *Journal of the Washington Academy of Sciences* 17: 7–16.
- Steyermark, J.H. (1964) Notes on Ecuador Plants. *Phytologia* 9: 340–341.
- Urban, I. (1921) Plantae Haitienses novae vel rariores a cl. Er. L. Ekman 1917 lectae. *Arkiv fur Botanik* 17(7): 1–72.
- Vargas, W.G. (2002) *Guía ilustrada de las plantas de las montañas del Quindío y los Andes Centrales*. Caldas: Ciencias Agropecuarias, Universidad de Caldas, 813 pp.