

## Revision of *Reldia* (Gesneriaceae)

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*Reldia* (Gesneriaceae) includes terrestrial herbs with alternate leaves, inflorescences which often possess both primary and secondary pedicels but are epedunculate, small white, spurred flowers, a nectary usually reduced to a dorsal gland, and a bivalved capsule. The genus is distributed from Panama to northern Peru. In the present work five species are recognized: *Reldia alternifolia* from Panama; *R. minutiflora*, originally described from Peru, but distributed from this country north to Panama; two new species from eastern Ecuador, *R. calcarata* and *R. multiflora*, and one new species from Colombia, *R. grandiflora*. Two varieties of *R. minutiflora* are recognized, var. *minutiflora* and var. *veraguensis*.

*Reldia* occurs in forested, deeply shaded and highly humid ravines usually along streams. The altitude ranges from sea level up to 2500 meters.

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### Introduction

*Reldia* Wiehl. is a small genus that mainly occurs in mountain forests, and to a lesser extent in lowland rainforests, usually in humid, shaded ravines along streams. It is distributed from Panama to northern Peru but is rarely collected and does not thrive in culture. The most remarkable feature of the genus is the alternate leaf arrangement, a rare feature in Gesneriaceae, which distinguishes *Reldia* from its relatives *Gasteranthus* Benth. and *Cremosperma* Benth.

In the present work five species of *Reldia* are recognized. Wiehler (1977) based the genus on two species from Panama, *R. alternifolia* and *R. veraguensis*. The latter is in this work reduced to *R. minutiflora* var. *veraguensis*. *Reldia minutiflora* var. *minutiflora* was originally described as *Nautilocalyx minutiflorum* by Skog (1974), and later transferred to *Cremosperma* by Wiehler (1978). Three species are newly described, *R. calcarata* and *R. multiflora* from Ecuador and *R. grandiflora* from Colombia.

### Material and methods

This revision is based on studies of herbarium material and on field observations of *R. alternifolia* in Panama, *R. grandiflora* in Colombia, *R. minutiflora* var. *minutiflora* in Ecuador and *R. minutiflora* var. *veraguensis* in Colombia.

### General part

#### Delimitation of *Reldia*

Specimens of *Reldia* are often confused with those of the genus *Cremosperma*, but *Reldia* is more closely related to *Gasteranthus* Wiehler (1983) placed these genera (along with *Besleria* L. and three small and possibly unrelated genera, *Anetanthus* Hiern, *Resia* H. E. Moore and *Tylopsacus* Leeuw.) into the tribe *Beslerieae*, a group based mainly on the ebracteate state of their inflorescences. *Besleria* itself differs from *Reldia*, *Cremosperma* and *Gasteranthus* by having berries instead of dry or fleshy capsules. The features that distinguish *Reldia* from *Cremosperma* and *Gasteranthus* appear in Tab. 1. The only characters which immedi-

Tab. 1. Features that distinguish *Reldia* from *Creemosperma* and *Gasteranthus*.

	<i>Reldia</i>	<i>Creemosperma</i>	<i>Gasteranthus</i>
Leaf arrangement	alternate	opposite, ternate	opposite
Stomata	scattered (clustered)	scattered	clustered
Inflorescences	epedunculate	pedunculate	pedunculate
Calyx lobes	nearly free	adnate half of length	usually nearly free
Spur	present	absent	present
Nectary	usually a dorsal gland	annular, seminannular or dorsally thickened	usually annular or semiannular
Capsule	dry, bivalved	dry, bivalved or irregular	fleshy, bivalved or irregular
Seeds	globose to broadly elliptic	narrowly elliptic	globose to broadly elliptic

ately distinguish *Reldia* from both the other two genera, are the alternate leaf arrangement and the frequent possession of epedunculate inflorescences with both primary and secondary pedicels. However, an additional number of features set *Reldia* apart from one or the other of these genera (Tab. 1), and we believe *Reldia* to be a distinct genus.

#### Inflorescences

The inflorescences of *Reldia* are located in the leaf axils toward the apex of the shoots. Often several inflorescences appear to arise from a single leaf axil due to the fact that both primary and secondary pedicels exist, and peduncles are absent (Fig. 1A). This feature is seen in *Reldia calcarata*, *R. grandiflora*, *R. multiflora* and both varieties of *R. minutiflora*. *Reldia alternifolia*, is also epedunculate, but has only primary pedicels (Fig. 1D). This compound inflorescence type (Fig. 1A) is often reduced (Fig. 1B,C,D,E), and the different stages

frequently occur on the same shoot. We have never observed inflorescences with peduncles on the same plant with primary and secondary pedicels (Fig. 1F). Thus, *Reldia* lacks peduncles in contrast to *Creemosperma* and *Gasteranthus* which do have pedunculate inflorescences. Still, some reduced inflorescences of *Reldia* may, for all practical purposes, appear pedunculate (Figs 1C, 7A). The inflorescence shown in Fig. 1 is simplified as the secondary pedicels are arranged in a raceme (Fig. 7A) rather than in an umbel.

#### Stomata

According to Wiehler (1983) the stomata of the New World Gesneriaceae predominantly are the anisomesogenous type. These have three subsidiary cells as demonstrated by *R. grandiflora* (Fig. 2C). The stomata of *R. calcarata* and both *R. minutiflora* varieties (Fig. 2B,D,E) are raised above the surface of the leaves, in contrast to those of *R. alternifolia*, *R. grandiflora* and *R. multiflora* (Fig. 2A,C,F). Wiehler (1983) suggested that a raised stoma is an adaptation that helps to increase the transpiration in a humid environment with little air-movement. This explanation would be apt for the occurrence of this feature in *Reldia*. However it is puzzling that two vegetatively very similar species growing in similar habitats, *R. calcarata* and *R. grandiflora*, would have raised and "plane" stomata respectively (Fig. 2B,C).

Wiehler (1977) and Skog (1978) claimed that clusters of stomata occur in *R. alternifolia*. We have searched carefully for stomata clusters in all five species (Fig. 2). We never observed the stomata located in conspicuous clusters as illustrated by Wiehler (1977). Their distribution is scattered and appears entirely random, and consequently occasionally two or three or even four stomata are located close together as illustrated by Skog (1978), but these groups are not easily distinguishable from the surrounding cells. According to Wiehler (1975) all species of *Gasteranthus* have clustered stomata and in some species the clusters are visible to the naked eye. Skog (1976) found that both scattered and clustered stomata occur in the genus *Gesneria*. According to Hoover (1986) a clustered arrangement of the stomata reduces transpiration, but *Reldia*, and the gen-

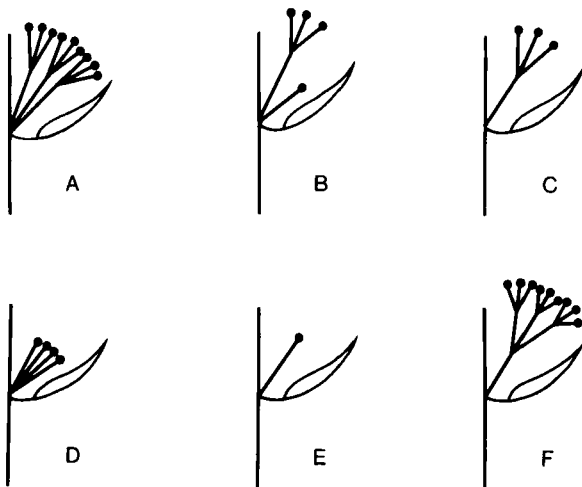


Fig. 1. Inflorescence types (the arrangement of the secondary pedicels is simplified). - A: Epedunculate *Reldia* inflorescence with primary and secondary pedicels. - B-E: Reduction stages of the A inflorescence type. - F: Pedunculate inflorescence not found in *Reldia*.

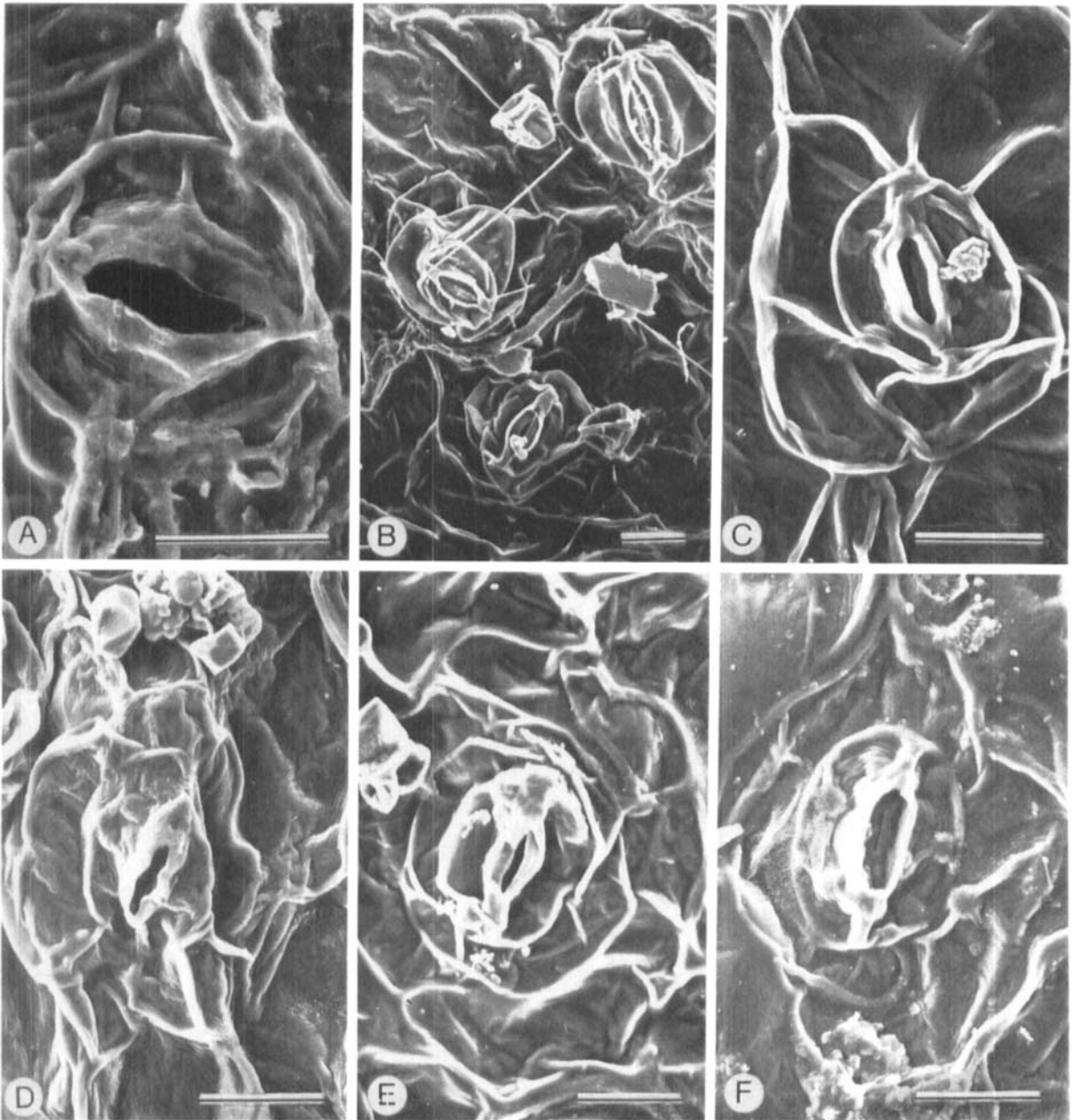


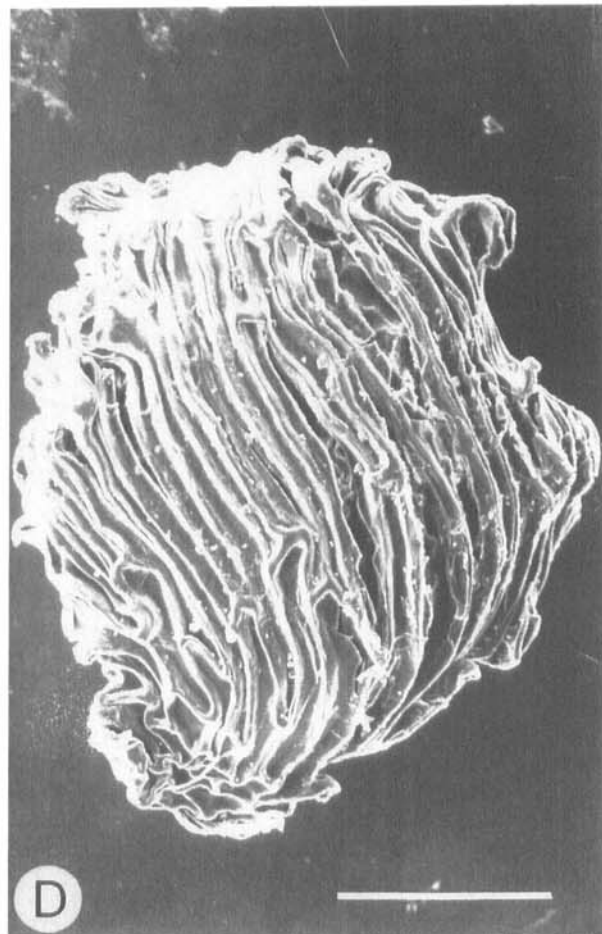
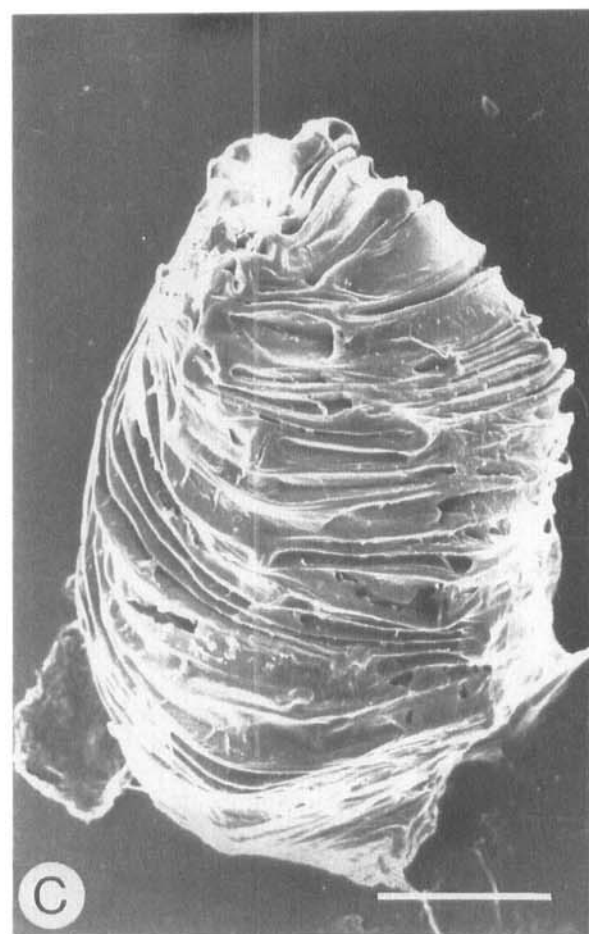
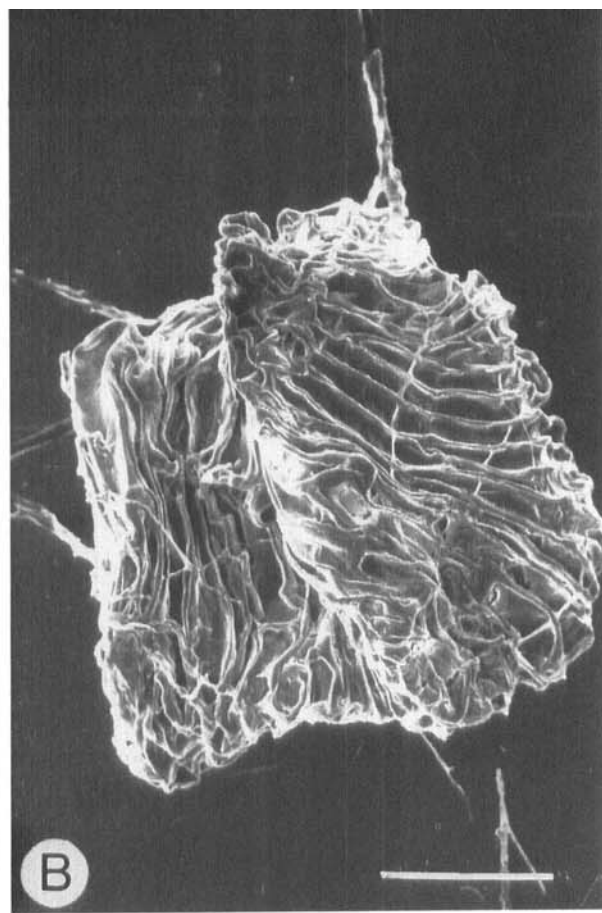
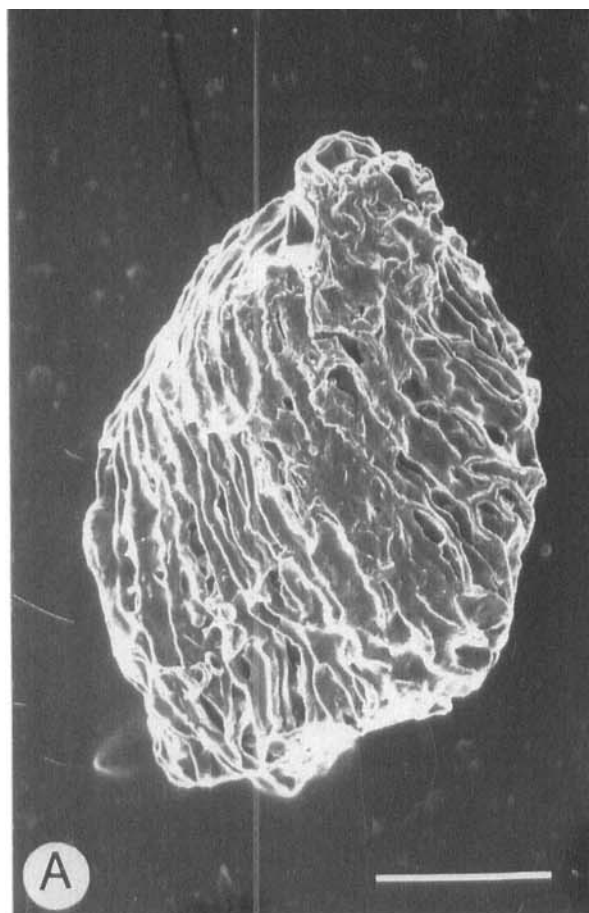
Fig. 2. The stomata of *Reldia*. – A: *R. alternifolia* (Dressler 4891). – B: *R. calcarata* (Steyermark 54284). – C: *R. grandiflora* (Luteyn 10607). – D: *R. minutiflora* var. *minutiflora* (Berlin 1946). – E: *R. minutiflora* var. *veraguensis* (Lawrance 83). – F: *R. multiflora* (Oellgaard et al. 39241). – Scale: 20  $\mu$ m.

era of Gesneriaceae with clustered stomata, *Gasteranthus*, *Gesneria* and *Napeanthus*, occur in very humid habitats with a need to increase rather than to reduce the transpiration.

#### Seeds

Beaufort-Murphy (1983) illustrated the seeds of *Reldia alterniflora* and *Cremaosperma minutiflorum* (= *Reldia minutiflora* var. *minutiflora*). She noted the seeds of

*Cremaosperma minutiflorum* to be different from those of other *Cremaosperma* species but similar to those of *Reldia* and *Besleria*. We have examined the seeds of all *Reldia* taxa, and illustrate the seeds of the remaining taxa, *R. calcarata* (Fig. 3A), *R. grandiflora* (Fig. 3B), *R. minutiflora* var. *veraguensis* (Fig. 3C) and *R. multiflora* (Fig. 3D) which are similar to those of the two *Reldia* taxa illustrated by Beaufort-Murphy (1983). *Reldia* has irregularly globose to broadly elliptic seeds in contrast to *Cremaosperma*, the seeds of which are narrowly ellip-



tic. Each capsule contains numerous tiny seeds (0.3–0.4 × 0.2–0.3 mm). The seed surface is striate-reticulate and shows little variation among the taxa (Fig. 2).

### Ecology

*Reldia* is found in shaded, permanently humid ravines, along streams or close to waterfalls. Most plants grow on steep moss-covered rocks. This habitat is common to all the taxa we have observed, thus the genus must be adapted to very low light intensities. In this habitat few other flowering plants occur. However, several other genera of Gesneriaceae, such as *Napeanthus*, *Gasteranthus*, *Diastema* and *Parakohleria* frequently share the habitat with *Reldia*. The genus is rarely collected partly due to its extreme habitat, and partly because the plants possess few flowers at any time. However, when sought for in its habitat, species of *Reldia* are locally fairly common. In the Pastaza river valley of Ecuador *R. minutiflora* var. *minutiflora* was found in three of four visited ravines (Kvist 60313, 60316, 60328) Previously only three collections existed from Ecuador. Equally, *R. minutiflora* var. *veraguensis* was frequent on the eastern slopes of the Andes in the Dept Caquetá, Colombia (Londoño & Kvist 131, 140, 148). These were the first collections from this department.

*Reldia* occurs in a habitat practically unaffected by seasonal changes, and appears to flower continuously but with low intensity. *Reldia* populations apparently offer pollinators a constant supply of flowers throughout the year. The identities of the pollinators are unknown. The five species of *Reldia* are distinguished by floral characters. Only *R. minutiflora* and *R. multiflora* have flowers so similar that it is likely they share the same or related pollinators (Figs 6D,d, 7C). Of the other species, the throat of *R. alternifolia* (Fig. 6A,a) is much wider, *R. calcarata* (Fig. 6B,b) possesses a long spur, and *R. grandiflora* (Fig. 6C,c) has the largest flowers.

*Reldia minutiflora* var. *minutiflora* (Kvist 60313, 60316, 60128) and *R. grandiflora* (Londoño & Kvist 100) appear to propagate mainly by shoots arising from creeping, moss-covered rhizomes, thus forming small open clones. The plants of *R. minutiflora* var. *veraguensis* (Londoño & Kvist 131, 140, 148) are usually scattered, indicating that this taxon primarily reproduces by seeds.

So far only *R. alternifolia* has been in cultivation and the species has to our knowledge died out in culture. We brought *R. grandiflora* (Londoño & Kvist 100) back alive, but it did not survive. Species of *Reldia* will probably prove to be very slowgrowing in culture, just as ecologically similar species of *Parakohleria* and *Napeanthus*.

### Distribution

Many genera of Gesneriaceae consist of a single or a few widespread species, and a larger number of narrow endemics. The latter however are often common within their restricted distribution ranges. The local endemics usually show little variation, while the widespread species may be quite variable. This variability can be seen in the genus *Creemosperma* with *C. hirsutissimum* (Kvist & Skog 1988) and the genus *Heppiella* with *H. ulmifolia* (Kvist, in prep.), as good examples. Similarly, *Reldia*, has *R. minutiflora* as the widespread, variable species (Fig. 5), and the four other species have restricted ranges and little variation (Fig. 4).

### Taxonomy

#### *Reldia* Wiehl.

Wiehler 1977: 124. – Type: *R. alternifolia* Wiehl.

Suffrutescent terrestrial herbs. Shoots often rising from creeping rhizomes, stems terete. Leaves alternate, spirally arranged, often clustered towards the stem apex; stomata often raised above the leaf surface, scattered apparently at random on the abaxial surface with occasional clusters of 2–4. Inflorescences with 1-numerous flowers in upper leaf axils, epedunculate but occasionally appearing pedunculate due to reduction, often with both primary and secondary pedicels, ebracteate. Calyx lobes equal to subequal, free nearly to the base; corolla funnel-shaped, usually white, often with yellow in the throat, the tube dorsally spurred, the limb unequal; stamens didynamous, subincluded, less commonly included, filaments adnate to corolla tube base for 0.8–2.0 mm, anthers coherent, thecae separate or partly confluent, a dorsal staminode present; disc usually a posterior bilobed gland, rarely two glands or absent; ovary superior, stigma capitate. Fruit a dry capsule, surrounded by the persistent calyx, dehiscence bivalved; seeds numerous, irregularly globose to broadly elliptic, striate-reticulate.

#### Key to the species and varieties of *Reldia*

1. Corolla throat 3.5–6.0 mm wide, corolla 13–19 mm long, lobes never indented; inflorescences with only primary pedicels; upper leaf surface flat, margin subentire ..... 1. *R. alternifolia*
1. Corolla throat 1.5–3.0 mm wide, corolla 6–25 mm long, lobes often indented; inflorescences frequently both with primary and secondary pedicels; upper leaf surface flat or tuberculate, margin serrate or subentire ..... 2
2. Corolla 18–25 mm long, at least upper lobes indented, spur 2–3 or 6–8 mm long; upper leaf surface tuberculate, margin serrate ..... 3
2. Corolla 6–15 mm long, lobes not indented, spur 1–2 mm

Fig. 3. The seeds of *Reldia*. – A: *R. calcarata* (Seyermark 54284). – B: *R. grandiflora* (Luteyn 10607). – C: *R. minutiflora* var. *veraguensis* (Folsom & Renteria 10344). – D: *R. multiflora* (Oellgaard et al. 39241). – Scale: 100 µm.

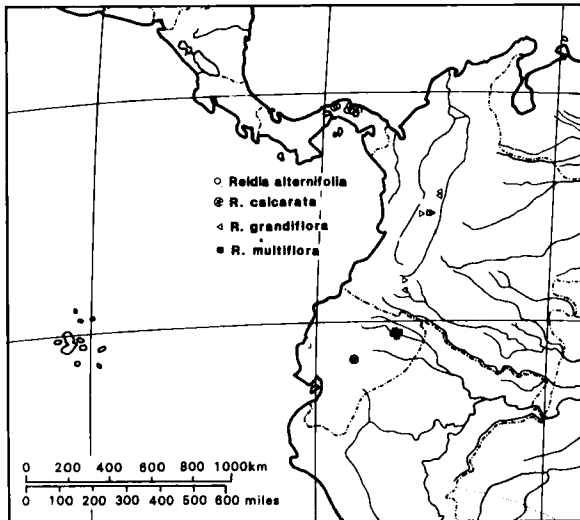


Fig. 4. The distribution of *Reldia alternifolia*, *R. calcarata*, *R. grandiflora* and *R. multiflora*.

- long; upper leaf surface flat or tuberculate, margin serrate or subentire. .... 4
3. Corollas with a 6–8 mm long spur; leaves elliptic-obovate ..... 2. *R. calcarata*
3. Corollas with a 2–3 mm long spur; leaves oblanceolate ..... 3. *R. grandiflora*
4. Calyx lobes nearly as long as the corolla, 6–8 mm long, linear; leaves not succulent, upper surface glabrous, margin serrate. .... 5. *R. multiflora*
4. Calyx lobes half of corolla length or less, lobes 3–5 mm long, lanceolate-ovate; corolla 7–15 mm long; leaves often succulent, upper surface tuberculate or glabrous, margin serrate or subentire. .... 5
5. Upper leaf surface pilose and tuberculate, margin serrate; shoots often arising from creeping rhizomes ..... 4a. *R. minutiflora* var. *minutiflora*
5. Upper leaf surface glabrous and usually flat, margin subentire; shoots rarely arising from creeping rhizomes ..... 4b. *R. minutiflora* var. *veraguensis*

**1. *R. alternifolia* Wiehl.**

Wiehler 1977: 124. – Type: Dressler 4540, Panama, Prov. Panama, El Llano-Carti highway, 17 km N of El Llano (SEL holotype, PMA, SEL, US isotypes).

*Illustrations.* Figs 2A (stomata), 6A,a (corolla). – Wiehler 1977: pl. 35A. – Skog 1979: 977, fig. 31.

Erect shoots 5–15 cm long. Leaves obovate-oblanceolate, succulent, upper surface nearly plane (not tuberculate), glabrous, margin subentire. Inflorescences of 1–8 flowers, congested in upper leaf axils. Calyx lobes ovate, 4–6 mm long, corolla 13–19 mm long, white, throat 3.5–6.0 mm wide, yellow striped, limb 13–16 mm wide, lobes glabrous.

*Additional specimens.* Panama. Prov. Colón: Río Escandaloso, Antonio 1305 (MO, US). – Between Río Guanche and Río

Iguanita, Dressler 4891 (SEL). – Río Escandaloso, Hammel 3227 (MO), 3734 (MO), 3915 (MO), 3920 (MO). – Above Río Iguanita, Skog et al. 4189 (E, MO, US). – Prov. Panama: San Blas border, El Llano-Carti road, km 14, Folsom 3500 (MO), km 15, Folsom & Maas 5204 (MO, US), km 12, Folsom et al. 6165 (MO). – El Llano-Carti road, km 10–15, Maas et al. 2821 (NY). – Prov. San Blas: 15 km N of La Margarita, Hammel & McPherson 14512 (MO). – El Llano-Carti road, Nusagandi, Nevers & Gonzalez 3661 (MO, US). – El Llano-Carti road, km 17, Nevers & Herrera 4160 (MO). – Between Cangandi and San José, Nevers & Herrera 6956 (MO). – Río Taimdi, Nevers & Herrera 7670 (MO).

*Distribution.* Along the Caribbean side of Panama, where it has been found along streams in wet tropical lowland rainforest from sea level to 500 meters altitude (Fig. 4).

*Distinguishing features.* The combination of nearly flat, glabrous leaves, large flowers with wide throats (diam. 3.5–6.0 mm in contrast to 1.5–3.0 mm. in other species) and inflorescences that only have primary pedicels identifies *R. alternifolia*. It is difficult to distinguish *R. alternifolia* vegetatively from *R. minutiflora* var. *veraguensis*, while *R. multiflora* differs by having less succulent leaves with a serrate margin.

**2. *R. calcarata* Kvist et L. Skog, sp. nov.**

Type: Steyermark 54284, Ecuador, Prov. Morona-Santiago, trail between Mirador and Pailas, in shade of moist bluff, 2000–2250 m, Sept. 9, 1943 (US holotype, F isotype).

*Illustrations.* Figs 2B (stomata), 3A (seed), 6B,b (corolla).

Differt a *Reldia grandiflora* Kvist et L. Skog calcaribus longioribus (6–8 mm longis), foliis elliptico-obovatis, a

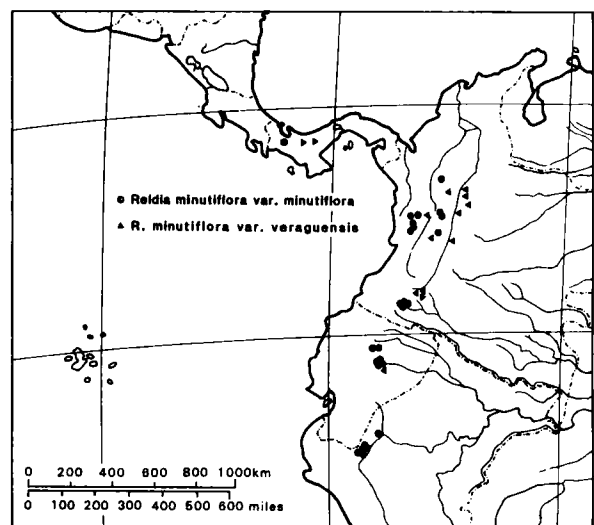


Fig. 5. The distribution of *Reldia minutiflora*.

*R. minutiflora* var. *minutiflora* floribus magnis, lobis corallis superis indentatis.

Terrestrial suffrutescent herbs. Stems unbranched, 40–50 cm long, pilose to lanate near apex; internodes 1.5–3.0 cm long. Leaves alternate; blade elliptic-obovate, 8–12 × 3–5 cm, apex acute, base cuneate, oblique, margin serrate, above dark bluish-green, tuberculate, sparsely pilose to glabrous, below green, rugose, pilose; petiole 1–2 cm long, lanate. Inflorescences with 4–10 flowers in upper leaf axils; primary pedicels 1–2, each 4–6 cm long, sparsely pilose, secondary pedicels 3–5, each 4–9 mm long, pilose. Calyx lobes 3–5 mm long, ovate, apex acute, outside sparsely pilose, inside glabrous; corolla funnel-shaped, white, spur 6–8 mm long, narrow, tube 6–7 mm long, diam. 2–3 mm, outside pilose, throat 2–3 mm wide, villous, limb 11–14 mm wide, glabrous, lobes obovate, upper lobes 4–5 mm long with indented edge, lateral lobes and lower lobe 5–7 mm long; stamens subincluded, filaments ca. 5 mm, glandular hairy, anthers ca. 0.8 × 0.8 mm, coherent in pairs, thecae separate; staminode 1–2 mm long; disc a bilobed dorsal gland, 0.3–0.7 mm high; ovary pilose, style ca. 5 mm long, sparsely pilose. Capsule globose, diam. 2–4 mm, dehiscence bivalved; seeds ca. 0.4 × 0.3 mm, broadly elliptic.

*Distribution.* Only known from the type locality in Ecuador (Fig. 4).

*Distinguishing features.* The very long spur distinguishes *Reldia calcarata* (Fig. 6B,b) from the closely related and vegetatively nearly identical *R. grandiflora* (Fig. 6C,c). Specimens of *R. minutiflora* var. *minutiflora* are also often vegetatively similar, but this taxon has smaller flowers with only a 1–2 mm long spur, and its corolla lobe margins are not indented, only often somewhat erose (Fig. 6D,d).

### 3. *Reldia grandiflora* Kvist et L. Skog, sp. nov.

Type: Londoño & Kvist 100, Colombia, Dept. Caquetá, road Guadalupe-Florencia, km 14, primary mountain forest along stream, 2200 m, 7 Feb. 1987 (AAU holotype, COL, QCA, TULV, US).

*Illustrations.* Figs 2c (stomata), 3B (seed), 6C,c (corolla).

Differt a *Reldia calcarata* Kvist et L. Skog calcaribus brevibus (2–3 mm longis), foliis oblanceolatis, a *R. minutiflora* var. *minutiflora* floribus magnis, lobis corallis indentatis.

Terrestrial suffrutescent herbs. Stems unbranched, 15–50 cm long, pilose to villous toward apex, rising from creeping rhizomes; internodes 1–2 cm long. Leaves alternate; blade oblanceolate, 6–15 × 1.5–4.5 cm, apex acute, base cuneate, oblique, margin serrate, above dull

green, tuberculate, sparsely pilose to glabrous, below green, pilose; petioles 2–10 mm long, villous. Inflorescences of 1–5 flowers in upper leaf axils; primary pedicels 1 (–2), each 3–6 cm long, pilose, secondary pedicels 0 (–5), each 4–12 mm long, villous. Calyx lobes 3–6 mm long, lanceolate, apex acuminate, outside pilose, inside glabrous; corolla funnel-shaped, white, spur 2–3 mm long, tube 9–11 mm long, diam. 3–4 mm, outside pilose, inside glandular, limb nearly glabrous, diam. 17–21 mm wide, lobes obovate with indented edge, upper lobes 5–7 mm long, lateral and lower lobes 9–11 mm long; stamens included, filaments 4–5 mm long, nearly glabrous, anthers ca. 0.8 × 0.5 mm, coherent, thecae partly confluent, staminode ca. 1 mm long; nectary a dorsal bilobed gland, 0.3–0.5 mm high, rarely absent; ovary pilose, style ca. 4 mm long, sparsely pilose. Capsule globose, diam. 2–3 mm, dehiscence bivalved; seeds ca. 0.35 × 0.35 mm, irregularly globose.

*Additional specimens.* Colombia. Dept. Caquetá: Río Hacha, below Gavinete, Cuatrecasas 8577 (F). – Dept. Tolima: Ibagué, Goudot s.n. (K, P). – Mariquita, Linden 960 (BM, BR, K, P, W). – Mariquita (?), Linden 964 (P). – Ibagué-Nevada del Tolima road, 18 km beyond Juntas, Luteyn et al. 10607 (NY, US). – 11 km beyond Juntas, Río Conbeima valley, Stein 3530 (MO, US).

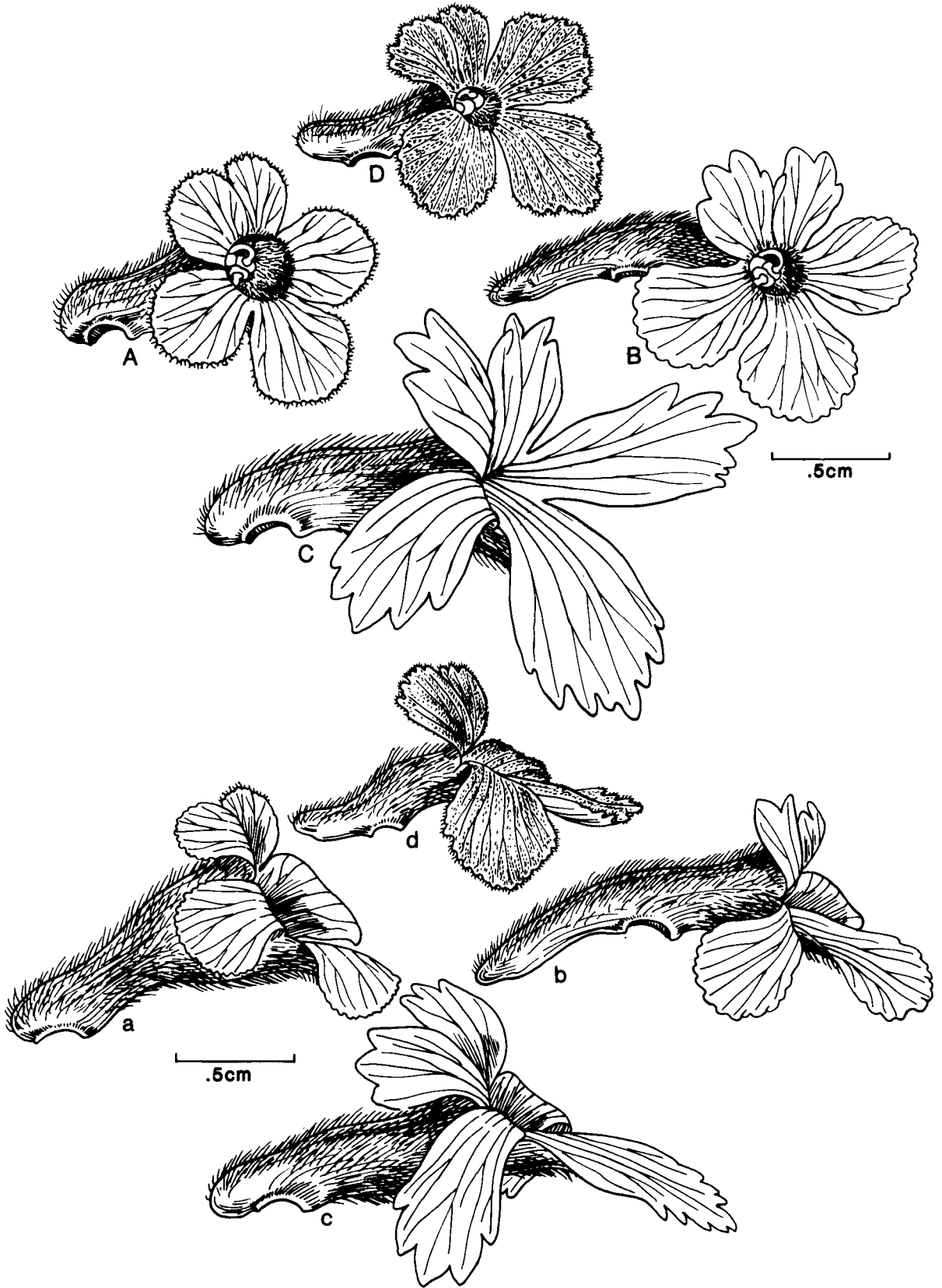
*Distribution.* The central and southern highlands of Colombia (Fig. 4). Known from the eastern slopes of the Central Cordillera in the Dept. Tolima and from the Eastern Cordillera in the Dept. Caquetá. The altitudinal range is from 800 to 2500 m.

*Distinguishing features:* The absence of a long spur distinguishes *R. grandiflora* from *R. calcarata* (Fig. 6B,b,C,c). The much smaller flowers set *R. minutiflora* apart (Fig. 6D,d). Both varieties of *R. minutiflora* are sympatric with *R. grandiflora* (Figs 4, 5), and *R. minutiflora* var. *minutiflora* is vegetatively similar to *R. grandiflora*.

### 4. *Reldia minutiflora* (L. Skog) Kvist et L. Skog, comb. nov.

*Nautilocalyx minutiflorus* L. Skog 1974: 238. – *Cremosperma minutiflorum* (L. Skog) Wiehler 1978: 45. – Type: Wurdack 2072, Peru, Dept. Loreto, high rainforest along Río Marañón near Teniente Pinglo, Pongo de Manseriche, 250–300 m (US holotype, BH, F, NY, S, WAG isotypes).

Shoots erect, appressed to the ground or pendulous, often arising from creeping rhizomes. Leaves hygro-morphic-succulent, upper surface tuberculate and pilose to plane and glabrous, margin serrate to subentire. Inflorescences with few-many flowers, with long primary and short secondary pedicels, short primary and long secondary pedicels or only primary pedicels. Calyx lobes 3–5 mm long, lanceolate-ovate, corolla white, tube 4–6 mm long, spur 1–2 mm long, throat yellow, 1.5–2.5 mm wide, limb 7–11 mm wide, lobes usually pubescent.





**Distinguishing features.** *Reldia minutiflora* is the most common and widespread species in the genus. The inflorescences and especially the leaves are highly variable. The two varieties we propose differ in leaf characters and may look strikingly different. *Reldia minutiflora* var. *minutiflora* (Kvist 60313, 60316, 60328) and *R. minutiflora* var. *veraguensis* (Londoño & Kvist 131, 140, 148) were studied in Ecuador and Colombia, respectively. The former is relatively slender and has hygomorphic, tuberculate leaves with serrate margins, the latter has rather succulent leaves, with a plane and glabrous upper surface and subentire margins. Consequently *R. minutiflora* var. *minutiflora* is vegetatively similar to *R. calcarata* and *R. grandiflora* (see these species), and *R. minutiflora* var. *veraguensis* is vegetatively similar to *R. alternifolia* and to some extent *R. multiflora* (see these species).

**Additional notes.** The size and shape of the limb vary considerably, but the same range of variation is found in both varieties, apparently uncorrelated with the leaf morphology. In addition, a number of Colombian collections, especially from the Depts. Boyaca and Cundinamarca, have features intermediate between the two varieties.

#### 4a. var. *minutiflora*

Shoots usually erect, often arising from creeping rhizomes. Leaves not succulent, upper leaf surface tuberculate, usually pilose, margin serrate. Inflorescences with both primary and secondary pedicels.

**Illustrations.** Figs 2D (stomata), 6D,d (corolla).

**Additional specimens.** Panama. Prov. Bocas del Toro: Guacala-Chiriquí road, km 14, Fortuna Dam area, Nevers & McPherson 6863 (MO, US). – Colombia. Dept. Antioquia: Municipio de Zaragoza, Providencia, Soejarto & Villa 2694 (COL, GH (2)). – Dept. Caldas: Manizales, La Francia, Chipre, Cerón s.n. (FAUC, US). – Dept. Chocó: San José de Palmar, road to Alto de Galápago, Lozano et al. 4985 (COL). – San José del Palmar-Corondoto road, km 16–25, Luteyn et al. 10488 (NY). – Dept. Putumayo: Mocoa region, Río Rummyaco, Bristol 466 (GH). – Río Mocoa above the confluence with Río Putumayo, Soejarto et al. 1249 (COL), 1250 (COL, GH). – Mocoa, Vogel 324 (US). – Dept. Risaralda: Santa Rosa, road to Herradura, between Fermales and Paramo de Santa Rosa, Idrobo et al. 9546 (COL). – Santa Cecilia, Sneidern 5086 (F). – Dept. Tolima: Libano, “La Trinidad”, Pennell 3321 (GH, NY). – Dept. El Valle: The valley of Río Sanquiniñí, La Laguna, Cuatrecasas 15500 (F, US). – Above Las Brisas, between El Tabor and Alto de Mira, Cuatrecasas 22427 (F). – Above Villa Colombia, near Las Mesitas, Cuatrecasas 26893 (US). – Ecuador. Prov. Pastaza: 15 km SSW from Tena,

Talay, Grubb et al. 113 (NY). – Mera, Mangayacu, Harling 11014 (GB). – Mera, Isidro Ayora, Harling et al. 19707 (GB). – Pastaza Valley between Río Verde and Río Negro, Kvist 60313 (AAU, NY, QCA, QCNE, US). – Pastaza valley E of Río Negro, Kvist 60316 (AAU), 60328 (AAU). – Peru. Dept. Amazonas: Vicinity of Huampami, 5 km E of Chávez Valdivia, Ancuash 1153 (MO, US). – 5 km E of Río Huampami, Río Cenepa, Berlin 491 (MO, NY, US). – Trail E of Huampami to Shaim, Berlin 1946 (MO, US). – Río Cenepa, Quebrada de Apigkagentsa, Kayap 607 (MO). – Huampami, Quebrada Pantamentsa, Kayap 896 (AAU, F, GH, MO(2)).

**Distribution.** Panama to northern Peru (Fig. 5). The current collections indicate that five disjunct populations exist; in western Panama, in the Western and Central Cordillera of central Colombia, in the Eastern Cordillera of southern Colombia, in the Eastern Cordillera of central Ecuador and along the foothills of the Andes in northern Peru. The plants from central Colombia often have characteristics intermediate with *R. minutiflora* var. *veraguensis*.

The collections from Panama and Peru all come from below 300 meters altitude, the ones from Ecuador between 1000 and 1500 meters while those from Colombia are from 300 to 2500 meters.

**Additional notes.** The type collection of *Reldia minutiflora* var. *minutiflora* comes from lowland rainforest in the extreme southern part of its range. The collection is atypical and has the largest leaves seen in the genus (up to 20 × 10 cm). In addition the nectary consists of two glands, with the one large and dorsal, and the other small and ventral. This state has not been observed in other *Reldia* specimens.

#### 4b. var. *veraguensis* (Wiehl.) Kvist et Skog, stat. nov.

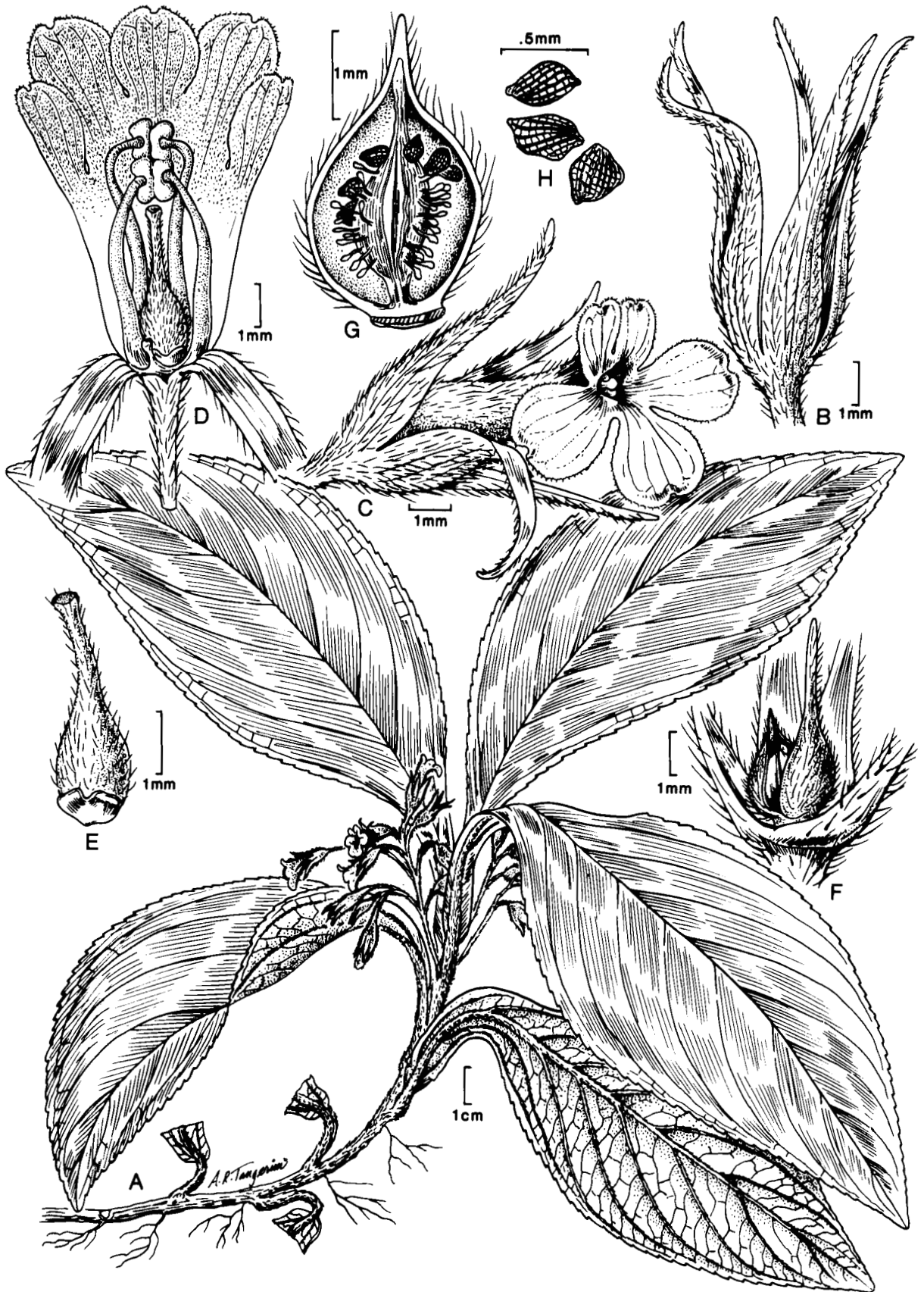
*Reldia veraguensis* Wiehler 1977: 127. – Type: Dressler 4831, Panama, prov. Veraguas, 13 km NW of Santa Fé, between third branch of Río Santa María and continental divide (SEL holotype).

Shoots erect to decumbent, rarely pendent, rarely rising from creeping rhizomes. Leaves rather succulent, upper surface plane and glabrous, margin subentire. Inflorescences often only with primary pedicels.

**Illustrations.** Figs 2E (stomata), 3E (seed). – Wiehler 1977: pl. 35B.

**Additional specimens.** Panama. Prov. Bocas del Toro: Without detailed locality, Carleton 208 (US). – Prov. Coclé: 7 km N of El Copé, Alto Calvario, Rivera’s sawmill, Folsom 3215 (MO), 5739 (MO), Folsom & Collins 6495 (MO). – Trail from Río San Juan, Hammel 3343 (MO), 3457 (MO). – Colombia. Dept. Antioquia: N of Caramanta, Pennell 10779 (PH). – Bogota-

Fig. 6. The flowers of *Reldia*, oblique and lateral views. – A,a: *R. alternifolia* (Antonio 1305). – B,b: *R. calcarata* (Steyermark 54284). – C,c: *R. grandiflora* (Londoño & Kvist 100). – D,d: *R. minutiflora* (Kvist 60313).



Medellín road, below San Luis, along Río Clara, Folsom & Rentería 10344 (US). – Dept. Boyaca: Extreme western part, region of Mt. Chapon, Lawrance 83 (GH(2), K, MO, S, UC, US). – El Humbo, 1500 m, Lawrance 704 (E, GH, K, MO, US(2)) – Dept. Caldas: Río San Rafael, below Cerro Tatama, Pennell 10330 (GH). – Dept. Caquetá: Florencia-Guadalupe road, km 21, Londoño & Kvist 131 (AAU, COL, QCA, TULV, US), km 40, 140 (COL), km 26, 148 (AAU, COL, QCA, TULV, US). – Prov. Cundinamarca: Paima, Joseph 1086 (US). – Sasaima, San Bernardo, Quebrada San Isidro, Schneider 1118 (S). – Dept. Tolima: Tovano Grande, Goudot s.n. (P). – Linden 995 (BR, K, P). – Ecuador. Prov. Morona-Santiago: 50 km N of Macas, Macuma-Río Cusutca, Lugo S. 3762 (GB).

**Distribution.** Panama, central and southern Colombia and eastern Ecuador (Fig. 5). The variety occurs from 300 to above 2000 m.

**Additional notes.** The type collection of *R. minutiflora* var. *veraguensis* comes from the extreme northern part of the range of the taxon. The secondary pedicels of the plants of this collection are very short and the flowers densely congested. The shape of the small corollas also is unusual.

##### 5. *Reldia multiflora* Kvist et L. Skog, sp. nov.

Type: Lawesson et al. 39509, Ecuador, Prov. Napo, Parque National Yasuní, Añangu at the southern bank of Río Napo, 260–350 m, 28 April–6 May 1983 (AAU holotype).

**Illustrations.** Figs 2F (stomata), 3D (seed), 7A,H.

Species insignis lobis calycum linearibus 6–8 mm longis prope corallis longitudinibus.

Terrestrial suffrutescent herbs. Stems decumbent or erect, erect part 8–20 cm long, unbranched, glabrous to pilose near apex, with adventitious roots below; internodes 3–15 mm long. Leaves alternate, clustered toward the apex; blade oblanceolate, 7–19 × 3–6 cm, apex acute, base cuneate, margins serrate, above glabrous, below pilose at the prominent veins, secondary veins 6–8 per side; petiole 1.0–1.5 cm long, glabrous or sparsely pilose. Inflorescences with few-numerous flowers in upper leaf axils; pedicels sericeous-villous, primary 1–5, each 2–4 cm long, secondary 3–10, each 1–10 mm long. Calyx lobes 6–8 mm long, linear, outside sericeous, inside glabrous; corolla funnel-shaped, white, throat yellow with brown spots, spur 0.5–1.0 mm long, tube 4–5 mm long, diam. 1.5–2.5 mm, outside pilose, inside with glandular hairs in throat, limb 5–6 mm wide, pube-

ruled inside, lobes obovate, upper lobes 1.0–1.5 mm long, lateral lobes and basal lobe 2.0–2.5 mm long; stamens subincluded, filaments ca. 4 mm long, anthers ca. 0.7 × 0.4 mm, coherent, thecae partly confluent; nectary a bilobed dorsal gland, 0.3–0.5 mm high; ovary pilose, style 2.0–2.5 mm long, sparsely pilose. Capsule globose, diam. 2–3 mm, bivalved; seeds ca. 0.35 × 0.30 mm, globose.

**Additional specimens.** Ecuador. Prov. Napo: Añangu, Korning & Thomsen 47129 (AAU), 47142 (AAU), Oellgaard et al. 39125 (AAU), 39241 (AAU).

**Distinguishing features.** The 6–8 mm long linear calyx lobes that approach the length of the small corollas, distinguish *R. multiflora* from other species of *Reldia*. Vegetatively *R. multiflora* differs from *R. minutiflora* by having non-succulent leaves with flat, glabrous upper surfaces, and serrulate margins.

**Distribution.** Only known from Añangu on the southern bank of Río Napo in the Napo province of eastern Ecuador.

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Fig. 7. *Reldia multiflora*. – A: Habit. – B: Calyx. – C: Calyx and corolla. – D: Corolla opened showing stamens, pistil, staminode and nectary. – E: Pistil and nectary. – F: Calyx opened showing capsule. – G: Capsule valve showing seeds, funiculi and placenta. – H: Seeds. – Lawesson et al. 39509.