

**ZYGIA NATALIAGOMEZAE (FABACEAE: LEGUMINOSAE-MIMOSOIDEAE),
A NEW SPECIES FROM THE TRANSITIONAL DRY FOREST IN THE
CENTRAL ANDES IN THE DEPARTMENT OF VALLE DEL CAUCA, COLOMBIA**

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Abstract. *Zygia nataliagomezae*, a new species of Fabaceae from Colombia, is described and illustrated. The new species was found in a transitional foothill between a tropical dry forest and a sub-Andean Forest in the Central Andes in the Department of Valle del Cauca, Colombia. It can be recognized by its habit, a small tree of thin stems with little branching, and by its red inflorescence, which is borne on the defoliated branches rather than on the stem, as in many other species within the genus.

Keywords: Systematics, taxonomy, tropical dry forest

Resumen. Se describe e ilustra *Zygia nataliagomezae*, una nueva especie de Fabaceae de Colombia. La nueva especie se encontró en un piedemonte transicional entre un bosque seco tropical y un bosque subandino en los Andes Centrales, en el Departamento del Valle del Cauca, Colombia. Se puede reconocer por su hábito, un pequeño árbol de tallos delgados, poco ramificado y por su inflorescencia roja que se encuentra en las ramas desfoliadas y no en el tallo como en muchas otras especies del género.

Palabras claves: Sistemática, taxonomía, bosque seco tropical.

Zygia P. Browne (Fabaceae, Mimosoideae) is a neotropical genus distributed from Central America to South America (Rico-Arce, 1991; Barneby and Grimes, 1997). The genus comprises ca. 60 species of small to medium-sized, thornless trees with pinnate leaves and petiolar nectaries. The inflorescences are cauliflorous or ramiflorous, appearing in spikes or pseudoracemes, and the flowers are homomorphic, with some exceptions featuring an interstaminal disc that covers the base of the ovary. The seeds lack an aril and have a thin seed coat without a pleurogram. Species within the genus are ecologically associated with humid lowlands and

riparian forests, although most species are found in lowland areas, with a few exceptions occurring above 2000 meters in elevation (Britton and Rose, 1928; Barneby and Grimes, 1997; López-Contreras et al., 2015; Ferm et al., 2019).

In Colombia, *Zygia* is represented by 21 species, eight of which are endemic. These species are distributed from sea level to high Andean forests at nearly 2800 meters in elevation, with the Andes and the Amazon being the regions where the greatest number of species are found (Romero-Hernández, 2017). Here, we describe and illustrate a new species of *Zygia* from the Central Andes of Colombia.

MATERIALS AND METHODS

The description and illustrations were prepared from living specimens and flowers. Flowers and plants were dissected and measured, and digital images of those parts were taken with a Canon EOS 50D camera equipped with a macro lens. The description and photographic plate were based on specimens collected. The photographic compositions, including plant habit, leaves, views of the flower, inflorescence, and the dissected flower, were

digitally retouched in Adobe Photoshop CS6 and exported as JPEG files. The new species was described following the botanical terminology by Beentje (2012) and Stearn (1992). All original descriptions of related species were consulted for detailed comparisons (Romero-Hernández, 2017). Specimens from the following herbaria, COL, CUVC, JBB, VALLE, CAUP, and MO (online), were consulted, and no additional material of the new species was found.

TAXONOMIC TREATMENT

Zygia nataliagomezae Vargas & J.S.Moreno, *sp. nov.*

TYPE: COLOMBIA. Valle del Cauca: Municipio de Palmira, vereda La Quisquina, en las márgenes de la quebrada Los Negros, 3°34'45"N 76°10'59"O, 1540 m, 27 March 2008, W. Vargas 18858 (Holotype: COL) Fig. 1–2.

Zygia nataliagomezae can be recognized by its growth habit: a small tree with thin branches and little branching,

leaves with 2–4 pairs of pinnae with numerous papyraceous folioles, inflorescences that are borne in the last defoliated branches and not on the stem, as in other species within the genus. The most similar species is *Zygia dinizii*, which has inflorescences in short and grouped spikes.

Tree, up to 4–5 m tall, stem 3–10 cm in diameter. *Apical buds* purple to light brown; *branches* reddish, terete,

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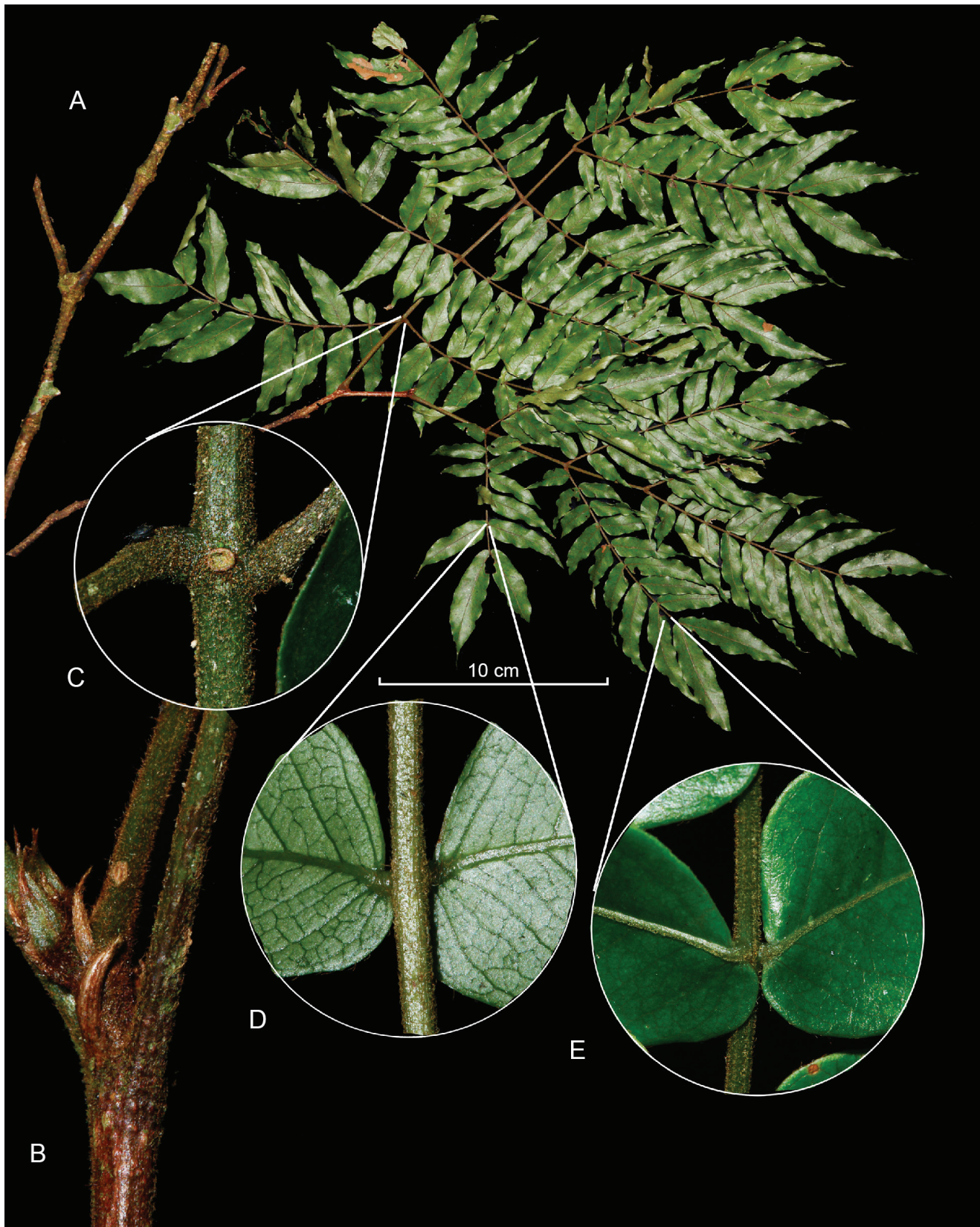


FIGURE 1. *Zygia nataliagomezae* Vargas & J.S. Moreno. **A**, habit; **B**, branch and apical bud; **C**, nectary; **D**, abaxial view of leaflet base and petiolule; **E**, adaxial view of leaflet base and petiolule. Composite digital plate by J. S. Moreno based on the holotype and photographs by W. Vargas.

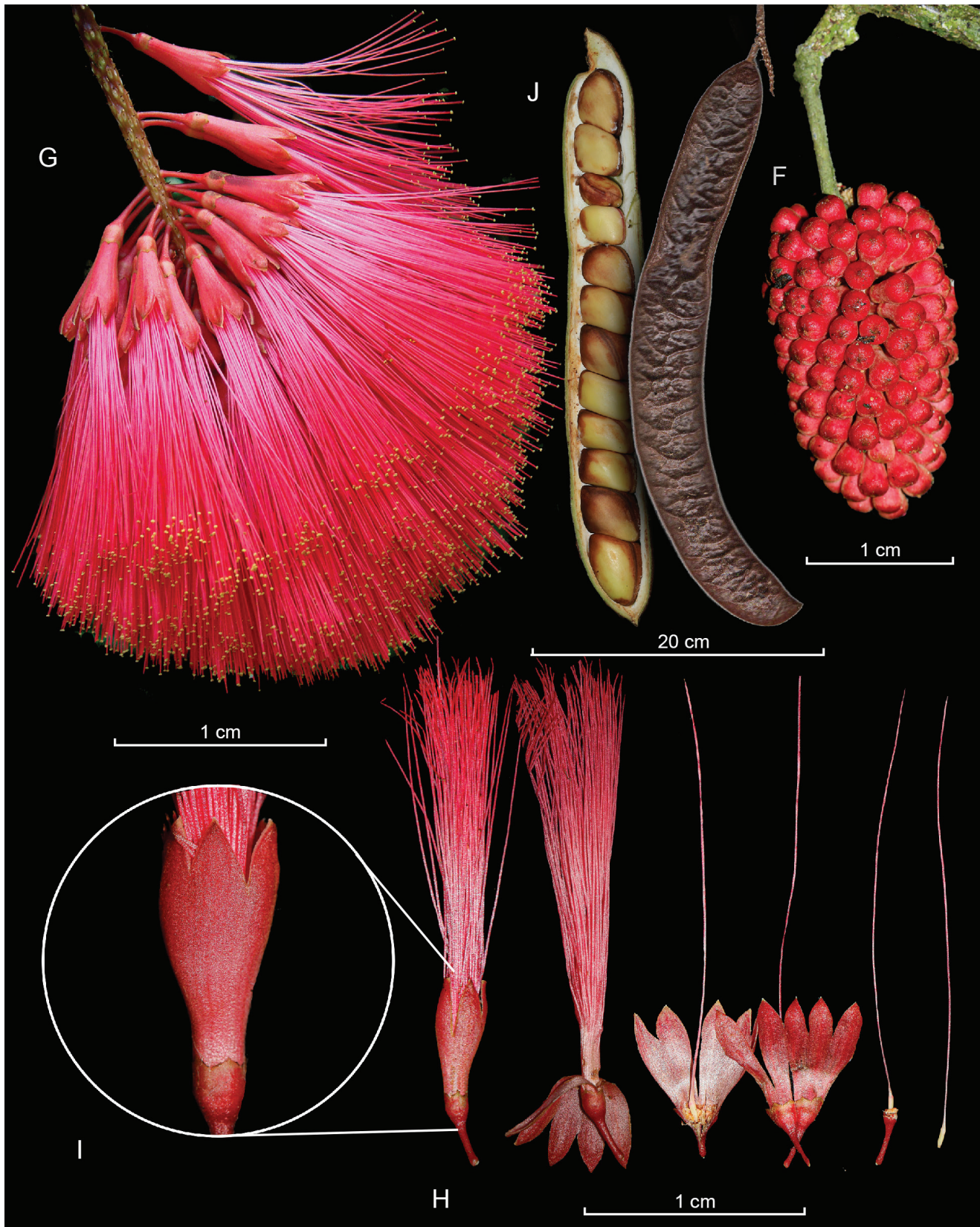


FIGURE 2. *Zygia nataliagomezae* Vargas & J.S. Moreno. **F**, immature inflorescence and peduncle; **G**, mature inflorescence; **H**, dissected flower showing from right to left up to the stamen; **I**, close-up of the calyx; **J**, legume, and seeds. Composite digital plate by J. S. Moreno based on the holotype and photographs by W. Vargas.

tomentulose to glabrous, lenticellate. *Leaves* bipinnate, with tomentose axes, *stipules* linear, 3–4 × 1 mm, free, slightly falcate, tomentose ferruginous; *pulvinus* 2–4 mm long, tomentose, obscure; *petiole* 4.5–8.5 cm long, lenticellate, tomentose, with ferruginous brown hairs toward the base and the pinna insertion, striated; *rachis of the leaves* 8.5–12.0 cm long, tomentose, with a cupular gland, 0.8–1.0 mm wide between every pair of pinna, frequently absent or reduced in the apical pinna, the basal always present; *pinna* 3 pairs, eventually 2 or 4 pairs, the inferior pair shorter, *rachis* (interpetiolar segment) 5.5–11.0 cm long, 6–9 pairs of folioles, *petiolule* 0.3–0.7 cm long, the middle pair with a *petiolule* 0.3–0.5 cm long, *rachis* 12.0–13.5 cm, 10–11 pairs of folioles, the apical pair with a *petiolule* 0.3–0.7 cm long and 10–12 pairs of folioles; *folioles* unequal, elliptic-lanceolate, membranaceous, glabrous, rounded base, notoriously unequal, acute, margins undulate, central and laterals veins prominent, tertiary veins reticulate, basal 1.5–3.5 × 0.9–1.2 cm, middle 3.5–6.5 × 1.2–1.5 cm, apical 5.4–9.5 × 1.5–2.1 cm. *Inflorescence* a pendulous, solitary raceme that is borne over the defoliate apical branches, sometimes in the apex of foliate branches or very sporadically on the trunk; *peduncle* 0.8–1.2 cm long, purple; *rachis* 3.5–4.5 cm long, reddish to green purple; *bracts* reddish, linear, 0.8–1.5 mm long, less than 1 mm wide, persistent and subtending each flower. *Flowers* 120–140 per inflorescence, 40–45 open at once; *pedicel* red, 0.5–0.8 cm long; *calyx* tube red to yellowish, 3–5 mm long, apex and lobes green-yellow, glabrous, margins softly toothed to smooth, lobes 5, triangular, 0.5–1.0 mm long; *corolla* red, glabrous, tube 1.5–1.7 mm long, 2.0–2.5 mm wide at the base, 6.0–6.5 mm in diameter at the apex, lobes 5, triangular, 3 × 3.5–5.0 mm, margins sometimes green; *stamens* red, 55–75, basal half light-pink, 4.0–4.7 mm long, exceeding the corolla by 2.5–3.0 mm. *Ovary* 2–3 mm long, glabrous, white; *style* white-yellow, 4.8–5.5 cm long, longer than the stamens. *Legume* brown, tomentose, erect when immature; at maturity the apex is curved toward the ventral face or erect when short, 18–37 × 2.5–3.2 cm, laterally compressed, dorsal suture thick and prominent, dehiscent by ventral suture, valves ligneous, thick, alveolate-reticulate, acute. *Seeds* 11–18 per legume, oblong-applanate, compressed in the ends, 17–21 × 12–17 mm, 7–11 mm thick; testa brown-red, glabrous, papyraceous, smooth.

Additional specimens examined: COLOMBIA. Valle del Cauca: Florida, vereda La Diana, 1595m, 3°19'32.78"/76°10'13.01", WV37335 (CUVC), W. Vargas, M. Arenas, y L. Ander Ruiz, enero 23 de 2023. Pradera, vereda Canadá, 1638m, 3°23'21.94"/76°11'07.44", WV37338 (CUVC), W. Vargas, M. Arenas, y L. Ander Ruiz, enero 23 de 2023.

Eponymy: In honor of Natalia Gómez, wife of the first author, who in the year 2000 promoted the exploration of the area where the new species was discovered. She, from the Corporación Autónoma Regional del Valle del Cauca (CVC), has led the effort to establish nearly 300,000 hectares of protected areas in the department of Valle del Cauca.

Habitat and ecology: *Zygia nataliagomezae* is a species restricted to the Central Andes in the department of Valle

del Cauca, Colombia, with a range of distribution from 1200 to 1800 m in elevation. It is a small tree up to 2–5 m, and 4–10 cm in diameter and grows near water sources on rocky soils in the transition between tropical dry forest and montane humid forest. It is associated with trees such as *Aiouea montana* (Sw.) R. Rohde, *Nectandra turbacensis* (Kunth) Nees (Lauraceae), *Toxicodendron striatum* (Ruiz & Pav.) Kuntze (Anacardiaceae), *Cupania americana* L. (Sapindaceae), *Croton gossypifolius* Vahl (Euphorbiaceae), *Ficus* spp. (Moraceae), *Inga* spp. (Fabaceae), and *Chamaedorea pinnatifrons* (Jacq.) Oerst (Arecaceae), and shrubs and herbs such as *Picramnia* sp., *Heliconia griggsiana* L.B. Sm. (Heliconiaceae), *Aphelandra* sp. (Acanthaceae), *Renealmia aromatica* (Aubl.) Griseb. (Zingiberaceae), and *Anthurium buganum* Engl. (Araceae). It has been recorded flowering in January, May, and June and fruiting in January, September, and October.

In addition to deforestation, high seed predation increases the risk of extinction for *Zygia nataliagomezae*, which partially explains the absence of seedlings and young trees. In the two known isolated trees, predation affects 100% of the fruit and up to 80% of the seeds while they are still maturing. In some cases, seeds contained up to three larvae, resulting in 100% predation (Fig. 3). Ten larvae were raised to the adult stage and identified as belonging to the genus *Conotrachelus* Dejean (Coleoptera: Curculionidae) (Fig. 4), a genus with over 1200 species, many of which are pests in economically important crops such as avocado and apple (Mancera et al., 2018).

Predation before fruit dehiscence causes the loss of all or almost all seeds, even before maturity. Within the forest, predation is less pronounced, but fruit production is very low; during 22 years of observation, only three fruits were collected in a state of maturity and seeds free of damage. In January of 2023, we collected 42 fruits from two isolated trees, which contained 597 seeds, of which 87% presented some level of predation. The partially damaged seeds were immersed in a solution of insecticides and fungicides (Sulfoxaflor, Carboxin + Captan) for 12 hours, and we discarded 50% of the seeds due to high levels of damage. A final germination rate of 78.6% was obtained, these being the only plants obtained so far and they are being used in ecological restoration processes and conservation of this threatened species (Fig. 5).

Conservation status: *Zygia nataliagomezae* is known only from eight adult individuals and two juveniles in the type locality. This population is strongly threatened by deforestation, and little regeneration has been observed within the forest. Fewer individuals remain because of logging, as has been observed in at least fifteen visits to the site over the last twenty years, when more than twenty adult individuals were originally observed in the area. The species is not known to be cultivated despite the beauty of its inflorescences and the great potential it has as an ornamental plant. Unfortunately, it is a very slow growing species and only grows in the understory. The new species is classified as Data Deficient (DD) because we do not have the distribution and population information necessary to apply the IUCN categorization protocols. (IUCN Standards and Petitions Subcommittee, 2017; IUCN, 2024).



FIGURE 3. Seed predation in *Zygia nataliagomezae* Vargas & J.S. Moreno. **A**, seed predation within the legume showing damaged seeds; **B**, close-up sequence showing larva infestation and emergence from the seed.

Zygia nataliagomezae is recognized by its growth habit. It is a small tree with thin stems and sparse branching; leaves with 2–4 pairs of pinnae with numerous narrow, papery leaflets and compact; red, pendulous, and highly conspicuous inflorescences on the most recently defoliated branches or the subterminal portion of the branches, rather than on the main stem or the base of the branches as in most species of the genus. Among the six species of *Zygia* present in the region (Romero-Hernández, 2017), *Zygia nataliagomezae* is the only species found in the transitional zone between dry forest and sub-Andean Forest in the Cordillera Central. Together with *Zygia longifolia* (Humb. & Bonpl. ex Willd.) Britton & Rose, it is found at the lowest elevations in this part of the Cauca River basin. However, *Zygia longifolia* differs greatly in tree architecture, being tall with leaves having a single pair of pinnae and spike-like inflorescences clustered on the branches. In this sector of the Central Cordillera, *Zygia*

latifolia var. *communis* Barneby & J.W. Grimes might also be found. It differs from *Zygia nataliagomezae* by having much broader leaflets over 10 cm in length, and short, dense spike inflorescences on the stem and main branches. The greatest foliar similarity is with *Zygia dinizii* (Ducke) D.A. Neill, G.P. Lewis, & Klitg., but this species is found in lowland areas of the Amazon, Pacific, and Caribbean regions (Romero-Hernández, 2017), and it also has short, clustered spike inflorescences (Romero-Hernández, 2017). Regarding the type of large, showy, compact, and red inflorescences, the only species in the region is *Zygia lehmannii* (Harms) Britton & Rose ex Britton & Killip, which is found in the Amazonian foothills and the western slope of the Western Cordillera up to Valle del Cauca. It differs from *Zygia nataliagomezae* by having leaves with a single pair of pinnae, large broad leaflets sometimes over 15 cm in length, and inflorescences on the stems and main branches.



FIGURE 4. *Conotrachelus* sp. (Coleoptera: Curculionidae). **A**, adult *Conotrachelus* sp. on a branch of *Zygia nataliagomezae* Vargas & J.S. Moreno; **B**, various developmental stages of *Conotrachelus* sp, showing different phases of its lifecycle, including larvae and adult. The scale bar represents 5 mm. Photographs by W. Vargas.



FIGURE 5. Germination and early growth stages of *Zygia nataliagomezae* Vargas & J.S. Moreno seedlings. A, initial germination stage; B, early seedling development; C, intermediate growth stage; D, advanced seedling stage with developing leaves. Photographs by W. Vargas.

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