

## FLORA FARALLONENSIS II: AROIDS FROM THE PICO DE ÁGUILA LOW MONTANE FOREST IN COLOMBIA

M. Á. GAMBOA-GAITÁN

*Laboratorio de Biología Tropical, Departamento de Biología, Facultad de Ciencias  
Universidad Nacional de Colombia*

*E-mail: magamboaga@hotmail.com; magamboaga@unal.edu.co*

(Received: 16 June 2019; Accepted: 2 August 2021)

This is the second manuscript about a series of papers dedicated to study the flora of Los Farallones de Cali, an Andean natural region in Colombia. The general purpose is to make an inventory of plants, algae and fungi by studying different locations in Los Farallones. This paper deals with aroids (Araceae family), from a low montane forest at Pico de Águila (Valle Department, Colombia). Data about altitudinal and geographical distribution in Colombia of aroids found are presented here, along with some drawings for facilitating field identification.

**Key words:** *Anthurium*, Araceae, Colombia, *Dieffenbachia*, Farallones de Cali, *Monstera*, neo-tropical flora, *Philodendron*, *Xanthosoma*

### INTRODUCTION

Aroids are a diverse group of plants, mostly tropical but with many species in subtropical and even temperate environments. About 1,800 species were described at 1980s (Cronquist 1981, Jones 1988), more than 2,500 at 1990s (Grayum 1990), and today the number of aroids is well above 2,800 and expected to be larger than 3,500 (Croat 1992). The Araceae family contains 125 genera (Boyce and Croat 2011), *Anthurium* and *Philodendron* being the most diverse ones, since they hold more than a half of the species in this group. It is believed that many new species will be described if floristic work continues, especially in tropical environments.

This manuscript is part of a research program devoted to study the flora of Los Farallones de Cali, a natural montane ecosystem placed in the western branch of the Colombian Andean mountains. In the first paper of this series (Gamboa-Gaitán 2018), there is a more general description of this project and of Los Farallones as a natural location. In brief, this project is devoted to study its flora by sampling point locations within Los Farallones, beginning with Pico de Águila, a low montane forest placed next to Cali (Valle Department, Colombia). This paper is the second one about this location, and it deals with aroids (Araceae family), an interesting and diverse group of monocotyledon plants.

## MATERIALS AND METHODS

This work deals with the local flora of a rural community in the vicinity of Los Farallones de Cali National Park (FCNP). In fact, Pico de Águila is a settlement of about 80 people in a rural suburban location near Cali, the third largest city in Colombia. Forests surrounding Pico de Águila are declared a buffer zone, not properly part of a national park, but they are devoted to protect and making a transition between Cali city and preserved montane forests within FCNP. Pico de Águila is located at 1,550 m above sea level, in the east slope of FCNP, and its vegetation is classified as low montane tropical forest (Espinal 1968, Gamboa and Ramos 1995, Gamboa-Gaitán 2018). FCNP is part of the Colombian system of natural national parks (Sarria 1993), and it has long been considered a threatened environment (García-Kirkbride 1986).

This study started by 1994 (Gamboa-Gaitán 1995), and field work continued in a non-regular way due to logistic (lack of funding) or public order situations. Plants were collected in the field following standard procedures (Croat 1985), and transported either to the Universidad del Valle herbarium (CUVC) or to the Laboratory of Tropical Biology at Universidad Nacional de Colombia, for further treatment. There, plant material was pressed and dried in conventional ovens using standardised protocols (70 °C for 24 hours). Live material was used by author for making drawings here presented. Dried herbarium specimens were used for identification of species, using keys or sending some vouchers to specialists. Original samples of plants here reported are deposited at CUVC, at the Herbario Nacional Colombiano (COL) or at the herbarium of the Missouri Botanical Garden (MO). Nowadays, the study of Pico de Águila flora continues, especially with attempts to sample more aroid species from canopy, since all the species here presented are terrestrial or climbing herbs.

## RESULTS

In this paper I report 16 species of Araceae from the low montane forest of Pico de Águila, in Cali, Colombia. All of them are herbs, either terrestrial or climbing, and one is probably a new species to science. Data about their geographical distribution in Colombia are reported here, and some of them are represented in a drawing.

*Anthurium calense* Engl. (Fig. 1) – Climbing herb, leaves heart-shaped, with a 2 cm long acumen, internodes up to 12 cm long in mature stems, adventitious roots produced at nodes. Spadix 11.5 cm long, spathe 10 cm long. It was found in preserved, understory environments. Distribution: Valle, 1600 m.

*Anthurium giganteum* Engl. – Terrestrial herb 70 cm in height. Leaves entire, 44 cm × 50 cm. Spathe light green 8–15 cm long, spadix variable 8–85 cm long. It was found in preserved areas with abundant litter. Distribution: Valle, 1,600 m.

*Anthurium insigne* Mast. – Terrestrial herb, trilobed leaves, rare. Distribution: Chocó, Valle, 50 to 1,600 m.

*Anthurium marmoratum* Sodiro (Fig. 2) – Terrestrial herb. Entire leaves 65 × 45 cm, acuminate apex, petiole 35–50 cm long. Spadix 20–50 cm long, spathe 20–25 cm long. Found in preserved, wet, shading zones. Distribution: Valle, 1,450 to 1,600 m.

*Anthurium myosuroides* (Kunth) Schott – Hemiepiphytic herb, leaves lanceolate, dark green in colour, 10–20 cm long, 5–10 cm wide, conspicuous leaf scars, spadix 10–12 cm long, spathe 5 cm long. Found in preserved, wet and dark environments. Distribution: Antioquia, Caldas, Chocó, Cundinamarca, Putumayo, Quindío, Santander, Tolima y Valle, 30 to 2,250 m.

*Anthurium pedatum* (Kunth) Schott (Fig. 3) – Terrestrial herb up to 1 m tall. Simple leaves with deep finger-like lobes, petiole base red. Found in shaded, well preserved environments. Distribution: Cauca and Valle, 350 to 2,090 m.

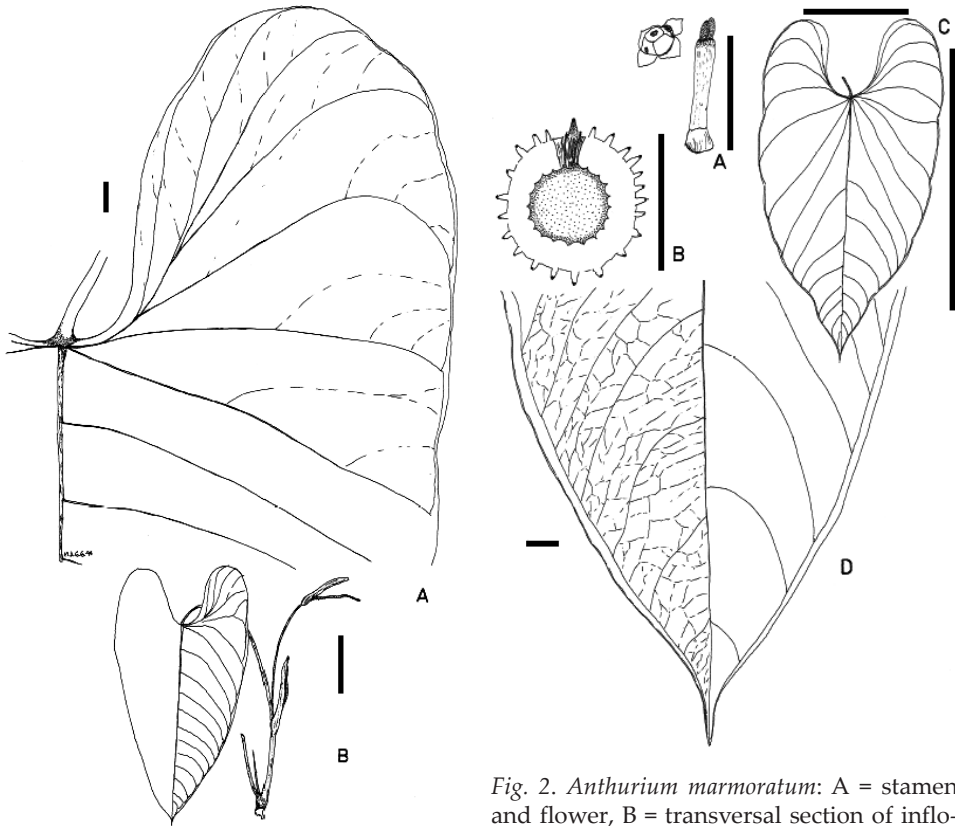


Fig. 2. *Anthurium marmoratum*: A = stamen and flower, B = transversal section of inflorescence, C = leaf (frontal view), D = foliar apex. Scale bars: A = 3 mm, B = 1.4 cm, C = 55 cm, D = 1 cm

Fig. 1. *Anthurium calense*: A = base of leaf, B = habit. Scale bars: A = 1 cm, B = 11 cm

*Anthurium revolutum* (Engl.) Croat (Fig. 4) – Terrestrial herb. Leaves lanceolate, 20–25 cm long, 3–5 cm wide. Spadix 13 cm long, spathe 2 cm long. Found in shaded zones, sometimes on big rocks holding litter. Distribution: Valle, 1,600 m.

*Anthurium scandens* (Aubl.) Engl. – Epiphytic herb. Spadix 2 cm long, spathe 1.5 cm long. It seems to belong to subsp. *scandens*. Distribution: Antioquia, Boyacá, Caldas, Caquetá, Cauca, Chocó, Cundinamarca, Huila, Guajira, Magdalena, Meta, Nariño, Norte de Santander, Putumayo, Quindío, Risaralda, Santander, Tolima, Valle y Vaupés, 0 to 2,700 m.

*Anthurium obtusum* (Engl.) M. H. Grayum (Fig. 5) – Epiphytic or epilithic herb, internodes 2–4 cm long. Leaves lanceolate, 15–20 cm long, 4–6 cm width. Spadix 7–13 cm long. Found in preserved, wet and shaded zones. Distribution: Valle, 1,500 m.

*Dieffenbachia daguensis* Engl. (Fig. 6) – Terrestrial herb, whitish sap, exuding a strong odour when cut. Simple leaves, oval-shaped, 18–24 cm long, 8–15 cm wide, spotted on upper surface. Stem 1 cm in diameter, internodes 3.0–3.5 cm long. Spadix 22–24 cm long, opening when fruits are almost completely mature. Fruit a berry, orange, fully exposed on curved axis of spadix when open. Common in shaded and wet environments, individuals aggregate in dense patches which include many asexual clones. Many insects are found in the spadix of this species, including nesting ants. Distribution: Valle, from sea level to 1,900 m.

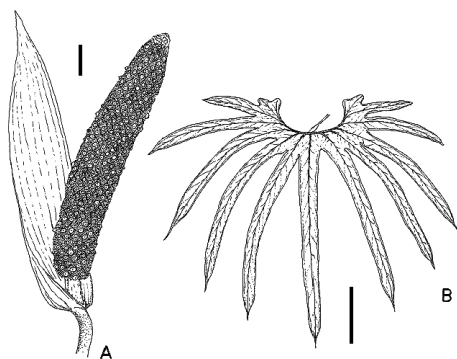


Fig. 3. *Anthurium pedatum*: A = inflorescence, B = leaf (frontal view). Scale bars: A = 1 cm, B = 10 cm



Fig. 4. *Anthurium revolutum*: shoot, terminal branch

*Monstera obliqua* Miq. (Fig. 7) – Climbing herb. Stem 1 cm in diameter, internodes 4–7 cm long, conspicuous leaf scars. Simple leaves, elliptic, perforated at maturity, acuminate apex, petiole 15.5–18.0 cm long, surrounding base of inflorescence axis, this one up to 19 cm long, spadix 8 cm long, orange, spathe 10 cm long, detaching rapidly from inflorescence. Black seeds with white, sweet aril. Distribution: Amazonas, Antioquia, Caldas, Caquetá, Chocó, Meta, Putumayo, Risaralda, Valle, Vaupés, from sea level to 2,220 m.

*Monstera xanthospatha* Madison (Fig. 8) – Epiphytic herb. Leaves 15–30 cm long, perforated at maturity, petiole surrounding base of stem,

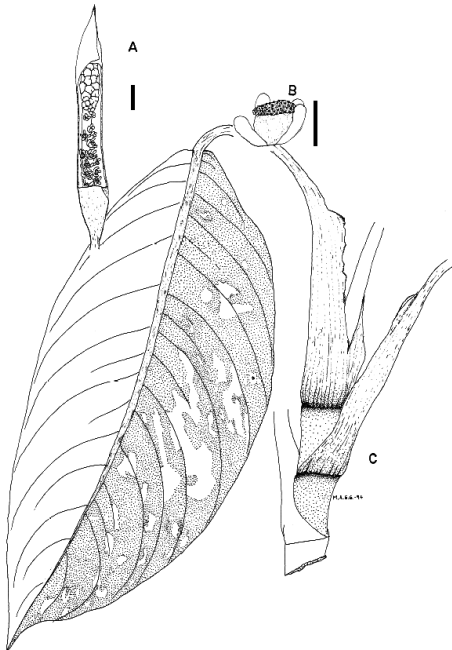


Fig. 6. *Dieffenbachia daguensis*: A = inflorescence, B = pistillate flower, C = leaf and stem. Scale bars: A = 1 cm, B = 3 mm

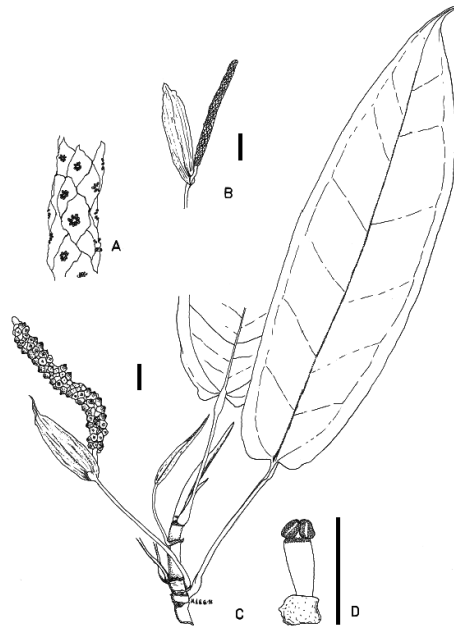


Fig. 5. *Anthurium obtusum*: A = inflorescence, B = spadix (lateral view), C = habit upper part, D = stamen. Scale bars: B–C = 1 cm, D = 2.5 cm

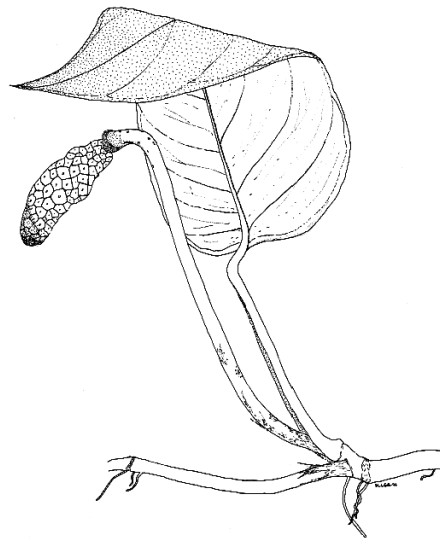


Fig. 7. *Monstera obliqua*: leaf and inflorescence

spathe 15 cm long, 8 cm width, yellow, falling early during development. Distribution: Antioquia, Quindío y Valle, 1,485 to 2,060 m.

*Philodendron* sp. (Fig. 9) – Epiphytic herb. Leaves 20–26 cm long, 25–30 cm wide, stem with transparent viscous sap, strongly scented, internodes 2.5–6 cm long. Spadix 16–20 cm long, purple at base and green-yellow at top, spathe purplish violet outside, abundant net-like sclerenchymatic tissue at base of inflorescences. Although this species is similar to *P. ornatum* Schott, Thomas Croat (pers. comm.) says it is a new species to science.

*Philodendron tenue* K. Koch et Agustin (Fig. 10) – Epiphytic herb. Leaves hearth-shaped, de 40–45 cm long, 25–30 cm wide, with sclerenchymatic tissue at the base of petiole, this one 61 cm long, with a longitudinal canal. Inflorescence up to 15 cm long, globose at base, acute at apex, yellow-green before anthesis. This species is found in wet, preserved zones within forest. Distribution: Amazonas, Antioquia, Cauca, Chocó, Huila, Risaralda and Valle, from sea level to 2,300 m.

*Philodendron tuerckheimii* Grayum (Fig. 11) – Epiphytic herb. Leaves 15–20 cm long, 4–6 cm wide, petiole surrounding stem, with lateral, flat extensions, internodes 1–5 cm long. Spathe fully covering inflorescence, globes at base. Distribution: Antioquia, Bolívar, Chocó y Valle, 700 to 2,050 m.

*Xanthosoma daguense* Engl. – Terrestrial herb, succulent, viscous sap. Petiole green, with transversal spots dark green in colour, spongy, inflorescence green-yellow, globose at base, decomposing from apex to base, partially surrounded by petiole. This spe-

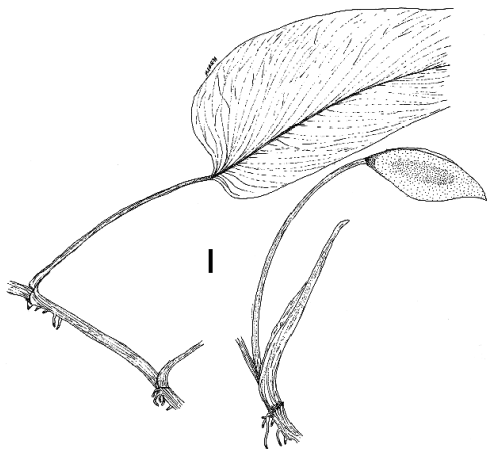


Fig. 8. *Monstera xanthospatha*: habit and detail of young inflorescence. Scale bar: 1 cm

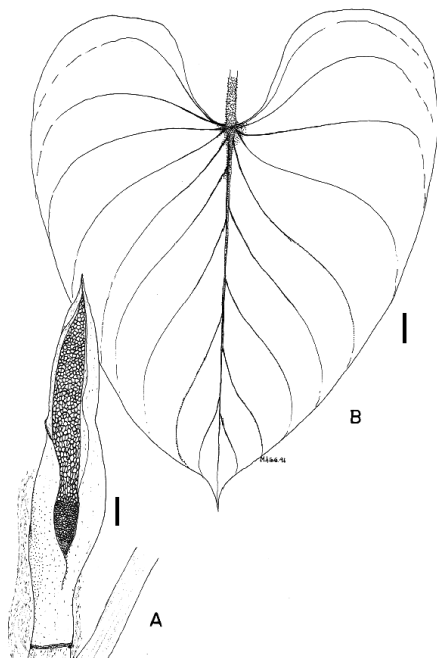


Fig. 9. *Philodendron* sp.: A = inflorescence, B = leaf (frontal view). Scale bars: A = 1 cm, B = 2 cm



cies is found in shaded places, on soil litter. Distribution: Antioquia, Cauca, Chocó, Nariño, Risaralda y Valle, from sea level to 2,055 m.

## DISCUSSION

Pico de Águila (PA), is a rural settlement very close to a large city (Cali, Colombia), but since it is relatively isolated from urban activities and is placed next to a national park, it contains a high plant diversity (Gamboa and Ramos 1995). This site receives partial protection from environmental authorities because it is considered a transitional zone, a buffer, between an urban location and a completely protected ecosystem as Farallones de Cali National Park is. The presence of 16 aroids, all of them terrestrial or climbing, is a good indicator of the biological richness of the low montane forest surrounding PA. It is possible to predict that number of aroids will increase as canopy – which can reach 30 m – receives more sampling effort, which is the next step in this research.

Since lowlands in the Pacific slope of the Cordillera Occidental de Colombia – the Andean mountains in which FCNP is found –, are a centre of diversity for Araceae (Croat *et al.* 2006), it is possible that surrounding ecosystems are rich in aroids too. Although PA is placed in the eastern slope of the Cordillera Occidental, it is not

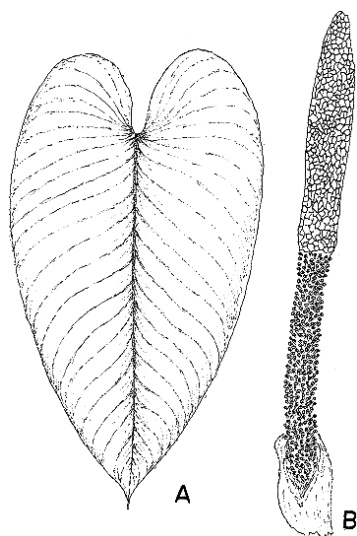


Fig. 10. *Philodendron tenue*. A = leaf (frontal view), B = inflorescence



Fig. 11. *Philodendron tuerckheimii*: shoot and leaf (frontal view)

far away from Pacific lowlands and, in fact, there are sites in which these mountains are not so high and show biological continuity with pacific lowlands.

Along with increasing sampling effort, it is necessary to study the potential value of aroids from PA in aspects like ornamental use and prospective medicinal applications. These aspects are largely unknown for many species of Araceae.

\*

*Acknowledgements* – I thank my former teachers Jorge Eduardo Ramos and Philip Silverstone-Sopkin, from the Herbarium of Universidad del Valle (CUVC), for guiding my efforts and providing counselling during my undergraduate studies. Thanks a lot to Mike Grayum, Dorothy Bay and Tom Croat from the Missouri Botanical Garden for advising and helping me with aroid identification.

## REFERENCES

- Boyce, P. C. and Croat, T. B. (2011 onwards): *The Überlist of Araceae. totals for published and estimated number of species in aroid genera.* – <http://www.aroid.org/genera/180211uberlist.pdf>. (accessed June 15, 2019).
- Croat, T. B. (1985): Collecting and preparing specimens of Araceae. – *Ann. Missouri Bot. Gard.* **72**: 252–258. <https://doi.org/10.2307/2399178>
- Croat, T. B. (1992): Species diversity of Araceae in Colombia: a preliminary survey. – *Ann. Missouri Bot. Gard.* **79**: 17–28. <https://doi.org/10.2307/2399806>
- Croat, T. B., Bay, D. C. and Yates, E. D. (2006): New taxa of Anthurium (Araceae) from the Bajo Calima Region (Valle, Chocó), Colombia and Ecuador. – *Novon* **16**: 25–50. [https://doi.org/10.3417/1055-3177\(2006\)16\[25:ntoaaaf\]2.0.co;2](https://doi.org/10.3417/1055-3177(2006)16[25:ntoaaaf]2.0.co;2)
- Cronquist, A. (1981): *An integrated system of classification of flowering plants.* – Columbia University Press, Nueva York, U.S.A.
- Espinal, L. S. (1968): *Visión ecológica del Departamento del Valle del Cauca.* – Universidad del Valle, Cali, Colombia.
- Gamboa, M. A. and Ramos, J. E. (1995): *Composición florística y diversidad vegetal de un bosque premontano en Los Farallones de Cali.* – In: *Memorias del primer congreso nacional sobre biodiversidad.* Instituto de Estudios del Pacífico, Universidad del Valle, Santiago de Cali, Colombia, pp. 71–76.
- Gamboa-Gaitán, M. A. (1995): *Contribución a la flora de Los Farallones de Cali. I. Vereda Pico de Águila.* – Trabajo de grado, Departamento de Biología, Universidad del Valle, Cali.
- Gamboa-Gaitán, M. A. (2018): Flora Farallonensis I: los helechos del bosque premontano de Pico de Águila. – *Revista Mutis* **8**(2): 7–24. <https://doi.org/10.21789/22561498.1412>
- García-Kirkbride, M. C. (1986): *Biological evaluation of the Chocó biogeographic region in Colombia.* – WWF, Washington DC, U.S.A.
- Grayum, M. H. (1990): Evolution and phylogeny of the Araceae. – *Ann. Missouri Bot. Gard.* **77**: 628–697. <https://doi.org/10.2307/2399668>
- Jones, S. B. (1988): *Sistemática vegetal.* 2 ed. – McGrawHill, Mexico.
- Sarria, S. (1993): *Parque Nacional Natural Farallones de Cali. Monografía.* – Corp. Aut. Reg. Valle del Cauca CVC, Fund. Prot. Cuencas Procuenas, Cali, Colombia.