ISSN 2262-9017
Jardin Botanique de Guyane
nouvelle série RICHARDIANA
Volume 2
http://richardiana.jardinbotaniquedeguyane.com

The smallest orchid in the world is now a *Lepanthes*

Fredy Archila Morales[1,2] & Guy R. Chiron[3]

[1]Estación Experimental de orquídeas de la familia Archila - archilae@gmail.com
[2]Herbario BIGU, Universidad de San Carlos de Guatemala
[3]Herbiers, Université de Lyon 1, F-69622 Villeurbanne Cedex (France)

Abstract

Lepanthes is a neotropical genus within which a surprising number of species have been described in recent decades. Such a diversity is related to its ability to bloom throughout the year and to its pollination by miniature *Diptera*. Recently a extremely small *Lepanthes* was discovered in Guatemala. Its dimensions make it the smallest orchid in the world, attribute hitherto granted to Platystele imperialis, also native to this country. The thorough scrutiny showed that it was a new species, which is here described, illustrated and compared to its closest relative, *Lepanthes purulahensis*. A key to the Guatemalan species belonging to the group « leaves coriaceous, inflorescence shorter than leaf » is proposed.

Résumé

Lepanthes est un genre néotropical dans lequel ont été décrites ces dernières décennies un nombre surprenant d'espèces. Cette diversité est liée à sa capacité de fleurir tout au long de l'année et à sa pollinisation par des diptères miniatures. Récemment a été découvert au Guatemala un *Lepanthes* extrêmement petit dont les dimensions en font la plus petite orchidée au monde, attribut accordé jusque là à *Platystele imperialis*, également originaire du ce pays. L'étude de cette plante a montré qu'il s'agissait d'une espèce nouvelle, qui est ici décrite, illustrée et comparée à

Manuscrit reçu le 24/11/2018 Article mis en ligne le 08/12/2018 – pp. 175-184

son plus proche parent, *Lepanthes purulahensis*. Une clé d'identification des espèces guatémaltèques du groupe « feuilles coriaces, inflorescence plus courte que la feuille » est proposée.

Resumen

Lepanthes es un género Neotropical, que en las últimas décadas ha incrementado su número de especies de manera sorprendente, esa diversidad tiene que ver con la capacidad de florecer durante todo el año y su relación de polinización con insectos dípteros miniatura. Recientemente se descubrió un *Lepanthes* sumamente pequeño en Guatemala, que al realizar sus mediciones resulta ser la orquídea más pequeña del mundo, un calificativo que se le dio a *Platystele imperialis*, también colectado en ese país. Después de revisiones de literatura se pudo entender que se trataba de una nueva especie, la que se describe aquí ilustrada y comparada con su pariente más cercano *Lepanthes purulahensis*. Se propone una clave para el grupo de especies guatemaltecas de hojas coriáceas e inflorescencias más cortas que las hojas.

Keywords: biodiversity, Guatemala, Pleurothallidinae, taxonomy.
Mots clés : biodiversité, Guatemala, Pleurothallidinae, taxinomie.
Palabras clave: biodiversidade, Guatemala, Pleurothallidinae, taxonomia.

History of the Guatemalan *Lepanthes*

The genus *Lepanthes* was proposed by O. Swartz (1799). It is characterized by its stems enclosed in some tubular lepanthiform sheats, its inflorescence arising from near the apex of the ramicaul with an annulus, its sepals forming a subtriangular tray on which the transversely bilobed petals lay (Archila *et al*., in press). It is comprised of over 1100 species. The leaves can be fleshy or coriaceous, the inflorescence can be shorter than the leaf or much longer. In Guatemala Archila *et al*. (in press) register over 70 species.

The first specimens of *Lepanthes* registered in Guatemala were collected by H. von Türckheim and were published by Schlechter who described seven species: *Lepanthes acuminata* (Schlechter, 1912: 355), *L. guatemalensis* (id.: 355), *L. inaequalis* (id.: 356), *L. oreocharis* (id.: 423), *L. scopula* (id.: 356), *L. stenophylla* (id.: 396) and *L. tuerckheimii* (id.: 257).

The next four species added to the flora of Guatemala were published by Ames – *Lepanthes appendiculata* (Ames, 1923: 9), *L. gibberosa* (id.: 12),

L. johnsonii (id.: 24) and *L. samacensis* (id.: 25) – who described later one more species together with D.S. Correll, *Lepanthes excedens* Ames & Correll (1942: 72), based on material collected by Margaret Ward Lewis.

These same two scientists, working on the Orchidaceae for the Flora of Guatemala project, published the first volume of Orchidaceae (Ames & Correll, 1952); we can find here the first monograph of the genus *Lepanthes*, which includes all the species described by Schlechter, Ames and Correll with a couple of modifications: (1) *L. tuerckheimii* is treated as a synonym of *L. guatemalensis* and (2) a new name is proposed, *L. turialvae* Reichenbach f. (1855: 225), described from Costa Rica, to replace the Schlechter's name *L. scopula*, that is, according to their opinion, a synonym of the former.

For several years these changes have led to a controversy, particularly complicated given that, during WWII, a fire destroyed the Berlin herbarium, burning many types including those of Schlechter's *Lepanthes*. This caused a grave taxonomic issue because many of those species began to be treated as conspecific. In some cases species have even been gathered into groups because types and populations were not known. However in the early 90's Paul M. Catling lectotypified *L. guatemalensis, L. scopula* and *L. stenophylla* based on materials and descriptions deposited in other herbaria (Catling, 1990). Clearly this work helped to clarify the situation and gave bases for the study of other related species. It was also a contribution to the interpretation of some other destroyed Schlechter's materials. In the same article Paul Catling presented an analysis of material collected in the field (Guatemala and Mexico). This base was clearly a very important step as, after this work, many people in the country, especially collectors, began to look for and collect plants of *Lepanthes*. It was in particular the case of the Orchid Experimental Station of the Archila Family (OES), who collected material that was made available to Carl Luer, who described, together with Moises Béhar, several new species for Guatemala: *Lepanthes archilae* (Luer & Béhar in Luer, 1990: 182), *L. beharii* (Luer, 1990: 185), *L. fratercula* (Luer & Béhar in Luer, 1990: 188), *L. geniculata* (id.: 188), *L. juanii* (id.: 191) – however detailed analyzes of lectotypes by the senior author led us to consider it as a synonym of *L. inaequalis* – *L. mittelstaedtii* (id.: 191), *L. quetzalensis* (id.: 194), *L. tecpanica* (id.: 198), *L. herrerae* (Luer & Béhar, in Luer, 1991: 70), *L. velifera* (id.: 79), *L. ordonezii* (Luer & Béhar, in Luer, 1997: 34), *L. noellii* (Luer & Béhar, in Luer, 2000: 318).

At the same time, a research work was carried out in Mexico for the construction of the book "El genero *Lepanthes* Sw. en Mexico" (Salazar & Soto Arenas, 1996). The authors collected through the country orchids in general, with important attention for the genus *Lepanthes*. Several species originating from border areas and described by them for the first time had already been collected in Guatemala: *L. williamsii* (Salazar & Soto Arenas, 1992: 139), *Lepanthes breedlovei* (Salazar & Soto Arenas, 1996: 75), *L. matudana* (id.: 129), *L. maxima* (id.: 131), *L. minima* (id.: 133) and *L. motozintlensis* (id.: 143). An interesting case is *Lepanthes williamsii* which many people in Guatemala continue to call *Lepanthes viridis*, a name suggested in Guatemala for the taxon but not published (Archila, 2001).

The members of the OES, motivated by the uncommon character of the genus and above all by the large amount of material collected as well as by the endemism of some taxa, kept collecting (which they had been doing since 1970), paying special attention to the populations of *Lepanthes* (location, dispersion, endemism, etc.) with the purpose of understanding the different evolutionary lineages. The first great achievement of this work was the book “Lepanthes of Guatemala” (Archila, 2001), about which Sandra Knapp and Gerrit Davidse said that it was an example of how botany should be done in modern times with local actors (Knapp & Davidse, 2006). In this book thirteen new species were published: *Lepanthes any* (Archila, 2001: 83), *L. carvii* (id.: 99), *L. cobanensis* (id.: 102), *L. cleistogama* (id.: 105), *L. gustavo-romeroi* (id.: 133), *L. huehuetenangensis* (id.: 142), *L. luisii* (id.: 163), *L. necae* (id.: 180), *L. oroscoi* (id.: 190), *L. oscarii* (id.: 193), *L. purulhaensis* (id.: 206), *L. salazarii* (id.: 211) and *L. sotoi* (id.: 220), a few ones having been published some years before: *L. enca-barcenae* (Archila, 1998: 13), *L. isabeliae* (id.: 7), *L. javieri* (id.: 1), *L. tactiquensis* (id.: 19) and *L. verapazencis* (id.: 25). Then several additional species were published by the senior author, in different places. Among them the most recent novelties are *L. vilchezii* (Archila in Archila & Vilchez, 2013: 15), *L. milciadesmejiae* (Archila, F. Jimenez & Veliz, 2015: 16), *L. swartzii* (Archila, Szlachetko & Rykaczewski, 2017: 93) and *L. sergioromeroi* (Archila, Szlachetko & F. Jimenez, 2018: 78). These last new species show that in reality Guatemala has an enormous species richness in *Lepanthes*, far bigger than the 11 species described in “Flora of Guatemala”.

An additional novelty has recently been discovered by the senior author and is described below.

Taxonomic treatment

For greater convenience, we can divide the *Lepanthes* species into three groups according the following key:

A. Leaves fleshy, plants always growing in the life zone "subtropical very humid low montane forest".....group I
A'. Leaves coriaceous, plants from a different life zone.....B
B. Inflorescence much longer than the leaves.....group II
B'. Inflorescence shorter than the leaves (except *L. cleistogama*).....group III

The new species belongs to the group III. It is related to *Lepanthes systole* Luer (1983: 373) and *Lepanthes purulhaensis* but it is easily differentiated by the orbicular leaves and the small size of its flowers.

***Lepanthes oscarrodrigoi* Archila & Chiron, sp. nov.**

Type: Guatemala, Alta Verapaz, Cobán, col. Fredy Archila, Claudia de Archila, Javier & Oscar Archila Cortez, XI/2015, 1,100 m s.n.m. en bosques nubosos de la vertiente norte de la Sierra Sacranix, sobre arbustos, *FA-sn* (Holotype: BIGU, Isotype: BIGU); Guatemala, Alta Verapaz, Cobán, col. Fredy Archila, Claudia de Archila, Javier & Oscar Archila Cortez, XI/2015, 1,150 m s.n.m. en bosques nubosos de la vertiente norte de la Sierra Sacranix, en ramas terciarias de árbol pequeño, *FA-sn* (Paratype: BIGU).

Herba nana inter nanas cum ramicaulis brevissimis. Haec herba Lepanthes purulahensis similis est sed foliis orbicularibus, sepalo intermedio lanceolato acuminato, sepalis lateralibus ellipticis acuminatis, bilobatis petalis cum lobos superos oblique oblongos truncatos et lobos inferos oblique triangulares acuminatos, labelli proxima parte cum laminas orbiculares, columna cylindrata subcapitata 0.22 mm longa, differt.

Etymology: dedicated to Oscar Rodrigo Archila Cortez, codiscoverer of the species.

Dwarf plant; ramicauls very short, 2.5-3 mm long, covered by 2-3 imbricated bracts; bracts lepanthiform, 1 mm long, 0.9 mm wide at the ostium level, tubular, the lower ones obliquely obtuse, the upper one obliquely acute, with longitudinal papillose-dentate veins, ostium margin pubescent; leaf orbicular, 5 mm long, 5.5 mm wide, green on the adaxial face, blood-red on the abaxial face, apically tridentate, lateral teeth triangular, median one linear, like an appendix, without touching the lateral ones; inflorescence short, 4 mm long; flowers distichous, congested,

sepals externally coffee-colored, internally pale pink, translucent; floral bracts short, subglobose, minutely pubescent on the outside; ovary 0.5 mm long, with the dorsal part rounded and the ventral part concave; dorsal sepal 0.7 mm long, 0.4 mm wide, lanceolate, apically acuminate; lateral sepals connate on 1/3 of their length, forming a synsepal 0.7 mm long, 0.5 mm wide, elliptic, with apices acuminate; petals bilobed, 0.15 mm long, 0.3 mm wide, upper lobe obliquely oblong with the apex obliquely truncate, lower lobe obliquely triangular with the apex acuminate with an obliquely rounded projection; lip trilobed, median lobe reduced to a linear cylindrical appendage with a minute pubescence 0.05 mm long, connectives trapezoidal, laminae orbicular in the proximal part, linear acuminate in the distal part, each lamina 0.17 mm long, 0.1 mm wide; gynostemium cylindrical, slightly capitated, 0.22 mm long. Fig. 1 & 2.

Fig. 1. ***Lepanthes oscarrodrigoi***
[ph. Fredy Archila]

Notes

1. This species usually grows on tree twigs where it is extremely difficult to detect as it is covered by briophytes. Its very small size grants it the title of "smallest orchid in the world".

2. *Lepanthes oscarrodrigoi* looks like *L. purulahensis* but it is very easy to differentiate it despite its small size by its orbicular leaves (*versus* elliptical), its lanceolate dorsal sepal acuminate (*versus* elliptical-ovate acute), its elliptic synsepal with acuminate apices (*versus* ovate with obliquely acute apices), its petal upper lobe obliquely oblong (*versus* triangular), obliquely truncate (*versus* acuminate), its petal lower lobe obliquely triangular with an acuminate apex (*versus* forming a small projection inconspicuously rounded) and its lip proximal part with laminae orbicular (*versus* orbicular-oblong).

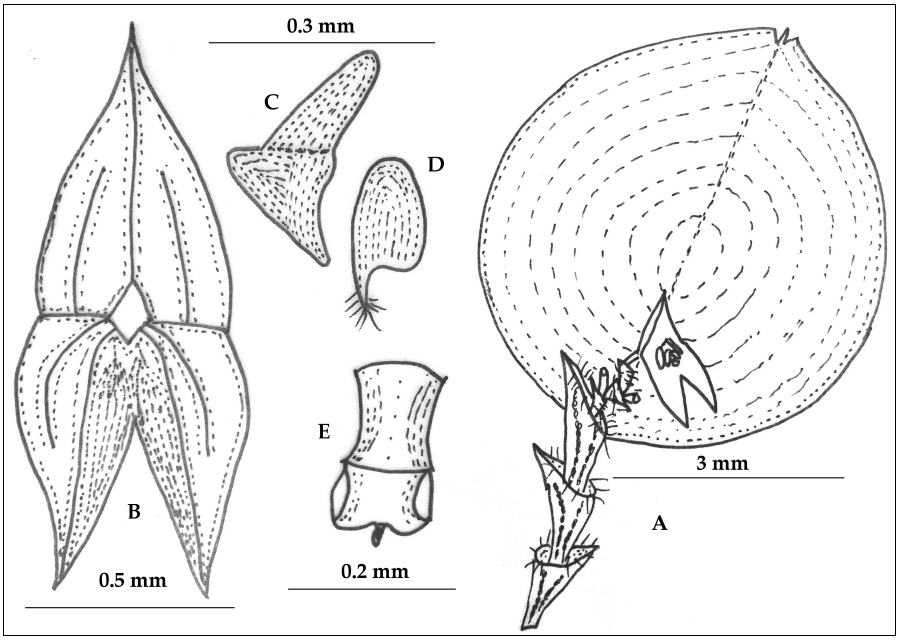

Fig. 2. *Lepanthes oscarrodrigoi*

A. plant; B. sepals; C. petal; D. half a lip; E. column [drawing Fredy Archila]

Key to the Guatemalan *Lepanthes* species within "group III"

1. Lip laminate entire.....2
1'. Lip bilaminate.....4

2. Inflorescence longer than the leaf.....*L. cleistogama*
2'. Inflorescence shorter than the leaf.....3

3. Apices of the petal lobes caudate.....*L. pantomima*
3'. Apices of the petal lobes acuminate.....*L. yunckeri*

4. Flowers on the adaxial face of the leaf.....5
4'. Flowers on the abaxial face.....9
5. Leaf lamina convex in relation to the flower position.....*L. appendiculata*
5'. Leaf lamina concave.....6

6. Plants less than 3.5 cm high.....*L. samacensis*
6'. Plants more than 3.5 cm high.....7

7. Distal apices of the laminae of the lip with a membranous veil that joins them.....*L. velifera*
7'. Distal apices of the laminae without veil, free.....8

8. Petal lobes papilionaceous.....*L. motozintlensis*
8'. Petal lobes oblong, not papilionaceous.....*L. bredlovei*

9. Inflorescence a scopuliform raceme.....10
9'. Inflorescence with short pedicels, not scopuliform.....14

10. Plants pendulous.....11
10'. Plants erect or semi-pendulous.....12

11. Petal lobes papilionaceous.....*L. hondurensis*
11'. Petal lobes not papilionaceous, the upper lobes with the inner margins superimposed.....*L. disticha*

12. Column distinctly exceeding the laminae of the lip.....*L. javieri*
12'. Column shorter than the laminae of the lip or with only the apex of the rostellum and the pollinarium protruding.....13

13. Upper lobes of the petals ovate-elliptic.....*L. scopula*
13'. Upper lobes of the petals linear-oblong.....*L. quetzalensis*

14. Leaves orbicular or orbicular elliptic.....15
14'. Leaves elliptic, oblong or lanceolate.....18

15. Leaves orbicular.....*L. oscarrodrigoi*
15'. Leaves orbicular elliptic.....16

16. Synsepal ovate apically acute.....*L. excedens*
16'. Synsepal not ovate, apically acuminate.....17

17. Petal lobes orbicular or suborbicular.....*L. acuminata*
17'. Petal lobes triangular.....*L. chapina*

18. Margin of the sepals dentate.....19
18'. Margin of the sepals entire.....20

19. Plants less than 2.2 cm high, densely dentate.....*L. parvula*
19'. Plants more than 2.2 cm high, sparsely dentate.....*L. huehuetenangensis*
20. Leaf lamina less than 2 cm long.....21
20'. Leaf lamina more than 2 cm long.....25

21. Lower lobes of the petals absent or inconspicuous.....*L. purulhaensis*
21'. Lower lobes of the petals present.....22

22. Petals pubescent, upper lobe sub-triangular.....*L. systole*
22'. Petals papillate-puberulent, upper lobe not sub-triangular.....23

23. Lower lobes of the petals triangular divergent.....24
23'. Lower lobes of the petals elliptic, parallel, sub-convergent*L. ancylopetala*

24. Upper lobes of the petals not superimposed.....*L. papillipetala*
24'. Lower lobes of the petals superimposed.....*L. noelii*

25. Apex of the lateral sepals acuminate-caudate.....*L. matudana*
25'. Apex of the lateral sepals not acuminate-caudate, usually acute.....26

26. Flower more than 1 cm long.....27
26'. Flower less than 1 cm long.....28

27. Upper lobes of the petals oblong, parallel and separate.....*L. inaequalis*
27'. Upper lobes of the petals oblanceolate, superimposed.....*L. archilae*

28. Sepals yellowish green.....*L. isabeliae*
28'. Sepals yellow.....29

29. Flower more than 0.68 cm long, yellow.....*L. carvii*
29'. Flower less than 0.6 cm long, red, orange and/or purple.....30

30. Upper lobes of the petals purple, linear, overlapping.....*L. stenophylla*
30'. Upper lobes of the petals orange, oblong-elliptic, parallel, not overlapping.....*L. cobanensis*

References

Ames, O., 1923. *Schedulae Orchidianae* 3: 9. Boston.

Ames, O. & D.S. Correll, 1942. Some new or noteworthy Guatemalan Orchids. *Botanical Museum Leaflets* 10: 72.

Ames, O. & D.S. Correll, 1952-1953. *Orchids of Guatemala*. Chicago Natural History Museum, Chicago. 779 pp.

Archila, F., 2001. *Lepanthes* de Guatemala: Monografía del género *Lepanthes Sw.* (Orchidaceae) para Guatemala. *Revista Guatemalensis*. Edición especial. 281 pp.

Archila, F. & L. Vilchez, 2013. *Lepanthes vilchezii* nueva especie de Pleurothallidinae / Orchidaceae para Guatemala y Honduras. *Revista Guatemalensis* 15(2): 12-21.

Archila, F., F. Jiménez & M. Veliz, 2015. Adiciones taxonómicas para la orquideoflora neotropical. *Moscosoa* 19: 14-21.

Archila, F., D. Szlachetko & M. Rykaczewski, 2017. A new species of Lepanthes (Orchidaceae, Pleurothallidinae) from Guatemala. *Wulfenia* 24: 5.

Archila, F, D. Szlachetko & F. Jiménez, 2018. Nueva especie de Lepanthes Sw. del complejo mesoamericano, de hojas suculentas. *Revista Guatemalensis* 21(1) : 74-81.

Archila F., D. Szlachetko, G. Chiron, M. Lipińska, V. Bertolini & K. Mystkowska, in press. *Orchid genera and species in Guatemala*. Koeltz Botanical Books. Germany.

Catling, P., 1990. Typification and taxonomic characters of some of Schlechter´s Guatemalan species of *Lepanthes*. *Orquídea* (Méx.) 12(1): 28-40.

Knapp S. & Davidse G. 2006. *Flora of Guatemala Revisited. Biodiversidad de Guatemala*. Volumen I: 25-47. Enio B. Cano Ed. Universidad del Valle.

Luer, C., 1983. New species of *Lepanthes* (Orchidaceae). *Phytologia* 54(5): 325-378.

Luer, C., 1990. New species of *Lepanthes* from Guatemala. *Lindleyana* 5(3): 162-198.

Luer, C., 1991. New species of *Lepanthes* (Orchidaceae). *Lindleyana* 6(2): 64-83.

Luer, C., 1997. New species of *Lepanthes* and *Pleurothallis* (Orchidaceae) from Guatemala, Panama, Perú, Surinam and Venezuela. *Lindleyana* 12(1): 34-55.

Luer, C., 2000. *Orquideologia* 21: 318.

Reichenbach, H.G.R., 1855. Symbolae Orchidaceae. *Bonplandia* 3: 212-227.

Salazar, G. & M.A. Soto Arenas, 1992. *Lepanthes williamsii* (Orchidaceae), una especie nueva de México y Guatemala. *Orquidea* (Mex.) 12. 139-144.

Salazar, G. & M.A. Soto Arenas, 1996. EL GENERO *LEPANTHES* SW. EN MEXICO. *Orquidea* (Mex.) 14. 231 pp.

Schlechter, R., 1912. Orchidaceae novae et criticae. Decas XXVII-XXVIII. *Repertorium Specierum Novarum Regni Vegetabilis* 10: 355.

Swartz, O., 1799. Dianome Epidendri Generis Linn. *Nova Acta Regiae Societatis Scientiarum Upsaliensis* 6: 85. Uppsala.