

# Taxonomy of the subtribe Maxillariinae (Orchidaceae, Vandoideae) revised

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**Abstract:** A new classification of the subtribe Maxillariinae (Orchidaceae) is proposed. Thirty-seven genera are revised. The *Camaridium* group is divided into seven genera, *Adamanthus*, *Camaridium*, *Pseudomaxillaria*, *Psittacoglossum* and three described here: *Chaseopsis*, *Chelyella* and *Viracocha*. *Ornithidium* s.l. is divided into seven genera: *Heterotaxis*, *Laricorchis*, *Neo-urbania*, *Nitidobulbon*, *Ornithidium*, *Vazquezella* and *Aucellia*, the latter two described here. 193 new combinations on the species level are validated and the relationships among the genera are briefly discussed. A key to the determination of all genera representing Maxillariinae s. s. is provided.

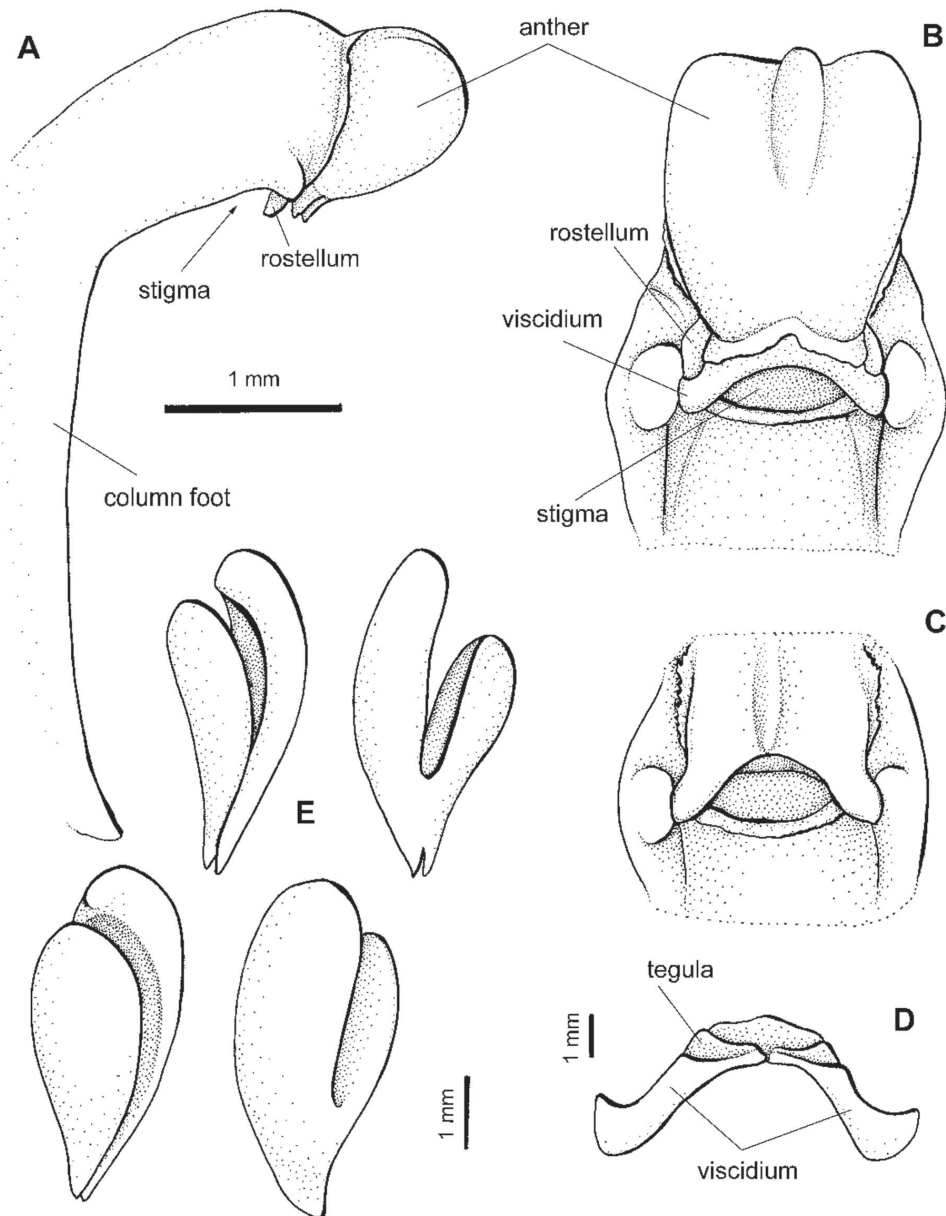
**Key words:** *Maxillaria*, *Camaridium*, *Ornithidium*, new genera, Neotropics, taxonomy

## 1. Introduction

The subtribe Maxillariinae Benth. (Orchidaceae, Vandoideae), with its significant genus *Maxillaria* Ruiz & Pav., is one of the largest taxa of this rank in the orchid family. The genus was described by Ruiz and Pavón in 1794 and according to various authors, it includes from 420 (Dressler 1993; Christenson 2002) to 750 species (Senghas 2002). *Maxillaria* sensu lato is characterized by a combination of the following features: conduplicate leaves, single-flowered inflorescence(s), 3-lobed lip adorned by prominent oblong callus, presence of column foot and hippocrepiform viscidium (Szlachetko & Mytnik-Ejsmont 2008, cf. Fig. 1). A significant unification of the flower structure and very high variability of the vegetative characters can be observed such as: the size of plant, a type of growth, a number and type of the leaves per shoot, presence or absence of foliaceous sheaths at the base of the pseudobulb and the type of inflorescence. Such widely defined generic delimitation caused many taxonomical problems, which were additionally exacerbated by various opinions concerning lectotypification of the name of *Maxillaria* (Garay & Sweet 1972; Garay 1997; McIlmurray & Oakeley 2001). There were few attempts to propose a new classification of this genus, but all were based solely

on morphological data (Dressler 1993; Senghas 1993, 2002; Christenson 2002).

Recently, the results of complex study of the subtribe Maxillariinae, both on molecular and morphological levels, were published (Whitten *et al.* 2007; Blanco *et al.* 2007, 2008; Ojeda *et al.* 2009). Until now, they are the most comprehensive work on the subtribe and this kind of approach is worth to continue. The molecular data of so many species as those examined by the authors (Whitten *et al.* 2007; Blanco *et al.* 2007) makes it possible to observe a connection between various species very clearly. The new classification of the subtribe based on both molecular and morphological data proposed in this work is clearer and more useful. Whitten *et al.* (2007) proposed to divide *Maxillaria sensu lato* into 17 genera. There is no manner of doubt with generic delimitations of such genera as *Rhettinantha* M.A. Blanco, *Sauvetrea* Szlach., *Christensonella* Szlach., Mytnik, Górniak & Śmiszek, *Mapinguari* Carnevali & R.Singer, *Inti* M.A. Blanco, *Brasiliorchis* R.B.Singer, S.Koehler & Carnevali or *Nitidiobulbon* I.Ojeda, Carnevali & G.A.Romero. The relation between the genera mentioned above is confirmed by both, similarity of the examined molecular regions (ITS, *atpB-rbcL*, *matK*, nrITS, *rpoC1*) and also the high morphological resemblance. These taxa seem to be well-established



**Fig. 1.** *Maxillaria* sp. – selected features of flower morphology

Explanations: A – gynostemium side view, B – apical part of gynostemium, bottom view, C – rostellum remnant, front view, D – tegula and viscidium, front view, E – pollinia, various views (Holm-Nielsen & Jeppesen 5689, AAU) (Szlachetko & Mytnik-Ejsmont 2008)

based on strong taxonomic background if a narrow concept of genera is accepted (Schlechter 1926; Szlachetko 1995; Senghas 2002).

Some years ago we started a taxonomic study leading to a generic revision of the subtribe Maxillariinae and, particularly, the genus *Maxillaria*. Independently from Whitten *et al.* (2007), we examined a more or less similar spectrum of species obtaining similar molecular data-based trees. However, our conclusions concerning generic circumscriptions of what formerly was called *Maxillaria* *sensu lato* and following nomenclatural consequences are different.

There are two major genera extracted from *Maxillaria* which must be treated in detail; these are *Camariidium* Lindl. and *Ornithidium* Salisb. *ex* R.Br. Unfortuna-

tely, both genera treated in the way proposed by Whitten *et al.* (2007) are questionable. *Camariidium* and *Ornithidium* include different species from the morphological point of view; however, the molecular data grouped them into two well-supported clades. On the other hand, there is significant resemblance of morphological features between some species of these two groups. Such morphological differences within genera and such inaccurate and broadly defined generic delimitations make the identification of species very difficult. It is problematic in the same way as in the case of *Maxillaria sensu lato*.

Whitten *et al.* (2007) and Blanco *et al.* (2007) circumscribed *Camariidium* as follows: variable in growth habit, mostly with pseudobulbs separated by

rhizome segments of variable length, some caespitose, others monopodial or with dimorphic growth; the floral bracts in almost all species are longer than pedicels and ovaries, overlapping the base of the dorsal sepal; the flowers are usually deceptive, but in some cases produce nectar; the sepals and petals lack fiber bundles and the column foot long or short. According to Blanco *et al.* (2007), *Ornithidium* is characterized by the following combination of features: sympodial (caespitose or long-rhizomatous), monopodial or with dimorphic growth; inflorescences are usually fascicled; the pedicel and ovary are invariably much longer than the floral bract; the flowers are usually small, fleshy, campanulate or more often subglobose and often produce nectar; the perianth segments lack fibers.

According to Whitten *et al.* (2007) and Blanco *et al.* (2007), the length of the floral bracts is a useful feature in separating *Camaridium* from *Ornithidium*. In our opinion, it is the only character and, what is most important, not constant.

Therefore we propose to divide *Ornithidium* and *Camaridium* into some smaller groups of species, hence better defined, with a significant resemblance of morphological structures in accordance with the results of molecular analyses (Whitten *et al.* 2007). New taxa are easily distinguishable from one another and from the rest of genera of the subtribe.

Thus, we postulate here to divide *Camaridium sensu* Blanco *et al.* (2007) into seven genera – *Adamanthus* Szlach. *emend.* Szlach. & Sitko, *Camaridium* Lindl., *Chaseopsis* Szlach. & Sitko, *gen. nov.*, *Chelyella* Szlach. & Sitko, *gen. nov.*, *Pseudomaxillaria* Hoehne, *Psittacoglossum* Lex. *in* La Llave & Lexarza and *Viracocha* Szlach. & Sitko, *gen. nov.* According to the results of molecular analyses the taxa mentioned above usually form distinct groups. Additionally, in our opinion, *Ornithidium sensu* Blanco *et al.* (2007) should also be divided into seven genera – *Aucellia* Szlach. & Sitko, *gen. nov.*, *Heterotaxis* Lindl., *Laricorchis* Szlach., *Neourbania* Fawc. & Rendle, *Nitidobulbon* I.Ojeda, Carnevali & G.A.Romero, *Ornithidium* Salisb. *ex* R.Br. and *Vazquezella* Szlach. & Sitko, *gen. nov.*

## 2. Material and methods

### 2.1. Morphological studies

To assess morphological variations within the group treated, we examined both herbarium and fluid preserved materials as well as living and flowering plants, if they were available. We studied nearly 1,000 herbarium specimens, representing a broad spectrum of Maxillariinae. Most of the studied collections are deposited in Kew Royal Botanic Gardens (K), Museum National d'Histoire Naturelle in Paris (P) and Naturhistorisches Museum in Wien (W). Some specimens were

loaned from AAU, B, BM, BR, C, COL, GOET, HBG, M, MO, NY, NYS, P, S, SEL, U, UPS, US, WRSL, WU and Z (Holmgren *et al.* 1990). We also examined floral characters for nearly 300 samples preserved in spirit (Kew Mixture, Copenhagen Mixture), deposited in HBG, HEID, K and UGDA. Finally, the living specimens were collected from botanical gardens of Hamburg, Heidelberg, Munich and Wien. Some samples were taken from Szlachetko's private collection gathered during expeditions to French Guiana (1997, 1999), Ecuador (2005, 2007, 2008), Peru (2007, 2008) and Colombia (2011).

At the end of the description of each genus and a brief discussion about its taxonomic position, we present a list of those species belonging to the genus, for which we propose a new nomenclatural combination. Those species which have been transferred to the genus by earlier authors are not mentioned.

### 2.2. Taxon sampling

To reconstruct DNA sequence-based phylogeny, we sampled nearly 249 species representing all major groups of Maxillariinae, some minor representatives of allied subtribes within the tribe Cymbidieae and the outgroup taxa. We obtained 94 sequences of ITS region (ITS1-5.8S-ITS2) and combined them with additional 155 ITS sequences from GenBank resources (National Center for Biotechnology Information). Sequence accession numbers and voucher information for the sampled material will be listed in a forthcoming paper about phylogeny of Maxillariinae.

### 2.3. DNA extraction, amplification and sequencing

Total genomic DNA was extracted from 100 mg of fresh or 20 mg silica-dried leaves using Genomic Mini AX Plant (A&A Biotechnology, Gdynia, Poland). Lysing Matrix A and FastPrep (MP Biomedicals, USA) following manufacturer protocols. Samples were homogenized in precooled (-65°C) pestles and mortars.

ITS region was amplified using two sets of primers: AB101 with AB102 (Douzery *et al.* 1999) or ITS4 with ITS5 (White *et al.* 1990). Primer sequences are listed in Table 1. Polymerase chain reaction (PCR) in the final volume of 50 µl was prepared using 10 µl 5x buffer, 1 µl 50 mM MgCl<sub>2</sub>, 2 µl 5mM dNTPs, 0.3 µl of 20 µM of each primer, 2.5 µl dimethyl sulfoxide (DMSO) and 1.0 unit of Yellow Perpetual DNA polymerase (Eurx,

**Table 1.** ITS primer sequences

ITS	Primer sequence
ITS AB101	5' ACGAAT TCATGGTCCGGTGAAGTGTTCC 3'
ITS AB102	5' TAGAATTCCCCGGTTCGCTCGCCGTTAG 3'
ITS4	5' TCCTCCGCTTATTGATATCG 3'
ITS5	5' GGAAGTAAAAGTCGTAACAAG G 3'

Gdańsk, Poland). Amplification was carried in Biometra T Gradient and Eppendorf Mastercycler thermalcyclers. Amplification conditions were as follows: initial denaturation for 3 min in 96°C, then 28 cycles with 45 sec denaturation in 94°C, 45 sec annealing in 57°C (for AB101/AB102 primer set) or 52°C (for ITS4/ITS5 primer set) and 1 min elongation in 72°C, with final extension for 7 min in 72°C. PCR products were then purified using the High Pure PCR Product Purification Kit (Roche Diagnostic GmbH, Germany) following manufacturer instructions. Sequencing reaction was carried out using Big Dye Terminator v 3.1 Cycle Sequencing Kit (Applied Biosystems, Inc.) with the same primers used for PCR amplification: 1.3 µl of 5x sequencing buffer, 1.0 µl of Big Dye terminator with 0.32 µl of 10 µM primer (3.2 pmol), 1-4 µl of amplified product (30-90 ng/µl), 0.5 µl DMSO and H<sub>2</sub>O in a total of 10 µl reaction volume. Cycle sequencing conditions were as follow: 25 cycles each with 15 sec denaturation (94°C), 5 sec annealing (52°C) and 4 min elongation (60°C). Sequencing reaction products were sequenced on ABI 3720 automated capillary DNA sequencer in the Institute of Biochemistry and Biophysics. Both strands were sequenced to assure accuracy in base calling. FinchTV (Geospiza Inc.) was used for sequence editing and the two complementary strands were assembled using AutoAssembler (Applied Biosystems, Inc).

#### 2.4. Sequence assemblage and phylogenetic analysis

The obtained sequences were initially aligned using ClustalX (Thomson *et al.* 1997) and then the resulting alignment was corrected manually using SeaView (Galtier *et al.* 1996). Single ITS matrix comprising 830 positions was then subjected to phylogenetic analysis using both maximum parsimony and Bayesian inference optimality criteria. Parsimony analysis was performed using PAUP\* version 4b10 (Swofford 2002) with all characters treated as unordered and equally weighted. A set of most parsimonious trees was acquired through heuristic search with simple stepwise addition, tree bisection–reconnection (TBR) branch swapping and MULTREES (holding multiple trees) option in effect. Basic tree statistics like tree length, Consistency (CI) and Retention (RI) indices were also recorded. Internal support of clades was estimated using non-parametric bootstrapping with 1000 replicates with the same heuristic search strategy as above. We defined bootstrap support as weak for 50-69%, medium 70-84% and strong 85-100%.

Bayesian analysis was conducted using MrBayes 3.1 (Huelsenbeck & Ronquist 2001) with general time reversible model of substitution, with gamma distribution and invariable sites (GTR+I+G). The model was selected by the Akaike information criterion imple-

mented in MrModeltest version 2.2 (Nylander 2004). The posterior probabilities (PP) of clades were estimated by sampling trees from the PP distribution using Markov chain Monte Carlo simulations. Two parallel runs with four simultaneous chains were executed for 1,000,000 generations with trees sampled every 100 generation. A plot of generations against likelihood scores of the sampled trees was then examined in order to establish “burn-in” required for both runs to converge on a stationary probability value – burn-in trees were then discarded from the study. The remaining trees were used to calculate a majority rule consensus tree.

### 3. Results and discussion

#### 3.1. Phylogeny reconstruction and morphological analysis

ITS matrix features and basic statistics of resultant parsimony trees are summarized in Table 2. The shortest parsimony trees were used to generate strict consensus tree, described then with posterior probability values and bootstrap support (Fig. 2). The numbers in numerator represent a bootstrap support and those in denominator – poster probability values.

**Table 2.** ITS matrix and parsimony trees statistics

	ITS
Aligned length in bases	830
Number of variable sites	434
Number of parsimony informative sites	339
Number of shortest trees	+10,000
Fitch tree length (number of steps)	1811
CI	0.423
RI	0.820
Transition/transversion ratio	2.0

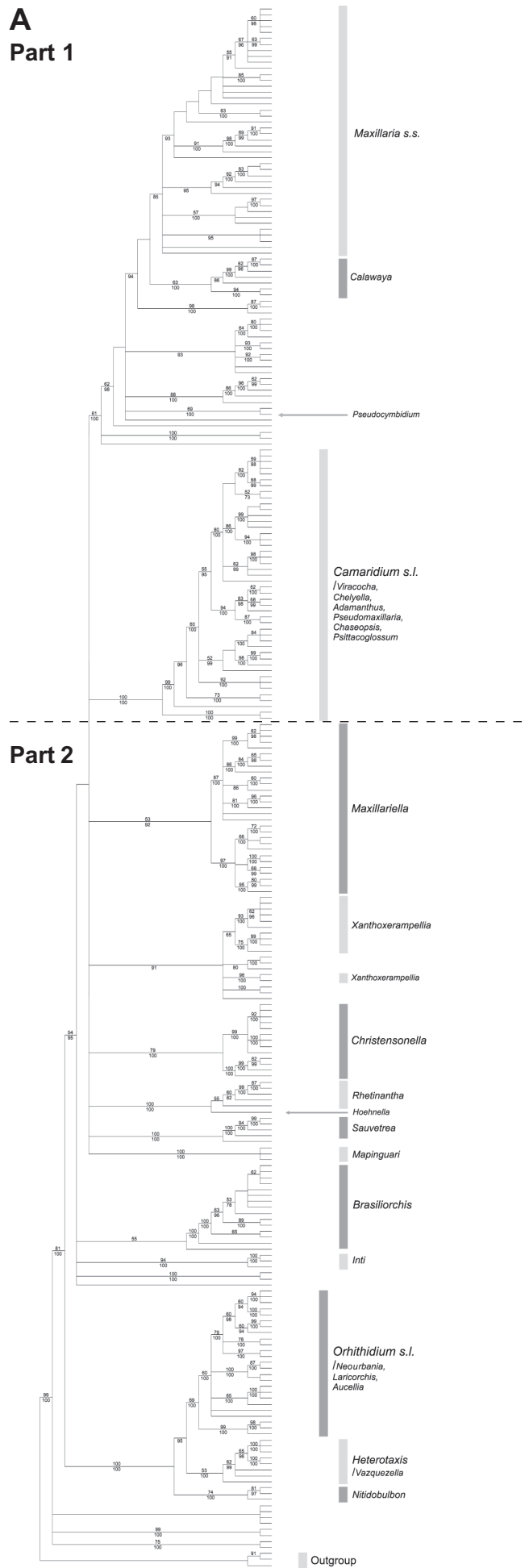
The subtribe Maxillariinae includes 36 genera, and the dichotomous key to all genera is presented below.

Key to the genera

1. Pseudobulbs covered and fused to scarious tunicas ..... *Pityphyllum*
1. Pseudobulbs without tunicas ..... 2
2. Sepals twice or much longer than petals ..... 3
2. Sepals subsimilar in size to petals ..... 4
3. Sepals basally connate into a tube, petals without any subterminal thickening, lip with backward-projecting spur ..... *Cryptocentrum*
3. Sepals basally free, petals with shiny, subterminal thickening, lip spurless ..... *Trigonidium*
4. Lip insectiform ..... 5
4. Lip not insectiform ..... 6
5. Shoots dimorphic – pseudobulbous more or less caespitose, and monopodial, simple or branching, producing supra-axillary inflorescences ..... *Cyrtidiorchis*

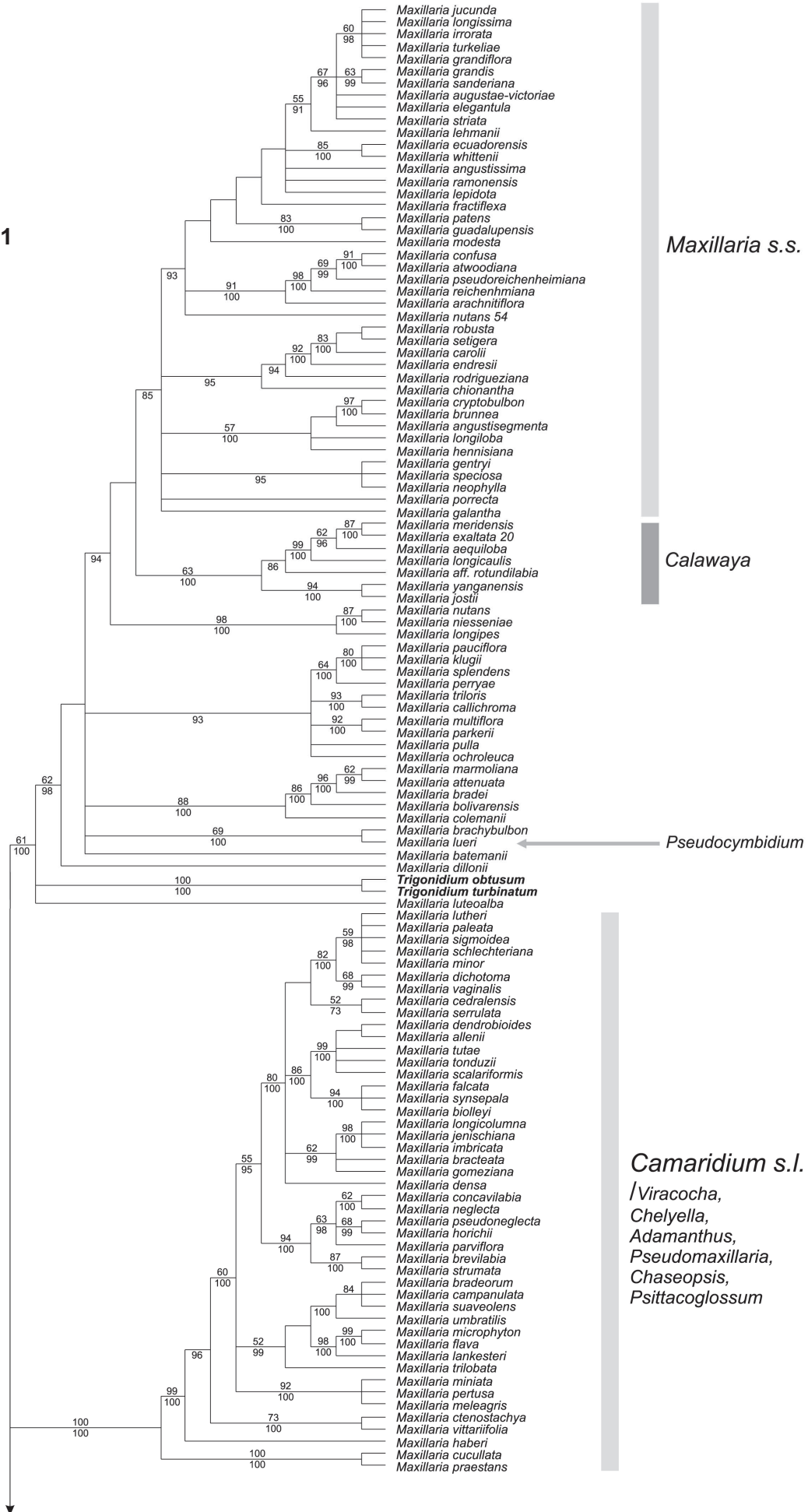
- 5. Shoots pseudobulbous, pseudobulbs well-spaced along aerial stolons, inflorescence emerging from between older pseudobulbs ..... *Chrysocycnis*
- 6. Leaves terete, dorsally grooved or not, or laterally flattened ..... 7
- 6. Leaves conduplicate or plicate ..... 12
- 7. Plants without pseudobulbs ..... 8
- 7. Plants with pseudobulbs ..... 10
- 8. Leaves succulent, leaf bases not overlapping ..... *Vazquezella*
- 8. Leaves laterally flattened, equitant ..... 9
- 9. Stem erect, leaves stiff, erect ..... *Marsupiaria*
- 9. Stem pendulous, leaves soft, fleshy ..... *Hoehnella*
- 10. Plants large, flowers showy, lip with several parallel keels ..... *Scuticaria*
- 10. Plants small or medium-sized, flowers rather inconspicuous, lip callus not as above, if any ..... 11
- 11. Lip with oblong callus in the centre, column foot prominent ..... *Christensonella*
- 11. Lip ecallose, column foot rudimentary .. *Pityphyllum*
- 12. Leaves obscurely plicate, flowers sequentially produced on inflorescence ..... *Hylaeorchis*
- 12. Not above combination of features ..... 13
- 13. Plants monopodial ..... 14
- 13. Plants sympodial ..... 15
- 14. Leaves ligulate to oblong ligulate, unequally bilobed at the apex, with both lobes rounded, flowers produced on short peduncle, covered by few sterile bracts, sepals and petals subsimilar in form and size, column foot short but well seen and forming a conical spur ... *Adamanthus*
- 14. Leaves linear-lanceolate, widest at the base, attenuate gradually towards the apex, both leaf lobes acute, peduncle very short with a single bract, sepals larger than petals, column foot obscure, completely connate to the ovary apex, and forms a shallow, saccate spur ..... *Neourbania*
- 15. Inflorescence produced from between older pseudobulbs ..... 16
- 15. Inflorescence produced at the base of pseudobulbs or along new shoot which transforms into pseudobulbs after flowering ..... 17
- 16. Inflorescence very short, more or less as long as pseudobulbs, tepals subsimilar, lip with an oblong callus ..... *Xanthoxerampellia*
- 16. Inflorescence as long as leaf, tepals dissimilar, lip callus pad-like, covered by trichomes ..... *Mormolyca*
- 17. Leaves fan-like, pseudobulbs absent or very obscure ..... *Inti*
- 17. Leaves do not form any fan, pseudobulbs prominent ..... 18

**Fig 2.** Strict consensus of most parsimonious trees recovered during the analysis of large ITS matrix. Numbers above branches represent bootstrap support (BP), below branches posterior probabilities (PP) from the Bayesian analysis  
 Explanations: A – overview, B – parts of parsimonious tree



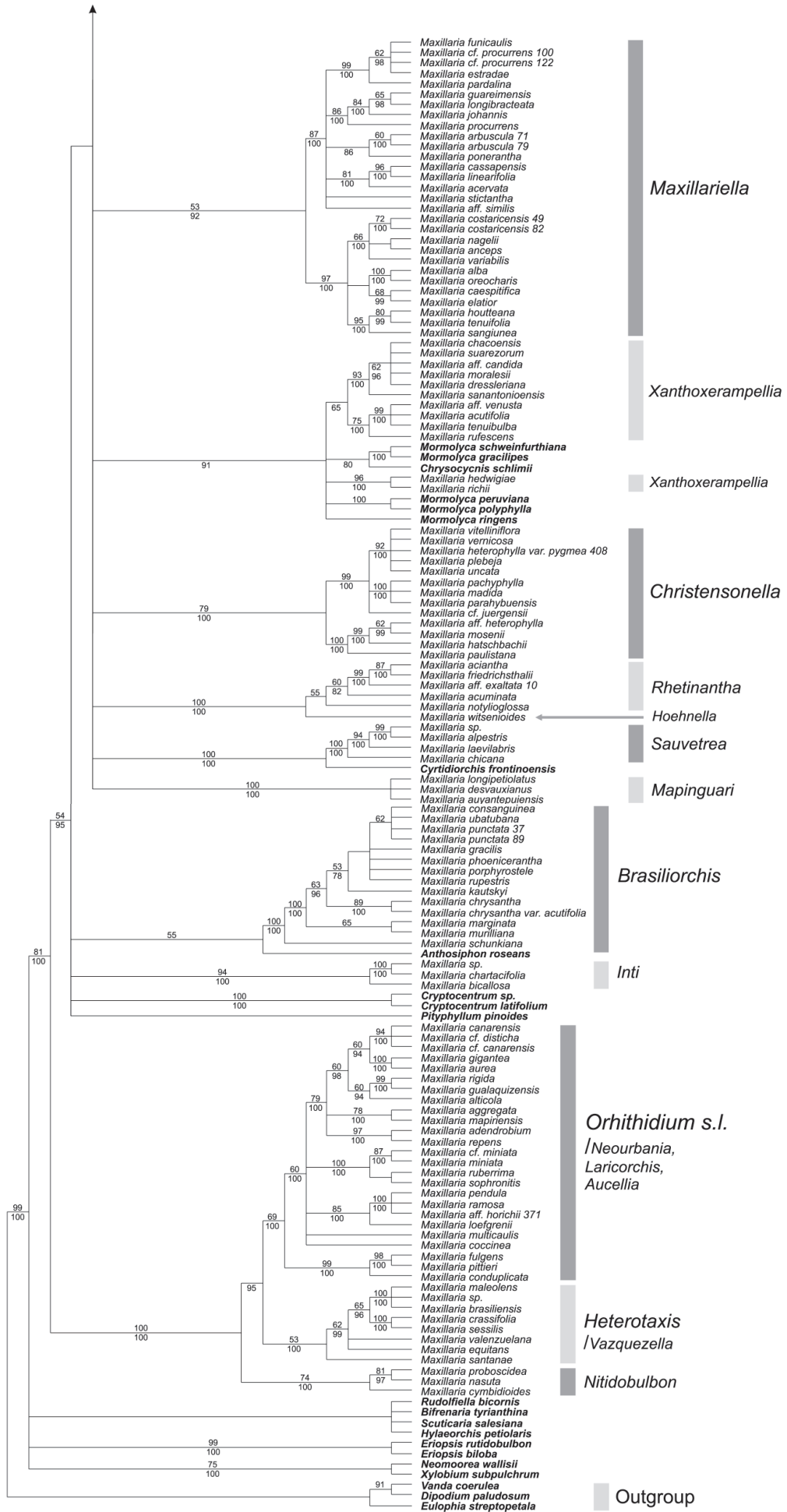
**B**

**Part 1**



B

Part 2



18. Tepals with fibrous bundles .....	19
<b>18.</b> Tepals without fibrous bundles .....	27
19. Flowers produced along new shoots which after flowering transform in pseudobulbs .....	<i>Maxillariella</i>
<b>19.</b> Flowers produced at the base of mature or premature pseudobulbs .....	20
20. Leaves thick, succulent .....	<i>Christensonella</i>
<b>20.</b> Leaves thin or leathery but never succulent .....	21
21. Pseudobulbs produced in intervals along rhizome .....	22
<b>21.</b> Plants caespitose .....	24
22. Pseudobulbs terete, leaves very long, grass-like, column foot long, apically free .....	<i>Pseudocymbidium</i>
<b>22.</b> Pseudobulbs ovoid, conical to fusiform, leaves never grass-like, column foot reduced .....	23
23. Lip clawed, oblong-obovate, ligulate-lanceolate, pandurate to obscurely 3-lobed in the lower portion, secreting a sticky, resinous substance in most species .....	<i>Rhetinantha</i>
<b>23.</b> Lip sessile, oblong triangular in outline, 3-lobed near the apex .....	<i>Calawayia</i>
24. Flowers erect, i.e. lip held in vertical position ....	25
<b>24.</b> Flowers resupinate, i.e. lip lowermost .....	26
25. Pseudobulbs concealed by non-foliaceous bracts .....	<i>Mapinguari</i>
<b>25.</b> Pseudobulbs concealed by foliaceous bracts .....	<i>Heterotaxis</i>
26. Inflorescence very short, usually shorter than pseudobulbs, lip obscurely 3-lobed, column foot rudimentary .....	<i>Nitidobulbon</i>
<b>26.</b> Inflorescence distinctly longer than pseudobulbs, lip distinctly 3-lobed, column foot prominent, robust .....	<i>Maxillaria</i>
27. Pseudobulbs concealed by non-foliaceous bracts .....	28
<b>27.</b> Pseudobulbs concealed by foliaceous bracts .....	32
28. Plants with elongate rhizome, pseudobulbs produced in intervals .....	<i>Sauvetea</i>
<b>28.</b> Plants caespitose, pseudobulbs tightly packed or superposed .....	29
29. Pseudobulbs bifoliate .....	<i>Brasiliorchis</i>
<b>29.</b> Pseudobulbs unifoliate .....	30
30. Lip lateral lobes acute .....	<i>Xanthoxerampellia</i>
<b>30.</b> Lip lateral lobes rounded .....	31
31. Pseudobulbs superposed, inflorescences usually as long as pseudobulbs, usually gathered in tufts, flowers small .....	<i>Chelyella</i>
<b>31.</b> Pseudobulbs tightly packed, inflorescences longer than pseudobulbs, produced singly or few, flowers medium-sized .....	<i>Psittacoglossum</i>
32. Lip hanging on the top of the column foot .....	33
<b>32.</b> Lip more or less concave at base, stiffly joined with the column foot .....	34
33. Lip prominently and very unequally 3-lobed, the middle lobe much larger than laterals, oblong to ligu-	

late, occasionally lateral lobes rudimentary, callus often very obscure, spread between apical margins of lateral lobes .....	<i>Chaseopsis</i>
<b>33.</b> Lip deeply or rarely obscurely, 3-lobed, the middle lobe usually as large as lateral lobes, callus oblong, prominent, in the lower half or third of the lip ...	<i>Camaridium</i>
34. Sepals connate together into tube, lip basally elongate into cylindrical spur .....	<i>Anthosiphon</i>
<b>34.</b> Sepals free to the base, lip does not form any cylindrical spur .....	35
35. Flowers produced along new shoot, floral bracts longer than pedicel and ovary .....	<i>Viracocha</i>
<b>35.</b> Flowers produced at the base of juvenile or mature pseudobulbs, floral bracts rudimentary .....	36
36. Flowers produced singly (2) at the base of mature pseudobulbs .....	<i>Auceilia</i>
<b>36.</b> Flowers produced in large number at the base of juvenile pseudobulbs .....	37
37. Pseudobulbs usually rounded in cross-section, lip constricted near or below the middle and here geniculate, hypochile more or less rectangular, epichile broadly ovate, notched at apex, usually wider than basal part, callus prominent, canaliculate .....	<i>Laricorchis</i>
<b>37.</b> Pseudobulbs more or less compressed, lip not as above .....	<i>Ornithidium</i>

#### 1. *ADAMANTHUS* Szlach.

Richardiana 7: 30. 2007; GENERITYPE: *Adamanthus dendrobioides* (Schltr.) Szlach. [*Camaridium dendrobioides* Schltr.].

Stem slender, elongate, often branching, monopodial. Pseudobulbs absent or only juvenile. Leaves distichous, ligulate, oblong to linear-lanceolate, subequally bilobed at the apex, lobes rounded. Flowers small, campanulate or tubular, appearing singly or in fascicles in the leaf axils. Sepals and petals dissimilar in size and form, usually shorter than pedicel and ovary, lacking fibers. Sepals larger than petals. Petals not decurrent on the column foot. Lip much smaller than sepals, unequally 3-lobed, the middle lobe the largest. Callus oblong, massive, in the lower part of the lip. Gynostemium short, massive, arcuate. Column foot short.

On the basis of monopodial type of growth, Szlachetko & Sitko (2007) proposed the genus *Adamanthus* for a group of *Maxillaria* species. However, the results of recent molecular studies conducted by Blanco *et al.* (2007) proved clearly a polyphyletic character of the genus.

*Adamanthus*, as here understood, is nested in the *Camaridium* clade and well separated from the other groups of species treated. Superficially, it is similar to *Neo-urbania* (the *Ornithidium* complex), but it differs from *Neourbania* in some features. In *Adamanthus*, the leaves are ligulate to oblong ligulate, unequally bilobed at the apex, with both lobes rounded. In *Neo-urbania*, the leaves are linear-lanceolate, widest at the base, attenuate gradually towards the apex, both leaf lobes



are acute. Additionally, in *Adamanthus*, the flowers are produced on short peduncle, covered by few sterile bracts, sepals and petals are subsimilar in form and size, column foot is short but well seen and forming a conical spur. In *Neourbania*, the peduncle is very short and possesses a single bract, sepals are larger than petals, column foot is obscure, completely connate to the ovary apex, and forms a shallow, saccate spur.

Thirty-two species (including twenty-seven new combinations) are classified within the genus.

***Adamanthus alfaroi*** (Ames & C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria alfaroi* Ames & C. Schweinf. in Ames, Sched. Orchid. **10**: 83. 1930; TYPE: COSTA RICA. *Alfaro 248* (AMES).

***Adamanthus allenii*** (L. O. Williams) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria allenii* L.O. Williams, Ann. Missouri Bot. Gard. **27**: 282. 1940; TYPE: PANAMA. *Allen 1650* (MO).

***Adamanthus amabilis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria amabilis* J.T. Atwood, Lindleyana **9**: 239. 1994; TYPE: COSTA RICA. *Gómez, Herrera & Murillo 23979* (HOLO: MO; ISO: F, SEL).

***Adamanthus appendiculoides*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria appendiculoides* C. Schweinf., Bot. Mus. Leaflet. **4**: 119. 1937; TYPE: COSTA RICA. *Brenes 239 (1427)* (AMES, NY).

***Adamanthus biolleyi*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium biolleyi* Schltr., Repert. Spec. Nov. Regni Veg. **9**: 29. 1910; TYPE: COSTA RICA. *Biolley 1052* (B†, AMES, W, AMES – drawing).

***Adamanthus brevifolius*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium brevifolium* Lindl., Pl. Hartweg.: 154. 1844; TYPE: ECUADOR. *Hartweg s.n.* (K).

***Adamanthus compactus*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium compactum* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 177. 1920; TYPE: COLOMBIA. *Madero s.n.* (B†).

***Adamanthus conduplicatus*** (Ames & C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium conduplicatum* Ames & C. Schweinf. in Ames, Sched. Orchid. **8**: 66-68. 1925; TYPE: PANAMA. *Powell 341* (AMES).

***Adamanthus costaricensis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium costaricense* Schltr., Repert. Spec. Nov. Regni Veg. **8**: 456. 1910, non *Maxillaria costaricensis* Schltr. 1923; TYPE: COSTA RICA. *Pittier 2177* (B†, AMES).

***Adamanthus fragrans*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria fragrans* J.T. Atwood, Selbyana **22**: 131. 2001; TYPE: PANAMA. *Mori & Kallunki 3770* (HOLO: SEL; ISO: MO, WIS).

***Adamanthus lankesteri*** (Ames) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium lankesteri* Ames, Sched. Orchid. **4**: 52. 1923, non *Maxillaria lankesteri* Ames 1924; TYPE: COSTA RICA. *Lankester & Sancho 421* (AMES).

***Adamanthus luteorubra*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium luteorubrum* Lindl., Orchid. Linden.: 22. 1846; TYPE: VENEZUELA. *Linden 633* (K).

***Adamanthus machinazensis*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria machinazensis* D.E. Benn. & Christenson, Lindleyana **13**: 71. 1998; TYPE: PERU. *Cavero et al. 1642* (HOLO: NY, ISO: USM).

***Adamanthus monteverdensis*** (J. T. Atwood & Barboza) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria monteverdensis* J.T. Atwood & Barboza, Lindleyana **9**: 241. 1994; TYPE: COSTA RICA. *Atwood 89-33* (HOLO: SEL).

***Adamanthus nicaraguensis*** (Hamer & Garay) Szlach. & Sitko, *comb. nov.*

Basionym: *Neourbania nicaraguensis* Hamer & Garay, Ic. Pl. Trop. **13**: 1238. 1985; TYPE: NICARAGUA. *Heller 7057* (HOLO: AMES; ISO: AMES, SEL).

***Adamanthus oxapampensis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria oxapampensis* J.T. Atwood, Selbyana **24**: 36. 2003; TYPE: PERU. *Gentry & Smith 35969* (HOLO: MO, ISO: SEL, USM).

***Adamanthus parvilabia*** (Ames & C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria parvilabia* Ames & C. Schweinf. in Ames, Schedul. Orchid. **8**: 62. 1925; TYPE: COSTA RICA. *Standley 32939* (AMES, US).

***Adamanthus pustulosus*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria pustulosa* J.T. Atwood, Selbyana **24**: 41. 2003; TYPE: ECUADOR. *Luer et al. 916* (HOLO: SEL).

***Adamanthus quitensis*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium quitense* Rchb.f., Linnea **41**: 34. 1876; TYPE: ECUADOR. *Sine coll.* (W).

***Adamanthus sanguinolentus*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium sanguinolentum* Lindl., Orchid. Linden.: 22. 1846; TYPE: VENEZUELA. *Moritz 1072* (K, W).

***Adamanthus scalariformis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria scalariformis* J.T. Atwood, Selbyana **19**: 257. 1998 (1999); TYPE: PANAMA. *Dressler 6050* (HOLO: SEL).

***Adamanthus simplex*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria simplex* J.T.Atwood, Selbyana **24**: 43. 2003; TYPE: PERU. *Dudley 11203* (HOLO: USM).

***Adamanthus synsepala*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria synsepala* J.T.Atwood, Selbyana **19**: 260. 1998 (1999); TYPE: PANAMA. *Werff & Herrera 6435* (HOLO: SEL; ISO: MO).

***Adamanthus tonduzii*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium tonduzii* Schltr., Repert. Spec. Nov. Regni Veg. **3**: 250. 1907; TYPE (Atwood 1999: 41): COSTA RICA. *Tonduz 10770* (B<sup>†</sup>, LECTO: US, ISOLECTO: US).

***Adamanthus tricarinatus*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria tricarinata* J.T.Atwood, Selbyana **19**: 260. 1998 (1999); TYPE: PANAMA. *Dressler 5810* (HOLO: SEL).

***Adamanthus tutae*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria tutae* J.T.Atwood, Selbyana **19**: 262. 1998 (1999); TYPE: PANAMA. *Knapp & Sytsma 2641* (HOLO: SEL; ISO: MO)

***Adamanthus valerioi*** (Ames & C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria valerioi* Ames & C.Schweinf., Schedul. Orchid. **10**: 96. 1930; TYPE: COSTA RICA. *Standley & Valerio 46940* (AMES, US).

## 2. *ANTHOSIPHON* Schltr.

Repert. Sp. Nov. Regni Veg., Beih. **7**: 182. 1920; GENERITYPE: *Anthosiphon roseans* Schltr.

Pseudobulbs oblong, compressed, unifoliate. Leaf ligulate. Flowers small, tubular, at the base of pseudobulbs. Sepals similar, connate into tube. Lateral sepals elongate basally to form a cylindrical spur. Petals smaller. Lip lanceolate, acute, antire, without any callus, basally elongate to form cylindrical spur hidden within lateral sepals. Gynostemium short, dilated near the stigma. Column foot missing. Rostellum short, rostellum remnant incised. Pollinia 2, oblong. Tegula prominent, oblong-rectangular. Viscidium rounded.

A monospecific genus, occasionally included in *Cryptocentrum*.

## 3. *AUCELLIA* Szlach. & Sitko, *gen. nov.*

*Pseudobulbi parvi, in sectione transversali rotundati, uni- vel bifoliati, basi 1-3 foliaceis bracteis cincti, secus rhizoma vulgo laxi; folia rigida, coriacea; flores parvi, coccinei vel aurantiaci; sepala petalaeque subsimilaria vel dissimilaria, pedicellato ovario breviora; labelli callus prominens et centralis; columnae pes obscurus.*

ETYMOLOGY: *Aucella* (Lat.) – a small bird; an allusion to the flower colour and form of the species included in the genus resembling small birds.

GENERITYPE: *Aucellia ruberrima* (Lindl.) Szlach. & Sitko [*Scaphyglottis ruberrima* Lindl.].

Pseudobulbs small, rounded in cross section, sulcate, uni- or bifoliate, surrounded basally by 1-3 leafy bracts, usually well spaced along rhizome. Rhizome covered by non-foliaceous bracts. Leaves stiff, coriaceous. Flowers small, campanulate, carmine-red, orange or yellow, produced singly, rarely 2, at the base of mature pseudobulbs. Floral bracts rudimentary. Sepals and petals dissimilar, shorter than pedicel and ovary, without fibers. Lip 3-lobed, cochleate, stiffly joined with the column foot, the middle lobe densely papillate, callus prominent spread between lateral lobes. Gynostemium elongate, subarcuate to erect. Column foot rudimentary.

The set of features mentioned above enable to distinguish the genus easily from other genera of Maxillariinae. The species of *Aucellia* are also characterized by bright purple or orange flowers, probably an adaptation to hummingbird pollination.

There are four species classified within the new genus.

***Aucellia croceorubens*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium croceorubens* Rchb.f., Linnaea **41**: 35. 1877; TYPE: HAITI. *Coll? (W)*. =*Maxillaria croceorubens* (Rchb.f.) L.O.Williams, *Caldasia* **1**(5): 16. 1942.

***Aucellia patula*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria patula* C.Schweinf., *Fieldiana, Bot.* **28**(1): 197. 1951; TYPE: VENEZUELA. *Steyermark 62650* (AMES, F).

***Aucellia ruberrima*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Scaphyglottis ruberrima* Lindl., *Orchid. Linden.*: **22**. 1846; TYPE: VENEZUELA. *Linden 667* (K).

***Aucellia sophronitis*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium sophronitis* Rchb.f., *Bonplandia* **2**: 18. 1854; TYPE: VENEZUELA. *Moritz. 863* (W).

## 4. *BRASILIORCHIS* R. B. Singer, S. Koehler & Carnevali

Novon **17**: 94.2007; GENERITYPE: *Brasiliorchis picta* (Hook.) R.B.Singer, S.Koehler & Carnevali [*Maxillaria picta* Hook.].

Pseudobulbs oblong-ovoid, aggregated or distant, sulcate, bifoliate, subtended by non-foliaceous sheaths. Leaves linear to elliptic-lanceolate, acute, leathery. Inflorescences several, produced simultaneously from the base of the most recent pseudobulb. Floral bract almost always shorter than the pedicel and ovary. Flowers campanulate, food deceptive without any rewards. Sepals and petals dissimilar. Sepals lack fibers, and in most species with dark spots, usually more intense on the external surface. Lip always markedly 3-lobed, lobes usually rounded; the middle lobe being the longest. Callus oblong, prominent in the lower half of the lip. Column foot short or long. Capsules with apical dehiscence.

*Brasiliorchis* is a group of 25 species well defined regarding morphology of vegetative parts and flower architecture. The results of molecular analyses reveal it is a monophyletic group sister to *Christensonella*. However, both genera are characterised by a set of unique features. The bases of always succulent leaves in the bifoliate species of *Christensonella* are mostly or completely overlapping at the point of insertion on the pseudobulbs, roots remind an accordion (alternating swellings and constrictions) and the rostellum is dome-like, projecting downwards. All of these features are missing in the *Brasiliorchis* species. *Psittacoglossum* is another genus similar to *Brasiliorchis* vegetatively but all species of the former genus have unifoliate pseudobulbs.

The following seven new combinations are validated in the genus *Brasiliorchis*.

***Brasiliorchis crassipes*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria crassipes* Kraenzl., Kongl. Svenska Vetensk. Acad. Handl. **46**(10): 72, pl. 11. 1911; TYPE: BRAZIL. *Mosén* 3229 (?).

***Brasiliorchis diamantensis*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria diamantensis* Kraenzl., Notizbl. Bot. Gart. Berlin-Dahlem **7**: 419. 1920; TYPE: COLOMBIA. *Kalbreyer* 1088 (B<sup>†</sup>).

***Brasiliorchis grobyoides*** (Garay & Dunsterville) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria grobyoides* Garay & Dunsterville, Venezuelan Orchids Illustr. **5**: 186. 1972; TYPE: VENEZUELA. *Dunsterville* 953 (HOLO: AMES).

***Brasiliorchis murilliana*** (Hoehne) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria murilliana* Hoehne, Arq. Bot. Estad. S. Paulo, n.s. form maior, **2**: 130. 1952; TYPE: BRAZIL. *Hort. Bot. S. Paolo* (SP).

***Brasiliorchis rupestris*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rupestris* Barb.Rodr., Gen. Spec. Orchid. **2**: 199. 1881; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Brasiliorchis serotina*** (Regnell & Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria serotina* Regnell & Barb.Rodr. in Barb.Rodr., Orchid. Nov. **2**: 203. 1881; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Brasiliorchis steyermarkii*** (Foldats) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria steyermarkii* Foldats, Acta Bot. Venez. **3**: 361. 1968; TYPE: VENEZUELA. *Dunsterville* 98384 (HOLO: AMES).

##### 5. CALAWAYA Szlach. & Sitko, *gen. nov.*

*Aliis generibus Maxillaria cognatis similis sed caule caulescente cum pseudobulbo inconspicuo unifoliato*

*3-5 vaginis foliaceis cincto differt. Flores parvi ad mediocres, tepala cum fascibus fibrosis, labellum multo brevius quam alia segmenta insignite apice trilobatum, callus prope labelli centrum prominens antice rotundatus, columnae pes prominens.*

ETYMOLOGY: Dedicated to Dr. Calaway H. Dodson, an eminent researcher of Neotropical orchids.

GENERITYPE: *Calawaya meridensis* (Lindl.) Szlach. & Sitko. [*Maxillaria meridensis* Lindl.].

Plants terrestrial or epiphytic, erect to decumbent, with long aerial stolons covered by non-foliaceous sheaths. Pseudobulbs conical-ovoid to almost fusiform, inconspicuous, unifoliate, closely imbricated by 3-5 foliaceous bracts. Leaf and bracts oblong, coriaceous to fleshy. Inflorescence 1 to few at the base of mature or premature pseudobulbs. Ovary and pedicel shorter than subtending floral bracts. Tepals dissimilar, with fibrous bundles, usually much longer than lip. Lip oblong triangular in outline, 3-lobed near the apex. Callus prominent, oblong, running from the base of the lip to the base of the middle lobe, rounded in front. Column foot prominent.

Species classified into this genus are nested in the *Maxillaria s.str.* clade. Both share the same feature, i.e. fibrous bundles in tepals. However, *Calawaya* differs from *Maxillaria s.str.* by a caulescent stem, small to medium-sized flowers and lip much shorter than other flower segments. The members of *Calawaya* are similar to *Laricorchis* and *Viracocha* regarding the plant habit, both of which have no fibres in vascular bundles. Flowers of *Calawaya* are usually produced singly at the base of mature pseudobulbs, whereas in *Laricorchis* at the base of immature pseudobulbs and in *Viracocha* along new shoots. Unlike *Laricorchis* and *Viracocha*, the gynostemium of *Calawaya* forms a prominent conical spur and the long column foot.

The followings fifteen species are classified within the genus.

***Calawaya aequiloba*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria aequiloba* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 165. 1920; TYPE: COLOMBIA. *Lehmann* 3898 (B<sup>†</sup>).

***Calawaya affinis*** (Poepp. & Endl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Scaphyglottis affinis* Poepp. & Endl., Nov. Gen. Sp. Pl. **1**: 59, t. 99A. 1836; TYPE: PERU. *Poeppig* 1726 (W). =*Maxillaria affinis* (Poepp. & Endl.) Garay, *Caldasia* **8**: 527. 1962.

***Calawaya caquetana*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria caquetana* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **27**: 89. 1924; TYPE: COLOMBIA. *Hopp* 53 (B<sup>†</sup>).

***Calawaya caulina*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria caulina* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **27**: 89. 1924; TYPE: COLOMBIA. *Hopp* 91 (B<sup>†</sup>).

***Calawaya elata*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria elata* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **27**: 90. 1924; TYPE: COLOMBIA. *Hopp 34* (B<sup>+</sup>).

***Calawaya embreei*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria embreei* Dodson, Orquideologia **19**(3): 65. 1994; TYPE: ECUADOR. *Dodson & Embree 16158* (HOLO: RPSC; ISO: QCA, QCNE).

***Calawaya exaltata*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria exaltata* (Kraenzl.) C.Schweinf., Bot. Mus. Leaflet **11**: 272. 1945; TYPE: PERU. *Weberbauer 4620* (B<sup>+</sup>; PHOTO: AMES).

***Calawaya insolita*** (Dressler) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria insolita* Dressler, Orquideologia **14**(3): 204. 1981; TYPE: PANAMA. *Dressler 4064* (HOLO: US).

***Calawaya jostii*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria jostii* Dodson, Harvard Pap. Bot. **7**(2): 437. 2003; TYPE: ECUADOR. *Jost 3133* (HOLO: RPSC).

***Calawaya longicaulis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria longicaulis* Schltr., Repert. Spec. Nov. Regni Veg. **27**: 72. 1929; TYPE: BOLIVIA. *Buchtien 5019* (B<sup>+</sup>, AMES, G, US).

***Calawaya meridensis*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria meridensis* Lindl., Orchid. Linden.: 19. 1846; TYPE: VENEZUELA. *Linden s.n.* (K).

***Calawaya minutiflora*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria minutiflora* D.E.Benn. & Christenson, Icon. Orchid. Peruvianum t. 700. 2001; TYPE: PERU. *Bennett et al. 4151* (HOLO: Herb. Bennettianum).

***Calawaya schlechteri*** (Foldats) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria schlechteri* Foldats, Acta Biol. Venez. **2**(31): 403. 1959, *nom. nov. pro M. rugosa* Schltr. Notizbl. Königl. Bot. Gart. Berlin **6**: 125. 1914, *nom. illeg. non* Scheidw., 1843; TYPE: VENEZUELA. *Ule s.n.* (B<sup>+</sup>).

***Calawaya williamsii*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria williamsii* Dodson, Orquideologia **19**(3): 91. 1994; TYPE: ECUADOR. *Dodson et al. 17947* (HOLO: RPSC; ISO: QCNE).

***Calawaya yanganensis*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria yanganensis* Dodson, Orquideologia **19**(3): 93. 1994; TYPE: ECUADOR. *Hirtz et al. 2332* [not *D'Alessandro 436*] (HOLO: RPSC [1317], transferred to MO).

## 6. *CAMARIDIUM* Lindl.

Bot. Reg. **10**: t. 844. 1824; GENERITYPE: *Camaridium ochroleucum* Lindl.

Pseudobulbs more or less laterally compressed, usually well-separated along rhizome, 2-3-leaved, sur-

rounded basally by foliaceous bracts. Aerial stolons covered by shorter or longer, but distinctly foliaceous sheaths. Flowers medium-sized to large, campanulate, produced along young, leafy shoots, terminated by new pseudobulbs. Floral bracts exceed pedicel and ovary. Sepals and petals subsimilar in size and form, with no obvious fibers. Lip motile, much smaller than tepals, deeply or rarely obscurely, 3-lobed, the middle lobe usually as large as lateral lobes, spur conical. Callus oblong, prominent, in the lower half or third of the lip. Gynostemium elongate, rather slender, arcuate. Column foot short, obscure.

The *Camaridium* species are very similar in flower morphology to *Psittacoglossum*. Both are rather easily distinguishable from each other by morphology of the vegetative parts. The pseudobulbs of *Camaridium* are usually well spaced along rhizome, flowers are produced along leafy shoots below new pseudobulbs. In *Psittacoglossum*, pseudobulbs are densely clustered and flowers set on peduncle usually longer than pseudobulbs and are produced at the base of mature pseudobulbs. For a long time, *Camaridium* was misjudged and its species were classified within *Ornithidium*. The molecular analyses of Maxillariinae-complex conducted by Blanco *et al.* (2007) and Whitten *et al.* (2007) clearly showed that both genera are not closely related. The authors differentiate genera on the basis of length of floral bracts versus pedicel and ovary; in most species of *Camaridium sensu* Blanco & Whitten floral bracts are longer than pedicel and ovary and in *Ornithidium* floral bracts are obscure, much shorter than pedicellate ovary. These characters are constant when both genera are treated in the narrower sense as proposed here. Additionally, the flowers of *Ornithidium* are small, gathered in tufts at the base of juvenile pseudobulbs, whereas in *Camaridium* they are medium-sized or large produced along new shoots transformed into new pseudobulbs after flowering.

Two species, *Maxillaria oestlundiana* and *M. pendens* (*Camaridium pendulum*), fit well to the genus *Camaridium* vegetatively. However, both of them differ from *Camaridium* by the lip morphology: the middle lobe is more or less rectangular and wider than basal part of the lip.

*Camaridium* includes 40 species. Three additional species are transferred to this genus below.

***Camaridium ampliflorum*** (C.Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria ampliflora* C.Schweinf., Bot. Mus. Leaflet **8**: 188. 1940; TYPE: PANAMA. *Killip 3565* (AMES, US).

***Camaridium carinulatum*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria carinulata* Rchb.f., Linnaea **41**: 6. 1877; TYPE: COLOMBIA. *Roezl s.n.* (W).

***Camaridium darienensis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria darienensis* J.T. Atwood, *Selbyana* **19**: 254. 1999; TYPE: PANAMA. *Folsom 4412* (HOLO: MO; ISO: SEL).

**7. CHASEOPSIS** Szlach. & Sitko, *gen. nov.*

*Pseudobulbi plus minusve latericompressi, secus rhizoma laxi, unifoliati, basi foliaceis bracteis cincti; rhizoma bracteis similibus vaginis obsitum; flores parvi, secus foliaceos caules infra noviblastos editi; sepala petalaeque amplitudine formaque subsimilaria; columnae pes brevis; labellum mobile, calcar conicum; epichilum hypochilo majus; callus inter hypochili apicales margines expansus.*

ETYMOLOGY: Dedicated to Dr. Mark W. Chase, an eminent molecular taxonomist.

GENERITYPE: *Chaseopsis microphyton* (Schltr.) Szlach. & Sitko [*Maxillaria microphyton* Schltr.].

Pseudobulbs more or less laterally compressed, well-spaced along aerial stolons, unifoliate, surrounded basally by leafy bracts. Rhizome covered by bract-like sheaths. Flowers small, campanulate, produced along leafy shoots, below new pseudobulbs. Floral bracts exceed pedicellate ovary. Sepals and petals subsimilar in size and form, much larger than lip. Lip motile, prominently and very unequally 3-lobed; the middle lobe much larger than laterals, oblong to ligulate; occasionally lateral lobes rudimentary. Callus often very obscure, spread between apical margins of lateral lobes. Spur small, conical. Column foot short.

The flowers of *Chaseopsis* are essentially similar to *Chelyella*, but their habit is quite different. In *Chelyella*, flowers are borne at the base of mature pseudobulbs, whereas in *Chaseopsis* they are produced along the shoots terminated by juvenile pseudobulbs. Possibly *Chaseopsis* represents a neotenic form of *Chelyella*. *Chaseopsis* is similar to *Viracocha* vegetatively, sharing long aerial stolons covered by non-foliaceous sheaths, distantly remote pseudobulbs, small flowers supported by floral bracts are longer than pedicellate ovaries. However, both genera are easily distinguishable basing on the lip connection with the column foot: the lip is motile in *Chaseopsis* versus stiffly lip of *Viracocha* joined with the apex of the column foot.

The following five species are included within the genus.

***Chaseopsis aurantiacum*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium aurantiacum* Schltr., *Repert. Spec. Nov. Regni Veg.*, Beih. **19**: 241. 1923; COSTA RICA. *Brenes 129* (B†).

***Chaseopsis burgeri*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria burgeri* J.T. Atwood, *Lindleyana* **9**(4): 233. 1994; TYPE: COSTA RICA. *Burger & Stolze 6062* (HOLO: F; ISO: MO).

***Chaseopsis microphyton*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria microphyton* Schltr., *Repert. Spec. Nov. Regni Veg.*, **8**: 457. 1910; TYPE: COSTA RICA. *Tonduz 9670* (B†, US).

***Chaseopsis ramonensis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium ramonense* Schltr., *Repert. Spec. Nov. Regni Veg.*, Beih., **19**: 243. 1923, *non Maxillaria ramonensis* Schltr. 1923; TYPE (Barringer 1986: 13): COSTA RICA. *Brenes 137* (NEO: AMES – drawing).

***Chaseopsis wercklei*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium wercklei* Schltr., *Repert. Spec. Nov. Regni Veg.*, Beih. **19**: 60. 1923; TYPE (Atwood 1999: 83): COSTA RICA. *Brenes 112* (NEO: AMES).

**8. CHELYELLA** Szlach. & Sitko, *gen. nov.*

*Pseudobulbi plus minusve latericompressi, superpositi, vulgo secus rhizoma angustodissiti, unifoliati, basi vulgo haud foliaceis vaginis cincti; rhizoma bracteis similibus vaginis obsitum; flores parvi, pseudobulborum basi vulgo caespitosi; sepala petalaeque amplitudine formaque subsimilaria; columnae pes parvus; labellum mobile, cum columnae pedem plus minusve conicum calcar formans.*

ETYMOLOGY: *Chelone* – a nymph in Greek mythology who insulted the gods by ridiculing or not attending (versions vary) the marriage of Zeus to Hera. The gods punished her by turning her into a turtle. An allusion to the pseudobulbs placed on rhizome like small turtles on the river bank.

GENERITYPE: *Chelyella densa* (Lindl.) Szlach. & Sitko [*Maxillaria densa* Lindl.].

Pseudobulbs more or less laterally compressed, superposed, usually closely spaced on rhizome, unifoliate, surrounded basally by usually bladeless sheaths. Rhizome covered by bract-like sheaths. Leaves ligulate, unequally bilobed at the apex. Flowers small, usually gathered in tufts at the base of the pseudobulbs. Sepals and petals subsimilar in size and form, with no fibers. Lateral sepals pendent. Lip motile, forming with the column foot conical, short spur, 3-lobed, the middle lobe usually prominently larger than laterals. Callus distinct, in the centre of the lamina spread between lip lateral lobes. Column foot obscure, obliquely placed at the ovary apex.

This genus is undoubtedly related to *Pseudomaxillaria*. In both genera, pseudobulbs are laterally compressed, unifoliate, and surrounded basally by bladeless sheaths. In *Chelyella*, however, pseudobulbs are usually

closely packed along rhizome, whereas in *Pseudomaxillaria*, they are usually well-spaced. The motile lip, usually much smaller than other flower segments, possesses large, ligulate middle lobe in *Chelyella*. The lip of *Pseudomaxillaria* is firmly joined with the column foot, and is slightly smaller than other perianth segments. The hypochile is large, rectangular in general outline and epichile (middle lobe) is distinctly smaller, more or less obovate. The lip callus of *Chelyella* is oblong, whereas in *Pseudomaxillaria* callus is obscure, if any.

The genus includes fourteen species.

***Chelyella admonens*** (I. Bock) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria admonens* I.Bock, Orchidee (Hamburg) **48**: 105. 1997; TYPE: COSTA RICA. *Horich s.n.* (HOLO: HAL).

***Chelyella bracteata*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium bracteatum* Schltr., Repert. Spec. Nov. Regni Veg. **9**: 217. 1911; TYPE: COSTA RICA. *Tonduz 12344* (B†, US).

***Chelyella carinata*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria carinata* Barb.Rodr., Gen. Spec. Orchid. **2**: 206. 1882; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Chelyella densa*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria densa* Lindl., Edwards's Bot. Reg. **21**: t. 1804. 1836; TYPE: MEXICO. *Loddiges s.n.* (K).

***Chelyella gomeziana*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria gomeziana* J.T.Atwood, Lindleyana **11**: 202. 1996; TYPE: COSTA RICA. *Atwood, Luer & Luer ex Atwood 5052* (HOLO: SEL).

***Chelyella hagsateriana*** (Soto Arenas) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria hagsateriana* Soto Arenas, Orquidea (Mexico City) **12**(2): 252. 1992; TYPE: MEXICO. *Soto Arenas & Martínez 5806* (HOLO: AMO; ISO: AMES, AMO, BM, BR, CHIP, ENCB, F, K, MO, MEXU, NY, SEL, US, XAL).

***Chelyella iguapensis*** (Hoehne & Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria iguapensis* Hoehne & Schltr., Arch. Bot. São Paulo. **1**: 271, t. 5. 1926; TYPE: BRAZIL. *Hoehne 1872* (B†, SP).

***Chelyella imbricata*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria imbricata* Barb.Rodr., Gen. Spec. Orchid. **1**: 120. 1877; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Chelyella jenischiana*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium jenischianum* Rchb.f., Bonplandia **2**: 18. 1854; TYPE: VENEZUELA. *Wagner s.n.* (W).

***Chelyella longicolumna*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria longicolumna* J.T.Atwood, Selbyana **22**: 132. 2001; TYPE: PANAMA. *Folsom 1574* (HOLO: MO; ISO: MO).

***Chelyella purpurea*** (Spreng.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium purpureum* Spreng., Syst. Veg. (ed. 16) [Sprengel] **3**: 735. 1826; TYPE: ?

***Chelyella serrulata*** (Ames & Correll) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium amparoanum* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **19**: 56. 1923; TYPE: COSTA RICA. *Wercklé 122* (W, AMES – drawing).

***Chelyella tubercularis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria tubercularis* J.T.Atwood, Lindleyana **9**(4): 229. 1994; TYPE: PANAMA. *McPherson 13567* (HOLO: MO).

***Chelyella vestita*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria vestita* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **27**: 97. 1924; TYPE: COLOMBIA. *Hopp 92* (B†).

**9. CHRISTENSONELLA** Szlach., Mytnik, Górniak & Sitko Polish Bot. J. **51**: 57. 2006; GENERITYPE: *Christensonella subulata* (Lindl.) Szlach., Mytnik, Górniak & Śmiszek [*Maxillaria subulata* Lindl.].

Sympodial, usually caespitose and epiphytic plants. Roots with characteristic alternating thickenings and constrictions of velamen. Rhizome rigid, very short, rarely elongate (e.g. *Christensonella uncatata*), usually covered in scarios, imbricating sheaths. Pseudobulbs usually aggregate, erect, fusiform or cylindrical to ellipsoid, often ridged, covered by several non-foliaceous, scarios or subscarios, semitransparent, subtending sheaths or brownish scales. Leaves 1–2, rarely 3–4 at the top of pseudobulb, always sessile, subulate or semiterete, coriaceous to fleshy or rarely thin. Inflorescence single-flowered, with a very short peduncle, covered by scarios or subscarios sheaths. Floral bracts similar to the sheaths. Flowers small to medium-sized, campanulate, usually yellow to dark red. Tepals subsimilar, equal or subequal to the lip, perianth fibers present. Lip hanging on the column foot, obscurely 3-lobed covered by numerous trichomes and papillae, with no obvious reward. The callus shiny, dry, glabrous, extends from the labellum base up to its median region, along the midvein, as a low, thick ridge. Column foot short, but prominent, mentum short. Capsules fusiform, with apical dehiscence.

A genus with twenty-five species, including seven following new nomenclatural combinations.

***Christensonella geckophora*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria geckophora* D.E.Benn. & Christenson, *Icon. Orchid. Peruvianum*: 695. 2001; TYPE: PERU. *Del Castillo & Bennett 6475* (HOLO: Herb. Bennettianum).

***Christensonella hatschbachii*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria hatschbachii* Schltr., *Repert. Spec. Nov. Regni Veg.* **23**: 56. 1926; TYPE: BRAZIL. *Hatschbach 100* (B<sup>†</sup>).

***Christensonella paranaensis*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria paranaensis* Barb.Rodr., *Sp. Orchid.* **2**: 205. 1882; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Christensonella plebeja*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria plebeja* Rchb.f., *Hamb. Gartenz.* **15**: 57. 1859; TYPE: BRAZIL. *Schiller s.n.* (W).

***Christensonella poaefolia*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria poaefolia* Schltr., *Repert. Spec. Nov. Regni Veg.* **27**: 74. 1929; TYPE: BOLIVIA. *Buchtien 5034* (B<sup>†</sup>).

***Christensonella spannagelii*** (Hoehne) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria spannagelii* Hoehne, *Arch. Inst. Biol. (Sao Paulo)* **3**: 310. 1930; TYPE: BRAZIL. *Spannagel 160* (SP).

***Christensonella spegazziniana*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria spegazziniana* Kraenzl., *Orchis* **2**(4): 51. 1908; TYPE: ARGENTINA. *Spegazzini s.n.* (B<sup>?</sup>).

#### 10. *CHRYSOCYCNIS* Linden & Rchb.f.

*Bonplandia* (Hannover) **2**: 280. 1854; GENERITYPE: *Chrysocynis schlimmii* Linden & Rchb.f.

Plants epiphytic. Rhizome long, creeping, covered by nonfoliaceous bracts. Pseudobulbs produced in long intervals, oblong-ovoid, laterally compressed, clothed in non-foliaceous bracts, unifoliate. Leaf short-petiolate, oblong, acute, leathery. Inflorescence single-flowered, short, produced from between older pseudobulbs. Flowers broadly opened. Sepals and petals dissimilar. Lip deeply 3-lobed, strongly insectiform, densely ciliate on the upper surface, hinged at the apex of the column foot. Gynostemium slender, strongly arcuate, ciliate. Column foot very short, massive.

*Chrysocynis* includes six species.

#### 11. *CRYPTOCENTRUM* Benth.

*J. Linn. Soc., Bot.* **18**: 325. 1881; GENERITYPE: *Cryptocentrum jamesonii* Benth. & Hook.

Epiphytic plants. Stem monopodial or rarely sympodial. Rhizome abbreviated if plants sympodial. Pseudobulbs ellipsoid to subspheroid, 1-4-leaved. Leaves conduplicate, coriaceous, flat, semicylindrical to trigonous, imbricating basally. Inflorescence single-flowered appearing from the axils of the basal leaf sheath. Flowers inconspicuous, dull-coloured, fragrant nocturnally. Sepals connate basally, free portion divergent apically. Petals free. Lip simple, ecallose. Spur cylindrical, produced from both lateral lobes, lip and column foot. Gynostemium short, erect. Column foot rather short.

The genus is a unique taxon within the subtribe by its very peculiar habit and type of flowers. Depending on the species concept adopted by various authors, the genus embraces about twenty species.

#### 12. *CYRTIDIORCHIS* Rauschert

Taxon **31**: 560. 1982; GENERITYPE: *Cyrtidiorchis rhomboglossa* (F.Lehm. & Kraenzl.) Rauschert

Plants with dimorphic shoots; clustered pseudobulbs and elongate, monopodial shoots. Pseudobulbs ovoid to conical, 1-2-leaved, caespitose or separated along rhizome, concealed by 1-3 foliaceous bracts. Monopodial stem erect to climbing, leafy. Leaves sessile, oblong-elliptic. Inflorescence supra-axillary. Flowers in tufts produced in succession, resupinate. Sepals and petals subsimilar, with no fibres. Lip 3-lobed, more or less insectiform, tomentose except on callus. Gynostemium slender, arcuate. Column foot short, massive.

The genus includes four to five species, according to various authors.

#### 13. *HETEROTAXIS* Lindl.

*Bot. Reg.* **12**: t. 1028. 1826; GENERITYPE: *Heterotaxis crassifolia* Lindl.

Plants epiphytic, closely caespitose. Pseudobulbs oblong, laterally compressed, covered by coriaceous, foliaceous sheaths, unifoliate. Leaf oblong to linear, unequally or subequally bilobed at the apex, coriaceous. Inflorescence single-flowered, as long as or slightly longer than pseudobulb, emerging from the leaf axils. Flowers fleshy, usually yellowish, campanulate, having perianth fibers. Sepals and petals dissimilar in size and form. Lip motile, obscurely 3-lobed near the middle, channel-formed. Callus oblong, usually prominent. Gynostemium stout, suberect. Column foot short. Capsules having lateral dehiscence.

Blanco *et al.* (2007) and Whitten *et al.* (2007), based on molecular analyses included to *Heterotaxis* two species without pseudobulbs with rather odd habit as for *Maxillaria*: *M. equitans* (Schltr.) Szlach. & Sitko and *M. valenzuelana* (A.Rich.) Garay. We decided to move these two species from *Heterotaxis* and maintain the status of separate genera for both.

The genus of about twenty species. We proposed below three additional nomenclatorial combinations.

***Heterotaxis gatunensis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria gatunensis* Schltr., Repert. Spec. Nov. Regni Veg., Beih. 17: 68. 1922; TYPE (Christenson 1991: 129): PANAMA. *Powell 207* (B†, LECTO: AMES, ISOLECTO: MO).

***Heterotaxis longifolia*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Dicrypta longifolia* Barb. Rodr., Gen. Sp. Orchid. 1: 125. 1877; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Heterotaxis verecunda*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria verecunda* Schltr., Repert. Spec. Nov. Regni. Veg. 27: 96. 1924; TYPE: COLOMBIA. *Hopp 84* (B†).

#### 14. **HOEHNELLA** Szlach. & Sitko, *gen. nov.*

*Marsuparia similis; plantae monopodiales caulibus tenuibus, libere pendulis; folia basi imbricata, tenera, carnosa, latericompressa, acuta; flores singulares, foliorum axillis orti.*

ETYMOLOGY: Dedicated to Frederico Carlos Hoehne (1882-1959), an eminent Brazilian orchidologist.

GENERITYPE: *Hoehnella witsenioides* (Schltr.) Szlach. & Sitko [*Maxillaria witsenioides* Schltr.].

Plants monopodial, stem delicate, freely pendent. Stem concealed basally by persistent, distichous, imbricating sheaths, leafy above. Leaves imbricating basally, laterally compressed, acute, subfalcate, thick, fleshy, soft. Flowers tubular, borne singly in leaves' axils. Floral bracts as long as pedicel and ovary. Tepals stiff, thick, with fibrous bundles. Sepals and petals dissimilar in size and form. Lip oblong-sagittate in outline, very obscurely 3-lobed. Callus oblong, thick in the lower half of the lip. Gynostemium suberect, slender. Column foot rudimentary.

*Hoehnella* is superficially similar to *Marsuparia*; however, the former genus has elongate, pendent stems and fleshy, soft leaves, instead of stiff, hard leaves of the latter.

A monotypic genus.

***Hoehnella witsenioides*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria witsenioides* Schltr., Repert. Spec. Nov. Regni Veg., Beih. 7: 175. 1920; TYPE: COLOMBIA. *Madero s.n.* (B†).

#### 15. **HYLAEORCHIS** G. A. Romero & Carnevali

Orchid. Venezuela, ed. 2, 3: 1136. 2000; GENERITYPE: *Hylaeorchis petiolaris* (Schltr.) Carnevali & G.A. Romero [*Maxillaria petiolaris* Schltr.].

Plants epiphytic, creeping. Pseudobulbs narrowly ovoid to ellipsoidal, unifoliate, enclosed by 3-4 scarious

bracts, which became disintegrating with age. Leaf oblong to elliptic, long petiolate, fleshy to coriaceous, blade with convolute veneration, obscurely plicate. Inflorescence arising from base of pseudobulbs, single-flowered in small plants, in larger plants continuously growing rachis flowering sequentially, branching from the basal internodes in mature plants. Sepals and petals subfleshy, free, lateral sepals forming a prominent mentum. Lip subentire, apical margins ciliate. Callus inconspicuous. Gynostemium slender, erect. Column foot stout, long.

A monotypic genus.

#### 16. **INTI** M. A. Blanco

Lankesteriana 7: 524-525. 2007; GENERITYPE: *Inti chartacifolia* (Ames & C.Schweinf.) M.A. Blanco [*Maxillaria chartacifolia* Ames & C.Schweinf.].

Plants caespitose, without pseudobulbs or very inconspicuous pseudobulbs completely concealed by leafy bracts. Leaves several per shoot, forming a fan, long-petiolate, linear to linear-lanceolate, thin. Inflorescence – a fascicle of several single flowers per leaves' axils, with short scapes. Flowers shortly lived. Sepals and petals subsimilar. Lip almost entire to obscurely 3-lobed. Callus prominent in the lower half or two-third of the lip. Gynostemium erect, rather slender. Column foot rudimentary.

The genus embraces four species.

#### 17. **LARICORCHIS** Szlach.

Richardiana 7(1): 28. 2007; GENERITYPE: *Laricorchis aggregata* (Rchb.f.) Szlach. & Sitko [*Dendrobium aggregatum* Humb., Bonpl. & Kunth].

Pseudobulbs conical, rounded in cross-section, sometimes slightly flattened, well spaced along aerial stolons, uni- or bifoliate, surrounded basally by 2-3 leafy bracts. Stolons much longer than pseudobulbs, covered by non-foliaceous bracts. Leaves linear, lanceolate to elliptic, acute, leathery, coriaceous to somewhat fleshy. Flowers small, campanulate, produced singly or gathered in tufts at the base of immature pseudobulb. Floral bracts rudimentary. Sepals and petals subsimilar in size and form, without fibrous bundles, much shorter than pedicel and ovary. Lip shallowly saccate at the base, unlobed to distinctly 3-lobed. Callus prominent. Column foot rudimentary.

Molecular analyses we conducted revealed the species included in *Laricorchis* were misidentified with *Neourbania* and were nested in the *Ornithidium*-clade. Because of differences in habit, we decided to keep both genera separately, realising that such approach created paraphyletic taxa.

The genus embraces twenty-three species.



***Laricorchis aggregatus*** (Kunth) Szlach.

Richardiana 7: 28. 2007. =*Dendrobium aggregatum* Kunth, Nov. Gen. Sp. Pl. 1: 358. 1816 (non *Dendrobium aggregatum* Roxburgh 1832); TYPE: ECUADOR. *Jameson 251* (TCD).

***Laricorchis aristeguietae*** (Foldats) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria aristeguietae* Foldats, Bol. Soc. Venez. Ci. Nat. 22: 266. 1961; TYPE: VENEZUELA. *Pittier 3791* (HOLO: VEN).

***Laricorchis condensatus*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria condensata* C.Schweinf., Fieldiana, Bot. 28(1): 194. 1951; TYPE: VENEZUELA. *Steyermark 60873* (AMES, F).

***Laricorchis fasciculatus*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria fasciculata* C.Schweinf., Bot. Mus. Leaf. 15: 162. 1952; TYPE: PERU. *Woytkowski 21* (AMES).

***Laricorchis fulgens*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium fulgens* Rchb.f., Beitr. Orchid.-K. C. Amer.: 76. 1866; TYPE: COSTA RICA. *Wendland s.n.* (W, AMES – drawing).

***Laricorchis gualaquizensis*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria gualaquizensis* Dodson, Orquideología 19(3): 69. 1994; TYPE: ECUADOR. *Dodson & Embree 13197* (HOLO: RPSC; ISO: US, SEL).

***Laricorchis hystrionica*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium hystrionicum* Rchb.f., Bonplandia 4: 324. 1856; TYPE: MEXICO. *Schiller s.n.* (W).

***Laricorchis loefgrenii*** (Cogn.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium loefgrenii* Cogn. in Mart., Fl. Bras., Orchid. 3(6): 92. 1904; TYPE: BRAZIL. *Loefgren s.n.* (BR?).

***Laricorchis maldonadoensis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria maldonadoensis* J.T.Atwood, Selbyana 24(1): 33. 2003; TYPE: ECUADOR. *Gentry & Shuppy 26575* (HOLO: SEL; ISO: MO).

***Laricorchis mapiriensis*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium mapiriense* Kraenzl., Repert. Spec. Nov. Regni Veg. 25: 23. 1928; TYPE: BOLIVIA. *Buchtien 558* (B†, MO).

***Laricorchis nubigena*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium nubigenum* Rchb.f., Ann. Bot. Syst. (Walpers) 6: 488. 1863; TYPE: COLOMBIA. *Funck & Schlim s.n.* (W).

***Laricorchis ochracea*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium ochraceum* Rchb.f., Gard. Chron. ser. 3, 1: 209. 1887; TYPE: COLOMBIA or PANAMA. *Wendland s.n.* (W).

***Laricorchis pendulus*** (Poepp. & Endl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Scaphyglottis pendula* Poepp. & Endl., Nov. Gen. Sp. Pl. 1: 58, t. 98. 1836; TYPE: PERU. *Poeppig 1749* (W).

***Laricorchis pittieri*** (Ames) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium pittieri* Ames, Schedul. Orchid. 2: 35. 1923; TYPE: COSTA RICA. *Pittier 1404* (AMES)

***Laricorchis ramosus*** (Ruiz & Pav.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria ramosa* Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 226. 1798; TYPE: PERU. *Pavon s.n.* (MA).

***Laricorchis repens*** (L. O. Williams) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria repens* L.O.Williams, Amer. Orchid Soc. Bull. 10(9): 273, t. 9. 1942; TYPE: PANAMA. *Allen 2868* (AMES, MO, US).

***Laricorchis rigidus*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rigida* Barb.Rodr., Gen. Sp. Orchid. 2: 206. 1881; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Laricorchis saragurensis*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria saragurensis* Dodson, Orquideologia 19(3): 85. 1994; TYPE: ECUADOR. *Hirtz 3104* (HOLO: RPSC).

***Laricorchis sillarensis*** (Dodson & Vasquez) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria sillarensis* Dodson & Vasquez, Ic. Pl. Trop., ser. 2: 261. 1989; TYPE: BOLIVIA. *Vasquez 249* (HOLO: MO).

***Laricorchis spathulata*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria spathulata* C.Schweinf., Bot. Mus. Leaf. 15: 164. 1952; TYPE: PERU. *Vargas 5532* (AMES).

***Laricorchis squarrosus*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium squarrosus* Schltr., Repert. Sp. Nov. Regni Veg., Beih. 8: 100. 1921; TYPE: ECUADOR. *Sodiro 95* (B†).

***Laricorchis tafallae*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Scaphyglottis tafallae* Rchb.f., Linnaea 22: 855. 1850; TYPE: PERU. *Ruiz s.n.* (W).

***Laricorchis tonsoniae*** (Soto Arenas) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria tonsoniae* Soto Arenas, Orquidea (Mexico City) 12(2): 245. 1992; TYPE: MEXICO. *Soto, Purata & Martinez 5710* (HOLO: AMO; ISO: SEL).

**18. MAPINGUARI** Carnevali & R.B.Singer

Lankesteriana 7: 525. 2007; GENERITYPE: *Mapinguari longipetiolatus* (Ames & C.Schweinf.) Carnevali & R.B. Singer [*Maxillaria longipetiolata* Ames & C. Schweinf.].

Pseudobulbs usually congested, unifoliate and smooth to slightly sulcate, mildly laterally compressed,

subtended by several chartaceous, fibrous, non-foliaceous bracts. Leaf single, with a distinct, usually long petiole and oblong, apically acute blade. Inflorescences very short, flowers clustered tightly around the most recent pseudobulbs, often barely exceeding their height. Flowers fleshy, erect (i.e., lip held in a vertical or near-vertical position), brown or dull maroon in coloration, and with perianth fibers. Tepals subsimilar. Lip usually 3-lobed with rounded lateral lobes, lack of trichomes. Callus shiny and warty or verrucose. Gynostemium rather massive, subarcuate. Column foot very short.

The species representing the genus are essentially similar to a large group of species classified within *Maxillaria* s. str. In the light of the results of molecular research, the relation appears to be a result of a convergence. Both genera are easily distinguishable by the length of the scape in relation to pseudobulbs.

The genus includes eleven species along with six nomenclatorial combinations proposed below:

***Mapinguari cacaoensis*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria cacaoensis* J.T. Atwood, Selbyana **19**: 254. 1998 (1999); TYPE: COSTA RICA. *Mora 60* (HOLO: INB; ISO: SEL).

***Mapinguari caparaoensis*** (Brade) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria caparaoensis* Brade, Arquiv. Serv. Florest. Rio de Janeiro **2**(1): 7. 1943; TYPE: BRAZIL. *Brade 17111* (HB).

***Mapinguari echinochila*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria echinochila* Kraenzl., Ark. Bot. **16**(8): 22. 1921; TYPE: BRAZIL. *Dusen 7012A* (S).

***Mapinguari planicola*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria planicola* C. Schweinf., Bot. Mus. Leafl., **8**: 188. 1940; TYPE (Christenson 1991): PANAMA. *Powell 8* (LECTO: AMES; ISOLECTO: AMES, K, MO).

***Mapinguari riopalenquense*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria riopalenquensis* Dodson, Selbyana **7**(24): 355. 1984; TYPE: ECUADOR. *Dodson 5439* (HOLO: SEL; ISO: RPSC).

***Mapinguari verrucifera*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria verrucifera* C. Schweinf., Bot. Mus. Leafl., Harvard Univ. **11**: 292. 1945; TYPE: PERU. *Klug 10047* (AMES).

### 19. *MARSUPIARIA* Hoehne

Arq. Bot. Estado São Paulo **2**: 69-70. 1947; TYPE: *Marsupiarina valenzuelana* (A. Rich.) Garay [*Pleurothallis valenzuelana* A. Rich.].

Plants monopodial, psygmoid, glaucous, with very abbreviated, non-swollen stem. Leaves iridiform, linear to narrowly lanceolate, acute, somewhat falcate, stiff, imbricating basally. Inflorescence – a fascicle of successively borne flowers. Flowers rather small, tepals with fibrous bundles. Sepals and petals dissimilar in size and form, thick, stiff. Lip oblong, somewhat expanded near the middle, thick, stiff, callus inconspicuous. Gynostemium rather short, massive. Column foot short, very massive.

A genus of two species, including one new combination.

***Marsupiarina angustata*** (Atwood) Szlach., *comb. nov.*

Basionym: *Maxillaria valenzuelana* (A. Rich.) Nash. ssp. *angustata* Atwood, Ic. Pl. Tropic., Orchid. Costa Rica, part 1, **14**: 1371. 1989; TYPE: NICARAGUA. *F. Ortiz 612* (HOLO: SEL).

### 20. *MAXILLARIA* Ruiz & Pav.

Fl. Peruv. Prodr.: 116, pl. 25. 1794; GENERITYPE: *Maxillaria platypetala* Ruiz & Pav.

Epiphytic, lithophytic or terrestrial caespitose plants. Pseudobulbs ovoid to ellipsoid, laterally compressed, concealed completely by foliaceous or non-foliaceous sheaths, unifoliate. Leaves variously petiolate, usually oblong to elliptic, leathery, rarely thin-textured. Inflorescence – single-flowered, originating from base of pseudobulbs. Flowers campanulate to spreading resupinate or non-resupinate. Sepals and petals free, with fibrous bundles. Lip hinged at the apex of column foot, usually 3-lobed. Callus variously shaped, prominent, glabrous or pubescent. Gynostemium stout, arcuate. Column foot stout, long.

A genus of about 250 species. Infrageneric classification of *Maxillaria* will be published in the ongoing paper.

### 21. *MAXILLARIELLA* M. A. Blanco & Carnevali

Lankesteriana **7**(3): 527. 2007; GENERITYPE: *Maxillariella diuturna* (Ames & C. Schweinf.) M. A. Blanco & Carnevali [*Maxillaria diuturna* Ames & C. Schweinf.].

Plants sympodial. Pseudobulbs ellipsoid, laterally compressed, uni- to bifoliate. Young shoots covered by foliaceous sheaths and producing flowers. Sheaths becoming bladeless. Leaves narrow, linear, unequally bilobed at the apex, thin. Flowers produced singly. Floral bracts very small. Tepals much longer than pedicel and ovary, subsimilar, with fibrous bundles. Lip hinged, oblong, usually obscurely 3-lobed. Callus oblong in the lower half of the lip, sometimes missing. Gynostemium slender, elongate, arcuate. Column foot rather short, but prominent. Capsules with lateral dehiscences.

From a molecular point of view, species included in this genus by Blanco *et al.* (2007) form a monophyletic group, although highly polymorphic and very difficult

to define. According to the authors, the species of *Maxillariella* differ from closely related *Ornithidium* in the capsule structure, i.e. lateral dehiscences in *Maxillariella* versus apical ones in *Ornithidium*. It appears to be the only constant difference between the two genera. It is possible that further studies will justify splitting *Maxillariella* into smaller but well-defined taxa.

*Maxillariella* includes about fifty species. The following five new combinations are validated below.

***Maxillariella chiriquiensis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria chiriquiensis* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **17**: 68. 1922; TYPE (Christenson 1991: 125): PANAMA. *Powell 125* (LECTO: AMES; ISOLECTO: K, MO, US).

***Maxillariella dichaeoides*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria dichaeoides* D.E.Benn. & Christenson, Phytotaxa **1**: 26. 2009; TYPE: PERU. *Bennett 8027* (HOLO: HAO).

***Maxillariella muscoides*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria muscoides* J.T.Atwood, Lindleyana **9**(4): 236. 1994; TYPE: COSTA RICA. *Dodson 2526* (HOLO: SEL).

***Maxillariella panamensis*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria panamensis* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **17**: 70. 1922; TYPE (Christenson 1991:129): PANAMA. *Powell 124* (LECTO: AMES).

***Maxillariella subpandurata*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria subpandurata* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 172. 1920; TYPE: COLOMBIA. *Lehmann 4126* (B<sup>+</sup>).

## 22. MORMOLYCA Fenzl.

Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. **1**: 253. 1859; GENERITYPE: *Mormolyca ringens* (Lindl.) Gentil [*Mormolyca lineolata* Fenzl].

Epiphytic, usually caespitose plants. Pseudobulbs ovoid to ellipsoid, laterally compressed, subtended by scarious, nonfoliaceous bracts, unifoliate. Leaf sessile, leathery, acute. Inflorescence single-flowered, emerging from between older pseudobulbs, longer than pseudobulbs, reaching almost leaf apex. Flowers usually broadly opened. Sepals and petals dissimilar, free. Lip hinged at the apex of the column foot, 3-lobed, basal callus puberulent. Gynostemium elongate, arcuate, slender. Column foot rudimentary.

The genus in its narrow concept includes about ten species.

## 23. NEOURBANIA Fawc. & Rendle

J. Bot. **47**: 125. 1909; GENERITYPE: *Neo-urbania adendrobium* (Rchb.f.) Fawc. & Rendle, J. Bot. **47**: 125. 1909.

Plants monopodial, without pseudobulbs, stem often branching. Leaves distichous, widest at or just above the base, gradually attenuate towards the apex, acute. Flowers produced singly or in tufts in leaf axils, small or even tiny. Floral bracts and tepals much shorter than pedicel and ovary. Sepals and petals subsimilar or dissimilar, without fibers. Lip obscurely 3-lobed near the middle or at the base. Callus oblong, near the lip centre. Column foot rudimentary, completely adnates to the ovary. Spur shallow, saccate.

The genus is a unique taxon in *Ornithidium*-complex by its monopodial habit. *Neourbania* is similar to *Adamanthus* vegetatively, as discussed briefly above (see p. 20-22).

*Neourbania* comprises twelve species, including eleven new combinations.

***Neourbania alticola*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria alticola* C.Schweinf., Bot. Mus. Leaflet. **11**: 261. 1945; TYPE: ECUADOR. *Hartweg 838* (AMES).

***Neourbania aurea*** (Poepp. & Endl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium aureum* Poepp. & Endl., Nov. Gen. Sp. Pl. **1**: 57, t. 96. 1835; TYPE: PERU. *Poeppig 1742* (W).

***Neourbania cachacoensis*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria cachacoensis* J.T. Atwood, Selbyana **24**: 30. 2003, TYPE: ECUADOR. *Dodson et al. 16021* (HOLO: MO).

***Neourbania canarensis*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria canarensis* J.T. Atwood, Selbyana **24**: 31. 2003; TYPE: ECUADOR. *Prieto 2605* (HOLO: SEL, Iso: AMES).

***Neourbania condorensis*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria condorensis* J.T.Atwood, Selbyana **24**(1): 32. 2003; TYPE: ECUADOR. *Hirtz 3811* (HOLO: RPSC).

***Neourbania cordyline*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium cordyline* Rchb.f., Linnaea **41**: 34. 1877; TYPE: ECUADOR. *Spruce 6242* (W).

***Neourbania disticha*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium distichum* Lindl., Pl. Hartw.: 153. 1845; TYPE: ECUADOR. *Hartweg 845* (K).

***Neourbania gigantea*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium giganteum* Lindl., Pl. Hartw.: 153. 1845; TYPE: ECUADOR. *Hartweg 846* (K).

***Neourbania haemathodes*** (Ruiz & Pav.) Szlach. & Sitko, *comb. nov.*

Basionym: *Fernandezia haemathodes* Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. **1**: 240. 1798; TYPE: PERU. *Pavon s.n.* (MA).

***Neourbania patella*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria patella* J.T. Atwood, *Selbyana* **24**(1): 37. 2003; TYPE: PERU. *Diaz & Campos 3744* (HOLO: MO; ISO: USM).

***Neourbania sculliana*** (J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria sculliana* J.T. Atwood, *Selbyana* **24**(1): 1. 2003; TYPE: COLOMBIA. *Silverstone-Sopkin et al. 1575* (HOLO: MO).

**24. *NITIDOBULBON*** I. Ojeda, Carnevali & G. A. Romero *Novon* **19**(1): 98. 2009; GENERITYPE: *Nitidobulbon nasutum* (Rchb.f.) I. Ojeda & Carnevali [= *Maxillaria nasuta* Rchb.f.].

Plants epiphytic, closely caespitose. Pseudobulbs oblong, laterally compressed, subtended by foliaceous sheaths, unifoliate. Leaf and sheaths grass-like, acute. Inflorescence single-flowered, exceeding pseudobulb, emerging from the leaf axil. Flowers campanulate, with perianth fibers. Sepals and petals dissimilar in size. Lip motile, obscurely 3-lobed near the middle, channel-formed and cochleate in the lower part. Callus oblong, prominent. Gynostemium rather slender, arcuate. Column foot rudimentary. Capsules with lateral dehiscence. The genus is somewhat similar to *Heterotaxis* by its unifoliate pseudobulbs concealed by leafy sheaths and a short inflorescence appearing in the leaf axil. However, both genera vary in the flower orientation and the lip callus details. In *Heterotaxis*, the flowers are held in vertical position and the lip callus is covered by trichomes without resin and is not sticky. On the other hand, flowers of *Nitidobulbon* are resupinate, that is the lip is lowermost and the sticky lip callus produces resin.

It embraces four species, including the following one new nomenclatorial combination.

***Nitidobulbon oxysepalum*** (Schltr.) Szlach & Sitko, *comb. nov.*

Basionym: *Maxillaria oxysepala* Schltr., *Repert. Spec. Nov. Regni. Veg.* **27**: 73. 1929; TYPE: BOLIVIA. *Buchtien 5003* (B<sup>+</sup>, AMES, G, US).

**25. *ORNITHIDIUM*** Salisb. *ex R. Br.*

*Hort. Kew.*, ed. 2, **5**: 210. 1813; GENERITYPE: *Ornithidium coccineum* (Jacq.) Salisb. *ex R. Br.*

Pseudobulbs ovoid to ellipsoid, more or less compressed, usually closely spaced, unifoliate, surrounded by foliaceous sheaths. Occasionally, rhizome elongate, covered by leafy sheaths. Leaf and basal sheaths linear to linear-lanceolate, acute, thin. Flowers borne in tufts at the base of juvenile pseudobulbs, small, resupinate, campanulate. Floral bracts very small. Tepals with no fibers, much longer than pedicel and ovary. Sepals larger than

petals. Lip stiffly joined with the column foot, sigmoid, more or less 3-lobed, basally concave, with prominent callus across lateral lobes. Column foot rudimentary.

The species classified within *Ornithidium* are related to *Camaridium*. The differences and similarities between these two genera were briefly discussed previously in this paper (see p. 14).

The genus includes about forty species. We validated below two nomenclatorial combinations at the species level.

***Ornithidium purpureolabium*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria purpureolabia* D.E. Benn. & Christenson, *Icon. Orchid. Peruv.*: 702. 2001; TYPE: PERU. *Campoverde & Bennett 5948* (HOLO: Herb. Bennettianum).

***Ornithidium sanaensis*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria sanaensis* D.E. Benn. & Christenson, *Icon. Orchid. Peruv.*: t. 706. 2001; TYPE: PERU. *Bennett et al. 494* (HOLO: UC).

**26. *PITYPHYLLUM*** Schltr.

*Repert. Spec. Nov. Regni Veg., Beih.* **7**: 162. 1920; GENERITYPE: *Pityphyllum antioquiense* Schltr.

Plants epiphytic. Rhizome elongate, pendent. Pseudobulbs ovoid, ribbed, rounded in cross-section, clothed in and fused to scarious tunica. Leaves 1-10, subterete to conduplicate, stiff, acute to acuminate. Inflorescence single-flowered, emerging from the base of pseudobulbs. Flowers small, reesupinate, light-coloured. Sepals and petals free, subsimilar. Lip entire or subentire, concave at base, ecallose. Gynostemium erect, slender. Column foot rudimentary.

*Pityphyllum* embraces five to seven species, according to various authors.

**27. *PSITTACOGLOSSUM*** La Llave & Lex.

*Nov. Veg. Descr.* **2**: 29. 1825; GENERITYPE: *Psittacoglossum atratum* La Llave & Lex.

Plants caespitose. Pseudobulbs ovoid to ellipsoid, laterally compressed, unifoliate, surrounded basally by usually bladeless bracts. Leaf linear to oblong-lanceolate. Inflorescence usually much longer than pseudobulbs, covered by few sterile bracts. Floral bracts longer than pedicel and ovary. Sepals usually widely spread, petals and lip parallel to gynostemium. Tepals subsimilar in size and form, with no fibers. Lip 3-lobed, the middle lobe oblong-elliptic to ligulate, usually much larger than laterals, occasionally all three lobes subequal in size. Callus in the lower part of the lip, massive, oblong. Gynostemium elongate, rather slender. Column foot short.

The results of molecular analyses indicate that *Psittacoglossum* hitherto existing is a paraphyletic

taxon. Therefore, we decided to keep it at generic rank, because the species classified within the genus are relatively uniform in flower structure and habit. The only exception is *Psittacoglossum vittarifolium*, its pseudobulbs are concealed by foliaceous sheaths and the lip is almost equally 3-lobed with a distinct callus. *Psittacoglossum* is similar to *Brasiliorchis* vegetatively, but the results of molecular analyses clearly indicate that both genera are not closely related.

It includes fifteen species (including fourteen new combinations).

***Psittacoglossum cedralensis*** (J.T. Atwood & Mora-Retana) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria cedralensis* J.T. Atwood & Mora-Retana, *Selbyana* **18**(1): 31. 1997; TYPE: COSTA RICA. *Mora B-35* (HOLO: USJ).

***Psittacoglossum cucullatum*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria cucullata* Lindl., *Edwards's Bot. Reg.* **26**: t. 12. 1840; TYPE: MEXICO. *Henchman s.n.* (K).

***Psittacoglossum hematoglossum*** (A. Rich. & Gal.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria hematoglossa* A.Rich. & Gal., *Ann. Sci. Nat., Bot. sér. 3*, 3: 24. 1845; TYPE: MEXICO. *Karwinski s.n.* (P).

***Psittacoglossum lindenianum*** (A. Rich. & Gal.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria lindeniana* A. Rich. & Gal., *Ann. Sci. Nat., Bot. sér. 3*, 3: 24. 1845; TYPE: MEXICO. *Galeotti s.n.* (P).

***Psittacoglossum meleagris*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria meleagris* Lindl., *Edwards's Bot. Reg.* **30** (misc.): 3. 1844; TYPE: MEXICO. *Loddiges s.n.* (K).

***Psittacoglossum mombachoensis*** (Heller ex J.T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria mombachoensis* Heller ex J.T. Atwood, *Selbyana* **5**(3-4): 302. 1981; TYPE: NICARAGUA. *Stevens 4331* (HOLO: MO).

***Psittacoglossum obscurum*** (Linden & Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria obscura* Linden & Rchb.f., *Beitr. Orchid.-K. C. Amer.*: 31. 1866; TYPE: PANAMA. *Linden s.n.* (W).

***Psittacoglossum praestans*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria praestans* Rchb.f., *Gard. Chron., n.s.*, **23**: 566. 1885; TYPE: GUATEMALA. *Lehman ex Low 1885* (W, SEL – microfiche).

***Psittacoglossum puncto-striatum*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria puncto-striata* Rchb.f., *Linnaea* **41**(1): 28. 1876; TYPE: COSTA RICA. *Kramer s.n.* (W).

***Psittacoglossum rhombeum*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rhombea* Lindl., *Edwards's Bot. Reg.* **26**: sub t. 12. 1840; TYPE: MEXICO. *Karwinski s.n.* (K).

***Psittacoglossum rubrilabium*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rubrilabia* Schltr., *Repert. Spec. Nov. Regni Veg., Beih.* **19**: 236. 1923; TYPE (Barringer 1986: 10): COSTA RICA. *Brenes 151* (NEO: AMES-drawing).

***Psittacoglossum seymourianum*** (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria seymouriana* J.T. Atwood, *Selbyana* **5**: 304, t. 2. 1981; TYPE: NICARAGUA. *Atwood & Neill AN112* (HOLO: SEL).

***Psittacoglossum soconuscanum*** (Breedlove & D. Mally) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria soconuscana* Breedlove & D. Mally, *Amer. Orchid Soc. Bull.* **58**(12): 1234. 1989; TYPE: MEXICO. *Breedlove 65691* (HOLO: CAS; ISO: AMES, MEXU).

***Psittacoglossum vittarifolium*** (L. O. Williams) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria vittarifolia* L.O. Williams, *Ceiba* **4**: 38. 1953; TYPE: COSTA RICA. *Lankester 1581* (HOLO: US; ISO: AMES, SEL).

**28. PSEUDOCYMBIDIUM** Szlach. & Sitko, *gen. nov.*

*Pseudobulbi inconspicui, tereti, 1-3-foliati, vaginis foliaceis cincti. Vaginae foliaque linearia graminiformia. Inflorescentia multo brevior quam folia. Floris bractea longior quam pedicellus ovariumque. Tepala subsimularia, angusta, fibrosa. Labellum trilobatum cum callo prominente oblongo. Columnae pes prominens.*

ETYMOLOGY: An allusion to the superficial similarity to the habit of *Cymbidium*.

GENERITYPE: *Pseudocymbidium linearis* (C. Schweinf.) Szlach. & Sitko [*Maxillaria linearis* C. Schweinf.].

Plants pendent or erect. Pseudobulbs inconspicuous, terete, uni- to 3-foliolate, subtended by more or less prominent foliaceous sheaths, produced at remote intervals. Leaves and sheaths similar, linear-lanceolate, long-acuminate, grass-like, very long. Inflorescence single-flowered, much shorter than leaves. Flowers produced singly or in fascicles, more or less tubular. Floral bracts longer than pedicel and ovary. Tepals subsimilar, fibrous. Lip oblong triangular to oblong-ovate in outline, 3-lobed. Callus prominent, oblong. Gynostemium relatively short and massive. Column foot very long, apically free.

*Pseudocymbidium lueri* is the only member of the genus the DNA material we obtained. It is nested in the *Maxillaria s.str.* clade. Nevertheless, we decided to keep it separately under the name of *Pseudocymbidium*, on account of very peculiar habit, that is inconspicuous, terete pseudobulbs with very long, narrow, grass-like leaves.

The genus embraces four species.

***Pseudocymbidium canarinum*** (D.E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria canarina* D.E. Benn. & Christenson, *Phytotaxa* **1**: 21. 2009; TYPE: PERU. *Hajek 226* (HOLO: USM).

***Pseudocymbidium linearis*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria linearis* C. Schweinf., *Amer. Orchid. Soc. Bull.* **13**: 60. 1944; TYPE: PERU. *Schunke 519* (F).

***Pseudocymbidium leforii*** (D. E. Benn. & Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria leforii* D.E. Benn. & Christenson, *Icon. Orchid. Peruv.*: 697. 2001; TYPE: PERU. *Schunke & Bennett 1263* (HOLO: Herb. Bennettianum).

***Pseudocymbidium lueri*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria lueri* Dodson, *Icon. Pl. Tropic. t.* 155. 1980; TYPE: ECUADOR. *Dodson & Luer 6800* (HOLO: SEL).

## 29. *PSEUDOMAXILLARIA* Hoehne

*Arq. Bot. Estado São Paulo, n.s.*, **2**(4): 71. 1947; GENERITYPE: *Pseudomaxillaria parviflora* (Poepp. & Endl.) Brieger [*Scaphyglottis parviflora* Poepp. & Endl.].

Pseudobulbs more or less laterally compressed, usually well-separated along rhizome, unifoliate, surrounded basally by bladeless bracts. Rhizome covered by bract-like sheaths. Leaf oblong-lanceolate. Flowers small, usually gathered in tufts at the base of the pseudobulbs. Sepals and petals dissimilar in size and form, without fibrous bundles. Lip more or less sigmoid, firmly joined with the column foot, forming saccate spur. Epichile usually much smaller than hypochile. Callus very obscure, occasionally developed. Column foot short, gently upcurved.

*Pseudomaxillaria* is a monophyletic taxon superficially similar to *Chelyella*, described above (see p. 25). Both genera are easily distinguishable from each other by habit and lip structure. *Pseudomaxillaria strumata* is an isolated species within the genus by its long column foot and partially connate lateral sepals. The other species with relatively long column foot is *P. horichii*, but its sepals are free along all their length.

The genus embraces fifteen species. We validate below the following nine nomenclatorial combinations.

***Pseudomaxillaria anceps*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium anceps* Rchb.f., *Beitr. Orchid.-K. C. Amer.*: 75. 1866, *non Maxillaria anceps* Ames & C. Schweinf. 1930; TYPE: COSTA RICA. *Wendland s.n.* (W, AMES – drawing).  
=*Maxillaria pseudoneglecta* J.T. Atwood, *Lindleyana* **8**(1): 30. 1993.

***Pseudomaxillaria brevilabia*** (Ames & Correll) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria brevilabia* Ames & Correll, *Bot. Mus. Leafl.* **11**: 15. 1943; TYPE: COSTA RICA. *Alfaro 227* (AMES).

***Pseudomaxillaria conferta*** (Griseb.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium confertum* Griseb., *Fl. Brit. W.I.* [Grisebach]: 626. 1864; TYPE (Atwood 1993: 29): CUBA. *Wright 650* (LECTO: GOET).

***Pseudomaxillaria exigua*** (Regel) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria exigua* Regel, *Index Seminum* [St. Petersburg] **1855**: 20. 1855; TYPE: ?

***Pseudomaxillaria grisebachiana*** (Nir & Dod) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria grisebachiana* Nir & Dod, *Orchidaceae Antill.*: 243. 2000; TYPE: HAITI. *Ekman 4609* (NY, S).

***Pseudomaxillaria horichii*** (Senghas) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria horichii* Senghas, *Orchidee* (Hamburg) **28**: 16. 1977; TYPE: COSTA RICA. *Horich s.n.* (HOLO: HEID).

***Pseudomaxillaria neglecta*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium neglectum* Schltr., *Repert. Spec. Nov. Regni Veg., Beih.* **19**: 242. 1923; Type (Barringer 1986: 17): COSTA RICA. *Brenes 164* (B<sup>+</sup>); *Anon. s.n.* (NEO: AMES).

***Pseudomaxillaria stenophylla*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium stenophyllum* Schltr., *Repert. Spec. Nov. Regni Veg., Beih.* **19**: 59. 1923, *non Maxillaria stenophylla* Rchb.f. 1854, *nec Maxillaria stenophylla* F. Lehm. & Kraenzl. 1899; TYPE: COSTA RICA. *Wercklé 109* (B<sup>+</sup>, W; DRAWING: AMES).  
=*Maxillaria concavilabia* Ames & Correll, *Bot. Mus. Leafl.* **11**: 15. 1943.

***Pseudomaxillaria strumata*** (Endres & Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium strumatum* Endres & Rchb.f., *Gard. Chron., n.s.*, **2**(51): 772. 1874; TYPE: COSTA RICA. *Endres 281* (W, AMES).

## 30. *RHETINANTHA* M. A. Blanco

*Lankesteriana* **7**(3): 534. 2007; GENERITYPE: *Rhetinantha acuminata* (Lindl.) M.A. Blanco [*Maxillaria acuminata* Lindl.].

Plants subcespitose to long rhizomatous. Pseudobulbs often ridged, covered usually by one or two subtending foliaceous sheaths. Leaves 1-4, at the apex of pseudobulb, linear, unequally bilobed at the apex, both lobes rounded. Inflorescences as long as or shorter than leaves, often arising from rhizome bracts a few shoots behind the most recent pseudobulb. Flowers campanulate, with rigid, acuminate perianth parts with strong fibers. Sepals and petals subsimilar or dissimilar. Lip clawed,

oblong-obovate, ligulate-lanceolate, pandurate to obscurely 3-lobed in the lower portion, secreting a sticky, resinous substance in most species. Callus prominent in the basal third or so. Gynostemium slender, arcuate. Margins of the clinandrium conspicuously ciliate. Column foot short. Capsules with lateral dehiscence.

Szlachetko & Sitko (2007) included most of the species classified in *Rhetinantha* in their broad concept of the genus *Sauvetrea*. Molecular analyses conducted by Blanco *et al.* (2007) and Whitten *et al.* (2007) clearly indicated that *Sauvetrea s.l.* was a polyphyletic taxon. For the group of species with aristate sepals, resinous secretion on the lip, ciliate column apex, lateral dehiscence on capsules and not strongly trigonous ovary Blanco *et al.* (2007) proposed a new generic name *Rethinantha*. They included in this genus *Maxillaria witsenioides* Schltr., which is embedded in the *Rhetinantha* clade. Because of a very unusual habit of this species we propose to separate it as a monotypic genus *Hoehnella*.

*Rhetinantha* includes twenty species. The following six new combinations are validated below.

***Rhetinantha fallax*** (Schltr.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria fallax* Schltr., Repert. Spec. Nov. Regni Veg. **27**: 70. 1929; TYPE: BOLIVIA. *Buchtien 5052* (B†, AMES, US).

***Rhetinantha flavoviridis*** (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria flavoviridis* Barb. Rodr., Gen. Sp. Orchid. **1**: 119. 1877; TYPE: BRAZIL. *Barbosa Rodrigues s.n.* (lost).

***Rhetinantha ochroglossa*** (Schltr.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria ochroglossa* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **27**: 175. 1924; TYPE: COLOMBIA. *Lehmann 115* (B†).

***Rhetinantha polybulbon*** (Kraenzl.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria polybulbon* Kraenzl., Repert. Spec. Nov. Regni Veg. **6**: 19. 1908; TYPE: BOLIVIA. *Herzog 219* (B†).

***Rhetinantha unguiculata*** (Schltr.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria unguiculata* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 173. 1920; TYPE: COLOMBIA. *Madero s.n.* (B†).

***Rhetinantha unguilabia*** (Schltr.) Szlach. & Sitko, *comb. nov.*  
Basionym: *Maxillaria unguilabia* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 174. 1920; TYPE: COLOMBIA. *Lehmann 125a* (B†).

### 31. SAUVETREA Szlach.

Richardiana **7**(1): 29. 2007; GENERITYPE: *Sauvetrea alpestris* (Lindl.) Szlach. [*Maxillaria alpestris* Lindl.].

Plants caespitose to moderately long rhizomatous. Pseudobulbs ellipsoid to ovoid, slightly flattened, frequently ancipitous, subtended by a pair of non-foliaceous, acute, papery short-lived sheaths. Rhizome covered by few, short, acutely triangular, two-ranked, strongly keeled papery bracts exposing the green internodes. Leaf single, oblong to elliptic-oblong, membranous to coriaceous, stiff. Inflorescences from the base of the newly emerging pseudobulbs, much longer than pseudobulbs, usually as long as leaf, the scapes with strongly ancipitous, two-ranked, strongly keeled bracts. Flowers medium-sized, covered by imbricating sheaths, with spreading perianth segments, without strong fibers. Floral bracts as long as or longer than pedicel and ovary. Tepals subsimilar, narrow. Lip hanging on the column foot, unequally 3-lobed, with a central, ligulate callus with sulcate depression along its length. Column foot short. Ovary and fruit strongly trigonous. Fruit with lateral dehiscence.

The genus is easily distinguishable from closely related *Rhetinantha* by the lip callus. *Sauvetrea* includes fifteen species.

The new nomenclatorial combination is proposed below.

***Sauvetrea baumanniana*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria baumanniana* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **7**: 166. 1920; TYPE: COLOMBIA. *Madero s.n.* (B†).

### 32. SCUTICARIA Lindl.

Bot. Reg. **29**, Misc.: 14. 1843; GENERITYPE: *Scuticaria steelei* (Hook.) Lindl. [*Maxillaria steelei* Hook.].

Epiphytic or lithophytic plants. Pseudobulbs cylindrical or fusiform, heteroblastic, unifoliate, concealed by scarious bracts. Leaf terete, grooved, usually pendent. Inflorescence lateral racemose, 1-3-flowered, emerging from the base of pseudobulbs. Flowers showy, resupinate. Sepals and petals subsimilar, free, lateral sepals fused with the column foot forming a prominent mentum. Lip prominently 3-lobed, articulate with the column foot, sparsely pubescent. Callus fleshy, longitudinal, several-keeled. Gynostemium elongate, slender, arcuate. Column foot prominent.

The genus of ten species.

### 33. TRIGONIDIUM Lindl.

Edwards's Bot. Reg. **23**: t. 1923. 1837; GENERITYPE: *Trigonidium obtusum* Lindl.

Epiphytic or lithophytic plants. Pseudobulbs caespitose to widely spaced along rhizome, ovoid, laterally compressed or not, ridged or smooth, subtended by nonfoliaceous bracts, 1-5-leaved. Leaves linear to elliptic, subsessile. Inflorescence emerging from the

base of mature or developing pseudobulbs, single-flowered. Flowers trigonous, of various size. Sepals conspicuously larger than petals, lateral sepals basally concave. Petals with shiny, subterminal thickening. Lip prominently smaller than sepals, 3-lobed. Callus prominent near the lip centre. Gynostemium erect, rather massive. Column foot very obscure.

*Trigonidium* embraces seven species.

### 34. *VAZQUEZELLA* Szlach. & Sitko, *gen. nov.*

*Plantae ebulbosae, caulibus foliisque carnosis, caulibus internodiis elongatis, foliis distichis, arcuatis, obtusis, laxis, floribus Maxillaria typicis, foliorum axillis ortis, in parvis catervis aggregatis.*

ETYMOLOGY: Dedicated to Dr. Diego Vazquez, Director of the Orquidario, Cuenca University, Ecuador.

GENERITYPE: *Vazquezella equitans* (Schltr.) Szlach. & Sitko [*Camaridium equitans* Schltr.].

Stem fleshy, pendulous to subpendulous, flattened, distichously covered by sheathing leaf bases, internodes long. Pseudobulbs absent. Leaves linear, laterally compressed, fleshy, subfalcate, obtuse at the apex, well separated one from another along stem. Inflorescences several, in the leaves axils, short, single-flowered, surrounded by few short sheaths at the base. Flowers medium-sized. Tepals free, nearly as long as lip, with fibrous bundles, petals smaller and shorter than sepals. Lip fleshy, parallel to the gynostemium, hinged, recurved toward the apex, obscurely 3-lobed to subpanurate, with central oblong, sticky callus. Gynostemium slender, arcuate, column foot short.

A monotypic genus, characterised by an unusual, vandoid habit.

*Vazquezella equitans* (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium equitans* Schltr., Repert. Spec. Nov. Regni. Veg. **7**: 176. 1920; TYPE: COLOMBIA. VALLE DE CAUCA. Pennel, Killip & Hazen 8403 (B†, AMES, NY). ≡ *Maxillaria equitans* (Schltr.) Garay, Bot. Mus. Leaflet. **18**: 208. 1958.

### 35. *VIRACOCHA* Szlach. & Sitko, *gen. nov.*

*Pseudobulbi plus minusve latericompressi, unifoliati, basi 2-3 folia similibus vaginis cincti; stolo acrius elongatus, vaginis similibus bracteis dense obsitus; flores secus noviblastos deinceps editi; sepala petalaeque amplitudine formaque subsimilaria, pedicellato ovario longiora; columnae pes brevis, crassus, apice anocurvatus; labellum plus minusve sigmoideum, basi saccatum, columnae pedi rigide connatum, obscure trilobatum; callus oblongus, labelli inferna parte positus.*

ETYMOLOGY: *Viracocha* – “Sun God” in Quechua, the great creator god of all things in pre-Inca and Inca mythology.

GENERITYPE: *Viracocha schlechteriana* (J.T. Atwood) Szlach. & Sitko [*Maxillaria schlechteriana* J.T. Atwood].

Pseudobulbs more or less laterally compressed, unifoliolate, basally surrounded by 2-5 foliaceous sheaths. Leaf and sheaths lanceolate to elliptic, acute to acuminate. Aerial stolone long, densely covered by sheath-like bracts. Flowers produced successively along new shoots. Floral bracts exceed pedicel and ovary. Sepals and petals subsimilar in size and form, longer than pedicel and ovary, with no fibers. Lip more or less sigmoidally curved, saccate at the base, stiffly fused with the column foot, obscurely to prominently 3-lobed. Callus prominent, oblong in the lower or central part of the lip. Gynostemium rather short, massive, arcuate. Column foot short, massive, apically upcurved.

This genus is superficially similar to *Laricorchis* (the *Ornithidium*-group). Both genera share similar habit, i.e. pseudobulbs surrounded by leafy sheaths, well-spaced along aerial stolons, but in the light of molecular analyses it appears to be a convergence. The pseudobulbs of *Viracocha* are laterally compressed, whereas in *Laricorchis* they are rounded in cross section. The flowers of *Viracocha* appear successively along new shoots, whereas in *Laricorchis* they are produced in large number in tufts of juvenile pseudobulbs. Additionally, sepals and petals of *Viracocha* are subsimilar, longer than pedicel and ovary and the lip is usually distinctly sigmoidally curved. The sepals of *Laricorchis* are larger than petals, and both are shorter than pedicel and ovary. The lip in the latter genus is usually slightly arched, shallowly saccate basally.

The genus includes eight species.

*Viracocha dichotoma* (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium dichotomum* Schltr., Repert. Spec. Nov. Regni Veg., Beih. **8**: 98. 1921; TYPE: ECUADOR. *Sodiro 94* (B†).

*Viracocha imbricata* (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium imbricatum* Schltr., Beih. Bot. Centralbl. **36**(2): 415. 1918, *non* (Barb.Rodr.) Hoehne 1947; TYPE: COSTA RICA. *Wercklé s.n.* (B+, AMES, W; SYN: 671 *herb. O. Jiménez*).

*Viracocha lutheri* (J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria lutheri* J.T. Atwood, Selbyana **19**: 257. 1999; TYPE: PANAMA. *Luther et al. 1068* (HOLO: SEL).

*Viracocha minus* (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium minus* Schltr., Beih. Bot. Centralbl. **36**(2): 417. 1918; TYPE: COSTA RICA. *Wercklé s.n.* (B†, AMES – drawing).

*Viracocha paleata* (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium paleatum* Rchb.f., Linnaea **41**: 36. 1876; TYPE: MESOAMERICA. *Anon. s.n.* (W).



***Viracocha sigmoidea*** (C. Schweinf.) Szlach. & Sitko, *comb. nov.*

Basionym: *Ornithidium sigmoideum* C.Schweinf., Bot. Mus. Leafl., Harvard Univ. **4**: 121. 1937; TYPE: COSTA RICA. *Valerio* 72 (AMES).

***Viracocha vaginalis*** (Rchb.f.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria vaginalis* Rchb.f., Beitr. Orchid.-K. C. Amer.: **77**. 1866; TYPE: COSTA RICA. *Wendland* 1247 (W).

***Viracocha wrightii*** (Schltr.) Szlach. & Sitko, *comb. nov.*

Basionym: *Camaridium wrightii* Schltr., Repert. Spec. Nov. Regni Veg. **16**: 448. 1920; TYPE: NICARAGUA. *Wright s.n.* (B†, AMES).

### **36. XANTHOKERAMPELLIA** Szlach. & Sitko, *gen. nov.*

*Hoc genus inflorescentia circiter tam longa quam pseudobulbo, tepalis sub-similaribus, labello valde inaequaliter trilobato, callo oblongo Mormolyca differt. Labellum nunquam insectiferum.*

ETYMOLOGY: *Xanthos-* (Gr.) – yellow; *xerampelinus* (Lat.) – dull red with mixture of brown. An allusion to the basic colour flower in most species.

GENERITYPE: *Xanthoxerampellia rufescens* (Lindl.) Szlach. & Śmiszek [*Maxillaria rufescens* Lindl.].

Plants epiphytic, caespitose. Pseudobulbs ovoid to oblong, more or less laterally flattened, rugose, somewhat fleshy, unifoliate. Leaf coriaceous, lanceolate, oblong to elliptic, narrowed towards the base and apex. Inflorescence usually much shorter than leaf, basal, subtended basally by 1-2 bracts. Flowers usually widely opened, scented. Sepals and petals subsimilar, rather fleshy. Lip distinctly, very unequally 3-lobed, the middle lobe subrectangular, truncate at the apex, lateral lobes obliquely triangular to falcate, acute, much smaller. Lip callus oblong in the basal half of the lip. Gynostemium short, massive, slightly arcuate. Column foot short, rather massive.

The group of species described here under the generic name *Xanthoxerampellia* were combined with *Mormolyca* by Blanco *et al.* (2007), based on the results of molecular analyses. However, *Xanthoxerampellia* differs from *Mormolyca* by having a short inflorescence as long as pseudobulbs, subsimilar tepals, very unequally 3-lobed lip with an oblong callus. Lip is never insectiferous and furnished with acute lateral lobes.

The genus of sixteen species, but probably many more are still not known to science.

***Xanthoxerampellia acutifolia*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria acutifolia* Lindl., Edwards's Bot. Reg. 25(Misc.): 92. 1839; TYPE: GUYANA: *Loddiges s.n.* (K).

***Xanthoxerampellia aureoglobula*** (Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria aureoglobula* Christenson, Orchids **71**(2): 125. 2002; TYPE: COLOMBIA. Hort. Orquideas del Valle. *Sine coll., s.n.* (HOLO: CUVC).

***Xanthoxerampellia chacoensis*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria chacoensis* Dodson, Icon. Pl. Trop., II, **6**: t. 531. 1989; TYPE: ECUADOR. *Hirtz* 1967 (HOLO: MO).

***Xanthoxerampellia cleistogama*** (Brieger & Illg) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria cleistogama* Brieger & Illg, Trab. Congr. Nac. Bot. (Rio de Janeiro). **26**: 247. 1977; TYPE: BRAZIL. *Brieger* 1551 (HOLO: HB).

***Xanthoxerampellia dressleriana*** (Carnevali & J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria dressleriana* Carnevali & J.T.Atwood, Lindleyana **11**(1): 29. 1996; TYPE: PANAMA. *Carnevali* 3858 (HOLO: SEL, ISO: AMES, INB, MO)

***Xanthoxerampellia hedwigiae*** (Hamer & Dodson) Szlach. & Śmiszek, *comb. nov.*

Basionym: *Maxillaria hedwigiae* Hamer & Dodson, Icon. Pl. Trop. **8**: t. 800. 1982 (1983); TYPE: GUATEMALA. *Hamer* 161 (HOLO: SEL).

***Xanthoxerampellia minor*** (Fawc. & Rendle) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rufescens* var. *minor* Fawc. & Randle, J. Bot. **48**: 108. 1910; TYPE: JAMAICA. *Haris* 7615 (HOLO: BM).

***Xanthoxerampellia moralesii*** (Carnevali & J. T. Atwood) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria moralesii* Carnevali & J.T.Atwood, Lindleyana **11**: 31. 1996; TYPE: COSTA RICA. *Carnevali & Morales* 384 (HOLO: INB; ISO: SEL).

***Xanthoxerampellia muelleri*** (Regel) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria muelleri* Regel, Gartenflora **39**: 574. 1890; TYPE: COLOMBIA. *Sander s.n.* (LEN).

***Xanthoxerampellia phaeoglossa*** (Schltr.) Szlach. & Śmiszek, *comb. nov.*

Basionym: *Maxillaria phaeoglossa* Schltr., Notizbl. Bot. Gart. Berlin-Dahlem **7**: 279. 1918; TYPE: Origin unknown. *von Furstenberg s.n.* (B†).

***Xanthoxerampellia richii*** (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria richii* Dodson, Orquideologia **19**: 81. 1994; TYPE: ECUADOR. *Dodson et al.* 16586 [not 18283], (HOLO: RPSC; ISO: QCNE).

***Xanthoxerampellia rufescens*** (Lindl.) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria rufescens* Lindl., Edwards's Bot. Reg. **22**: t. 1848. 1836; TYPE: TRINIDAD. *Lowe s.n.* (K).

***Xanthoxerampellia sanantonioensis*** (Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria sanantonioensis* Christenson, Orchids **71**: 128. 2002; TYPE: COLOMBIA. CALI. Hort. Orquideas del Valle. *S. coll.*, *s.n.* (HOLO: CUVV).

*Xanthoxerampellia sotoana* (Carnevali & Gómez-Juárez) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria sotoana* Carnevali & Gómez-Juárez, Brittonia **53**(3): 461. 2001; TYPE: MEXICO. *Soto Arenas, Solano & Izquierdo 7201* (HOLO: AMO; ISO: AMES, CICY).

*Xanthoxerampellia suarezorum* (Dodson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria suarezorum* Dodson, Icon. Pl. Trop., II, **6**: t. 547. 1989; TYPE: ECUADOR. *Suárez 4* (HOLO: QCNE; ISO: RPSC, SEL).

*Xanthoxerampellia tenuibulba* (Christenson) Szlach. & Sitko, *comb. nov.*

Basionym: *Maxillaria tenuibulba* Christenson, Orchid Rev. **109**: 41. 2001; TYPE: COLOMBIA. Moter Orchids. *Christenson 1998* (HOLO: K – spirit).

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