Taxonomy of the subtribe Maxillariinae (Orchidaceae, Vandoideae) revised

Dariusz L. Szlachetko¹, Magdalena Sitko², Piotr Tukało¹ & Joanna Mytnik-Ejsmont¹

¹Department of Plant Taxonomy and Nature Conservation, University of Gdańsk, Al. Legionów 9, 80-441 Gdańsk, Poland, *e-mail: dariusz.szlachetko@gmail.com
²University of Reading, Harborne Building, School of Biological Sciences, Reading, RG6 6AS, UK

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; McIllmurray & 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 Rhetinantha M.A. Blanco, Sauvetrea Szlach., Christensonella Szlach., Mytnik, Górnik & Śmieszek, 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
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 *Camaridium* Lindl. and *Ornithidium* Salisb. ex R.Br. Unfortu-

tely, both genera treated in the way proposed by Whitten *et al.* (2007) are questionable. *Camaridium* 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 deliminations 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 *Camaridium* as follows: variable in growth habit, mostly with pseudobulbs separated by

---

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

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 – Auscella Szlach. & Sitko, gen. nov., Heterotaxis Lindl., Laricorchis Szlach., Neourbanaia 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 Natural histories Musem 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 MgCl₂, 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

<table>
<thead>
<tr>
<th>ITS</th>
<th>Primer sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITS AB101</td>
<td>5' AGCAAT TCAATGGTTCCGGTAAAGTGTTGC 3'</td>
</tr>
<tr>
<td>ITS AB102</td>
<td>5' TAGAAATCCCGGCGTCGGCGCTTAG 3'</td>
</tr>
<tr>
<td>ITS5</td>
<td>5' TCTTCCGCTTATTAGTATCG 3'</td>
</tr>
<tr>
<td>ITS5</td>
<td>5' GGAAGTAAATCTCGTAACCAG 3'</td>
</tr>
</tbody>
</table>
Gdańsk, Poland). Amplification was carried in Biometra T Gradient and Eppendorf Mastercycler thermocyclers. 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 H2O 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 compromising 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 implemented 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 – posterior probability values.

Table 2. ITS matrix and parsimony trees statistics

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

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*
2. Sepals twice or much longer than petals .............. 3
3. Sepals basally connate into a tube, petals without any subterminal thickening, lip with backward-projecting spur ................................................................. *Cryptocetrum*
4. Lip insectiform ........................................ 5
5. Lip not insectiform ..................................... 6
6. 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 .............. *Chrysocyclus*
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
Taxonomy of the subtribe Maxillariinae (Orchidaceae, Vandoideae) revised

Dariusz L. Szlachetko et al.

Maxillaria s.s.

Calawaya

Pseudocymbidium

Camaridium s.l.

/Viraccocha, Chelyella, Adamanthus, Pseudomaxillaria, Chasseopsis, Psittacoglossum
20. Leaves thick, succulent. **Christensonella**

21. Pseudobulbs produced in intervals along rhizome

**Pseudobulbs superposed, inflorescences usually as long as pseudobulbs**

22. Plants caespitose

**Pseudobulbs unifoliate**

23. Lip sessile, oblong triangular in outline, 3-lobed near the apex

**Calaway**

24. Flowers resupinate, i.e. lip lowermost

25. Pseudobulbs concealed by non-foliaceous bracts

**Mapinguari**

26. Inflorescence very short, usually shorter than pseudobulbs, lip obscurely 3-lobed, column foot rudimentary

**Ntitobulbon**

27. Pseudobulbs concealed by non-foliaceous bracts

28. Plants with elongate rhizome, pseudobulbs produced in intervals

**Sauvetrea**

29. Pseudobulbs bifoliate

**Brasiliorchis**

30. Lip lateral lobes acute

**Anthosiphon**

31. Pseudobulbs superposed, inflorescences usually as long as pseudobulbs,Usually gathered in tufts, flowers small

**Psitacoglossum**

32. Lip hanging on the top of the column foot

33. Lip more or less concave at base, stiffly joined with the column foot

34. Lip prominently and very unequally 3-lobe, 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

**Chaseopsis**

33. 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

**Camaridium**

34. Sepals connate together into tube, lip basally elongate into cylindrical spur

**Anthisophon**

35. Flowers produced along new shoot, floral bracts longer than pedicel and ovary

**Viracocha**

36. Flowers produced in large number at the base of mature pseudobulbs

**Aucellia**

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

**Laricorchis**

38. Flowers produced at the base of juvenile or mature pseudobulbs

**Ornithidium**

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 recurved 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 & Siiko (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 allenii* (L. O. Williams) Szalach. & Sitko, *comb. nov.*

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

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

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

*Adamanthus brevilolius* (Rchb.f.) Szalach. & Sitko, *comb. nov.*

*Adamanthus compactus* (Schltr.) Szalach. & Sitko, *comb. nov.*
Basionym: *Ornithidium compactum* Schltr., Repert. Spec. Nov. Regni Veg., Beih. 7: 177. 1920; *Type: COLOMBIA*. *Madero s.n.* (B†).


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

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


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


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

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

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


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

*Adamanthus quitensis* (Rchb.f.) Szalach. & Sitko, *comb. nov.*
Basionym: *Ornithidium quitense* Rchb.f., Linnea 41: 34. 1876; *Type: ECUADOR*. *Sine coll. (W).*

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

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


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


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


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


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


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


2. **Anthosiphon** Schltr.


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.

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


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


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

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

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


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, bifoliolate, 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 bifoliolate 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 unifoliolate 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.*

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

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

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

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

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

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 insignie apice trilobatum, callo inter lobelli centrum prominens antice rotundatus, columna pes prominens.

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

**GENETYPETYPE**: *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, unifoliolate, 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. Column 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.*

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

**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†).

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

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

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

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

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

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

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.

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

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

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

6. Camaridium 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 obovate, 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.

Camaridium carinulatum (Rchb.f.) Szlach. & Sitko, comb. nov.
Camaridium darienensis (J. T. Atwood) Szlach. & Sitko, comb. nov.

7. Chaseopsis Szlach. & Sitko, gen. nov.
Pseudobulbi plus minusve latericompressi, secur rhizoma laxi, unifoliati, basi foliaceis bracteis cincti; rhizoma bracteis similibus vaginis obsitum; flores parvi, secus foliaceos caules infra noviblastos editi; sepala petalaque amplitudine formaque subsimilaria; columnae pes brevis; labellum mobile, calcar conicum; epichillum hypochilio 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, unifoliolate, surrounded basally by leafy bracts. Rhizome covered by bract-like sheaths. Flowers small, campanulate, produced along leafy bracts. Rhizome covered by bract-like sheaths. Leaves ligulate; occasionally and very unequally 3-lobed; the middle lobe exceed pedicellate ovary. Sepals and petals subsimilar in size and form, with no fibres. Lateral sepals pendent. Lip motile, forming with the apex of 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, unifoliolate, 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.*


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


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


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


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


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


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


**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.*


**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.*


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


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


9. **Christensonella** Szlach., Mytnik, Górniak & Sitko

Polish Bot. J. **51**: 57. 2006; Generitype: *Christensonella subulata* (Lindl.) Szlach., Mytnik, Górniak & Śmieszek [*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 uncuta*), usually covered in scarious, imbricating sheaths. Pseudobulbs usually aggregate, erect, fusiform or cylindrical to ellipsoid, often ridged, covered by several non-foliaceous, scarious or subscarious, 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 scarious or subscarious sheaths. Floral bracts similar to the sheaths. Flowers small to medium-sized, campanulate, usually yellow to dark red. Tepals subimbricate, 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.*

**Christensonella hatschbachii** (Schltr.) Szlach. & Sitko, *comb. nov.*
Basionym: *Maxillaria hatschbachii* Schltr., Repert. Spec. Nov. Regni Veg. 23: 56. 1926; Type: BRAZIL. *Hatsbach 100 (B†).*

**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 poaeofolia** (Schltr.) Szlach. & Sitko, *comb. nov.*
Basionym: *Maxillaria poaeofolia* Schltr., Repert. Spec. Nov. Regni Veg. 27: 74. 1929; Type: BOLIVIA. *Buchtien 5034 (B†).*

**Christensonella spannageli** (Hoehne) Szlach. & Sitko, *comb. nov.*
Basionym: *Maxillaria spannageli* 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†).*

10. **Cryptocentrum** Lindl. & Rchb.f.
Bonplandia (Hannover) 2: 280. 1854; Genotypetype: *Cryptocentrum schlimgii* Lindl. & Rchb.f.


**Cryptocentrum** includes six species.

11. **Cryptocentrum jamesonii** Benth.


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. **Cyrtidichirs** Rauschert
Taxon 31: 560. 1982; Genotypetype: *Cyrtidichirs 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.

Plants epiphytic, closely caespitose. Pseudobulbs oblong, laterally compressed, covered by coriaceous, foliaceous sheaths, unifoliate. Leaf oblong to linear, unequal 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 3-lobed, more or less insectiform, tomentose except on callus. 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 nomenclatural combinations.

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

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

**Heterotaxis verecunda** (Schltr.) Szlach. & Sitko, *comb. nov.*
Basionym: *Maxillaria verecunda* Schltr., Repert. Spec. Nov. Regni. Veg. 27: 96. 1924; *Type*: COLOMBIA. Hopp 84 (B†).


* Marsuparia similis; plantae monopodiales caudibus tenuibus, libere pendulis; folia basi imbricata, ternera, carnosa, latericompresa, 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.].


*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

*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 vernation, 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

*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 sub similars. 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.

*Pseudobulbs conical, rounded in cross-section, sometimes slightly flattened, well spaced along aerial stolons, uni- or bifoliolate, 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.

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

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

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

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

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

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.

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

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

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

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

Laricorchis pittieri (Ames) Szlach. & Sitko, comb. nov.
Basionym: Ornithidium pittieri Ames, Schedul. Orchid. 2: 35. 1923; TYPE: COSTA RICA. Pittier 1404 (AMES)

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

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

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

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

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

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

Laricorchis squarrosus (Schlr.) Szlach. & Sitko, comb. nov.
Basionym: Ornithidium squarrosum Schltr., Repert. Sp. Nov. Regni Veg., Beih. 8: 100. 1921; TYPE: ECUADOR. Sodiro 95 (B†).

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

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

18. Mapinguari Carnevali & R.B.Singer

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 nomenclatural combinations proposed below:

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

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

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


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


19. **Marsupiaria** Hoehne

Plants monopodial, ps ygmoi d, 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.

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

20. **Maxillaria** 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 petiolar, 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


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.

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

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

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

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

**22. Mormolyca** Fenzl.


The genus in its narrow concept includes about ten species.

**23. Neourbania** Fawc. & Rendle

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 subdissimilar 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 alicola** (C. Schweinf.) Szlach. & Sitko, comb. nov.

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

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

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

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

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

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


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 tri-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 nomenclatoral combinations at the species level.

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

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


Pitthyllum embraces five to seven species, according to various authors.


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 spaced, petals and lip parallel to gynostemium. Tepals subisimilis 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 vittariifolium*, 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.


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


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


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


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


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


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


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


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

The genus embraces four species.

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

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

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

29. Pseudomaxillaria Hoehne

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 nomenclatural combinations.

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


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

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.

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

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

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


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

30. Rhetinantha M. A. Blanco
Lankesteriana 7(3): 534. 2007; Genus Type: Rhetinantha acuminata (Lindl.) M.A.Blanco [Maxillaria acuminata Lindl.].

Plants subcespite to long rhizomatous. Pseudobulbs often ridged, covered usually by one or two subtending foliaceous sheaths. Leaves 1-4, at the apex of pseudobulb, linear, uniformly bilobed at the apex, both lobes rounded. Inflorescences as long 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 dehiscens on capsules and not strongly trigonous ovary Blanco et al. (2007) proposed a new generic name *Rethinanthera*. 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.*

### *Rhetinantha flavoviridis* (Barb. Rodr.) Szlach. & Sitko, *comb. nov.*

### *Rhetinantha ochroglossa* (Schltr.) Szlach. & Sitko, *comb. nov.*

### *Rhetinantha polybulbon* (Kraenzl.) Szlach. & Sitko, *comb. nov.*

### *Rhetinantha unguiculata* (Schltr.) Szlach. & Sitko, *comb. nov.*

### *Rhetinantha unguilabia* (Schltr.) Szlach. & Sitko, *comb. nov.*

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

Plants cespitose 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 nomenclatoral 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; **Genus Type**: *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.

Epiphytic or lithophytic plants. Pseudobulbs cespitose 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

*Trigonidium* embraces seven species.

34. **Vazquezella** Szlach. & Sitko, gen. nov.

*Plantae ebulbosae, caulibus foliisque carnosis, caulibus internodis elongatis, foliis distichis, arcauis, 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 subpandurate, 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.


35. **Viracocha** Szlach. & Sitko, gen. nov.

*Pseudobulbi plus minusve latericompresi, unifolia-ti, basi 2-3 folia similibus vaginis cincti; stolo aerius elongatus, vaginis similibus dense obsitus; flores secus noviblastos deinceps editi; sepala petalaque amplitudine formaque subsimilari, pedicellato ovario longiora; columnae pes brevis, crassus, apice anocurvatus; labellum plus minusve sigmoideum, basi saccato, 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.


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


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

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

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

**Xanthoxerampellia** 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_ (L.) – dull red with mixture of brown. An allusion to the basic colour flower in most species.

**Generitype:** *Xanthoxerampellia rufescens* (Lindl.) Szlach. & Śmieszek [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, subten- ded 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 sub- ded basally by 1-2 bracts. Flowers usually widely ope- ned, scented. Sepals and petals subsimilar, rather fleshy. Lip distinctly, very unequally 3-lobed, the middle lobe sub- rectangular, 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 long, 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 uneq- ually 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.*

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

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

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

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

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

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

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

**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. & Śmieszek, *comb. nov.*

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

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

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

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


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


References


