

The genus *Habenaria* (Orchidaceae) in the Brazilian Amazon

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ABSTRACT – (The genus *Habenaria* (Orchidaceae) in the Brazilian Amazon). A survey of *Habenaria* in the Amazon region in northern Brazil was undertaken. Forty species are recognized for the region. The majority of the species occur in savannah vegetation and the vegetation types with the highest number of species are the inland savannahs on terra firme (19 spp.), the savannahs of Roraima (16 spp.) and the coastal savannahs of Pará and Amapá (15 spp.). Only four species grow in forest and three in the Amazonian caatinga. Nine of these species are restricted in Brazil to the Amazon region, four species from forest formations and three from highlands at the border with Venezuela. Only one species, *H. sylvicultrix* Lindl. ex Kraenzl., is possibly endemic to northern Brazil. When compared to other regions, the greatest similarity is found with the “cerrado” of the centralwestern region (28 spp. in common) and the Guianas (26 spp.). Only five species are common with the Atlantic Forest. Five species are recorded for the first time or confirmed in Brazil: *H. avicula* Schltr., *H. dentifera* Schweinf., *H. huberi* Carnevali & Morillo, *H. lehmanniana* Kraenzl. and *H. seticauda* Lindl. New synonyms are proposed and *Habenaria marupaana* Schltr. is included under the synonymy of *H. amambayensis* Schltr., *H. platyactyla* Kraenzl. under *H. schwackei* Barb. Rodr., *H. mitomorpha* Kraenzl. under *H. subfiliformis* Cogn., and *H. pratensis* (Salzm. ex Lindl.) Rehb. f. var. *parviflora* Cogn. under *H. spathulifera* Cogn.

Key words - Amazon, Brazil, *Habenaria*, Orchidaceae

RESUMO – (O gênero *Habenaria* (Orchidaceae) na Amazônia Brasileira). Foi realizado um estudo do gênero *Habenaria* na região da Amazônia brasileira. São registradas 40 espécies para a região. A maioria das espécies ocorre em vegetação de savana e os tipos de vegetação com o maior número de espécies são as savanas interiores de terra firme (19 spp.), as savanas de Roraima (16 spp.) e as savanas do litoral do Pará e Amapá (15 spp.). Apenas quatro espécies são de formações florestais e três das caatingas Amazônicas. Nove espécies são restritas, no Brasil, à região Amazônica incluindo as quatro espécies de formações florestais e três, de áreas altas na região de fronteira com a Venezuela. Apenas uma espécie, *H. sylvicultrix*, é possivelmente endêmica do norte do Brasil. Quando comparada a outras regiões, a maior similaridade é observada com o cerrado da região centro oeste (28 spp. em comum) e as Guianas (26 spp.). Apenas cinco espécies são comuns com a Mata Atlântica. Cinco espécies são registradas pela primeira vez ou confirmadas para o Brasil: *H. avicula* Schltr., *H. dentifera* Schweinf., *H. huberi* Carnevali & Morillo, *H. lehmanniana* Kraenzl. e *H. seticauda* Lindl. Novos sinônimos são propostos e *Habenaria marupaana* Schltr. é incluída sob a sinonímia de *H. amambayensis* Schltr., *H. platyactyla* Kraenzl. sob *H. schwackei* Barb. Rodr., *H. mitomorpha* Kraenzl. sob *H. subfiliformis* Cogn. e *H. pratensis* (Salzm. ex Lindl.) Rehb. f. var. *parviflora* Cogn. sob *H. spathulifera* Cogn.

Palavras-chave - Amazônia, Brasil, *Habenaria*, Orchidaceae

Introduction

Habenaria has a temperate and pantropical distribution and the main centers of diversity are in Brazil, southern and central Africa, and East Asia (Kurzweil & Weber 1992). The genus accounts for about 600 species (Pridgeon *et al.* 2001) of which 165-170 are known from Brazil (Hoehne 1940, Pabst & Dungs 1975). The genus is typical of open grasslands and the main centers of

diversity in Brazil are the *cerrado* (savannah vegetation) and *campos rupestres* (rocky fields) vegetation of the centralwestern and southeastern regions. In the Distrito Federal alone (5,783 km²), located in the central region of the *cerrado* vegetation of central Brazil, there are 77 taxons of *Habenaria* (Batista & Bianchetti 2003).

Until very recently there were no specific works about the Orchidaceae of the Brazilian Amazon, and the knowledge of the Orchids of that region was restricted to the major taxonomic works of the Brazilian Orchidaceae. Cogniaux (1893) in *Flora Brasiliensis* reported six species of *Habenaria* for northern Brazil, Hoehne (1940) in *Flora Brasilica* recorded 20 species and Pabst & Dungs (1975), in *Orchidaceae Brasilenses*, raised that number to 30 *Habenaria* species. In the most recent floristic surveys of the Orchidaceae of the Brazilian Amazon, Silva *et al.* (1995) based on their own collections recorded

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seven *Habenaria* species and Silva & Silva (2004) reported 33 species for the region. However, in the list of Silva & Silva (2004), seven species are now considered synonyms of other species in the same list. In between, several new species were described for the region (Schlechter 1914, 1925a, b, Hoehne 1937, Pabst 1955) and there were a few other reports of *Habenaria* species included in regional surveys such as the Orchidaceae from the states of Amapá (Pabst 1967) and Pará (Ilkiu-Borges & Cardoso 1996), Brazil's highlands at the border with Venezuela at Serra da Neblina (Dunsterville 1972), Serra dos Carajás (Silveira *et al.* 1995), Serra das Andorinhas (Atzingen *et al.* 1996) and the orchids of the IAN Herbarium (Pabst 1955, 1962).

As a contribution to the taxonomy and geographical distribution of the genus *Habenaria* and to the flora of the Brazilian Amazon we present here a survey of the genus *Habenaria* in the Amazon region of Brazil.

Material and methods

The area covered by the present study includes basically the states of northern Brazil (Acre, Amapá, Amazonas, Pará, Rondônia, Roraima) and northern Mato Grosso. Northern Tocantins and western Maranhão are also included, but *Habenaria* collections available from these areas are not significant. Other parts of Mato Grosso, Maranhão and Tocantins belong to legal Amazonia, but were not included in this survey because they are more related to other biomes than to the Amazon forest. Definition of the Amazonian vegetation types follows Pires & Prance (1985).

The survey was based on collections made by the authors and on dried specimens. Species recorded in the literature but not examined were not included. Material from the following herbaria was examined: AMES, CEN, EAC, ESA, HB, HRB, HRCB, IAC, IAN, INPA, MBM, MG, MPU, NY, OXF, R, RB, SP, SPF, and UB. The species were identified by comparing them to the original descriptions and, when available, with the type material. Images of type material from the following herbaria were seen: BM, BR, K, M, NY, P, RENZ, S, U, US and W. The main taxonomic works consulted were Lindley (1830-1840, 1843), Barbosa-Rodrigues (1877, 1882), Kraenzlin (1892), Cogniaux (1893), and Hoehne (1937). In the list of synonyms, only those relevant to the region were included. Illustrations are based primarily on the material from Northern Brazil, and in a few cases, when there were no well conserved flowers for sketches, the material from the "cerrado" of central Brazil was used.

Results and discussion

Floristics – Forty species of *Habenaria* are recorded here for the Amazon region of Brazil. This represents

an addition of about 14 species when compared to previous reports (Hoehne 1940, Pabst & Dungs 1975, Silva & Silva 2004). Among the Orchidaceae, the genus is probably the fourth in number of species in the region, surpassed only by *Catasetum* (57 species), *Pleurothallis s.l.* (46 spp.), *Maxillaria* (44 spp.) and possibly *Epidendrum* (40 spp.). This high number of *Habenaria* species is somehow unexpected as the genus is typical of open grasslands, a type of vegetation which corresponds only to a small part of the Amazonian vegetation. This result is probably due to the floristic importance of the savannah vegetation physiognomies to the Brazilian Amazon flora. Accordingly, the states with the highest number of species are those with the largest extensions of savannah vegetation. An exception is the state of Maranhão, in which large extensions of savannahs are unfortunately poorly collected. The number of *Habenaria* species per state is: 25 for Pará, 16 for Roraima, 10 for Amazonas, nine for northern Mato Grosso, eight for Amapá, four for Rondônia, two for western Maranhão and one for Acre.

Five species are recorded for the first time or confirmed for Brazil: *H. avicula*, *H. dentifera*, *H. huberi*, *H. lehmanniana*, and *H. seticauda*. The first two are forest and Amazonian "caatinga" species from northern Mato Grosso and Amazonas, *H. huberi* is recorded from Rondônia and *H. lehmanniana* and *H. seticauda* from the Serra of Pacaraima in Roraima, at the border with Venezuela.

Sixteen species of *Habenaria* were described from northern Brazil. Of these, five are accepted here (*H. depressifolia*, *H. longipedicellata*, *H. quadrata*, *H. sprucei*, and *H. sylvicultrix*), ten are considered synonyms (*H. amazonica* Schltr., *H. culmiformis* Schltr., *H. denticulata* Pabst, *H. duckeana* Schltr., *H. georgii* Schltr., *H. kuhlmannii* Schltr., *H. leaoana* Schltr., *H. marupaana* Schltr., *H. staminodiata* Schltr., and *H. viridiaurea* Lindl. ex Kraenzl.) and one is an obscure taxon (*H. achroantha* Schltr.). Only *H. sylvicultrix* is possibly restricted to the Brazilian Amazon, but this hypothesis needs further investigation as *H. dusenii* Schltr., a species widespread in central, south and southeastern Brazil, is very similar and probably conspecific.

In terms of sampling there are 4.9 collections per species (196 collections for 40 species) for the region. When compared to some *Habenaria* species-rich regions that have been well sampled, like the Distrito Federal with 11.1 collections per spp., the value for northern Brazil is low, but similar to other regions with an intermediate number of species and that are moderately surveyed, such as the state of Bahia (5.8 collections per spp.). The

species with the highest number of collections are *H. trifida*, with 26 collections, followed by *H. longipedicellata* (14 collections) and *H. spathulifera* (12 collections). The first two species can colonize disturbed and man made habitats, like roadsides and pastures, and this may explain the higher number of collections. Twenty one species (52%) are only known by one to three collections. Comparison with other areas – When compared to the *Habenaria* species composition of other regions, 28 (70%) of the species from the Brazilian Amazon occur in the “cerrado” of the centralwestern region, 26 (65%) occur in the Guianas and 17 (42%) in the Venezuelan Guayana (comparison to the lists of Renz (1992) and Carnevali *et al.* (2003), respectively). The Atlantic forest has only five *Habenaria* species (12.5%) in common with the Amazon, four of which are widespread species that also occur in other Brazilian biomes. None of the *Habenaria* forest species typical of the Atlantic forest, such as *H. josephensis* Barb. Rodr., *H. nemorosa* Barb. Rodr. and *H. umbraticola* Barb. Rodr. occur in the

Amazon region and none of the *Habenaria* forest species from the Amazon region such as *H. alterosula* Snruvenrink & Westra and *H. dentifera* Schweinf. occur in the Atlantic forest. In addition, other forest species with broad distribution such as *H. cryptophylla* Barb. Rodr., *H. distans* Griseb. and *H. glaucophylla* Barb. Rodr. have not been recorded for the Amazon region of Brazil.

Distribution of the species per vegetation type – The majority (32 spp. = 80%) of the *Habenaria* species in northern Brazil occur in savannah vegetations (table 1). The vegetation types with the highest number of species are the inland savannahs on terra firme (19 spp.), the savannahs of Roraima (16 spp.), and the coastal savannahs of Pará and Amapá (15 spp.). Six species are known from the savannahs on rocky soil (“campo rupestre”) and four from the inundated savannah of lower Amazon. One species, *H. roraimensis*, is restricted to the high altitude fields of the mountain range at the borders of Brazil with Venezuela and Guyana.

Table 1. Distribution of the *Habenaria* species per vegetation type. (T.F. = savannahs on “terra firme”; S.R. = savannahs of Roraima; C.S. = coastal savannahs of Pará and Amapá; C.R. = “campo rupestre”; I.S. = inundated savannah of lower Amazonia; For. = “terra firme” forests; Caa. = “caatinga”; Aqu. = aquatic).

	Savannahs					For.	Caa.	Aqu.
	T.F.	S.R.	C.S.	C.R.	I.S.			
<i>H. alterosula</i> Snruvenrink & Westra						x		
<i>H. amambayensis</i> Schltr.	x	x	x					
<i>H. aricaensis</i> Hoehne	x							
<i>H. armata</i> Rchb. f.	x	x						
<i>H. avicula</i> Schltr.							x	
<i>H. ayangannensis</i> Renz								
<i>H. candolleana</i> Cogn.	x			x				
<i>H. dentifera</i> Schweinf.						x	x	
<i>H. depressifolia</i> Hoehne	x		x					
<i>H. glazioviana</i> Kraenzl. ex Cogn.	x			x				
<i>H. goyazensis</i> Cogn.			x					
<i>H. hamata</i> Barb. Rodr.	x		x				x	
<i>H. heptadactyla</i> Rchb. f.	x	x			x			
<i>H. hexaptera</i> Lindl.	x							
<i>H. huberi</i> Carnevali & Morillo	x							
<i>H. aff. josephensis</i> Barb. Rodr.						x		
<i>H. lehmanniana</i> Kraenzl.		x						
<i>H. leprieuri</i> Rchb. f.	x	x	x					
<i>H. longicauda</i> Hook.								x
<i>H. longipedicellata</i> Hoehne	x		x					
<i>H. ludibundiciliata</i> J. A. N. Bat. & Bianch.	x	x	x	x				
<i>H. macilenta</i> (Lindl.) Rchb. f.		x	x					
<i>H. nabucoi</i> Ruschi								x
<i>H. aff. nuda</i> Lindl.				x				

continue

continuation

	Savannahs					For.	Caa.	Aqu.
	T.F.	S.R.	C.S.	C.R.	I.S.			
<i>H. obtusa</i> Lindl.	x		x					
<i>H. orchioalcar</i> Hoehne	x			x				
<i>H. parviflora</i> Lindl.		x						
<i>H. petalodes</i> Lindl.			x					
<i>H. quadrata</i> Lindl.						x		
<i>H. repens</i> Nuttall								x
<i>H. roraimensis</i> Rolfe		x						
<i>H. schwackei</i> Barb. Rodr.		x	x					
<i>H. secundiflora</i> Barb. Rodr.	x	x						
<i>H. seticauda</i> Lindl.		x						
<i>H. spathulifera</i> Cogn.	x	x	x		x			
<i>H. sprucei</i> Cogn.	x	x	x		x			
<i>H. subfiliformis</i> Cogn.		x	x					
<i>H. sylvicultrix</i> Lindl. ex Kraenzl.					x			
<i>H. trifida</i> Kunth	x	x	x					
<i>H. aff. warmingii</i> Rchb. f. & Warm.				x				
Total	19	16	15	6	4	4	3	3

Four species are typically from forest, including both terra firme and inundated forests (“várzeas” and “igapós”). Some additional species, such as *H. petalodes*, *H. longipedicellata* and *H. hexaptera* can occasionally grow at the border or inside forests, but all are more frequent and typical of open vegetation. The proportion of *Habenaria* forest species in the

Amazon (10%) is higher than the proportion of the genus in Brazil, where only 5%-6% of the total number of species are from forests. Only three species (7.5%) are known from the Amazonian caatingas or campinaranas. Lastly, three species are typically aquatic or semi aquatic, growing in water at the margins of streams, lakes and rivers.

Key to the *Habenaria* species from the Brazilian Amazon

1. Leaves basal, orbicular, fleshy, reticulate, adpressed to ground *H. depressifolia*
1. Leaves distributed along the stem, oblong, lanceolate or linear, membranaceous or papery.
 2. Plants aquatic; spur ≥ 10 cm long; stigmas 6-12 mm long, margins involute.
 3. Flowers light green; dorsal sepal 13-17 mm long; lip segments and lateral sepals reflexed in fully opened flowers, forming a right angle with the dorsal sepal; midlobe of rostellum 3.5-4 mm high, completely enclosed between the anthers; spur 13-20(-25) cm long, acuminate, (apex ca. 1 mm wide) *H. longicauda*
 3. Flowers white; dorsal sepal 20-23 mm long; lip segments and lateral sepals not reflexed; midlobe of rostellum 8-9 mm high, partially projected beyond the anthers; spur 10-15 cm long, clavate, thickened towards the apical part (apex 2-4 mm wide) *H. nabucoi*
 2. Plants terrestrial (except *H. repens*), but many from humid places and marshes; spur < 10 cm long (except *H. aricaensis* and *H. hamata*); stigmas 0.5-4 mm long, margins not involute.
 4. Petals and lip yellow or orange; segments of the lip spatulate, 2-5 mm wide (occasionally linear in *H. spathulifera*); midlobe of rostellum conspicuous, projected beyond the anthers.
 5. Pedicellate ovary 1.6-2.5 cm long; flowers bright yellow *H. spathulifera*
 5. Pedicellate ovary 3-5 cm long; flowers light yellow or orange.

6. Flowers light yellow; lip midlobe very broad, roundish, cordate or obreniform, 10-22 mm wide *H. glazioviana*
6. Flowers orange; lip midlobe oblong, ca. 5 mm wide *H. huberi*
4. Petals and lip usually green or white, rarely pure yellow; lateral segments of the lip usually linear, not spatulate (except *H. schwackei*), 0.3-1.5 mm wide; midlobe of rostellum variable in size, enclosed between or project beyond the anthers.
7. Pedicel 1.5-9 cm long, the same size or longer than the ovary; midlobe of rostellum prominent, apex projected beyond the anthers.
8. Spur small, ovoid, scrotiform, 3-3.5 mm long *H. orchioalcar*
8. Spur long, linear to clavate, 2.5-9.5 cm long.
9. Dorsal sepal 10-18 mm long; petals and lip completely white or yellow.
10. Dorsal sepal 10-12 mm long; lateral sepals 2.5-3 mm broad; petals and lip yellow; lip undivided base conspicuous, 3-4 mm long; rostellum midlobe with acute apex *H. macilenta*
10. Dorsal sepal (8-)10-15(-19) mm long; lateral sepals (4-)4.5-6(-7) mm broad; petals and lip white; lip undivided base short, 1-2 mm long; rostellum midlobe with truncate apex *H. trifida*
9. Dorsal sepal 5-7 mm long; petals and lip green-white.
11. Leaves adpressed to the stem; lateral segment of the petal 1.5-2 times as long as the posterior segment *H. sylvicultrix*
11. Leaves spreading from the stem; lateral segment of the petal the same size or slightly longer than the posterior segment.
12. Dorsal sepal 6-7 mm long; lateral segments of the petals and lip about the same size as the posterior petal and midlobe of lip; spur thickened towards the apical part, often curved forwards; apex of midlobe of rostellum broad, truncate *H. lehmanniana*
12. Dorsal sepal 4-6 mm long; lateral segments of the petals and lip usually longer than the posterior petal and midlobe of lip; spur narrowly cylindrical throughout, apex mostly hidden among the bracts; apex of midlobe of rostellum narrow, acute *H. longipedicellata*
7. Pedicel 0.1-1.3 cm long, shorter than the ovary; midlobe of rostellum not prominent, completely enclosed between the anthers.
13. Leaves conspicuous, only the basal part adpressed to the stem, the blade spread, broad, linear, lanceolate or oblong.
14. Petals and lip simple; lateral segments, when present, obscure or short.
15. Plants mainly from savannahs; flowers green-white; dorsal sepal 7-30 x 6-15 mm; spur 2.6-12 cm long.
16. Flower segments elongated; dorsal sepal ca. 3 cm long; petals and lip with a conspicuous basal segment, ca. 4-6 mm long *H. aricaensis*
16. Flower segments not elongated; dorsal sepal 0.7-1.6 cm long; petals and lip simple or with an obscure basal segment, ca. 1 mm long.
17. Bracts not imbricate, not covering the rachis; dorsal sepal 1.2-1.6 cm long; lip 2.5-3.6 cm long; spur sinuous or hook shaped, free, not enclosed between the bracts, 9.5-12 cm long *H. hamata*
17. Bracts imbricate, usually covering the rachis; dorsal sepal 0.7-1.0 mm long; lip 1.0-1.8 cm long; spur straight, usually enclosed between the bracts, 2.6-9.5 cm.
18. Spur (2.6-)3.5-4.5(-5.5) cm long *H. obtusa*
18. Spur 8-9.5 cm long *H. seticauda*

15. Plants mainly from forests or “caatinga” (except *H. hexaptera* and *H. petalodes*); flowers mostly green; dorsal sepal 4.5-11 x 3.5-9 mm; spur 1.0-3.5 cm long.
19. Lateral segment of the petals conspicuous, tooth like, 1/2 the size of the posterior segment, ca. 2 x 1 mm, apex obtuse; posterior segment of the petal with a conspicuous tridentate apex; spur 3-3.5 cm long. *H. dentifera*
19. Lateral segment of the petals absent or little developed, 1/4 to 1/8 the size of the posterior segment, when present with an acute apex; apex of the posterior segment of the petal obtuse, truncate, acute or obscurely tridentate; spur 1-2.5 cm long.
20. Petals oblong-spatulate; apex truncate, 4-7 mm wide *H. petalodes*
20. Petals oblong, linear or falcate, not spatulate; apex acute or, when truncate, 1-1.5 mm wide.
21. Anther canals 2 mm long.
22. Leaves concentrated on the middle of the stem; petals and lip with lateral segments 1-2 mm long; apex of the petal posterior segment acute *H. avicula*
22. Leaves distributed along the stem; petals and lip simple or with an inconspicuous basal segment ca. 0.5 mm long; apex of the petal posterior segment truncate *H. quadrata*
21. Anther canals ca. 1 mm long.
23. Dorsal sepal 7-9 x 5-7 mm, conspicuously apiculate; posterior segment of the petal 6-8 mm long, spur 1-2 mm wide *H. hexaptera*
23. Dorsal sepal 4-4.5 x 3-4 mm, obscurely apiculate; posterior segment of the petal 4 mm long; spur 0.5 mm wide *H. aff. josephensis*
14. Petals bipartite; lip tripartite; lateral segments little shorter, the same size or longer than the posterior petal and midlobe of lip.
24. Lateral segments of the petals and lip slightly shorter, the same size or little longer than the posterior petal segment and midlobe of lip.
25. Plants from inside forest; leaves in rosette at the middle of the stem *H. alterosula*
25. Plants from open areas or, at most in the border of forests; leaves basal or distributed along the stem.
26. Dorsal sepal 3-4.5 mm long; spur 0.6-1.0 cm long.
27. Plants aquatic; dorsal sepal 3-4.5 mm long; lateral sepals 2-3 mm wide; lateral segments of the petals and lip little longer than the petal posterior segment and lip midlobe *H. repens*
27. Plants from water saturate areas, but not aquatic; dorsal sepal 3-3.5 mm long; lateral sepals 1-1.5 mm wide; lateral segments of the petals and lip shorter than the petal posterior segment and lip midlobe *H. parviflora*
26. Dorsal sepal 6-7 mm long; spur 3.5-4.5 cm long.
28. Leaves concentrated in the stem base; inflorescence lax, 2-4-flowered; sepals green, petals and lip white; lateral segments of the petals and lip shorter than the petal posterior segment and lip midlobe; spur little longer than the pedicellate ovary *H. candolleana*
28. Leaves spread along the stem; inflorescence congest, 6-30-flowered; flowers mostly green; lateral segments of the petals and lip little longer than the petal posterior segment and lip midlobe; spur twice as long as the pedicellate ovary *H. goyazensis*

24. Lateral segments of the petals and lip 1.5-2 times longer than the posterior petal segment and midlobe of lip.
29. Plants 15-30 cm tall; larger leaves usually concentrated in the stem base; dorsal sepal 4-5 mm long; lateral segment of the petal ca. 8 mm long; spur ca. 6 mm long *H. armata*
29. Plants 24-90 cm tall; larger leaves distributed along the stem; dorsal sepal 6-13 mm long, lateral segment of the petal ca. 13-25 mm long; spur 14-22 mm long.
30. Dorsal sepal 6-7 x 5 mm, petal lateral segment ca. 13 mm long, spur ca. 14 mm long *H. amambayensis*
30. Dorsal sepal 11-13 x 6-7 mm, petal lateral segment 22-25 mm long, spur 20-22 mm long *H. aff. warmingii*
13. Leaves usually inconspicuous, mostly adpressed to the stem, linear or filiform, frequently grasslike (except *H. aff. nuda*), narrow.
31. Dorsal sepal 3-4 mm long; midlobe of lip 2-4(-6) mm long.
32. Flowers usually bright yellow, rarely green; inflorescence congest, densely-flowered *H. heptadactyla*
32. Flowers green; inflorescence lax, loosely-flowered.
33. Lateral sepals conspicuously aristate; lateral segments of the petals and lip usually ciliate *H. ludibundiciliata*
33. Lateral sepals not or obscurely aristate; lateral segments of the petals and lip never ciliate.
34. Bracts shorter than the pedicellate ovary; flowers spreading from the rachis *H. ayangannensis*
34. Bracts equaling or exceeding the pedicellate ovary; flowers not spread, main axis parallel to the rachis.
35. Lateral sepals linear to narrowly lanceolate; lip midlobe 1 mm wide; spur 8-12 mm long *H. leprieuri*
35. Lateral sepals lanceolate-ovate to broadly lanceolate; lip midlobe 0.5 mm wide; spur 5-6.5 mm long *H. subfiliformis*
31. Dorsal sepal 4-11 mm long; midlobe of lip (4-)5-12 mm long.
36. Pedicel 5-9 mm long; sepals green; petals and lip white *H. schwackei*
36. Pedicel 1-2 mm long; sepals, petals and lip green or greenish-yellow.
37. Petal lateral segment from a reduced tooth like projection to ca. $\frac{3}{4}$ the size of the posterior segment, 1-5 mm long *H. roraimensis*
37. Petal lateral segment 6-11 mm long.
38. Dorsal sepal lanceolate to broadly lanceolate, 5-6 x 3-4 mm; petals entire for about 2 mm from the base and then divided above. *H. secundiflora*
38. Dorsal sepal orbicular to roundish, 6-9 x 5.5-8 mm; petals divided near the base.
39. Leaves linear, not grasslike, 4-8 mm wide; dorsal sepal 7-9 x 6.5-8 mm; petal posterior segment connivent with the dorsal sepal; lip lateral segments slightly longer and narrower than the midlobe *H. aff. nuda*
39. Leaves filiform, grasslike, 3-4 mm wide; dorsal sepal ca. 6 x 5.5 mm; petal posterior segment spreading, not connivent with the dorsal sepal; lip lateral segments and midlobe of approximately the same length and width *H. sprucei*

1. *Habenaria alterosula* Snouvenrink & Westra, Acta. Bot. Neerl. 30(3):235. 1981. Type: SURINAME. Lelygebergte, 29-V-1976, M. & P. Teunissen 1635 (Holotype BBS).

Figure 1A-D

Specimens examined: BRAZIL. PARÁ: Monte Alegre, 17-VII-1981, J. Jangoux & B.G.S. Ribeiro 1451 (MG).

Distribution: Brazil (PA), French Guiana and Surinam.

Illustrations: Snouvenrink & Westra (1983, Figure 2), Werkhoven (1986, p.141).

This species is similar and apparently closely related to *H. avicula*. The main difference is in the length of the lateral segments of the lip (about 5 mm in *H. alterosula* vs. 1-2 mm in *H. avicula*). The flower depicted in Lindley's original drawings of *H. abortiens* Lindl., a poorly known species described previously from Peru, is remarkably similar to *H. alterosula* and it is possible that the two species may be conspecific. In the only collection of *H. alterosula* known from Brazil the species was collected in a terra firme forest. Flowers are recorded as green.

2. *Habenaria amambayensis* Schltr., Repert. Spec. Nov. Regni Veg. 16: 353. 1920. Type: PARAGUAY. Sierra de Amambay, II-1913, E. Hassler 10969 (Isotypes BM, MPU, NY, S; drawing and fragment of the isotype RENZ).

= *Habenaria marupaana* Schltr., Bot. Centralbl. Beih. 42(2):73. 1925. Type: BRAZIL. Rio Branco, Serra do Marupá, I-1913, J.G. Kuhlmann 776 (Holotype B, destroyed; Isotypes AMES, RB, SP) *syn. nov.*

Figure 1E-F

Selected specimens examined: BRAZIL. AMAPÁ: Macapá, 9-VI-1981, J.B. Rabelo 1286 (MG); PARÁ: Ilha de Marajó, 1877, Jobert 122 (R); RONDÔNIA: Alta Floresta, 11-VII-1997, L.C.B. Lobato *et al.* 1727 (MG); RORAIMA: Boa Vista, 12-X-1991, J.B.F. da Silva 247 (MG), Pacaraima village, 18-VI-1999, J.B.F. da Silva 828 (MG), Amajari, 8-X-2005, J.A.N. Batista 1592 (BHCB).

Distribution: Brazil (AP, MS, MT, PA, RO, RR), French Guiana, Guyana and Paraguay.

Illustrations: Mansfeld (1930, Tafel 1, Figure 1; Tafel 4, Figure 15), Silva & Silva (2004, p.250 as *H. schomburgkii*).

This species is similar to *H. repens* but differs by the size of the flowers and length of the lateral segments of the petals and lip (about 12-15 mm in *H. amambayensis* vs. ca. 4-7 mm in *H. repens*). In the type material and original description of *H. marupaana*, plants and inflorescences are shorter and the lateral segments of

the petals and lip less developed than in *H. amambayensis*. However, these characters are somewhat variable in *H. amambayensis* and the two species agree well in all of the other details of flower morphology. *Habenaria amambayensis* is also similar to *H. schomburgkii* and the exact distinction between the two species is not completely clear. The flowers of *H. amambayensis* are completely green and the species is typical of marshes and permanently humid places, usually with water over the soil.

3. *Habenaria aricaensis* Hoehne, Comm. Linhas Teleg. Estrateg. Matto Grosso Anexo 5, Bot. 5: 30, t.84. 1915. Type: BRAZIL. MATO GROSSO: Cuyabá, III-1911, F.C. Hoehne 4092 (Holotype R).

Figure 1G-H

Selected specimens examined: BRAZIL. RONDÔNIA: Rio Guaporé, 15-VI-1952, G.A. Black & E. Cordeiro 52-15016 (IAN); TOCANTINS: Araguaçu, 16-II-1997, J.A.N. Batista *et al.* 682 (CEN).

Distribution: Brazil (MT, RO, TO).

Illustration: Pabst & Dungs (1975, Figure 7).

This species is similar to *H. hamata* but distinct by the short lateral segments of the petals and lip (ca. 4-6 mm long in *H. aricaensis* vs. absent or at most obscure in *H. hamata*) and the completely white flowers (vs. a green lip and green and white sepals). *Habenaria aricaensis* is an uncommon species, restricted to the Brazilian "Pantanal" and the northern part of the "cerrado" biome, where it borders and occasionally enters the southwestern part of the Amazon region. The species grows in water or in very humid places.

4. *Habenaria armata* Rchb. f., Bonplandia. 2(2):10. 1854. Type: VENEZUELA. CARACAS: Wagener *s.n.* (Holotype W; photocopy, drawing and fragment of the holotype RENZ).

Figure 1I

Specimens examined: BRAZIL. PARÁ: Paru do Oeste River, 16-III-1962, D.C. Fittkau *s.n.* (INPA12768); RORAIMA: Boa Vista, 19-VI-1999, J.B.F. da Silva 846 (MG). VENEZUELA. BOLÍVAR: Gran Sabana, Mount Roraima, 22-VIII-1997, R.S. Oliveira 236 (CEN).

Distribution: Brazil (DF, GO, MG, PA, PR, RR, SP), Colombia, Guyana, Surinam and Venezuela.

Illustrations: Foldats (1969, Figure 15), Dunsterville & Garay (1979, Figure 337), Snouvenrink & Westra (1983, Figure 6) all as *H. entomantha*.

This species is similar in flower morphology to *H. amambayensis* and *H. aff. warmingii*, characterized by

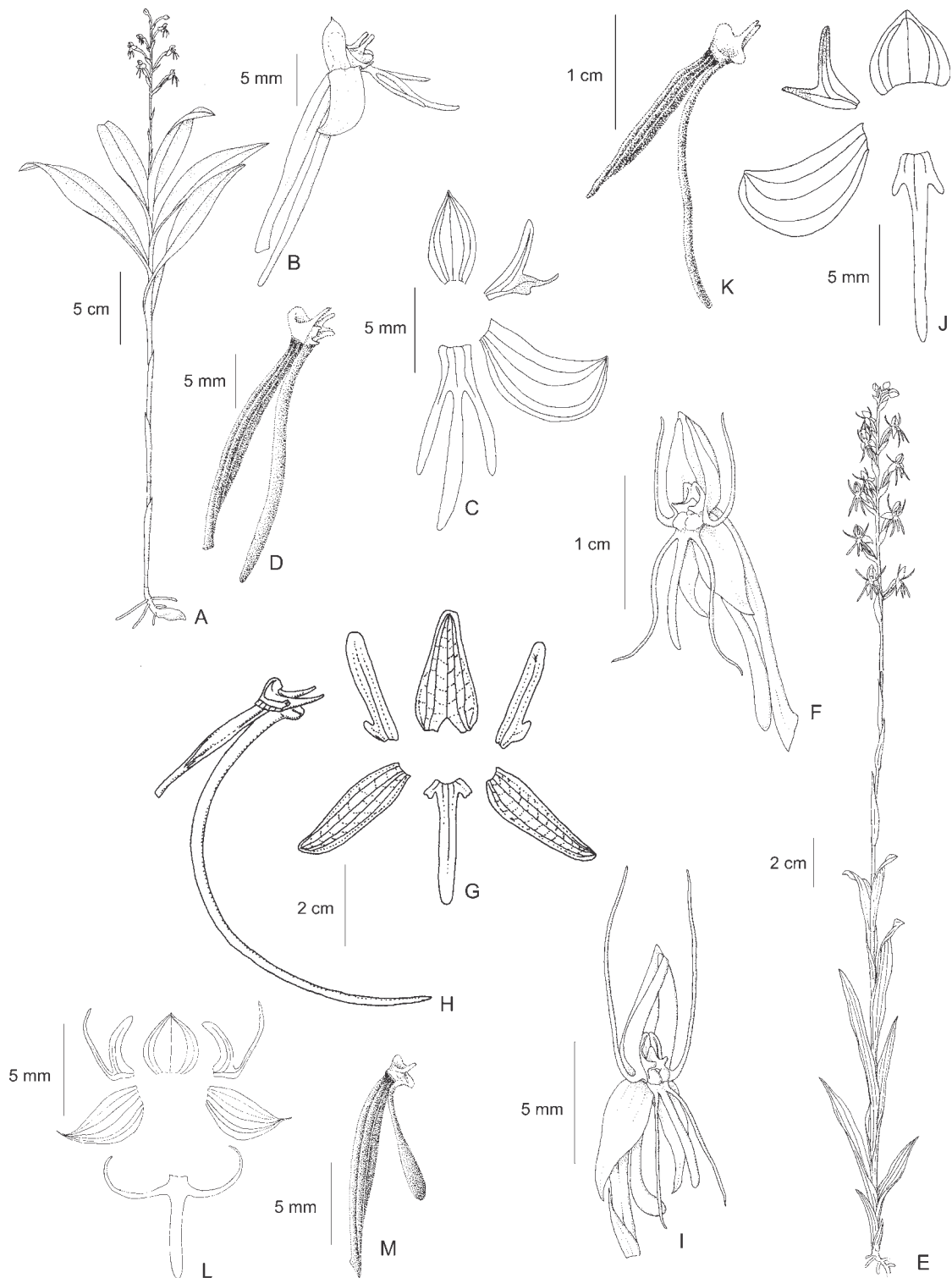


Figure 1. A-D. *Habenaria alterosula* Snuevink & Westra. A. Habit. B. Flower. C. Perianth. D. Ovary, column and spur. E-F. *Habenaria amambayensis* Schltr. E. Habit. F. Flower. G-H. *H. aricaensis* Hoehne. G. Perianth. H. Ovary, column and spur. I. *Habenaria armata* Rchb. f., flower. J-K. *Habenaria avicula* Schltr. J. Perianth. K. Ovary, column and spur. L-M. *Habenaria ayangannensis* Renz. L. Perianth. M. Ovary, column and spur. (A-D. Jangoux & Ribeiro 1451 (MG); E-F. J.B.F. da Silva 828 (MG); G-H. Batista et al. 682 (CEN); I. J.B.F. da Silva 846 (MG); J-K. Prance et al. 15907 (HB); L-M. Batista 1594 (BHCB)). All figures drawn from dried material.

the lateral segments of the petals and lip, which are distinctly longer than the corresponding petal posterior segment and lip midlobe. However, *H. armata* is distinct by smaller plants (about 15-30 cm tall in *H. armata* vs. 24-76 cm tall in *H. amambayensis* and around 90 cm tall in *H. aff. warmingii*), the larger leaves concentrated on the lower part of the stem (vs. the larger leaves concentrated in the middle of the stem in *H. amambayensis* and *H. aff. warmingii*) and smaller flowers (dorsal sepal about 4-5 x 3 mm vs. 6-7 x 5 mm in *H. amambayensis* and 11-13 x 6-7 mm in *H. aff. warmingii*). Flowers are completely green and the species is typical of dry or at most seasonally humid places.

5. *Habenaria avicula* Schltr., Repert. Spec. Nov. Regni Veg. 17: 138. 1921. Type: PANAMA. XII-1900, *W. Joseph s.n.* (Holotype B, destroyed; no isotype located) *n.v.*

Figure 1J-K

Specimens examined: BRAZIL. AMAZONAS: basin of Rio Negro, Camanaus, 31-X-1971, *G.T. Prance et al. 15907* (HB, INPA, NY).

Distribution: Brazil (AM), Colombia, Panama, Peru and Venezuela.

This species is similar to *H. leptoceras* Hook., found in the Atlantic forest and “restingas” in the states of Rio de Janeiro, Espírito Santo and Bahia in southeastern Brazil. However, in *H. avicula*, similarly to *H. alterosula*, the leaves are concentrated on the middle or upper part of the stem and the lateral segments of the lip range from about 1 mm long to almost absent. In *H. leptoceras* the leaves are better distributed along the stem or concentrated on the lower part, and the lateral segments of the lip are (2-)3-4 mm long. The only collection of *H. avicula* known from Brazil was collected in a “caatinga” on white sand, a vegetation similar to the coast sandy “restingas”, where *H. leptoceras* is typically found. Flowers are recorded as green and white.

6. *Habenaria ayangannensis* Renz, Candollea 47(2): 490, figure 1. 1992. Type: GUYANA. Ayanganna Plateau, Chinowieng village, 21-VII-1960, *S.S. Tillett, C.L. Tillett & R. Boyan 44892* (Holotype NY, mixed with *H. leprieuri*; photocopy, drawing and fragment of the holotype RENZ).

Figure 1L-M

Specimens examined: VENEZUELA. BOLÍVAR: Gran Sabana, Santa Elena de Uairén, 9-X-2005, *J.A.N. Batista 1594* (BHCB).

Distribution: Brazil (DF, GO, MG), Guyana and Venezuela.

Illustration: Foldats (1969, Figure 20, as *H. mesodactyla*).

There is no known material of this species from northern Brazil, however it occurs in Venezuela, where it was collected a few meters from the Brazilian border and reaches the central region of the “cerrado” biome, where it is common in some localities. Thus, it is likely that the species occurs and will eventually be found in northern Brazil, at least in the state of Roraima. Distinctive features of this species are the linear-setaceous leaves, the small flowers (dorsal sepal ca. 3 x 2.5 mm), the ovary which spreads from the rachis and the bracts usually shorter than half the length of the pedicellate ovary, even in the lower flowers in the inflorescence. Flowers are mainly green and the species is typical of humid places. Flowering time in central Brazil as well as in Venezuela occurs at the end of the rainy season.

7. *Habenaria candolleana* Cogn. in Mart., Fl. Bras. 3(4): 73. 1893. Type: BRAZIL. GOYAZ: near Natividade, II-1840, *G. Gardner 3991* (Isotypes BM, K, NY, OXF, P).

Figure 2A-C

Specimens examined: BRAZIL. MATO GROSSO: Luciara, 19-III-1997, *V.C. Souza et al. 14539* (ESA); PARÁ: Serra do Cachimbo, 17-XII-1956, *J.M. Pires et al. 6392* (IAN, NY, RENZ).

Distribution: Brazil (DF, GO, MT, PA, TO).

This species is typical of the northern part of the “cerrado” biome, but occasionally enters the savannahs on rocky soil of the Amazon region. In flower morphology it is similar to *H. goyazensis*, but *H. candolleana* is distinguished by the leaves that are concentrated on the stem base (vs. spread along the stem), the lax inflorescence with 2-4 flowers (vs. 6-30 in *H. goyazensis*), the green sepals and white petals and lip (vs. green petals and lip), and the spur which is as long or a little longer than the pedicellate ovary (vs. about twice the length of the pedicellate ovary in *H. goyazensis*). The species occurs in seasonally humid places.

8. *Habenaria dentifera* Schweinf., Bot. Mus. Leaf. Harvard Univ. 9(3):46, figures 5-6. 1941. Type: PERU. JUNIN, VI-1929, *E.P. Killip & A.C. Smith 23841* (Holotype F, *n.v.*; Isotypes AMES, NY, US; photocopy and drawing of the isotype RENZ).

Figure 2D-F

Specimens examined: BRAZIL. AMAZONAS: Taracua, upper Rio Negro, 12-VI-1962, *J.M. Pires & N.T. Silva 8058* (IAN); MATO GROSSO: Juina, 19-IV-1985, *J.A.F. da Costa 702* (R).

Distribution: Brazil (AM, MT), Ecuador and Peru.

Illustration: Pabst & Dungs (1975, Figure 90, as *H. strictissima* var. *odontopetala*).

This is an uncommon species in Brazil known just from the two collections mentioned above. The specimen in the collection *Pires & Silva 8058* was identified by Pabst (1962) as *H. odontopetala* Rchb. f. However, although the two species are similar, the flowers of *H. dentifera* have a prominent anterior petal (ca. 2 mm long) about half the length of the posterior petal (vs. reduced to a denticulate projection ca. 1 mm long and about 1/5 the length of the posterior petal in *H. odontopetala*). The species occurs in forests or “caatinga” and the flowers are recorded as green.

9. *Habenaria depressifolia* Hoehne, Bot. Jahrb. Syst. 68: 136, Tafel 23. 1937. Type: BRAZIL. AMAPÁ: Macapá, 24-IV-1924, *J.G. Kuhlmann 2072* (Holotype RB; Isotypes AMES, SP).

Figure 2G-H

Specimens examined: BRAZIL. AMAPÁ: Macapá, 16-IV-1982, *N.A. Rosa et al. 4235* (CEN, HRB, INPA, MG, NY); PARÁ: Ourém, 1-V-1994, *J.B.F. da Silva 303* (MG), Maracanã, 6-IV-1980, *G. Davidse et al. 17951* (NY).

Distribution: Brazil (AP, DF, GO, PA).

Among the *Habenaria* species from the Amazon region, *H. depressifolia* is very distinctive by the orbicular, fleshy, reticulate leaves that are addressed to ground. Among other Brazilian species it is similar to *H. schenckii* Cogn., but the two species differ in the development of the leaf (the larger leaf is about 2-3 x 2-3.5 cm in *H. depressifolia* vs. 3.5-5 x 4.5-7 cm in *H. schenckii*) and size of the flowers (dorsal sepal 3.5-5 x 3-4 mm and anterior petal 4-6 mm long in *H. depressifolia* vs. 6-7 x 3.5-4 mm and about 7-9 mm long, respectively, in *H. schenckii*). Flowers are completely green and the species grows in permanently dry, rocky places as well as in seasonally humid fields.

10. *Habenaria glazioviana* Kraenzl. ex Cogn. in Mart., Fl. Bras. 3(4):84. 1893. Type: BRAZIL. MINAS GERAIS: Serra do Caraça, *A.F.M. Glaziou 14295* (Holotype BR; Isotype P).

Figure 2I-J

Specimens examined: BRAZIL. AMAZONAS: Manicoré, 15-IV-1985, *C.A. Cid Ferreira 5575* (HRCB, NY, UB); PARÁ: Conceição do Araguaia, 24-II-1980, *T. Plowman et al. 9095* (MG, NY, RENZ), São Geraldo do Araguaia, 23-IV-2004, *G. Pereira-Silva et al. 9035* (CEN), Ourilândia do Norte, 26-II-1999, *M.R. Cordeiro*

2871 (IAN); RONDÔNIA: road Porto Velho-Cuiabá, 9-II-1983, *L.O.A. Teixeira et al. 1392* (INPA, MG).

Distribution: Brazil (AM, BA, GO, MG, MS, MT, PA, PB, PE, RO, SP, TO).

Illustration: Silva & Silva (2004, p.253).

This species is very similar and undoubtedly close related to *H. pratensis* (Salzm. ex Lindl.) Rchb. f. The main difference is the width of the midlobe of lip and petal posterior segment, which are very broad and expanded in *H. glazioviana* and narrower in *H. pratensis* (midlobe of lip 9-22 mm wide vs. ca. 2-5 mm wide in *H. pratensis*). In the coast restingas of northeastern Brazil the two species can occur side by side and the existence of intermediate forms makes identification difficult. Further studies are still necessary to determine the exact relation between the two taxa. Flowers are pale yellow and the species is usually found in seasonally humid places.

11. *Habenaria goyazensis* Cogn. in Mart., Fl. Bras. 3(4):77. 1893. Type: BRAZIL. GOIÁS: near Conceição, II-1840, *G. Gardner 3995* (Isotypes BM, K, OXF; photocopy, drawing and fragment of isotype RENZ).

Figure 2K-L

Specimens examined: BRAZIL. PARÁ: Marajó, 1877-1878, *Jobert 141* (P, RENZ); TOCANTINS: Araguaçu, 16-II-1997, *J.A.N. Batista et al. 683* (CEN). GUYANA. VIII-1948, *G. Wilson-Browne 2* (K, RENZ, image seen).

Distribution: Brazil (GO, MG, MT, PA, PE, SE, TO) and Guyana.

This is an uncommon species. In Northern Brazil it is known only by a 127 years old collection by Jobert from the island of Marajó. In the “cerrado” the species grows in seasonally humid places. Flowers are mainly green, with the base of the petals and lip white. The name *H. goyazensis* was mistakenly applied by Hoehne (1940) and Pabst (Pabst & Dungs 1975) to the species now known as *H. longipedicellata* (northern Brazil) and *H. tamanduensis* Schltr. (centralwest and southeastern Brazil). However, *H. goyazensis* has a short pedicel (ca. 5-6 mm long) and a spur about twice the size of the pedicellate ovary, while *H. longipedicellata* and *H. tamanduensis* have markedly long pedicels (15-30 mm long) and the spur and pedicellate ovary are about the same length.

12. *Habenaria hamata* Barb. Rodr., Gen. Sp. Orchid. 1: 162. 1877. Type: BRAZIL. SÃO PAULO: Retiro da Lagem, III-1857, *A.F. Regnell III-1158* (Isotypes S, SP).

Figure 3A-D

Selected specimens examined: BRAZIL. AMAPÁ: Macapá, 21-V-1944, *A.M. Bastos s.n.* (HB2159,

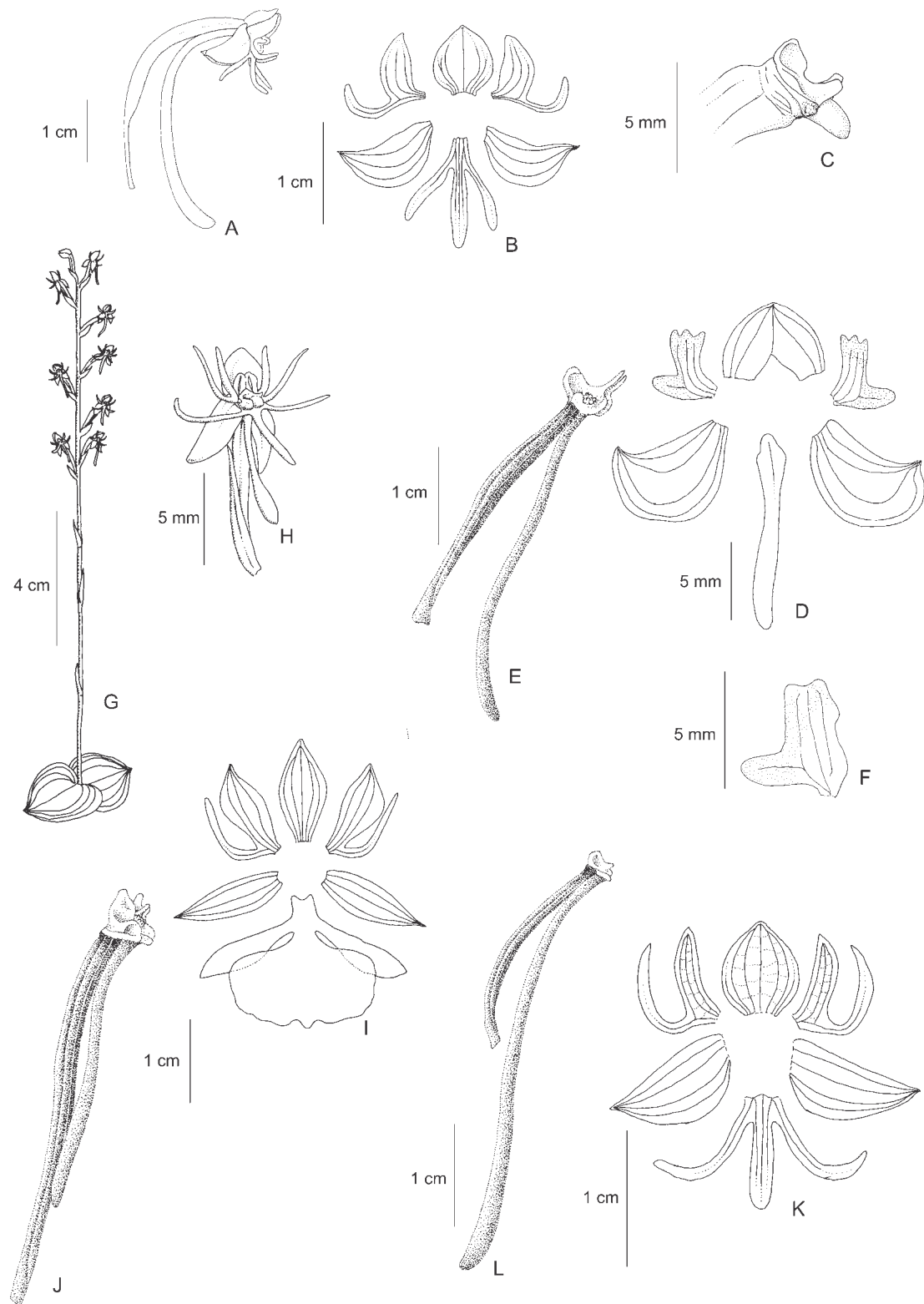


Figure 2. A-C. *Habenaria candolleana* Cogn. A. Flower. B. Perianth. C. Column, side view. D-F. *Habenaria dentifera* Schweinf. D. Perianth. E. Ovary, column and spur. F. Petal. G-H. *Habenaria depressifolia* Hoehne. G. Habit. H. Flower. I-J. *Habenaria glazioviana* Kraenzl. ex Cogn. I. Perianth. J. ovary, column and spur. K-L. *Habenaria goyazensis* Cogn. K. Perianth. L. Ovary, column and spur. (A-C. Pires *et al.* 6392 (IAN); D-E. J.A.F. da Costa 702 (R); F. Pires & Silva 8058 (IAN); G-H. Rosa *et al.* 4235 (MG); I-J. Cordeiro 2871 (IAN); K-L. Batista *et al.* 683 (CEN)). All figures drawn from dried material.

RB58418), Tartarugalzinho, 23-V-2001, *L.A. Pereira et al.* 467 (MG); PARÁ: Oriximiná, 30-V-2004, *J.B.F. da Silva 1381* (IAN). FRENCH GUIANA. 9-VI-1989, *G. Cremers & M. Hoff 10717* (RENZ, image seen).

Distribution: Brazil (AP, BA, DF, GO, MG, PA, PB, PE, PI, SP, TO) and French Guiana.

This species is similar and undoubtedly closely related to *H. obtusa* and *H. seticauda*, but distinct by the not imbricate bracts (vs. imbricate and covering most of the rachis in *H. obtusa* and *H. seticauda*), usually larger flowers (midlobe of lip 25-36 mm long in *H. hamata* vs. 10-18 mm long in *H. obtusa* and *H. seticauda*), which spread from the stem, and the spur which is free from the bracts and hook shaped or sinuous (vs. usually completely enclosed between the bracts and straight in *H. obtusa* and *H. seticauda*). Sepals are green and white, the petals mainly white and the lip green. The species occurs in humid as well as in dry places.

13. *Habenaria heptadactyla* Rchb. f., *Linnaea* 22: 812. 1849. Syntypes: VENEZUELA. s.d., *Humboldt & Bonpland* (not located, *n.v.*), Monagas, Caripe, s.d., *Moritz 615* (Syntype BM; photocopy and drawing of the syntype RENZ). GUYANA. s.d., *R. Schomburgk s.n.* (Syntype W; Syntype photocopy RENZ).

Figure 3E-F

Selected specimens examined: BRAZIL. AMAZONAS: Rio Negro, Barra, X-1850–III-1851, *R. Spruce s.n.* (AMES, BM32707, RENZ, MG19354, P, W), Campo de Januári, s.d., *R. Spruce 1222* (K), Humaitá, 23-XII-1979, *A. Janssen & I. Gemtchujnicov 62* (INPA); MATO GROSSO: crossroad of highways Cuiabá-Santarém and Porto Velho, 4-II-1979, *M.G. Silva & A. Pinheiro 4434* (INPA, MG); RORAIMA: Boa Vista, Rio Branco, VIII-1913, *J.G. Kuhlmann 786* (AMES, RB, SP), Igarapé Caraná, 20-VIII-1951, *G.A. Black 51-12774* (IAN).

Distribution: Bolivia, Brazil (AM, DF, GO, MS, MT, RR, TO), Colombia, Guyana, Panama, Surinam, Trinidad and Tobago, and Venezuela.

Illustrations: Pabst & Dungs (1975, Figure 124), Dunsterville & Garay (1979, Figure 339), Snuverink & Westra (1983, Figure 8), Kenny (1998, p.17 as *H. leprieuri*, p.18 as *H. leprieuri* var. *heptadactyla*), Silva & Silva (2004, p.250 as *H. leprieuri*), Carnevali *et al.* (2003, p.384, Figure 351).

This species is similar and apparently closely related to *H. leprieuri* and *H. schwackei*, but distinct by the congest inflorescence with many bright yellow flowers. *Habenaria leprieuri* has a lax inflorescence and completely green flowers, and *H. schwackei* has a longer

pedicel (about 8-9 mm long vs. 2-3 mm long in *H. heptadactyla*), slightly larger flowers (dorsal sepal 4-5.5 x 3.5-4 mm in *H. schwackei* vs. 3-3.5 x 2-3 mm in *H. heptadactyla*) with white petals and lip. *Habenaria heptadactyla* grows mainly in seasonally humid places, but can also be found in rocky soil in drier areas.

14. *Habenaria hexaptera* Lindl., *Gen. Sp. Orchid. Pl.*: 316. 1835. Type: BRAZIL. MINAS GERAIS: s.d., *C.F.P. Martius s.n.* (Holotype M; drawings of type by Lindley K).

Figure 3G

Selected specimens examined: BRAZIL. PARÁ: Alto Tapajós, Rio Cururu, village Prata, 11-II-1974, *W.R. Anderson 10755* (HB, IAN).

Distribution: Bolivia, Brazil (BA, CE, DF, ES, GO, MA, MG, MT, PA, PE, RJ, SP, TO), Colombia, Peru, and Venezuela.

This species is very similar to *H. alata* Hook., known from northern South America and Central America, and a detailed investigation is still necessary to determine the exact relation between them. The only records of *H. hexaptera* in Northern Brazil are from the “cerrados” over white sand of the Alto Tapajós. Flowers are completely green and the species is typical of dry places.

15. *Habenaria huberi* Carnevali & Morillo, *Ernstia* 19: 6. 1983. Type: VENEZUELA. AMAZONAS: Atures, *Huber 4542* (Holotype VEN) *n.v.*

Figure 3H-I

Specimens examined: BRAZIL. RONDÔNIA: Presidente Médici, 11-III-1986, *N.A. Rosa et al.* 4932 (MG).

Distribution: Brazil (RO) and Venezuela.

Illustration: Carnevali *et al.* (2003, p.384, Figure 350).

This is the first record of *H. huberi* for Brazil. *Habenaria huberi* is similar and close related to *H. pratensis*, but apparently distinct by the color of the flowers (orange vs. pale yellow in *H. pratensis*) and the lateral segments of the lip (distinctly spatulate vs. linear or discreetly spatulate in *H. pratensis*). *Habenaria huberi* differs from *H. spathullifera* by the color of the flowers (orange vs. bright yellow) and size of pedicellate ovary (3-3.7 cm long vs. 1.6-2.5 cm long in *H. spathullifera*), and from *H. glazioviana* by the color of the flowers (orange vs. pale yellow) and narrower segments of the posterior petal and lip (midlobe of lip about 5 mm wide vs. 9-22 mm wide in *H. glazioviana*).

16. *Habenaria* aff. *josephensis* Barb. Rodr., *Gen. Sp. Orchid.* 2: 257. 1882. Type: BRAZIL. MINAS GERAIS: Serra de S. José d’El Rey, s.d., *Barbosa-Rodrigues s.n.*

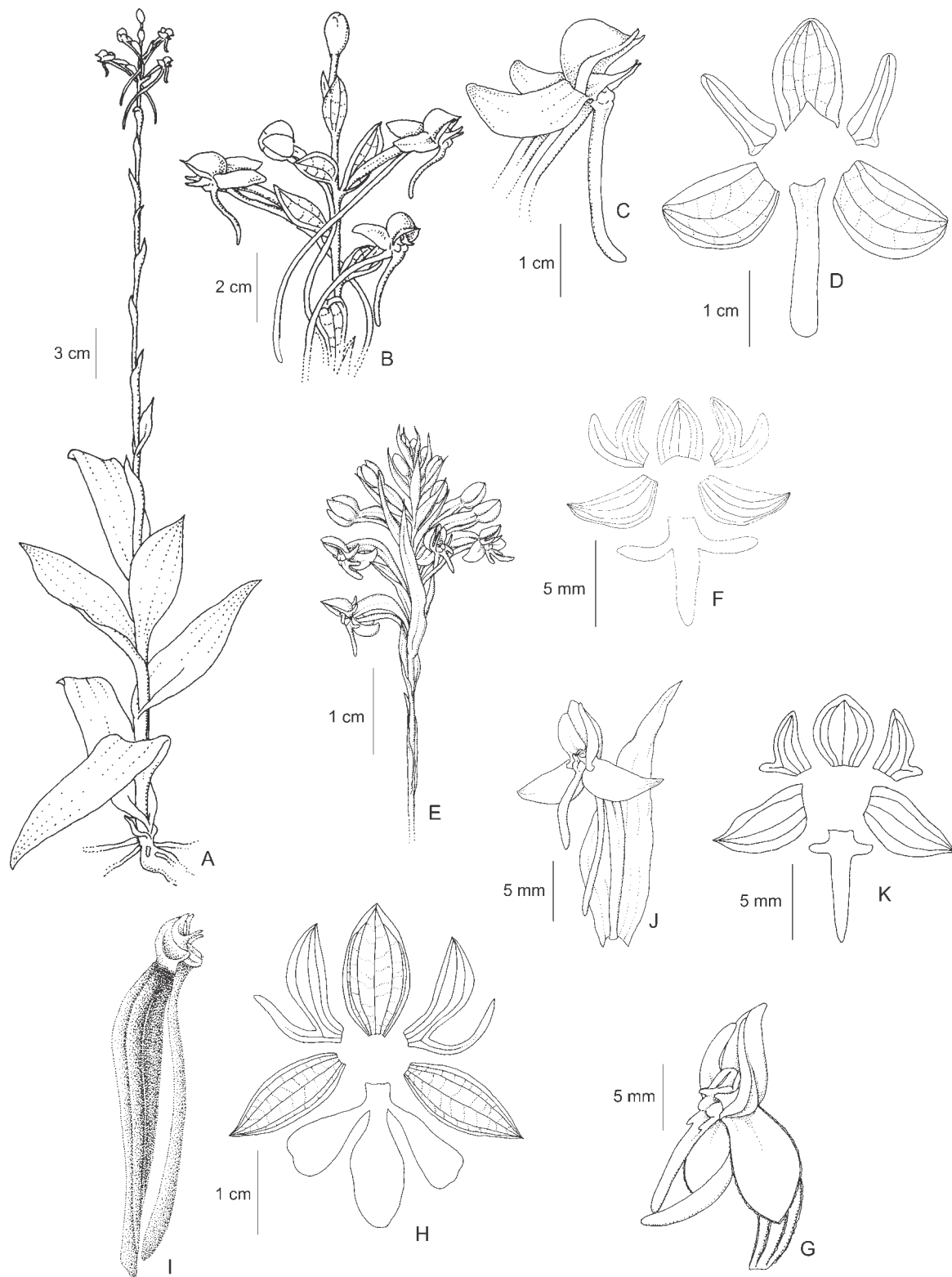


Figure 3. A-D. *Habenaria hamata* Barb. Rodr. A. Habit. B. Inflorescence. C. Flower. D. Perianth. E-F. *Habenaria heptadactyla* Rchb. f. E. Inflorescence. F. Perianth. G. *Habenaria hexaptera* Lindl., flower. H-I. *Habenaria huberi* Carnevali & Morillo. H. Perianth. I. Ovary, column and spur. J-K. *Habenaria* aff. *josephensis* Barb. Rodr. J. Flower. K. Perianth. (A-D. *J.B.F. Silva* 1381 (IAN); E-F. *Silva & Pinheiro* 4434 (MG); G. *Anderson* 10755 (IAN); H-I. *Rosa et al.* 4932 (MG); J. *Pinheiro & Carvalho* 421 (IAN); K. *Coelho et al.* 1744 (INPA)). All figures drawn from dried material.

(Holotype unknown, presumably lost. Original illustration by Barbosa-Rodrigues in *Iconographie des Orchidées du Brésil*, v.1, t.19 RB, copy K. Reproduced in Sprunger 1996. v.1: 72).

Figure 3J-K

Specimens examined: BRAZIL. ACRE: Rio Branco, 13-V-1980, *L. Coelho et al. 1744* (INPA); PARÁ: Estreito-Marabá, 8-IV-1974, *G.S. Pinheiro & J.F.V. Carvalho 421* (IAN).

The exact identity of this taxon is unclear. It is similar to *H. josephensis*, known from the "Mata Atlântica" in the southern, southeastern and northeastern regions of Brazil, but distinct by the larger leaves concentrated in the middle of the stem (vs. the larger leaves concentrated on the lower part of the stem in *H. josephensis*) and shorter anterior petal segment (1 mm long vs. 1.5-2.5 mm long in *H. josephensis*) with a truncate or obtuse apex (vs. acute in *H. josephensis*).

17. *Habenaria lehmanniana* Kraenzl., Bot. Jahrb. Syst. 16: 97. 1892. Type: COLOMBIA. CAUCA: 1750 m, 26-II-1884, *F.C. Lehmann 3689* (Holotype G, n.v.; Holotype photocopy RENZ).

Figure 4A-D

Specimen examined: BRAZIL. RORAIMA: Pacaraima village, 18-VI-1999, *J.B.F. da Silva 827* (MG).

Distribution: Brazil (RR), Colombia and Venezuela.

Illustrations: Silva & Silva (2004, p.253 as *H. repens*, p.255 as *H. amazonica*).

This species is remarkably similar to *H. longipedicellata*. One of the most significant differences is the apex of rostellum midlobe, which is projected beyond the anthers in both species, but is broad and truncate in *H. lehmanianna* and narrow and acute in *H. longipedicellata*. The development of the vegetative parts and number of flowers is variable in both species. *Habenaria lehmanianna* is concentrated in high altitude areas of Colombia and Venezuela, but sporadically enters northern Brazil in the state of Roraima. The collection *J.B.F. da Silva 827* is the first confirmed report of *H. lehmanianna* for Brazil. The record of *H. lehmanianna* for French Guiana is doubtful as the report by Renz (1992) is based on the collection *Veyret 1619* which is, in our opinion, referable to *H. longipedicellata*. Sepals are green and the petals and lip light green with a whitened base.

18. *Habenaria leprieuri* Rchb. f., *Linnaea* 19: 376. 1846. Type: FRENCH GUIANA. Cayenne, 1839, *Leprieur 132* (Holotype W; Isotype P).

= *Habenaria culmiformis* Schltr., Bot. Centralbl. Beih. 42(2):70. 1925. Type: BRAZIL. RORAIMA: Rio Branco, VIII-1913, *J.G. Kuhlmann 779* (Holotype B, destroyed; Isotypes AMES, RB, SP).

Figure 4E-G

Selected specimens examined: BRAZIL. AMAPÁ: Amapá, 19-IV-1950, *G.A. Black & I. Lobato 50-9511* (IAN); PARÁ: Marapanim, 16-VI-1991, *M.N. Bastos et al. 1062* (MG), Maracanã, 13-VI-1994, *M.N. Bastos et al. 1680* (MG), Conceição do Araguaia, 10-II-1980, *T. Plowman et al. 8661* (MG, NY, RENZ), Vigia, 16-V-1952, *R.L. Fróes 27840* (IAN, SPF, SP); RORAIMA: Boa Vista, 17-VII-2002, *L.B. Bianchetti 1719b* (CEN). VENEZUELA. BOLÍVAR: Gran Sabana, Santa Elena de Uairén, 9-X-2005, *J.A.N. Batista 1595* (BHCB).

Distribution: Brazil (AP, DF, GO, MG, MT, PA, RR, SP, TO), French Guiana, Guyana, Surinam, Trinidad & Tobago and Venezuela.

Illustrations: Mansfeld (1930, Tafel 2, Figure 5, type illustration of *H. culmiformis*), Pabst & Dungs (1975, Figure 117), Renz (1992, Plate 1a), Kenny (1998, p.18, as *H. mesodactyla*).

Renz (1992) considered *H. culmiformis* a synonym of *H. leprieuri* and we follow this position here. Distinctive features from other closely related species such as *H. alpestris* and *H. heptadactyla* are the completely green flowers and the width of the lateral sepals (1 mm in *H. leprieuri* and 1.5-2 mm in *H. alpestris* and *H. heptadactyla*). Also, the flowers are spaced in the inflorescence and the ovary is mostly parallel to the inflorescence axis and at least half covered by the bracts. The species is typical of humid places, usually growing in areas with water over the soil.

19. *Habenaria longicauda* Hook., Bot. Mag. 4, t.2957. 1829. Type: GUYANA. Demerara, s.d., *C.S. Parker s.n.* (Holotype K; Isotype K).

Figure 4H-K

Selected specimens examined: BRAZIL. PARÁ: Bragança, 15-VI-1989, *J.B.F. da Silva 03* (MG), Melgaço, Estação Científica Ferreira Pena, 13-X-1995, *J.B.F. da Silva 476* (MG), Belém, 1-V-1947, *J. Murça Pires & G. Black 1538* (IAC, IAN, P, RB), Almeirim, 16-IV-1923, *A. Ducke s.n.* (RB18720, SP31494).

Distribution: Brazil (BA, MA, PA), French Guiana, Guyana, Surinam, and Venezuela.

Illustrations: Foldats (1969, Figure 29, as *H. sartor*), Snuverink & Westra (1983, Figure 9), Werkhoven (1986, p.141), Silva & Silva (2004, p.253), Chiron & Bellone (2005, p.66, as *H. seticauda*).

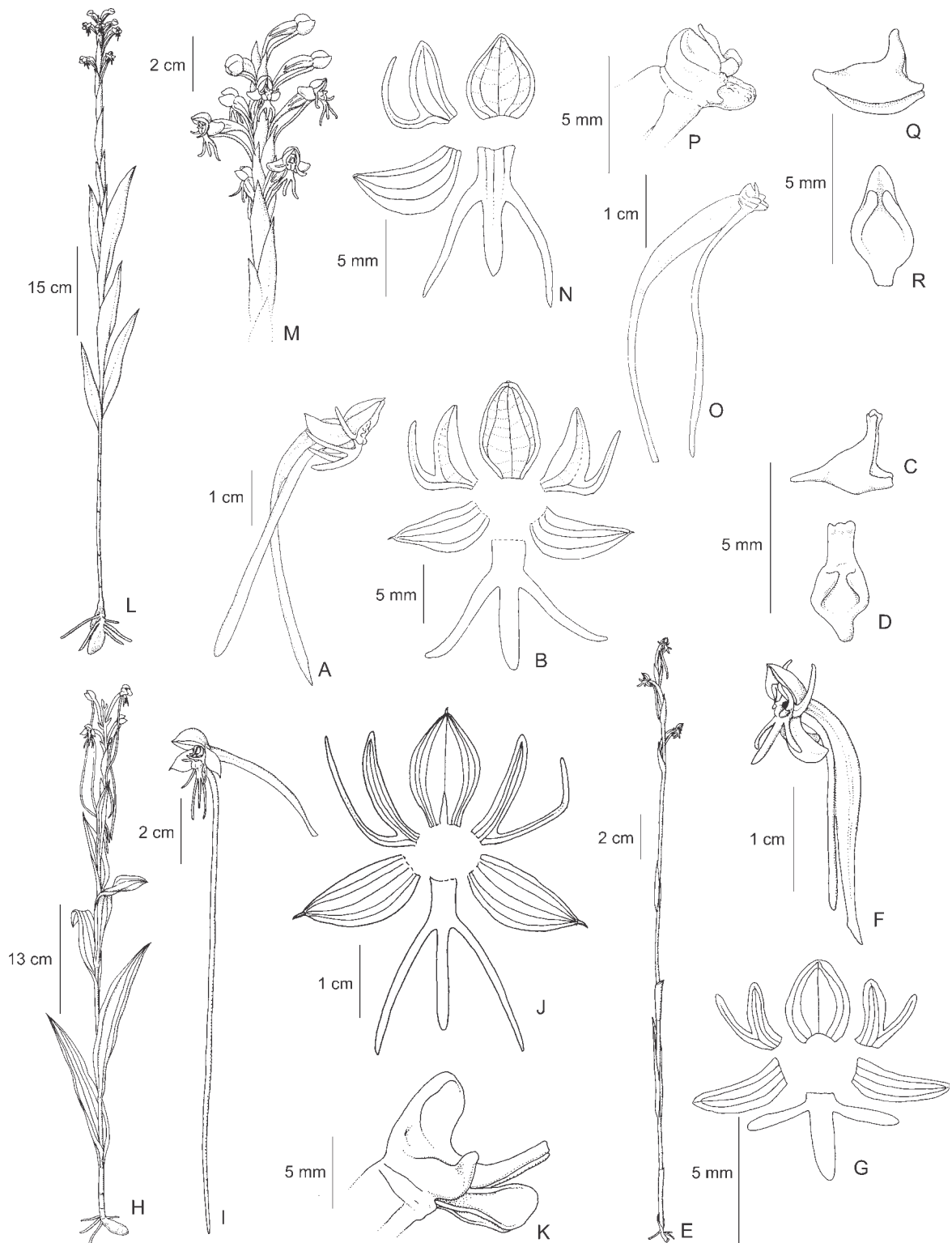


Figure 4. A-D. *Habenaria lehmanniana* Kraenzl. A. Flower. B. Perianth. C-D. Rostellum. C. Side view. D. Ventral view. E-G. *Habenaria leprieuri* Rchb. f. E. Habit. F. Flower. G. Perianth. H-K. *Habenaria longicauda* Hook. H. Habit. I. Flower. J. Perianth. K. Column. L-R. *Habenaria longipedicellata* Hoehne. L. Habit. M. Inflorescence. N. Perianth. O. Ovary, column and spur. P. Column, side view. Q-R. Rostellum. Q. Side view. R. Ventral view. (A-D. *J.B.F. da Silva* 827 (MG); E-G. *Batista* 1595 (BHCB); H-K. *J.B.F. da Silva* 03 (MG); L-R. *J.B.F. da Silva* 1050 (MG)). Figures A, B, C, D, E and G and drawn from dried material, figures F, H, I, J, K, L, M, N, O, P, Q and R from alcohol-fixed material.

Habenaria longicauda is characterized by the long spur (13-20 cm) and long stigmas (6-7 mm) with involute margins. It is similar to *H. nabucoi*, but distinct by the lateral sepals reflexed (vs. not reflexed in *H. nabucoi*), flowers light green (vs. pure white in *H. nabucoi*), the midlobe of rostellum completely enclosed between the anthers (vs. partially exposed) and the spur acuminate, with an acute apex (vs. thickened and rounded). The species is typically aquatic, and occurs in water at the margins of lakes, streams and rivers. For more information about the species taxonomy and distribution see Batista *et al.* (2006).

20. *Habenaria longipedicellata* Hoehne, Bot. Jahrb. Syst. 68: 133, Tafel 19. 1937. Type: BRAZIL. PARÁ: Belém do Pará, 21-II-1927, A. Ducke s.n. (Holotype RB 19440; holotype fragments SP31823).

Figure 4L-R

Selected specimens examined: BRAZIL. AMAPÁ: Macapá, 1-V-1997, M.R. Cordeiro 2592 (IAN), Serra do Navio, III-1962, J.R. Mattos 11366 (SP); AMAZONAS: Manaus, 2-VII-1992, M. Nee 42904 (INPA, MBM, NY), Rio Negro, Unini River, 1-II-1975, M. Mee s.n. (HB63144); PARÁ: Castanhal, 7-V-1994, J.B.F. da Silva 309 (MG), Vigia, 8-V-1994, J.B.F. da Silva 315 (MG), Bragança, IV-2001, J.B.F. da Silva 1050 (MG), Marajó, Salvaterra, 23-IV-1980, N.A. Rosa 3625 (INPA, MG). FRENCH GUIANA. Cayenne, 10-V-1990, G. Cremers & M. Hoff 11374 (RENZ, image seen), St. Elie, 16-V-1979, Y. Veyret 1619 (RENZ, U, image seen).

Distribution: Brazil (AM, AP, PA) and French Guiana.

Illustrations: Pabst & Dungs (1975, Figure 97, as *H. goyazensis*), Silva & Silva (2004, p.252 as *H. petalodes*), Chiron & Bellone (2005, p.66, as *H. rodeiensis*).

Habenaria longipedicellata is very similar to *H. lehmanniana*, *H. rodeiensis* Barb. Rodr. and *H. tamanduensis* Schltr., and the exact identity of each of these taxa and the separation between them is not clear. Until a more detailed comparative study is done, we provisionally treat here all the material in this group from lowlands in the Brazilian Amazon as *H. longipedicellata*. Material of *H. longipedicellata* appears identified in the literature and in several herbaria as *H. caldensis*, *H. lehmanniana* and *H. rodeiensis*. *Habenaria longipedicellata* occurs in open areas as well as the borders or even inside forests. Along with *H. trifida* and *H. petalodes*, it is one of the few *Habenaria* species that can colonize disturbed habitats and sometimes is frequently found in pastures, road sides and other man made habitats. The flower segments have a white base which becomes green towards the apex.

21. *Habenaria ludibundiciliata* J. A. N. Bat. & Bianch., Sittentibus 6(1):9. 2006. Type: BRAZIL. MARANHÃO: Carolina, 22-I-2003, J.A.N. Batista & O.B. Oliveira Neto 1372 (Holotype CEN; Isotypes AMES, BHCB, HB, HUEFS, K, MBM, MO, NY, RB, SP, SPF, UEC).

Figure 5A-C

Selected specimens examined: BRAZIL. PARÁ: Serra do Cachimbo, 12-XII-1956, J.M. Pires *et al.* 6116 (IAN, NY, RENZ), Muaná, 21-IV-1982, M. Dantas & Nivaldo 1008 (IAN), Santarém, 22-IV-2003, T. Sanaiotti s.n. (CEN), Marapanim, IV-1980, G. Davidse *et al.* 17867 (HRB); RORAIMA: Boa Vista, 19-VI-1999, J.B.F. da Silva 846 (MG). COLOMBIA. VAUPES: cerro Yapoboda, 15-VIII-1960, Garay 103 (AMES).

Distribution: Brazil (DF, GO, MA, MT, PA, RR) and Colombia.

Illustration: Pabst & Dungs (1975, Figure 116, as *H. culicina*).

This species is similar to *H. mystacina* Lindl. due to the small flowers and hairy segments of the flowers. However *H. ludibundiciliata* is typically from dry, rocky places (vs. seasonally humid for *H. mystacina*), has the inflorescence usually secund and lax (vs. compact and densely flowered in *H. mystacina*), has conspicuous aristate lateral sepals (vs. not aristate), the hairs are concentrated on the margins of the lateral segments of the petals and lip and occasionally are completely absent (vs. invariably densely haired and covering the surface of the segments, including the lip midlobe), and occurs in the centralwest and northern regions (vs. restricted to the Espinhaço range in Minas Gerais and Bahia) (Batista & Bianchetti 2006).

22. *Habenaria macilentata* (Lindl.) Rchb. f., Flora (Regensburg) 48: 180. 1865 ≡ *Bonatea macilentata* Lindl. in Benth., Hook. Lond. Journ. Bot. 2: 673. 1843. Type: GUYANA. s.d., R. Schomburgk s.n. (Holotype K; Isotype W; drawings of isotype RENZ).

= *Habenaria staminodiata* Schltr., Bot. Centralbl. Beih. 42(2):74. 1925. (non *Habenaria staminodiata* Schltr., Repert. Spec. Nov. Regni Veg. 10: 3. 1911) ≡ *Habenaria staminodiifera* Mansf., Repert. Spec. Nov. Regni Veg. 28: 93. 1930. Type: BRAZIL. RORAIMA: Rio Branco, I-1913, J.G. Kuhlmann 781 (Holotype B, destroyed; Isotype RB)

Figure 5D-F

Specimens examined: BRAZIL. DISTRITO FEDERAL: Brasília, 4-I-1995, J.A.N. Batista *et al.* 446 (CEN); MATO GROSSO: Campos Novos da Serra do Norte, XI-1911, F.C. Hoehne 5566 (R); PARÁ: Ilha de Marajó, III-1950,

R. Lima 77 (IAN), Muaná, 6-III-1970, *E. Oliveira* 5158 (IAN, SP); RORAIMA: Boa Vista, 19-VII-1999, *J.B.F. da Silva* 850 (MG), Ilha de Maracá, 14-V-1987, *W. Milliken* 211 (INPA).

Distribution: Brazil (DF, GO, MG, MT, PA, RR, TO), French Guiana, Guyana, Surinam and Venezuela.

Illustrations: Mansfeld (1930, Tafel 6, Figure 24, type illustration of *H. staminodiata*), Pabst & Dungs (1975, Figure 26), Snuverink & Westra (1983, Figure 15), Batista & Bianchetti (2002, Figures 2B, D).

In the general morphology of the flowers this species is similar to *H. trifida*, but distinct by the vegetative parts. In *H. macilenta* the plants are usually more slender and shorter (13-43 cm tall vs. (24-)40-76(-94) cm tall in *H. trifida*), the leaves 4-10 x 0.4-1.1 cm (vs. 9-20 x 0.9-2 cm in *H. trifida*), the larger leaves are usually on the lower part of the stem (vs. the larger leaves concentrated on the middle of the stem in *H. trifida*) and the internodes usually larger than the leaves (vs. smaller with the internodes usually covered by the leaves in *H. trifida*). Other differences are the shorter pedicel (1.5-3 cm long vs. 3-9.5 cm in *H. trifida*), the color of the petals and lip (yellowish vs. white in *H. trifida*) and column structure (Batista & Bianchetti 2002). Sepals are green and the petals and lip yellowish. The species grows in marshes or seasonally humid places.

23. *Habenaria nabucoi* Ruschi, Bol. Mus. Biol. Prof. Mello-Leitão, Ser. Bot. 78: 1. 1973. Type: BRAZIL. ESPÍRITO SANTO: Serra, I-1973, *E. Colnago* (Holotype MBML; Isotype HB).

Figure 5G-H

Selected specimens examined: BRAZIL. AMAZONAS: Labrea, 29-X-1968, *G.T. Prance et al.* 8057 (HB, INPA); MATO GROSSO: cabeceira do rio Arinos, XI-1914, *J.G. Kuhlmann* 124 (R), *J.G. Kuhlmann* 125 (R).

Distribution: Brazil (AM, BA, DF, ES, MG, MT, PI, SP) and Venezuela.

Illustrations: Foldats (1969, Figure 30), Pabst & Dungs (1975, Figure 12).

Habenaria nabucoi is similar and closely related to *H. longicauda*, but in *H. nabucoi* the flowers are usually larger and predominantly pure white (vs. light green in *H. longicauda*), the lateral sepals are not reflexed (vs. reflexed), the spur is thickened and rounded at the apex (vs. acuminate and acute) and the rostellum midlobe is taller and partially projected beyond the anthers (vs. smaller and enclosed between the anthers) (Batista *et al.* 2006). The species is typically aquatic and grows in water at the margins of lakes and streams.

24. *Habenaria* aff. *nuda* Lindl., Gen. Sp. Orchid. Pl. 312. 1835. Type: BRAZIL. MINAS GERAIS: s.d., *C.F.P. Martius* s.n. (Holotype M; drawings of type by Lindley K).

Figure 5I

Selected specimens examined: BRAZIL. PARÁ: Marabá, Serra de Carajás, 18-IV-1970, *N. Cavalcante & M. Silva* 2630 (HB, MG, NY, RENZ), 14-III-1984, *A.S.L. Silva et al.* 1768 (INPA, MG, NY, RENZ).

In the area covered by the study, this taxon is found so far only in the rocky fields of the Serra dos Carajás in the state of Pará. It is similar to *H. nuda*, but a more precise identification is not possible at the moment since the exact identity of *H. nuda* is not clear. The material from northern Brazil is possibly identical to the material from French Guiana (*de Granville et al.* 6194, *Sarthou* 537) identified as *H. rodriguezii* Cogn. by Renz (1992). The relation between *H. nuda* and *H. rodriguezii* is unclear as the exact identity of *H. rodriguezii* is also not clear. *Habenaria* aff. *nuda* is also similar and can be confused with *H. sprucei*, but is distinct by the leaves, which are wider (4-8 mm wide vs. 3-4 mm wide in *H. sprucei*), not setaceous and the usually larger flowers (dorsal sepal 7-9 x 6.5-8 mm vs. ca. 6 x 5.5 mm in *H. sprucei*).

25. *Habenaria obtusa* Lindl., Gen. Sp. Orchid. Pl.: 315. 1835. Type: BRAZIL. MINAS GERAIS: Montis Itacolumi, s.d., *C.F.P. Martius* s.n. (Holotype M; drawings of type by Lindley K).

= *Habenaria ornithoides* Barb. Rodr., Gen. Sp. Orchid. 1: 162. 1877. Type: BRAZIL. MINAS GERAIS: Uberaba, II-1849, *A.F. Regnell ser. III-1185* (Isotypes BR fragment, P, S, SP).

Figure 5J-L

Selected specimens examined: BRAZIL. DISTRITO FEDERAL: Brasília, 26-XII-1992, *J.A.N. Batista* 366 (CEN); PARÁ: Vigia, 12-VI-1966, *G.F.J. Pabst* 8964 (AMES, HB), Alto Tapajós, Rio Cururu, 13-II-1974, *W.R. Anderson* 10940 (HB, RENZ, IAN, NY).

Distribution: Brazil (BA, DF, GO, MA, MG, MS, MT, PA, PB, PE, PR, SE, SP, TO), Colombia, Ecuador, Guyana, Paraguay, Peru, Surinam, and Venezuela.

Illustrations: Foldats (1969, Figure 23), Dunsterville & Garay (1979, Figure 342), Pabst & Dungs (1975, Figure 89), Snuverink & Westra (1983, Figure 11).

Habenaria obtusa and *H. seticauda* are very similar and differ basically in the development of the spur (2.6-5.5 cm vs. 8-9.5 cm in *H. seticauda*). Both taxa are similar to *H. hamata*, but distinct by the arrangement of the flowers (parallel and close to the inflorescence axis vs. spreading in *H. hamata*) and the imbricate bracts that

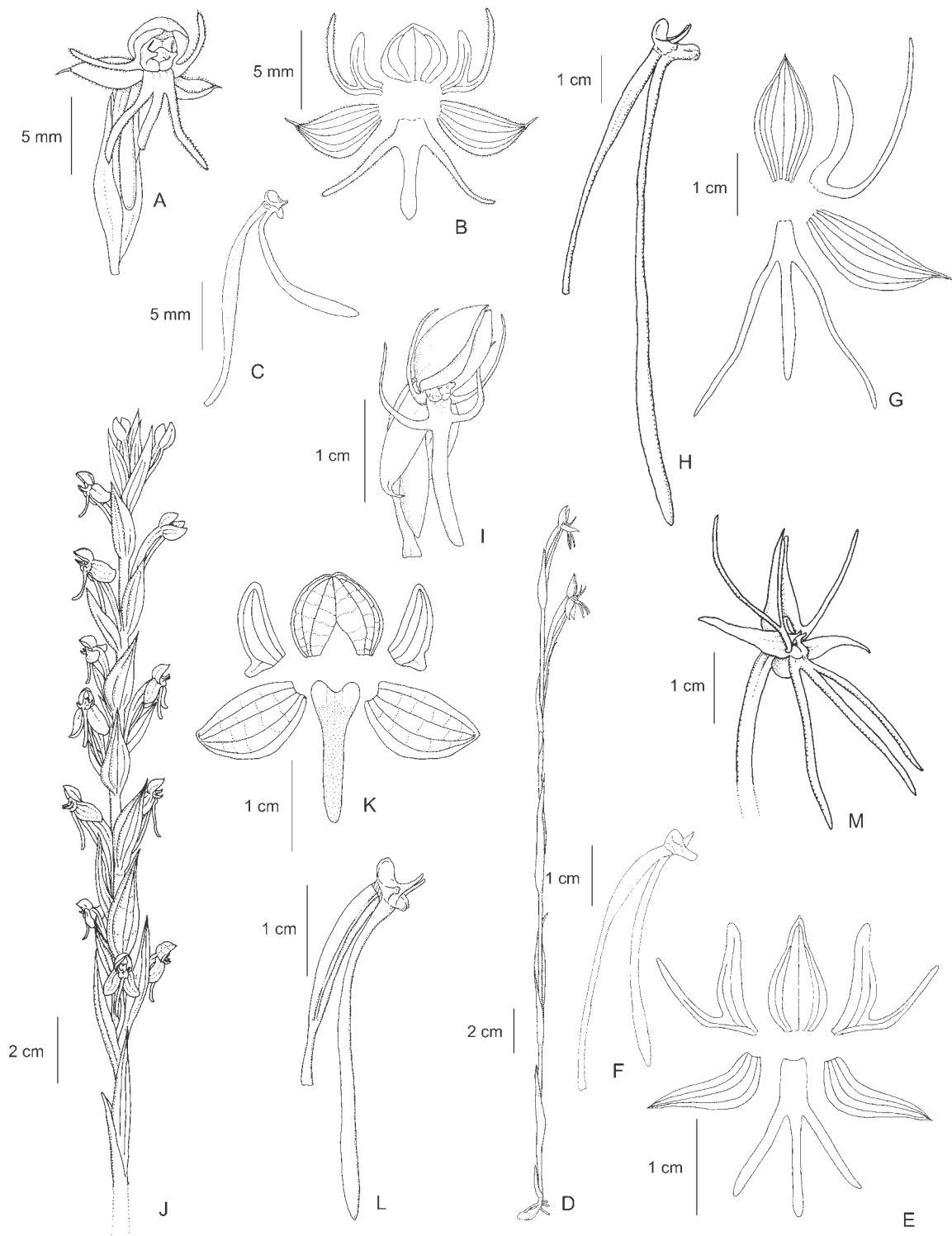


Figure 5. A-C. *Habenaria ludibundiciliata* J. A. N. Bat. & Bianchetti. A. Flower. B. Perianth. C. Ovary, column and spur. D-F. *Habenaria macilentata* (Lindl.) Rchb. f. D. Habit. E. Perianth. F. Ovary, column and spur. G-H. *Habenaria nabucoi* Ruschi. G. Perianth. H. Ovary, column and spur. I. *Habenaria* aff. *nuda* Lindl., flower. J-L. *Habenaria obtusa* Lindl. J. Inflorescence. K. Perianth. L. Ovary, column and spur. M. *Habenaria orchioalcar* Hoehne, perianth. (A-C. Batista & Oliveira-Neto 1372 (CEN); D. Oliveira 5158 (IAN); E-F. Batista et al. 446 (CEN); G-H. Prance et al. 8057 (INPA); I. Silva et al. 1768 (MG); J. Frões 27836 (IAN); K-L. Batista 366 (CEN); M. J.B.F. da Silva 219 (MG)). Figure A drawn from alcohol-fixed material, all other figures from dried material.

usually cover the rachis and the spur (vs. the exposed rachis and free spur of *H. hamata*).

26. *Habenaria orchioalcar* Hoehne, Comm. Linhas Teleg. Estrateg. Matto Grosso Anexo 5, Bot. 5: 42, tab. 85, figure 1. 1915. Type: BRAZIL. MATO GROSSO: Campos Novos da Serra do Norte, XI-1911, *F.C. Hoehne s.n.* (Holotype lost; Lectotype designated by Batista and Bianchetti 2002: t.85, figure 1, loc. cit.).

= *Habenaria lancipetala* Pabst, Orquidea 29(2):62, tab. 1. 1967. Type: BRAZIL. DISTRITO FEDERAL: Chapada da Contagem, 14-I-1966, *H.S. Irwin et al. 11682* (Holotype HB; Isotype UB).

Figure 5M

Specimens examined: BRAZIL. MARANHÃO: Carolina, Pedra Caída, 10-I-2007, *J.B.F. da Silva 1503* (BHCB); MATO GROSSO: Luciara, 19-III-1997, *V.C. Souza et al. 14490* (ESA); PARÁ: São Felix do Xingu, 18-XII-1993, *J.B.F. da Silva 219* (MG).

Distribution: Brazil (DF, GO, MA, MS, MT, PA, TO).

Illustrations: Batista & Bianchetti (2002, figs. 1, 2A, C).

The distribution of this species ranges from the central to the northern part of the “cerrado” biome, where it borders and occasionally enters the Amazon region. In the vegetative parts the species is similar to *H. macilenta*, but *H. orchioalcar* is distinct from all the other species in the region by the small (3-3.5 x 2.5-3 mm), ovoid, scrotiform, ventrally compressed spur. Sepals are green and petals and lip completely white and the species is typical of humid places (Batista & Bianchetti 2002).

27. *Habenaria parviflora* Lindl., Gen. Sp. Orchid. Pl.: 314. 1835. Type: BRAZIL. BAHIA: s.d., *Salzmann s.n.* (Syntypes K, MPU, P; photocopy, drawing and fragment of the syntype RENZ); RIO DE JANEIRO: monte Corcovado, s.d., *C.F.P. Martius s.n.* (Syntype presumably at M, n.v.).

Figure 6A-B

Specimens examined: BRAZIL. RORAIMA: summit of Serra do Surucucu, XI-1992, *J.B.F. da Silva & A. Cardoso 640* (MG), Serra Surucucu, 23-I-1975, *B.G.S. Ribeiro 15167-594* (IAN).

Distribution: Argentina, Brazil (BA, DF, ES, GO, MG, PR, RJ, RR, RS, SC, SP), Colombia, Ecuador, Guyana, Paraguay, Uruguay and Venezuela.

This species is particularly frequent in southeastern Brazil, but it reaches the Guiana shield and extends until Colombia and Ecuador. The species is uncommon in the Brazilian Amazon region and known so far only from the two collections above. Typical material of the species

is characterized by the dense, many flowered inflorescences and small flowers (dorsal sepal 3-4 x 2-3 mm). The plants from northern Brazil are shorter and have less congest inflorescences, but are identical in flower morphology to typical material from southeastern Brazil. The flowers are completely green and the species is typical of humid places.

28. *Habenaria petalodes* Lindl., Gen. Sp. Orchid. Pl.: p.316. 1835. Type: BRAZIL. MINAS GERAIS: Serra do Itacolomi, 21-28-IV-1818, *C.F.P. Martius s.n.* (Holotype M; drawings of type by Lindley K).

Figure 6C-F

Selected specimens examined: BRAZIL. MARANHÃO: São Luiz do Maranhão, 3-VI-1907, *A. Ducke 520* (RB); PARÁ: Maracanã, 12-IV-1991, *M.N. Bastos et al. 730* (MG), Marapanim, 15-VI-1991, *M.N. Bastos et al. 1028* (MG), Bragança, 13-III-1995, *S. Monteiro & M. Fernandez 398* (MG), Vigia, 5-VI-1994, *J.B.F. da Silva 328* (MG), Icoaraci-Belém road, 24-II-1965, *Grup. Soc. Parae. Orqu. 51* (HB), Ilha de Marajó, Maracá, IX-1969, *P. Lacerda & T. Guedes 130* (IAN).

Distribution: Brazil (BA, CE, DF, ES, GO, MA, MG, MS, PA, PB, PE, RJ, SE, SP) and Paraguay.

Habenaria petalodes is similar to *H. quadrata*, *H. dentifera*, *H. avicula*, and *H. alterosula* and many other extra Brazilian species such as *H. odontopetala* Rchb. f., *H. floribunda* Lindl., *H. eustachya* Rchb. f., *H. autumnalis* Poepp. & Endl., *H. selerorum* Schltr., and *H. socialis* Fawcett & Rendle, all characterized by growing in forests, by the well developed leaves, by the petals and lip mostly simple and by the column structure, with long, slender anther canals. However, *H. petalodes* is distinct from all of these closely related species by the completely simple, oblong-spatulate petals. *Habenaria warszewiczii* Schltr. from Panama is remarkably similar, but apparently distinct by the flowers about half the size of *H. petalodes*, according to the original author of the species (Reichenbach 1866). The material described and illustrated from Venezuela (Dunsterville & Garay 1979) and identified as *H. petalodes* is, in our opinion, referable to *H. odontopetala*. Flowers of *H. petalodes* are completely green and the species occupies a broad range of habitats, from open fields to the border of forests. The species can also occupy man made habitats and is frequently found at the margins of roads and other disturbed areas.

29. *Habenaria quadrata* Lindl., Gen. Sp. Orchid. Pl.: 316. 1835. Type: BRAZIL. AMAZONAS: Rio Negro, flumen Madeira, s.d., *C.F.P. Martius s.n.* (Holotype M;

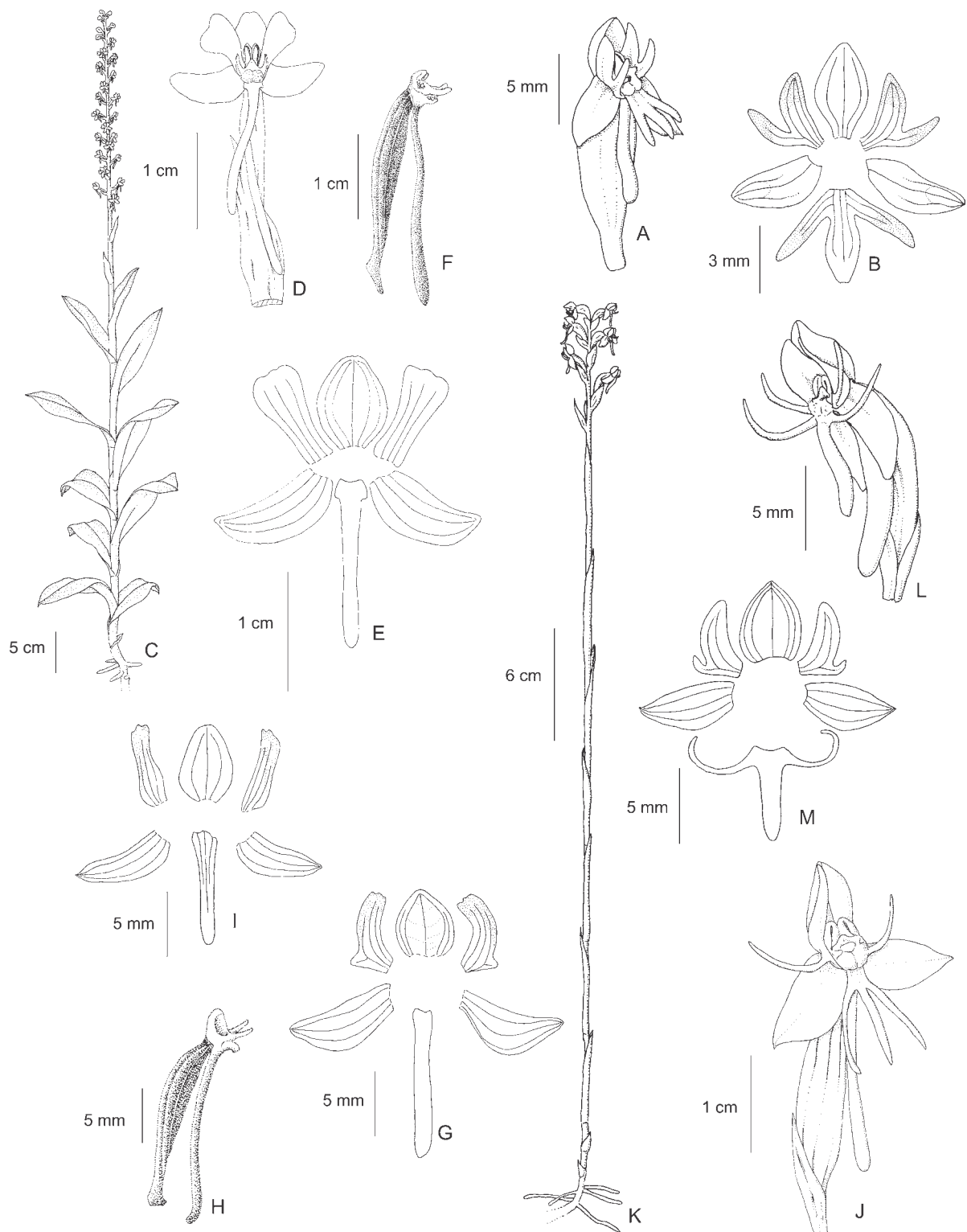


Figure 6. A-B. *Habenaria parviflora* Lindl. A. Flower. B. Perianth. C-F. *Habenaria petalodes* Lindl. C. Habit. D. Flower. E. Perianth. F. Ovary, column and spur. G-I. *Habenaria quadrata* Lindl. G. Perianth. H. Ovary, column and spur. I. Perianth. J. *Habenaria repens* Nuttall, flower. K-M. *Habenaria roraimensis* Rolfe. K. Habit. L. Flower. M. Perianth. (A-B. *J.B.F. da Silva & Cardoso* 640 (MG); C-F. *J.B.F. da Silva* 328 (MG); G-H. *Monteiro s.n.* (INPA 81947); I. *Maciel & Welber* 171 (INPA); J. *J.B.F. da Silva* 372 (MG); K-L. *J.B.F. da Silva* 463 (MG); M. *Oliveira* 239 (CEN)). Figures C-F drawn from alcohol-fixed material, other figures from dried material.

photocopy and drawing of holotype RENZ; drawings of type by Lindley K).

Figure 6G-I

Specimens examined: BRAZIL. AMAZONAS: Manacapuru, 20-III-1979, *O.P. Monteiro s.n.* (INPA 81947); MATO GROSSO: Barão de Melgaço, 4-I-1979, *A. Maciel & A. Welber 171* (INPA).

Distribution: Brazil (AM, MT).

The exact identity of *H. quadrata* has been controversial and Cogniaux (1893) included *H. curvilabria* as a synonym. The specimens in the two collections above are distinct from the typical *H. curvilabria* of central and southeastern Brazil by the size of the petals (6 x 1.5 mm vs. 2.5-3.5 x 1.5-2.3 mm in *H. curvilabria*). They are similar to *H. petalodes*, but have smaller flowers (dorsal sepal 5-6 x 4-4.5 mm vs. ca. 8 x 6 mm in *H. petalodes*), a shorter spur (15-17 mm long vs. ca. 25 mm long in *H. petalodes*) and petals that are not broad at the apex (vs. the spatulate petals of *H. petalodes*). *Habenaria quadrata* is similar to the extra Brazilian species *H. odontopetala* Rchb. f. and *H. floribunda* Lindl. and further studies are necessary to determine the exact relation between these species. Flowers are recorded as light green, and the species occurs in “varzea” forests and “terra firme capoeiras”. *Habenaria quadrata* was recorded for Venezuela (Foldats 1969), but the report needs confirmation.

30. *Habenaria repens* Nuttall, Gen. N. Am. Pl. 2: 190, figure 10. 1818. Type: UNITED STATES OF AMERICA. GEORGIA & CAROLINA: s.d., *Nuttall s.n.* (Holotype PH) *n.v.*

Figure 6J

Specimens examined: BRAZIL. PARÁ: Tucuruí, 24-III-1995, *J.B.F. da Silva 372* (MG), Itupiranga, 7-II-1976, *N.T. Silva 4287* (IAN), Santarém, 23-II-1981, *M. Yamakashi 110* (INPA), lake of Curuá-Uma dam, VII-1980, *P.S. Mera 326* (INPA). UNITED STATES OF AMERICA: SOUTH CAROLINA: Darlington, 6-VIII-1972, *S.W. Leonard 5518* (SP).

Distribution: Throughout the neotropics, from southern USA to northern Argentina.

Illustrations: Foldats (1969, Figure 27), Dunsterville & Garay (1979, Figure 344).

This species is typically aquatic, growing inside the water at the margins of lakes or other flooded places, over clumps of aquatic vegetation or even over floating, decaying dead tree trunks. *Habenaria repens* is similar to *H. amambayensis*, but distinct by the habitat, the smaller flowers (dorsal sepal ca. 4-5 x 4.5 mm vs. ca. 7 x 5 mm in *H. amambayensis*) and the shorter lateral segments of

the petals and lip (4-7 mm in *H. repens* vs. ca. 12-15 mm in *H. amambayensis*). Flowers are completely green.

31. *Habenaria roraimensis* Rolfe, Trans. Linn. Soc. London, Ser. 2, Bot. 6(1):65. 1901. Type: GUYANA. Roraima, summit, 1808, *F.V. McConnell & J.J. Quelch 698* (Holotype K, *n.v.*; Isotype BM; photocopy of holotype RENZ).

Figure 6K-M

Specimens examined: BRAZIL. AMAZONAS: Santa Isabel do Rio Negro, Pico da Neblina, 14-IX-1995, *J.B.F. da Silva 463* (MG). VENEZUELA. BOLÍVAR: Gran Sabana, Mount Roraima, 23-VIII-1997, *R.S. Oliveira 239* (CEN).

Distribution: Brazil (AM, RR), Guyana and Venezuela.

Illustrations: Dunsterville (1972, Plate 10), Dunsterville & Garay (1979, Figure 346).

This species is restricted to the high tepuis of the Guyana Highland (Renz 1992). The leaves may be completely appressed to the stem or have the apex spread. The lateral segments of the petals vary from inconspicuous to almost the size of the anterior petal segment. Flowers are green and the species grows in the shallow, but usually humid soil found over the rocky formations of the mountain summits.

32. *Habenaria schwackei* Barb. Rodr., Gen. Sp. Orchid. 2: 254. 1882. Type: BRAZIL. PARANÁ: Ponta Grossa, 13-I-1880, *C.A.W. Schwacke 191* (Holotype R; Isotypes R, RB).

= *Habenaria platydactyla* Kraenzl., Kongl. Svenska Vetenskaps. Handl. 46(10):9, Tafel 2, Figure 5. 1911. Type: BRAZIL. PARANÁ: Capão Grande, 24-I-1910, *P. Dusen 9089* (Holotype S; Isotypes HB, MBM, NY, P) *syn. nov.*

= *Habenaria amazonica* Schltr., Bot. Centralbl. Beih. 42(2):69. 1925. Type: BRAZIL. RORAIMA: Boa Vista, Rio Branco, I-1913, *J.G. Kuhlmann 787* (Holotype B, destroyed; Isotypes AMES, RB, SP).

Figure 7A-C

Specimens examined: BRAZIL. GOIÁS: Alto Paraíso, 9-I-2001, *J.A.N. Batista & E.R. Pansarin 1147* (CEN); PARÁ: Ilha de Marajó, III-1950, *R. Lima 76* (IAN); TOCANTINS: Palmas, 17-II-1997, *J.A.N. Batista et al. 689* (CEN).

Distribution: Brazil (BA, GO, MA, MG, MT, PA, PR, RR, SP, TO), Colombia, French Guiana, Guyana, Paraguay, Surinam and Venezuela.

Illustrations: Mansfeld (1930, Tafel 1, Figure 2, type illustration of *H. amazonica*), Foldats (1969, Figure 19), Pabst & Dungs (1975, Figure 111), Renz (1992, plate 2).

Renz (1992) included *H. amazonica* under the synonymy of *H. platyactyla*. The examination of the type material of the two species and a large number of live and dried specimens from central Brazil and Paraná have confirmed the position held by Renz and shown that both species are identical to *H. schwackei*. The species is similar to *H. heptadactyla* and *H. leprieuri*, but distinct by the conspicuous pedicels (about 8-9 mm vs. 2-3 mm long in *H. leprieuri* and *H. heptadactyla*), the green sepals and white petals and lip (vs. the yellow petals and lip of *H. heptadactyla* and the green petals and lip of *H. leprieuri*), and the frequently broad lateral segments of the petals and lip (up to 2 mm broad vs. 0.5-0.75 mm broad in *H. leprieuri* and *H. heptadactyla*). *Habenaria schwackei* is typical of seasonally humid places.

33. *Habenaria secundiflora* Barb. Rodr., Gen. Sp. Orchid. 2: 252. 1882. Type: BRAZIL. MINAS GERAIS: São João d' El-Rey, s.d., *Barbosa-Rodrigues s.n.* (Holotype unknown, presumably lost. Original illustration by Barbosa-Rodrigues in *Iconographie des Orchidées du Brésil*, v.1, t.10 RB, copy K. Reproduced in *Sprunger* 1996. v.1: 63).

Figure 7D-E

Specimens examined: BRAZIL. PARÁ: Jutahy de Almeirim, 19-IV-1923, *A. Ducke s.n.* (RB18721). VENEZUELA. BOLÍVAR: Gran Sabana, Mount Roraima, 22-VIII-1997, *R.S. Oliveira 234* (CEN).

Distribution: Brazil (DF, GO, MG, PA, PR, SP), Colombia, French Guiana, Guyana, and Venezuela.

Illustration: *Dunsterville & Garay* (1979, Figure 340, as *H. mesodactyla*), *Batista et al.* (2004, Figures 1H, 3D).

This is a common species in Venezuela and in the "cerrado" of central Brazil but has been collected only once in the study area. A distinctive feature of the species is the petals which are entire for about 2 mm from the base and then divided above. The species was mistakenly identified as *H. setacea* Lindl. by *Hoehne* (1940, tab. 105, Figure 3), *Pabst & Dungs* (1975, Figure 140) and *Renz* (1992), and as *H. mesodactyla* Griseb. by *Dunsterville & Garay* (1979). Flowers are completely green and the species occurs in dry or seasonally humid places.

34. *Habenaria seticauda* Lindl., Hook. Lond. Journ. Bot. 2: 673. 1843. Type: GUYANA. Pirara, s.d., *R. Schomburgk 219* (Holotype K; photocopy and drawing of isotype RENZ).

Figure 7F-G

Selected specimens examined: BRAZIL. RORAIMA: Pacaraima, 20-VI-1999, *J.B.F. da Silva 851* (MG).

VENEZUELA. BOLÍVAR: Gran Sabana, Santa Elena de Uairén, 9-X-2005, *J.A.N. Batista 1596* (BHCB, CEN).

Distribution: Brazil (RR), Guyana and Venezuela.

Illustration: *Silva & Silva* (2004, p.251, as *H. obtusa*).

In the length of the spur *H. seticauda* is similar to *H. hamata*, and we first suspected they were conspecific. Accordingly, material of *H. hamata* from French Guiana (*Cremers & Hoff 10717*) was identified by *Renz* (1992) as *H. seticauda*. However, examination of material from Venezuela and Roraima in Brazil showed that *H. seticauda* is a distinct entity and in fact very similar to *H. obtusa*. The two taxa differ basically in the length of the spur, which is longer in *H. seticauda* (8-9 cm) than in *H. obtusa* (3-5 cm). Besides this, the only other difference is that *H. seticauda* is restricted to the Guianas shield while *H. obtusa* has a broad distribution. Considering the differences above, we prefer to keep the two entities as separate species, although the collection of material (*G. Eiten & L. Eiten 3869* – SP) with spurs of intermediate length (6-7 cm) at the state of Maranhão suggests that the separation of the two entities at the species level may not be justifiable. This is the first confirmed report of the species in Brazil, and other previous reports (*Hoehne* 1940, *Pabst & Dungs* 1975, *Silva et al.* 1995, *Silva & Silva* 2004) were based in misidentification. The lateral sepals are green, the dorsal sepal is white with a green base, petals are white and the lip is green with a white base. The spur has a white base and becomes green towards the apex. The species occurs in open dry places or at the border of forests.

35. *Habenaria spathulifera* Cogn. in *Mart.*, *Fl. Bras.* 3(4):86. 1893. Type: BRAZIL. Brasilia austro-orientali, s.d., *A.F.M. Glaziou 10092* (Holotype BR; Isotype P).

= *Habenaria pratensis* (Salzm. ex Lindl.) Rchb. f. var. *parviflora* Cogn. in *Mart.*, *Fl. Bras.* 3(4):86. 1893. Syntypes: BRAZIL. TOCANTINS: between Natividade and Conceição, II-1840, *G. Gardner 3994* (BM, K, NY, OXF, P, SP); MATO GROSSO: Cuiabá, s.d., *Riedel s.n.* (BR) *syn. nov.*

= *Habenaria mattogrossensis* Kraenzl., *Kongl. Svenska Vetenskaps. Handl.* 46(10):14, Tafel 1, Figure 4. 1911. Type: BRAZIL. MATO GROSSO: Espinheiros, 10-II-1894, *C.A.M. Lindman 2785* (Holotype S; Isotype S).

= *Habenaria georgii* Schltr., *Bot. Centralbl. Beih.* 42(2):86. 1925. Type: BRAZIL. AMAZONAS: auf Campos Cacáo-Pireira, s.d., *G. Huebner 85* (Holotype B, destroyed. No isotype located).

= *Habenaria spathuliglossa* Kraenzl. ex *Hoehne*, *Flora Brasilica* 12(1), tab. 113, figure 1. 1940. *nomen nudum*.

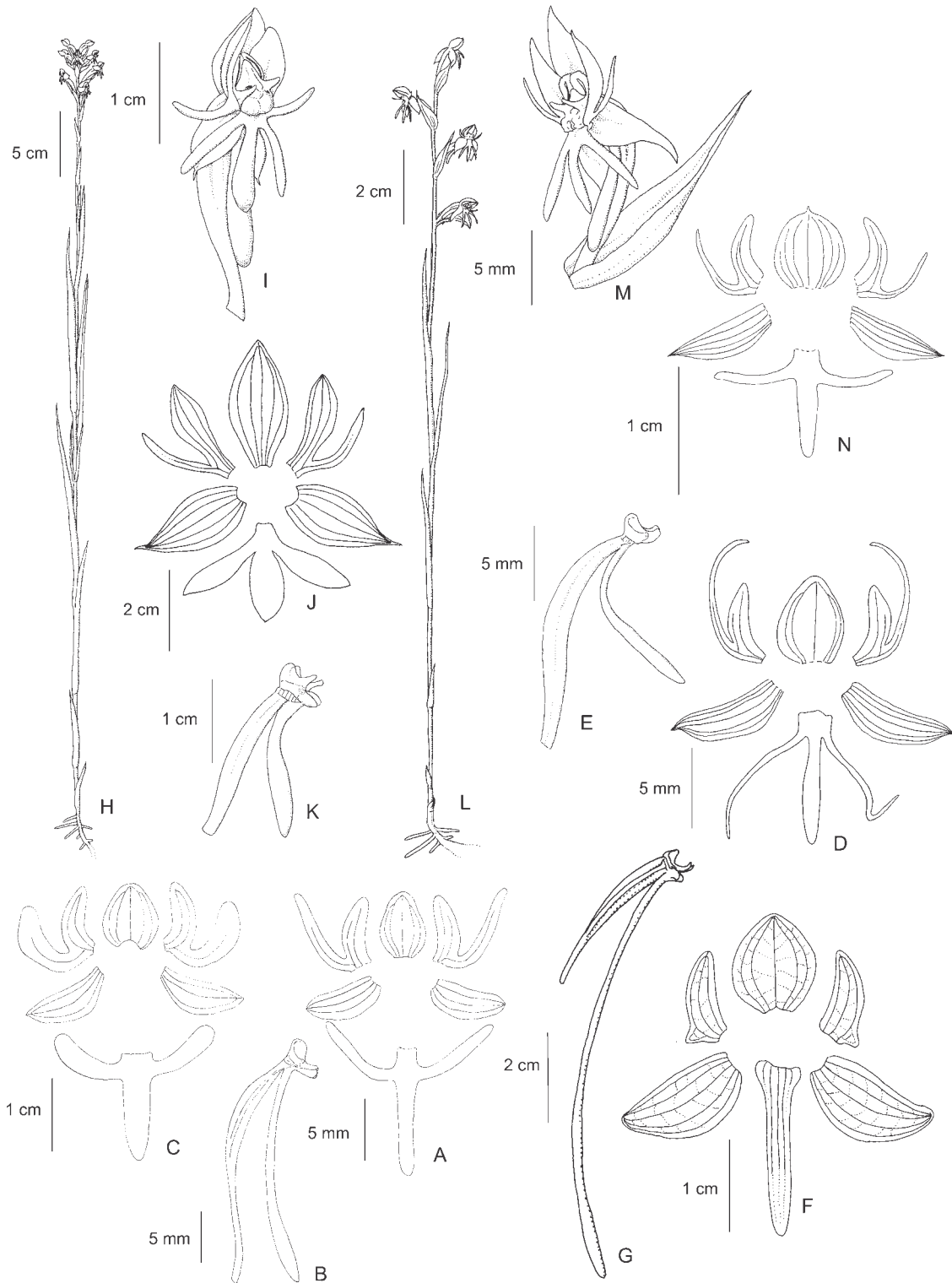


Figure 7. A-C. *Habenaria schwackei* Barb. Rodr. A. Perianth. B. Ovary, column and spur. C. Perianth. D-E. *Habenaria secundiflora* Barb. Rodr. D. Perianth. E. Ovary, column and spur. F-G. *Habenaria seticauda* Lindl. F. Perianth. G. Ovary, column and spur. H-K. *Habenaria spathulifera* Cogn. H. Habit. I. Flower. J. Perianth. K. Ovary, column and spur. L-N. *Habenaria sprucei* Cogn. L. Habit. M. Flower. N. Perianth. (A-B. Batista & Pansarin 1147 (CEN); C. Batista *et al.* 689 (CEN); D-E. Oliveira 234 (CEN); F-G. Batista 1596 (BHCB); H-I. J.B.F. da Silva 302 (MG); J-K. Plowman *et al.* 8666 (MG); L-M. J.B.F. da Silva 847 (MG); N. Oliveira & Gonçalves 284 (CEN)). All figures drawn from dried material.

Figure 7H-K

Selected specimens examined: BRAZIL. AMAPÁ: Santana, 5-V-1982, *N.A. Rosa & M.R. Santos 4316* (HRB, INPA, MG); AMAZONAS: Rio Negro, Barra, XII-1850 III-1851, *R. Spruce s.n.* (BM32698, K, MG19345, OXF, P, RENZ), Campo de Janauari, s.d., *R. Spruce 1298* (K), Campo de Marajózinho, 9-II-1946, *A. Ducke 1907* (IAN, MG, RB); MARANHÃO: Perizes, 6-VII-1954, *G.A. Black et al. 54-16540* (IAN); MATO GROSSO: São Felix do Araguaia, 14-III-1997, *V.C. Souza et al. 14055* (ESA), Luciara, 19-III-1997, *V.C. Souza et al. 14593* (ESA); PARÁ: Ilha de Marajó, 9-V-1924, *J.G. Kuhlmann 2146* (RB, SP), Ourém, 1-V-1994, *J.B.F. da Silva 302* (MG), Conceição do Araguaia, 10-II-1980, *T. Plowman et al. 8666* (MG), Muaná, 25-IV-1982, *M. Dantas & Nivaldo S. 1195* (IAN); RORAIMA: Amajari, Ilha de Maracá, 8-VIII-2003, *A.S.F. Castro 1443* (EAC).

Distribution: Brazil (AM, AP, GO, MA, MT, PA, RR, TO), French Guiana, Surinam, and Venezuela.

Illustrations: Pabst & Dungs (1975, Figure 23, as *H. macilenta*), Snuverink & Westra (1983, Figure 12), Renz (1992, Plate 3a), Silva & Silva (2004, p.250, as *H. allemanii* and *H. leaoana*, p.254, as *Habenaria* sp.), Chiron & Bellone (2005, p.66, as *H. leaoana*).

This species has been considered a subspecific taxon of *H. pratensis*. However the differences between *H. pratensis* var. *parviflora* and *H. pratensis* are greater than the differences between *H. pratensis* and *H. glazioviana*, which are considered distinct species. Thus, as a matter of coherence, *H. pratensis* var. *parviflora* should also deserve a specific status. An alternative to reduce *H. glazioviana* to a subspecific taxon of *H. pratensis* would require a new combination that we prefer to avoid until a more detailed analysis of the three taxa is undertaken. Analysis of the literature revealed that the earlier available name for this taxon is *H. spathulifera*. Diagnostic characters of *H. spathulifera* are the short pedicellate ovary (1.6-2.5 cm long) and bright yellow flowers, while *H. pratensis* and *H. glazioviana* have long pedicellate ovaries (3-4.7 cm long) and larger, pale yellow flowers. Sepals of *H. spathulifera* are green and the petal and lip bright yellow. The species is typical of seasonally humid places.

36. *Habenaria sprucei* Cogn. in Mart., Fl. Bras. 3(4):40. 1893. Type: BRAZIL. AMAZONAS: Campo de Janauari, s.d., *R. Spruce 1221* (Isotypes K, P; photocopy, drawing and fragment of isotype RENZ).

= *Habenaria leaoana* Schltr., Bot. Centralbl. Beih. 42(2):72. 1925. Type: BRAZIL. RORAIMA: Boa Vista, Rio Branco, VIII-1913, *J.G. Kuhlmann 778* (Holotype

B, destroyed; Isotypes AMES, NY, RB, SP; photocopy, drawing and fragment of isotype RENZ).

Figure 7L-N

Selected specimens examined: BRAZIL. AMAPÁ: Macapá, 24-IV-1924, *J.G. Kuhlmann 2072* (RB); AMAZONAS: Rio Negro, Barra, XII-1850 – III-1851, *R. Spruce s.n.* (BM32683, OXF, RENZ, W); MARANHÃO: São Raimundo das Mangabeiras, 18-I-1998, *R.S. Oliveira & E. Gonçalves 284* (CEN); PARÁ: Almeirim, 8-IV-1903, *A. Ducke s.n.* (RB18730); RORAIMA: Pacaraima, 24-VI-1999, *J.B.F. da Silva 847* (MG), Boa Vista, 17-VII-2002, *L.B. Bianchetti 1719a* (CEN).

Distribution: Brazil (AM, AP, MA, PA, RR), French Guiana, Guyana, Surinam and Venezuela.

Illustrations: Mansfeld (1930, Tafel 4, Figure 14, type illustration of *H. leaoana*), Foldats (1969, Figure 18), Snuverink & Westra (1983, Figure 7, as *H. leaoana*), Werkhoven (1986, p.141, as *H. leprieuri*), Renz (1992, plate 1b, color photo), Chiron & Bellone (2005, p.66, as *H. trifida*).

This species is similar to *H. aff. nuda*, but distinct by the characters outlined in the key. The flowers are completely green and the species is typical of seasonally humid grassy fields.

37. *Habenaria subfiliformis* Cogn., Bull. Soc. Bot. Belg. 43: 272. 1907. Type: PARAGUAY. San-Joaquin prope Caaguazú, XII-1905, *E. Hassler 9681a* (Holotype BR).

= *Habenaria mitomorpha* Kraenzl., Kongl. Svenska Vetenskaps. Handl. 46(10):11, Tafel 2, figure 4. 1911. Type: BRAZIL. MATO GROSSO: Serra do Tapirapuan, s.d., *C.A.M. Lindman 2931* (Isotype S) *syn. nov.*

= *Habenaria rudolfi-schlechteri* Hoehne, Bot. Jahrb. Syst. 68: 126, Tafel 9. 1937. Type: BRAZIL. SÃO PAULO: São Bernardo, XII-1911, *A.C. Brade 5085* (Holotype HB; Isotype SP).

Figure 8A-C

Specimens examined: BRAZIL. PARÁ: Marajó, Câmara, 8-VIII-1950, *G.A. Black 50-9994* (IAN); RORAIMA: Serra dos Surucucus, 14-II-1969, *G.T. Prance et al. 9898* (HB, INPA). SURINAM. PARA: Fransina savanne, 2-VII-1972, *M. & P. Teunissen 1261* (RENZ, U, image seen). VENEZUELA. BOLÍVAR: Gran Sabana, Santa Elena de Uairén, 9-X-2005, *J.A.N. Batista 1597* (BHCB, CEN), Piar, 24-XI-1958, *O. Renz 9210* (RENZ, image seen).

Distribution: Brazil (DF, GO, MG, MT, PA, PR, RR, SP, TO), Paraguay, Surinam and Venezuela.

This species is similar and can be confused with *H. leprieuri*. In the Herbarium RENZ and U all the material

of the species is misidentified as *H. lepriouri*. Distinctive features of *H. subfiliformis* are the slender and usually taller plants, the narrower lip midlobe (0.5 mm in *H. subfiliformis* vs. 1 mm in *H. lepriouri*) and the shorter spur (5-6.5 mm vs. 8-12 mm). Examination of the isotype of *H. mitomorpha* and holotype of *H. rudolfi-schlechteri* revealed that they are conspecific with *H. subfiliformis*. Flowers are completely green and the species is typical of seasonally humid places. Flowering time throughout most of the species distribution range occurs mainly at the end of the rainy season.

38. *Habenaria sylvicultrix* Lindl. ex Kraenzl., Bot. Jahrb. Syst. 16: 101. 1892. Type: BRAZIL. AMAZONAS: Barra do Rio Negro, s.d., R. Spruce 1262 (Holotype K; Isotype K).

Figure 8D-E

Specimens examined: BRAZIL. AMAZONAS: Rio Negro, 18-XII-1958, W. Rodrigues 736 (HB, INPA), Manaus, Rio Negro, 14-XII-1977, S. Keel & J. Guedes 378 (INPA), Manaus, Rio Cuieiras, 17-XII-1961, W. Rodrigues & B. Wilson 3964 (INPA).

Distribution: Brazil (AM).

This species is similar to *H. longipedicellata*, but distinct by the smaller plants (stem 15-38 cm including the inflorescence vs. 64-97 cm in *H. longipedicellata*), the linear leaves that are adpressed to the stem (vs. the lanceolate and spreading leaves of *H. longipedicellata*), the usually few flowered inflorescence, (3-11 flowers vs. (3-)12-35 flowers in *H. longipedicellata*) the larger flowers (dorsal sepal 6-7 x 5-6 mm vs. 4.5-5.5 x 3.5-4.5 mm in *H. longipedicellata*) and the longer lateral segments of the petals and lip (lateral segments of the lip 10-14 mm long vs. 6-9 mm long in *H. longipedicellata*). *Habenaria sylvicultrix* is possibly the only *Habenaria* species restricted to northern Brazil. However, *H. dusenii* Schltr., known from the centralwest, southeastern and southern regions of Brazil (GO, MG, MT, PR, SP) is remarkably similar and possibly conspecific. We have not seen any collection of *H. sylvicultrix* from Venezuela and the Guianas and the specimens we have seen from these countries identified as *H. dusenii* do not match the typical *H. dusenii* from southern Brazil.

39. *Habenaria trifida* Kunth, Nov. gen. sp. 1: 330. 1816. Type: COLOMBIA. inter villam San Miguel et convallem Guachicon prope Almaguer, Humboldt & Bonpland 2051 (Holotype P).

= *Habenaria allemanii* Barb. Rodr., Gen. Sp. Orchid. 2: 254. 1882. Type: BRAZIL. CEARÁ: Tauapé,

1856, F. Allemão 1500 (Holotype R, not located. Original illustration by Barbosa-Rodrigues in Iconographie des Orchidées du Brésil, v.1, tab. 9 RB, copy K; reproduced in Sprunger, 1996. v.1: 62).

= *Habenaria duckeana* Schltr., Bot. Centralbl. Beih. 42(2):71. 1925. Type: BRAZIL. RORAIMA: Rio Branco, VII-1913, J.G. Kuhlmann 782 (Holotype B, destroyed; Isotypes AMES, RB, SP);

= *Habenaria kuhlmannii* Schltr., Bot. Centralbl. Beih. 42(2):72. 1925. Type: BRAZIL. RORAIMA: Boa Vista, Rio Branco, I-1913, J.G. Kuhlmann 783 (Holotype B, destroyed; Isotypes AMES, HB, RB, SP).

= *Habenaria denticostriis* Pabst, Arquiv. Bot. Est. S. Paulo 3(3):118, tabs. 29, 36A. 1955. Type: BRAZIL. PARÁ: Alto Tapajós, Vila Nova, 17-I-1952, J.M. Pires 3944 (Holotype IAN).

Figure 8F-G

Selected specimens examined: BRAZIL. AMAPÁ: Macapá, 16-IV-1982, N.A. Rosa *et al.* 4241 (HRB, INPA, MG); PARÁ: Almeirim, 8-IV-1903, A. Ducke 3434 (BM32721, MG s.n.), Marajó, 11-IV-1927, A. Ducke s.n. (AMES, HB1923, RB19443, SP31805), Vigia, 1-IV-1952, G.A. Black *et al.* 52-14194 (AMES, IAN), Marapanim, 20-VI-1958, J.M. Pires 6772 (IAN), Rio Paru do Oeste, 19-III-1962, D.C. Fittkau s.n. (INPA12823), Matapiquara, 5-IV-1980, G. Davidse *et al.* 17901 (NY), Maracanã, 6-IV-1980, G. Davidse *et al.* 17924 (NY).

Distribution: Mexico, Central America, Trinidad and Tobago, and South America from Colombia to northern Argentina.

Illustrations: Mansfeld (1930, Tafel 2, Figure 6, type illustration of *H. duckeana*; Tafel 4, Figure 13, type illustration of *H. kuhlmannii*), Foldats (1969, Figure 25), Pabst & Dungs (1975, Figures 15, 22), Dunsterville & Garay (1979, Figure 349), Snuverink & Westra (1983, Figure 16), Renz (1992, plate 3b), Kenny (1998, p.19), Silva & Silva (2004, p.249).

As currently understood, *H. trifida* is a highly variable species with a broad distribution, ranging from Mexico to northern Argentina. The size of the flowers and development of the petals lateral segments are particularly variable, but the general morphology of the flowers is well conserved in the species. Though many of the 19 current synonyms of *H. trifida* are unquestionable, it is possible that a more detailed analysis may segregate some as distinct taxa, probably at the subspecific level. The species is more frequent in dry places, but can also grow in seasonally humid areas. The sepals are green and the petals and lip white, cream or white-greenish. The species can colonize man made habitats and sometimes

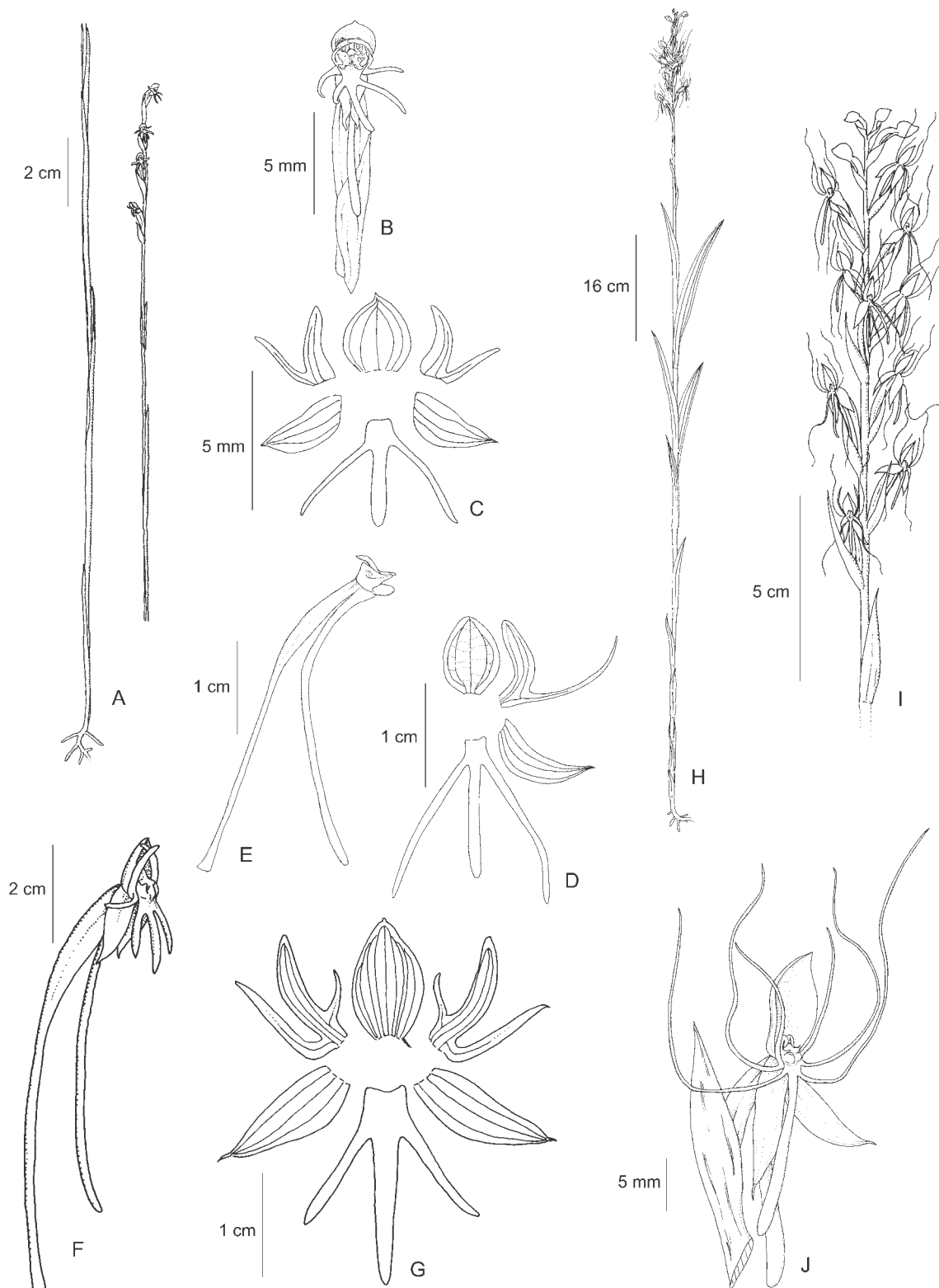


Figure 8. A-C. *Habenaria subfiliformis* Cogn. A. Habit. B. Flower. C. Perianth. D-E. *Habenaria sylvicultrix* Lindl. ex Kraenzl. D. Perianth. E. Ovary, column and spur. F-G. *Habenaria trifida* Kunth. F. Flower. G. Perianth. H-J. *Habenaria* aff. *warmingii* Rchb. f. & Warm. H. Habit. I. Inflorescence. J. Flower. (A-C. *Batista 1597* (BHCB); D-E. *Rodrigues 736* (INPA); F-G. *J.B.F. da Silva 138*, without voucher; H-J. *Plowman et al. 8649* (MG)). Figures A, C, D, E, H, I and J drawn from dried material, figures B, F and G from alcohol-fixed material.

it is frequent at road sides, pastures and other disturbed areas. Chosen for illustration here is a flower with tripartite petals, an uncommon characteristic in the species, although its specific name.

40. *Habenaria* aff. *warmingii* Rchb. f. & Warm., *Otia Bot. Hamb.* 2: 80. 1881. Type: BRAZIL. MINAS GERAIS: Lagoa Santa, s.d., *J.E.B. Warming 148* (Holotype not located; Holotype drawings by Warming W, photocopy RENZ).

Figure 8H-J

Specimens examined: BRAZIL. PARÁ: Conceição do Araguaia, 10-II-1980, *T. Plowman et al. 8649* (HRB, INPA, MG, NY, RENZ).

The specimens in the collection above are similar to *H. warmingii*, from southeastern Brazil, but distinct by the consistently larger flowers (dorsal sepal 11-13 x 6-8 mm vs. ca. 7-8 x 5-5.5 mm in *H. warmingii*) and details of the column structure, such as the midlobe of the rostellum that is projected beyond the anthers (vs. enclosed between the anthers in *H. warmingii*). It is possible that they may represent a northern variant of the species.

Doubtful or obscure species

Habenaria achroantha Schltr., *Notizbl. Königl. Bot. Gart. Berlin* 54(6):120. 1914. Type: BRAZIL. Rio Branco-Gebiet, Serra do Mel, Surumu, 160 m, VII-1909, *E. Ule br. 27* (Holotype B, destroyed. No isotype located) *n.v.*

This species apparently has not been collected after the type specimen and was known only from the type material, which was destroyed at the bombing of the Berlin Herbarium. According to Hoehne (1940) the species is probably conspecific with *H. repens*. In our opinion, based on the original description, the long spur (3.7 cm) apparently place it close to other taxa characterized by long spurs and conspicuous pedicels such as *H. longipedicellata* and *H. lehmanniana*.

Habenaria schomburgkii Lindl., *London J. Bot.* 2: 673. 1843. Type: BRAZIL. RORAIMA: in swamps on the Rio Branco, VII-1839, *R.H. Schomburgk 814* (Holotype K; Isotypes BM, G, OXF, P, US, W; at RENZ photocopies and drawing of the isotypes in G, P, W).

Distribution: Brazil (RR), Guyana, Surinam and Venezuela.

Illustrations: Foldats (1969, Figure 31), Dunsterville & Garay (1979, Figure 347) and Snuverink & Westra (1983, Figure 14).

The type of this species is a collection from Roraima, but we have not seen any additional material from Brazil

that we could undoubtedly assign to *H. schomburgkii*. Silva & Silva (2004) have reported the species for the Brazilian Amazon, based on the gathering *J.B.F. da Silva 828* – MG, but which is, in our opinion, referable to *H. amambayensis*. *Habenaria schomburgkii* is very similar to *H. amambayensis*, but apparently distinct by the lax (vs. densely many-flowered inflorescences in *H. amambayensis*), shorter inflorescences (5-10 cm long in *H. schomburgkii* vs. 15-28 cm in *H. amambayensis*) with less flowers (4-13 vs. 15-62 *H. amambayensis*). Additionally, *H. schomburgkii* is apparently restricted to the Guiana Shield, while *H. amambayensis* is distributed from Paraguay to Venezuela. *Habenaria schomburgkii* has also been recorded for the state of Ceará (*Gardner 814*) in Brazil, but we have not been able to confirm the identification of this collection.

Habenaria ernestii Schltr., *Notizbl. Königl. Bot. Gart. Berlin* 54(6):122. 1914. Type: GUYANA. campos des Roraima-Gebirges, 1700 m, XII-1909, *E. Ule br. 47* (Holotype B, destroyed. No isotype located) *n.v.*

Specimen examined: VENEZUELA. BOLÍVAR: Gran Sabana, Mount Roraima, 22-VIII-1997, *R.S. Oliveira 235* (CEN).

Illustration: Dunsterville & Garay (1979, Figure 345, as *H. rodeiensis*).

Renz (1992) considered this species related to *H. gollmeri* Schltr., while Foldats (1990) considered it a probable synonym of *H. roraimensis*. On the other hand, Garay & Romero-González (1998) treated it as a distinct taxon closely related to *H. rodeiensis* and *H. lehmanniana*. The collection *Oliveira 235* agrees with Schlechter's original description of *H. ernestii* and Garay and Romero-González (1998) concept of the species. It apparently differs from *H. lehmanniana* by the anterior petal segment that is consistently shorter than the posterior petal segment and the apex of the rostellum which is narrower and not truncate. It is expected that the species occurs and will eventually be collected in the adjoining state of Roraima in Brazil.

Excluded species

Habenaria caldensis Kraenzl., *fide* Pabst & Dungs (1975), Renz (1992).

We have not seen any material of this species from the Amazon region. The material identified as *H. caldensis* by Pabst, is *H. sylvicultrix*, and the material from the Guianas reported by Renz (1992) and Snuverink & Westra (1983) is apparently something similar to *H. candolleana*. For more information on the misidentifications of *H. caldensis* see Batista *et al.* (2004).

Habenaria culicina Rchb. f. & Warm., *vide* Hoehne (1940), Pabst & Dungs (1975), Ilkiu-Borges & Cardoso (1996).

The material from the Amazon region identified as this species is referable to *H. ludibundiciliata*.

Habenaria minarum Hoehne & Schltr., *vide* Pabst & Dungs (1975).

This species is a synonym of *H. rupicola*.

Habenaria odontopetala Rchb. f., *vide* Pabst (1962).

The collection (R.L. Fróes 27836 – IAN 74648) identified as this species by Pabst, author of the report, is referable to *H. obtusa*. Another collection from northern Brazil (J.M. Pires & N.T. Silva 8058 – IAN) also identified as *H. odontopetala* by Pabst is, in our opinion, referable to *H. dentifera*.

Habenaria pratensis (Salzm. ex Lindl.) Rchb. f., *vide* Cogniaux (1893).

All the material we have seen from northern Brazil from the species pair *H. pratensis*/*H. spathullifera* is referable to *H. spathullifera*.

Habenaria rupicola Barb. Rodr., *vide* Silva *et al.* (1995).

We have not seen any material from the Amazon region that we could assign to this species. The exact identity of *H. rupicola* is not clear, but the species is apparently restricted to southeastern Brazil. A similar species, *H. coxiopensis* Hoehne, is known from Tocantins and Mato Grosso and may occur in the Amazon region.

Habenaria setacea Lindl., *vide* Cogniaux (1893), Hoehne (1940), Pabst & Dungs (1975), Ilkiu-Borges & Cardoso (1996).

All the material from the Amazon region that we have seen identified as *H. setacea* is referable to *H. secundiflora*.

Habenaria strictissima Rchb. f., *vide* Ilkiu-Borges & Cardoso (1996).

This is a very distinct species which has been mistakenly treated as a synonym of *H. odontopetala* by some authors. The species is known from Mexico and Central America.

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