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

JOÃO A. N. BATISTA¹,JOÃO BATISTA F. DA SILVA² and LUCIANO DE BEM BIANCHETTI³

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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.) Rchb. f. var. *parviflora* Cogn. under *H. spathulifera* Cogn.

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


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 taxa 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 Brasilia* recorded 20 species and Pabst & Dungs (1975), in *Orchidaceae Brasilienses*, 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...
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, HBR, 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 forth 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. denticrostris* Pabst, *H. duckeana* Schltr., *H. georgii* Schltr., *H. kuhlmannii* Schltr., *H. leaoana* Schltr., *H. marupaana* Schltr., *H. seticauda* Schltr., *H. sprucei* Schltr., *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.).
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* Snuvenrink & Westra and *H. dentifera* Schweinf. occur in the Atlantic forest. In addition, other forest species with broad distribution such as *H. cryptophila* 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).

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<th>Species</th>
<th>T.F.</th>
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<td><em>H. alterosula</em> Snuvenrink &amp; Westra</td>
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<td><em>H. huberii</em> Carnevali &amp; Morillo</td>
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<td><em>H. ludibundiciliata</em> J. A. N. Bat. &amp; Bianch.</td>
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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*
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.

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<tr>
<th>Species</th>
<th>Savannas</th>
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<td><em>H. parviflora</em> Lindl.</td>
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<td><em>H. petalodes</em> Lindl.</td>
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<td><em>H. quadrata</em> Lindl.</td>
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<td><em>H. aff. warmingii</em> Rchb. f. &amp; Warm.</td>
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6. Flowers light yellow; lip midlobe very broad, roundish, cordate or obovate, 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. orchiocalcar
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 cylindric 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 savannas; 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. ¾ 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*

**Figure 1A-D**


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

Illustrations: Snuverink & 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.


**Figure 1E-F**


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.


**Figure 1G-H**


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.


**Figure 11**


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

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

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


**Figure 11-K**


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, Espirito 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 avicula *Avicula*. However, in *H. amambayensis* and *H. aff. warmingii* and smaller 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.


**Figure 11-L-M**


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.


**Figure 2A-C**


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 sepal 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.


**Figure 2D-F**


Distribution: Brazil (DF, GO, MG).
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.


Figure 2G-H


Among the Habenaria species from the Amazon region, H. depressifolia is very distinctive by the orbicular, fleshy, reticulate leaves that are adpressed to ground. Among other Brazilian species it is similar to H. schenckii Cogn., but the two species differ in the development of the leaves (the larger leaves are about 2-3 x 2-3.5 cm in H. depressifolia vs. 3.5-5 x 2.5-4.5 cm in H. schenckii) and size of the flowers (dorsal sepal 3.5-5 x 2-3.5 cm and anterior petal 4-6 x 2-3 mm in H. depressifolia vs. 6-7 x 3.5-4.5 cm 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.


Figure 2I-J


Figure 3A-D


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

Figure 2K-L


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.

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.


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

This species is similar and apparently 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.


Figure 3G


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. hexaperta 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.


Figure 3H-I


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. pathullifera 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. pathullifera), 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).


Figure 31-K


The exact identity of this taxon is unclear. It is similar to Habenaria 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).


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. lehmanniana and narrow and acute in H. longipedicellata. The development of the vegetative parts and number of flowers is variable in both species. Habenaria lehmanniana 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. lehmanniana for Brazil. The record of H. lehmanniana 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.


Figure 4E-G


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.


Figure 4H-K


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).
**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 reflected 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).


**Figure 4L-R**

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 until a more detailed comparative study is done, we provisionally treat here all the material in this group. **Figure 5A-C**


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 central-west and northern regions (vs. restricted to the Espinhaço range in Minas Gerais and Bahia) (Batista & Bianchetti 2006).


**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); **PARA**: Ilha de Marajó, III-1950,
Figure 5G-H
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.


Figure 5I

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*).


Figure 5J-L

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


Figure 5M


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. orchiocalcar* 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).


   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. orchiocalcar* 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).


Figure 6C-F


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.

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

Figure 6G-I


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. odontopetalum* 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.


Figure 6J


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.


Figure 6K-M


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 apressed 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.


= *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.


Figure 7A-C


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. platydactyla*. 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.


Distribution: Brazil (DF, GO, MG, PA, PR, SP); Mato Grosso: Cuiabá, s.d., A.F. M. Glaziou 10092 (BR); Mato Grosso: Pacaraima, 20-VI-1999, J.B.F. da Silva 851 (MG).

**Figure 7D-E**


**Figure 7F-G**


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

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

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.


Type: BRAZIL. MATO GROSSO: Serra do Tapirapuan, s.d., C.A.M. Lindman 2931 (Isotype S).


Figure 8A-C


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. leprieuri*. 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. leprieuri*) 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.


**Figure 8D-E**


**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-)12-35 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 central-west, southeastern and southern regions of Brazil (GO, MG, MT, PR, SP) is remarkably similar and possibly conspecific. We have not seen any collection of *S. 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.


**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
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.


Figure 8H-J

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

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.


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.


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

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. candelleana. For more information on the misidentifications of H. caldensis see Batista et al. (2004).

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

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

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

**Habenaria odontopetala** Rchb. f., *fide* 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., *fide* 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., *fide* 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. coxipoensis* Hoehne, is known from Tocantins and Mato Grosso and may occur in the Amazon region.

**Habenaria setacea** Lindl., *fide* 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*.


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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