

Zeitschrift: Candollea : journal international de botanique systématique = international journal of systematic botany
Herausgeber: Conservatoire et Jardin botaniques de la Ville de Genève
Band: 47 (1992)
Heft: 2

Artikel: The genus *Habenaria* (Orchidaceae) in the Guianas
Autor: Renz, J.
DOI: <https://doi.org/10.5169/seals-879581>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 01.05.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

The genus *Habenaria* (Orchidaceae) in the Guianas

J. RENZ

RÉSUMÉ

RENZ, J. (1992). Le genre *Habenaria* (Orchidaceae) dans les Guyanes. *Candollea* 47: 483-512. En anglais, résumés français et anglais.

Le genre d'Orchidacées *Habenaria* est révisé à l'intention de la "Flora of the Guianas". Trente-et-une espèces sont reconnues, dont deux (*H. ayangannensis* et *H. montis-wilhelminae*) sont nouvellement décrites. Une clé détaillée de tous les taxons est fournie, ainsi qu'une compilation des habitats des spécimens examinés dans l'aire de la Flore et dans les régions avoisinantes du Brésil et du Venezuela. Les relations de parenté avec les *Habenaria* sud-américains les plus proches sont brièvement commentées.

ABSTRACT

RENZ, J. (1992). The genus *Habenaria* (Orchidaceae) in the Guianas. *Candollea* 47: 483-512. In English, French and English abstracts.

The Orchidaceous genus *Habenaria* is revised for the "Flora of the Guianas". 31 species are recognized, two of which (*H. ayangannensis* and *H. montis-wilhelminae*) are described as new. A detailed key for all taxa is provided and a compilation of the habitats is presented for the specimens examined within the area of the Flora and neighbouring regions of Brazil and Venezuela. The relationship to closely connected South-American *Habenaria* is briefly discussed.

1. Introduction

The present account is a synopsis of *Habenaria* for the "Flora of the Guianas", including Guyana, Surinam and French Guiana (map). This distinct phytogeographical region is situated between eastern Venezuela and northeastern Brazil, showing a great variety of regional habitats, extending from lowland tropical savannas up to the cloud-forest and shrub vegetation of the highest mountain chain, culminating in Mt. Roraima at an altitude of 2773 m, where the borders of Guyana, Venezuela and Brazil coincide. The first *Habenaria* reported from the Guianas was *H. longicauda* Hook. This is perhaps the most spectacular *Habenaria* of this region. It has been collected in 1824 by Charles Sandbach Parker from United Kingdom, a student of A. P. de Candolle in Geneva. This plant from Demerara in Guyana has been described and illustrated in 1829 by HOOKER (1830) in the "Botanical Magazine" on t. 2957. Only about 150 years later a first comprehensive study covering a part of the region has been published by SNUVERINK & WESTRA (1983), listing 13 species for Surinam. In the present study 31 species have been recognized for the area of the three Guianas. Their distribution pattern can be summarized as follows:

Habenarias widespread throughout tropical America (7 species)

alata Hook
entomantha (Ll. & Lex.) Lindl.
monorrhiza (Sw.) Rchb. f.
obtusa Lindl.

odontopetala Rchb. f.
repens Nutt.
trifida H. B. K.

From the above-mentioned distribution pattern it is evident that the floristic relationship between the Amazonian region of Northern Brazil and the Guianas is considerable; the most suitable habitat-conditions for the corresponding taxa are found mainly in savanna-areas.

The possibility of joining the Roraima-expedition of the Botanical Institute¹, Utrecht-University and an extensive Herbarium-material of Orchids, collected in northern South-America (Venezuela and Colombia) mainly by my brother Otto Renz and myself, gave the impulse for this special treatment of *Habenaria* for the region of the "Flora of the Guianas".

2. Key of the species of *Habenaria* for the "Flora of the Guianas"

- | | |
|--|--|
| 1a. Petals simple or produced basally on the anterior margin into a tooth-like appendage (see also 25a) | 2 |
| 1b. Petals conspicuously bilobed | 7 |
| 2a. Lip simple; sometimes basally widened or with a pair of teeth or 1-2 mm long lobes | 3 |
| 2b. Lip clearly 3-lobed or deeply 3-partite | 7 |
| 3a. Bracts large, foliaceous, sometimes exceeding the flowers; spur 4-12 cm long | 4 |
| 3b. Bracts lanceolate or ovate-lanceolate, \pm the length of ovary, spur less than 3 cm long | 5 |
| 4a. Bracts commonly exceeding the flowers; spur cylindric 4-6 cm long; lip 10-15 mm long 17. <i>H. obtusa</i> Lindl. | |
| 4b. Bracts \pm as long as the ovary; spur filiform, slender, 10-12 cm long; lip 28-30 mm long 29. <i>H. seticauda</i> Lindl. | |
| 5a. Petals lanceolate with subacute apex | 6 |
| 5b. Petals rectangular-oblong or subquadrate, with truncate, often unequally bi- or tri-toothed apex | 18. <i>H. odontopetala</i> Rchb. f. |
| 6a. Leaves lanceolate, conduplicate; inflorescence many-flowered; lip simple or basally with a pair of short teeth on each side; ovary with prominent wings .. | 1. <i>H. alata</i> Hook. |
| 6b. Leaves very narrowly linear, grasslike; inflorescence remotely up to 2-8 flowers; lip basally with 1-2 mm long lobules on each side; ovary without wings 16. <i>H. montis-wilhelminae</i> Renz | |
| 7a. Leaves grasslike, filiform, up to 4 mm broad | 8 |
| 7b. Leaves not grasslike, more than 5 mm broad, linear or lanceolate, oblong-lanceolate or broader | 13 |
| 8a. Flowers bright yellow or (greenish)-yellow; inflorescence cylindrical, short and broad (3-5 cm long, 2-2.5 cm in diam.), densely many-flowered... | 10. <i>H. heptadactyla</i> Rchb. f. |
| 8b. Flowers green or green and white; inflorescence elongated (normally up to 12 cm long, 1-2 cm in diam.), loosely 1-8 flowered, flowers often one-sided | 9 |
| 9a. Sepals green, petals, lip and spur white or creamy-white; lateral lobes of lip broad (1.5-2mm) | 20. <i>H. platydactyla</i> Kraenzl. |
| 9b. Sepals green, petals and lip greenish, sometimes yellowish- or brownish-green; lateral lobes of lip narrow, filiform, 1 mm or less broad | 10 |
| 10a. Flowers \pm adpressed to the rachis, therefore inflorescence narrow (\pm 10 mm broad); flowers very small: sepals \pm 3 mm long | 11 |

¹The expedition was organized by the Institute of Systematic Botany in 1985 from January 30 to March 4, with Dr. Stephan Robbert Gradstein (Mosses) as expedition leader and the members A. Aprot (Lichens), J. Renz (Phanerogams) and H. J. Sipman (Lichens). I would like again to express my sincerest thanks to Utrecht and to the participants for the excellent spirit and fine cooperation during the field work.

- 10b. Inflorescence up to 20 mm broad; flowers somewhat larger: sepals 5-8 mm long 12
- 11a. Bracts ovate-lanceolate, ending in a soft bristle, equalling or slightly exceeding the ovary
12. H. leprieurii Rchb. f.
- 11b. Bracts ovate, much shorter than ovary **5. H. ayangannensis** Renz
- 12a. Leaves rather long, up to 20 cm; dorsal sepal with 5-(7) conspicuously darker green veins; lip with c. 2 mm long undivided basal part, lobes \pm equal in length and width
30. H. sprucei Cogn.
- 12b. Leaves rather short, normally not longer than 6 cm; dorsal sepal with 3-(5) veins; lip divided nearly to the base, the lateral lobes narrower than the middle lobe
28. H. setacea Lindl.
 A. Spur slightly shorter than ovary var. **setacea**
 B. Spur absent var. **ecalcarata** Renz
- 13a. Inflorescence 1-3(-6) flowered 14
- 13b. Inflorescence few- to many-flowered 16
- 14a. Stem \pm stout, distantly leafy throughout its length; leaves lanceolate to ovate-lanceolate, rather short (up to 10 cm), mostly folded; pedicel of ovary 2-4 cm long; anterior lobe of petals \pm equal in length to the posterior 15
- 14b. Stem very slender; leaves linear to linear-lanceolate, mainly in the lower part of the stem, rather long (up to 25 cm); pedicel of ovary up to 1 cm long; anterior lobes of petals 2-3 times longer than the posterior **7. H. dusenii** Schltr.
- 15a. Spur 5-7(-10) cm long, about as long as the ovary with pedicel, only slightly thickened in apical half, apex obtuse; rostellum middle lobe hooded, projecting forward in front of the anther-loculi **31. H. trifida** H. B. K.
- 15b. Spur 2-3 cm, about half as long as the ovary with pedicel, swollen in apical third, apex acute; rostellum middle lobe hooded, projecting forward in front of the anther-loculi
14. H. macilenta (Lindl.) Rchb. f.
- 16a. Leaves linear to narrowly-lanceolate 17
- 16b. Leaves lanceolate, oblong-lanceolate or broader 19
- 17a. Inflorescence loosely few- to many-flowered, very narrow (\pm 1 cm in diam.); anterior lobe of petals much shorter than the posterior, dentiform, the tip minutely papillose; lateral lobes of lip with papillose tips, shorter than the fleshy middle lobe; spur half as long as ovary, cylindric, up to 4 mm long **3. H. amalfitana** Lehm. & Kraenzl.
- 17b. Inflorescence \pm densely many-flowered, cylindric (3-5 cm in diam.); anterior lobe of petals as long or longer than the posterior; lateral lobes of lip longer than the middle lobe; spur as long or longer than the ovary 18
- 18a. Inflorescence rather short, usually less than 10 cm long; spur exceeding the ovary in length, 25-40 mm long; lateral lobes of lip somewhat longer than the middle lobe
6. H. caldensis Kraenzl.
- 18b. Inflorescence elongated, up to 15(-20 cm) long; spur \pm equalling the ovary in length, 12-15 mm long; lateral lobes of lip up to twice as long as the middle lobe
4. H. amambayensis Schltr.
- 19a. Leaves many (12-15), packed closely in the upper part of the stem in a rosette; dorsal sepal about half as long as the laterals **2. H. alterosula** Snuv. & Westra
- 19b. Leaves \pm evenly arranged on the stem, sometimes more concentrated toward the basal part; dorsal sepal about equal in length as the laterals 20

- 20a. Stem and leaf-sheaths distinctly blackish maculate; leaves with narrow scarious margins
15. H. monorrhiza (Sw.) Rchb. f.
- 20b. Stem and leaf-sheaths not spotted; leaves without scarious margins 21
- 21a. Pedicel of ovary elongated, up to 8 cm long 22
- 21b. Pedicel short or inconspicuous, less than 1 cm long 24
- 22a. Pedicel 4-8 cm long; spur commonly much more than 10 cm, up to 20-25 cm long, subaquatic plant **13. H. longicauda** Hook.
 A. Spur present subsp. **longicauda**
 B. Spur absent subsp. **ecalcarata** Snuv. & Westra
- 22b. Pedicel of ovary 1.5-2(-2.5) cm long, spur 2-4 cm long; terrestrial plant 23
- 23a. Flowers spreading, \pm in a right angle to the axis, rather small; dorsal sepal 4-5 mm long; spur narrowly cylindric, very slender throughout, the apex mostly hidden among the bracts; rostellum middle lobe broadly triangular, slightly overtopping the anther-loculi
24. H. rodeiensis Barb.-Rodr.
- 23b. Flowers slightly spreading and larger: dorsal sepal 6-7 mm long; spur cylindric, slightly thickened in the distal part, often curved outwards; rostellum middle lobe prominent and hooded, clearly overtopping the anther-loculi **11. H. lehmanniana** Kraenzl.
- 24a. Subaquatic plants, growing in swamps and even on floating mats in shallow water; rhizome elongated, with long roots **23. H. repens** Nutt.
- 24b. Plants of dry and wet habitats, growing in savannas, grassy hillsides among shrubs and in woodland; rhizome not evidently elongated 25
- 25a. Anterior petal lobe shorter or at most equally long as the posterior, rarely reduced to a short tooth or sometimes even obsolete 26
- 25b. Anterior petal lobe clearly longer than the posterior 29
- 26a. Inflorescence loose, 3-12-flowered 27
- 26b. Inflorescence dense, many-flowered 28
- 27a. Leaves green, linear-lanceolate, up to 20 cm long, 8-12 mm wide; sepals green, petals and lip yellow or yellowish-green; lobes of lip nearly equal in length, narrow-oblong, broadest in the middle (2-3(-4) mm), narrowed towards the base and apex, up to 14 mm long; middle lobe of rostellum prominent and hooded, projecting beyond the anther-loculi
21. H. pratensis (Lindl.) Rchb. f.
 A. Flowers large: sepals 11-15 mm long var **pratensis**
 B. Flowers small: sepals 7-10 mm long var. **parviflora** Cogn.
- 27b. Leaves bluish-green, reduced in size, the lower sheaths-like, the remainder lanceolate, the largest 5-6 cm long; flowers green, lobes of lip 5-7 mm long, linear, side lobes somewhat narrower; middle lobe of rostellum inconspicuous, bluntly triangular
26. H. roraimensis Rolfe
- 28a. Inflorescence as a rule very dense; flowers yellowish-green and very small: dorsal sepal 3(-4) mm long, lateral lobes of lip shorter and narrower than the broader, ligulate middle lobe (2.5-3.5 mm long, 1 mm broad) **19. H. parviflora** Lindl.
- 28b. Inflorescence moderately dense; flowers green and larger: dorsal sepal 5-7 mm long, middle lobe of lip fleshy, ligulate, (4-)5(-6) mm long, 1.5 mm broad, lateral lobes linear-filiform, variable in length, but usually only slightly shorter than the middle lobe
9. H. gollmeri Schltr.
- 29a. Spur much longer than ovary with pedicel, 3-6(-10) cm
22. H. quinqueseta (Michx.) A. Eaton

- 29b. Spur \pm the length of ovary with pedicel, 7-20 mm. 30
- 30a. Stem with numerous leaves along its length, gradually passing over into the bracts
8. *H. entomantha* (Llave & Lex) Lindl.
- 30b. Stem with a few remotely arranged leaves, mainly in the lower part, clearly separated from the bracts 31
- 31a. Stem rather stout; inflorescence few-flowered; flowers up to 10, larger sepals 12-14 mm long; petals and lip lively yellow, the lateral lobes of lip curving upwards parallel to the erect anterior lobes of the petals **25. *H. rodriguezii*** Cogn.
- 31b. Stem rather slender; inflorescence many-flowered, dense; flowers smaller: sepals 6-7 mm long; petals and lip greenish; the lateral lobes of lip diverging, but not curved upwards
27. *H. schomburgkii* Lindl. ex Benth.

1. *Habenaria alata* Hook., Exot. Fl. 3: t. 169 (1826)

Type: Lesser Antilles, St. Vincent, *Guilding, s.n.* (K)

Specimens examined. — Surinam: without precise locality, *Splitgerber 282!* (W).

Distribution outside the Guianas. — Central-America, tropical South-America, Antilles, Southern United States.

Notes. — *H. alata* has a wide distribution in tropical Central- and South-America, growing in a variety of habitats, such as grassy hillsides, among shrubs in open woodland, but also in savannas and on riversides; in Venezuela in a remarkable range of altitudes from 300-3000 m, mainly around 1000 m. In the Guianas it has been collected — as far as I could find out — only once, but it can be expected to occur throughout the area of the present Flora.

According to my findings, *H. hexaptera* Lindl. (Type from Minas Gerais) could be identical with *H. alata*. If Lindley's specification in the protologue "petalis lineari-oblongis, obtusissimis" proves to be right for the Brazilian *H. hexaptera*, than *H. alata* differs clearly with the petals having an acute apex. The gatherings from Brazil, Bolivia and Peru which I could examine, have subobtusely or acute petals. Particularly this feature, as well as the winged ovary are characteristic for *H. alata*, and also for *H. parvidens* from Peru, which is closely allied or probably conspecific. I mention this relationship as SCHWEINFURTH (1958, p. 32) already suggested that the 3 concepts may prove to be conspecific. On the Herbarium-sheet of the gathering *Splitgerber 282* from Surinam the name *parvidens* has been given by REICHENBACH (1859). This collection is identical with *H. alata*. More investigation is necessary to decide whether the 3 concepts *alata*, *hexaptera* and *parvidens* are specifically well defined entities or whether they should be better arranged within the range of variability of *H. alata* Hook.

H. alata is flowering in Venezuela from August (in lower regions already in July) to December.

2. *Habenaria alterosula* Snuverink & Westra, Acta Bot. Neerl. 30(3): 235, f. 2 (1981); Marga C. M. Werkhoven, Orchids of Surinam: 141, col. phot. (1986).

Type: Surinam, *P. Teunissen 1635* (holo BBS).

Specimens examined. — **SURINAM:** Distr. Marowijne: Lelygebergte, in forest, 650 m, 29.5.1976, *M. & P. Teunissen 1635!* (holo BBS); Emma Range: forest on almost bare granite rocks, 24.5.1963, *Wessels Boer 1471!* (U); Grote Hendriktop, 500 m, 22.8.1959, *Daniëls & Jonker 1274!* (U); Wilhelmina Mts.: forested middle slopes of Frederik Top SSE of Juliana Top, 650-800 m, 23.8.1963, *Irwin & al. 55011!* (U, NY). **FRENCH GUIANA:** Kwata Kwima, SE part, *Grenand 1274!* (CAY); Trois Sauts, forêt humide oval de Pakusili, 8.6.1975, *Grenand 1018!* (CAY)

Distribution. — Surinam and French Guiana, endemic.

Notes. — *H. alterosula* is a typical forest plant with the many leaves arranged closely in a rosette in the upper part of the stem and with foliaceous, ovate, acute or acuminate bracts. Another speciality is the size of the sepals: the laterals are apr. twice as large as the dorsal-sepal. This development is also characteristic for another nearly related forest-*Habenaria* — *H. avicula* Schltr. — known from Panama, Venezuela and Perú (as var. *peruviana* C. Schweinf., SCHWEINFURTH [1941]).

3. *Habenaria amalfitana* Lehm. & Kraenzl., Engl. Bot. Jahrb. 16: 113 (1892).

Type: Colombia: Dep. Antioquia, in schiefriem Geröll bei Amalfi, 1800 m, 22.9.1884, *F. C. Lehmann 4210!* (holo G).

Syn.: *Habenaria arecunarium* Schltr., Notizbl. Bot. Gart. & Mus. Berlin-Dahlem 6(54): 121 (1914). **Type:** Guyana, auf dem Campos unterh. des Roraima-Gebirges, ca. 1600 m, im Gebiet der Arecuna-Indianer, blühend Dez. 1909, E. Ule 8566.

Specimen examined. — **GUYANA:** Upper Mazaruni, N-slope of Mt. Roraima, on ridge, 2000-2300 m, exposed humid scrub, 17.2.1985, *Renz 14051* (U, Herb. RENZ).

Distribution outside Guyana. — Ecuador, Colombia (Antioquia, Meta), Venezuela (Trujillo, Merida, Aragua), Antilles (Puerto Rico).

Notes. — This is a widespread, but rather scattered occurring *Habenaria*, growing in a wide range of habitats and altitudes from 700 m (Puerto Rico, Sierra de Luquillo, in rainforest, *Renz 9927*) up to 2500 m (Venezuela, Est. Trujillo, Alto del Tornon, in sphagnum bog, *Renz 4371*).

The leaves are somewhat bluish-green; the sepals green to olive-green; lip and petals light green. The minutely papillose tips of the short anterior lobes of the petals and the lateral lobes of the lip are characteristic.

The flowering time extends from (June)-July to December(-January).

4. *Habenaria amambayensis* Schltr., Fedde Rep. 16: 353 (1920); Fedde Rep. Beih. 58: T. 1, Nr. 1 (1930).

Syn.: *Habenaria savannensis* Renz, in sched. (NY).

Type: Paraguay: in altaplanitie "Sierra de Amambay", Febr. 1913, *E. Hassler 10969* (holo: B, destroyed; iso G, K, Z).

Specimens examined. — **GUYANA:** Sand Cr., Rupununi River, savanna, Aug. 1948, *Forest Dep. Field No. WBI!* (BRG); Rupununi Northern Savanna, Mountain View Nappi, grassland with scattered trees, ca. 100 m, 10.9.1943, *Gooland & Persaud 624!* (NY), 21.8.1963, *Gooland 518!* (NY); Rupununi Distr., Manari, wet place in savanna, 22.10.1979, *Maas & Westra 3762!* (NY, U); Rupununi Distr., Chaakoitou, near Mountain Point, wet savanna, 26.10.1979 (in fruit), *Maas & Westra 4048!* (U, NY). **FRENCH GUIANA:** Kourou, 13.7.1914, *Mission R. Benoist 1473!* (P). **NE-BRAZIL:** Roraima, Limao, among lush grass in shallow flooded marsh, 21.9.1927, *Tate 75!* (NY).

Distribution outside the Guianas. — Paraguay (type), Brazil. Can be expected to occur in the savannas of Eastern Venezuela (Est. Bolivar, Territorio Amazonas).

Notes. — *H. amambayensis* is a widespread, but not abundantly occurring plant, preferring wet savannas and even semiaquatic habitats. Although this entity is quite uniform in appearance, it has been collected several times under different names: SCHLECHTER (1920) compared it with *H. repens* as the nearest relative; SNUVERINK & WESTRA (1983) identified it with *H. repens*; Benoist the plant from French Guiana with *H. setacea* and SCHWEINFURTH (1948) placed the plant from the Brazilian Roraima (on the Herbarium-sheet) in the affinity of *H. caldensis*. But all these *Habenaria*-taxa are well distinct from the type specimen of *H. amambayensis*. The Guiana plants correspond in their measurements of the flower parts with the description and illustration of the type specimen from Paraguay.

H. amambayensis is characterized by a leafy stem with many long, linear-lanceolate, acuminate leaves. The inflorescence is cylindrical, elongated (up to 20 cm) and densely many flowered. The lateral segments of the lip and the anterior segments of the petals are 1.5-2 times longer than the corresponding middle lobe and the posterior petal-lobe.

The flowers are reported to be green (the sepals) and white (petals and lip).

In the Guianas the flowering time extends from July to September.

5. *Habenaria ayangannensis* Renz, spec. nov. — Fig. 1.

Affinis *H. leprieurii* Rchb. f., a qua bracteis ovatis, quam ovario sessili multo brevioribus, calcarum ovario dimidio brevioribus, capsulis maturescentibus a rachidi distincte patentibus (habitu similis *Wulfschlaegelia* aphyllae) bene distinguenda.

Typus: Guyana. *Tillet & Boyan 44892!* (p.p. cum *H. leprieurii*) (holo NY).

Very slender savanna plant, up to 20-30 cm high. Tubers unknown. Stem straight or slightly flexuous, remotely leafed throughout its length. Leaves 5-6, from a sheathing base very narrow linear-setaceous, acuminate, rather short. Inflorescence laxely 3-7-flowered. Bracts much shorter than the sessile ovary, ovate, acute, up to 5 mm long. Flowers very small, greenish. Sepals slightly 3-nerved; dorsal sepal erect, concave, broadly ovate or almost circular, apiculate, 2.5 mm long and wide; lateral sepals slightly longer, obliquely ovate, up to 2 mm wide. Petals bipartite, posterior segment erect, oblong-lanceolate, subobtusely, slightly falcate, 2-nerved, 2.5 mm long, up to 1 mm wide; anterior segment narrowly linear, up to 2 mm long. Lip 3-lobed, divided nearly to the base, lobes about equal in length, midlobe linear-ligulate, subacute, up to 3 mm long, lateral lobes diverging, linear, somewhat tapering towards to apex, up to 3.2 mm long. Spur filiform, slightly dilated towards the apex, up to 7 mm long, about half as long as the ovary. Column short, obtuse, with short anther-canals and short stigmatic processes. Ovary cylindrical, up to 15 mm long, very widely spreading when ripening.

Specimen examined. — **GUYANA:** Ayanganna Plateau, Upper Mazaruni River Basin, Haieka savannah, E-side of Haieka-river, E. of Chinowieng village, 740 m, 21. July 1960. *St. S. & C. L. Tillet & R. Boyan 44892* (Type, NY). (together with *H. leprieurii* Rchb. f. on the same Herbarium-sheet).

Distribution outside the Guianas. — So far only known from the type-locality. It can be expected to occur in adjoining Venezuela (Est. Bolivar).

Notes. — *H. ayangannensis* is a typical savanna plant. It has been collected in the same habitat together with *H. leprieurii*, and both plants can be easily confused. It can however be recognized by the short bracts, in contrast to the bracts of *H. leprieurii*, which are extended into a long bristle-like apical part. Very characteristic is also the aspect of plants with mature capsules, which are spreading from the rachis, giving the appearance of a *Wulfschlaegelia aphylla*. Beside these more striking features there are also some differences in the relative length of the lip- and petal-segments.

The short bracts of *H. ayangannensis* are unique among the group of similar and partly still insufficiently known *Habenaria* such as *H. mesodactyla* Griseb., *H. culmiformis* Schltr. and *H. leprieurii*, all occurring in a wet savanna-biotop.

6. *Habenaria caldensis* Kraenzl., Engl. Bot. Jahrb. 16: 128 (1892).

Type: Brasilia, dans les marécages des environs de Pocos de Caldas, *Regnell 1181*.

Syn.: *H. paludosa* Barb.-Rodr. in Gen. Spec. Orchid. 1: 153 (1877), nom. illegit. **Type:** Brasilia, Poços de Caldas, *Regnell 1181*.

Specimens examined. — **GUYANA:** H. M. P. S. Mazaruni, *Fanshawe M. 153!* (K); Horobea Savanna, *Ward 185* (K); Rockstone Railroad Track, *Gleason 594!* (NY), *673!* (NY), *737!* (NY);

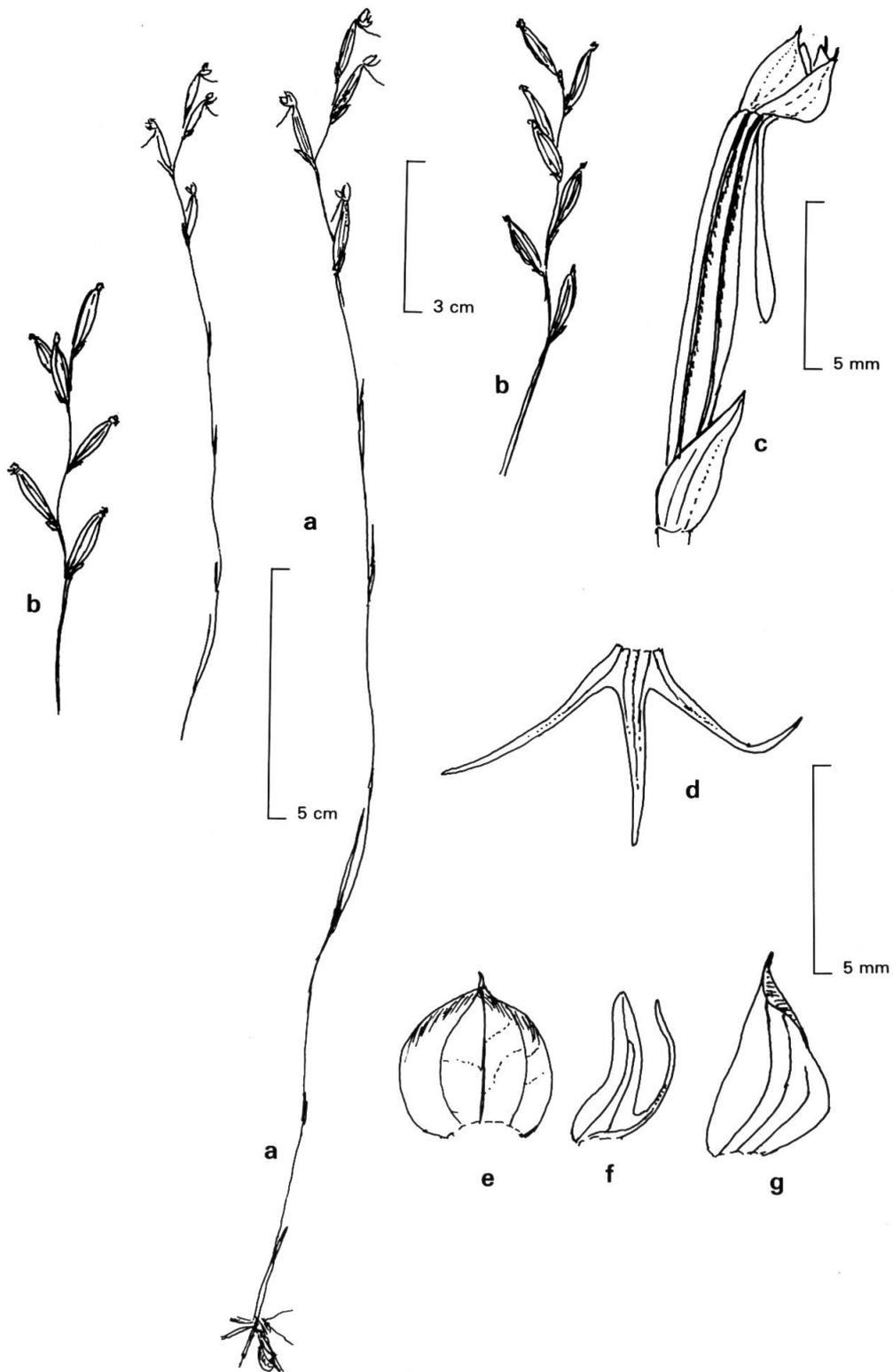


Fig. 1. — *Habenaria ayangannensis* Renz, Tillet & Boyan 44892 from Guyana.
a, flowering plant; **b**, inflorescence fruiting; **c**, flower with bract; **d**, lip; **e**, dorsal sepal; **f**, petal; **g**, lateral sepal.

Rupununi River, Sand creek, Aug. 1948, *Wilson-Browne 2!* (K), *Forest Dep. Field No WB 2!* (NY). **SURINAM:** Zanderij, *Geyskes 103!* (BBS).

General distribution outside the Guianas. — Venezuela (Est. Bolivar), Brazil, Perú.

There is some uncertainty on the concept *H. caldensis*. I have not seen living material. The description and illustration of the Peruvian plant (DODSON & BENNETT, 1989, pl. 76) does not correspond well with the Guiana-plants, which on the other side fit the original description of *H. paludosa* (Barbosa-Rodrigues 1877, p. 153 and KRAENZLIN, 1892, p. 128) in all details and also the illustration of *H. caldensis* (COGNIAUX, 1893, p. 70, plate 13, f. 2; HOEHNE, 1916, tab. 166 & 167/III).

The flowers are white according to a note by Jobert on the Herbarium label for a plant from Northern Brazil (Pará: Marajo, Jobert 141 (P)).

7. *Habenaria dusenii* Schltr., Fedde Rep. 16, 251 (1919); Fedde Rep. Beih. 58 t.2, Nr. 7 (1930).

Type: Brasilia: Pará, 23-Turmac, locis paludosis, Oct. 1914, *P. Dusen 15709* (B lost).

Specimens examined. — **SURINAM:** Sipaliwini savanna on Brazilian frontier, 280 m, 24.1.1969, *Oldenburger, Norde & Schulz ON 970!* (K); Distr. Saramacca, Rudi Kappel airstrip, 8.8.1981, *Werkhofen UVS 16637* (K). **FRENCH GUIANA:** Région de Kourou, savane Matiti, 27.11.1978, *Sastre 6370* (P).

General distribution outside the Guianas. — Brazil (Paraná), Venezuela (Territorio Amazonas).

Notes. — The inflorescence with only a few, rather large, greenish-yellow flowers and the long spur (25-35 mm), combined with the slender appearance, are distinctive for this rare plant, which can easily be separated from the other *Habenaria*, growing in the savannas.

The flowering period extends from July to December (and January).

8. *Habenaria entomantha* (Llave & Lex.) Lindl., Gen. & Sp. Orch. Pl.: 311 (1835).

Type: Mexico, prope Vallisoletum, *Llave* (M).

Basionym: *Orchis entomantha* Llave & Lex., Nov. Gen. Descr. 2: 8 (1824).

Syn.: *Habenaria moritzii* Ridley, p.p. in Trans. Linn Soc. London, Ser. 2, Bot. 2: 284 (1887);

Type: Guyana, Roraima, 4000 ft., *Im Thurn 367* (K).

Specimens examined. — **GUYANA:** Roraima, 1200 m, *Im Thurn 367!* p.p. (K, as *H. moritzii* Ridl.); Rupununi Northern Savanna, grassland with scattered trees near Wachabai, ca. 100 m, 20.8.1963, *Goodland & Maycock 482!* (NY), 28.8.1963, *Goodland 518!* (NY); Orinduik, Ireng River, 12.8.1984, *Harrison 1426!* (K). **SURINAM:** Coesewijne Savanne, *Teunissen 1416a* (U); Lobin Savanna, distr. Para, 2.4.1972, *Teunissen 1101!* (U, Z); Road to Hannover, distr. Para, 30.4.1978, *Teunissen 1338!* (K).

General distribution outside the Guianas. — C-America, Columbia, Venezuela (also Mt. Roraima, Philipp Camp, 1600-1800 m, 7.11.1927, *Tate 304!* (NY)).

Notes. — *H. moritzii* Ridley is of special interest in connection with *H. entomantha*. RIDLEY (1887) assigned two collections to the type: Roraima, 4000 ft. *im Thurn 367* and Venezuela, *Moritz 630b* (RIDLEY, 1887 and ROLFE, 1901). These entities represent two different taxa. According to the description, the *Roraima* plant fits well with *H. entomantha*; the Venezuelan plant is identical with *H. gollmeri* Schltr. FOLDATS (1969: p. 46) considers *H. moritzii* Ridley to be conspecific with *H. armata* Rchb. f., a plant, which seems to be nearly related to *H. entomantha*. Also SCHWEINFURTH (1967) agreed that *H. armata* and *H. moritzii* are both synonyms to *H. entomantha*. The proportions of the flower parts are indeed similar, only the general habit is quite different. Whether

the vegetative and floral discrepancies are sufficient to keep *armata* and *entomantha* as separated entities can only be decided, when more information from living material is available.

The flowers of *H. entomantha* are yellowish-green. Flowering time extends from August to December.

9. *Habenaria gollmeri* Schltr., Fedde Rep. Beih. 6: 27 (1919), Beih. 42: t. 1, Nr. 3 (1929).

Type: Venezuela: Miranda, Silla de Caracas 1.1856, *Gollmer, s.n.* (AMES).

Syn.: *Habenaria moritzii* Ridl. p.p. in Trans. Linn. Soc. London, ser. 2, Bot., 2: 284 (1887),

Type: Venezuela: Prov. Aragua, *Moritz 630b*. *H. moritzii* from Guyana: Roraima, Im *Thurn 367* is identical with *H. entomantha*.

General distribution. — Venezuela, Colombia, Ecuador. Has not yet been recorded from the Guianas.

Notes. — *H. gollmeri* is in Venezuela one of the most widespread and abundant *Habenaria*, growing in a wide range of habitats and altitudes, preferably in the montane region between 1500-2000 m, but going occasionally up to 3000 m, in Colombia (Paramo da Guasca) also above 3000 m. Favoured localities are grassy hillsides among shrubs, open woodland on limestone poor soil, often growing together with *Pteridium aquilinum*.

A near relative to *H. gollmeri* is *H. parviflora*. Typical *parviflora* individuals, as they occur in Brazil, Paraguay and Uruguay have within the South-American *Habenaria* the smallest flowers and the densest inflorescences. Such typical *parviflora* have not been observed in Venezuela, where plants having intermediate characters to *H. gollmeri* are the rule. See also the discussion under *H. parviflora*.

H. gollmeri is flowering in Venezuela mainly from July to December.

10. *Habenaria heptadactyla* Rchb. f., Linnaea 22: 812 (1850); R. Schomburgk, Fauna and Flora Guiana: 1123 (1848), tantum nomen.

Type: Venezuela: Dep. Monagas, Caripe, "fl. flavi", *Moritz 615!* (W).

Syn.: *Habenaria viridiaurea* Lindl. ex Kraenzl. in Engl. Bot. Jahrb. 16: 102 (1892), in syn. *Habenaria lepreurii* Rchb. f. var. *heptadactyla* (Rchb. f.) Schultes, Bot. Mus. Leafl. Harv. Univ. 17(7): 193 (1956).

Specimens examined. — **GUYANA:** Pirare, Jan. 1842, *Schomburgk 634!* (W); Rupununi Distr., Manari, wet places, savanna, 22.10.1979, *Maas & Westra 3763!* (U). **SURINAM:** Lower Saracca River, near Saron, *Kegel 1283*.

General distribution outside the Guianas. — Brazil, Bolivia, Colombia, Panama, Trinidad, Venezuela.

Notes. — This is a very distinct species, which should not be treated as a variety of *H. lepreurii* Rchb. f. Divergent from the latter and other savanna-*Habenaria* are the bright yellow color of the flowers and the short, cylindric and dense inflorescence. The tips of the lateral segments of the lip are more or less distinctly papillose. They are reminding somewhat the osmophores of *Chloraea*-species, but nothing is known to me whether the flowers are fragrant.

11. *Habenaria lehmanniana* Kraenzl., Engl. Bot. Jahrb. 16: 97 (1892).

Type: Colombia: Est. del Cauca, Halbsavanne um Popayan, 1750 m, 23.2.1884, *Lehmann 3689!* (G. in sched. = *H. lehmanni* Kraenzl.).



b

a

Plate 1. — a) *Habenaria lepreurii* Rchb. f., *Renz 14004* from French Guiana, $\times 3$.
b) *Habenaria sprucei* Cogn., *Renz 14002* from French Guiana, $\times 3.3$.



Plate 2. — *Habenaria platydactyla* Kraenzl, Renz 14000 from French Guiana $\times 5$.
a) side view; b) front view.

Specimens examined. — **GUYANA:** No specimen seen. From the border region of Venezuela (Est. Bolivar) several collections are known: Ptari Tepui, 1500-2000 m, forested savanna, 17.12.1952, *Maguire & Wurdack 33861!* (NY); Auyan-Tepui, 2200 m, *Tate 1234!* (NY); El Dorado, 1200-1400 m, 2. 1972, *Steyermark & Dunsterville 105472!* (AMES). **FRENCH GUIANA:** Poste St. Elie, 16.5.1979, *Y. Veyret 1619!* (CAY).

Notes. — *H. lehmanniana* can be confused with *H. caldensis*, which has somewhat smaller flowers and narrower leaves. There are also some differences in the development of the petals and lip. In the case of *H. caldensis* the usually reflexed anterior segments of the petals are slightly longer than the posterior and the lateral segments of the lip exceed in length distinctly the middle segment. The corresponding segments of *H. lehmanniana* are \pm equal in length.

The leaves of *H. lehmanniana* are bluish-green, the sepals mostly dark green to olive-green; the petals and lip light green or white with some greenish. The flowering time extends from (June)-July-December-Februar(-March).

12. *Habenaria leprieurii* Rchb. f. — Plate 1, a, — *Linnaea* 19: 376 (1846).

Type: French Guiana: Cayenne, 1839 *Leprieur 132!* (W).

Syn.: Habenaria culmiformis Schltr., Bot. Centralbl. Beih. 42, Abt. II: 70 (1925); **Type:** Brasilia, Amazonas, Rio Branco, 1913, *Kuhlmann 779*.

Specimens examined. — **GUYANA:** Rupununi Distr. Chaakritou, just S. of Kanaku Mts., Savanna, *Maas & Westra 4030!* in fruit (U, P, Z, NY); Manari, Savanna, 22.10.1979, *Maas & Westra 3761!* in fruit (U, P, Z, NY); Upper Mazaruni River Basin, Haieka savanna, E. of Chinowieng village, 740 m, 21.7.1960, in fruit, *Tillett & Boyan 44892!* (NY); Kaieteur Plateau, sphagnum bog, *Fanshave 23288* (NY). **SURINAM:** Distr. Nickerie, Nature Reserve Sipaliwini, 6.1979, *Teunissen 1259!* (U); Brokopondo Distr., 4 km E. of village Brownsveg, open savanna, wet loamy sand (afterwards lake), 8.3.1966, *van Donselaar 3221!* (U), *Donselaar 2841!* (U); Savanna at km 116,5 along small ditch along railway, 23.4.1940, *Lanjouw & Lindeman 3053!* (U); Rudi Kappel airstrip, distr. Saramacca, 8.7.1981, *Werkhofen UVS 16645* (U); Fransina Savanna, *Teunissen 1261!* (U). **FRENCH GUIANA:** Cayenne, 1839, *Leprieur 231* (G, W); s.l., *Leprieur 104* (K); Savane bordelaise à proximité de la mare au fond de la savane, 4.5.1979, *Veyret 1615, 1616* (CAY); Savane inondée à proximité de Cayenne, 25.3.1976, *Veyret 1359* (CAY); Savane près de Iracombo, 23.3.1979, *Veyret 1600* (CAY); Savane Changement, 6 km de Sinnamary, 16.4.1976, *Sastre 4781a* (CAY); Savane Matiti, SE de Kourou, ca. 10 m, 15.3.1985, *Renz 14004* (Herb. RENZ, Basle); km 21 de Cayenne à Kourou, ca. 10 m, 13.3.1985, *Renz 24005* (Herb. RENZ); Savane Aubanèle, SSW Kourou, 80 m, 9.6.1989, *Cremers & Hoff 10710* (CAY).

General distribution outside the Guianas. — Venezuela (Est. Bolivar), Trinidad, Brazil (Pará, Roraima, Goyaz).

Notes. — Several nearly related *Habenarias* with the typical grass like appearance are growing in the savannas of the Guianas, such as *H. leprieurii* Rchb. f., *H. setacea* Lindl., *H. sprucei* Cogn., *H. platydactyla* Kraenzl., *H. heptadactyla* Rchb. f. and *H. ayangannensis* Renz. Although these 6 Taxa of similar habit with the linear-subulate leaves can be distinguished by the characters outlined in the key, they gave rise to considerable confusion, reflected in ambiguous interpretations in certain Herbarium collections. In Reichenbach's Herbarium (W) on sheet Nr. 51239, labelled *H. leprieurii* are sketches of 3 different taxa, which can be allocated to *H. leprieurii*, *H. platydactyla* and *H. sprucei*.

Nearly allied to *H. leprieurii* is *H. mesodactyla* Griseb. (GRISEBACH, 1864, p. 644) known from Trinidad. According to the protologue the anterior segments of the petals are "twice as long as the linear posterior ones" and the middle segment of the lip is "twice as long as the lateral ones". The anterior segment of the petals of *H. leprieurii* is mostly shorter than the posterior, sometimes equal in length; the 3 lip-segments are very similar in size. *H. mesodactyla* is also reported to occur in Central America and the West Indies (WILLIAMS, 1956). CORRELL (1965) considered this

taxon synonymous with *H. lepriurii*. However the description of the gathering from Honduras does not correspond with the typical *H. lepriurii* from French Guiana. Without having more knowledge from living plants outside the Guianas, I prefer to abstain from reducing *H. mesodactyla* Griseb. to synonym of *H. lepriurii*.

The plant illustrated in WERKHOVEN (1986) as *H. lepriurii* is, I think, near to *H. sprucei* Cogn.

Another plant giving some difficulties in connexion with *H. lepriurii* is *H. culmiformis* Schltr. I consider these two entities identical, based on comparisons of plants from Guyana with those from Brazil (Pará, Amazonas: type from Rio Branco, *Kuhlmann 779*) and Venezuela (Est. Bolivar: Rio Carrao, *Renz 9210*). The spur of *H. culmiformis* is described by SCHLECHTER (1925) as being equal in length as the ovary. The *H. lepriurii*-plants from the Guianas I could examine, have a short spur (usually from half to nearly the same length of the ovary). The other flower parts are very similar in size, form and position.

The flowers of *H. lepriurii* are green, the petals and lip sometimes yellowish-green or light brownish-green. The flowering time in the Guianas extends from (February-)March to July.

13. *Habenaria longicauda* Hook., Bot. Mag. t. 2957 (1829).

Type: Guyana, Demerara, Parker, s.n. (holo: K, iso: G).

H. longicauda subsp. **ecalcarata** Snuverink & Westra, Acta Bot. Neerl, 30(3): 237 (1981); **Type:** Surinam, Javaweg near Lelydorp, about 20 km from Paramaribo, 17.3.1950, *Geijskes 23!* (holo: U, iso: AMES; BRS, HB, K, MO, NY, P, VEN).

Specimens examined. — **GUYANA:** North-West District, Waini River, 4.1923, *De la Cruz 3762* (K, NY), *De la Cruz 1131* (also subsp. *ecalcarata*, K, NY, AMES); Demerara River, vicinity of Wismar, *De la Cruz 2440* (K, NY); Tapakuma Creek, Essequibo, freshwater among sedges, 29.4.1976, *Grewal & Persaud 157* (U, also subsp. *ecalcarata*); without locality, savannah, in water, *Jenman 6385* (BRG, NY); Moruka savannah, 9.1929, *Marbyn 151* (BRG); Hoobaboo Creek, 3.1897, *Jenman 7249* (BRG, K); Pomeroron, aquatic, 5.1882, *Jenman 1977* (K, BRG); SE of Georgetown, East Coast Water Conservancy, Lamaha stop-off, 25.11.1919, *Hitchcock 16884* (NY); *Ward, s.n.* (BRG, NY); Mazaruni Station in swampy savanna-like field, 12.8.1937, *Sandwith 1046* (AMES, K); Pomeroron Distr., Waramuri Mission, Moruka River, 10.1922, *De la Cruz 2536* (AMES; NY); Ipacooma lake, aquatic, 2.1882, *Jenman 1637* (BRG); Wanama River, North-West Distr., 5.1923, *De la Cruz 4014* (NY); Anarica, 6.5.1977, *Lall & Murgasen 404*, (U, also *ecalcarata*). **SURINAM:** Without locality, in paludosis, fl. albo-virescenti, *Splitgerber 754* (W); Distr. Marowijne, Perica 12.1.1975, *Teunissen 1452* (U); Fluv. Marowijne inferior, 0,5 km W from Albina, 3.10.1961, *Hekking 1076* (U, NY); near Lelydorp, 25 km S. of Paramaribo, 14.4.1954, *Lindemann 5735* (U); Road to Santigrón at Saramacca Riv., 2 km E. of village, on sand ridge, 24.8.1980, *Lindeman & al. 1* (U, subsp. *ecalcarata*); Distr. Para, Rijdsdijkweg, 9.9.1975, *Lindeman & Teunissen, LBB 15225* (BBS, K = subsp. *ecalcarata*); Distr. Nickerie, Nanniswamp, near Kaaimans Kreek, 26.5.1972, *Teunissen 1255* (K, BBS, U = subsp. *ecalcarata*), Distr. Saramacca, Granmanswamp, 11.1975, *Teunissen 1122* (K, BBS = subsp. *ecalcarata*); Coronie, swamp, 4.5.1928, *Stahel 6849* (U). **FRENCH GUIANA:** Plaine de Kaw, crique Angélique, marais à végétation herbacée flottante, 13.4.1984, *de Granville 6818, 6821* (CAY, U, NY, Herb. RENZ), *Cremers 9589* (CAY); Marais Yiyi, env. de Sinnamary, flottante sur des radeaux d'herbes sans aucun contact avec de fond de l'eau, 2.10.1962, *Hallé 686* (U, P, CAY, K); Mission R. Benoist 1913-14, 15.11.1913, *Benoist 247* (P); without locality, 1876, *Mélinon 352* (P); Route de l'Est, 20.5.1979, *de Granville 1627* (CAY); C.A.S. Mon Repos, 30.12.1958, *Trin J. 1367* (K); Sinnamary, piste de Ste. Elie, bas-fond à Typha, 1.3.1980, "fleur jaunâtre", *Sastre 6874* (CAY).

General distribution outside the Guianas. — Brazil (Amazonas: on the Rio Purus, *Prance & al. 8057, 13665* (NY).

Notes. — *H. longicauda* is one of the largest Habenarias growing under unique conditions in very wet swamps, ditches, creeks and even on floating mats of *Cyperaceae* and grasses in shallow



a



b

Plate 3. — a) *Habenaria praterensis* (Lindl.) Rehb. f. var. *parviflora* Cogn., *Renz 14009* from French Guiana, $\times 4.8$.
b) *Habenaria trifida* H.B.K., *Renz 14006* from French Guiana, $\times 2$.

water. Unusual is also the extremely long, filiform spur (up to 25 cm) with its end hidden behind the leaf-sheaths. The spur can be sometimes completely absent in plants occurring throughout the range of distribution in the Guianas. Nothing is known about the pollinators.

The flowers are green or light green (rarely whitish); with the age of the flowers the color turns to yellowish-green. Flowering all through the year.

A very near relative to *H. longicauda* is the Brazilian *H. macronectar* (Vell.) Hoehne (1940); Basionym: *Orchis macronectar* VELLOSO (1835); Syn.: *H. sartor* Lindl. (1843). Some characteristic features of the floral parts — such as the long undivided lip-base, the length of petal- and lip-segments, the development of anther canals and stigmatic processes — are pretty well in accordance; but the spur of *H. macronectar* is only about half as long. The length of the spur is obviously constant for the two plants and I prefer to keep *longicauda* and *macronectar* as separate entities, as long as this character is not sufficiently confirmed.

14. *Habenaria macilenta* (Lindl.) Rchb. f., Flora (Regensburg) 48: 180 (1865).

Type: Guyana, s.l., *Schomburgk, s.n.* (iso: W)

Basionym: *Bonatea macilenta* Lindl. in Hook. London Journ. Bot. 2: 673 (1843), **Type:** "British Guiana" *Schomburgk* (W).

Syn.: *Habenaria muelleriana* Cogn., Fl. Brasil. 3(4): 72 (1893). **Type:** French Guiana, s.l., 1839/40, *Leprieur, s.n.* (holo: W, iso: G). *Habenaria staminodiata* Schltr., nom. illeg., Bot. Centralbl. Beih. 42 II: 74 (1925), non Schlechter in Fedde Rep. 10: 3 (1911), from Celebes. *Habenaria staminodiifera* Mansf., nom. nov., Fedde Rep. 28: 93 (1930).

Specimens examined. — **GUYANA:** Without precise locality, *Schomburgk, s.n.* (W). **SURINAM:** Sipaliwini savanna on Brazilian border, *Oldenburger & al. 970* (U). **FRENCH GUIANA:** Without precise locality, *Poiteau, s.n.* (W), 1838, *Leprieur 133* (G), 1839, *Leprieur, s.n.* (G), 1840, *Leprieur, s.n.* (G, P).

Distribution outside the Guianas. — Brazil (Amazonas).

Notes. — *H. macilenta* is a rare savanna species restricted to the Guianas and neighbouring regions of Brazil. Already LINDLEY (1843) accentuated the near affinity to *H. pauciflora* = *H. trifida* H. B. K., which is a widespread *Habenaria*, occurring from C-America southwards to Brazil and Argentina. There are some distinct differences between these two taxa: *H. macilenta* is a smaller and more delicate plant with slightly smaller flowers and a shorter spur with the apical part clubshaped and acute. Both plants have similar and well developed, about 2 mm long, strap-shaped staminodes.

I have not seen living material of this plant. No mention is given in literature or on Herbarium labels about the color of the flowers. It would be important to have details and to know whether they differ from those of the related *H. trifida* with greenish sepals and white petals, lip and spur.

15. *Habenaria monorrhiza* (Sw.) Rchb. f., Ber. Deutsch. bot Ges. 3: 274 (1885). **Type: Jamaica, Swartz, s.n. (BM).**

Basionym: *Orchis monorrhiza* Sw., Nov. Gen. & Spec Pl. Prodr.: 118 (1788).

Syn.: *Habenaria maculosa* Lindl., Gen. & Spec. Orch. Pl.: 309 (1835).

Distribution. — Throughout the American tropics.

Notes. — This characteristic *Habenaria* with the brownish or blackish maculate or striate leaf-sheaths and white flowers (sometimes flushed with some greenish) has not yet been collected in the Guianas. As it is widespread and locally abundant in neighbouring Venezuela and over the whole of the American tropics, it can be expected to be found also in the Guianas. In Venezuela it grows

mainly in altitudes below 2000 m (in Colombia up to 2200 m) on grassy, moist hillsides and is flowering from September to December.

16. *Habenaria montis-wilhelminae* Renz, spec. nov. Fig. 2.

Affinis *Habenaria campos-portei* Schltr. et *Habenariis* graminifoliaceis guianensibus (viz.: *ayangannensis*, *heptadactyla*, *leprieurii*, *platydactyla*, *setacea*, *sprucei*), ab illa statura graciliore, foliis anguste linearibus, inflorescentiis laxe paucifloris, calcari apice leviter incrassato necque vesiculato-inflato, ab his petalis margine anteriore basi dente brevi instructis, labello basi latere utrinque lobulo brevi, subfalcato ornato, bene distinguitur.

Typus: Surinam, *G. Stahel 580!* (holo U); 576 (syn.: BW 7142); 578a (para: BW 7117a).¹

Terrestrial slender plant, 30-60 cm high. Tubers ellipsoid, sometimes on 1-4 cm long stalks. Stem straight or somewhat flexuous, at base with 1-2 blackish-maculate sheaths, above with 5-7 rather remotely arranged, narrow-linear, long-acuminate leaves, diminishing in length upwards, the uppermost similar to bracts. Inflorescence up to 10 cm long, laxely 3-6 flowered, occasionally one-sided. Bracts tapering from an ovate base to a fine point, the lower slightly shorter than the ovary, the uppermost about half as long. Flowers erect, greenish or yellowish-green. Sepals finely triner-ved; dorsal sepal erect, broadly ovate, obtuse, 6.5 mm long, 5-5.5 mm wide; lateral sepals deflexed, obliquely ovate-lanceolate, subobtuse, 7 mm long, 3 mm wide. Petals lanceolate, falcate, subacute, 6 mm long, 2-2.5 mm wide, on the anterior margin produced into a toothlike, about 0.5-1 mm long appendage. Lip trilobed from a up to 1 mm long undivided base, on each side with c. 2 mm long, linear, falcate lobules, middle lobe linear-ligulate, 8 mm long, about 5 mm from the apex somewhat geniculately bent. Spur cylindrical, moderately dilated in the apical half, up to 10 mm long. Column 1.5-2 mm high, with outcurved short anther-canals and porrect, fleshy stigmatic processes; rostellum midlobe narrowly triangular, acute, about 0.5 mm long.

Specimens examined. — **SURINAM:** Wilhelmina Gebergte, 1.8.1926, on the ascent to the granitic top 1040 m from Oost-River, 3°35'N., 56°20'W., *G. Stahel 580!* (type: U); Wilhelmina Gebergte, 9-14,5 km N. of Lucie River, in east drainage of Oost-River, 450 m, on granitic outcrop in forested hills, 21.7.1963, *Maguire & al. 54275* (NY, U); Wilhelmina Gebergte, 25.6.1926, *Stahel 548* (U, AMES).

Notes. — This striking species is apparently uncommon and only known from the Wilhelmina Mts. of Central Surinam. Although the lip and petals show near affinities to the Brazilian *H. campos-portei* Schltr., the grass like leaves and the spur without a vesicularly inflated tip indicate a clear relationship to the group of slender savanna plants, such as *ayangannensis*, *leprieurii*, *platydactyla*, *setacea* and *sprucei*.

17. *Habenaria obtusa* Lindl., Gen. & Sp. Orch. Pl.: 315 (1835).

Type: Brasilia: in radice montis Itacolumi at Villa Ricca, prov. Minarum, *Martius, s.n.*

Specimens examined. — **GUYANA:** Rupununi Northern Savanna, Takutu paddock, 2 miles S. of St. Ignatius, 10-11.8.1963, grassland with scattered trees, ca. 100 m, *Goodland & Maycock 351* (NY); Makushi area, dense Curatella shade, ca. 100 m, 21.8.1963, *Goodland & Maycock 489* (NY); Rupununi district, foothills N.W. Kanku Mts., near Moco-Moco-village, 100 m, dry savanna under shrub, *Maas & Westra 3846* (U); Karanambo, savanna on sandy clay, 4.9.1988, *Maas & al. 7260* (U); Pirara, 8.1842, *Schomburgk 700* (W); in pratis apricis Macouriae, 1869, *Herb. A. Rich.* (W, P). **SURINAM:** Nat. Reserve Sipaliwini, *Teunissen 1256* (U, BBS); Surinam River, near Joden Savanna, *Splitgerber 856* (vide: REICHENBACH fil., 1859).

Distribution outside the Guianas. — Colombia, Venezuela, Brazil, Perú.

¹I am grateful to Mr. J. C. Lindmann, Utrecht, for a personal communication from Prof. Stahel's daybook.

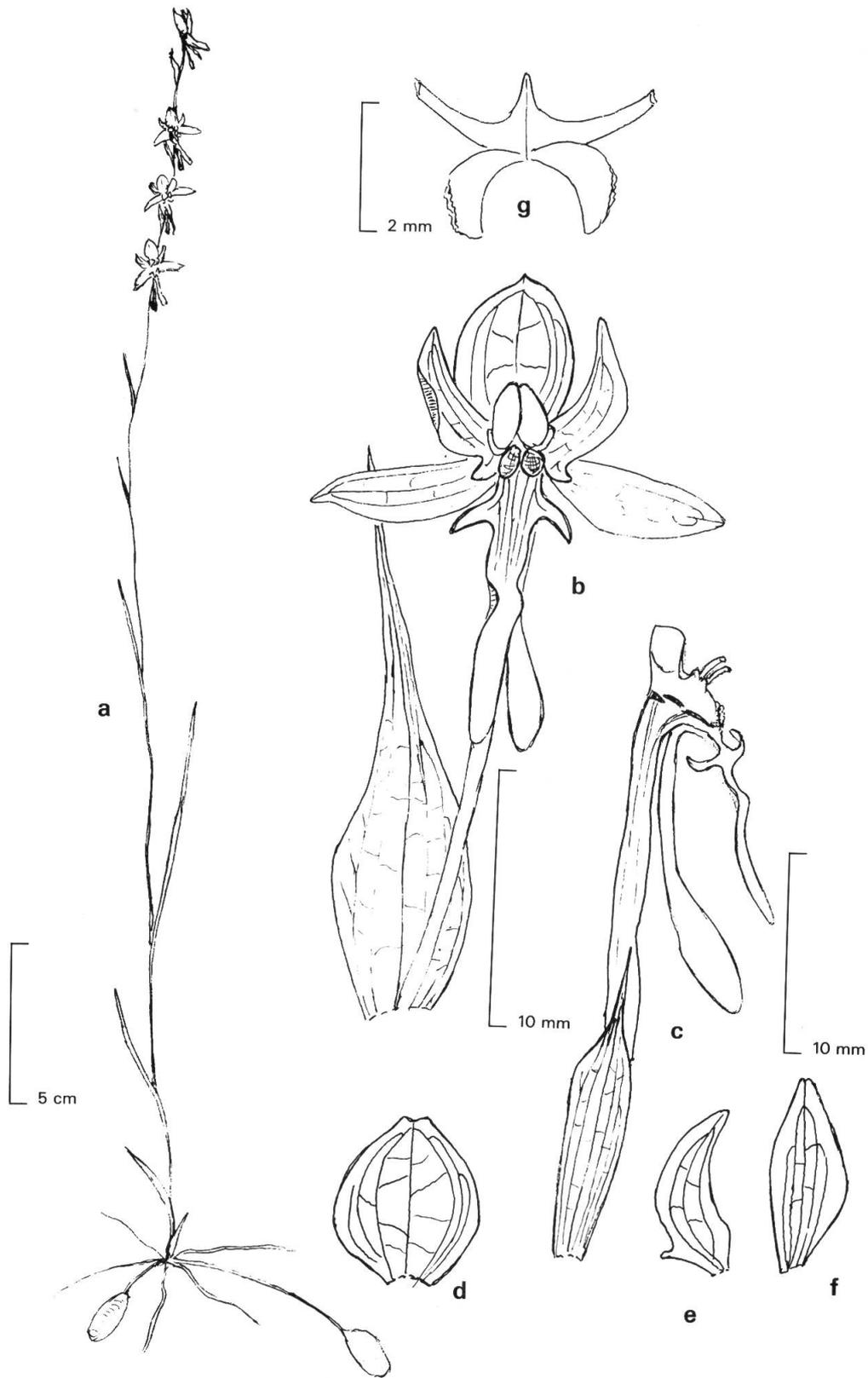


Fig. 2. — *Habenaria montis-wilhelminae* Renz, *Stahel 580* from Surinam.
 a, flowering plant; b, flower with bract, front view; c, flower, sepals and petals removed, side view; d, dorsal sepal; e, petal;
 f, lateral sepal; g, rostellum and stigmas.

Notes. — *H. obtusa* has large foliaceous, obviously darker green reticulate bracts and an elongated spur (4-5 cm). From the Guianas a related plant has been described by LINDLEY (1843) as *Habenaria seticauda*, being well distinguished by a larger spur ("calcare setaceo acuminato longissimo bene distinguenda"). I could examine the narrowly cylindrical spur of *Habenaria obtusa* from many localities in Venezuela and Colombia and found the average length to be fairly constant between 4-5 cm. *Habenaria seticauda* has a filiform spur about twice as long: the plant from French Guiana has a 10 cm long spur.

WARMING (1884) illustrated two flowers of *H. obtusa* from Brazil: one with a long spur, the other with a short spur of appr. 1/2 the length. All the samples from Brazil, I could examine, match well with the characters of *H. obtusa*.

The flowers of *H. obtusa* are green and white: the lateral sepals are green, the dorsal sepal white, sometimes flushed with greenish or light green, the petals and lip are white or light greenish. The spur is white and towards the tip greenish. Flowering time extends from July to October(-November).

18. *Habenaria odontopetala* Rchb. f., *Linnaea* 18: 407 (1844).

Type: Mexico: "temperiertes Mexico", *Leibold, s.n.* (W).

Specimens examined. — GUYANA: Upper Mazaruni, Mt. Ayanganna, 900-1100 m, 7.8.1960, mixed evergreen forest between first and second cliffs along NE-side, *Tillet & Boyan 45187* (K, NY); Upper Potaro River, Wokomung base camp and vicinity, 1070-1160 m, 30.6.1989, *Boom & Samuels 8997* (NY). VENEZUELA/GUYANA: Border area: Est. Bolivar, La Escalera, 900 m, forest, March 1959, *Renz 9384* (herb. RENZ, Basel); Est. Bolivar, Rio Venamo, bosque humedo montanoso, vicinidades del salto, 900 m, 9.1.1964, *Steyermark & Dunsterville 92901* (NY).

Distribution outside the Guianas. — Florida, Antilles, trop. America.

Notes. — The plants from Guyana and Eastern Venezuela are robust and have a densely leafy stem with an elongated, rather loosely many flowered inflorescence (up to 35 cm). The lateral sepals are commonly reflexed and longer than the hooded dorsal sepal (9-10 mm in relation to 6-7 mm). The petals are rectangular, often somewhat curved with an unequally 3-dentate, truncate apex and at base on the anterior edge with a small triangular-lanceolate tooth. The fleshy linear lip is slightly flexuous, up to 15 mm long and at base with a pair of small teeth oriented at right angles. The slenderly cylindrical spur is appr. as long as the ovary with the short pedicel.

A similar plant is *H. floribunda* Lindl. from Perú (Type: without precise locality, *Haenke, s.n.* (BR)), but the lip of the type specimen has no tooth-like appendages at base.

The relationship and geographical distribution of several close allies of *H. odontopetala* (*autumnalis* Poepp. & Endl., *floribunda* Lindl., *parvidens* Lindl., *petalodes* Lindl., *quadrata* Lindl., *selerorum* Schltr.) are not yet clear.

H. odontopetala is growing in Eastern Venezuela and Guyana in forests and is flowering from December to March. The leaves are membranous and dull green, the flowers pale green and fragrant at night.

19. *Habenaria parviflora* Lindl., *Gen. & Sp. Orch. Pl.*: 314 (1835).

Syntypes: Brasilia: frequens prope Bahiam, Salzmann; in monte Corcodavo ad Rio Janeiro, *Martius* (G).

Syn.: *Habenaria demerarensis* Rchb. f. ex Schomburgk, *Fauna et Flora Guiana*: 1123 (1848). **Type:** Guyana angl.: s.l., *Schomburgk 1283!* (sketch in W).

Specimens examined. — GUYANA: Mt. Roraima, 1500 m, *im Thurn 46, 251* (K); Upper Mazaruni River, near mouth of Partang River, Merume Mts. 460 m, Imbaimadai Savanna, 16.1.1960,

Maguire 43864 (NY). **VENEZUELA/GUYANA:** Border area: Est. Bolivar, Mt. Roraima, SW-facing quebrada near Rondon Camp, 2040 m, 25.9.1944, *Steyermark 58648* (AMES).

Distribution outside the Guianas. — Venezuela, Colombia, Brazil, Uruguay, Paraguay, Argentina.

Notes. — *H. parviflora* Lindl. belongs among the S.-American Habenarias to the species with the smallest flowers. Widespread in Brasil and Uruguay, it becomes rarer in the Guianas and in Venezuela, but also less characteristic as the inflorescences are laxer, the flowers somewhat larger (sepals up to 4.5 mm, for the type from Bahia 2.6-3 mm). These plants are already related to *H. gollmeri* Schltr., widely distributed throughout the Northern part of S.-America, especially Venezuela. Also in the Guianas *H. parviflora* has the tendency to approach in appearance and floral characters *H. gollmeri*.

The flowers are light-green to yellowish-green (sepals green, petals and lip yellowish-green), and sweet fragrant (similar to the European *Platanthera bifolia* (L.) L. C. Rich.). Flowering time extends from June to December-January.

20. Habenaria platydactyla Kraenzl. — Plate 2 — Kgl. Sv. Vet. Acad. Handl. 46(10): 9, t. 2, f. 5 (1911).

Type: Brasilia: Paraná, Capao grande prope fluvium Guavirova, in pratis, *Dusén 9089* (S).

Syn.: *Habenaria amazonica* Schltr., Bot. Centralbl. Beih. 42: 69 (1925), Fedde Rep. Beih. 58: t. 1, Nr. 2 (1930). **Type:** Brasilia: Amazonas, Boa Vista, Rio Branco, 1913, *G. Kuhlmann 787* (B, lost).

Specimens examined. — **GUYANA:** Demerara River, *Jenmann 1881* (K); Soesdyke, wet white Savanna, 9.1973, *Coope 299* (U); Kaieteur Plateau, sphagnum bog, 7.5.1944, *Maguire & Fanshave 23288* (NY). **SURINAM:** Western part of Great Sipaliwini savannah on Brazilian frontier, flat sandy valley floor with Paspalum pulchellum, Echinolaena inflexa, 280 m, 14.1.1909, *Oldenburger & al. 927* (U, K); Coesewajne river, distr. Saramacca, savanna, 5.3.1974, *Teunissen 1416* (K), *van Donselaar 592* (U), 28.2.1977, *Lindemann & al. 173* (U); Buffelsavanne along Wanekreek, distr. Marowijne, NE-Suriname, in Rhynchospora globosa vegetation, 29.1.1972, *Teunissen 1170* (U); Kap-pel savanna, prope pedem australem montis Tafelberg, Distr. Saramacca, 300 m, moist open sand savanna, 19.2.1961, *Kramer & Hekking 2963, 2941* (U); Palaime savana, 24.2.1943, *Wessels Boer 795* (U); Zanderij II, on sand, wet savanna, 3.1943, *Stahel, s.n.* (U). **FRENCH GUIANA:** Route de Stoupan, 1 km avant Crique Macrabo, Savane, formation basse périodiquement inondée, 24.2.1968, *Sastre 14* (CAY); Savane arborée sous la Montagne des Péres près de Kourou, 15.3.1985, *Renz 14000* (Herb. RENZ, Basle), 25.3.1976, *Veyret 1361* (CAY); without precise locality, *Leprieur 134* (K), *Leprieur 140* (P); Piste de Saut Léodate, région de Cayenne, 13.12.1986, *Feuillet 3915* (CAY); Village Galibi de Bellevue, 27.12.1986, *Feuillet 4001* (CAY); Savane de Corossony, 5 m, 27.12.1986, *Cremers 9548* (CAY).

Distribution outside the Guianas. — Brazil (Amazonas, Goyaz, S. to Paraná), Colombia (Vaupes).

Notes. — First I had some doubts to combine *H. platydactyla* Kraenzl. with *H. amazonica* Schltr. The protologues of Kraenzlin and Schlechter go well together, and having been able to study more material from Brazil (Amazonas and Goyaz) and the Guianas, I am now convinced that both entities should be treated as being conspecific. There are only some minor differences in the shape of the petals: the Brazilian plants have the anterior lobe occasionally somewhat longer than the posterior lobe. But the broad anterior petal lobes and the equally broad lateral lip segments, as well as their orientation (being curved backwards) are characteristic features for both of the plants from Brazil and the Guianas. *H. platydactyla* is well distinguished from *H. leprieurii* by these characters and the color of the flowers.

The color of the flowers of *H. platydactyla* is very characteristic: The sepals are green, sometimes with pale green margins; petals, lip and spur are white or creamy-white. The tip of the spur is enclosed in the bracts. In the Guianas the plant is flowering from January to March(-April).

21. *Habenaria pratensis* (Lindl.) Rchb. f., Linnaea 22: 813 (1849).

Type: Brazil: Prov. Bahia, without precise locality, *Salzmann, s.n.* (K, Syntype W).

Basionym: *Bonatea pratensis* Lindl., Gen. & Sp. Orch. Pl.: 238 (1835).

The Guiana-plants, which I have seen, belong all to the small flowering variety:

var. **parviflora** Cogn. — Plate 3, a — Fl. Bras. 3, IV: 86 (1893).

Type: Brazil, several localities (prov. Goyaz, *Gardner 3994*; Matto Grosso, *Riedel*).

Syn.: *Habenaria georgii* Schltr., Bot. Centralbl. Beih. 42, Abt. II: 86 (1925). **Type:** Brazil: Amazonas, auf Campos, Cacáo-Pireira, Februar, *Hübner 85*.

Specimens examined. — **SURINAM:** Fransina savanna, distr. Para, Dec. 1914, *Teunissen 1441* (K); Sipaliwini savanna, April 1972, *Teunissen 1257* (K); E. regione Para, *Wullschägel 529* (COGNIAUX, 1893). **FRENCH GUIANA:** Without precise locality, 1838, 1839, 1840, 1848, 1850, *Leprieur, s.n.* (P, G); Cayenne, 1819, *Perrottet, s.n.* (P), 1821, *Perrottet, 117/6*. Guyane, without precise locality, *Poiteau, s.n.* (K); savane Matiti, March 1976, *Veyret 1355* (CAY, P), 1356 (CAY); sur la route Iracombo-Mana, à 26 km à l'ouest d'Iracombo, dépression inondée, Jan. 1974, *Descoings & Luu 20459* (CAY); Savanna on the N. of Montagne des Péres near Kourou, March 1985, *Renz 14009* (Herb. RENZ); S. of Tonate, between Cayenne-Kourou, Savanna at km 2 of the main road, March 1985, *Renz 14008* (Herb. RENZ). Savane de Corossonie, 5.3.1986, *Cramers 9372* (CAY); Savane Mamaribo, région littorale, 26.5.1989, *Hoff & Cremers 5554* (CAY).

Distribution outside the Guianas. — Brazil, Venezuela (Bolivar).

Notes. — The large-flowering variety (var. *pratensis*) is known from Brazil; it is represented in the Guianas in a small-flowering variety (var. *parviflora* Cogn.), which is also known from Brazil (Prov. Goyaz).

The flowers of the var. *parviflora* have exactly the appearance of the large flowering variety: the sepals are light green, petals and lip are yellow. For both, the development of the middle lobe of the rostellum is characteristic: it is prominent and hooded, projecting beyond the anther-loculi. The flowers are fragrant, similar to the European *Plantanthera bifolia*. Flowering time in the Guianas is from February to April.

22. *Habenaria quinqueseta* (Michx.) A. Eaton, Mant. Bot. ed. 5: 253 (12.I.1829).

Type locality: "Hab. in Carolina" (P, Herb. Michaux).

Basionym: *Orchis quinqueseta* Michx., Fl. Bor.-Am. 2: 155 (1803).

Specimens examined. — **GUYANA:** *Parker, s.n.* **SURINAM:** *Anderson, s.n.*; *Berthoud-Coulon 77*.

General distribution outside the Guianas. — N-America (Carolina, Florida), C-America, Colombia, Venezuela.

Notes. — I have not seen Herbarium material of gatherings from the Guianas and dont know whether they represent the long-spurred var. *macroceratilis* (Willd.) Luer (with spur length up to 18 cm = *H. macroceratilis* Willd.) or the short-spurred var. *quinqueseta* (spur length 2-6 cm). All specimens from Venezuela which I could examine, represent the short-spurred form. It seems therefore probably, that the Guiana-plants belong also to the same variety.

23. *Habenaria repens* Nuttall, Gen. N. Am. Pl. 2: 190, f. 10 (1818).

Type. — U.S.A.: Swamp near Savannah, Georgia, Nuttall, s.n. (PH).

Specimens examined. — **GUYANA:** Trenches behind Georgetown, *Jenman 4422* (BRG, K, NY); between Karanambo and Kwaimatta, in small ponds in savanna, 27.9.1988, *Maas & al. 7720*

(U); Rupununi Northern Distr., marsh S. of Rd. Takutu, St. Ignatius, ca. 100 m, 8.8.1963, *Goodland 304* (NY). **SURINAM:** Distr. Marowijne, Perica, 4.12.1975, *Teunissen 1073* (K,U), 3.6.1972, *Teunissen 1451* (U); Distr. Nickerie, Nanniswam, near Kaaimans Kreek, between Eichhornia in floating mats, 26.5.1972, *Teunissen 1254* (K, U); near Cupido, 15.5.1949, *Lanjouw & Lindeman 3410* (U, AMES); Grote Zwiebelwamp, 15.11.1948, *Lanjouw & Lindeman 1169* (U, AMES), *Lindeman 1429* (U, AMES); Patamaca, *Teunissen 1559* (BBS); Sipaliwini savanna, Distr. Nickerie, 3.6.1972, *Teunissen 1257* (U). **FRENCH GUIANA:** Rio Kaw, 4.11.1954, *Black & al. 17473* (CAY).

Distribution. — Widespread throughout the American tropics and subtropics.

Notes. — *H. repens* is a terrestrial or semiaquatic plant with an elongated rhizome and a rather dense inflorescence with greenish flowers. The sepals are darker green; petals, lip and spur light green to greenish-white. Flowering time extends from November to January until June.

24. *Habenaria rodeiensis* Barb.-Rodr., Gen. Spec. Orchid. 2: 256 (1882).

Type: Brazil: environs de Rodeio, à Rio de Janeiro, fleurit en Février.

Specimens examined. — **GUYANA:** Mt. Ayanganna, Pakaraima Mts, in savanna between Chinieng and Chi-Chi-landing, 1000 m, 10.2.1955, *Maguire & al. 40661* (NY); Rockstone, dense upland forest, 15.8.1921, *Gleason 673, 737, 594* (NY); Greenheart Camp. in swampy places, Sept. 1911 (in fruit), *Hunt 181* (BRG, K); Hookeboo Creek, May 1888, *Jenmann 7246* (BRG); Horobea savanna, *Ward 155* (K); HMPS-Mazaruni, 1939, *Fanshawe M 153* (K). **FRENCH GUIANA:** Fleuve Approuagua, Régina, près du terrain de l'aviation, 18.4.1976, *Sastre 4182* (P); Cayenne, environs de Sinnamary, bords de la piste de Ste. Elie, 16.5.1979, *Veyret 1619* (CAY, P, U, G); Piste forestière de Risquetout, 40 km SE de Cayenne, 17.3.1985, *Skog 5608* (NY, Herb. RENZ); Cayenne, *Sagot, s.n.* (P); without precise locality, *Poiteau, s.n.* (K); savane sur la route du Gallion, un peu avant le croisement avec la route de Macouria, 6.5.1976, *Veyret 1367* (CAY); Crique Fourmi-Bassin de la Comité, 10 m, 2.3.1988, *Philippe 292* (CAY); Saül, secondary vegetation near village, 200-300 m, 8.6.1986, *Mori & Gracie 18390* (NY).

Distribution outside the Guianas. — Brazil, Paraguay, Perù.

Notes. — *H. rodeiensis* belongs to a group of nearly related *Habenaria*, which have been described as *H. goyazensis* Cogn. and *H. corcovadensis* Kraenzl., both from Brazil. The delimitation of these entities is still not clear, and more studies in the field will be necessary. They all have a long-pedicelled ovary, with the flowers spreading, in *H. rodeiensis* at an angle of up to 45°. When in fruit this orientation of the flowers is even more manifest, giving the inflorescence a typical appearance. The middle lobe of the rostellum of *H. rodeiensis* is prominent; it is somewhat helmet-shaped and slightly projecting beyond the anther loculi.

The flowers have green sepals; petals, lip and spur are white or faintly greenish-white. Flowering time is from February to August.

25. *Habenaria rodriguezii* Cogn., Fl. Bras. 3, IV: 43, T. 7, F. 3 (1893).

Type: Brazil: Minas Gerais, S. Jao d'El-Rey, *Barbosa Rodriguez*.

Specimens examined. — **FRENCH GUIANA:** Montagne de la Trinité, sommet nord-est, 400 m, savane roche, 22.1.1984, *de Granville & al. 6194* (CAY, U); Montagne des Nouragues, Bassin de l'Arataye, sommet, savane roche, 1.6.1989, *Sarthou 537* (CAY).

Distribution outside the Guianas. — Brazil (Minas Gerais).

Notes. — *H. rodriguezii* is closely allied to a group of related *Habenaria*, including the Brazilian *H. nuda* Lindl., *H. nasuta* Rchb. f. & Warm. and *H. warmingii* Rchb. f.; but the development of the lip- and petal-segments of *H. rodriguezii* is quite divergent from the above mentioned entities.

A typical feature of *H. rodriguezii* is also the broadly triangular, hooded middle lobe of the rostellum, which is distinctly visible in front of the anther.

The showy flowers of *H. rodriguezii* have yellow petals and a yellow lip in contrast to the green sepals.

26. *Habenaria roraimensis* Rolfe, Trans. Linn. Soc. London, ser. 2, Bot. 6(1): 65 (1901).

Type: Guyana, *McConnell & Quelch 698* (K).

Specimens examined. — **GUYANA:** Roraima summit, 2600 m, autumn 1898, *McConnell & Quelch 698* (Type, K), 24.11.1927, *Tate 409* (NY), 2300 m, 1.11.1973, *Persaud 148* (BRG), N-ridge escarpment, 2000-2150 m, 26.3.1978, *Warrington & al. K.E.R. 68* (U). **Adjoining VENEZUELA:** Est. Bolivar, Cerro Roraima 2750-2800 m, 28.8.-2.9.1976, *Steyermark, Brewer Carias & Dunster-ville 112.559* (VEN, K); Chimantá Massif, along stream margin, scrub forest, 1925 m, 2.2.1955, *Steyermark & Wurdak 334* (NY); summit of Apacara-tepui, 2450-2500 m, common in large swamp and on rocky hummocks surrounding swamp, 22.1.1952, *Steyermark 75944* (NY); Cumbre de Ilu-(Uru)-tepui, 2630 m, *Huber 9512* (NY); Chimantá tepui, 2450 m, *Steyermark & al. 128.932* (NY).

Distribution outside the Guianas. — Brazil (Frontier-region to Guyana, Territorio do Rio Branco), Venezuela (Estado Bolivar, Territorio del Amazonas).

Notes. — *H. roraimensis* is restricted to the high tepuis of the Guyana Highland, extending from *Roraima* summit to the Venezuelan tepuis. It is growing mainly above 2000 m in alpine scrub, on windswept and often cloud-covered sites with frequent rains. Although some individuals may look like the Brazilian *H. pratensis* var. *parviflora* or the Venezuelan *H. gollmeri*, there are distinct divergencies in the development of the flowers and leaves. Remarkable for *H. roraimensis* are the rather stout bluish-green scape and the reduced bluish-green leaves. The flowers are green to yellowish-green: the sepals olive-green and the petals, lip and spur yellowish-green. Flowering time is from August to March(-April).

27. *Habenaria schomburgkii* Lindl. ex Benth., London Journ. Bot 2: 673 (1843).

Type: Guyana/Brazil frontier region, *Schomburgk 814* (holo: K, iso: P, W, G)

Specimens examined. — **GUYANA/BRAZIL:** "In swamps on the Rio Branco" and "Interior of British Guyana", *Schomburgk 814* (K, P, W, G). **SURINAM:** Joden Savanne, Heyligers 226 (U).

Distribution outside the Guianas. — Brazil (Prov. Roraima, Prov. de Ceara), Venezuela (Est. Bolivar, Terr. Fed. Amazonas).

Notes. — I only know the type collection *Schomburgk 814* and a gathering from Brazil, Prov. de Ceara, *Gardner 814* (G). The latter has been labeled by Cogniaux as *H. gracilis* Lindl. (1835), nom. illegit., a plant described from Minas Gerais. However a sketch by Reichenbach of the entity *Gardner 814* from Brazil exists in W (Reichenbach, Herb. Orchid. Nr. 51211). Both the sketch of flower details and of the entire plant of *Gardner 814* are well in agreement with the plants *Schomburgk 814* in the various Herbaria (K, E, W, P, G).

I have not seen living plants of *H. schomburgkii*. No indications on the color of the flowers are given on Herbarium labels or in the literature.

28. *Habenaria setacea* Lindl., Gen. & Spec. Orch. Pl.: 312 (1835).

Type: Brazil: Minas Gerais, in graminosis ad radicem montis Itambe, *Martius*.

Specimens examined. — **VENEZUELA/GUYANA, border area:** Est. Bolivar, Distr. Roscio, sabanas secundarias sobre las faltas inferiores SW del Cerro Kukenán, 1200 m, June 1983, *Huber & Alarcon 7672* (NY). **FRENCH GUIANA:** Savane près Iracoubo, Mars 1979, *Veyret 1599* (CAY).

Distribution outside the Guianas. — Brazil, Venezuela, Colombia.

Notes. — *H. setacea* belongs to a group of slender savanna-*Habenaria* with grasslike leaves and narrow few-flowered inflorescences. This group is represented in the Guianas mainly by *H. leprieurii* Rchb. f., *H. sprucei* Cogn. and *H. platydictyla* Kraenzl. *H. setacea* occurs quite frequently in Venezuela in altitudes between 1500-2000 m. Here in the large populations a spureless variety could be observed:

H. setacea Lindl. var. **ecalcarata** Renz, var. nov.

A var. *setacea* floribus absque calcari distinguitur.

Type: Venezuela, Est. Tachira, Mesa Peres, Rio Negro valley, 1850 m, savanna, 3.8.1949, *Renz 5893* (Herb. RENZ). This spurless plant may occur also in the Guianas.

The flowers of *H. setacea* are green, the lip is sometimes light green or yellowish-green. Flowering time in Venezuela is from June to August.

29. *Habenaria seticauda* Lindl. ex. Benth., Hook. London Journ. Bot. 2: 673 (1843).

Type: "Guiana angl.: Pirara, *Schomburgk 219!*" (K, W).

Specimens examined. — **FRENCH GUIANA:** Bassin du Kourou, Savane Aubanèle, 20 m. 9.6.1989, *Cremers & Hoff 10717* (CAY, Herb. RENZ). **GUYANA:** Pirara, interior of Guyana, *Schomburgk 219.* — Type.

Distribution outside the Guianas. — Apparently endemic in the Guianas. The type originates from the border-area Guyana-Brazil. It can be expected that the plant occurs also in the savannas of North-eastern Brazil.

Notes. — This unfrequent plant of wet savannas is closely allied to *Habenaria obtusa* which is more widespread throughout northern S-America. Vegetatively they are similar, but some striking features in the flowers separate these two entities distinctly. *H. seticauda* is characterized by a long, very slender spur (twice as long as the spur of *H. obtusa*) and the up to 3 cm long, strap-shaped lip (also appr. twice as long as the lip of *H. obtusa*).

The flowers of *H. seticauda* are greenish; the petals and lip are not recorded to be white as in *H. obtusa*. The plant is flowering in French Guiana already in June, somewhat earlier than *H. obtusa*.

30. *Habenaria sprucei* Cogn. — Plate 1, b — Fl. Brasil 3(4): 40 (1893).

Type: Brazil: Prov. Alto Amazonas, ad Campo de Januari ad oram meridionalem flum. Rio Negro in vicinia Manáos, *Spruce 1221*.

Syn.: *Habenaria leaoana* Schltr. in Bot. Centralbl. Beih. 42, Abt. II: 72 (1925); Fedde Rep. Beih. 58: t. 4, f. 14 (1930). **Type:** Brazil, Amazonas, Rio Branco, 1913 Kuhlmann 778 (B, lost).

Specimens examined. — **GUYANA:** Pakaraima Mts., Mt. Aymatoi, *Maas & al. 5812* (BRG, U). **SURINAM:** Coesewjine savanna, sandy loam, 4.3.1959, *van Donselaar 591* (U); Savanna Mamilie-Otilie, NE of Powakka, 26.3.1959 (in fruit), *van Donselaar 663* (U). **FRENCH GUIANA:** Without precise locality, 1838, *Leprieur, s.n.* (P), 1840, *Leprieur, s.n.* (G); Savane Changement, 6 km de Sinnamary, 16.4.1978, *Sastre 4781b* (P); Savanna near Kourou, ca. 10 m, 16.3.1985, *Renz 14002* (herb. RENZ); Savanna on km 21 of road Cayenne-Kourou, 11.3.1985, *Renz 14001* (herb. RENZ); between Montsinary and Tonate (Macouria), white sand savanna, ca. 50 m, 15.3.1985, *Renz 14003* (herb. RENZ); Savanna near Crique Macrabo, *Sastre 14a* (MES, AMES); Savane sur la route du Gallion, un peu avant le croisement avec la route de Macouria, 6.5.1976, *Veyret 1366* (CAY), *Cremers 9506* (CAY); Savane de Corossony, 27.12.1986, *Cremers 9547* (CAY); Route du Tour de l'île de Cayenne, savane au PK 16, 28.3.1986, *Cremers 9420* (CAY).

Distribution outside the Guianas. — Brazil (Pará, Amazonas, Rio Negro).

Notes. — This species has been confused in several Herbaria with *H. leprieurii*. The habitat-ecology for both plants is the same, and in the Guianas they frequently grow together. *H. sprucei* can be separated from *H. leprieurii* by the larger flowers, the dorsal sepal with 5-7 distinctly darker green veins and the rather long individed lip-base. According to the original description by COGNIAUX (1893), the development of the lip-base is also characteristic for the Brazilian plant and according to SCHLECHTER (1925) also for *H. leaoana* Schltr. I have seen a plant from Pará in NY (a duplicate of No. 3348 in RB) labeled *H. leaoana* Schltr., collected by Kuhlmann from Boa Vista, Rio Branco, probably the type locality. This plant is in all details of the flowers identical with *H. sprucei* from the Guianas.

31. *Habenaria trifida* H.B.K. — Plate 3, b — Nova Gen. & Spec. 1: 330 (1816).

Type: Colombia, Dept. Cauca, between San Miguel and Guachicon Valley, near Almaguer, *Humboldt 2051!* (P).

Syn.: *H. pauciflora* (Lindl.) Rchb. f. in Bonplandia 2: 10 (1854), non *H. pauciflora* Lindl. (1865) from Chile.

Basionym: *Bonatea pauciflora* Lindl., Gen. & Spec. Orch. Pl.: 329 (1835). **Type:** Brazil, Bahia, Salzmann, s.n. (K-L). *H. setifera* Lindl., Ann. Nat. Hist 4: 381 (1840); **Type:** Mexico, Choapan, Hartweg, s.n. (K-L).

Specimens examined. — **GUYANA:** 1839, *Schomburgk 757* (K, G); 1868, *Schomburgk 33* (P); Savanna between Berbice R. and Demerara R., *Salzmann, s.n.* (P); Karanambo, savanna, *Maas & al. 7260* (U). **SURINAM:** Berseba, April 1954, *Geijskes 172* (K, BRS, U); Coesewijne Savanne, March 1959, *van Donselaar 615* (K); Fransina Savanne, distr. Para, Dec. 1974, *Teunissen 1442* (K, BBS); Lobin Savanne, *van Donselaar 478* (U); Mimilie-Okilie Savanne, NE of Powakka, March 1959, *van Donselaar & al. 668* (U); Vierkinderen, Distr. Para, April 1972, *Teunissen 1100* (K, U); ad rivulum Palaime, flum. Sipaliwini trib., Febr. 1963, *Wassels Boer* (U). **FRENCH GUIANA:** Savane entre Cayenne et Mathoury, févr. 1901, *Benoist, s.n.* (P), *Lemée, s.n.* (P); Cayenne, 1839, *Leprieur, s.n.* (G); Savane Matiti, Mars 1976, *Veyret 1354* (CAY), 1357 (CAY); Savane au Pt. 21 à l'OE d'Iracoubo, Mars 1979, *Veyret 1604* (CAY); Iracoubo, Village Bellevue, en savane rase sur sable blanc, Déc. 1978, *Sastre 6398* (P); Piste forestière allant de la route N2 vers Nancibo, Oct. 1983, *Billiet & Jadin 1841* (CAY).

Distribution outside the Guianas. Widely spread from C-America (Mexico to Panama) to S.-America, south to Brazil and Paraguay.

Notes. A showy plant, recognizable by the 1-3-flowered inflorescences with the large green and white flowers. A near relative is *H. macilenta* (Lindl.) Rchb. f., which has a shorter spur (only about half the length of the long-pedicelled ovary) than *H. trifida* (spur only slightly shorter than the ovary with pedicel). There are also differences in the development of the middle lobe of the rostellum: strap shaped in *macilenta* and somewhat hooded in *trifida*. But so far I could not study enough plant material to know whether these characters are really consistent with a separation of the two entities on specific level.

The sepals of *H. trifida* are green; petal, lip and spur are white or creamy-white, sometimes flushed with greenish, the colors are changing to reddish-brown in age.

Flowering time is more or less the year all around: in the Guianas mainly from February to April, in Venezuela in July-August.

Taxa of unknown affinity

Habenaria abortiens Lindl., Gen. & Sp. Orch Pl. 306 (1835).

Type: Perú, s.l., *Haenke, s.n.*

This incompletely known Peruvian plant has been mentioned by PAWIŁOWSKI (no year) based on a specimen in CAY.¹ According to Lindley and Kraenzlin's description (1892) some characteristic features of the flowers point to a plant related to *H. alterosula*. The small dorsal sepal compared with the large, reflexed lateral sepals seem to be also typical for *H. abortiens*.

Habenaria angustifolia H.B.K., Nov. Gen. & Spec. 1: 330 (1815).

Type: Venezuela, Est. Bolivar, Ciudad Bolivar, locis humidis, *Humboldt & Bonpland*.

LINDLEY (1835, p. 314) refers to this plant from the Guyana Highland ("in humidis uliginosis Guyanae, floret Junio, Humboldt"), but the description gives only a vague picture of this plant. HOEHNE (1940, t. 92, f.1) has given an illustration, which again is difficult to interpret. It might be related to *H. trifida*; according to KRAENZLIN (1892) rather near to *H. amalfitana*. I have not seen Herbarium material.

Habenaria ernestii Schltr. Notizbl. Berl.-Dahl. 6: 122 (1914).

Type: Guyana, untere Campos des Roraima-Gebirges, 1700 m, Dez. 1909, *Ernst Uhle 47* (B lost).

I have not seen a specimen. Schlechter presumed it might be near to *H. caldensis* Kraenzl. However there are some considerable differences concerning the leaves, the size of the flowers and the relative length of the petal- and lip-segments. According to Schlechter's description it is rather related to *H. gollmeri* Schltr., but certainly not conspecific. This taxon remains still doubtful.

Habenaria santensis Barb.-Rodr., Gen. Spec. Orchid. 2: 253 (1881).

Type: près de Santos à S. Paulo, Regnell Herb. III, 1689, pr.p.; *Mosén 1083*.

According to Barb.-Rodrigues (1877) this plant is related to *H. caldensis* Kraenzl (= *H. paludosa* Barb.-Rodr.). The leaves of this apparently incomplete record were lacking and could not have been described in the original diagnosis, but PULLE (1912), based on a gathering No. 135 from Surinam by a native collector ("am Rande der Patricksavanne in Para-Gebiet, blühend und fruchttragend am 16.4.1910") made the following addition: "caulis graciles 100 cm longus basi vaginatus, medio foliatus, foliis lanceolatis c. 7 cm longis, 13 mm latis, apice acutis, trinervis". *H. santensis* belongs therefore to a small group of rare *Habenaria*, having the leaves crowded closely together in about the middle or upper part of the stem. There are only 2 nearly related species known from the American tropics with such an arrangement of the leaves: *H. alterosula* Snuv. & Westra from the Guianas and *H. avicula* Schltr., known from Panama (WILLIAMS, 1946), Colombia (Vaupes, leg. *Schultes & al. 18452*, AMES), Perú (SCHWEINFURTH, 1958, the var. *peruviana* Schweinf.) and Venezuela (Est. Barinas, *Renz 7410*, Herb. RENZ). I have not seen Herbarium specimens of *H. santensis*. According to the descriptions and illustrations (BARB.-RODRIGUEZ, 1877; COGNIAUX, 1893, Tab. 18, F. 3; LEMÉE, 1955) it is not *H. avicula*, but might be near to *H. alterosula*.

¹According to a personal communication from Dr. Cremers, CAY, there is no plant *H. abortiens* in the CAY-herbarium.

Habenaria sartor Lindl. in Hook. Lond. Journ. Bot. 2: 662 (1843).

Type: Brazil, Organ Mts., *Gardner 676* (W).

REICHENBACH (1859) identified a plant collected by *Splitgerber* (No. 754) in Surinam ("ad margines fl. Para prope plantationem Onoribo") as *H. sartor* Lindl. (PULLE, 1906) and compared it with the gathering *Gardner 676* from Brazil. According to HOEHNE (1940), *H. sartor* Lindl. is conspecific with *H. macronectar* (Vell.) Hoehne. All the Herbarium samples named either "*sartor*" or "*macronectar*", I could study, are indeed very similar with *H. longicauda* Hook. The main difference is the shorter spur of *macronectar*: appr. 7 cm as compared to the spur of *longicauda*, having at least twice this length (15-22 cm). The development of the spur of these two entities seems to be a constant, characteristic feature, justifying specific separation.

According to SNUEVERINK & WESTRA (1983), the specimen from Surinam preserved in Leyden (L) has no good flowers left and "is referable to *H. longicauda* with hardly any doubt". See also the remarks under *H. longicauda*.

Adopted names and synonyms

The names of accepted taxa and the page number of their main treatment are given in bold type; (Fig.) refers to a line-drawing, (Pl.) to a colour plate.

| | |
|---|---|
| Bonatea macilenta Lindl. | 499 |
| — pauciflora Lindl. | 508 |
| — pratensis Lindl. | 504 |
| Habenaria abortiens Lindl. | 509 |
| — alata Hook. | 483, 485, 488 |
| — alterosula Snuv. & Westra | 484, 486, 488 , 509 |
| — amalfitana Kraenzl. & Lehm. | 484, 486, 489 , 509 |
| — amambayensis Schltr. | 484, 486, 489 |
| — amazonica Schltr. | 503 |
| — angustifolia H. B. K. | 509 |
| — arecunarium Schltr. | 489 |
| — armata Rchb. f. | 492 |
| — autumnalis Poepp. & Endl. | 502 |
| — avicula Schltr. | 489, 509 |
| — ayangannensis Renz | 484, 486, 490 , 491 (Fig.), 496, 500 |
| — caldensis Kraenzl. | 484, 486, 489, 490 , 492, 496, 509 |
| — campos-portei Schltr. | 500 |
| — corcovadensis Kraenzl. | 505 |
| — culmiformis Schltr. | 490, 496, 497 |
| — demerarensis Rchb. f. | 502 |
| — dusenii Schltr. | 484, 486, 492 |
| — entomantha (Llave & Lex.) Lindl. | 483, 488, 492 |
| — ernestii Schltr. | 509 |
| — floribunda Lindl. | 502 |
| — georgii Schltr. | 504 |
| — gollmeri Schltr. | 484, 487, 493 , 503, 506, 509 |
| — goyazensis Cogn. | 505 |
| — gracilis Lindl. | 506 |
| — heptadactyla Rchb. f. | 484, 485, 493 , 496, 500 |
| — hexaptera Lindl. | 488 |
| — leaoana Schltr. | 507, 509 |
| — lehmanniana Kraenzl. | 484, 487, 493 |
| — leprieurii Rchb. f. | 484, 486, 490, 494 (Pl.), 496 , 500, 503, 507, 508 |
| — var. heptadactyla (Rchb. f.) Schultes | 493 |
| — longicauda Hook. | 484, 487, 497 , 510 |
| — var. ecalcarata Snuv. & Westra | 487, 497 |
| — macilenta (Lindl.) Rchb. f. | 484, 486, 499 , 508 |
| — macroceratilis Willd. | 504 |
| — macronectar (Vell.) Hoehne | 499, 508 |
| — maculosa Lindl. | 499 |
| — mesodactyla Griseb. | 490, 496 |
| — monorrhiza (Sw.) Rchb. f. | 483, 487, 499 |
| — montis-wilhelminae Renz | 484, 485, 500 , 501 (Fig.) |
| — moritzii Ridley | 492, 493 |
| — muelleriana Cogn. | 499 |

| | |
|---|---|
| Habenaria nasuta Rchb. f. & Warm. | 505 |
| — nuda Lindl. | 505 |
| — obtusa Lindl. | 483, 485, 500 , 507 |
| — odontopetala Rchb. f. | 483, 485, 502 |
| — paludosa Barb.-Rodr. | 490, 492, 509 |
| — parvidens Lindl. | 488, 502 |
| — parviflora Lindl. | 484, 493, 502 |
| — pauciflora (Lindl.) Rchb. f. | 499, 508 |
| — petalodes Lindl. | 502 |
| — platydictyla Kraenzl. | 484, 485, 495 (Pl.), 496, 500, 503 , 507 |
| — pratensis (Lindl.) Rchb. f. | 484, 487, 498 (Pl.), 504 |
| — — var. parviflora Cogn. | 484, 487, 498 (Pl.), 504 , 506 |
| — quadrata Lindl. | 502 |
| — quinqeseta (Michx.) A. Eaton | 484, 487, 504 |
| — — var. macroceratilis (Willd.) Luer | 504 |
| — repens Nutt. | 484, 487, 505 |
| — rodeiensis Barb.-Rodr. | 484, 487, 505 |
| — rodriguezii Cogn. | 484, 488, 505 |
| — roraimensis Rolfe | 484, 506 |
| — santensis Barb.-Rodr. | 509 |
| — sartor Lindl. | 499, 510 |
| — savannensis Renz | 489 |
| — schomburgkii Lindl. ex Benth. | 484, 488, 506 |
| — selerorum Schltr. | 502 |
| — setacea Lindl. | 484, 486, 489, 496, 500, 506 |
| — — var. ecalcarata Renz | 486, 507 |
| — seticauda Lindl. | 484, 485, 502, 507 |
| — setifera Lindl. | 508 |
| — prucei Cogn. | 484, 486, 494 (Pl.), 496, 500, 507 |
| — staminodiata Schltr. | 499 |
| — staminodiifera Mansf. | 499 |
| — trifida H. B. K. | 483, 486, 498 (Pl.), 499, 508 , 509 |
| — viridiaurea Lindl. | 493 |
| — warmingii Rchb. f. | 505 |
| Orchis entomantha Llave & Lex | 492 |
| — macronectar Vell. | 499 |
| — monorrhiza Sw. | 499 |
| — quinqeseta Michx. | 504 |

ACKNOWLEDGMENTS

I am grateful to the directors of the following Herbaria who loaned me their specimens or assisted at their institutions during my visits: AMES, BRG, CAY, E, G, K, MPU, NY, P, SEL, U, W, Z.

REFERENCES

- COGNIAUX, A. (1893). Orchidaceae. In: Martius, Eichler & Urban, *Flora Brasiliensis* III/4: Habenaria 18-102. Leipzig.
- CORREL, D.S. (1965). Supplement to the Orchids of Guatemala and British Honduras. *Fieldiana (Bot.)* 31(7): Habenaria 178-179.
- DODSON, C.H. & D. E. BENNETT (1989). Orchids of Perú. *Icon. Pl. Trop. Ser. II*, Fasc. 1, t. 76 — Missouri Botanical Garden, St. Louis.
- FOLDATS, E. (1969). Habenaria. In: LASSER, T. (ed.), *Flora de Venezuela* 15(1): 37-98. Instituto Botánico, Caracas.
- GRISEBACH, A. H. R. (1864). *Flora of the British West Indian Islands. Habenaria*: 643-644. London.
- HOEHNE, F. L. (1916). Commissao de Linhas Telegraphicas Estrategicas de Mattogrosso ao Amazonas. *Annexo No. 5, Historia Natural, Botanica, Parte IX, Habenaria*: 25-26, T. 165-168. Rio de Janeiro.
- HOENHE, F. L. (1940). *Flora Brasílica* 12(1): Habenaria 52-254, T. 11-122. Secretaria da Agricultura, Industria & Comércio de Sao Paulo, Brasil.
- HOOKE, W. J. (1830). *Curtis's Botanical Magazine*, t. 2957. London.
- KRAENZLIN, Fr. (1892). Beiträge zu einer Monographie der Gattung Habenaria Willd. *Engl. Bot. Jahrb.* 16(1-2): 51-223.
- KRAENZLIN, Fr. (1911). Beiträge zur Orchideenflora Südamerikas. *Svensk Vetensk. Handl.* 46(10): Habenaria 5-16.
- LEMÉE, A. (1955). *Flore de la Guyane française* 1: Habenaria 379-383. Paris.
- LINDLEY, J. (1835). *The genera and species of orchidaceous plants. Habenaria*: 306-326. London.

- LINDLEY, J. (1843). Orchidaceae. In: BENTHAM, G., Contributions towards a Flora of South America. Enumeration of plants coll. by Mr. Schomburgk in British Guiana. *London J. Bot. No.* 13: 670-674.
- PAWILOWSKI, Cl. (no year). *Orchidées de Guyane, par la Société Guyanaise d'Orchidophilie. Nature Guyanaise. Liste provisoire des Orchidées de la Guyane française.* Cayenne, Imprimerie des Amandiers, 80 pp., illustr. (1987?).
- PULLE, A. (1906). An enumeration of the vascular plants known from Surinam, together with their distribution and synonymy. *Habenaria*: 116. Leiden.
- PULLE, A. (1912). Neue Beiträge zur Flora Surinams, III. *Rec. Trav. Bot. Néerl.* 9: Orchidaceae 135-136.
- REICHENBACH, H. G. (1859). Orchideae Splitgerberianae Surinamenses. *Ned. Kruidk. Arch.* 4: 319-335.
- RIDLEY, H. N. (1887). Orchideae. In: F. IM THURN, Botany of the Roraima expedition of 1884. *Trans. Linn. Soc. 2. Ser. Bot.* 2(13): Orchidaceae 58-65.
- RODRIGUEZ, J. BARBOSA (1877-1881). *Genera et Species Orchidearum novarum, Habenaria*: I, 151-163; II, 249-259. Sebastianapolis (Rio de Janeiro). 18., Iconographie des Orchidées du Brésil, Rio de Janeiro. *Habenaria* 44 plates (RB, unpublished).
- ROLFE, R. A. (1901). In: BROWN, N. E. & al., Report on two botanical collections made by Messes. F.V. Mc Connell and J.J. Quelch at Mount Roraima in British Guiana. *Trans. Linn. Soc. 2. ser. Bot.* 6(1): 58-65.
- SCHLECHTER, R. (1914). Orchidaceae. In: PILGER, R., *Plantae Uleanae. Notizbl. Berl.-Dahl.* 6 (No. 54): *Habenaria* 120-126.
- SCHLECHTER, R. (1919). Beiträge zur Kenntnis der Orchideenflora von Paraná. *Fedde Rep.* 16: 247-254.
- SCHLECHTER, R. (1920). Orchidaceae novae et criticae, Decas 65. *Fedde Rep.* 16: 353.
- SCHLECHTER, R. (1925). Beiträge zur Orchideenkunde des Amazonas-Gebietes. *Bot. Centralbl. Beih.* 42, *Abt. II*: *Habenaria* 69-74.
- SCHOMBURGK, R. (1848). *Versuch einer Fauna und Flora von Britisch-Guiana*: *Habenaria* 1123-1124. Verlag J.J. Weber, Leipzig.
- SCHWEINFURTH Ch. (1941). Orchidaceae Peruvianae 1. *Bot. Mus. Leaflet. Harv. Univ.* 9(3): 45.
- SCHWEINFURTH, Ch. (1948). Orchidaceae. In: MAGUIRE, B. & al., Plant exploration in Guiana in 1944, chiefly to the Tafelberg and Kaieteur Plateau. I. *Bull. Torrey Bot. Club* 75(1): 212-230.
- SCHWEINFURTH, Ch. (1958). Orchids of Perú. *Fieldiana, Bot.* 30(1): *Habenaria* 21-36.
- SCHWEINFURTH, Ch. (1967). Orchidaceae of the Guyana Highland. *Mem. New York Bot. Gard.* 14(3): 69-214, *Habenaria* 71-75.
- SNUVERINK, J. H. & L. Y. Th. WESTRA (1981). Two new taxa in *Habenaria* Willd. from Surinam. *Acta Bot. Neerl.* 30(3): 235-238, f. 1.
- SNUVERINK, J. H. & L. Y. Th. WESTRA (1983). Studies on the flora of the Guianas. 3. A survey of *Habenaria* Willd. in Surinam (Orchidaceae). *Proc. Nederl. Akad. Wetensch., Ser. C. Bot.* 86(4): 567-593, f. 1-16.
- VELLOSO, J. M. (1835). *Florae Fluminensis, Atlas* 9: t. 45. — Rio de Janeiro. Text reprint 1881. *Arch. Mus. Nac. Rio de Janeiro* 5: *Habenaria* ("Orchis macronectar") 368.
- WERKHOVEN, Marga C. M. (1986). *Orchids of Surinam. Habenaria*: 141-145. Vaco, Paramaribo.
- WILLIAMS, L. O. (1946). Orchidaceae. In: WOODSON, R. E. & R. W. SCHERY (eds.), *Flora of Panama, Part III, fasc. 2. Ann. Missouri Bot. Gard.* 33(1): *Habenaria* 117-122.
- WILLIAMS, L. O. (1956). An enumeration of the Orchidaceae of Central America, British Honduras and Panama. *Ceiba (Tegucigalpa)* 5(1): *Habenaria* 12-16.