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## Studies on the flora of the Guianas. 3

### A survey of *Habenaria* Willd. in Suriname (Orchidaceae)

by J.H. Snuverink and L.Y.Th. Westra

*Institute of Systematic Botany, Heidelberglaan 2, Postbus 80.102,  
3508 TC Utrecht, the Netherlands*

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#### SUMMARY

This is a preliminary survey of the *Habenaria* species now known from Suriname. A key and descriptions, as well as analytical drawings of the flowers are provided. The descriptions are based not only on collections from Suriname, but also on material from the other Guianas.

#### INTRODUCTION

The genus *Habenaria* was founded by Willdenow in 1805 with 2 species. Prior to that, the name (derived from the Latin word "habena" = "strap" or "rein", probably referring to the strap-like appendages of petals and lip) had been used on the specific level by Linnaeus (1759) for the New World species *Orchis habenaria* L., now known as *Habenaria quinqueseta* (Michx.) Eaton. After *Bulbophyllum* Thouars, *Habenaria* is one of the largest genera within the family. Up until now approximately 1500 binomials have been validly published in *Habenaria*. A number are now referable to other genera, and others have been reduced to synonyms. In current literature still about 800 species in *Habenaria* are recognized. A critical monographic study might, however, further reduce this number to about 600 (Schlechter ed. Brieger et al., 1973). The first and so far only monographic treatment was that by Kränzlin (1893), in which 347 species were recognized.

The present study has the function of a precursor to a treatment of the whole Orchid flora of the Guianas.

## MATERIAL AND METHODS

For this study both dried herbarium material and specimens preserved in alcohol were used. Floral analysis and description of flowers was made from alcohol material whenever possible. Herbarium material was used for this purpose only when no alcohol material was available.

The length of the leaves is measured including the sheath, unless indicated otherwise. The values for the width refer to the largest width of a given plant part. Most drawings were made with the aid of a dissecting microscope Wild type M7A equipped with a drawing-mirror type 256575.

Alcohol as a preservative has the disadvantage that it solves the substance which holds the pollen grains together thus causing the pollinia to disintegrate to a greater or lesser extent. The viscidia, too, are affected by alcohol, so that often in pickled flowers only remnants of pollinia and viscidia are seen. This, at least, has appeared to be the case with the *Habenaria* flowers used for the present study. The same might be expected in other members of the Orchidoideae, all with soft pollinia.

## DESCRIPTION OF *HABENARIA* IN SURINAME

Terrestrials of dry to wet or swampy habitats, varying in height between about 10 cm and 2 m. Roots more or less fleshy, usually with one or more, mostly ovoid, fleshy tubers. Stem erect, unbranched, with sheaths at the base. Leaves sessile, distributed over the stem or sometimes basal, mostly with gradual change into sheaths below and into bracts above.

Inflorescence a terminal raceme of one to many flowers of varying size from ca. 0.5–4 cm in diam. (not including spur). Sepals free to slightly connate at base; dorsal sepal usually connivent with the petals (or the posterior lobes) to form a hood or a helmet over the column; lateral sepals mostly longer and narrower than the dorsal sepal, spreading to often recurved. Petals mostly 2-lobed, rarely with a third, tooth-like lobe. Lip mostly 3-partite or 3-lobed, less frequently the lateral lobes reduced to a short tooth or the lip undivided. Base of the lip prolonged into a prominent cylindrical to clavate spur, the opening of which is situated just beneath the stigma. In some instances species normally having a spur may develop forms with a rudimentary spur, or a spur may be missing altogether. Column short and thick with an immobile anther with two separate, more or less distant thecae, each theca terminating at the base in a curved anther-canal which lies against a lateral rostellum lobe below it. Rostellum 3-lobed, the midlobe in the center of the flower between the thecae, the lateral lobes each with a viscid disc at the apex. Pollinia 2, granular, each enclosed within a theca and more or less attenuate at the base into a caudicle which is enclosed within the anther-canal and is attached to a viscid disc at the other end. Sometimes the two viscidia are so close as to become stuck together resulting in the pollinia, in effect, to become connected to one common viscidium (such as in *Habenaria trifida*). Stigma-lobes 2, stalked or sessile, relatively large, extending around the opening of the spur and often touching each other in front of it. See Fig. 1.

KEY TO THE SPECIES AND DESCRIPTIONS

- 1. Leaves linear, filiform or setaceous, the best developed up to 4 mm wide ..... 2  
 Leaves linear-lanceolate, elliptic or ovate, the best developed wider than 7 mm (*H. staminodiata* wider than 4 mm) ..... 4
- 2. Dorsal sepal with (3–)–5 veins, up to 5 mm long ..... 3  
 Dorsal sepal with 7 veins, longer than 6 mm ..... 5. *H. leaoana*
- 3. Spur up to 7 mm long; anther-canals porrect ..... 3. *H. culmiformis*  
 Spur 8–20 mm long; anther-canals bent inwards ..... 6. *H. lepieurii*
- 4. Lip deeply tripartite ..... 5  
 Lip undivided, with a very short tooth on each side of the base ..... 8. *H. obtusa*
- 5. Plants from swamps and ditches; roots originating from an elongated basal part of the stem, that part ca 3–20 cm long ..... 6  
 Plants from other habitats, including wet savannas but not swamps; roots all originating from one point ..... 8
- 6. Dorsal sepal longer than 10 mm; lateral sepals longer than 15 mm; stigma-lobes elongated, 7–8 mm long ..... 7  
 Dorsal sepal up to 7,5 mm long; lateral sepals up to 10 mm long; stigma-lobes short, up to 3 mm long ..... 10. *H. repens*
- 7. Lip tripartite 7–8 mm from its base; spur 14–25 cm long .....  
 ..... 7a. *H. longicauda* ssp. *longicauda*  
 Lip tripartite immediately from its base; spur absent .....  
 ..... 7b. *H. longicauda* ssp. *ecalcarata*
- 8. Leaves distributed over the greater part of the stem or at the basal part of the stem; spur not narrowing towards the apex; anther-canals short, up to 2,5 mm long, bent inwards or porrect ..... 9  
 The largest leaves more or less forming a rosette in the middle of the stem; spur narrowing towards the apex; anther-canals 3.2–3.6 mm long, bent upwards .....  
 ..... 1. *H. alterosula*
- 9. Spur longer than 25 mm; anther-canals bent inwards ..... 10  
 Spur up to 25 mm long; anther-canals porrect ..... 11
- 10. Dorsal sepal with 3 veins, up to 7,5 mm long; flowers mostly 6 or more .....  
 ..... 2. *H. caldensis*

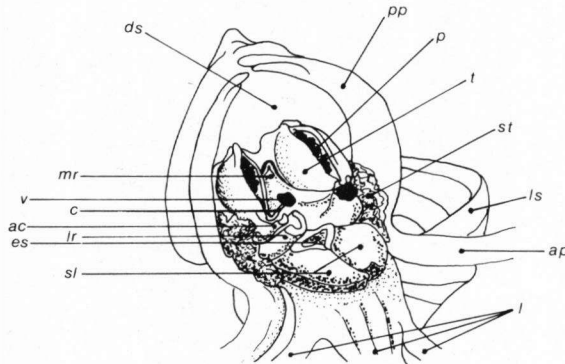


Fig. 1. Analysis of a flower of *Habernaria*. Left viscidium with attached caudicle lifted from lateral lobe of rostellum to show the shape of anther-canal and lateral lobe of rostellum: ac – anther canal; ap – anterior lobe of petal; c – caudicle; ds – dorsal sepal; es – entrance of spur; l – lip; lr – lateral lobe of rostellum; ls – lateral sepal; mr – midlobe of rostellum; p – pollinium; pp – posterior lobe of petal; sl – stigma-lobe; st – staminodium (auricle); t – theca; v – viscidium (viscid disc)

- Dorsal sepal with 7–9 veins, 8 mm or longer; flowers mostly 1–3, rarely up to 6 ...  
 ..... 13. *H. trifida*
11. Dorsal sepal up to 9 mm long; if longer, then flowers not bicolorous; posterior lobe of  
 the petals linear to narrowly triangular; flower light-green to yellow-green..... 12  
 Dorsal sepal 9 mm or longer; posterior lobe of the petals oblong-lanceolate to  
 dolabriform; flowers bicolorous; sepals green and petals yellow ..... 9. *H. pratensis*

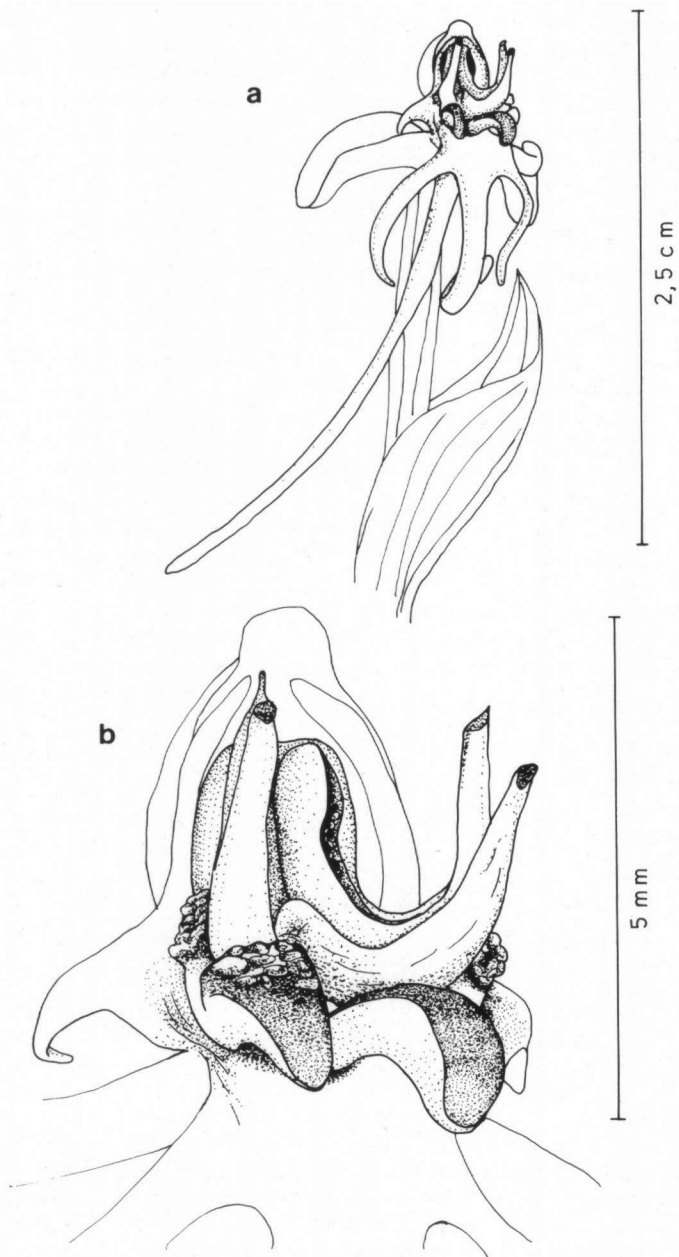


Fig. 2. *Habenaria alterosula*. Drawn from alcohol material M. & P. Teunissen 1635 (U). a. Flower. b. Detail of flower; note anther-canals and lateral lobes of rostellum bent upwards.

12. Dorsal sepal 7 mm or longer; spur, if well-developed, longer than 19 mm; flowers mostly up to 7, rarely up to 10 ..... 13  
 Dorsal sepal up to 7 mm long; spur up to 16 mm long; flowers many, i.e. more than 10 ..... 4. *H. entomantha*
13. Leaves up to 6 cm long and 6 mm wide; staminodes up to 2,5 mm long; flowers 1, rarely up to 3 ..... 12. *H. staminodiata*  
 Leaves longer than 8 cm and wider than 8 mm; staminodes up to 1 mm long; flowers 3–7, sometimes up to 10 ..... 11. *H. schomburgkii*

1. *Habenaria alterosula* Snuverink & Westra, Acta Bot. Neerl. 30: 235 (1981). Fig. 2.

Terrestrial herb 30–46 cm high. Tubers ovoid, to 25 mm long and 12 mm thick; roots to 95 mm long, some with small tubers of 7 × 5 mm at their apex. Stem bearing 9 or 10 (rarely up to 12) large leaves in the middle, 2 or 3 small leaves (< 4 cm long) in the upper part, the lower part of the stem (measuring ca. 9,5–18,5 cm in length) with mostly 4 sheaths or sheath-like leaves (lamina < 2,5 cm long). The large leaves membranous, elliptic, lanceolate to ovate, broadest at or above the middle, acute to apiculate, reticulate, 6,5–17 cm long including a sheath of ca. 1,5–2,5 cm long, and 10–27 mm wide.

Inflorescence several-flowered, flowers 9–17, green, or sepals green and petals cream. Bracts foliaceous, reticulate, ovate, acute to acuminate, 11–22 mm long and 3–13 mm wide. Dorsal sepal ovate to almost round, concave, obtuse, with 5 veins, 4,5–5,5 mm long and 4,8–5,4 mm wide. Lateral sepals ovate, strongly oblique, reflexed, obtuse, with 5 veins, 7,5–10 mm long and 5,5–7,4 mm wide. Petals bipartite; posterior lobe linear, obtuse 2,2–3,2 mm long and 0,4–0,6 mm wide; anterior lobe triangular, reflexed, obtuse to acute, 1,9–3,5 mm long and 0,9–1,6 mm wide at the base. Lip tripartite 1–1,5 mm from its base; lateral lobes linear, obtuse, 3,7–7,5 mm long and 0,5–1 mm wide; midlobe linear, reflexed, the margins revolute, obtuse, 11,2–13,8 mm long and 1,0–1,6 mm wide. Spur pendulous, filiform, narrowing towards the apex, obtuse, 20–27 mm long and 1,4–1,5 mm thick at the base, 0,6–0,8 mm thick at the apex. Anther-canals curved upwards, rather long, 3,2–3,6 mm long. Stigma-lobes tongue-shaped, 2,2–3 mm long. Fruit, immature, 20 mm long and 5 mm wide.

Distribution. Suriname, French Guiana; in forest.

Material examined. SURINAME: Emma Range, Wessels Boer 1471 (U). Grote Hendriktop, Emma Range, Daniëls & Jonker 1018 (U). Lely Mts., M. & P. Teunissen 1635 (holotype, BBS).

FRENCH GUIANA: Kwata Kwima, SE part, Grenand 1274 (CAY).

2. *Habenaria caldensis* Kränzlin, Bot. Jahrb. Syst. 16: 128. (1892). Fig. 3.

Terrestrial herb (20–)40–109 cm high. Tubers ellipsoid to oblong, 2,5–4 cm long and 5–15 mm thick. Leaves linear-lanceolate, acute to acuminate, 2,5–15 cm long and 4–11(–14) mm wide.

Inflorescence few- to several-flowered, flowers (4–)6–15(–20), bicolorous: sepals green and petals white. Bracts ovate-lanceolate, acute to acuminate,

(10-)16-44 mm long and (4-)7-9 mm wide. Dorsal sepal ovate, obtuse to acute, with 3 veins, 5-7.5 mm long and 3.5-5.5 mm wide. Lateral sepals ovate-lanceolate, oblique, with 3 veins, acute, 5-8(-10) mm long and 2,3-3,8(-4,2) mm wide. Petals bipartite; posterior lobe oblong-lanceolate, acute, 5-7 mm long and 1,5-2,5 mm wide; anterior lobe linear, 4,6-7,5 mm long and 0,7-3 mm wide. Lip tripartite from the very base or to 2 mm from the base; lateral

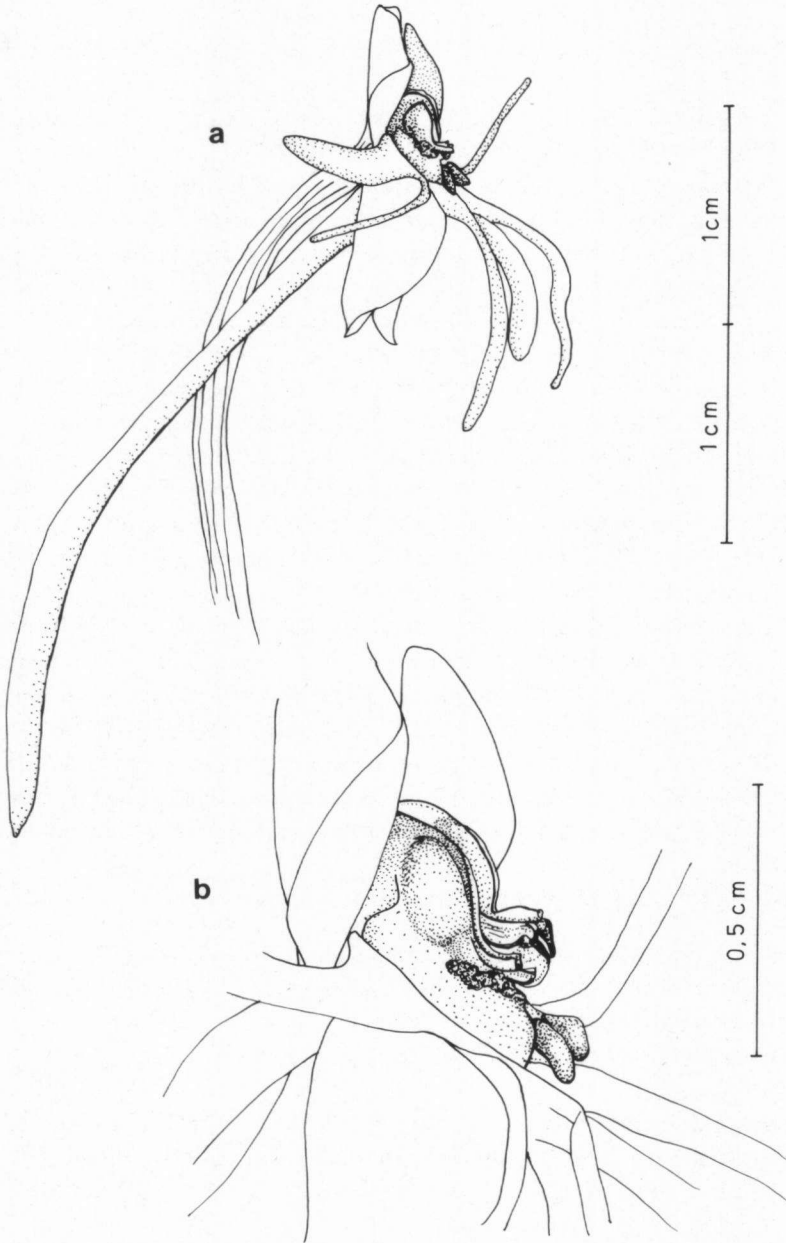


Fig. 3. *Habenaria caldensis*. Drawn from herbarium material Forest Department of British Guiana WB2 (NY). a. Flower. b. Detail of flower.

lobes linear-filiform, 6–11 mm long and about 0,4 mm wide; midlobe linear, 5–9 mm long and 0,7–1,5 mm wide. Spur filiform to filiform-clavate, 2,5–7,5 cm long and 0,5–1 mm thick, to ca. 2 mm thick towards the apex. Anther-canals short, about 1 mm long, somewhat bent inwards. Stigma-lobes short, 1,5–1,8 mm long.

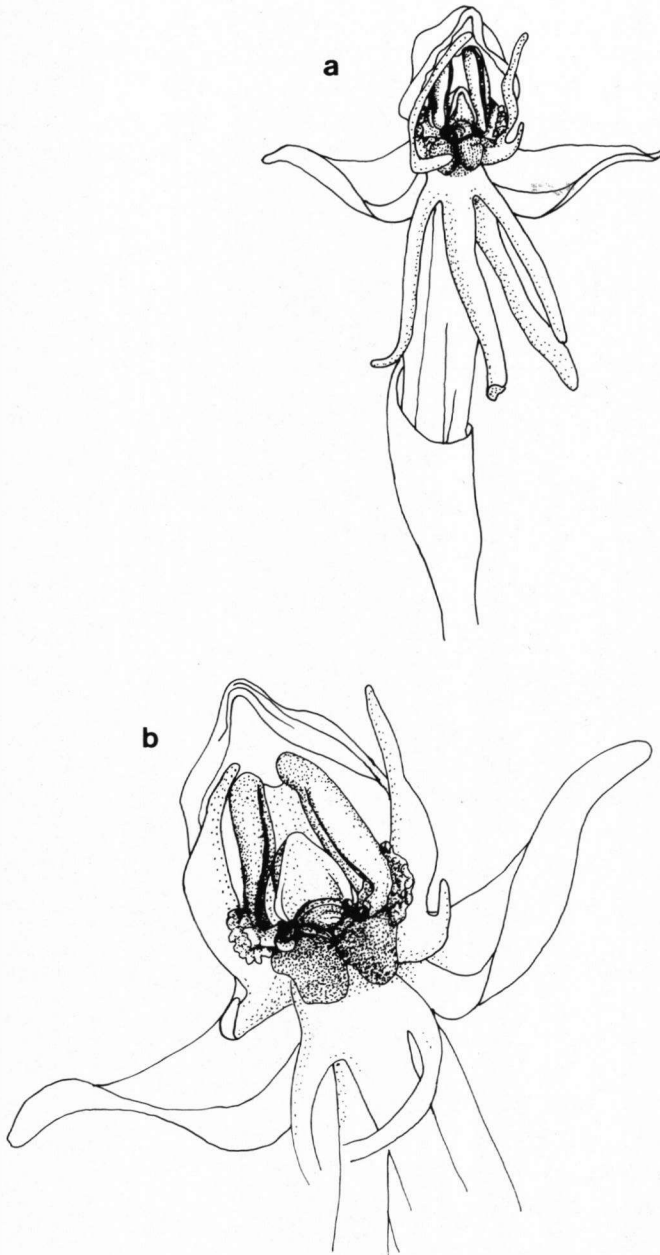


Fig. 4. *Habenaria culmiformis*. Drawn from alcohol material M. & P. Teunissen 1259 (U). a Flower. b. Detail of flower; note the large theca.

Distribution. Venezuela, the Guianas, Brazil, Peru; in savannas and swampy places.

Material examined. SURINAME. Zanderij, Geyskes 103 (BBS).

FRENCH GUIANA. Cayenne, Veyret 1367 (CAY). Piste de St. Elie, Veyret 1619 (P).

GUYANA. Between Chinowieng and Chi-Chi-landing, B. & C. Maguire & Bagshaw 40661 (NY). Greenheart Camp, Hunt 181 (BRG, K). HMPS-Mazaruni, Fanshawe M 153 (K). Horobeia Savanna, Ward 185 (K). Rockstone Railroad Track, Gleason 594 (NY); 673 (NY); 737 (NY). Sand Cr., Rupununi, Forest Department of British Guyana WB 2 (NY): Wilson-Browne 2 (K).

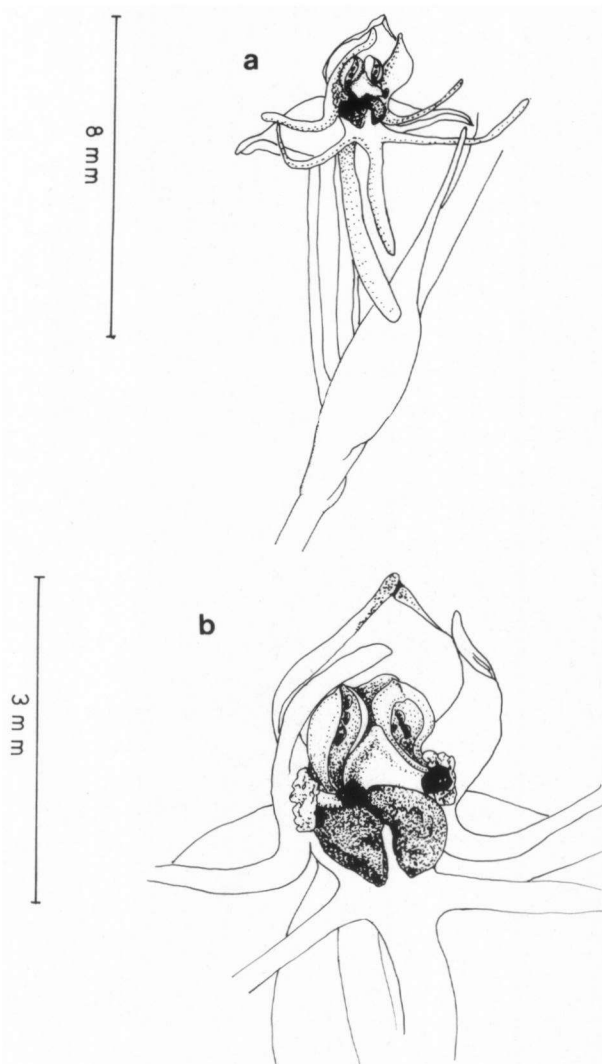


Fig. 5. *Habenaria culmiformis*. Drawn from alcohol material M. & P. Teunissen 1261 (U). a. Flower. b. Detail of flower; note the small theca.



3. *Habenaria culmiformis* Schltr., Beih. Bot. Centralbl. 42(2): 70 (1926). Fig. 4, 5.

Terrestrial herb 18–54 cm high. Tubers to 3, ovoid to ellipsoid, 3–14 mm long and 3–6 mm thick; roots to 51 mm long. Leaves 3–8, filiform to setaceous, acute, 1,6–14 cm long including the large sheaths comprising up to about 1/3 of the total length, and 1–2 mm wide.

Inflorescence few-flowered, flowers 2–10, green to yellow, with a brown lip. Bracts broadly ovate, acuminate, 1,4–11 mm long and 2,4–3 mm wide. Dorsal sepal ovate, often concave, obtuse to subacute, with 5 veins, 2,6–3,5 mm long and 1,9–3 mm wide. Lateral sepals lanceolate to ovate, oblique, reflexed, obtuse to apiculate, 3–4 mm long and 1,2–1,8 mm wide. Petals bipartite; posterior lobe linear-lanceolate to narrowly triangular, obtuse, 2,4–3 mm long and 0,4–0,6 mm wide; anterior lobe linear, obtuse, 1–2,3 mm long and 0,2 mm wide. Lip tripartite at the very base or to 0,3 mm from the base; lateral lobes linear, obtuse to mucronate, 3,4–3,9 mm long and 0,1–0,3 mm wide; midlobe linear, obtuse, 2,8–4,6 mm long and 0,3–0,6 mm wide. Spur linear to filiform, obtuse, the apex hidden behind the bract, 5,5–6,5 mm long and 0,4–0,5 mm thick. Anther-canals very short, 0,4–0,5 mm long. Stigma-lobes short, 0,6–1,2 mm long.

Distribution. Suriname, French Guiana, Brazil; in savannas.

Material examined. SURINAME. Fransina Savanne, M. & P. Teunissen 1261 (U). Kayser Airstrip, Schulz 10006 (U). Km. 116.5 of railroad Paramaribo-Kabelstation, Lanjouw & Lindeman 3053 (U). Nat. Res. Sipaliwini, M. & P. Teunissen 1259 (U). Joden Savanne, Heyligers 262 (U), 263 (U).

FRENCH GUIANA. Cayenne, Veyret 1359 (CAY), 1615 (P), 1616 (P). Irocoubou Savanna, Veyret 1599 (U), 1600 (P).

GUYANA. Manari, near Lethem, Maas & Westra 3761 (BRG, U). Chaakoitou near mountain Point (Z°56'N, 59°40'W), Maas & Westra 4030 (BRG, U).

4. *Habenaria entomantha* (Llave et Lex.) Lindley, Gen. Sp. Orchid. Pl. 311 (1835). Fig. 6.

Terrestrial herb 12–48 cm high. Tubers ovoid, small. Leaves narrowly ovate to lanceolate, acute to acuminate, 1,5–13 cm long and 0,8–2,5 cm wide.

Inflorescence many-flowered, flowers green or yellow-green. Bracts lanceolate to ovate, acuminate, 8–25 mm long and 3–6 mm wide. Dorsal sepal ovate to broadly elliptic, obtuse to acute, often apiculate and reflexed at the apex, 5,5–7 mm long and 3–5(–6) mm wide. Lateral sepals lanceolate, oblique, acute to mucronate, often strongly reflexed at the apex, 6,5–7,5 mm long and 1,8–3 mm wide. Petals bipartite (sometimes undivided or nearly so); posterior lobe linear-lanceolate, (4–)5–6 mm long and 0,8–1,2(–1,5) mm wide; anterior lobe filiform, reflexed, 11–14 mm long and 0,4–0,6 mm wide (sometimes shorter). Lip tripartite from its base; lateral lobes filiform, 9–13 mm long and 0,4–0,6 mm wide; midlobe linear, (4–)6–9(–12) mm long and 6–9(–10) mm

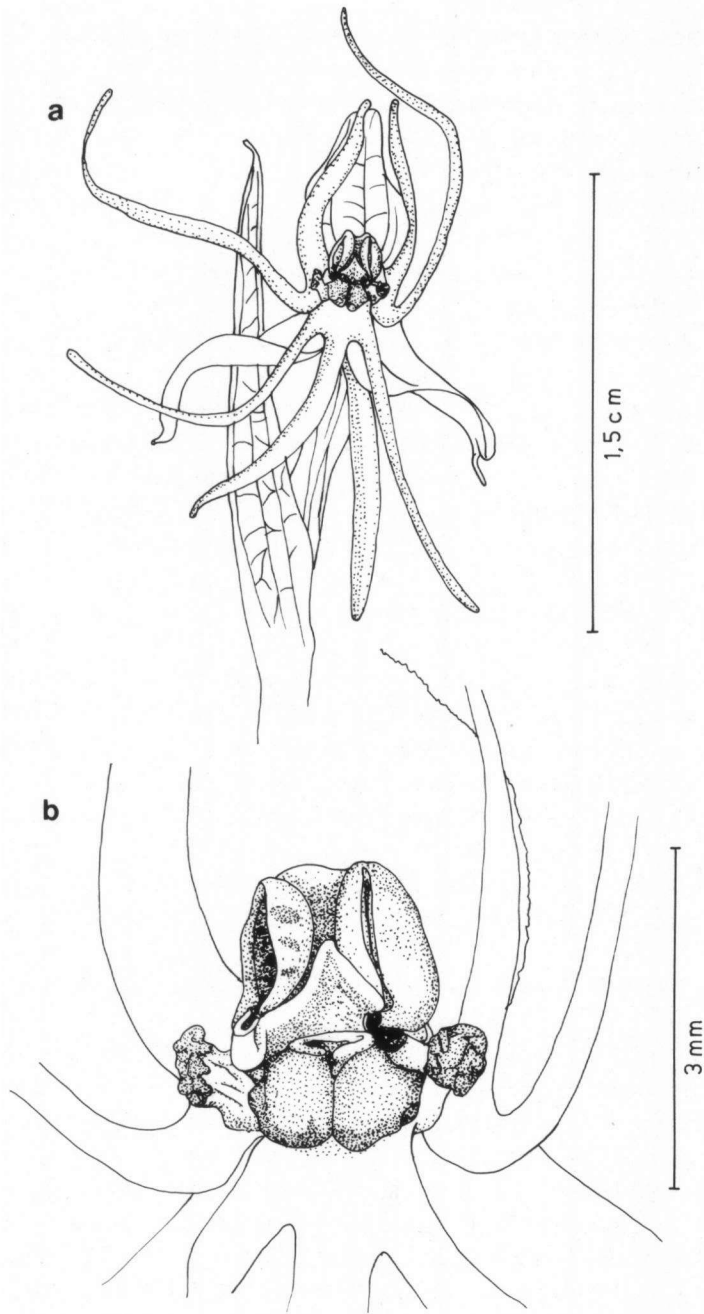


Fig. 6. *Habenaria entomantha*. Drawn from alcohol material Van Donselaar 492 (U). a. Flower. b. Detail of flower.

wide. Spur fusiform to linear, 7–16 mm long and 0,9–1 mm thick. Anther-canals about 1 mm long. Stigma-lobes very short, 1–1,5 mm long.

Distribution. Mexico to Venezuela, Guyana, Suriname; in savannas.

Material examined. SURINAME. Coesewijne Savanne, M. & P. Teunissen 1416 a (U). Lobin Savanne Van Donselaar 492 (U), LBB 15745 (BBS), M. & P. Teunissen 1101 (U).

GUYANA. Sand Cr., Rupununi R., Forest Department of British Guiana WB 1 (K, NY).

5. *Habenaria leaoana* Schltr., Beih. Bot. Centralbl. 42(2): 72 (1926). Fig. 7.

Terrestrial herb 22–36 cm high. Tubers ellipsoid, 10–25 mm long and 4–10 mm thick; roots to 22 mm long. Leaves 3–5, linear to setaceous, acute, 4,3–21 cm long and 1–4 mm wide.

Inflorescence few-flowered, flowers mostly 2–4, sometimes up to 8, light green to greenish-white. Bracts ovate to elliptic, acuminate, (10–)18,5–22(–27) mm long and 5–5,5 mm wide. Dorsal sepal broadly ovate, acute to apiculate, with 7 veins, 7,5 mm long and 5,5 mm wide. Lateral sepals ovate to lanceolate, more or less oblique with 5–7 veins, acute to mucronate, 7–8 mm long and 2,7–3,5 mm wide. Petals bipartite; posterior lobe lanceolate-triangular to narrowly triangular, acute, 6,4–7,3 mm long and 1,3–1,5(–2) mm wide; anterior lobe linear to filiform, obtuse to ca. acute, 5,5 mm long and 0,2–0,5 mm wide. Lip tripartite at the very base or to 2 mm from the base; lateral lobes linear, obtuse, (6,5–)7–8 mm long and 0,6–0,8 mm wide; midlobe linear, obtuse, sometimes with a slight thickening at the apex, 7,5–8 mm long and 1–1,2 mm wide. Spur clearly thickened towards the apex, 9,2–10,4(–15) mm long and 1,4–1,8 mm thick, often with the apex behind the bract. Anther-canals spreading, short, 1,5–2 mm long. Stigma-lobes short, ca. 1,4 mm long.

Distribution. Venezuela, the Guianas, Brazil; in savannas.

Material examined. SURINAME. Coesewijne Savanne, Van Donselaar 591 (U). Mimilie-Okilie Savanne, Van Donselaar 663 (U). Sipaliwini Savanne, Oldenburger et al. 789 (U).

FRENCH GUIANA. Cayenne, Veyret 1366 (CAY). Savanna near Crique Macrabo, C. & F. Sastre 14a (MES).

GUYANA. Pakaraima Mts.: Mt. Aymatoi, Maas et al. 5812 (BRG, U).

6. *Habenaria leprieurii* Reichb. f., Linnaea 19: 376 (1846). Fig. 8.

*Habenaria heptadactyla* Reichb. f., Linnaea 22: 812 (1850); Pulle, Enum. 116 (1906).

Terrestrial herb 19–54(–60) cm high. Tubers 1 or 2, ovoid to ellipsoid, 8–22 mm long and 5–10 mm thick, roots to 50 mm long. Leaves 4–7, linear-filiform to setaceous, acute, 0,8–8,2 cm long and 0,5–4 mm wide.

Inflorescence few-flowered, flowers 1–9, bicolorous, sepals green and petals white. Bracts lanceolate to ovate-lanceolate, acuminate, 7,5–20 mm long and

(1,5–)2–5,5 mm wide. Dorsal sepal ovate, obtuse, with (3–)5 veins, 2,5–4,3 mm long and 2–3,5 mm wide. Lateral sepals lanceolate to ovate, oblique, with (3–)5 veins, reflexed, obtuse, 3–5 mm long and (1,2–)1,5–2,2 mm wide. Petals bipartite; posterior lobe oblong to triangular, obtuse, (2–)2,5–4 mm long and 0,7–1,7 mm wide; anterior lobe rarely reduced to a tooth, oblong, obtuse to

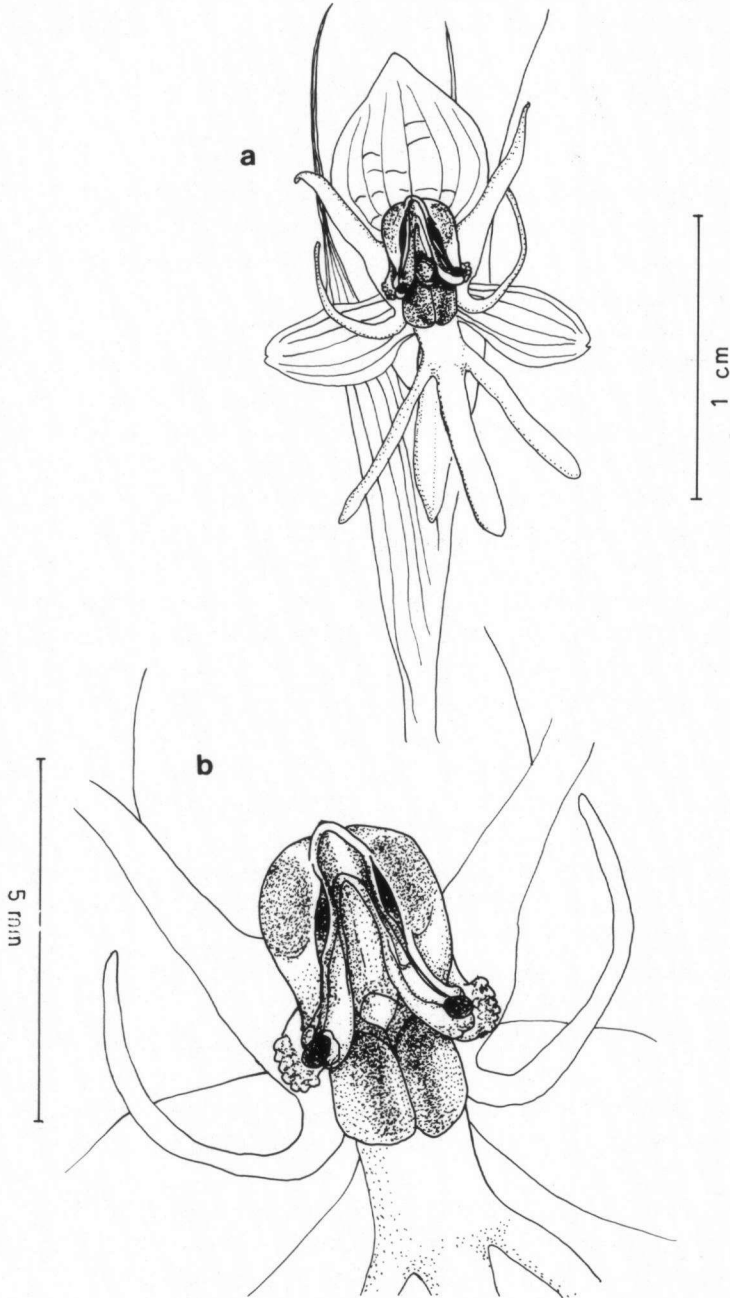


Fig. 7. *Habenaria leaoana*. Drawn from alcohol material Oldenburger et al. 789 (U). a. Flower; note dorsal sepal with 7 veins. b. Detail of flower.

acute, often bilobulate at the apex, 2–4,5 mm long and 0,3–1 mm wide. Lip tripartite from its base; lateral lobes linear to linear-lanceolate, obtuse to acute, often bilobulate at the apex, (2–)3–5 mm long and 0,3–1,5 mm wide; midlobe linear, obtuse, 2,5–6 mm long and 0,4–2 mm wide. Spur linear-filiform, obtuse to acute, 8–20 mm long and 0,5 mm thick, up to 1,5 mm thick towards the

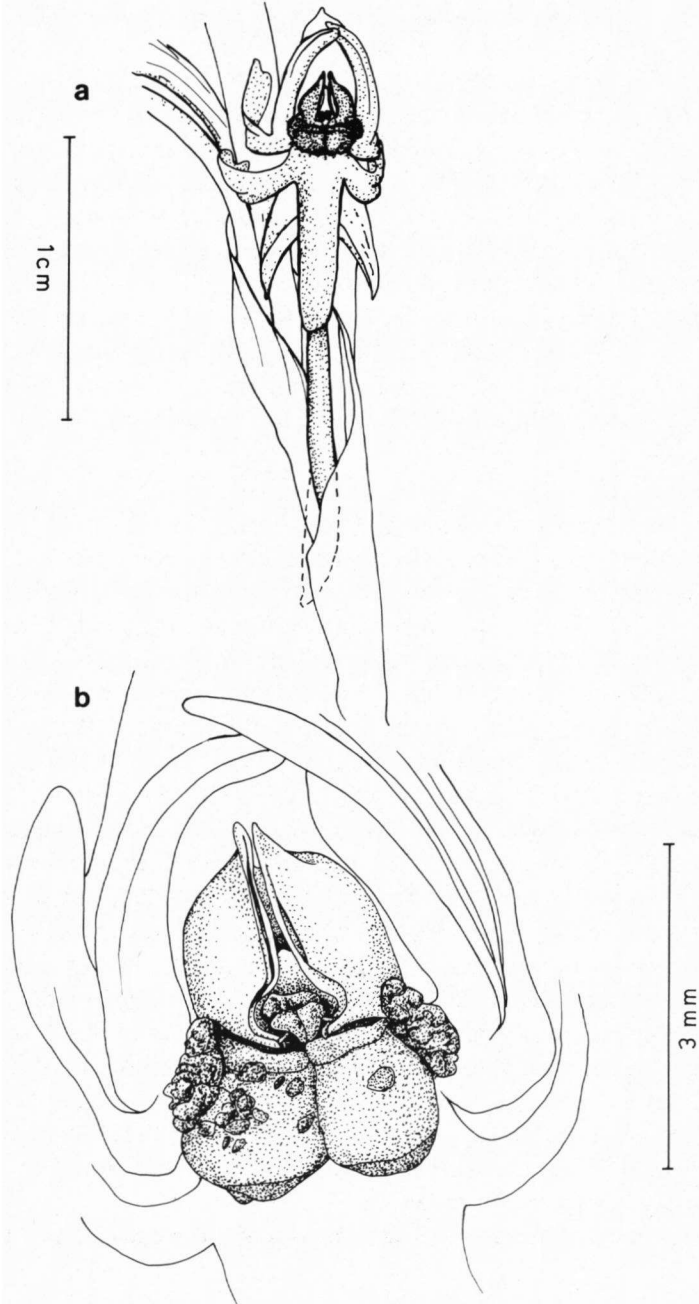


Fig. 8. *Habenaria leprieurii*. Drawn from alcohol material Oldenburger et al. 927 (U). a. Flower. b. Detail of flower; note the lateral lobes of the rostellum and the anther canals bent inwards.

apex, hidden behind the bract. Anther-canals very short, bent inwards. Stigma-lobes short, 0.8–1.8 mm long.

Distribution. Panama, Colombia, Venezuela, Trinidad, the Guianas, Brazil; in dry to swampy savannas.

Material examined. SURINAME. 4 km of Brownsweg, Van Donselaar 2841 (U), 3221 (U), Buffel Savanne, M. & P. Teunissen 1170 (U). Coesewijne Savanne, Van Donselaar 592 (U), M & P. Teunissen 1416b (BBS), Lindeman et al. 173 (U). Kappel Savanne, Kramer & Hekking 2941 (U). Lobin Savanne, Van Donselaar 473 (U). Nat. Res. Brinckheuvel, Sabanpasi Savanne, Wildschut & Teunissen LBB 12174 (U). Palaim Savanne, Wessels Boer 795 (U). Tafelberg, Kramer & Hekking 2936 (U). Saparakreek Savanne, Maratakka, Maas & Tawjoeran 3255 (U). Sipaliwini Savanne, Oldenburger et al. 927 (U), Rombouts 387 (U). Zanderij, Stahel s.n. (U).

FRENCH GUIANA. Cayenne, Veyret 1361 (CAY). Savanna near Crique Macrabo, C. & F. Sastre 14b (CAY, AMES). Without locality, Donné 104 (K).

GUYANA. Demarara R., Jenman 1881 (K). Kaieteur Plateau, Maguire & Fanshawe 23288 (NY). Manari, near Lethem, Maas & Westra 3763.

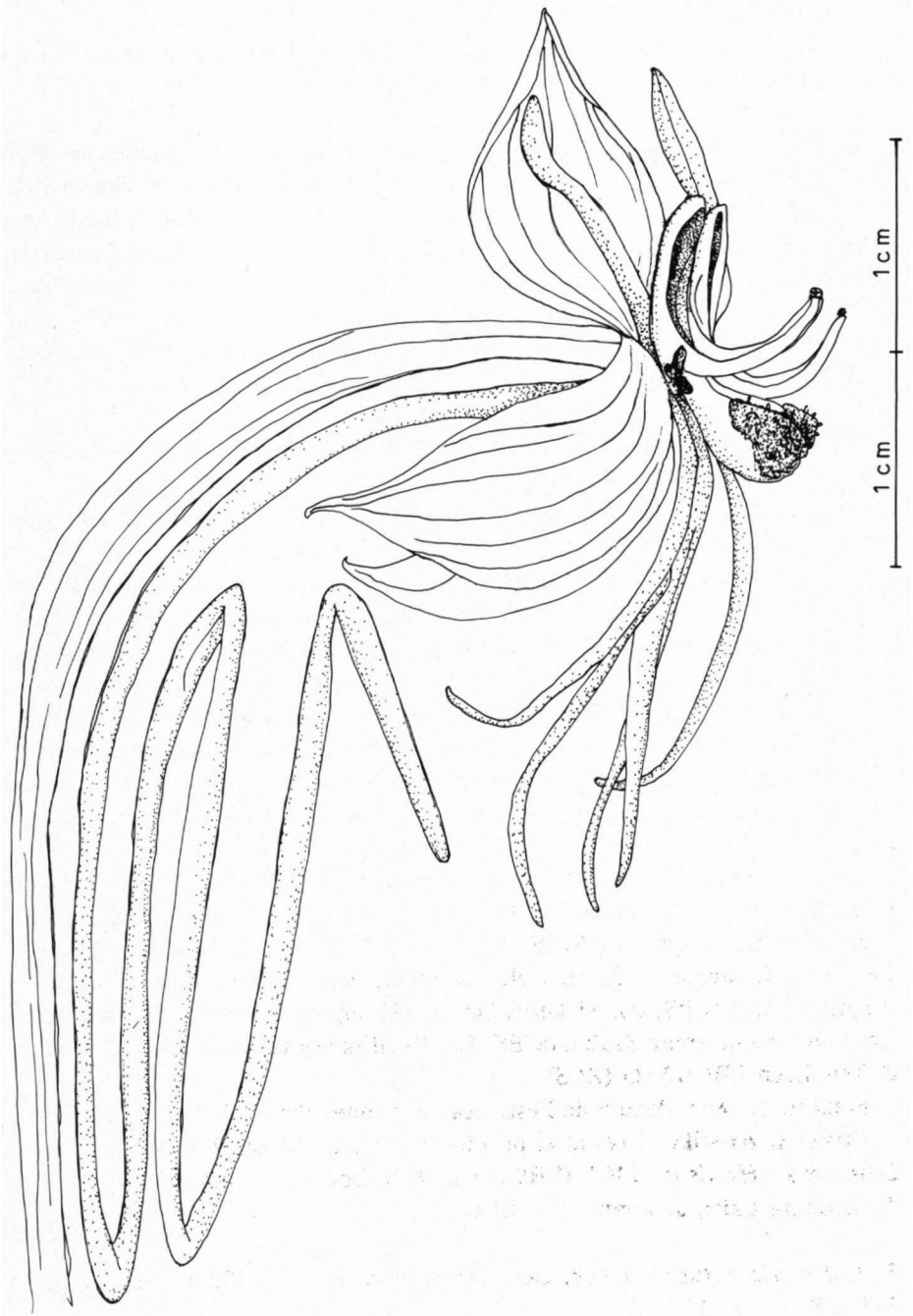
7a. *Habenaria longicauda* Hook. ssp. *longicauda*. Fig. 9.

*Habenaria longicauda* Hook., Bot. Mag. t. 2957 (1830).

Herbs from wet places (50–)70–130 cm high, 7–20 cm of which thickly beset with roots of 10–30 cm long. Some roots with small tubers of 6 × 4 mm at their apex. Leaves about 8, lanceolate, spreading, acuminate, 18–33 cm long including the large sheaths to about 1/5 of the total length, and 10–17(–25) mm wide. Upper leaves gradually changing into floral bracts. Bracts lanceolate, foliaceous, 45–65 mm long and 9–12 mm wide.

Inflorescence few-flowered, flowers 2–10, relatively large for the genus, light-green to yellow-green, rarely white. Dorsal sepal ovate, acuminate, with 5–7 veins, 12–17 mm long and 8–11 mm wide. Lateral sepals oblique, strongly acuminate, reflexed, with 7(–9) veins, 18–22(–25) mm long and 6–9(–12) mm wide. Petals bipartite, sometimes with a third, obtuse, tooth; the posterior lobe linear-lanceolate, falcate, as long as the dorsal sepal and 2–4 mm wide; the anterior lobe narrower, 16–20(–25) mm long and 1–1.5 mm wide. Lip tripartite, the undivided basal part 7–8 mm long and 2–3 mm wide; lateral lobes resembling the anterior lobes of the petals, 16–20 mm long and 1–1.5 mm wide; midlobe 12–18 mm long and 1.5–2 mm wide. Spur pendulous, filiform, 14–22(–25) mm long and ca. 1 mm thick, to ca. 2 mm thick in the apical part, hidden behind the bract. Anther-canals long, bent upwards, 7–8 mm long. Stigma-lobes elongated, 7 mm long.

Distribution. The Guianas, Brazil; in swampy savannas, trenches, creeks, etc.



**Fig. 9.** *Habenaria longicauda* ssp. *longicauda*. Drawn from alcohol material Sandwith 1047 (K), flower.

Material examined. SURINAME. Albina, Hekking 1076 (NY, U). Perica, Teunissen 1452 (U).

FRENCH GUIANA. Marais yiyi, Hallé 868 (CAY, K).

GUYANA. Bartica, Essequibo R. De la Cruz 2008 (NY, AMES). East coast water conservancy, SE of Georgetown, Lamaha stop-off, Bartlett 8110 (BRG), Hitchcock 16884 (NY), Ward s.n. (BRG, NY). Hoobaboo Cr., Jenman 7249 (BRG, NY). Hooroobea, Jenman 3802 (K). Mazaruni Station, Sandwith 1046 (AMES, K), 1047 (K), Tutin 33 (K). Moruka R. (Pomeroon Distr.), De la Cruz 2536 (NY, AMES). Moruka Savanna, Itabu E. of Acquero: Marty 151 (BRG). Kamwatta (Pomeroon Distr.), De la Cruz 1201 (NY). Pomeroon, Jenman 1977 (BRG, K). Waini R. (Northwest Distr.). De la Cruz 1131 (AMES, NY), 3762 (AMES, K, NY), 4014 (AMES, NY). Wismar, Demarara R., De la Cruz 2440 (NY). Without locality, Jenman 5882 (BRG), 6385 (BRG, NY).

7b. *Habenaria longicauda* Hook. ssp. *ecalcarata* Snuverink & Westra, Act. Bot. Neerl. 30: 237 (1981). Fig. 10.

Plant resembling *H. longicauda* ssp. *longicauda* except for the complete absence of a spur.

Inflorescence few- to several-flowered, flowers 5–16. Dorsal sepal 16–19 mm long and 8–12 mm wide. Lateral sepals 20–22 mm long and 6–9 mm wide. Petals bipartite, sometimes with an obtuse third tooth; posterior lobe as long as the dorsal sepal; anterior lobe 21–33 mm long. Lip tripartite immediately from its base; lateral lobes 20–30 mm long; midlobe 19–24 mm long. Anther-canals long, bent upwards, 8 mm long. Stigma-lobes elongated, 8 mm long. Fruit 38–52 mm long and 7–12 mm wide, on pedicel 45–65 mm long.

Distribution. The Guianas; in swampy savannas, trenches, creeks, etc.

Material examined. SURINAME. Coronie, Stahel 6849 (U). Granman-swampoe, M. & P. Teunissen 1112 (BBS). Lelydorp, Javaweg, Geyskes 23 (holotype, U; isotypes, AMES. BBS, NY, MO, K, P, VEN, HB). Near Lelydorp, Lindeman 5735 (U). Nanniswamp, near Kaaimanskreek, M. & P. Teunissen 1255 (BBS, U). Nickerie, between Hampton Court and Henarpoolder, Lanjouw & Lindeman 3192 (AMES, U). Rijsdijkweg (Distr. Para), Lindeman & Teunissen LBB 15225 (BBS).

FRENCH GUIANA. Route de l'est, near Cayenne, Veyret 1627 (P).

GUYANA. Anarika, Grewal et al. 404 (U). C.A.S. Mon Repos, East Coast Demarara, Harrison 1367 (BRG, K). Hooroobea, Jenman 3802 (BRG). Japacooma Lake, Jenman 1637 (BRG).

8. *Habenaria obtusa* Lindley, Gen. Sp. Orchid. Pl. 315 (1835); Pulle, Enum. 116 (1906). Fig. 11.

Terrestrial herb 30–96 cm high. Leaves 10–15, lanceolate to ovate, acute, 6–16 cm long and 1.5–4 cm wide.

Inflorescence many-flowered, flowers 10–18, white or light green. Bracts foliaceous, lanceolate to ovate, acute, 23–42(–60) mm long and (6–)9–12(–22)



mm wide. Rhachis covered by the bracts. Dorsal sepal broadly ovate to almost round, obtuse, 7–9(–12) mm long and 6,2–8(–10) mm wide. Lateral sepals oblique, narrowly ovate to elliptic, obtuse, 8–11(–14) mm long and 4,3–5,5(–7) mm wide. Petals undivided, but with a short obtuse tooth at the anterior side up to 0,5 mm, oblong-elliptic to triangular, 6,5–8(–10) mm long

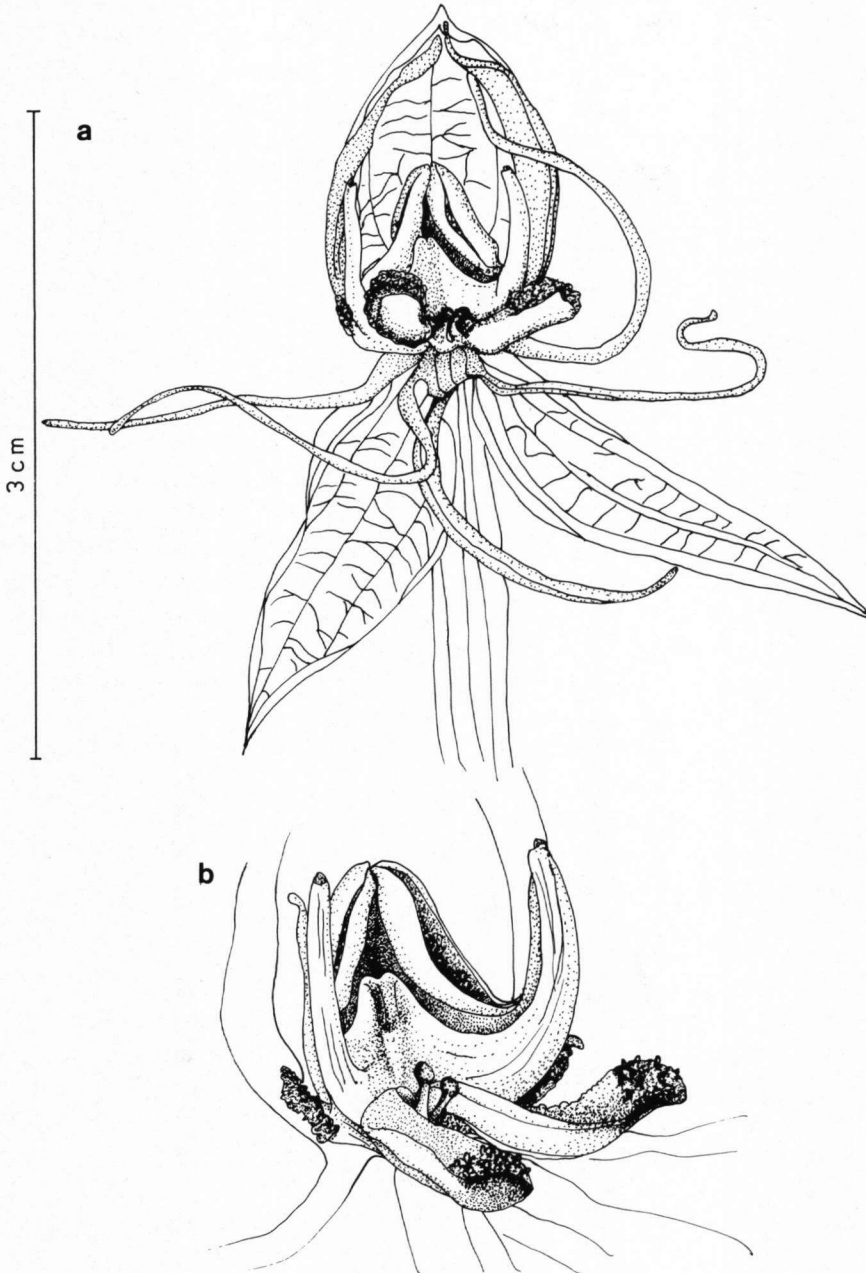


Fig. 10. *Habenaria longicauda* ssp. *ecalcarata*. Drawn from alcohol material M. & P. Teunissen. 1255 (U). a. Flower; note the absence of a spur. b. Detail of flower.

and 2–2,5(–4) mm wide. Lip undivided, tongue-shaped, obtuse, with a very short tooth on each side at the base, 9,5–15(–18) mm long and 1,9–2,6(–3) mm wide. Spur linear-filiform, obtuse, the apex hidden behind the bract, (37–)44–57(–70) mm long and 1,5–2 mm thick. Anther-canals 3,5–4 mm long. Stigma-lobes short, 1,5–2,5 mm long.

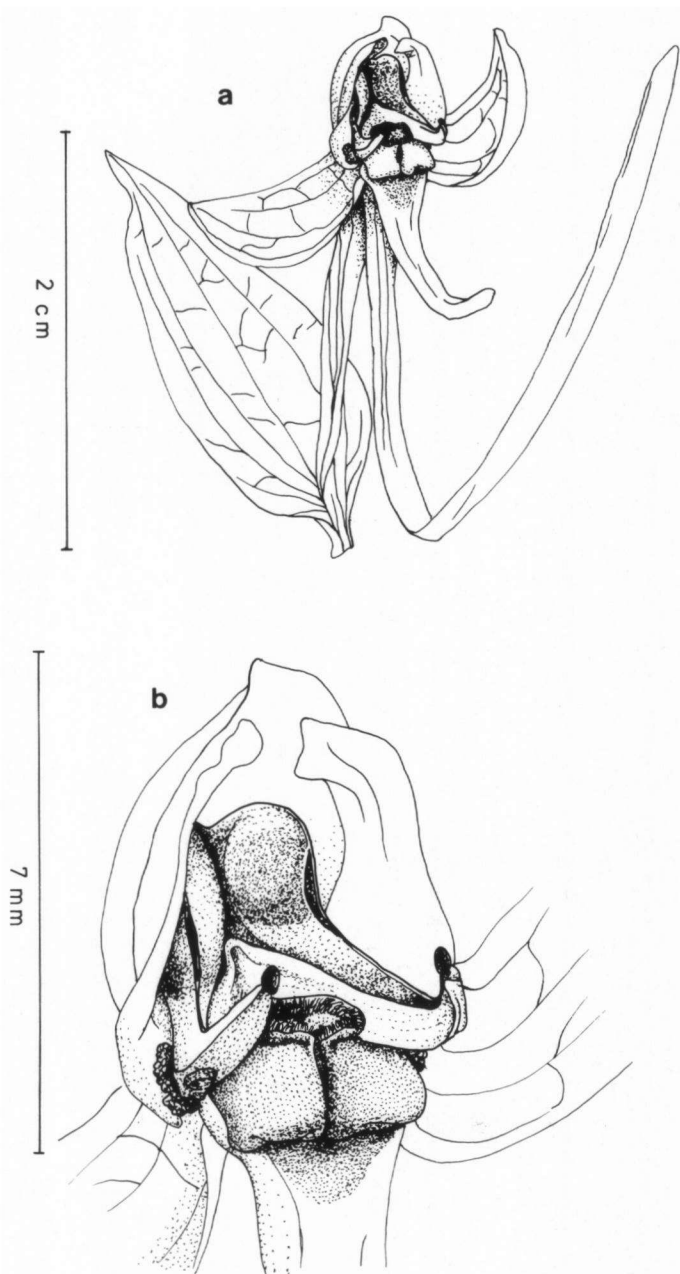


Fig. 11. *Habenaria obtusa*. Drawn from alcohol material M. & P. Teunissen 1256 (U). a. Flower; note the undivided lip. b. Detail of flower.

Distribution. Colombia, Venezuela, Guyana, Suriname, Brazil, Peru, Paraguay; in savannas.

Material examined. SURINAME. Nat. Res. Sipaliwini, M. & P. Teunissen 1256 (BBS, U).

GUYANA. Moco-moco, foothills of Kanuku Mts., Maas & Westra 3846 (U).

9. *Habenaria pratensis* (Lindley) Reichb. f., *Linnaea* 22: 813 (1849); *Pulle Enum.* 116 (1906). Fig. 12.

Terrestrial herb (20–)35–45(–50) cm high. Tubers ovoid, 12–20 mm long and 5–10 mm thick. Leaves 5–8, linear to lanceolate, obtuse to acute, with 3 clear veins, carinate abaxially, 2,5–26,5 cm long including the sheaths comprising up to 1/4 of the total length, and 5–15 mm wide.

Inflorescence few-flowered, flowers 4–11, bicolorous, sepals green and petals yellow. Bracts oblong-lanceolate, acuminate, 11–38 mm long and 5–8 mm wide. Dorsal sepal ovate, obtuse to mucronate, with 5 veins, 9–11(–13) mm long and 6–8(–10) mm wide. Lateral sepals lanceolate to ovate, oblique, with 5 veins, reflexed, acute to mucronate, 8–12(–15) mm long and 4–6 mm wide. Petals bipartite; posterior lobe oblong-lanceolate to dolabriform, 7–8,2(–12) mm long and 2,5–3,5 mm wide; anterior lobe linear, obtuse, 7,2–9(–14) mm long and 0,7–0,8 mm wide. Lip tripartite from the very base or to 2 mm from the base; lateral lobes linear, obtuse, 8–10(–11) mm long and 0,9–2,5 mm wide; midlobe lanceolate, the margins often revolute, 8–9,5(–14) mm long and 2,4–4 mm wide. Spur linear, obtuse, 14–21(–35) mm long and 1,5–2 mm thick, the apex hidden behind the bract. Anther-canals short, spreading, 1,5 mm long. Stigma-lobe short, globular, 1,8 mm long.

Distribution. The Guianas, Brazil; in savannas.

Material examined. SURINAME. Fransina Savanne, M. & P. Teunissen 1441 (BBS).

FRENCH GUIANA. Cayenne, Veyret 1355 (CAY), 1356 (CAY). Along the road Iracoubo-Mana, 26 km. W. of Iracoubo, Descoings & Luu 20459 (CAY).

10. *Habenaria repens* Nutt., *Gen. N. Amer. PL.* 2: 190 (1818). Fig. 13.

Herbs from wet places, (10–)40–69(–100) cm high, 3–20 cm of which thickly beset with roots of 4–13 cm long. Lateral shoots originating from among the roots. Leaves linear to linear-lanceolate, acute, 5–20(–24) cm long and 4–19(–30) mm wide.

Inflorescence many-flowered, flowers green to yellow-green. Bracts ovate to lanceolate, acute, (1–)1,8–2,6(–7) cm long and (3–)5–6(–14) mm wide. Dorsal sepal broadly ovate to almost round, obtuse to acute, with 5 veins, (3–)5,5–6,2(–7,5) mm long and (3–)6–6,5 mm wide. Lateral sepals oblique, ovate to lanceolate, acute, with 5 veins, (4–)8–9,7 mm long and (2–)4,2–4,8 mm wide. Petals bipartite; posterior lobe oblong-lanceolate, falcate, obtuse, (3–)5,4–5,5(–7) mm long and 1–2 mm wide; anterior lobe linear, obtuse,

(3–)7,1–7,5 mm long and 0,6–0,8 mm wide. Lip tripartite from its base; lateral lobes linear, obtuse, (4–)9,3–10,5(–11) mm long and 1,4–1,5 mm wide; midlobe linear, obtuse to slightly acute, (4–)8,4–9,3 mm long and about 2 mm wide. Spur linear-filiform, obtuse, (8–)37–43 mm long and 2,1–2,5 mm thick. Anther-canals spreading, about 1,5 mm long. Stigma-lobes tongue-shaped, 2,5–2,9 mm long.

Distribution. From N. America to Brazil, Peru, Bolivia, Paraguay; in swampy places, trenches, creeks, etc.

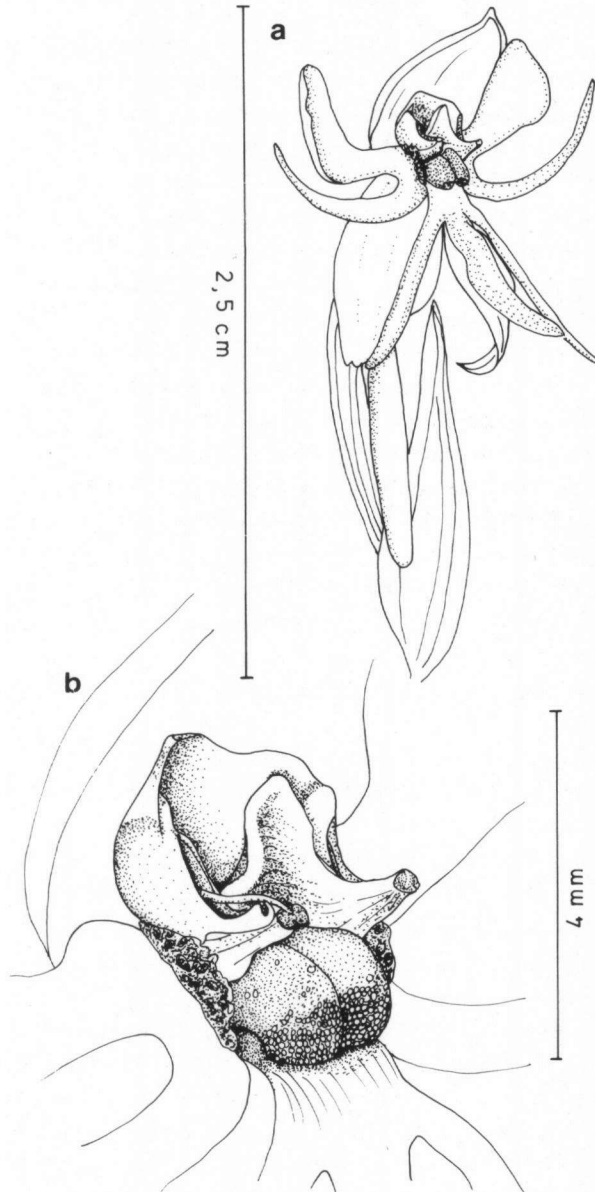


Fig. 12. *Habenaria pratensis*. Drawn from alcohol material M. & P. Teunissen 1441 (U). a. Flower. b. Detail of flower; caudicle is clearly seen here.

Material examined. SURINAME. Coronie, Coppename, Lanjouw & Lindeman 1429 (AMES, U). Grote Zwiebelswamp, Lanjouw & Lindeman 1169 (AMES, U). Nanniswamp, near Kaaimanskreek, M. & P. Teunissen 1257 (U). Nickerie, Lanjouw & Lindeman 3410 (AMES, U). Patamacca, M. & P. Teunissen 1559 (BBS). Perica, M. & P. Teunissen 1073 (BBS), Teunissen 1451 (U).

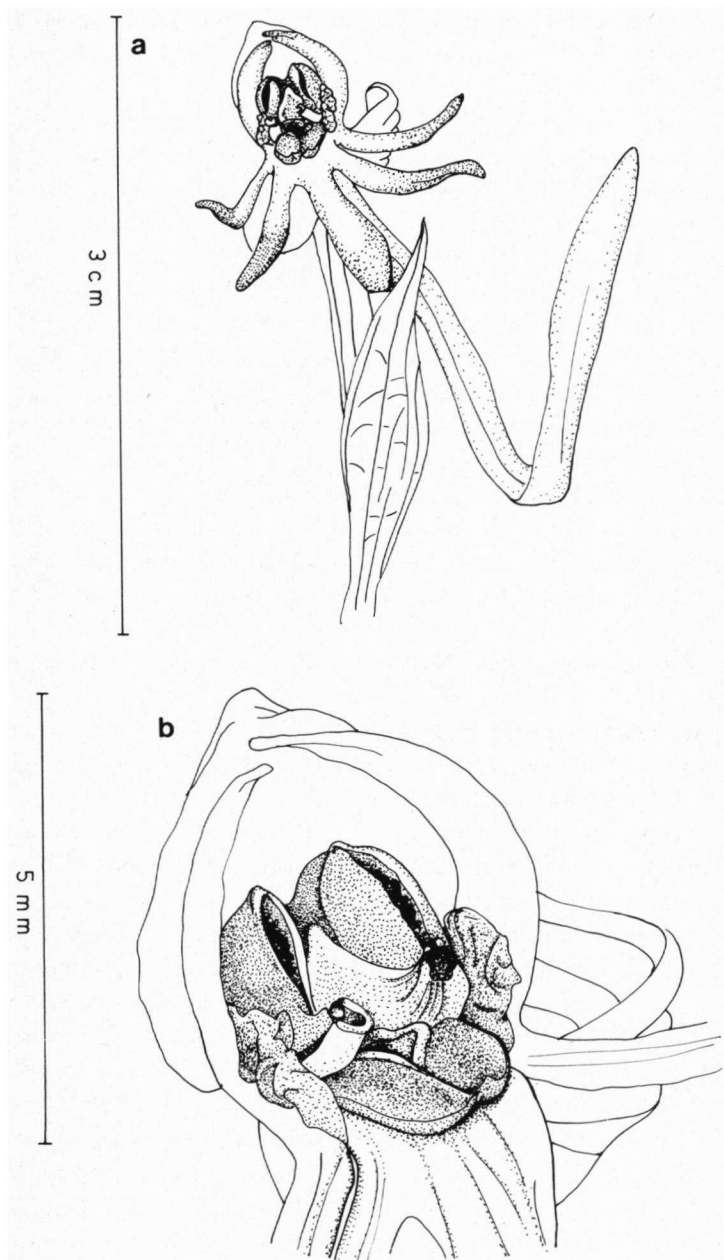


Fig. 13. *Habenaria repens*. Drawn from alcohol material M. & P. Teunissen 1257 (U). a. Flower b. Detail of flower.

FRENCH GUIANA. Rio Kaw, Black et al. 5417473 (CAY).

GUYANA. Georgetown, Jenman 4422 (BRG, K, NY), 7232 (K), Manari, near Lethem, Maas & Westra 3762 (U).

11. *Habenaria schomburgkii* Lindley ex Benth., London J. Bot. 2: 673 (1843). Fig. 14.

Terrestrial herb 20–43 cm high. Tubers ellipsoid to ovoid, 12–25 mm long and 8–15 mm thick. Leaves linear-lanceolate with 3 veins, acuminate, 8–13 cm long and 8–12 mm wide.

Inflorescence few-flowered, flowers mostly 3–10, green to yellow-green. Bracts lanceolate, strongly acuminate, 8–23 mm long and 2–9 mm wide. Dorsal sepal broadly ovate, obtuse, acute or slightly acuminate, 8–12 mm long and 4–9 mm wide. Lateral sepals narrowly ovate, oblique, acute, more or less reflexed, 9–13 mm long and 3–4,5 mm wide. Petals bipartite; posterior lobe linear to narrowly triangular, acute, 4,5–11 mm long and 1,2–2 mm wide; anterior lobe filiform, 9–20 mm long and ca. 0,5 mm wide. Lip tripartite from its base; lateral lobes filiform, 9–20 mm long and 0,5–0,6 mm wide; midlobe linear, obtuse, 7–12 mm long and 0,7–2 mm wide. Spur filiform-clavate, 10–25 mm long and 0,8–2 mm thick. Anther-canals short, 2–2,5 mm long. Stigma-lobes short, to 2 mm long, spreading.

Distribution. Venezuela, the Guianas; in savannas.

Material examined. SURINAME. Joden Savanne, Heyligers 226 (U).

GUYANA. Without locality, Schomburgk 814 (K).

12. *Habenaria staminodiata* Schltr., Beih. Bot. Centralbl. 42(2): 74 (1926). Fig. 15.

Terrestrial herb 19–33 cm high. Tubers ovoid to 12 mm long and 5–7 mm thick, roots to 25 mm long. Leaves about 4, narrowly ovate to lanceolate, acute, 1,6–9,5 cm long and 2,5–6 mm wide.

Inflorescence one- to few-flowered, flowers light green. Bracts lanceolate to ovate, acute, 14–17(–42) mm long and 6,5 mm wide. Dorsal sepal ovate to broadly elliptic, obtuse to submucronate, with 5 veins, 7–9 mm long and 5 mm wide. Lateral sepals lanceolate, oblique, reflexed, acute to mucronate, with 5 veins, 8,5 mm long and 2,5 mm wide. Petals bipartite; posterior lobe linear-lanceolate, 7 mm long and 1,8 mm wide; anterior lobe filiform, 6,5 mm long and 0,5 mm wide. Lip tripartite from its base; lateral lobes filiform, 8–9 mm long and 0,8 mm wide; midlobe linear, 9–10 mm long and 1 mm wide. Spur with a thickening at the apex, hidden behind the bract, 23–25 mm long and 0,7 mm thick at the base, 2,5 mm thick near the apex. Staminodes up to 2,5 mm long. Anther-canals 2–2,5 mm long. Stigma-lobes short, tongue-shaped, 2–2,5 mm long.

Distribution. Venezuela, the Guianas, Brazil; in savannas.

Material examined. SURINAME. Sipaliwini, Oldenburger et al. 970 (U).

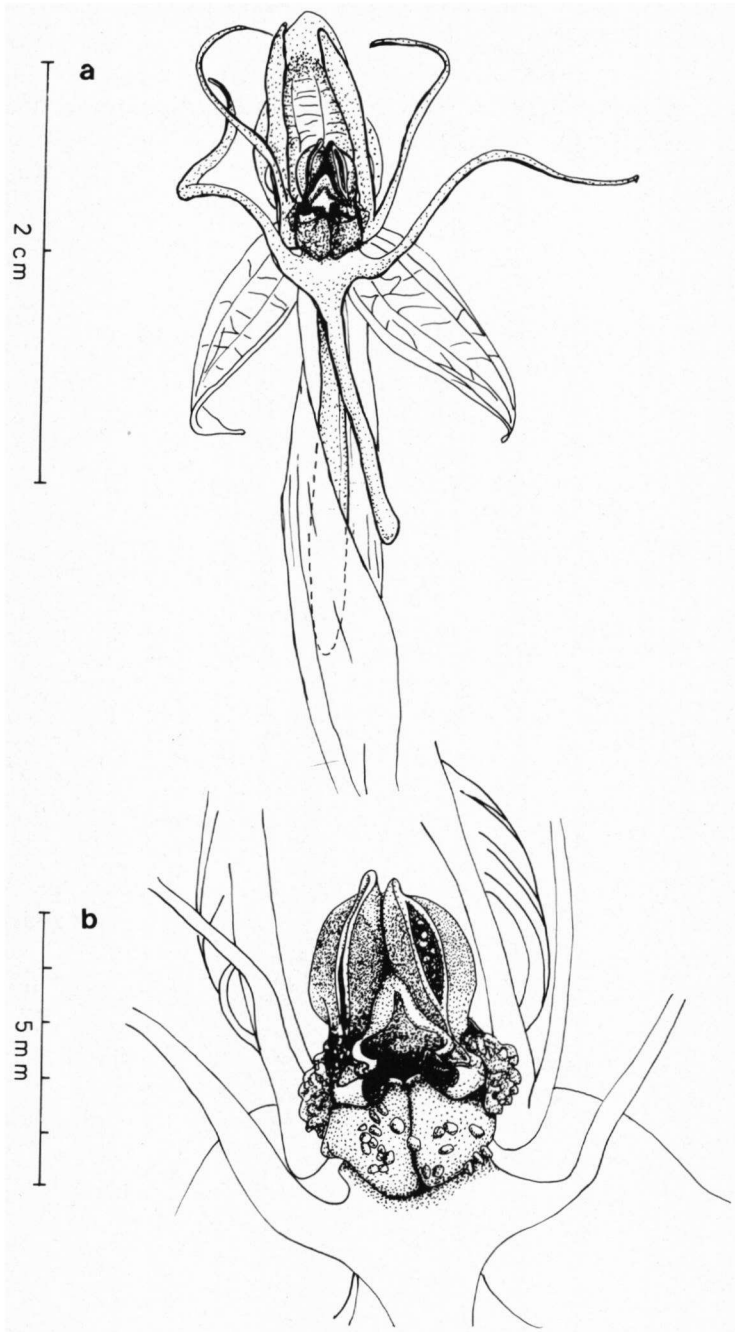


Fig. 14. *Habenaria schomburgkii*. Drawn from alcohol material Heyligers 226 (U). a. Flower. b. Detail of flower.

13. *Habenaria trifida* Kunth, Nov. Gen. Sp. 1: 330 (1815). Fig. 16.

*Habenaria pauciflora* (Lindley) Reichb. f., Bonplandia 2: 10 (1854).

Terrestrial herb 21–73(–80) cm high. Tubers ovoid, (12–)16–25(–35) mm long and 6–11 mm thick. Leaves (4–)6–8, linear-lanceolate to elliptic-lanceolate, acute to acuminate, (4–)6,5–19 cm long and (5–)10–17 mm wide.

Inflorescence few-flowered, flowers 1–3(–6), white, light green, or pale

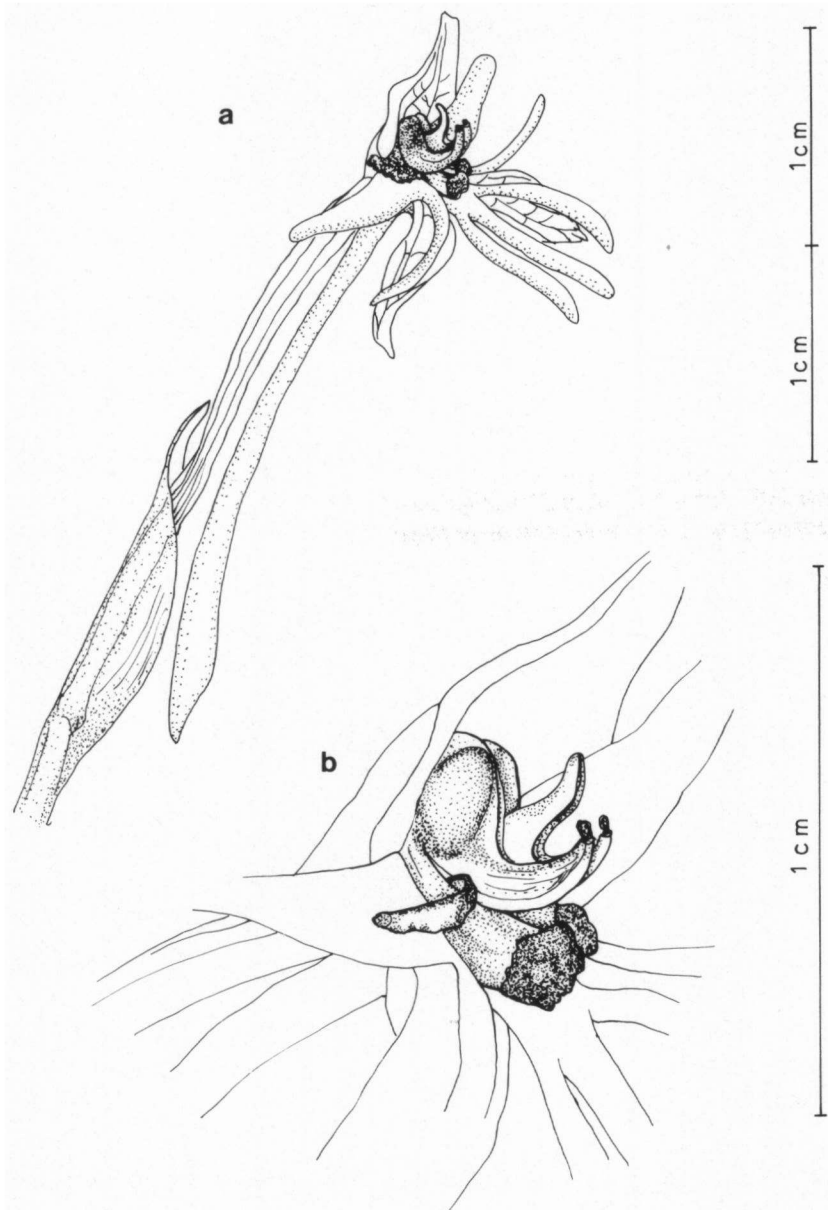
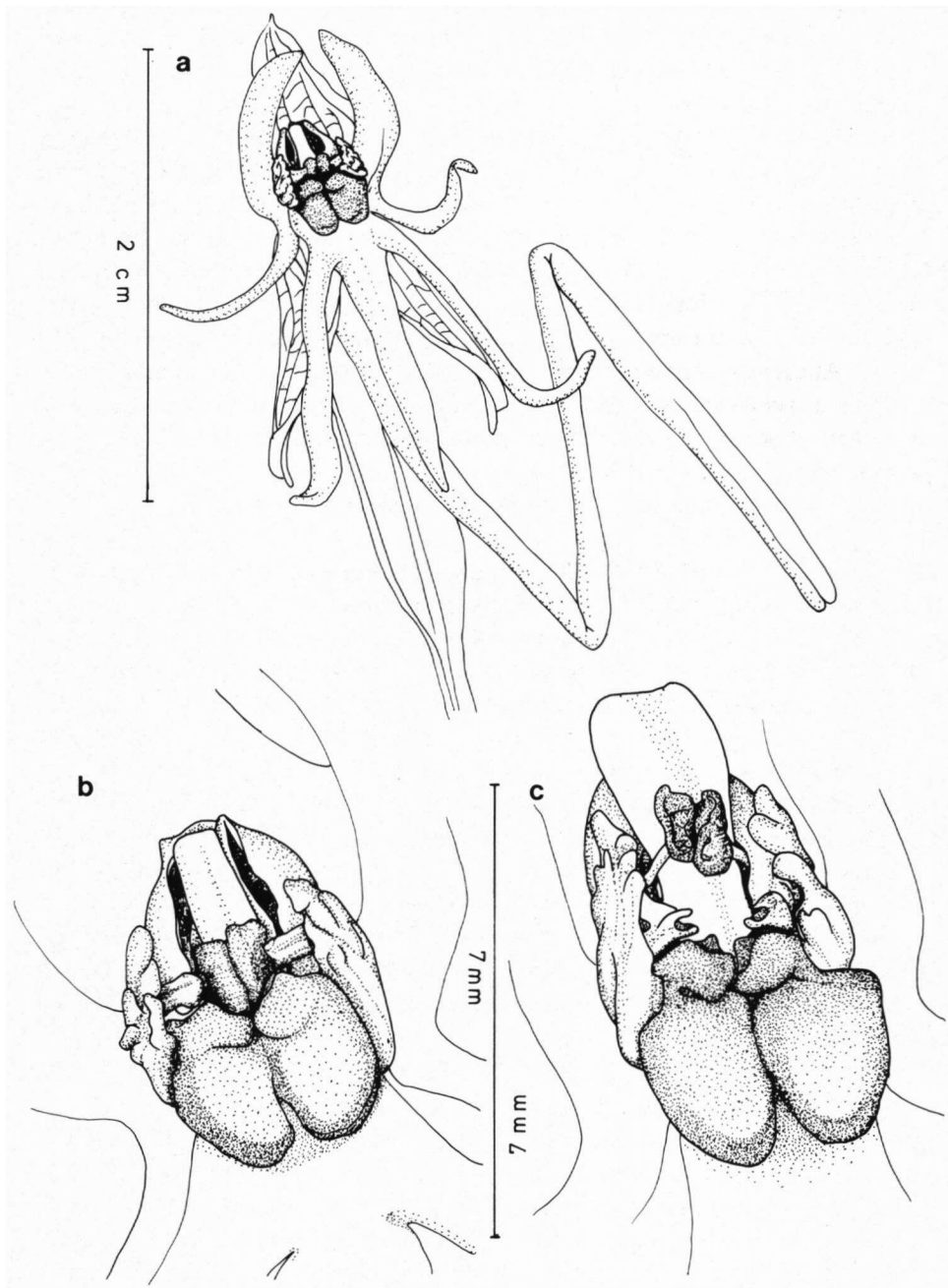


Fig. 15. *Habenaria staminodiata*. Drawn from herbarium material Oldenburger et al. 970 (U). a. Flower. b. Detail of flower; note the large staminodes (auricles).





**Fig. 16.** *Habenaria trifida*. Drawn from alcohol material M. & P. Teunissen 1100 (U). a. Flower. b. Detail of flower. c. Detail of another flower in the same collection; note the large midlobe of the rostellum.

cream. Bracts foliaceous, linear-lanceolate, acute, 30–72 mm long and (5–)8–16 mm wide. Dorsal sepal ovate to lanceolate-ovate, with 7–9 veins, mostly obtuse, sometimes acute or even mucronate, 8–15,5 mm long and 5–8,3 mm wide. Lateral sepals oblique, elliptic-lanceolate to narrowly triangular, acuminate to mucronate, reflexed, with 5–7 veins, 10–17 mm long and 4,7–7 mm wide. Petals bipartite; posterior lobe elliptic-lanceolate to lanceolate, falcate, obtuse, (8–)9–13,5 mm long and (1,5–)2,4–2,9(–4) mm wide; anterior lobe linear, obtuse, (4–)5–13 mm long and 1,1–1,5 mm wide. Lip tripartite at the very base or to 3,5 mm from the base; lateral lobes linear, mostly curved at the apex, obtuse, (8–)11–15,5 mm long and 1,1–2 mm wide; midlobe linear, obtuse, 14–21 mm long and 1,7–2,3 mm wide. Spur 29–90(–120) mm long and 1,5 mm thick, at the apex a slight thickening up to 2,5 mm, hidden behind the bract. Anther-canals very short, bent inwards above the stigma-lobes. Both pollinia attached to one viscid body due to the 2 viscidia having become stuck together. Rostellum variable in size, from 2 to 5 mm long. Stigma-lobes short, 3 mm long.

Distribution. Colombia, Venezuela, the Guianas; in savannas.

Material examined. SURINAME. Berseba, Geyskes 172 (BBS, U). Coesewijne Savanne, Van Donselaar 615 (U). Fransina Savanne, M. & P. Teunissen 1442 (BBS). Lobin Savanne, Van Donselaar 478 (U). Mimilie-Okilie Savanne, NE of Powakka, Van Donselaar et al. 668 (U). Palaime Savanne, Wessels Boer 846 (U). Vierkinderen, M. & P. Teunissen 1100 (U). Without locality, Wichman 135 (U).

FRENCH GUIANA. Cayenne, Veyret 1357 (CAY). Cayenne, Savanna Matiti, Veyret 1354 (CAY). Savane du sable blanc, near Irocoubo: Veyret 1604 (P).

GUYANA. Savanna between Berbice R. and Demarara R., Salzmann s.n. (K).

#### SPECIES IN NEED OF FURTHER INVESTIGATION

*Habenaria macilenta* (Lindley) Reichb.f., Flora 48: 180 (1865). Syn.: *H. muelleriana* Cogn., Mart. Fl. Bras. 3, pt. 4: 72 (1893). Reported from British and French Guiana by Cogniaux (1893) and Hoehne (1949), and from the Guianas by Pabst & Dungs (1975).

*Habenaria macroceratitis* Willd., Sp. Pl. 4: 44 (1805); Pulle, Enum. 116 (1906), = *H. quinqueseta* (Michaux) Eaton, Man., ed. 5: 253 (1829). This is a variable species, particularly as regards the length of the spur, ranging from the southern United States through Mexico and Central America to north-western South America, also in the Caribbean region. Cogniaux (1893) cites 2 collections from Suriname and 2 collections from British Guiana. Large-flowered and long-spurred forms probably resemble *H. longicauda*. The main differentiating character probably lies in the anterior lobe of the petals being twice or more than twice as long as the posterior lobe in *H. quinqueseta* vs. the anterior petal lobe less than twice as long as the posterior lobe in *H. longicauda*, *fide* Hoehne (1940). The alliance of large-flowered and long-spurred *Habenarias*, to which these two species belong as well as *H. fastor* mentioned

further on, should perhaps be further investigated with regard to the delimitation of the species.

*Habenaria parvidens* Lindley, Gen. Sp. Orchid. Pl. 317 (1835); Reichb.f., Ned. Kruidk. Arch. 4: 319 (1859); Pulle, Enum. 116 (1906). This species was described from Peru. An unspecified collection was so identified by Reichenbach fil. in a paper on Splitgerber collections from Suriname (1859) sent to him for identification by the Rijksherbarium at Leyden. Hoehne (1940) refers to this collection as having come from the same locality as the type. It could not be located at Leyden.

*Habenaria sartor* sensu Cogn., Mart. Fl. Bras. 3, pt. 4: 32 (1893), non Lindley ex Benth. (1843); Reichb.f., Ned. Kruidk. Arch. 4: 320 (1859); Pulle, Enum. 116 (1906), = *H. fastor* Lindley ex Warm., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn, ser. 4, 6–8: 90 (1885?), emend. Hoehne, Fl. Brasílica 12, pt. 1: 71 (1940). *Fide* Pabst & Dungs (1975). Based on Splitgerber 754 from Suriname, Para R. near Plantation Onoribo (L); this collection was identified by Reichenbach fil. (1859) as *H. sartor*. The specimen now kept at Leyden has no good flowers left, but it is referable to *H. longicauda* with hardly any doubt. See also remark under *H. macroceratitis* = *H. quinqueseta* above.

*Habenaria setacea* Lindley, Gen Sp. Orchid. Pl. 312 (1835). Reported from the Guianas by Pabst & Dungs (1975).

*Habenaria seticauda* Lindley ex Benth., London J. Bot. 2: 673 (1843). Reported from British and French Guiana by Cogniaux (1893) and Hoehne (1940), and from the Guianas by Pabst & Dungs (1975).

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