

## Notes on *Schismatoglottidinae* of Borneo, I

By

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(Received July 31, 1965)

The Kyoto University Borneo Expedition, 1963-64<sup>1)</sup>, visited northern Borneo (Sarawak and Brunei). As a member of this expedition, the present writer, having special interest in the family Araceae, observed the species of this family in the field and collected rich herbarium materials. In this family, the subtribe *Schismatoglottidinae* is mostly found in Borneo. *Bucephalandra*, *Microcasia*, *Gamogyne* and *Aridarum* were reported as endemic genera of this region. The largest genus of this subtribe, *Schismatoglottis* has many species in Borneo. In this and the following papers, it is intended to report several revisions of genera or species of this interesting subtribe, including new taxa based chiefly upon our collections.

Here I would like to express my hearty thanks to Prof. S. KITAMURA and Dr. M. TAGAWA for their constant guidance, and my deep gratitude to many persons who helped our party of the expedition in various ways.

### 1. Note on *Piptospatha* and allied genera

The genera *Bucephalandra* SCHOTT, *Piptospatha* N. E. BROWN, *Microcasia* BECCARI, *Rhynchophyle* ENGLER, *Gamogyne* N. E. BROWN, and *Aridarum* RIDLEY are known from Borneo, and the second also from southern Malaya. They are closely related to each other as shown by their common features such as the deciduous and large spathe without constriction at the middle, soon deciduous male part of the spadix, more or less thick and usually lanceolate leaves with the lamina having subparallel veins and veinlets, liguliform free part attached to the petiole vagina (excluding *Bucephalandra* ?), and similarity in their habitats.

From field observations as well as from the studies in the herbarium, those genera cited above may derived from a single ancestral stock like *Schismatoglottis*. In the following pages, a revision will be given of those genera along the assumption mentioned above.

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1) The itinerary of this party was given by the present writer in Acta Phytotax. Geobot. 21 : 153-160 (1965).

## Key to Genera and Sections

- A. Ovules arranged on basal placenta :
- B. Stigma smaller than ovary in diameter, i. e. the upper part of the ovary constricted. Filament with round or truncate top. Plant small, 5-15 cm high ..... *Microcasia*
- C. Pollen sac with an apical horn and dehiscent by an apical pore ..... Sect. *Microcasia*
- CC. Pollen sac without horn, opening by an apical pore ..... Sect. *Truncatae*
- BB. Stigma as large as the ovary or slightly small, i. e. the upper part of the ovary not constricted or slightly constricted. Filament large and excavated. Plant not so small, usually 15-60 cm high ..... *Aridarum*
- C. Leaf linear, without distinct lateral nerves. Two pollen sacs attached to opposite sides of the filament ..... Sect. *Aridarum*
- CC. Leaf with distinct lateral nerves. Two pollen sacs attached to unilateral side of the filament ..... Sect. *Caulescentia*
- AA. Ovules arranged on parietal placenta :
- B. Pollen sac with an apical horn and dehiscent by an apical pore. Petiole vagina without free liguliform part (?) ..... *Bucephalandra*<sup>2)</sup>
- BB. Pollen sac without a horn, opening by a free apical pore ..... *Piptospatha*
- C. Ovaries free ..... Sect. *Piptospatha*<sup>3)</sup>
- CC. Ovaries connate ..... Sect. *Gamogine*

I. *Microcasia* BECCARI

*Microcasia* BECCARI in Bull. Soc. Tosc. di Ort. 179 (1879) ; ENGL. in ENGL. Pflanzenz. 55: 128, f. 77 (1912). Typus: *M. pygmaea* BECC.

Sect. *Microcasia*

- (1) *Microcasia muluensis* M. HOTTA, sp. nov. Fig. 1, A-F.

Caudiculus brevis, 5-15 mm longus. Foliorum petiolus 1.5-3 cm longus, vagina in partem liberam lanceolatam 1.5-2 cm longam producta, lamina supra viridis, subtus pallidior, oblonga vel suborbiculata, longitudinaliter leviter inaequalia, apice acuminata vel obtusa, apiculo 1.5-3 mm longo instructa, 1.5-4.5 cm longa, 1.3-2.0 cm lata, nervis lateralibus primariis et secundariis ascendentibus

2) Only one species, *B. motoleyana* SCHOTT is known from Borneo. According to the original figures of SCHOTT and the description given by ENGLER, this species undoubtedly related *Microcasia*, but *Bucephalandra* distinctly differs from *Microcasia* in the parietal placenta, and directly adjoined female and fertile male part of the spadix.

3) Here, I exclude two species, *P. havilandii* and *P. acutifolia* from this section. These two species may belong to *Schismatoglottis*.

deinde marginalibus. Pedunculus 3.5-5 cm longus, erectus. Spathae ovato-lanceolatae, acuminatae, induplicatae, 2-2.5 cm longae, albae. Spadix 9 mm longus, pars infima feminea ca. 10 flora et inferne ca. 8 organis neutris obsessa, 1.6 mm longa, et mascula sterilis staminodiis brevissime obpyramidatis praedita, pars mascula fertilis cylindricis, ca. 15 flora, pars suprema mascula sterilis subglobosa, 3.5 mm longa, 3 mm diam. Ovaria 0.6-1 mm longa, unilocularia, placenta basilaris; ovula orthotropa, 18-20; stigma discoideum. Filamentum obovoideum, 1 mm longum, extus superne thecis 2 praeditum, thecis apice in cornu productis, ellipsoideis, 0.5 mm longis, cornu 0.3 mm longum.

SARAWAK. Mardi: along S. Payau between S. Melinau Paku and Rubang Payau, at the foot of G. Mulu, 50-100 m, on wet limestone rock, March 22, 1964, *M. Hotta 15329* (Holotype in KYO).

This new species is very closely related to *M. elliptica* of Sarawak, but differs from it in having wider and longitudinally unequal lamina of the leaf, and in the spadix with upper sterile male part thicker than fertile part, and obovoid large filament.

(2) ***Microcasia oblanceolata*** M. Hotta, sp. nov.

Fig. 1, G-M.

Caudiculus dense foliatus, 0.5-4 cm longus. Foliorum petiolus 2-6 cm longus, vagina in partem liberam lanceolatam 2-3 cm longam producta, lamina subcoriacea, supra saturate viridis, subtus pallidior, lineari-oblanceolata vel anguste oblonga, apice acuta et apiculo breviter (0.5-1 mm) cylindrico intracta, 4-8 cm longa, 0.8-1.7 cm lata, nervis lateralibus I. tenuibus erecto patentibus, sursum procurrentibus atque nervis II. et III. numerosis subparallelis vix conspicuis. Pedunculus fere petiolo longior, 4-8 cm longus. Spathae tubus turbinatus, persistens, lamina decidua, 3 cm longa, alba. Spadix 1.5-2 cm longus, pars infima feminea cylindrica, 4 mm longa, 16-20 flora, et pars mascula sterilis staminodiis brevissime obpyramidatis praedita, pars mascula fertilis cylindrica, 3 mm longa, ca. 15 flora, pars superma mascula sterilis ovoidea quam fertilis longior et crassior, 1-1.3 cm longa, 5-6 mm diam. Ovaria unilocularia, placenta basilaris; ovula orthotropa, 45-60. Filamentum obovoideum, 5-angulatum, extus supra thecis 2 praeditum, thecis subglobosis, apice breviter cornutus.

BRUNEL. Brunei Tembrong: Bt. Peradayan, vicinity of Labu, 100-300 m, on wet sand stone in small valley of dense forest, Jan. 25, 1964, *M. Hotta 13586* (Holotype in KYO, isotype in SAR); along S. Lacquan, a branch of S. Batu-Apoi, 50-300 m, on wet rock near small stream, Jan. 31, 1964, *M. Hotta 13855* (KYO).

The present new species is a larger plant with linear-oblanceolate or narrow oblong leaves. The upper sterile male part of the spadix is ovoid and larger. The ovules are many in one ovary, usually 45-60 in numbers. This is a distinct species having no direct ally among the known species.

Sect. *Truncatae* M. Hotta, sect. nov.

Herba parva. Spadicis pars mascula sterilis inferior parva, superior attenu-

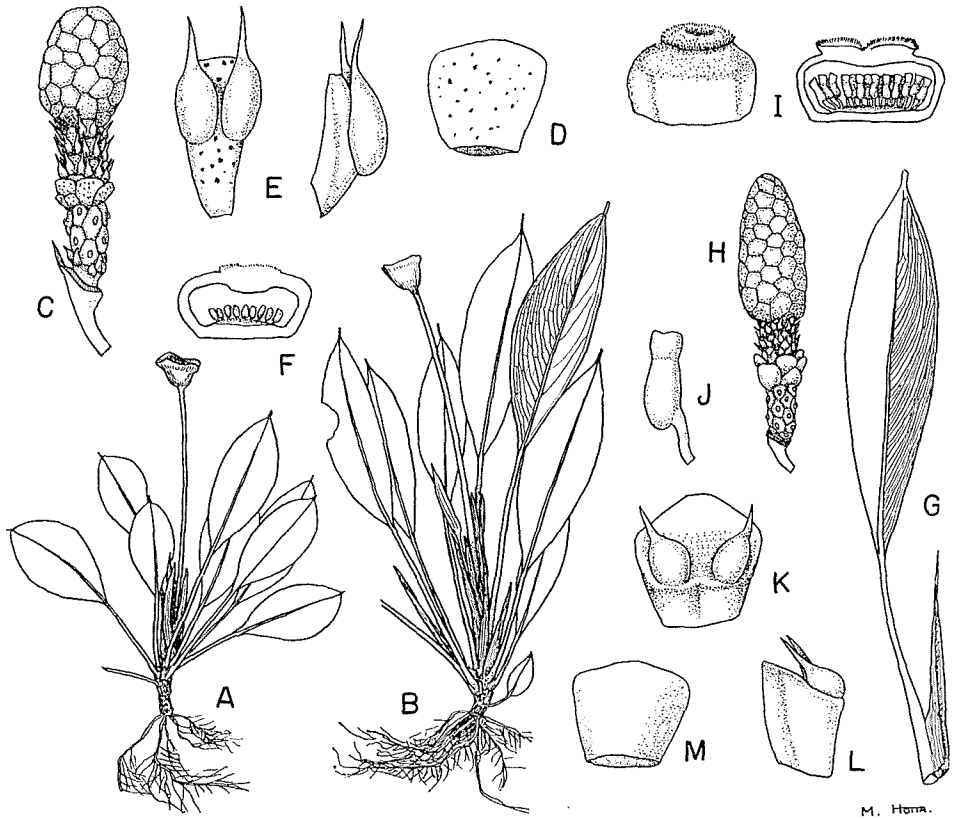


Fig. 1. A-F *Microcasia muluensis* M. HOTTA. A, B, whole plant ( $\times 1.3$ ). C, spadix ( $\times 4$ ). D, staminode ( $\times 20$ ). E, male flowers ( $\times 20$ ). F, ovary ( $\times 15$ ). G-M *Microcasia oblanceolata* M. HOTTA. G, leaf ( $\times 1$ ). H, spadix ( $\times 2$ ). I, ovaries ( $\times 15$ ). J, ovule ( $\times 50$ ). K, L, male flowers ( $\times 10$ ). M, staminode ( $\times 6$ ).

ata et quam fertilis brevior. Filamentum ovatum, thecis apice truncatis. Ovarium uniloculare, placenta basilaris; ovula orthotropa. Typus: *Microcasia truncata* M. HOTTA.

(3) ***Microcasia truncata*** M. HOTTA, sp. nov.

Fig. 2, A-G.

Caudiculus ascendens brevis. Foliorum petiolus quam lamina brevior, 3-4.5 cm longus, vagina in partem liberam lanceolatam 3-3.5 cm longum producta, lamina supra obscure viridis, subtus pallidior, oblanceolata, apice acuta vel rotundata et apiculo 1-2 mm longo cylindrico instructa, basi attenuata, margine minutissime undulata, 4-7 cm longa, 1.5-2.3 cm lata, nervis lateralibus I. 4-6 erecto patentibus, sursum procurrentibus. Pedunculus florifer

9-11 cm longus, fructifer 13 cm longus. Spathae induplicatae tubus persistens. Spadix 1.5 cm longus, pars feminea 4 mm longa, ca. 20 flora, inferne organis neutris obsessa, pars mascula 10 mm longa, basi floribus masculis sterilibus paucis intracta, apice leviter angustata rotundata, floribus masculis sterilibus intracta. Filamentum truncatum, thecis 0.4 mm longis. Ovaria unilocularia, placenta basilaris; ovula orthotropa, erecta, 12-15; stigma discoideum, basi breviter constrictum.

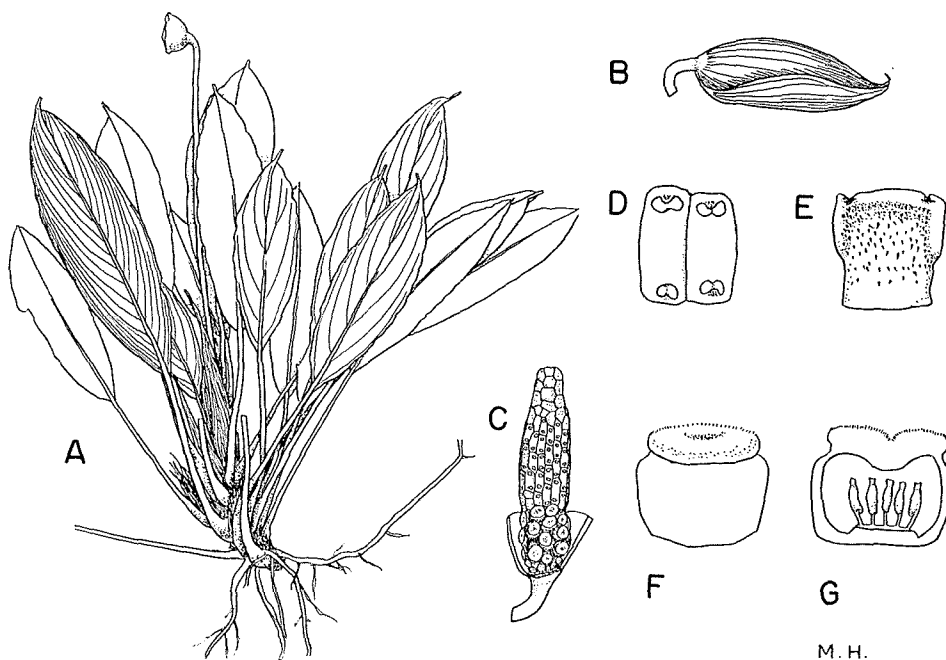
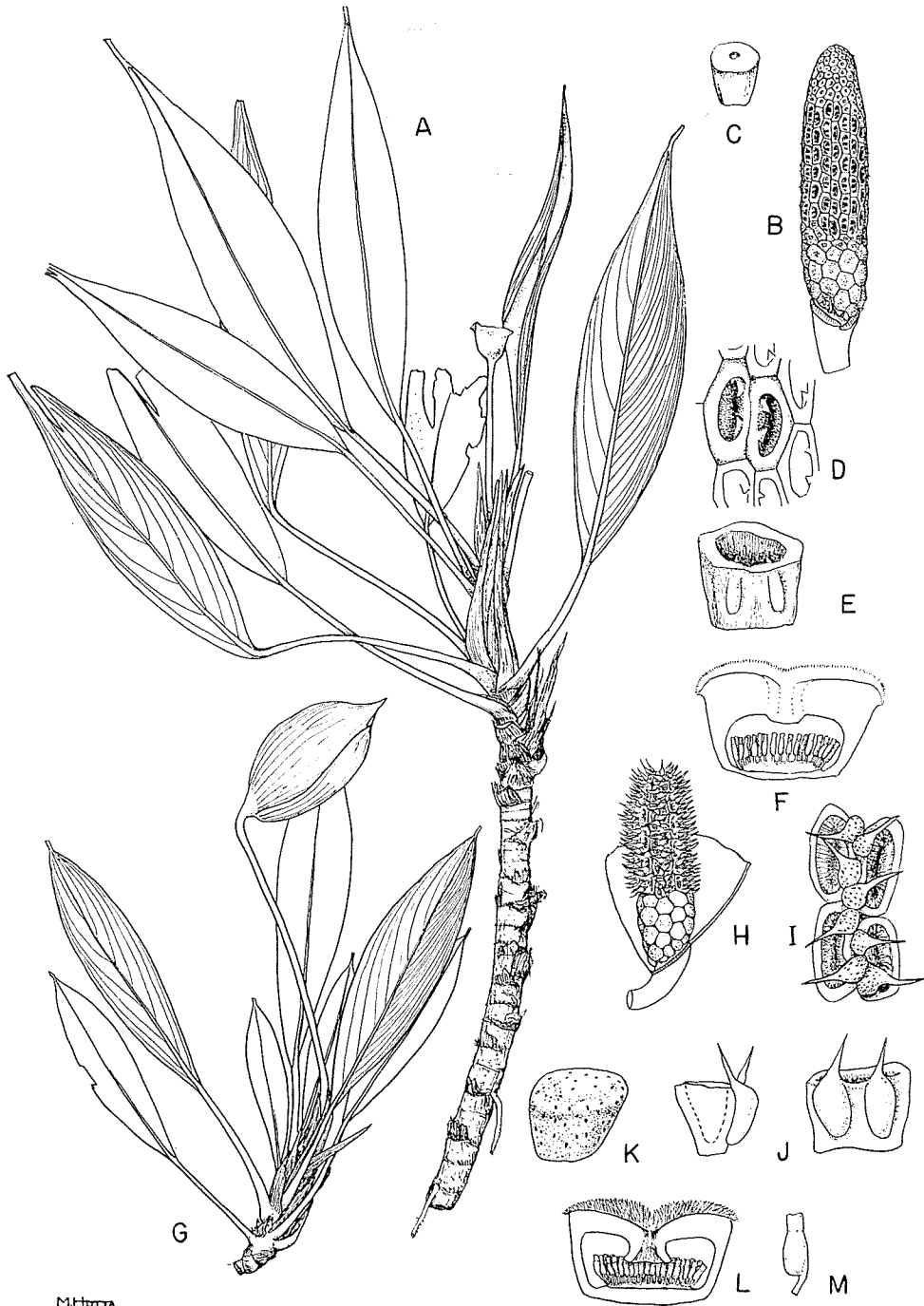


Fig. 2. A-G *Microcasia truncata* M. HOTTA. A, whole plant (1/2). B, spathe ( $\times 1$ ). C, spadix ( $\times 2$ ). D, upper view of male flowers ( $\times 20$ ). E, side view of male flower ( $\times 20$ ). F, ovary ( $\times 20$ ). G, vertical section of ovary ( $\times 20$ ).

SARAWAK. Bintulu: along Ulu S. Kakus, between S. Biyah and S. Mubong, on wet riverside rock, Nov. 11, 1963, *M. Hirano* & *M. Hotta* 1012 (Holotype in KYO); Ulu S. Kakus, between S. Tinggili and S. Biyah, Nov. 8, 1963, *M. Hirano* & *M. Hotta* 845 (KYO).

This new species is well marked by its basal placenta and truncate apex of the pollen sacs. It resembles to *Piptospatha* in the shape of male flower, but distinctly differs from all members of *Piptospatha* by its basal placenta and smaller size of the plant. On the otherhand, the present species closely related to *Microcasia* in its small size, venation of the leaf, and basal placenta of the



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ovary. Our specimens differ from the other members of *Microcasia* by the truncate apex of pollen sacs.

The present species seems to be related to both *Piptospatha* and *Microcasia* and more closely to the latter.

## II. *Aridarum* LIDLEY

*Aridarum* LIDLEY in Jour. Bot. 51: 201, tab. 527 (1913). Typus: *A. montana* LIDLEY

We collected two new species on Bt. Kana, Sarawak. Those species seem to be related to monotypic *Aridarum*. One of these two is closely related to FURTADO'S *Microcasia purseglovei*. Here I put those three species in a new section of this genus.

Sect. *Caulescentia* M. Hotta, sect. nov.

Herba parva vel longe caulescens. Spadix cylindricus, pars mascula fertilis ad apicem et basem floribus sterilibus instructa vel floribus sterilibus nullus. Filamentum cupriforme, extus lateraliter thecis 2 praeditum, thecis apice cornutus. Ovaria unilocularia, placenta basilaris; ovula orthotropa. Typus: *A. purseglovei* (FURTADO) M. HOTTA.

(1) *Aridarum purseglovei* (FURTADO) M. HOTTA, comb. nov.

*Microcasia purseglovei* FURTADO in Gard. Bull. 17: 276, figs. A-G (1958).

(2) *Aridarum caulescens* M. Hotta, sp. nov.

Fig. 3, A-F.

Caudiculus erectus, usque 10-20 cm longus, 1-1.5 cm crassus. Foliorum petiorus quam lamina brevior, 4-8 cm longus, basi late vaginatus, vagina in partem liberam 5-7 cm longam lanceolatam producta, lamina supura obscure viridis, subtus pallidior, coriacea, lanceolata, apice longe acuminata et apiculo 7-10 mm longo cylindrico instructa, basi attenuata, 10-17 cm longa, 2.5-4 cm lata, nervis lateralibus I. 5-8, ascendentibus, deinde marginalibus. Pedunculus florifer ca. 5 cm longus, fructifer 7-10 cm longus. Spathae albae, induplicatae, 5-6 cm longae, 3 cm diametientes. Spadix cylindricus 2.8 cm longus, 6 mm crassus, feminea 6 mm longa, ca. 25 flora, inferne organis neutris obsessa, pars masculi fertilis ad basem et apicem masculis sterilibus praedita. Ovaria 1.5-2 mm diametientia, unilocularia, stigmatis sessilibus coronata, placenta basilaris; ovula orthotropa, 50-60. Staminodia inferiora et superiora obovoidea, ca. 1 mm lata. Filamentum obovoideum, ca. 2 mm longum, 1 mm latum, cupriforme, apice truncatum, extus lateraliter thecis 2 instructum; thecis oblongis, apice breviter cornutus. Semina elongata, 2 mm longa, albumine

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Fig. 3. A-F *Aridarum caulescens* M. HOTTA. A, whole plant (1/2). B, spadix ( $\times 1.5$ ). C, staminode ( $\times 6$ ). D, upper view of male flowers ( $\times 6$ ). E, side view of male flower ( $\times 6$ ). F, ovary ( $\times 10$ ). G-M *Aridarum longipedunculatum* M. HOTTA. G, whole plant (1/2). H, spadix ( $\times 1.5$ ). I, upper view of male flowers ( $\times 6$ ). J, side view of male flowers ( $\times 6$ ). K, staminode ( $\times 10$ ). L, ovary ( $\times 10$ ). M, ovule ( $\times 25$ ).

copioso.

SARAWAK. Bintulu: eastern ridge of Bt. Kana, 800-950 m, on wet sand stone forming steep cliff in open forest, Nov. 20, 1963, *M. Hirano & M. Hotta 1468* (Holotype in KYO, isotype in SAR).

(3) *Aridarum longipedunculatum* M. HOTTA, sp. nov. Fig. 3, G-M.

Caudiculus brevis, erectus, usque 2-4 cm longus, 6-10 mm crassus. Foliorum petiolus quam lamina brevior, 3-6 (8) cm longus, basi late vaginatus, vagina in partem liberam lanceolatam 2.5-3.5 cm longam producta, lamina supra viridis, subtus pallidior, subcoriacea, oblanceolata vel oblonga, apice acuminata, apiculo 2-3 mm longo cylindrico intracta, basi attenuata, 5-10 (12) cm longa, 1.5-2.1 (2.5) cm lata, nervis lateralibus ascendentibus deinde marginalibus. Pedunculus 6-10 (14) cm longus. Spathae albae, induplicatae (3) 4.5-5.5 cm longae, 2.5-3 cm diametientes. Spadix cylindrico-ellipsoideus, 1.9 cm longus, pars feminea 7 mm longa, 5.5 mm crassa, ca. 20 flora, inferne organis neutris obsessa, pars mascula (flori sterili nullo) 12 mm longa, 6 mm crassa. Ovaria 1.5-2 mm diametientia, unilocularia, stigmatis discoideis sessilibus coronata, placentae basilaris; ovula orthotropa, 45-55.

SARAWAK. Bintulu: along the valley of Ulu S. Bejangang, eastern part of Bt. Kana, 700-850 m, on wet mossy rock in moist dense forest, Nov. 21, 1963, *M. Hotta 15381* (Holotype in KYO, isotype in SAR).

The two new species and *A. purseglovei* have two pollen sacs attached on the lateral side of cupuliform filament. Each pollen sac has apical horn. By those peculiar structures of the male flower, these species are closely related to *Aridarum montanum* but those differ distinctly from latter species in wider leaf with distinct lateral nervs and in pollen sacs attached on the unilateral side of the filament.

*Aridarum caulescens* differs from *A. longipedunculatum* and *A. purseglovei* by sterile male flowers of the male part of spadix, and by the shorter apical horn of the pollen sac.

*Aridarum longipedunculatum* differs from *A. purseglovei* by the shorter stem, ovoid pollen sac, nearly flat stigma, and shorter male part of the spadix.

### III. *Piptospatha* N. E. BROWN

*Piptospatha* N. E. BROWN in Gard. Chron. 11: 138, fig. 20 (1879); ENGLER in ENGL. Pflanzenr. 55: 124, fig. 75 (1912), p.p. — *Rhynchochyle* ENGL. in Bot. Jahrb. 1: 184 (1881). — *Gamogyne* N. E. BROWN in Jour. Bot. 20: 195 (1882), syn. nov. Typus: *P. insignis* N. E. BROWN

Sect. *Gamogyne* (N. E. BR.) M. HOTTA, stat. nov<sup>4)</sup>.

*Gamogyne* N. E. BR., l.c., pro. gen.

4) The following 6 species may belong to sect. *Piptospatha*: *P. elongata* N. E. BR., *P. perakensis* RIDLEY, *P. globowskii* ENGL., *P. marginata* N. E. BR., *P. ridleyi* N. E. BR., and *P. insignis* N. E. BR.



In this section, a species is known from Borneo.

- (1) *Piptospatha burbidgei* (N. E. BR.) M. HOTTA, comb. nov. Fig. 4.  
*Gamogyne burbidgei* N. E. BR. in Jour. Bot. 20: 195 (1882).  
 BRUNEI. Brunei Tembrong: S. Tongkat, a branch of S. Batu-Apoi, 50-200m,  
 on wet sunny rock along stream, Jan. 29, 1964, M. Hotta 13735 (KYO, SAR),  
 13721 (KYO).

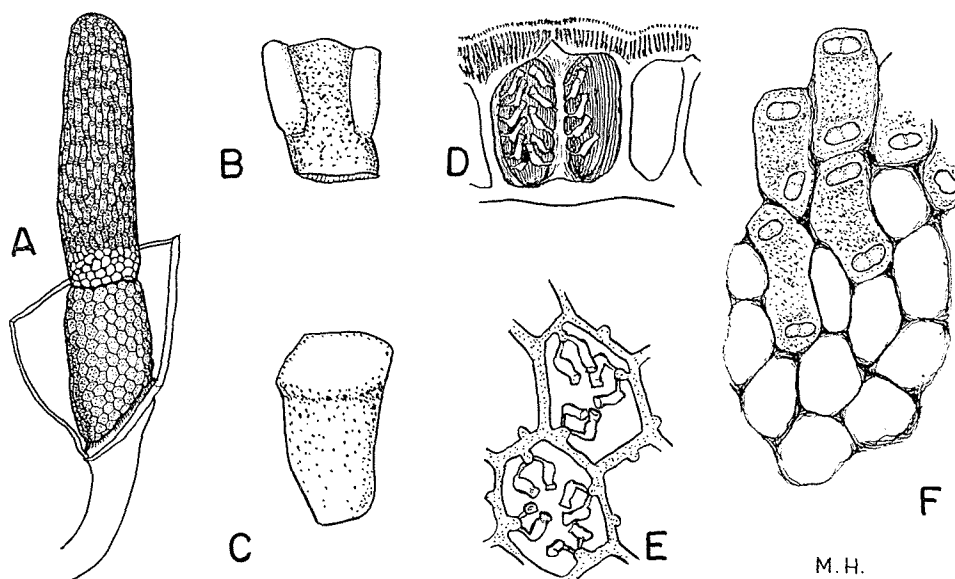
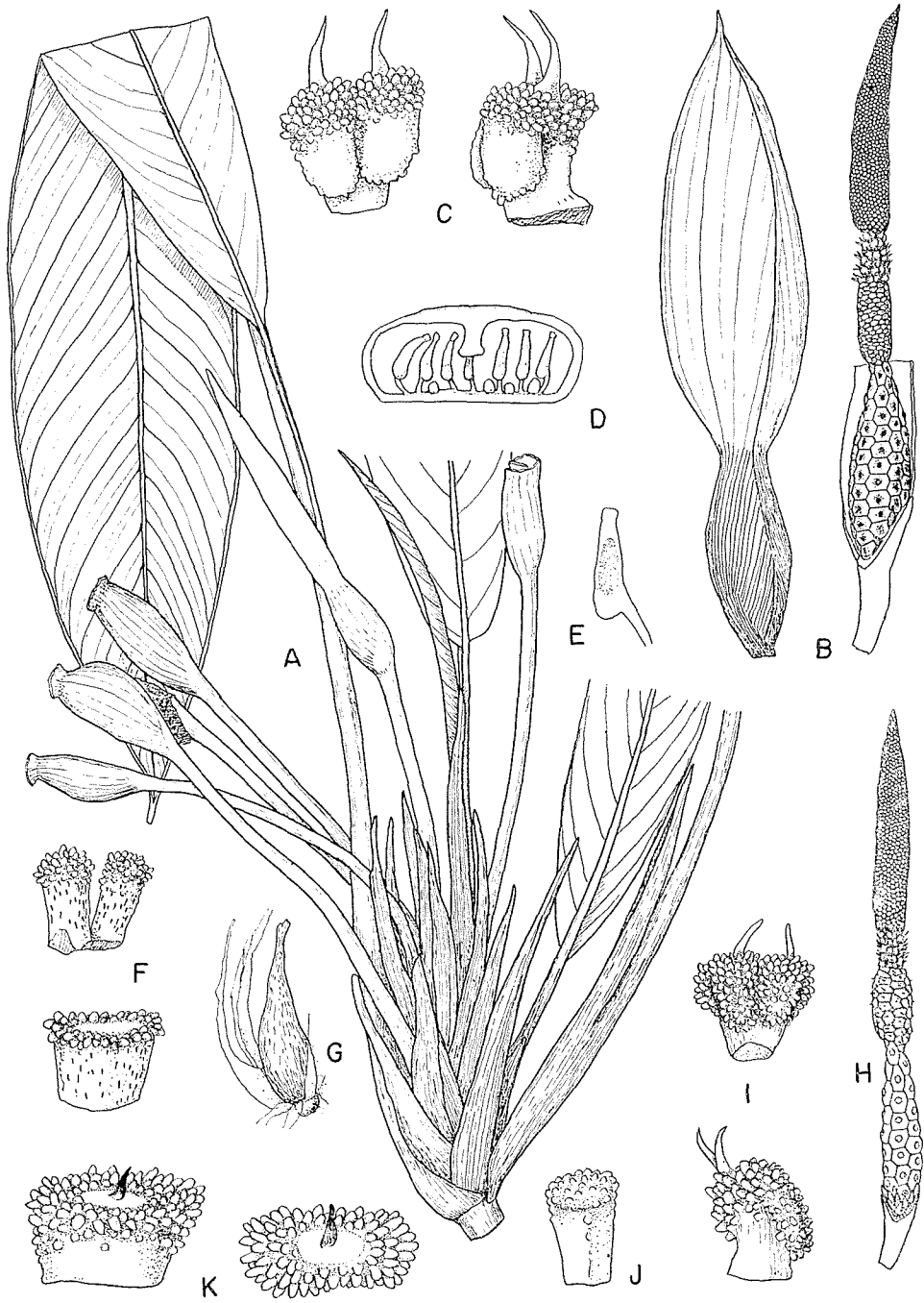


Fig. 4. A-F *Piptospatha burbidgei* (N. E. BR.) M. HOTTA. A, spadix ( $\times 1.5$ ). B, side view of male flower ( $\times 10$ ). C, staminode ( $\times 10$ ). D, vertical section of ovary ( $\times 13$ ). E, cross-section of ovary ( $\times 13$ ). F, lower male part of spadix ( $\times 10$ ).

Our specimens have rose spathe, connated ovaries, few sterile male flowers at the base of the male part of spadix, and parietal placentation. They may be referred to BROWN's *Gamogyne burbidgei* known from Bt. Sagan, Sarawak. For the genus *Gamogyne*, ENGLER noted that "petiole with winged vagina which is not freely prolonged beyond base of petiole". While our specimens have liguliform free part on the petiole vagina. The free liguliform part is very difficult to observe in dried specimens. So ENGLER's statement may be based on a miss-observation (N. E. BROWN did not mention this character). Formerly *Gamogyne* was separated generically from *Piptospatha* by the connated ovaries and the shape of vagina. But the two genera are closely related to each other in the shape of male flower, large and sessile stigma, the parietal placentation, and the venation of leaf. Therefore, these two genera are united.



2. A new genus of *Schismatoglottidinae*

*Schismatoglottidinae* are well differentiated in Borneo. Our party collected 2 species which belong to a group distinctly different generically from all species of this subtribe.

**Phymatarum** M. HOTTA, gen. nov.

Flores unisexuales nudi. Flores masculi fertiles 1-andri, thecis obovoideis, breviter multi-tuberculatis, apice cornutus. Flores masculi steriles inferiores. staminodiis angulalis obovoideis, superne ad marginem tuberculatis; flores masculi steriles superiores cylindrici superne tuberculati. Ovarium depresso globosum, uniloculare, placenta basilaris; ovulis orthotropis, 15-25 atque ovulis abortis ca. 10. Bacca depresso-globosa, polysperma. Semina ovoidea, elongata, basi membranis sectis protecta, albumine copioso. Herba parva, crescit in silva ad ripam. Foliorum petiolus inferne in vaginam supra in partem liberam lanceolatam productus. Pedunculus erectus. Spathae tubus ovoideus, persistens, lamina alba, induplicata, decidua. Spadicis pars feminea conoidea, basi sterilis obsessa; pars mascula quam feminea longior, pars mascula sterilis inferior quam fertilis longior, pars sterilis superior conoidea apice acuminata. Typus: *P. borneense* M. HOTTA.

(1) **Phymatarum borneense** M. HOTTA, sp. nov.

Fig. 5, A-G.

Caudiculus epigeus ascendens, 5-8 cm longus, 1-1.5 cm crassus, multi-foliatu. Foliorum petiolus quam lamina brevior, 8-13 cm longus, supra longitudinaliter canaliculatus basi in vaginam supra in ligulam lanceolatam (6-8 cm longam) productam angustatus, lamina herbacea, obscure viridis, oblonga, apice acuminata, apiculo ca. 5 mm longo cylindrico instructa, basi angustata vel attenuata, 10-30 cm longa, 2.7-7.0 cm lata, nervis lateralibus I. utrinque 10-16, arcuato-ascendentibus deinde in nervum collectivum marginalem confluentibus. Pedunculus 3-7, floriferi 7-11 cm longus, fructifer 7-13 cm longus. Spathae tubus viridis, 2.5-3 cm longus, 1.2-1.4 cm crassus, lamina ellipsoidea, 6 cm longa, 2 cm crassa, alba, decidua. Spadix pars feminea conoidea 2.7 cm longa, basi 7 mm crassa, organis neutris paucis (ca. 5) ovoideo-conicis praedita, pars mascula quam feminea longior, pars sterilis inferior cylindrica, basi constricta, 1.1 cm longa, 5 mm crassa pars fertilis 7-8 mm longa, pars sterilis superior conoidea 3.3 cm longa, apice acuminata. Staminodia sterilis inferiora leviter excavata. Ovaria subglobosa, stigma sessile, ovulis 15-20.

BRUNEI. Brunei Tembrong: en route from Kpg. Biang to Bt. Biang, ca. 20 m, on muddy floor of riparian forest, Jan. 20, 1964, *M. Hotta 13314* (Holotype

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Fig. 5. A-G *Phymatarum borneense* M. HOTTA. A, whole plant ( $\times 1/2$ ). B, spathe and spadix ( $\times 1$ ). C, fertile male flowers ( $\times 11$ ). D, section of the ovary ( $\times 6$ ). E, ovule ( $\times 15$ ). F, staminodes ( $\times 6$ ). G, seed ( $\times 5$ ). H-K *Phymatarum montanum* M. HOTTA. H, spadix ( $\times 1$ ). I, fertile male flowers ( $\times 10$ ). J, staminode of the upper part of spadix ( $\times 6$ ). K, staminodes ( $\times 6$ ).

in KYO, isotype in SAR), 13315 (KYO); S. Tongkat, a branch of S. Batu-Apoi, ca. 50 m, Jan. 29, 1964, *M. Hotta* 13722 (KYO).

(2) ***Phymatarum montanum*** M. HOTTA, sp. nov.

Fig. 5, H-K.

Caudiculus procumbens, 3 cm longus, 7 mm crassus. Foliorum petiolus 5-10 cm longus, lamina oblanceolata, apice acuminata vel attenuato-acuminata, 14-20 cm longa, 4-5 cm lata. Pedunculus 5-6 cm longus, 1-3 ad caulem. Spathae tubus 1.5-2 cm longus, lamina 6 cm longa. Spadicis pars feminea 2.5 cm longa, ad basi organis neutris ca. 15 instructis, pars mascula quam feminea longior, sterilis inferior ellipsoidea, crassior, 1 cm longa, 6 mm crassa, fertilis 5 mm longa, sterilis superior conoidea 3 cm longa. Staminodia sterilis inferiora apice cornis ca. 1 mm longis producta. Ovaria subglobosa, stigma sessile, ovalis 20-25.

SARAWAK. Mardi: along S. Payau between S. Melinau Paku and Rubang Payau, at the foot of G. Mulu, 50-100 m, on muddy floor of riparian forest, March 22, 1964, *M. Hotta* 15268 (Holotype in KYO). Bintulu: along S. Bejanggang, a branch of S. Anap, at the foot of Bt. Kana, Nov. 18, 1963, *M. Hirano* & *M. Hotta* 1210 (KYO).

This new genus is related to *Schismatoglottis* and *Piptospatha* group. It differs from *Schismatoglottis* in the lanceolate free part of petiole<sup>5)</sup>, basal placentation, tuberculated male flower, and apical horn of the pollen sac. From *Piptospatha* and allied genera, it differs in erect and constricted spathe, its tube not broaden at the fruiting time, and tuberculated pollen sac. This new genus is characterized by the peculiar structure of the male flowers. The pollen sacs are covered by many small tubercles and have long horn at the apex. The sterile male flowers are also covered by such tubercles.

The two species are closely allied to each other. *Phymatarum borneense* differs from *P. montanum* in slightly larger body with erect stem, narrower lamina of leaf, fewer neuter organs at the base of spadix, fewer ovules in a ovary, and lower staminodes of the male part of spadix without horn.

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5) Few species of *Schismatoglottis* have distinct liguliform free part on the petiole.