

**REDISCOVERY OF THISMIA CLAVIGERA (BECC.)
F. v. M. (BURMANNIACEAE)**

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ABSTRACT

The Burmanniaceous saprophyte originally described as *Geomitra clavigera* Becc., and known only from the type collection made in Sarawak in 1865, was rediscovered in Pulau Langkawi, Kedah, Malaysia, in November 1979. This second collection appears to match the original in all important respects, and permits a fuller description of the underground parts and seeds, and allows a fuller account of the staminal ring structure. A review of the generic characters indicates that the genus *Geomitra* should, however, be subsumed within *Thismia* Griff., and the species therefore is to be called *Thismia clavigera* (Becc.) F.v.M. Another recent, third, collection of this species, from North Sumatra, is discussed in an addendum.

INTRODUCTION

More than a century ago Odoardo Beccari obtained on Mt. Gadin near Lundu, in Sarawak, a saprophyte belonging to the family *Burmanniaceae*, under his collection number *P(iante) B(orneensi) 2642*. This plant was described and named *Geomitra clavigera* in Beccari's treatise 'Malesia' which was published in 1877.

Beccari included two species in his new genus *Geomitra*, *G. episcopalis* and *G. clavigera*. He commented that it was most probable that *Geomitra* was identical to *Sarcosiphon* Blume; but because Blume's genus omitted a description of the perigonium it was not possible to be certain. Beccari illustrated both his new species (and several other new *Burmanniaceae*), and a comparison of his Tav. X, Fig. 1 (*G. clavigera*) with our recent collection shows an all but perfect resemblance. Examination of Tav. XI, Fig. 1–5 (*G. episcopalis*) shows clearly the similarity in form of the two species including the mitre (formed by the inner three perigonal segments). The three claviform appendages of the mitre in *G. clavigera* are, however, a striking and important difference between the two species.

Beccari's genus *Geomitra* was reduced to *Thismia* Griffith 1844 by F. von Mueller in two stages – *G. clavigera* transformed to *T. clavigera* in 1890, and *G. episcopalis* to *T. episcopalis* in 1891. Schlechter reinstated the genus *Sarcosiphon* for both these species in 1921. In the Pflanzenfamilien, Engler had earlier transferred *G. episcopalis* to another Beccarian genus, *Bagnisia*, in 1889.

The matter was taken up again by F. P. Jonker, who revised the *Burmanniaceae* for his dissertation (1938) and subsequently provided the treatment of the family for the Flora Malesiana (1948). Jonker elected to treat *G. episcopalis* as a *Thismia*, following von Mueller's action; and reduced Blume's *Sarcosiphon* to sectional rank under *Thismia*, to include three species, *T. clandestina*, *T. episcopalis*, and *T. crocea*,

the last being in fact the sole original member of Beccari's genus *Bagnisia*, also originally published in 1877. However, Jonker maintained *Geomitra*, however limiting the genus to *G. clavigera*. The distinction of *Thismia* from *Geomitra*, according to Jonker, is based on the inner perianth (= perigonium) lobes, which in *Thismia* are free, in *Geomitra* connate apically to form a mitre which bears appendages. Beccari, in his original description, had also emphasized the absence, in *Geomitra*, of any annulus in the perigonial throat, which is present in *Thismia*, but Jonker evidently played down the value of this character or reassessed it when he placed *G. episcopalis* in the genus *Thismia*.

There is an error (typographic) in Jonker's generic diagnosis of *Thismia*: it states 'Stamens 3...' but this properly should read 'Stamens 6...' The correction is found in *Flora Malesiana* vol. 5 (ser. I), p. 554a.

Jonker in effect redefined the genus *Geomitra* and in effect typified it by his choice of *G. clavigera* as the only species. Yet, the characters distinguishing *Geomitra* from *Thismia*, while conspicuous and unmistakable, seem rather of specific than generic value. After a thorough examination of our new material it seems preferable to regard *Geomitra clavigera* as a distinctive but natural member of the genus *Thismia*.

THISMIA

Thismia Griff., Proc. Linn. Soc. 1 (1844) 221.

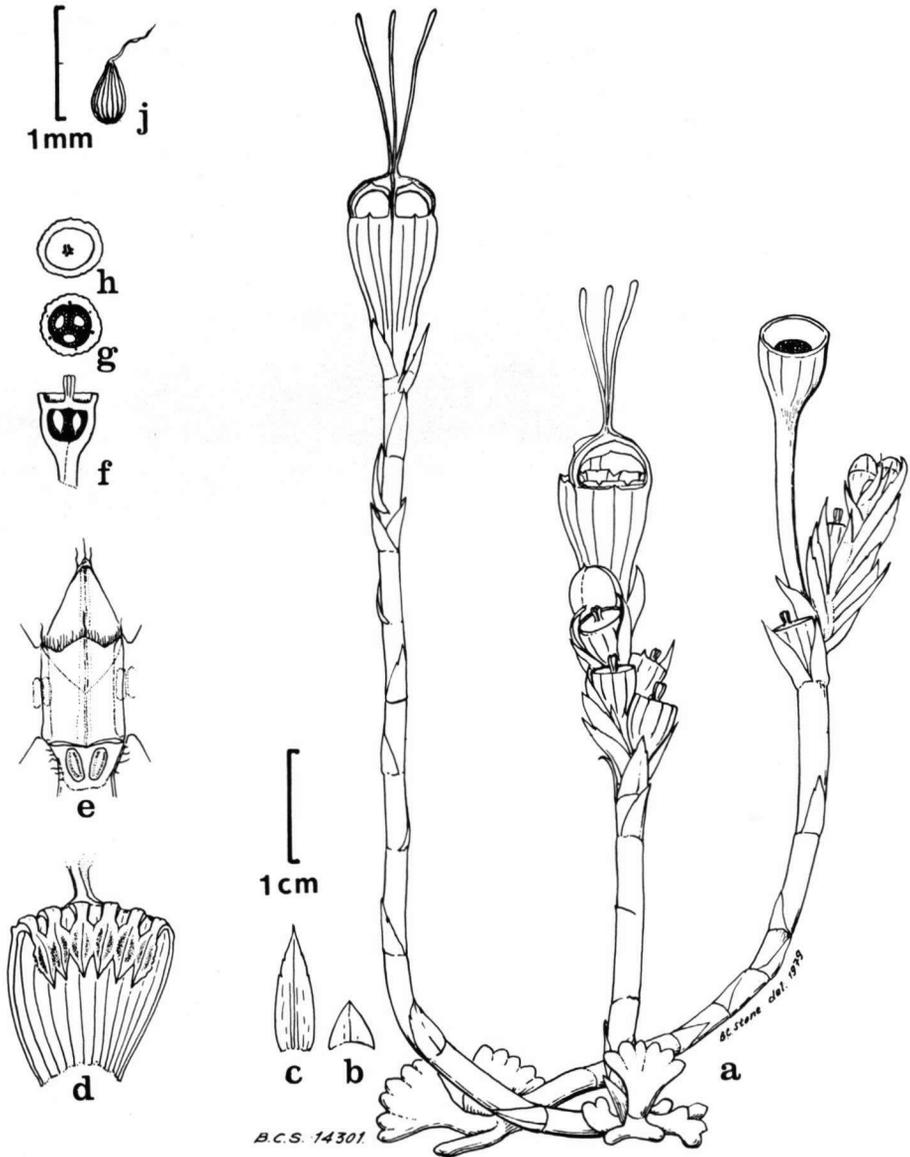
Geomitra Becc., Malesia 1 (1877) 250; Jonker, Monogr. (1938) 46, 254; Fl. Males. I, 4 (1948) 25.

Thismia clavigera (Becc.) F.v.M. — Fig. 1

T. clavigera (Becc.) F.v.M., Vict. Nat. 6 (1890) 235; Bot. Centralbl. 46 (1891) 141. — *Geomitra clavigera* Becc., Malesia 1 (1877) 251, Tav. X, f. 1. Jonker, Monogr. (1938) 46, 255; Fl. Males. I, 4 (1948) 25. — *Sarcosiphon clavigerus* (Becc.) Schltr., Notizbl. bot. Gart. Mus. Berlin-Dahlem 8 (1921) 39. — Type: Beccari P.B. 2642 (Fl, holotype), from Sarawak.

Small herbaceous achlorophyllous saprophyte. *Roots* coralliform of adnate dichotomies forming fan-shaped segments with slightly free, brownish-white tips. *Stems* dull white, upcurved, to c. 12 cm long, 2.5 mm diam., terete, obscurely nodose. *Leaves* spirally arranged, short, appressed, deltoid-ovate to lanceolate, to c. 6 mm long, 2 mm wide, acute or slightly acuminate, apically sometimes minutely erose. *Floral bracts* to 12 mm long, ovate-lanceolate, slightly acuminate, apically sometimes minutely erose; each flower subtended by 2 bracts at a bracteate node. *Flowers* c. 17 mm long, excluding tentacles; basal ovarian part hemi-ovoid, c. 3.5–4 mm long; tubular caducous perianth urceolate, 12-nerved; outer 3 lobes minute, 0.3–0.4 mm long, deltoid; throat margin slightly thickened; inner perianth mitriform with clawed lobes, incurved, centrally adnate to form a dome-shaped mitre with 3 wide archway-like openings, midveins riblike, apex with 3 slender

Fig. 1. *Thismia clavigera* (Becc.) F. v. M. — a. habit, showing the fan-shaped underground parts and 3 erect flowering stems; that on the left and in the center in flower, that on the right in fruit; the center and right stems with multiple flowers; b. a scale leaf from near the base of a stem; c. an upper bract; d. perianth tube, split down one side, inner surface, to show the downcurved anthers adnate laterally; e. inner (adaxial) view of one anther, to show the unequal apical margins, and the marginal transparent hairs; f. ovary in longitudinal section; g. ovary in transverse section; h. view of top of ovary showing stigmata; j. one seed with its funicle. — All from BCS-14301.



THISMIA CLAVIGERA (BECC.) F.v.M.

claviform appendages 12–14 mm long, all yellow-orange; tubular part of perianth after falling leaving basal part with thickened rim. *Stamens* 6, borne on the thickened margin of the perianth-tube, downcurved; filaments free, yellowish-white, quadrangular, 1.5 mm long; anthers adnate by their mediolateral margins, 3.5 mm long, whitish-semitranslucent, acute, obscurely 3-toothed, apical margin bearing a row of unequal transparent hairs, each tooth with a similar hair; anther base with 2 opaque elliptic-oblong areolas. *Stigmas* c. 1.4 mm long, contiguous, acute or rounded at apex, slightly folded (thus broadly V-shaped in section). Mature *ovary* c. 5 mm long (stigmas caducous). *Seeds* minute, numerous, on 3 apically swollen placentas, attached by short slender funicles, obovoid-pyriform, c. 0.5 mm long, longitudinally shallowly ribbed, brownish.

MALAYA. *K e d a h*: Pulau Langkawi, Gunung Raya, northern flank, along track to Ayer Terjun Durian Peranginan, in secondary thickets over granite-derived soils, c. 150 m alt., 13 Nov. 1979, *M. Ratnasabapathy & B. C. Stone BCS-14301* (KLU, L).

SUMATRA. *A c e h*: Gunung Leuser Reserve, Alas River valley, near the mouth of the Bengkong River, c. 50 km S. of Kutacane, c. 3°N–97°50'E, in primary lowland forest at c. 80 m alt., 14 July 1979, *W. J. J. O. de Wilde & B. E. E. de Wilde-Duyfjes 18674* (K, KLU, L) (see the addendum).

BORNEO. *S a r a w a k*: Lundu Dist., Mt. Gadin, 1865, *Beccari P B 2642* (FI).

N o t e s: 1. New records for Malaya as well as for Sumatra, and the second and third known collections of the species.

2. The description and illustration are based on the liquid preserved recently collected Malayan specimens.

3. Note on the staminal structure. Beccari does not describe or figure the almost invisible transparent hairs which are borne on the free apical margin of the anther; there are hairs on each of the rather obscure teeth, but also they occur along the rest of the margin; they are unequal in length. They are here illustrated (Fig. 1, e).

KEY TO THISMIA SPECIES IN MALAYA

1. Inner perianth lobes free, erect or spreading.
 2. Perianth lobes all equal in length.
 3. Flower with bent perianth tube **T. chrysops** Ridl.
 3. Flower with erect, symmetrical perianth tube.
 4. Stems several, flowers 4–6 in raceme **T. racemosa** Ridl.
 4. Stems simple, flowers 1 or 2, terminal.
 5. Stem bearing scale-leaves with glandular hairs on the dorsal surface
T. grandiflora Ridl.
 5. Stem with glabrous scale-leaves.
 6. Perianth lobes narrow, flat, acute-acuminate **T. fumida** Ridl.
 6. Perianth lobes triangular at base, tapering into a filiform tentacle.
 7. Perianth lobes orange, 7–9 mm long . . . **T. aseroe** Becc.
 7. Perianth-lobes white, 15–20 mm long . . . **T. alba** Holtt.
 2. Perianth lobes unequal, inner ones much longer.
 8. Perianth tube with 6 red streaks; anther apex teeth each with a weak obscure hair appendix **T. arachnites** Ridl.
 8. Perianth tube with 12 red streaks; anther apex with 3 hairlike appendages (doubtful if in Malaya). **T. javanica** J. J. S.
1. Inner perianth lobes joined at their apices to form a mitre; mitre crowned by 3 slender clavate tentacles **T. clavigera** (Becc.) F.v.M.

REMARKS ON THE GENUS *THISMIA* IN MALAYA

According to Jonker there are 7 species of *Thismia* in Malaya (i.e. the Malay Peninsula). With the addition of *T. clavigera* there are 8 species. They may be distinguished by the key as given above, based partly on notes by Prof. Holttum in the Herbarium of the Botanic Gardens, Singapore.

In Ridley's Flora of the Malay Peninsula the genus *Bagnisia* Becc. is included; one Malayan plant is referred to this genus as *B. crocea* Becc. var. *brunnea* Ridl. Jonker (1948: 25) remarks of this: 'This specimen was apparently not preserved; it is highly improbable that it belongs to *T. crocea*'. *Thismia (Bagnisia) crocea* (Becc.) J. J. S. is in fact a New Guinea species, not known elsewhere. There is, however, a specimen of Ridley's var. *brunnea*; it is in the Gardens' Herbarium, Singapore, and was collected in Perak, on Gunung Hijau above Taiping at about 4000 ft. altitude. Ridley had previously referred to this specimen (1893: 359) under the tentative identification *Geomitra episcopalis*. This he altered in his description of var. *brunnea* (1907). However, he seems to have regarded *Bagnisia* as including *Geomitra*, which accounts for his error in stating the original locality of *Bagnisia* ('the original species is from Borneo.') Ridley describes the plant as having a stout rhizome and being 'entirely red-brown' and 'the sepals linear connate at tips'. Probably, for sepals he should have written perianth lobes. This description does not fit either *T. episcopalis* or *T. clavigera*. Just what Ridley's plant really is cannot now be determined; it seems quite possible that it is still another *Thismia* in the Malayan peninsula, which would raise the total to 10 species. However, as Jonker mentions, *T. arachnites* and *T. javanica* may be the same species.

NOTES ON MALAYAN COLLECTIONS OF *THISMIA*

Some of the saprophytic *Burmanniaceae* are by no means rare, and adequate, if not numerous, collections have been made. This is true for *Gymnosiphon aphyllus* Bl., and to a lesser extent for *Thismia aseroe* Becc. Most of our other species seem to have been collected only a few times, or even but once: *T. chrysops*, *T. racemosa*, *T. grandiflora*, *T. alba*, are known only from single collections; *T. arachnites* and *T. fumida* from two specimens each. Now *T. (Geomitra) clavigera* has been raised from the status of excessively rare (once collected) to extremely rare (thrice collected). But the most remarkable aspect is the distance separating the two localities where, at an interval of about 115 years, it has been found: first in Sarawak, second in Pulau Langkawi. These localities are not just distant, but are usually considered to be rather distinct biogeographically. P. Langkawi is well-known for its high proportion of monsoon-zone species or 'Burmese' elements, and climatically is rather different (with a much more pronounced dry season almost or quite equating to a monsoon climate) from Sarawak.

It may be that most *Thismias* are truly rare. But is it not also true that they are very ephemeral plants, and appear at just that time of year when collectors are usually most inhibited — i.e. at the height of the wet season? Perhaps they are not quite so rare as is indicated by the specimens that have been preserved. It would appear that a deliberate search for them should be made in the rainiest months; but even so, the chance of success is rather slender.

T. racemosa Ridl. — The only specimen was obtained on 12th June 1913 (a rainy month) on low ground near a swamp at Temerloh in Pahang.

T. fumida Ridl. — The only specimens are from Singapore and Selangor, the latter obtained in July, which can be either a dry or sometimes a wet month.

T. alba Holtt. — The sole specimen was collected by E. J. H. Corner (*SF 23892*) on 30th November 1930, certainly a very rainy month, at Tembeling, Pahang.

Ridley's uncertain 'var. *brunnea*' was collected on Gunung (Mt.) Hijau, in Perak, in February 1892, at the end of the 'winter' rains.

T. aseroe Becc. — Several specimens of this from Malaya and Singapore are known; one from Singapore, coll. Ahmač, is dated 17th March 1932; March usually is rather dry. But another specimen, *B. C. Stone 6587*, was obtained on 26th December 1966 at Ginting Highlands, Pahang, in a very wet month (and on a very wet day).

From such minimal data no firm conclusion can be drawn, but an inference only, which suggests that rainy months are more likely to produce *Thismia*s than dry periods. Clearly, we are still only at the stage of infancy in our knowledge of this curious genus.

POLLINATION

Pollination in *Thismia* may be by flies; the mitriform perianth apex with its openings ('windows') suggest the syndrome of myophily. As Beccari already pointed out, the structure is very much like that in *Mitrephora* (*Annonaceae*) and *Sterculia* (*Sterculiaceae*, some species). Our collection did not, however, possess any noticeable odour; a 'putrefying' or excreta-like scent is indicated in the syndrome of myophily.

The abscission of the perianth tube following anthesis and the fragility of the membrane forming the roof of the ovarian chambers, with their numerous tiny seeds, suggests that seed-dispersal may be by rain-splash. It is most improbable that seed-dispersal can cover long distances or overcome wide intervening seas. The occurrence of *Thismia clavigera* in both Pulau Langkawi and Sarawak can therefore be accounted for only by past land connections, which are known to have existed (supermarine phase of the Sunda shelf).

ADDENDUM

After the manuscript on the Malaysian specimens had been completed, the collection *de Wilde & de Wilde-Duyffjes 18674*, from Aceh, North Sumatra, came to my attention.

These specimens (altogether 12 were found) were collected in primary lowland forest at c. 80 m alt., at the base of a slope, in clayey soil under humus, over sandstone parent rock, in damp shaded place; stems pale yellowish; flowers bright pink-red, darker towards apex, terminal appendages tinged purple.

The Sumatra specimens differ from the P. Langkawi plants in the shorter claviform appendages (c. 5 mm long rather than 12–15 mm long), and the rather different color scheme of the flowers, but agree in other dimensions and structure. Nevertheless, further collections are desirable to determine whether these differences are constant. As the Sumatran specimens were press-dried, while the Langkawi specimens were bottle-preserved, there are obvious differences due to

shrinkage. In addition the details of stamen structure were very difficult to make out in the dried material. Bottle-preservation in formalin or other suitable preservative fluids is the method best suited for future collections, to facilitate minute investigation and comparison of specimens.

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