

STUDIES ON THE TRIBE SACCOPETALEAE (ANNONACEAE) - II  
ADDITIONS TO THE GENUS OROPHEA BLUME

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SUMMARY

After a discussion about *Orophea multiflora*/*O. chinensis*, three new species (*O. sarawakensis*, *O. leuseri*, *O. malayana*) are described. Amended keys to subgenera and species are presented too, including new facts about some species recognized in the recent revision of the genus *Orophea*.

After having published my revision of *Orophea* (Keßler, 1988), some additional material of this genus became available to me. First, a recently published new species caught my attention: *Orophea chinensis* Huang. I have only checked the description and the figures because the original material was not at my disposal but nevertheless I cannot confirm its specific status. Huang (1984) said, that this species is close to *O. multiflora* Jovet-Ast but differs particularly in its leaves, the 9 stamens and the 3 ovules per carpel. However, *O. multiflora*, which is only known from the type collection, does have the same leaf-shape and the same number of stamens. I cannot believe that the carpels contain 3 ovules, because in subgenus *Sphaerocarpon* Keßler up to now all members possess always 2 ovules, never more or less. Also the other characters match very well, with the exception of the sculpture of the lamina of the inner petals. Nothing is mentioned of two hooked glands on the inner surface, which do occur in *O. multiflora*. In all respect this species has to be reduced to:

*Orophea* (*Sphaerocarpon*) *multiflora* Ast ex Jovet-Ast

*Orophea* (*Sphaerocarpon*) *multiflora* Ast ex Jovet-Ast, Notul. Syst. (Paris) 9 (1940) 85; Keßler, Blumea 33 (1988) 62 (revision).

*Orophea chinensis* Huang, Guihaia 4 (1984) 317, syn. nov. — T y p e: Huang & Qin 7515, China, Kwangsi, Ningming Xian, Longgang, shrub about 2 m high, flowers green-yellow, in forest on slope of limestone hill, 23-3-1980 (holo GBI, n. v.). — Note: This record from Kwangsi shifts the northern border of the genus nearly to the Tropic of Cancer.

In the index to specimens filed in the New York Botanical Garden, Vascular Plant Type Herbarium (Holmgren et al., 1985) a type of *Orophea megacarpa* Ban with the two varieties *ramosii* Ban and *tomentosa* Ban was cited. These names were apparently never published.

*Elmer 16208* (*O. megacarpa* Ban) was identified as *Orophea corymbosa* (Blume) Miq. as was *Ramos & Edaño 49072* (*O. megacarpa* var. *ramosii* Ban). *Elmer 17834* (*O. megacarpa* var. *tomentosa* Ban) is certainly an *Orophea* but cannot be identified up to species level due to lack of flowers.

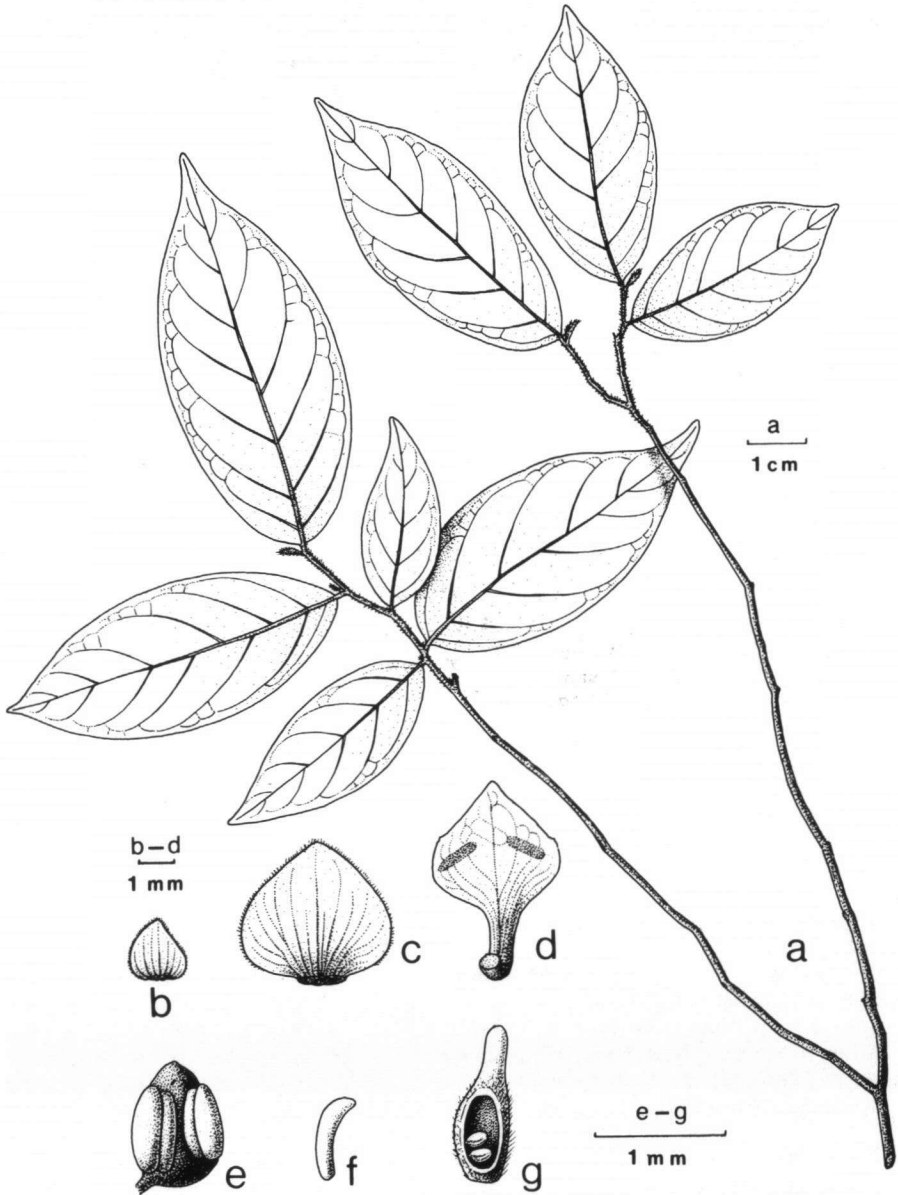


Fig. 1. *Orophea sarawakensis* Keßler. a. Habit; b. sepal, inside view; c. outer petal, inside view; d. inner petal, inside view; e. stamen; f. staminode; g. carpel (a-g Anderson S 16042).

As pointed out in my revision some of the species of subgenus *Orophea* superficially resemble *Popowia pisocarpa* (Blume) Endl. Among material ascribed to the latter genus some sheets from Borneo have now been identified as belonging to a species of *Orophea* new to science:

***Orophea (Orophea) sarawakensis* Keßler, spec. nov. – Fig. 1.**

Arbor 4–8 m alta. Ramuli iuniores pubescentes, mox glabrescentes. Folia oblonga usque elliptica, membranacea, 4–6(–9) cm longa, 1,5–2(–3) cm lata, costa nervisque excepta glabra, apice breviter subacute acuminata, basi acuta, costa supra canaliculata, subtus prominenti, nervis lateralibus 5–7-paribus, omnibus curvato-ascendentibus ca. 2 mm ante marginem conjunctis, sparse hirsutis; petioli 1 mm longi, 1 mm crassi. Inflorescentiae axillares vel supra-axillares, solitariae ca. 1,5 cm longae, 1- vel 2-floribus; pedunculi ca. 1 cm longi; pedicelli ca. 0,5 cm longi. Flores eburnei, parvi, ca. 0,5 cm diametro. Sepala triangulari-ovata, ca. 2 mm longa, ca. 2 mm lata. Petala exteriora sepala similia, ca. 3 mm longa, ca. 4,5 mm lata, interiora lamina triangulata ungue ca. 6,5 mm longa, ca. 4,5 mm lata, intus glabra, nectariis duobus laminarum ad apicem motis. Stamina 6; staminodia 6, teretia. Carpella 6, hirsuta; ovula 2; stigmata sessilia. Carpodia matura desunt. — **T y p u s:** *J.A.R. Anderson S 16042*, Borneo, Sarawak, Miri Dist., G. Subis, 100 ft, small tree on limestone rocks at base of limestone hill, in shade, 6-6-1962 (holo L; iso K, S).

Tree 4–8 m high. Young twigs pubescent, soon glabrescent. *Leaves* oblong to elliptic, membranaceous, 4–6(–9) cm long, 1.5–2(–3) cm wide, glabrous except midrib and lateral veins, apex shortly subacute acuminated, base acute, midrib canaliculate above, prominent beneath, lateral veins 5–7 pairs, curved, ascending, inter-arching c. 2 mm before the margin, sparsely hirsute. *Petiole* c. 1 mm long, c. 1 mm in diameter. *Inflorescences* axillary or supra-axillary, solitary, c. 1.5 cm long, 1- or 2-flowered, peduncle c. 1 cm long, pedicel c. 0.5 cm long. *Flowers* eburneous, small, c. 0.5 cm in diameter. *Sepals* triangular-ovate, 2 mm long, 2 mm wide. *Outer petals* similar to the sepals, c. 3 mm long, c. 4.5 mm wide, inner petals rhombic, lamina with claw c. 6.5 mm long, c. 4.5 mm wide, glabrous inside, with two nectaries at the top of the lamina, parallel to the margins. *Stamens* 6, staminodes 6, terete. *Carpels* 6, hirsute, ovules 2, stigma sessile. Ripe fruitlets unknown.

**D i s t r i b u t i o n.** Only known from three localities in Borneo (G. Subis and vicinity).

**H a b i t a t.** From low elevations on limestone hills.

BORNEO. Sarawak, southern slopes of G. Subis near Sekaloh River, *Sonny Tan & E. Wright S 27266*, 30-11-1966, only gall flowers present (K, L); G. Brangin, Ulu Sg. Subis, Niah National Park, limestone ridge, 130 m, *Yii Puan Ching S 40163*, 19-4-1979 (K, KEP, L, SAN, SAR).

A new species from Sumatra raised the number found on this island to three, and up to now *O. leuseri* seems to be endemic in the northern province.

***Orophea (Orophea) leuseri* Keßler, spec. nov. – Fig. 2.**

Arbor ca. 5 m alta. Ramuli iuniores pubescentes, mox glabrescentes. Folia oblonga usque elliptica, membranacea, 3–10 cm longa, 2–3,5 cm lata, glabra, costa nervisque excepta, apice breviter

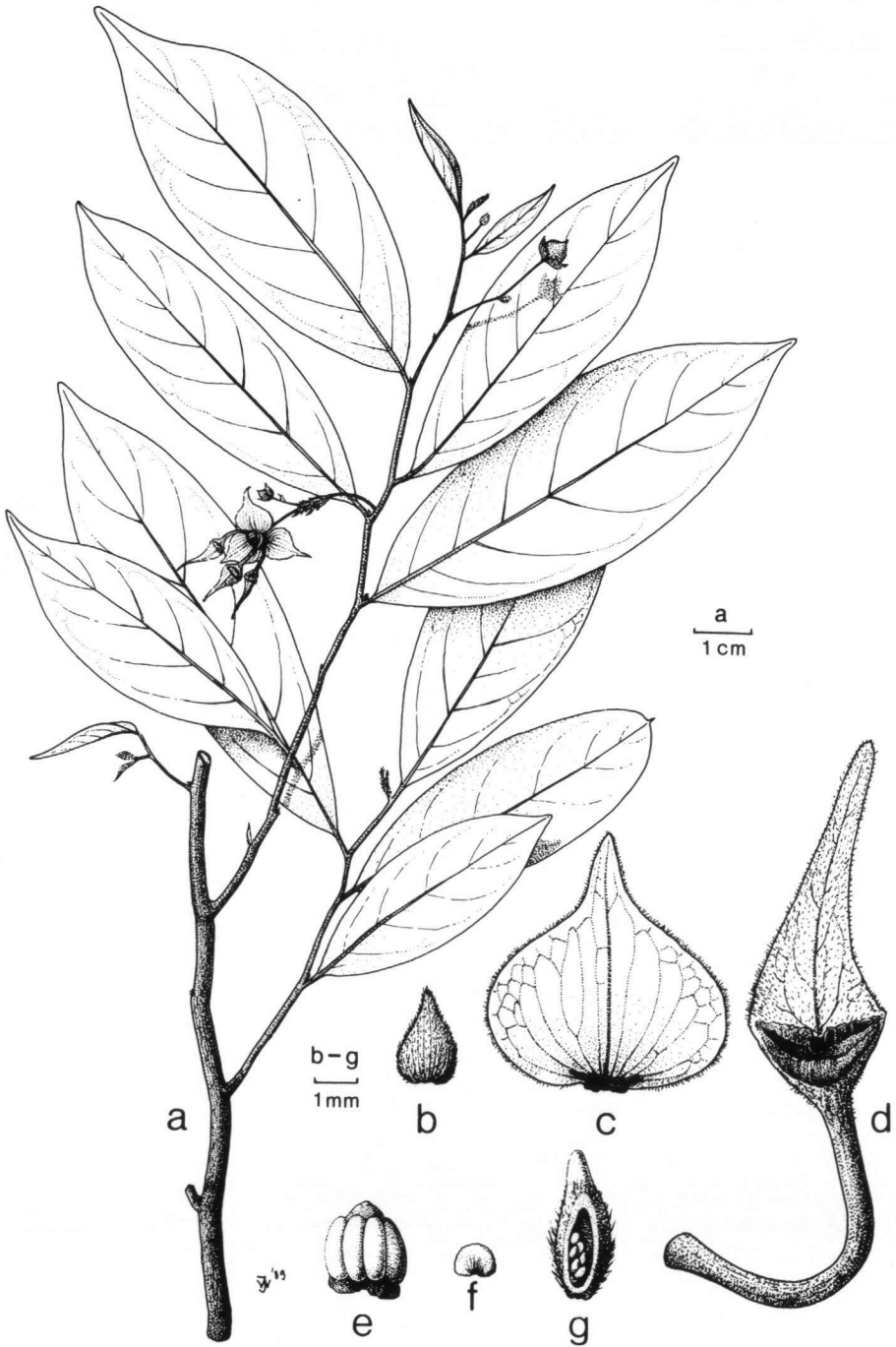


Fig. 2. *Orophea leuseri* KeBlér. a. Habit; b. sepal, inside view; c. outer petal, inside view; d. inner petal, inside view; e. stamen; f. staminode; g. carpel (a-g de Wilde & de Wilde-Duyffes 18657).

acuminata, basi cuneata, costa supra canaliculata, subtus prominenti, nervis lateralibus 8–10-paribus, omnibus curvato-ascendentibus ca. 2 mm ante marginem conjunctis, sparse pubescentibus; petioli ca. 2 mm longi, ca. 1 mm crassi. Inflorescentiae supra-axillares, solitariae, 1-florae; pedunculi ca. 1 cm longi; pedicelli ca. 1 cm longi. Flores ca. 1,2 cm diametro. Sepala linearia, ca. 4 mm longa, ca. 2 mm lata. Petala exteriora late ovata, ca. 11 mm longa, ca. 7 mm lata, interiora longe rhomboidea ungue ca. 1,9 cm longa, ca. 0,6 cm lata, praeter apicem intus glabra, nectario uno horizontale margine undulato textura nigra circumcincta. Stamina 6; staminodia 3, semicirculari. Carpella 3, hirsuta; ovula 6–8; stigmata sessilia. Carpidia non vidi. — **T y p u s:** *de Wilde & de Wilde-Duyffes 18657*, Sumatra, Gunung Leuser Nature Reserves, Aceh, southern part, Alas Valley, near the mouth of the Bengkong/Renun River, c. 50 km S of Kutacane, Moara Stulen to Bengkong, along river, 13-7-1979 (holo L).

Tree 5 m high. Young twigs pubescent, soon glabrous. *Leaves* oblong to elliptic, membranaceous, 3–10 cm long, 2–3.5 cm wide, glabrous except midrib and lateral veins, apex shortly acuminate, base cuneate, midrib canaliculate above, prominent beneath, lateral veins 8–10 pairs, curved-ascending, interarching c. 2 mm before the margin, slightly pubescent. *Petiole* c. 2 mm long, c. 1 mm in diameter. *Inflorescences* supra-axillary, solitary, 1-flowered, peduncle c. 1 cm long. *Flowers* c. 1.2 cm in diameter. *Sepals* linear, 4 mm long, 2 mm wide. *Outer petals* 2, broadly ovate, 11 mm long, c. 7 mm wide, inner petals small rhombic, with claw c. 19 mm long, c. 6 mm wide, glabrous inside except the apex, nectary 1, horizontal, with an undulating margin, surrounded by black tissue. *Stamens* 6, staminodes 3, semicircular. *Carpels* 3, hirsute, ovules 6–8, stigma sessile. Ripe fruitlets unknown.

**D i s t r i b u t i o n.** Only known from the type collection in North Sumatra.

**H a b i t a t.** Primary lowland rain forest, along stream.

**N o t e.** The outer petals (not tepals as indicated on the label) are said to be creamy, the inner pinkish-lilac. This species resembles *O. maculata* King with its recurved tips of the inner petals. The flower formula is identical with that of *O. katschallica* Kurz, but it differs from the latter by its recurved tips and the characteristic nectary with an undulated margin and the black tissue around it.

With *O. malayana* another species of subgenus *Sphaerocarpon* occurs on limestone in the Malay Peninsula and seems to be endemic there.

### *Orophea (Sphaerocarpon) malayana* Keßler, *spec. nov.* – Fig. 3.

Arbor 5–8 m alta. Ramuli iuniores pubescentes, mox glabrescentes. Folia oblonga usque elliptica, glabra, chartacea, 8–13 cm longa, 2,5–5 cm lata, apice longe acuminata, basi acuta, costa supra canaliculata, subtus prominenti, nervis lateralibus 8–10-paribus, omnibus curvato-ascendentibus, ca. 2 mm ante marginem conjunctis; petioli ca. 2 mm longi, ca. 1 mm crassi. Inflorescentiae axillares, solitariae, 1- vel 2-floribus; pedunculi ca. 1,3 cm longi; pedicelli ca. 1 cm longi. Flores viridi, parvi, ca. 4 mm diametro. Sepala ovata, persistentia, ca. 1,5 mm longa, ca. 1,5 mm lata. Petala exteriora sepalis similia, ca. 3 mm longa, ca. 2 mm lata, interiora rhomboidea ungue ca. 8 mm longa, 4 mm lata, praeter marginem intus glabra, nectariis duobus verticalibus. Stamina 12; staminodia desunt. Carpella 6, glabra; ovula 2; stigmata sessilia. Carpidia 6, globosa, glabra, ca. 1 cm diametro. Semina 2, semiglobosa. — **T y p u s:** *Ng FRI 27058*, Malaya, Pahang, Taman Negara, Gua Luas, halfway up limestone hill, 4-3-1977 (holo L, iso KEP).

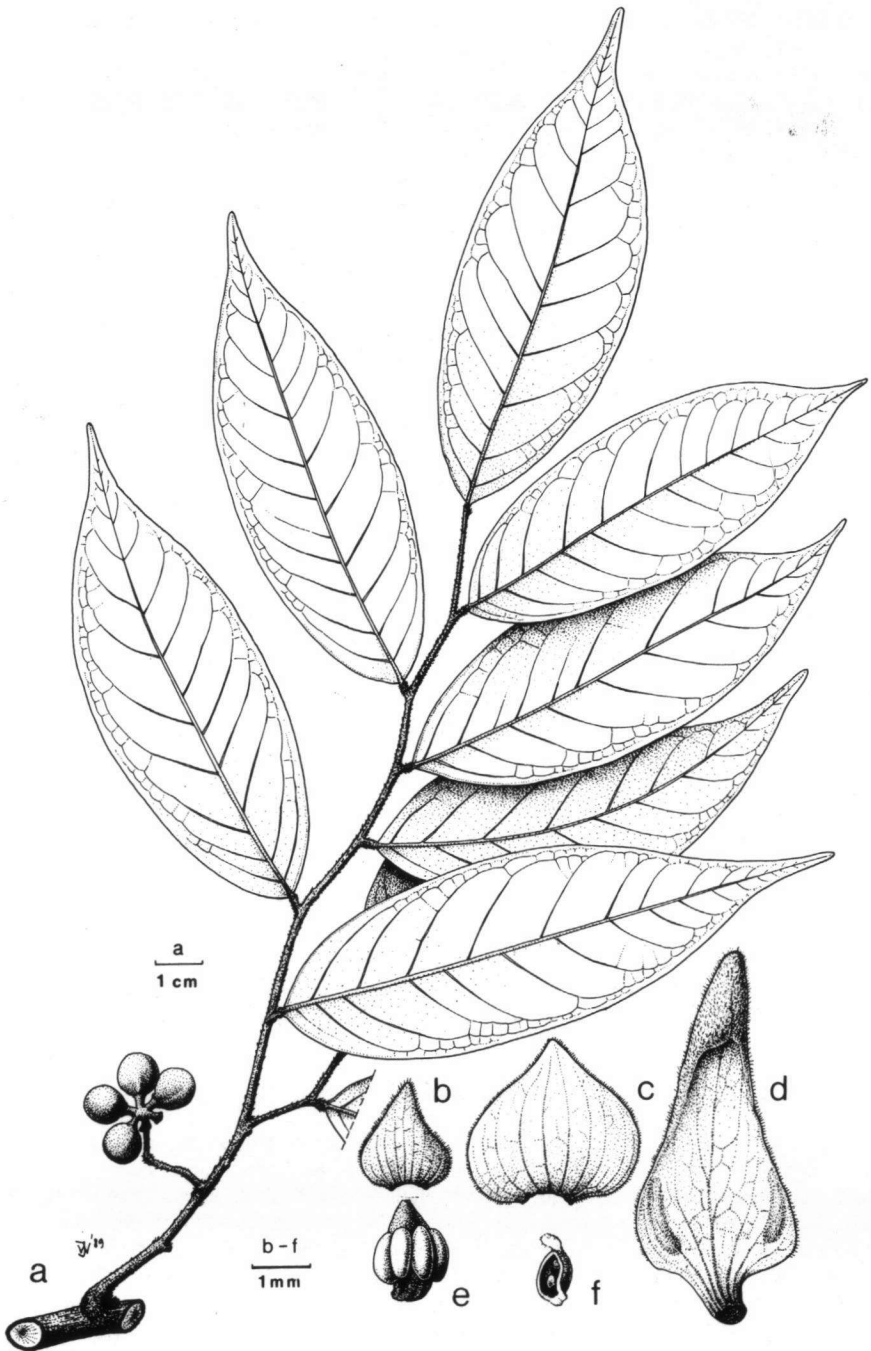


Fig. 3. *Orophea malayana* Kehler. a. Habit; b. sepal, inside view; c. outer petal, inside view; d. inner petal, inside view; e. stamen; f. staminode (a-f B. C. Stone 9504).

Tree 5–8 m high. Young twigs pubescent, soon glabrous. *Leaves* oblong to elliptic, glabrous, chartaceous, 8–13 cm long, 2.5–5 cm wide, apex long acuminate, base acute, midrib canaliculate above, prominent beneath, lateral veins 8–10 pairs, curved-ascending, interarching c. 2 mm before the margin. *Petiole* c. 2 mm long, c. 1 mm in diameter. *Inflorescence* axillary, solitary, 1 or 2-flowered, peduncle c. 1.3 cm long, pedicel c. 1 cm long. *Flowers* green, small, c. 4 mm in diameter. *Sepals* ovate, persistent, c. 1.5 mm long, c. 1.5 mm wide. Outer *petals* similar to sepals, c. 3 mm long, c. 2 mm wide, inner petals rhombic, with claw c. 8 mm long, c. 4 mm wide, glabrous inside except the margins, nectaries 2, vertical. *Stamens* 12, staminodes absent, carpels 6, glabrous, ovules 2, stigma sessile. *Fruitlets* 6, globose, glabrous, c. 1 cm in diameter. *Seeds* 2, semiglobose.

**Distribution.** Only known from some localities in the Malay Peninsula.

**Ecology.** On limestone hills, up to 400 m altitude.

**Notes.** This species is easily discernible from other species of the subgenus in the Peninsula by its leaves which are drying up red-brown.

**MALAY PENINSULA.** Perak, Gunong Pondok, *S.C. Chin 901*, 12-3-1971 (KEP); Lenggong Dist., Kampong Gelok, Gua Putri, *id. 958*, 13-3-1971 (KEP); hills south of Ipoh, *Ng FRI 1595*, 4-10-1966 (KEP, L); Gua Puteri, *Samsuri & Sidek SA 637*, 13-3-1971 (G). — Pahang, Taman Negara, Gua Peningat, *Loh FRI 17198*, 14-7-1970 (L); path to Gua Luas via Kuala Keniyam, *Shah & Shukor MS 2684*, 15-8-1972 (L). — Kelantan, Gua Musang, *Stone 9504*, 14-8-1970 (L).

### *Orophea (Orophea) merrillii* Keßler, *Blumea* 33 (1988) 33.

Up till now this species has only been recorded from Palawan, Mindoro, and Mindanao in the Philippines, but from this material it becomes obvious that it also occurs in whole Borneo.

**BORNEO.** Sarawak, 21st Mile Simanggang Road, *Anderson S 24796*, 5-9-1966 (L, SAR); 1st Div., Bukit Jebong, Bau, *P. Chai & Ilias S 25632*, 29-4-1967 (L, SAN, SAR); Sabah, Kalabakan Dist., Yayasan Sabh, block 9, *Fedilis & Sumbing SAN 91334*, 17-10-1979 (SAN); Kalimantan, East Kutai Reserve, vicinity of Sengata and Mentoko Rivers, *Leighton 164*, 24-4-1978 (L).

**PHILIPPINES.** Mindoro, Puerto Galera, *Ramos 46419* (NY); Mindanao, Davao Prov., Mati, *Ramos & Edaño 49104* (NY).

### *Orophea (Orophea) maculata* King; Keßler, *Blumea* 33 (1988) 38.

In Sumatra this species seemed undercollected compared to the Malay Peninsula. Now six more collections from N and W Sumatra were available to me.

**SUMATRA.** North: Gunung Leuser Nature Reserve, Alas River Valley, near mouth of the Renun River, c. 50 km S of Kutacane, *de Wilde & de Wilde-Duyffes 18886*, 19-7-1979 (L); same area, same collectors *18965*, 21-7-1979 (L); Gunung Leuser National Park, Middle Alas River (Lae Sauraya) area, c. 15 km N of Gelombang, S of Bengkong River, same collectors *20172*, 21-7-1985 (L); same area, same collectors *20181*, 21-7-1985 (L). — West: Barisan Range, Muro Kalumpi, Sungai Kwantan near Sijungjung, narrow gorge, along Japanese railroad, *de Vogel 2782*, 3-3-1974 (L); Barisan Range, Rimbo Panti Nature Reserve, *de Vogel 3006*, 19-3-1974 (L).

**Orophea (*Orophea*) trigyna** Miq.; Keßler, *Blumea* 33 (1988) 42.

Some new records of this species from Borneo can be reported here:

BORNEO. Sarawak, G. Pueh, Lundu Dist., *Mamit et al. S 34421*, 14-6-1974 (L); Kalimantan, E Kutei, Sangkulirang subdivision, along Menubar River, *Kostermans 5433*, 24-6-1951 (L, P), Mt Njapa on Kelay River, Belau, *Kostermans 21429*, 22-10-1963 (A, G, L), same locality, *Kostermans 21525*, 26-10-1963 (G, L); Djaro Dam, c. 10 km NE of Muara Uja, *de Vogel 722*, 11-11-1971 (L).

**Orophea (*Orophea*) corymbosa** (Blume) Miq.; Keßler, *Blumea* 33 (1988) 42.

This widespread species also occurs in the montane rain forest of Sumatra, between 1200 and 1500 m altitude, as the collection of De Wilde & De Wilde-Duyffjes shows:

SUMATRA. North: Gunung Hujan, 60 km east of Calany, *Laumonier 6935*, 9-3-1986 (L). Gunung Leuser Nature Reserve, *de Wilde & de Wilde-Duyffjes 15752*, 23-3-1975 (L).

**Orophea (*Orophea*) celebica** (Blume) Miq.; Keßler, *Blumea* 33 (1988) 48.

Two collections very interesting from the phytogeographical point of view came to my attention:

MOLUCCAS. N Buru, Waeha, between Waelanga and Lake Kunturum, *van Balgooy 4806*, 17-11-1984 (L); NW Buru, c. 10 km S of Bara, *van Balgooy 4980*, 30-11-1984 (L).

These records shift the southeastern border of the genus from Celebes to Buru. It now becomes most probable that this genus also occurs in Ceram, but up to now no collections are known from that island.

**Orophea (*Orophea*) alba** Keßler, *Blumea* 33 (1988) 52.

So far this species was only known from four collections and also these additions are all from Sabah.

BORNEO. Sabah, Pinangah Dist., Sungai Melikop, Chung Cheo Lung, *Leopold & Dewol SAN 60149*, 21-8-1984 (SAN, UKMS); Ranau Dist., Mt Tambayukan, *Aban Gibot SAN 68565*, 18-5-1970 (KEP, SAN); Tongod Dist., Ulu Sungai Pinangah, *Amin & Ismail SAN 107317*, 23-10-1984 (SAN).

**Orophea (*Orophea*) kostermansiana** Keßler, *Blumea* 33 (1988) 55.

Some new collections from Borneo can be added here:

BORNEO. Sarawak, Bukit Sarang, Tatau, Bintulu, *Anderson S. 20948*, 14-3-1965 (SAR); Sabah, Tongod/Sandakan Dist., Ulu Sg. Kawayai, Gunung Rara, *Sigin et al. SAN 107158* (SAN, SAR); Pinangah Dist., Ulu Sg. Pinangah, *Leopold & Dewol SAN 60419* (SAN).



***Orophea (Orophea) kerrii* Keßler, *Blumea* 33 (1988) 59.**

So far ripe carpidia of this species were unknown. Some new collections were made which show flowers and simultaneously fairly ripe fruitlets. The new records are from the west coast of Thailand and from the area where the holotype was detected. The description has to be expanded as follows:

Carpidia 12, globose, glabrous, 1 cm in diameter.

Habitat. A small understorey tree of primary or disturbed evergreen forest.

PENINSULAR THAILAND. Prov. Ranong, Khlong Kam Puang, at sealevel, disturbed evergreen forest along trail, *Geesink & Santisuk 4930*, 26-4-1973 (L), in flower and fruit; Prov. Pangnga, Khlong Nang Yon, alt. 100 m, *Geesink & Santisuk 5057*, 29-4-1973 (L), in fruit; Nakhon Si Thammarat, Khao-Luang, *Suvannakoset 1863*, 15-3-1962 (L), in flower; Trang Prov., Muang Dist., Kao Chong Park, *Maxwell 85-275*, 10-3-1985 (L), in flower; Prov. Pattalung, See Bahn Pote Dist., Kao Boo-Khao Yah National Park, *Maxwell 86-701*, 23-9-1986 (L), in fruit.

***Orophea (Sphaerocarpon) dodecandra* Miq.; Keßler, *Blumea* 33 (1988) 59.**

A new collection from Mt Kinabalu shows that this species does not only occur in lowland forest but also up to 1300 m altitude.

BORNEO. Sabah, Mt Kinabalu, Ulu Liwagu and Ulu Mesilau, *Chew et al. 2942*, 10-9-1961 (L, SAN).

***Orophea (Sphaerocarpon) rubra* Keßler, *Blumea* 33 (1988) 65.**

This species is now not only known from Kalimantan but also from Sarawak and Sabah.

BORNEO. Sabah, Beaufort Dist., Gunong Lumaku Forest Reserve, *Dewol & Sundaling SAN 78476*, 7-3-1975 (SAN), Mostyn Dist., Madai Forest Reserve, *Bongsu Ahmad 63903* (SAN); Sarawak, Miri Dist., Ulu Sg. Mamut Bakong, Miri ridge, *Ilias Paie S 24356*, 13-3-1966 (L, SAR), ibid., Miri nearby rivulet, *Sibat ak Luang S 34451*, 26-3-1966 (L, SAR).

***Orophea (Sphaerocarpon) glabra* Merr.; Keßler, *Blumea* 33 (1988) 66.**

*Orophea glabra* Merr., Govt. Lab. Publ. Philipp. 29 (1905) 14. — Type: *Clark 1017*, Philippines, Island of Ticao, May–June 1904 (lecto NY, iso BM, K).

*Orophea samarensis* Merr. in schedula.

*Sageraea parvifolia* Merr. & Quis. in schedula.

PHILIPPINES. Catanduanes, Mt Nagmakdit, *Ramos & Edaña 75482*, 16-8-1928 (NY); Catanduanes, Simanla, *Ramos & Edaña 75158*, Catanduanes, Simanla, Virac, *Ramos & Edaña 84561*, 16-9-1928 (NY); Luzon, Kinatakutan, Tayabas Prov., *Oro 30818*, 6-3-1929 (NY); Samar, Kadapan Bo. Bantayan, *Castro 5671*, 4-5-1948 (L), *5720*, 6-5-1948 (L), *5738*, 9-5-1948.

The keys to the subgenera and species of the genus *Orophea*, originally published in German (Keßler, 1988), have been corrected and translated into English, because three new species of the genus are described here:

## KEY TO THE SUBGENERA OF OROPHEA

- 1a. Leaves mostly pubescent; staminodes present or absent; carpels 3 or 6, never 9 or 12, hirsute; ovules 6,  $\pm$  rarely 1–3; carpidia cylindrical, 3–13 cm long, up to 1 cm in diameter; seeds cylindrical, c. 1 cm long, c. 0.5 cm in diameter  
**I. Subgenus Orophea**
- b. Leaves glabrous (except *O. hirsuta*); staminodes always absent; carpels 3, 6, 9, or 12, glabrous; ovules always 2; carpidia globose, up to 3 cm in diameter, seeds hemispherical . . . . . **II. Subgenus Sphaerocarpon**

## KEY TO THE SUBSPECIES OF SUBGENUS OROPHEA

- 1a. Carpels 3 . . . . . 2  
 b. Carpels 6 . . . . . 12
- 2a. Nectaries absent . . . . . 3  
 b. Nectaries present . . . . . 4
- 3a. Staminodes present. Java . . . . . *O. hexandra*  
 b. Staminodes absent. Java . . . . . *O. enneandra*
- 4a. Staminodes absent . . . . . 5  
 b. Staminodes present . . . . . 7
- 5a. Stamens 6. Philippines, Borneo . . . . . *O. merrillii*  
 b. Stamens 9 . . . . . 6
- 6a. Nectary 1, horizontal. Malaya . . . . . *O. chrysantha*  
 b. Nectaries 2, horizontal,  $\pm$  circular. Java . . . . . *O. chlorantha*
- 7a. Stamens 6 . . . . . 8  
 b. Stamens 3 . . . . . 11
- 8a. Nectaries 2,  $\pm$  circular. Malaya, Sumatra . . . . . *O. maculata*  
 b. Nectary 1 . . . . . 9
- 9a. Nectary triangular, completely covering the lamina, flowers born on 20–30 cm long flagellas. Borneo . . . . . *O. flagellaris*  
 b. Nectary horizontal, flowers short-stalked . . . . . 10
- 10a. Tips of the inner petals free, recurved, nectary with an undulated margin, surrounded by a black tissue. Sumatra . . . . . *O. leuseri*  
 b. Tips of the petals connivent, not recurved, nectary with a smooth margin. Andamans, Nicobars . . . . . *O. katschallica*
- 11a. Nectaries 2, oblong. Borneo . . . . . *O. trigyna*  
 b. Nectary 1, oblong. Java, Sumatra, Borneo, Philippines . . . . . *O. corymbosa*
- 12a. Staminodes present . . . . . 13  
 b. Staminodes absent . . . . . 22
- 13a. Nectaries absent. Vietnam . . . . . *O. desmos*  
 b. Nectaries present . . . . . 14
- 14a. Nectaries 2 . . . . . 15  
 b. Nectary 1 . . . . . 16

- 15a. Leaves 8–14 cm long, 3–5 cm wide, with 9–12 pairs of lateral veins; nectaries horizontal; ovules c. 6. Burma, Thailand, Malaya . . . *O. cuneiformis*  
 b. Leaves 4–6(–9) cm long, 1.5–2(–3) cm wide, with 5–7 pairs of lateral veins; nectaries oblong, parallel to the upper margins; ovules 2. Borneo: Sarawak . . . . . *O. sarawakensis*
- 16a. Staminodes semicircular . . . . . 17  
 b. Staminodes terete . . . . . 19
- 17a. Ovule 1; margins of the nectary undulating, in dried condition surrounded by black tissue. Burma, Thailand. . . . . *O. brandisii*  
 b. Ovules 2–6; nectary without black tissue . . . . . 18
- 18a. Margins of the nectary smooth; ovules  $\pm$  6. Burma, Thailand, Malaya  
*O. enterocarpa*  
 b. Margins of the nectary undulating; ovules 2. Borneo . . . . . *O. clemensiana*
- 19a. Leaves 20–25 cm long; flowers in the axils of fallen leaves. Philippines  
*O. leytenensis*  
 b. Leaves up to 18 cm long; flowers on leafy twigs . . . . . 20
- 20a. Lamina of the inner petals vaulted about the single half-moon-shaped nectary. Philippines . . . . . *O. wenzelii*  
 b. Lamina not vaulted . . . . . 21
- 21a. Inflorescences brightly hirsute to setose. SW India . . . . . *O. erythrocarpa*  
 b. Inflorescences only weakly pubescent. Celebes, Moluccas: Halmahera, Morotai, Buru . . . . . *O. celebica*
- 22a. Stamens 12 . . . . . 23  
 b. Stamens 6 or 9 . . . . . 25
- 23a. Flowers in fascicles of 20–80; apex of the inner petals recurved. Borneo  
*O. myriantha*  
 b. Flowers 1–5; apex of the inner petals connate . . . . . 24
- 24a. Flowers 1–2; inflorescences silky. Philippines: Mindanao . . . . . *O. sericea*  
 b. Flowers 3–5; inflorescences not silky. Philippines . . . . . *O. cumingiana*
- 25a. Stamens 9, nectary 1, horizontal. Philippines: Mindanao . . . *O. megalophylla*  
 b. Stamens 6 . . . . . 26
- 26a. Nectaries 2,  $\pm$  vertical, near the margins of the apex. Borneo . . . . . *O. alba*  
 b. Nectary 1, horizontal. Borneo . . . . . *O. kostermansiana*

## KEY TO THE SPECIES OF SUBGENUS SPHAEROCARPON

- 1a. Carpels 12 . . . . . 2  
 b. Carpels 3, 6, or 9 . . . . . 4
- 2a. Stamens 6. Hainan, Indochina, Andamans, Sri Lanka, Malaya, Lesser Sunda Islands: Flores, Sumba . . . . . *O. polycarpa*  
 b. Stamens 12 . . . . . 3
- 3a. Nectary hipocrepiform. Thailand . . . . . *O. kerrii*  
 b. Nectaries 2, horizontal. Borneo . . . . . *O. dodecandra*

