

A REVISION OF *EURYDIOPSIS* FREY (DIPTERA,
DIOPSIDAE) WITH DESCRIPTION OF FOUR NEW
ORIENTAL SPECIES

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Eurydiopsis Frey is defined. Catalogue and key to the six species are given, while differential and quantitative characters are discussed. The earlier proposed synonymy between *E. subnotata* (Westwood) from the Philippines and *E. argentifera* (Bigot) from Indonesia and Malaysia is rejected. Both species are redescribed, whereas *E. helsdingeni* sp. n. from Indonesia (Java), *E. glabrostylus* sp. n. from the Philippines, *E. brevispinus* sp. n. from Laos and Myanmar and *E. sarawakensis* sp. n. from Malaysia (Sarawak) are described.

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In 1928 Frey erected the subgenus *Eurydiopsis* in *Diopsis* Linnaeus 1775. As type-species *Diopsis subnotata* Westwood 1848 from the Philippines was designated. The only differential character indicated by Frey was constituted by the short and blunt facial teeth of the Oriental *Diopsis subnotata* and '*Diopsis circularis* Macquart' (sensu van der Wulp 1897), as opposed to the long and sharp facial teeth of the African *Diopsis*. However, many African *Diopsis* do not have facial teeth and it has been pointed out several times (e.g., Shillito 1971: 289, Feijen 1989: 14) that presence or absence of facial teeth cannot be used as a key character to distinguish a genus.

Feijen (1978) showed that *Diopsis circularis* Macquart 1835 represents an exclusively African species. The species identified as *Diopsis circularis* by van der Wulp (1897) and called *Eurydiopsis circularis* by Frey (1928) had to represent an undescribed Oriental species. Bigot (1874) described *Diopsis argentifera* from Celebes (Sulawesi), Indonesia. However, in 1881 Bigot placed his *Diopsis argentifera* in synonymy with *Diopsis subnotata*, quoting Osten Sacken who published the synonymy in 1882.

Séguy (1949) described two Malagasy diopsids as *Diopsis (Eurydiopsis) apollo* and *Diopsis (Eurydiopsis) apographica*. Later, Vanschuytbroeck (1965) described two more Malagasy species as *Eurydiopsis anjahanaribe* and *Eurydiopsis vadoni*. Shillito (1971) thought it necessary to erect a new Malagasy genus

for these four '*Eurydiopsis*', but Steyskal (1972) placed all four Malagasy '*Eurydiopsis*' in *Cyrtodiopsis*. Cogan & Shillito (1980) agreed to the inclusion in *Cyrtodiopsis*. Feijen (1981), in a note on *Cyrtodiopsis*, considered Shillito's original view correct, while Feijen (1989) included the four species in *Eurydiopsis* S. & V. nec Frey, a genus still to be described. The Malagasy species can, for instance, be distinguished from *Eurydiopsis* by their distinct inner vertical bristle (usually on a cone) and the non-articulated gonostyli with an apodeme.

Burkhardt & de la Motte (1985: 205) expressed the view that *Cyrtodiopsis quinqueguttata* was more related to *Eurydiopsis argentifera* (as *subnotata*) than to any *Cyrtodiopsis*. Feijen (1989) agreed that *quinqueguttata* is an aberrant species, but doubted that it is more related to *Eurydiopsis* than to the other *Cyrtodiopsis*.

Steyskal (1972) elevated *Eurydiopsis* to genus level, while Feijen (1989) stated that a redescribed *Eurydiopsis* should be maintained as a separate genus. So far, this genus only counted the one recognized Oriental/Australasian species, but study of material from various countries showed *subnotata* to represent a species complex.

The material identified by van der Wulp (1897: 189) as '*circularis*' was rediscovered in the Leiden Museum and the Brussels Museum. It proved to represent an undescribed *Eurydiopsis*, clearly distinct from the *subnotata* complex. This new species is now described

as *E. helsdingeni*. The synonymy of *E. argentifera* with *E. subnotata* is rejected and *argentifera* is now recognized as a distinct species occurring in Sulawesi, Java, Sumatra and peninsular Malaysia. Three more species were recognized in the *subnotata* complex: *E. glabrostylus* sp. n. as the second species from the Philippines, *E. brevispinus* sp. n. from Laos and Myanmar and *E. sarawakensis* sp. n. from Sarawak, Malaysia.

A diagnosis of *Eurydiopsis*, a catalogue and a key to the six species are presented. The geographic distribution of the *Eurydiopsis* species is briefly discussed. The phylogeny and biology of the genus is reviewed. The phylogenetic position of the genus *Eurydiopsis* in the Diopsinae is not yet clear. A possible closer relationship with the *Diopsis indica* complex is summarily indicated. Various differential and quantitative characters are discussed.

ABBREVIATIONS USED

IVB	Inner Vertical Bristle
l/w	length/width
OVB	Outer Vertical Bristle
sc	scutellar
scsp	scutellar spines
SE	Standard Error
tub	tubercles

ACRONYMS FOR COLLECTIONS

BMNH	British Museum (Natural History), London
BPBM	Bernice P. Bishop Museum, Hawaii
IRSNB	Institut Royal de Sciences Naturelles de Belgique, Bruxelles
MLUH	Wissenschaftsbereich Zoologie, Sektion Biowissenschaften, Martin-Luther-Universität, Halle
RMNH	Nationaal Natuurhistorisch Museum, Leiden (formerly Rijksmuseum van Natuurlijke Historie)
UMO	Hope Entomological Collections, University Museum, Oxford
UZMH	Zoological Museum, University of Helsinki
ZMA	Zoologisch Museum, Amsterdam

GENUS EURYDIOPSIS FREY 1928

Eurydiopsis Frey 1928: 70 (as subgenus of *Diopsis*, type species *subnotata* Westwood by original designation); Shillito 1971: 288 (as subgenus); Steyskal 1972: 10 (as genus); Steyskal 1975: 33 (as genus); Feijen 1989: 62 (as genus).

Diagnosis

Large Diopsidae (7-13 mm) with relatively very small eye stalks (eye span less than $\frac{3}{4}$ of body length);

bipartite arista; medium-sized OVB, IVB a minuscule wart or a small bristle; facial sulcus present; facial teeth absent or very small and blunt (Feijen 1989 mentions 'no facial teeth' for *Eurydiopsis* in his key to the Diopsidae genera. This should be replaced by 'facial teeth absent or very small and blunt'); precoxal bridge present; supra-alar and infra-alar spines absent; scutal bristles absent; scutellar spines medium-sized to long, straight to simply curved; apical bristle absent; metapleural spines strong and laterally directed; thorax uniformly pollinose; front femora slender to incrassate with two long rows of tubercles, the outer row counting on the average 19-23 tubercles and the inner row 22-26; no apical spurs on femora 2 and 3; mid tibiae with two small subapical bristles; alula absent, sixth vein not extending beyond anal cell, fifth vein extending beyond posterior crossvein but not reaching wing margin; wings patterned with two rows of hyaline spots and hyaline apex or preapical band; abdomen moderately to strongly clavate; syntergum consisting of terga 1-3 or terga 1-4, seam between terga 2 and 3 distinct; spiracle 1 in tergum; female tergum 8 divided or not, female tergum 10 with 3 to 4 pairs of hairs; female spiracle 7 in membrane, female sternum 8 a single plate, sometimes strongly constricted medially; three smooth, rounded spermathecae; male sternum 5 divided or single; male sternum 6 divided; male sternum 7+8 a very short, band-like sclerite with spiracle 7 located anteriorly of it (fig. 26); periandrium short, rounded; gonostyli simple, fused to periandrium but appearing articulated; processus longi fused (running from gonostylus to gonostylus via edge of periandrium); phallapodeme simple; ejaculatory apodeme small; no sexual dimorphism in length of eye stalks and shape of front femora.

Catalogue

Eurydiopsis Frey, 1928: 70 (as subgenus of *Diopsis*).

Type species *subnotata* Westwood 1848, by original designation).

Ref.: Steyskal 1972: 10; Steyskal 1975: 33; Feijen 1989: 62.

argentifera Bigot, 1874: 112 (*Diopsis*).

Type locality: Celebes (Sulawesi), Indonesia.

Ref.: Bigot 1881: 373 (synonymy with '*subnitida*' Westwood, quoting Osten Sacken 1882). Two syntypes (as 'cotypes') in UMO.

brevispinus sp. n.

Type locality: Mt. Victoria, Myanmar. Holotype and 1 paratype in BMNH, 3 paratypes in MLUH.

glabrostylus sp. n. Type locality: Arzroy, Philippines.

Holotype and 9 paratypes in UZMH. Ref.: Frey 1928: 71 (in part, as *subnotata*).

helsdingeni sp. n. Type locality: Java, Indonesia.

Holotype in RMNH, 2 paratypes in IRSNB, 1 paratype in MLUH.

Ref.: van der Wulp 1897: 189 (as '*Diopsis circularis*' Macquart); Frey 1928: 70 (as '*Diopsis circularis*' Macquart).

sarawakensis sp. n.

Type locality: Sarawak, Malaysia. Holotype in RMNH, 2 paratypes in BPBM.

'*subnitida*'; (Bigot 1881: 373, lapsus for *subnotata* Westwood).

subnotata Westwood, 1848, 37, pl. 18, fig. 2 (*Diopsis*).

Type locality: Philippines.

Ref.: Frey 1928: 71 (in part, others now included in *glabrostylus* sp. n.). Other records from India (Assam), Burma, Indonesia (Sumatra, Celebes) and New Guinea (Irian Jaya) are probably all misidentifications. Type (♀) in BMNH.

Distribution

So far the various *Eurydiopsis* species were all lumped under the name *E. subnotata*. This name was recorded from the Philippines (Westwood 1848: 37, Bezzi 1913: 328, Frey 1928: 71), Assam in India (Brunetti 1907: 164), Myanmar (Steyskal 1975: 33), Celebes, Java and Sumatra in Indonesia (Walker 1861: 263, van der Wulp 1896: 171, 1897: 192, de Meijere 1924: 60), mainland Malaysia (Tan 1965: 14, 1966: 133, 1967: 36; Burkhardt & de la Motte 1983: 99, 1985: 204) and New Guinea (Kertész 1899: 183). However, *Eurydiopsis subnotata* is now considered as a species which only occurs in the south-eastern islands of the Philippines. As a second species from the Philippines, *Eurydiopsis glabrostylus* is now recognized. This species occurs in the north/north-western islands of the Philippines. *Eurydiopsis argentifera*, formerly placed in synonymy with *E. subnotata*, is the most widely distributed species, occurring in Sulawesi (Celebes), Java, Sumatra and mainland Malaysia. Male genitalia of the various locations were compared (cf. figs. 1-3), but did not warrant the erection of more species. Given the distribution of *E. argentifera*, the possibility cannot be excluded that it also occurs in Borneo, as the second species of that island, besides the indigenous *Eurydiopsis sarawakensis* sp. n. The aberrant *Eurydiopsis helsdingeni* is the second species from Java, while *Eurydiopsis brevispinus* occurs in Laos and Myanmar. The *Eurydiopsis* recorded from Assam and from New Guinea are likely to represent additional undescribed species. Unfortunately, no material from these locations could be traced.

Phylogeny

Feijen (1989) discussed our present knowledge of the intrafamilial relationships of the Diopsidae. For the moment the Diopsidae are divided into the subfamilies Sphyracephalinae and Diopsinae. The Sphyr-

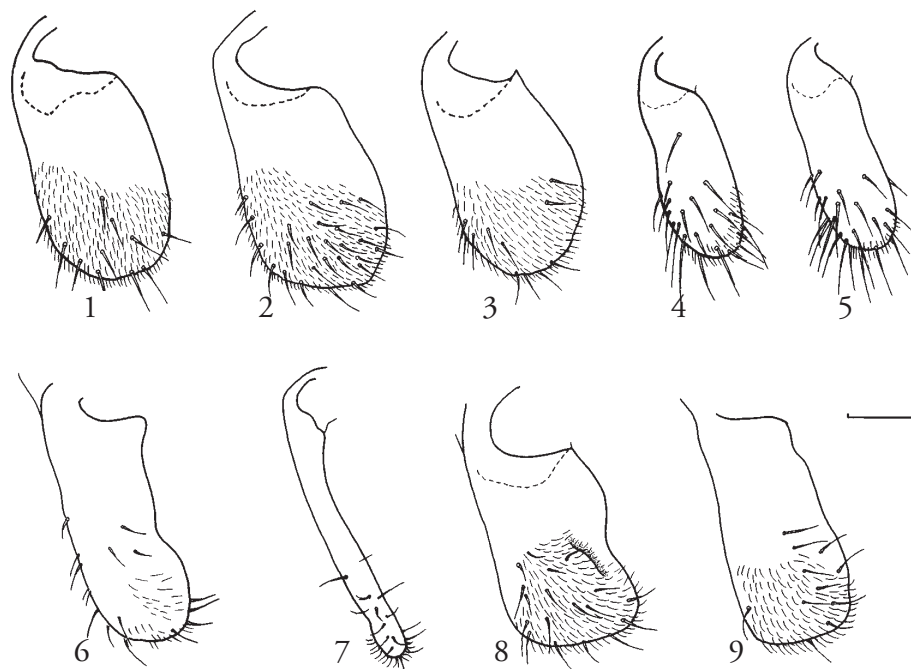
acephalinae are likely to represent a monophyletic group, but a proper groundplan with synapomorphic conditions cannot yet be presented. It remains to be seen whether the Diopsinae form a monophyletic group, and, as such, the sistergroup of the Sphyracephalinae. Feijen (1989) indicated a few possible groups of genera within the Diopsinae, but *Eurydiopsis* belongs to the genera of which the position within the Diopsinae remains unclear. In the key presented by Feijen (1989) *Eurydiopsis* keys out next to *Diopsis*, but this does not necessarily give an indication of a closer relationship.

As important plesiomorphic characters of *Eurydiopsis*, the following conditions can be given: absence of sexual dimorphism in length of eye stalks and shape of front femora, absence of facial teeth (or presence of very small rounded teeth) and presence of a distinct seam between terga 2 and 3 in the syntergum. A distinct seam between terga 2 and 3 in the syntergum further only occurs in *Diasemopsis* and *Sinodiopsis*, while in some species of the *Diopsis indica* complex a vague seam occurs.

As important apomorphic characters the absence of thoracic bristles and the very short, band-like male sternum 7+8 (fig. 26) can be mentioned. The only other genus in which no thoracic bristles occur is *Diopsis*. A reduced sternum 7+8 is only found in *Sphyracephala*, *Cladodiopsis*, *Eurydiopsis* and the *Diopsis indica* complex.

Intriguing is the occurrence of similar (subapical, central and proximal rows of irrorations) wing patterns in the genera *Diopsina*, *Sinodiopsis*, *Eurydiopsis*, *Teleopsis*, *Cyrtodiopsis* and *Eurydiopsis* S. & V. nec Frey. Feijen (1989) still assumed that these wing patterns did not indicate a common origin. However, the possibility cannot be excluded. Based on the common character of a very narrow male sternum 7+8, a closer relationship between *Eurydiopsis* and the *Diopsis indica* complex can also not yet be ruled out. It is doubtful that the *indica* complex will remain in a revised *Diopsis* genus.

Within *Eurydiopsis*, the *subnotata* complex and *E. helsdingeni* can be considered as sistergroups. As synapomorphic condition for the *subnotata* complex the slender to moderately incrassate front femora can be mentioned, while as apomorphic conditions for *E. helsdingeni* the fusion of tergum 4 to the syntergum, the glabrous wingbase and the divided male sternum 5 can be given. Within the *subnotata* group it is difficult to indicate relationships. It does not seem unlikely that *E. glabrostylus* and *E. brevispinus* are more closely related. This assumption is based on similar character states as the relative length of the scutellar spines, the ratio length/width of the gonostyli and the percentage coverage of the gonostyli with microtrichia (see table 1).



Figs. 1-9. Latero-ventral view of gonostylus. – 1, *Eurydiopsis argentifera*, Indonesia, Sulawesi, nr. Bantimurung; 2, *Eurydiopsis argentifera*, Indonesia, Java; 3, *Eurydiopsis argentifera*, Malaysia, Malaya (bred); 4, *Eurydiopsis brevispinus*, paratype, Myanmar, Mt. Victoria; 5, *Eurydiopsis brevispinus*, paratype, Laos, Pau; 6, *Eurydiopsis glabrostylus*, paratype, Philippines, Aroroy; 7, *Eurydiopsis helsdingeni*, paratype, Indonesia, Java; 8, *Eurydiopsis sarawakensis*, paratype, Malaysia, Sabah; 9, *Eurydiopsis subnotata*, Philippines, Surigao. Scale 0.1 mm.

Biology

Our knowledge of the biology of *Eurydiopsis* is mainly based on the studies of *Eurydiopsis argentifera* (as *subnotata*) by Burkhardt & de la Motte (1983: 99, 1985: 204), while a few observations were made by Tan (1965: 14, 1967: 36).

Among the Diopsidae the *Eurydiopsis* species are exceptional because of their size and weight. The Philippine *Eurydiopsis* are the largest (length of body) and heaviest diopsids known. However, there is nothing unusual about their eye stalks, which are, relatively, among the smaller ones in the Diopsidae. The absence of sexual dimorphism with regards to eye span and shape of femora is found in all *Eurydiopsis*. Burkhardt & de la Motte (1985: 204) also recorded *Eurydiopsis argentifera* (as *subnotata*) as a homomorphic species with a sex ratio of freshly emerged flies close to a 1 : 1 ratio.

Another remarkable feature of *Eurydiopsis* is their unusual life span. Burkhardt & de la Motte (1983: 99) mentioned a life span of almost one-and-a-half year for the Malayan *Eurydiopsis argentifera*.

Differential and quantitative characters

Measurements. – Within *Eurydiopsis* the two Philippine species, *E. glabrostylus* and *subnotata* are the large species, *argentifera* and *sarawakensis* are medium-sized, while *helsdingeni* and *brevispinus* are small. The various quantitative data for the species can be compared in table 1. The average relative eye span (ratio eye span/body length) is very uniform among the species concerned and varies only between 66% and 71%. The categories used for description of the relative eye span are given in Feijen (1998). Hardly any difference occurs in the relative eye spans of females and males, although the relative eye span is for all species marginally longer in the males. More interspecific variation occurs in the average relative length of the scutellar spines (ratio scutellar spines/body length). Large spines occur in *E. argentifera*, *sarawakensis* and *subnotata*, with ratios varying from 24% to 26%. Smaller spines occur in *E. brevispinus* and *glabrostylus* (ratios varying from 19% to 20%), while the spines are with 15% smallest in *E. helsdingeni*.

Head. – Small, rounded facial teeth occur in *E. argentifera* and *subnotata*. In the other four species the

Table 1. Measurements (in mm) and other quantitative characters for the six recognized *Eurydiopsis* species.

Character	<i>Eurydiopsis</i> <i>helsdingeni</i>		<i>Eurydiopsis subnotata</i> complex								
	♀	♂	<i>argentifera</i>		<i>brevispinus</i>		<i>glabrostylus</i>		<i>sarawakensis</i>	<i>subnotata</i>	
			♀	♂	♀	♂	♀	♂	♂	♀	♂
Length of body	8.2	7.8	9.7	9.3	8.5	8.6	10.7	10.2	9.4	11	9.7
Eye span	5.4	5.7	6.6	6.4	5.4	5.7	6.9	7	6.6	7.5	6.9
Ratio eye span/ body length	0.66	0.73	0.68	0.71	0.64	0.66	0.66	0.69	0.7	0.68	0.71
Length of wing	5.4	5.3	7.1	6.7	6.6	6.4	7.2	7.1	7	7.9	6.8
Length of sc. spines	1.27	-	2.31	2.26	1.71	1.71	2.01	2.05	2.46	2.73	2.41
Ratio scsp/body	0.15	-	0.24	0.24	0.2	0.2	0.19	0.2	0.26	0.25	0.25
Ratio l/w of femur 1	3.6	3.6	5.1	5.1	5.1	4.7	5.4	5.5	5.1	5.3	5.3
Outer tub. of femur 1	18.7	19	20.6	20.3	18.7	19	19.3	21.8	20.2	22.5	22.5
Inner tub. of femur 1	22.3	24	23.1	23.2	22.8	23.5	22.1	24.3	22.5	26	24.7
Ratio l/w of cerci	2.5	1.6	1.8	3.4	1.7	5	1.7	3.6	3.1	1.9	7.6
Ratio l/w of gonostyli		10		1.5-1.6		2.4-2.7		2.7	1.7		2.3
% coverage of gono- styli with microtrichia		< 5		40-50		< 5		< 5	30		30
Flies examined	3	1	8	5	2	3	5	5	3	3	9

facial corners are rounded. Small differences occur in the structural pattern and the pollinosity pattern of the frons. The *rvb* is minuscule in all species, except for *E. sarawakensis*, in which it is somewhat longer.

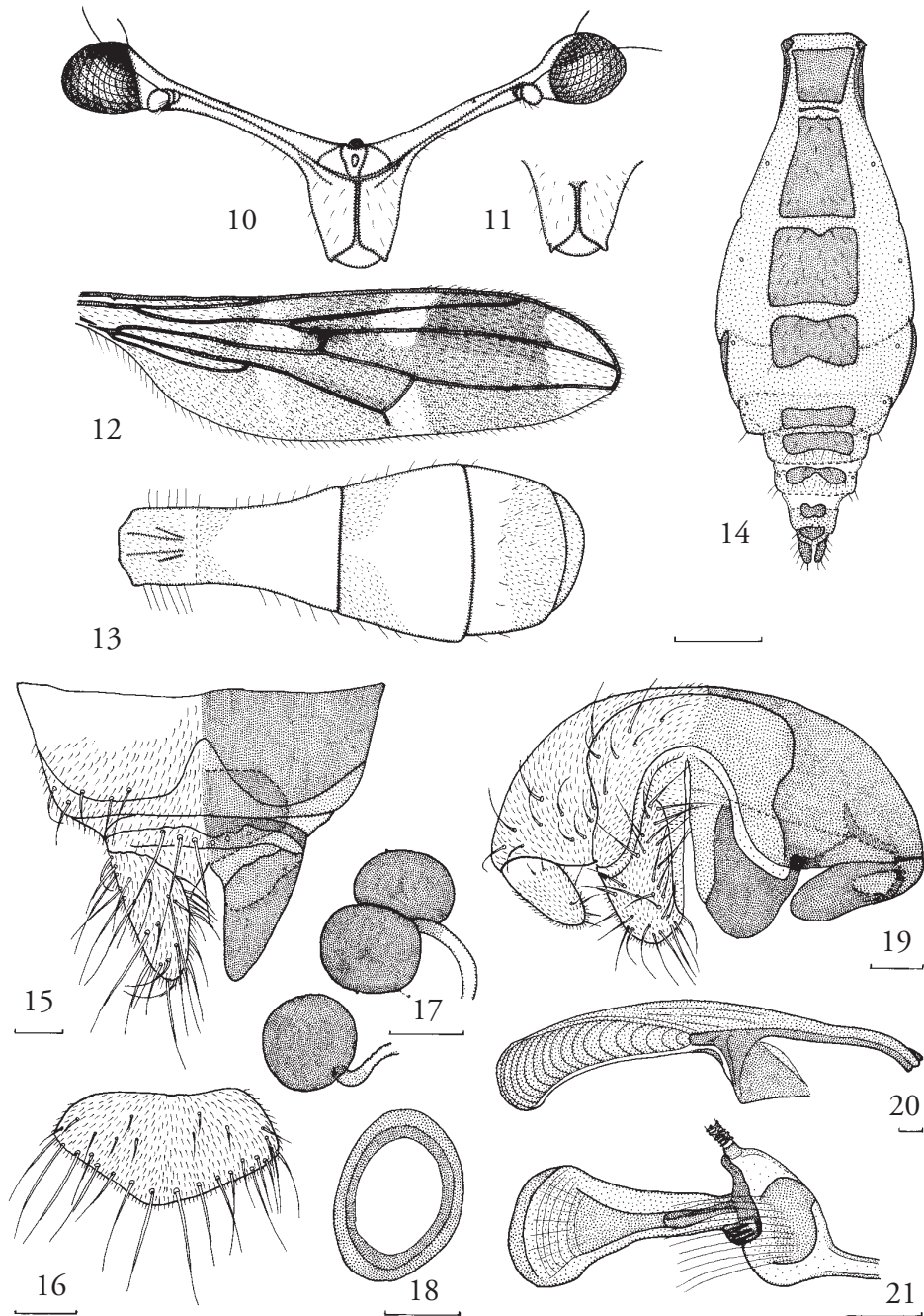
Wing. – In *E. helsdingeni* a large area of apical infuscation occurs, in *glabrostylus* a small area of infuscation occurs at the apex, while in the other four species no apical infuscation occurs at the tip. The distal anterior hyaline spot is small in *E. subnotata*, medium-sized in *helsdingeni* and large in the other four species. This spot continues well into the first posterior cell in *E. argentifera*, *brevispinus*, *glabrostylus* and *helsdingeni*, while in *sarawakensis* and *subnotata* the spot does not cross the third vein. The proximal anterior hyaline spot and the wingbase are glabrous in *E. helsdingeni*, while in the other five species the wings are almost uniformly pollinose with only in the basal region some tiny glabrous spots.

Legs. – The front femur is incrassate in *E. helsdingeni* (ratio length/width 3.6) and slightly incrassate to slender (ratios varying between 4.7 and 5.5) in the species of the *subnotata* complex. No sexual dimorphism could be found in this respect. In one species (*E. brevispinus*) the femur is even slightly more incrassate in the male, while normally in dimorphic diopsids the male has more slender femora. The categories used for description of the ratio length/width of the front femur are given in Feijen (1998). The numbers of tubercles in the two rows on the front femora cannot serve as differential characters within *Eurydiopsis* (table 1).

Preabdomen. – In *E. helsdingeni* the syntergum includes the first four terga, while in the species of the *subnotata* complex only the first three terga are included. According to Feijen (1989: 109) the only other diopsid with a syntergum consisting of terga 1+2+3+4 is *Cobiopsis latifascia* (Brunetti 1928: 592). Minor specific differences occur in the patterns of the densely white pollinose spots.

Female postabdomen. – Tergum 8 is divided into two sclerites in *E. helsdingeni* and *glabrostylus*, whereas in the other species it is a single plate, with a medial constriction in some species. Sternum 8 is strongly constricted in *E. helsdingeni*, less constricted in *argentifera* and *brevispinus* and not constricted in *glabrostylus* and *subnotata*. The cerci are rather broad in *E. helsdingeni* (ratio length/width 2.5) and broad in the other species (ratios varying from 1.7-1.9). The following categories are used for description of both female and male cerci: *broad* if the ratio length/width (L/W) is ≤ 2.0 , *rather broad* in case of $2.0 < L/W \leq 3.0$, *rather elongate* for $3.0 < L/W \leq 4.0$, *elongate* for $4.0 < L/W \leq 5.0$, and *very elongate* for $5.0 < L/W$. The subanal plate is more or less pentagonal in *E. helsdingeni*, *argentifera* and *subnotata*, triangular in *brevispinus* and somewhat rectangular with rounded posterior corners in *glabrostylus*.

Male postabdomen. – Sternum 5 is divided in *E. helsdingeni* and a single plate in the other species. The ratio length/width of the gonostyli is a major differential character and varies from 10 in *E. helsdingeni*, via 2.3-2.7 in *brevispinus*, *glabrostylus* and *subnotata*,



Figs. 10-21. *Eurydiopsis argentifera*. – 10, ♀, head in anterior view; 11, ♂, head in anterior view; 12, ♂, wing; 13, ♂, dorsal view of abdomen; 14, ♀, ventral view of abdomen; 15, dorsal view of ♀ terga 8, 10 and cerci; 16, ventral view of subanal plate; 17, spermathecae; 18, genital ring; 19, posterior view of periandrium with gonostyli and cerci; 20, lateral view of phallopodeme; 21, ejaculatory apodeme and sac. Scales: 1 mm (10-14), 0.1 mm (15-21). – Figs. 10, 15-21, Malaysia, Malaya (bred), 13, Indonesia, Sulawesi, nr. Bantimurung.

to 1.5-1.7 in *argentifera* and *sarawakensis* (table 1). The gonostyli are slightly constricted in *E. brevispinus* and *glabrostylus*. In *E. helsdingeni*, *brevispinus* and *glabrostylus* the gonostyli are largely glabrous with only a few microtrichia apically, in *sarawakensis* and *subnotata* the apical third of the outer side is covered with microtrichia, whereas in *argentifera* almost the whole apical half is pollinose. The ratio length/width of the cerci varies from 1.6 to 7.6. However, the shape of the cerci is rather irregular, making this character less useful.

KEY TO THE SPECIES

1. Syntergum 1+2+3, base of wing pollinose, front femur moderately incrassate to slender (ratio l/w > 4.5), ♂ sternum 5 a single sclerite, ratio l/w of gonostylus < 3.....(*subnotata* complex) 2
- Syntergum 1+2+3+4, base of wing glabrous, front femur incrassate (ratio l/w < 4), ♂ sternum 5 divided, ratio l/w of gonostylus ± 10, Java. *helsdingeni*
2. Small facial teeth present 3
- Facial teeth absent 4
3. Depression in front of ocellar tubercle, frons pollinose, small distal anterior wingspot not extending into first posterior cell, ♀ sternum 8 medially not constricted, ratio l/w of gonostyli ± 2.3, Philippines *subnotata*
- Elevation in front of ocellar tubercle, frons glossy, large distal anterior wingspot extending into first posterior cell, ♀ sternum 8 medially constricted, ratio l/w of gonostyli ± 1.5-1.6, Indonesia and Malaya. *argentifera*
4. Distal anterior wingspot extending into first posterior cell, IVB a minuscule wart, scutellar spines medium-sized (19-20% of body length), ratio l/w of gonostyli ± 2.4-2.7, gonostyli largely glabrous with apically a few microtrichia. 5
- Distal anterior wingspot not extending into first posterior cell, IVB a small bristle, scutellar spines large (± 26% of body length), ratio l/w of gonostyli ± 1.7, apical third of outer side of gonostyli pollinose, Borneo *sarawakensis* sp. n.
5. Wing apex slightly infuscated, ♀ tergum 8 divided, subanal plate apically rounded, gonostyli slightly constricted, ♂ cercus with ratio l/w ± 3.6, Philippines. *glabrostylus* sp. n.
- Wing apex hyaline, ♀ tergum 8 a single sclerite, subanal plate triangular, gonostyli not constricted, ♂ cercus with ratio l/w ± 5.0, Laos and Myanmar. *brevispinus* sp. n.

Eurydiopsis argentifera (Bigot, 1874)
(figs. 1-3, 10-21)

Diopsis argentifera Bigot, 1874: 112. Two syntypes (as 'copies'), Celebes (Sulawesi), Indonesia (UMO). [Examined] *Diopsis subnotata*; Walker 1861: 263 (wrong identification); Bigot 1881: 372 (senior synonym of *argentifera*, quoting Osten Sacken 1882: 237); Osten Sacken 1882: 237 (senior synonym of *argentifera*); van der Wulp 1896: 171, 1897: 192; de Meijere 1924: 60; Shillito 1971: 290-291; Tan 1965: 14, 1966: 133, 1967: 36; Burkhardt & de la Motte 1983: 99, 1985: 204.

Further material. – 1 ♀, 1 ♂, Indonesia, Sulawesi, nr. Bantimurung, Pattunung Asue, 17-20. iv.1991, c60m, C. v. Achterberg (RMNH); 1 ♂, Indonesia, Sulawesi, Watuwila Sulawesi SW 08, 16.x.1989, Krieken & Blom (RMNH); 1 ♂, Indonesia, Java, Batoeraden, G. Slamet., 17.vii.1927, F.C. Drescher (ZMA); 1 ♀, Indonesia, Sumatra, Serapa Kur., vii.1915, Edw. Jacobson (ZMA); 1 ♂, Indonesia, Java, Blume (RMNH); 1 ♀, Indonesia, W. Java, Tjidaon, Udjong Kulon, 5.xii.1958, A.N.R. Wegner (RMNH); 2 ♀, 4 ♂, Malaya, Malaysia 1988, bred by Burkhardt & de la Motte (RMNH).

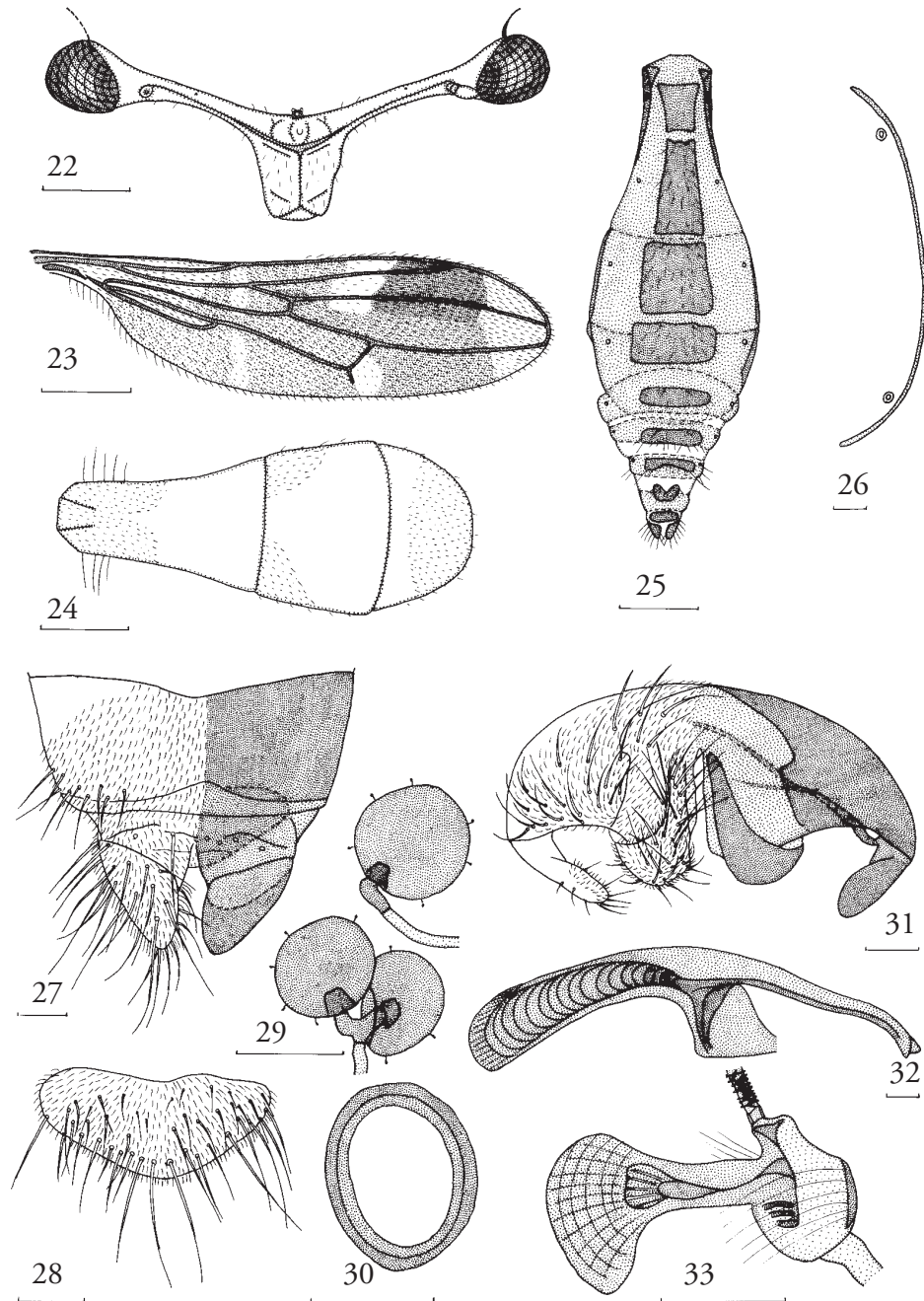
Description

Measurements. – (The measurements of the bred Malaysia flies were slightly smaller than those of wild material) Length of body in ♀ 9.7 mm ± SE 0.2 (range 9.1-10.5) and in ♂ 9.3 mm ± 0.3 (range 7.4-10.7), eye span in ♀ 6.6 mm ± 0.1 (range 6.4-7.0) and in ♂ 6.4 mm ± 0.2 (range 5.2-7.0), length of wing in ♀ 7.1 mm ± 0.1 (range 6.9-7.3) and in ♂ 6.7 mm ± 0.1 (range 6.0-7.3), length of scutellar spine in ♀ 2.31 mm ± 0.10 (range 1.83-2.57) and in ♂ 2.42 mm ± 0.06 (range 2.05-2.54).

Head. – Central part black, thinly pollinose; ocellar tubercle blackish; frons (fig. 10) with smooth elevation in front of ocellar tubercle, lateral areas smooth, a ridge around the frons; arcuate groove concolorous with rest of central part of head; face blackish, smooth and thinly pollinose, with ridge parallel to and just below arcuate groove, face somewhat bulging centrally, a few pale hairs, small blunt facial teeth present (figs. 10-11); eye span very small in female (32% smaller than the length of body) and very small in male (31% smaller than the length of body); stalks dark brown, broad apical parts blackish, pollinose; IVB tiny, OVB medium-sized, slightly longer than the diameter of the eye stalk.

Thorax. – Collar, scutum, scutellum, scutellar spines, pleura and sterna uniformly blackish brown pollinose; scutellar spines long (24% of body length), more than 3× scutellum; almost straight, slightly curved inward, diverging under an angle of 75-80°; metapleural spines large, glossy, laterally directed; very few sparse hairs on thorax.

Wing. – Apical eighth hyaline without infuscation at the tip (fig. 12); three complete transverse bands;



Figs. 22-33. *Eurydiopsis brevispinus*. – 22, ♂, head in anterior view; 23, ♂, wing; 24, ♀, dorsal view of abdomen; 25, ♀, ventral view of abdomen; 26, ♂ sternum 7+8; 27, dorsal view of terga 8, 10 and cerci; 28, ventral view of subanal plate; 29, spermathecae; 30, genital ring; 31, posterior view of periandrium with gonostyli and cerci; 32, lateral view of phallapodeme; 33, ejaculatory apodeme and sac. Scales: 1 mm (22-25), 0.1 mm (26-33). – Figs. 26, 31-33, holotype; 22, 23, ♂ paratype, Laos, Pao; 24, ♀ paratype, Laos, Pong King; 25, 27-30, ♀ paratype, Myanmar.

preapical band darkest, extending from tip of posterior crossvein to well beyond the tip of the second vein, proximal edge and apical edge straight; central band extending from base of submarginal cell to posterior crossvein, rather vague, darker around anterior crossvein; basal band very vague and irregular hardly reaching the anterior margin and constricted in anal cell, extending from base of third posterior cell to tip of anal cell; preapical band and central band broadly connected in posterior half of first posterior cell, central band and basal band connected in discal cell; except for hyaline base five hyaline spots, one from tip of costal cell extending to fourth vein, one from tip of anal cell to almost the wing margin, one large and distinct one extending from anterior wing margin to well into the first posterior cell, one basally in second posterior cell and one occupying the apical eighth of the wing; wing almost uniformly covered by microtrichia, only glabrous sections in base of costal cell and basal half of anal cell.

Legs. – Front leg brown, with blackish brown coxa, tibia and metatarsus, paler other tarsi, short black stripe apically on femur, coxa 1 pollinose, pollinosity on inner and outer side of femur 1; mid leg brown with whitish basal 2/5 of femur; hind leg brown with pale basal eighth of femur; femur 1 slender in ♀ and ♂ (ratio of length/width in both ♀ and ♂ $5.1 \pm \text{SE } 0.1$, range 4.8–5.3); tubercles on distal three-quarters, inner row in ♀ with 23.1 tubercles ± 1.1 (range 18–27) and in ♂ with 23.2 tubercles ± 1.0 (range 16–27), outer row in ♀ with 20.6 tubercles ± 1.0 (range 17–26) and in ♂ with 20.3 tubercles ± 0.8 (range 17–24).

Preabdomen. – Dorsally blackish brown, pollinose, base more whitish pollinose, terga 2 and 3 anterolaterally with whitish pollinose spots; tip (centre and apical edge of tergum 4, and tergum 5) whitish pollinose (fig. 13): syntergum consisting of terga 1, 2 and 3, seam between terga 2 and 3 distinct; sternum 1 dark brown, other sterna brown with whitish pollinose apical bands, pollinose.

Female postabdomen. – Deflexed, terga 6 and 7 rectangular plates (fig. 14: the female abdomens are in these types of figures presented in a see through way, so that the terga are visible behind the sterna); tergum 8 (fig. 15) represented by a single plate, posteriorly in a V-shaped way constricted medially, basal half of tergum 8 glabrous except medially; tergum 10 with three pair of hairs: cerci broad, ratio of length/width 1.8, covered with microtrichia and a number of hairs (fig. 15); sterna 5 and 6 single rectangular sclerites (fig. 14); sternum 7 strongly constricted medially, almost cut in two sclerites; sternum 8 a single, somewhat bean-shaped sclerite, slightly constricted medially; subanal plate (figs. 15–16) pentagonal, posteriorly nine pairs of hairs; spermathecae (fig. 17) rounded and smooth; genital ring (fig. 18) rounded.

Male postabdomen. – Terga 5 and 6 single plates; sterna 4 and 5 single rectangular sclerites; sternum 6 represented by two small sclerites; sternum 7+8 a very short, band-like sclerite; spiracles 5 and 6 in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8; perianthrium (fig. 19) rounded, with about 17 pairs of hairs, covered with microtrichia; gonostyli rounded to rectangular in lateral view (figs. 1–3), ratio length/width 1.5–1.6, in posterior view apically rounded, apical half on outer side covered with microtrichia, on inner side glabrous, on outer side some short hairs on apical third; gonostyli interconnected via thin processus longi; cerci rather elongate, ratio length/width 3.4, broadest preapically, covered with microtrichia and hairs; phallapodeme (fig. 20) solidly built, not broadening anteriorly, anterior arm 1.5 times as long as posterior arm; ejaculatory apodeme (fig. 21) broadening anteriorly.

Diagnosis

Eurydiopsis argentifera belongs to the *subnotata* complex and can be recognized by the wing pattern (no infuscation at the tip, large distal anterior spot extending into first posterior cell), almost uniform distribution of microtrichia on the wing, tiny *ivb*, medium-sized *ovb*, presence of facial teeth, slender front femora, large scutellar spines (24% of body length), syntergum 1+2+3, posteromedially constricted female tergum 8, medially strongly constricted female sternum 7, somewhat bean-shaped female sternum 8, broad female cerci, pentagonal subanal plate, single male sternum 5, rounded to rectangular gonostyli with a ratio length/width of 1.5–1.6, distal half of outer side of gonostyli covered with microtrichia, rather elongate male cerci with a ratio length/width of 3.4 and phallapodeme with anterior arm 1.5 times as long as the posterior arm.

Eurydiopsis brevispinus sp. n. (figs. 4–5, 22–30)

Type material. – ♂ Holotype, 1 ♀ paratype, Myanmar (Burma), Mt. Victoria, Chin hills, 1000m, iii.1938, leg. G. Heinrich (BMNH); 1 ♀ paratype, Myanmar (Burma), S. Shan States, road 40 km E. of Taunggyi, 1500m, 2–25.x.1934, Malaise (UZMH); 1 ♀ paratype, Laos, Pong King, 13.iv.1918, R. Vitalis de Salvaza (UZMH); 1 ♂ paratype, Laos, Pau, 8 km w., 18.iii.1920 (UZMH).

Description

Measurements. – Length of body in ♀ 8.5 mm $\pm \text{SE } 0.1$ (range 8.3–8.6) and in ♂ 8.6 mm (range 8.3–8.8), eye span in ♀ 5.4 mm ± 0.1 (range 5.3–5.5) and in ♂ 5.7 mm (range 5.6–5.7), length of wing in ♀ 6.6 mm ± 0.1 (range 6.5–6.8) and in ♂ 6.4 mm (range

6.1-6.6), length of scutellar spine in ♀ 1.71 mm ± 0.05 (range 1.61-1.77) and in ♂ 1.71 mm (range 1.64-1.77).

Head. – Central part blackish, thinly pollinose, ocellar tubercle black; frons (fig. 22) somewhat variable with slight, smooth elevation in front of ocellar tubercle, slight depression below elevation, lateral areas smooth, with circular ridge around the frons; arcuate groove concolorous; face with ridge parallel to and just below arcuate groove, face somewhat bulging centrally, a few pale hairs, facial corners rounded; eye span very small in female (36% smaller than the length of body) and very small in male (34% smaller than the length of body); stalks brown, broad apical parts blackish, pollinose; ivb minuscule and wart-like; ovb medium-sized, somewhat longer than the diameter of the eye stalk.

Thorax. – Collar, scutum, scutellum, scutellar spines, pleura and sterna uniformly blackish brown pollinose; scutellar spines medium-sized (20% of body length), almost 3× scutellum; almost straight, slightly curved inward, diverging under an angle of more than 80°; metapleural spines large glossy, laterally directed; some hairs on thorax.

Wing. – Apical eighth hyaline without infuscation at the tip (fig. 23); three complete transverse bands, preapical band darkest and with darker anterior half, extending from tip of posterior crossvein to well beyond the tip of the second vein, proximal edge curved and apical edge straight; central band extending from base of submarginal cell to posterior crossvein, rather vague, darker around anterior crossvein; basal band very vague and irregular hardly reaching the anterior margin and constricted in anal cell, extending from base of third posterior cell to tip of anal cell; preapical band and central band broadly connected around fourth vein, central band and basal band connected around fifth vein; except for hyaline base five hyaline spots, one from tip of costal cell extending into discal cell, one from tip of anal cell to wing margin, one large and distinct one extending from anterior wing margin to well into the first posterior cell, one basally in second posterior cell and one occupying the apical eighth of the wing; wing almost uniformly covered by microtrichia, glabrous sections include most of costal cell and basal parts of second basal cell and anal cell.

Legs. – Front leg brown, with darker coxa, tibia and metatarsus, paler other tarsi, coxa densely pollinose, remainder of front leg thinly pollinose; mid leg and hind leg brown, apices of femur darker; femur 1 slender in female (ratio of length/width 5.1 ± SE 0.1, range 4.9-5.2) and moderately incrassate in male (ratio of length/width 4.7, range 4.6-4.8); tubercles on distal two-thirds, inner row in ♀ with 22.8 tubercles ± 0.5 (range 21-25) and in ♂ with 23.5 tubercles (range 23-24), outer row in ♀ with 18.7 tubercles ± 0.8 (range

16-21) and in ♂ with 19.0 tubercles (range 19).

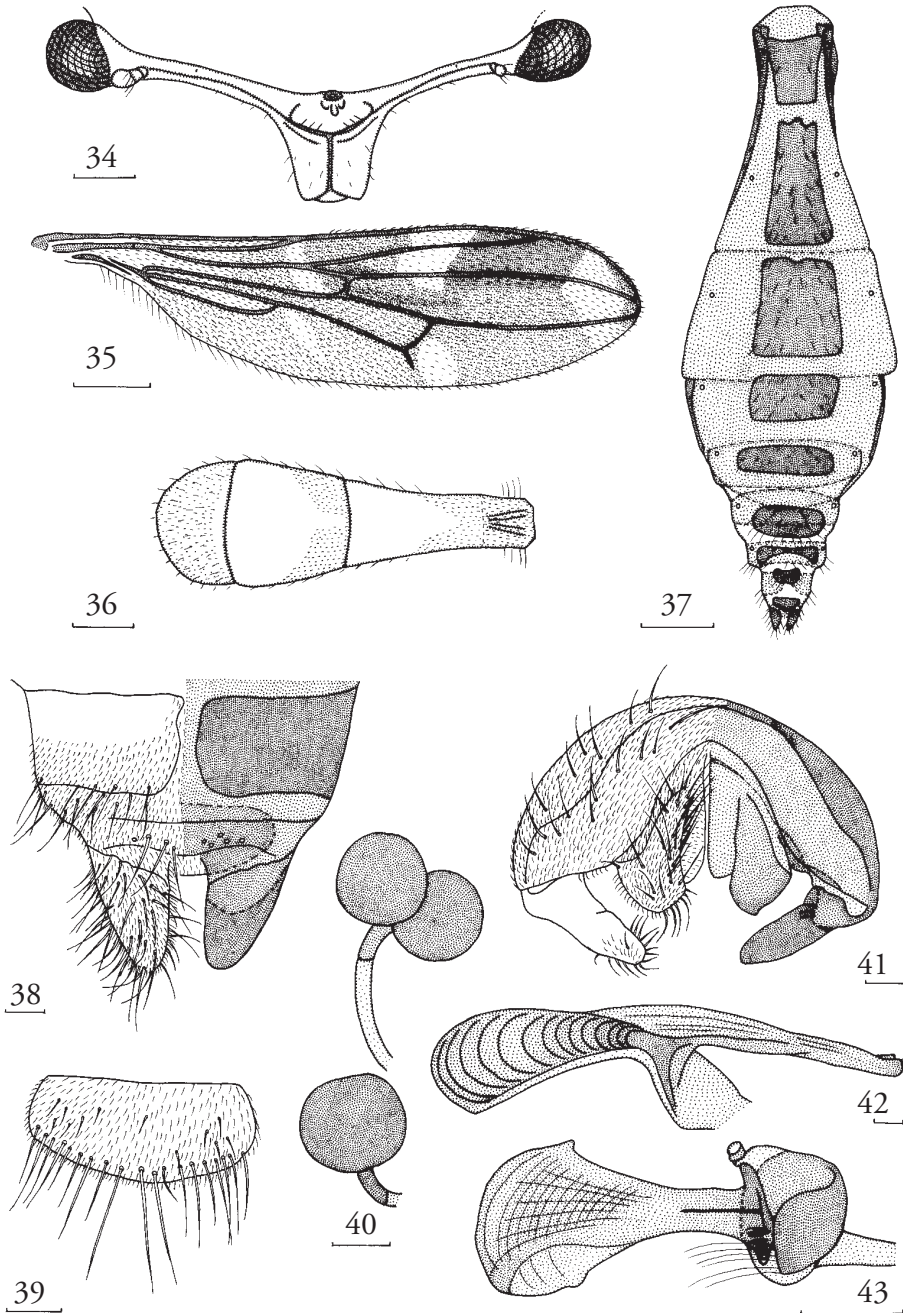
Preabdomen. – Dorsally blackish brown, pollinose, base more whitish pollinose, terga 2 and 3 anterolaterally with whitish pollinose spots; tip (centre and apical edge of tergum 4, and tergum 5) whitish pollinose (fig. 24); syntergum consisting of terga 1, 2 and 3, seam between terga 2 and 3 distinct; sternum 1 dark brown, other sterna brown with whitish pollinose apical bands, pollinose.

Female postabdomen. – Deflexed, terga 6 and 7 rectangular plates (fig. 25), tergum 8 (fig. 27) slightly constricted medially, tergum 8 covered with microtrichia except in anterolateral corners; tergum 10 with three pair of hairs: cerci broad, ratio of length/width 1.7, covered with microtrichia and a number of hairs (fig. 27); sterna 5 and 6 single rectangular sclerites (fig. 25); sternum 7 also rectangular but concave posteriorly; sternum 8 a single V-shaped sclerite; spiracle 7 in membrane; subanal plate (figs. 27-28) triangular to kidney-shaped, posteriorly nine pairs of hairs; spermathecae (fig. 29) rounded and smooth; genital ring (fig. 30) rounded.

Male postabdomen. – Terga 5 and 6 single plates; sterna 4 and 5 single rectangular sclerites; sternum 6 represented by two small triangular sclerites; sternum 7+8 a very short, band-like sclerite (fig. 26); spiracles 5 and 6 in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8 (fig. 26); perianthrium (fig. 31) rounded, with about 23 pairs of relatively long hairs, covered with microtrichia; gonostyli oblong in lateral view with rounded apical corners (figs. 4-5), ratio length/width 2.4-2.7, very slightly constricted in the middle, in posterior view apically rounded, only the very apex on inner and outer side with a few microtrichia, on outer side relatively long hairs on apical half; gonostyli interconnected via thin processus longi; cerci elongate, ratio length/width 5.0, broadest preapically, covered with microtrichia and hairs; phallopodeme (fig. 32) rather slender, not broadening anteriorly, anterior arm slightly longer than posterior arm; ejaculatory apodeme (fig. 33) broadening anteriorly.

Diagnosis

Eurydiopsis brevispinus belongs to the *subnotata* complex and can be recognized by its wing pattern (no infuscation at the tip, large distal anterior spot extending into first posterior cell), almost uniform distribution of microtrichia on the wing, minuscule ivb, medium-sized ovb, absence of facial teeth, moderately incrassate to slender front femora, medium-sized scutellar spines (20% of body-length), syntergum 1+2+3, rectangular (medially slightly constricted) female tergum 8, almost rectangular sternum 7, V-shaped female sternum 8, broad female cerci, triangular subanal plate, single male sternum 5, oblong gonostyli with a ratio length/width



Figs. 34-43. *Eurydiopsis glabrostylus*. – 34, ♀ head in anterior view; 35, ♀ wing; 36, ♂ dorsal view of abdomen; 37, ♀ ventral view of abdomen; 38, dorsal view of ♀ terga 8, 10 and cerci; 39, ventral view of subanal plate; 40, spermathecae; 41, posterior view of perianthrium with gonostyli and cerci; 42, lateral view of phallapodeme; 43, ejaculatory apodeme and sac. Scales: 1 mm (34-37), 0.1 mm (38-43). – All paratypes, Philippines, Aroroy.

of 2.4-2.7, glabrous gonostyli with only apically a few microtrichia, elongate male cerci with a ratio length/width of 5.0 and phallopodeme with anterior arm only slightly longer than posterior arm.

Eurydiopsis glabrostylus sp. n.

(figs. 6, 34-43)

Type material. – ♂ holotype, 1 ♂ paratype, Philippines, Masbate, Aroroy, x.1917 (UZMH); 1 ♀ paratype, Philippines, Masbate, Aroroy, viii.1918 (UZMH); 1 ♀ paratype, 1 ♂ paratype, Philippines, Luzon, Los Banos, iv.1914 (UZMH); 2 ♀ paratypes, 1 ♂ paratype, Philippines, Polillo, 18.viii.1915 (UZMH); 1 ♀ paratype, 1 ♂ paratype, Philippines, Mindoro, Subaan, i.1916 (UZMH).

Description

Measurements. – Length of body in ♀ 10.7 mm ± SE 0.6 (range 8.5-12.4) and in ♂ 10.2 mm ± 0.4 (range 8.8-11.2), eye span in ♀ 6.9 mm ± 0.4 (range 5.5-8.1) and in ♂ 7.0 mm ± 0.3 (range 5.7-7.4), length of wing in ♀ 7.2 mm ± 0.4 (range 6.0-8.3) and in ♂ 7.1 mm ± 0.3 (range 6.1-7.5), length of scutellar spine in ♀ 2.01 mm ± 0.08 (range 1.74-2.23) and in ♂ 2.05 mm ± 0.05 (range 1.86-2.14).

Head. – Central part blackish brown, pollinose; ocellar tubercle blackish; frons (fig. 34) with smooth elevation in front of ocellar tubercle, lateral areas smooth, or provided with vague radiating grooves laterally and anteriorly, a vague circular ridge around the frons; arcuate groove concolorous with rest of central part of head; face with ridge parallel to and just below arcuate groove, face somewhat bulging centrally, a few pale hairs, facial corners angular, but no distinct facial teeth; eye span very small in female (34% smaller than the length of body) and very small in male (31% smaller than the length of body); stalks dark brown, broad apical parts blackish, pollinose; rvb a minuscule wart, ovb small, 1.5× the diameter of the eye stalk.

Thorax. – Collar, scutum, scutellum, scutellar spines, pleura and sterna uniformly blackish brown pollinose; scutellar spines medium-sized (19% of body length), about 3× scutellum; slightly curved inward, diverging under an angle of 75°; metapleural spines large glossy, laterally directed; some hairs on thorax.

Wing. – Apical tenth hyaline with some distinct infuscation at the tip (fig. 35); three complete transverse bands, preapical band darkest, extending from tip of posterior crossvein to well beyond the tip of the second vein, convex on proximal edge and convex on apical edge; central band extending from base of submarginal cell to posterior crossvein, rather vague, darker around anterior crossvein and in first posterior

cell; basal band very vague and irregular hardly reaching the anterior margin, extending from base of third posterior cell to tip of anal cell; preapical band and central band broadly connected around fourth vein, central band and basal band connected in and around discal cell; except for hyaline base five hyaline spots, one from tip of costal cell extending to fourth vein, one from tip of anal cell to almost the wing margin, one large and distinct one extending from anterior wing margin to well into the first posterior cell, one basally in second posterior cell and one occupying most of the apical tenth of the wing; wing almost uniformly covered by microtrichia, only a tiny glabrous section in base of costal cell.

Legs. – Front leg brown with blackish brown tibia, coxa and metatarsus, paler other tarsi, densely pollinose coxa and thinly pollinose femur; mid leg and hind leg brown with darker apical sections on femora and slightly darker tibiae; femur 1 slender in ♀ (ratio of length/width 5.4 ± SE 0.1, range 5.0-5.6) and slender in ♂ (ratio of length/width 5.5 ± 0.1, range 5.2-5.8); tubercles on distal three-quarters, inner row in ♀ with 22.1 tubercles ± 0.9 (range 19-26) and in ♂ with 24.3 tubercles ± 0.8 (range 22-27), outer row in ♀ with 19.3 tubercles ± 0.6 (range 16-22) and in ♂ with 21.8 tubercles ± 1.0 (range 17-24).

Preabdomen. – Dorsally blackish brown, pollinose, base more whitish pollinose, terga 2 and 3 anterolaterally with whitish pollinose spots; tip (including most of tergum 4 and all of tergum 5) also whitish pollinose (fig. 36); syntergum consisting of terga 1, 2 and 3, seam between terga 2 and 3 distinct; sternum 1 dark brown, other sterna brown with whitish pollinose apical bands, pollinose.

Female postabdomen. – Deflexed, terga 6 and 7 rectangular plates (fig. 37); tergum 8 (fig. 38) represented by two rectangular plates, separated medially, basal half of tergum 8 glabrous except medially; tergum 10 with four pairs of hairs, cerci broad, ratio of length/width 1.7, covered with microtrichia and a number of hairs (fig. 38); sterna 5 and 6 single rectangular sclerites (fig. 37); sternum 7 angular anteriorly and strongly concave posteriorly; sternum 8 a single, somewhat bean-shaped sclerite; subanal plate (figs. 38-39) somewhat rectangular with rounded posterior corners, posteriorly nine pairs of hairs; spermathecae (fig. 40) rounded and smooth.

Male postabdomen. – Terga 5 and 6 single plates; sterna 4 and 5 single rectangular sclerites; sternum 6 represented by two small sclerites; sternum 7+8 a very short, band-like sclerite; spiracles 5 and 6 in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8; periandrium (fig. 41) rounded, with about 16 pairs of hairs, covered with microtrichia; gonostyli oblong in lateral view (fig. 6), slightly but distinctly constricted in the middle and with rounded

apical corners, ratio length/width 2.7, in posterior view apically pointed, distally on outer side a few microtrichia, on inner side glabrous, on outer side some short hairs on apical half; gonostyli interconnected via thin processus longi; cerci rather elongate, ratio length/width 3.6, broadest preapically, covered with microtrichia and hairs; phallapodeme (fig. 42) solidly built, broadening anteriorly, anterior arm just as long as posterior arm; ejaculatory apodeme (fig. 43) broadening anteriorly.

Diagnosis

Eurydiopsis glabrostylus belongs to the *subnotata* complex and can be recognized by its wing pattern (some infuscation at the tip, large distal anterior hyaline spot extending into first posterior cell), almost uniform distribution of microtrichia on the wing, minuscule IVB, small OVB, absence of facial teeth, slender front femora, medium-sized scutellar spines (19% of body length), syntergum 1+2+3, divided female tergum 8, posteriorly strongly concave female sternum 7, bean-shaped female sternum 8, broad female cerci, rectangular subanal plate with rounded posterior corners, single male sternum 5, oblong gonostyli slightly constricted in the middle and with a ratio length/width of 2.7, glabrous gonostyli with only apically a few microtrichia, male cerci with a ratio length/width of 3.6 and phallapodeme with equal-sized arms.

Eurydiopsis helsdingeni sp. n. (figs. 7, 44-55)

Diopsis circularis; van der Wulp, 1897: 189 (nec *circularis* Macquart).

Diopsis circularis; Frey, 1928: 70 (nec *circularis* Macquart).

Type material. – ♀ Holotype, Indonesia, Java, Blume, Coll. F.M. v. d. Wulp (RMNH); 1 ♀, 1 ♂ paratype, Indonesia, Java, Fruhstorfer (IRSNB); 1 ♀ paratype, Indonesia, Java, Batavia (= Djakarta), von Röder (MLUH). The first three specimens were identified by van der Wulp (1897) as '*Diopsis circularis*'. The second specimen was also by E. Brunetti identified as '*D. circularis*'.

Etymology. – It is my pleasure to name this interesting species after Dr. P. J. van Helsdingen, curator of Diptera at the Leiden Museum. Dr. van Helsdingen originates from the same island as *Eurydiopsis helsdingeni* sp. n.

Description

Measurements. – Length of body in ♀ 8.2 mm (range 7.8-8.6) and in ♂ 7.8 mm, eye span in ♀ 5.4 mm (range 5.2-5.7) and in ♂ 5.7 mm, length of wing in ♀ 5.4 mm (range 5.2-5.7) and in ♂ 5.4 mm,

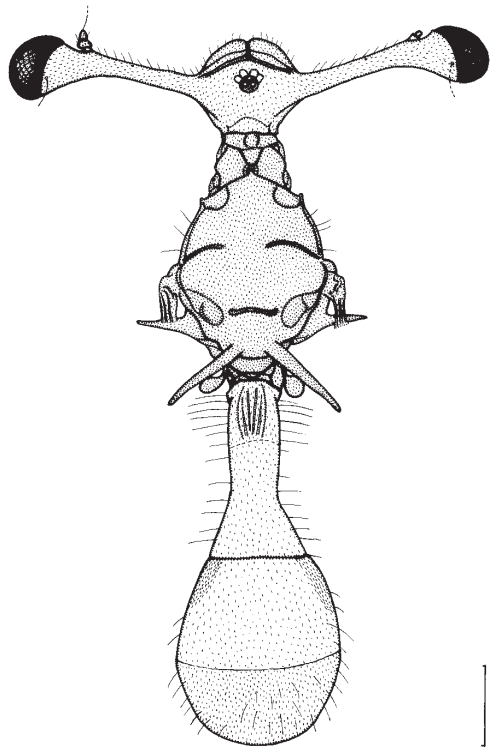
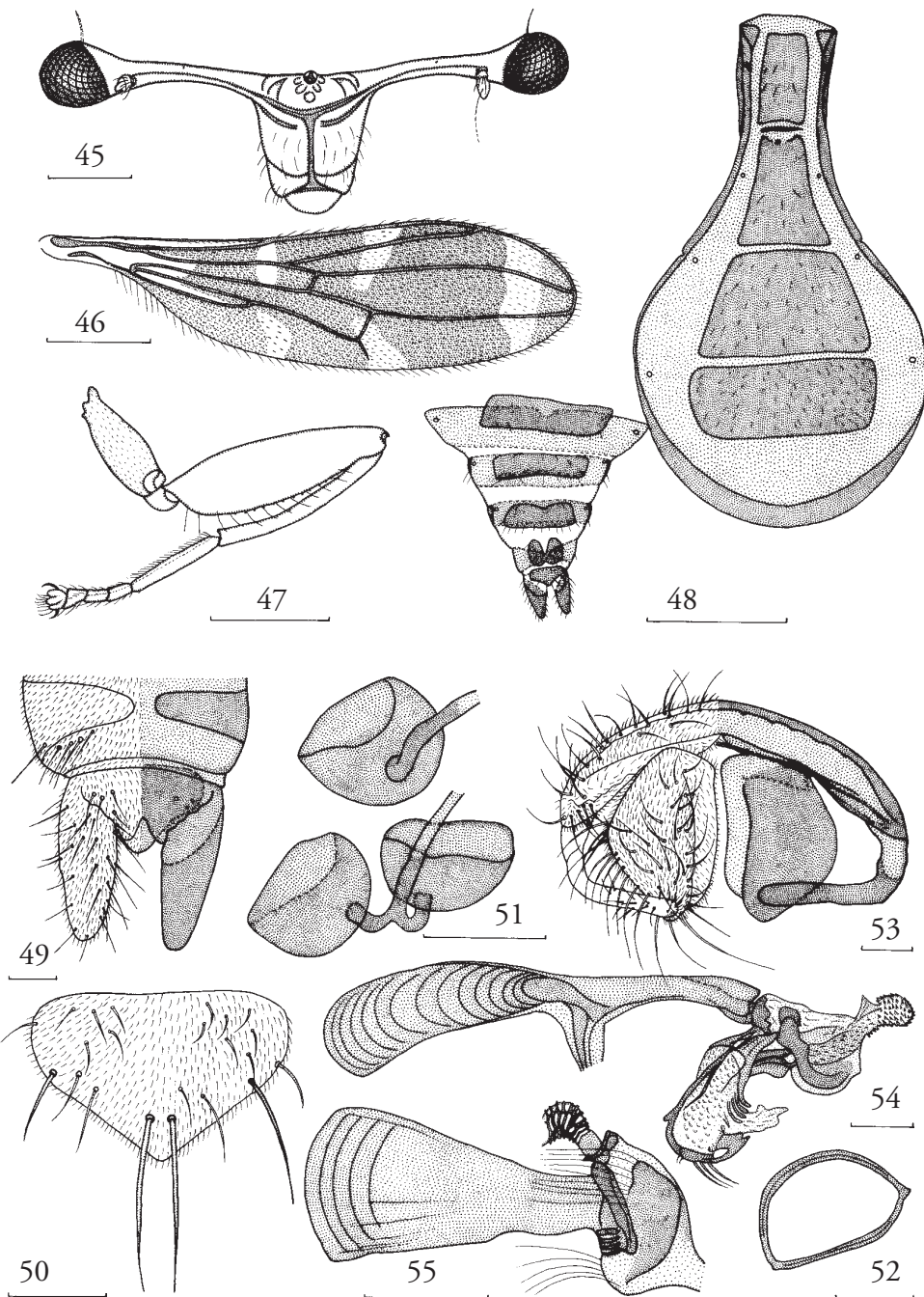


Fig. 44. *Eurydiopsis helsdingeni*. – ♀ paratype, Indonesia, Java, habitus in dorsal view. Scale: 1 mm.

length of scutellar spine in ♀ 1.27 mm (range 1.24-1.30), scutellar spines broken in ♂.

Head. – Central part uniformly brown (not black as stated by van der Wulp 1897), thinly pollinose; frons (figs. 44-45) with small rounded elevation in front of ocellar tubercle, anteriorly and laterally of ocellar tubercle some small depressions, lateral areas smooth, a ridge around the frons; arcuate groove dark brown; face with ridge parallel to and just below arcuate groove, smooth, lower fifth somewhat depressed, a few pale hairs, facial corners rounded, definitely without very small facial teeth as stated by van der Wulp 1897; eye span very small in female (34% smaller than the length of body) and very small in male (27% smaller than the length of body); stalks brown, broad apical parts blackish, pollinose, funiculus pale brown; IVB just indicated as a minuscule black wart (not absent as mentioned by van der Wulp); OVB medium-sized, 1.5 × the diameter of the stalk.

Thorax. – Collar dark brown to blackish brown, pollinose; scutum, scutellum and scutellar spines colorous with collar, pollinose; pleura and sterna also



Figs. 45-55. *Eurydiopsis helsdingeni*. – 45, ♀, head in anterior view; 46, ♀, wing; 47, ♀, front leg, outer side; 48, ♀, ventral view of abdomen; 49, dorsal view of ♀ terga 8, 10 and cerci; 50, ventral view of subanal plate; 51, spermathecae; 52, genital ring; 53, posterior view of periandrium with gonostyli and cerci; 54, lateral view of phallopodeme and aedeagus; 55, ejaculatory apodeme and sac. Scales: 1 mm (45-48), 0.1 mm (49-55). – Figs. 48-52, holotype, Indonesia, Java; 45, 53-55, paratypes, Indonesia, Java; 46, 47, ♀ paratype, Indonesia, Java, Batavia.

concolorous and uniformly pollinose; scutellar spines (fig. 44) relatively small (15% of body length), almost $2.5\times$ scutellum, pointed slightly upward, tip curving slightly inward, diverging under an angle of 90° ; metapleural spines rather large, laterally directed; a sparse distribution of fine hairs on thorax, especially on the scutellar spines.

Wing. – Apex with large patch of infuscation (fig. 46); three complete transverse dark bands, the bands together with the infuscated apex giving van der Wulp's 'vier bruine dwarsbanden' (four brown crossbands); preapical band darkest and broadest, extending from tip of posterior crossvein to apically of tip of second vein; central band extending from base of submarginal cell to tip of fifth vein: basal band vague and irregular, hardly reaching the anterior margin and constricted in anal cell, extending from base of third posterior cell to apex of anal cell; basal and central band connected around fifth vein, central band and subapical band connected around fourth vein; except for hyaline base five hyaline spots, one from tip of costal cell extending to just in discal cell, one centrally in third posterior cell, one extending from subapically in the marginal cell to halfway in the first posterior cell, one basally in second posterior cell just extending in discal cell and one hyaline subapical crossband between dark subapical band and infuscated tip; the glabrous basal wing parts include most of the subcostal cell, basal tip of marginal cell, basal half of first basal cell, basal tip of second basal cell and most of anal cell, the hyaline spot below the tip of the subcostal cell is also glabrous. Van der Wulp indicated the differences with the wing pattern of Macquart's *circularis*, but thought these due to inaccuracies and 'phantasie' of Macquart (1835). However, Macquart's inaccuracy consisted only of mentioning Java as a location of the African *circularis*. Macquart made exactly the same error with his *subfasciata* (see Feijen 1978).

Legs. – Front leg brown, coxa, tibia and metatarsus dark brown, thinly pollinose; mid leg and hind leg brown with darker tibiae, pollinose; femur 1 (fig. 47) incrassate in ♀ (ratio of length/width 3.5, range 3.4–3.5) and incrassate in ♂ (ratio of length/width 3.6); tubercles on distal three-quarters, inner row in ♀ with 22.3 tubercles (range 22–23) and in ♂ with 24 tubercles, outer row in ♀ with 18.7 tubercles (range 18–19) and in ♂ with 19 tubercles, outer row without gap.

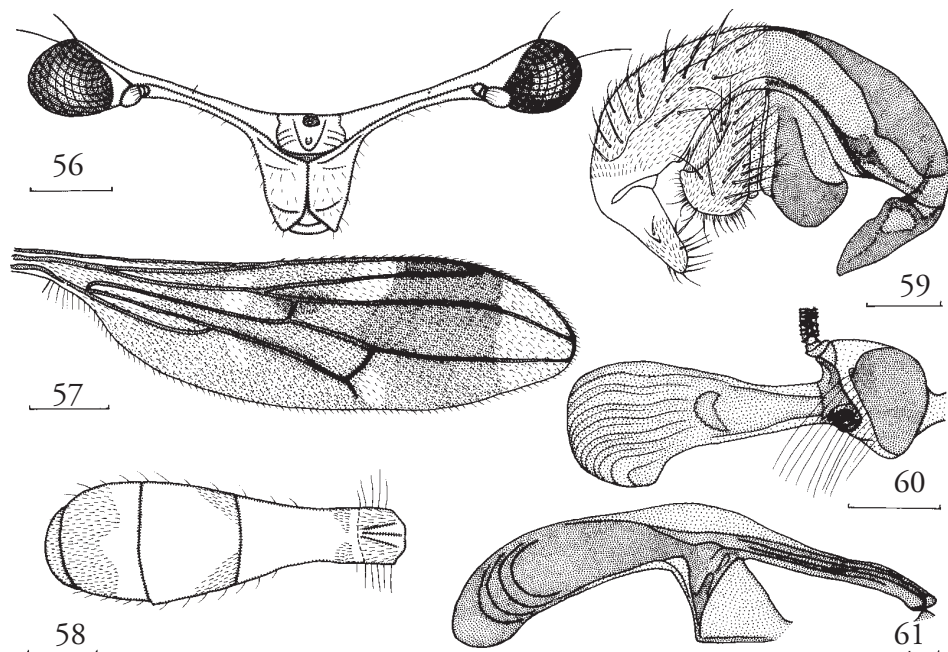
Preabdomen. – Dorsally dark brown, uniformly pollinose, tergum 3 (fig. 44) anterolaterally with densely pollinose spots; basally strongly constricted, posteriorly (tergum 4) rounded; syntergum consisting of the terga 1, 2, 3 and 4, seam between terga 2 and 3 distinct, seam between terga 3 and 4 less distinct; sterna pale brown, sternum 1 darker; spiracle 1 in tergum (fig. 48) other spiracles in membrane.

Female postabdomen. – Strongly deflexed under syntergum 1–4 (figs. 44, 48); terga 6 and 7 rectangular plates (fig. 48); tergum 8 (fig. 49) represented by two sclerites narrowly separated medially, sclerites covered by microtrichia; tergum 10 with four pairs of hairs, no long central hairs; cerci rather broad, ratio of length/width 2.5, covered with microtrichia and a number of hairs (fig. 49); sterna 5, 6 and 7 single rectangular sclerites (fig. 48), sternum 6 more sclerotized posteriorly; sternum 8 strongly constricted medially, the two halves narrowly connected posteriorly; spiracle 7 in membrane; subanal plate (figs. 49–50) almost triangular with rounded lateral corners, posteriorly two pairs of long hairs and two pairs of short hairs, the central pair of long hairs quite pronounced; spermathecae (fig. 51) rounded, apically concave but this may be due to an artefact, smooth; genital ring rounded (fig. 52).

Male postabdomen. – Terga 5 and 6 rectangular sclerites; sternum 4 a single rectangular sclerite; sternum 5 represented by a pair of L-shaped sclerites; sternum 6 represented by a pair of tiny sclerites; sternum 7+8 a short, band-like sclerite; spiracle 5 in membrane, spiracle 6 just in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8; periandrium (fig. 53) rounded, with about 22 pairs of hairs, covered with microtrichia; gonostyli (fig. 7) long and slender, ratio length/width about 10, glabrous with apically some hairs and microtrichia, fused to periandrium but on cursory inspection apparently articulate; gonostyli via thin processus longi connected to posterior edge of periandrium and from there interconnected via thin processus; cerci broad, ratio of length/width 1.6, covered with microtrichia and hairs, apically some long hairs; phallapodeme (fig. 54) rather slender, anterior arm slightly broadening anteriorly and one third longer than posterior arm; ejaculatory apodeme small, wedge-shaped (fig. 55).

Diagnosis

Eurydiopsis helsdingeni takes up an isolated position in its genus, all other known species belonging to the *subnotata* complex. It can be recognized by its wing pattern (three dark crossbands and infuscated apex, five hyaline spots), distribution of microtrichia on the wing (glabrous base and glabrous basal anterior spot), minuscule ivb, medium-sized ovb, absence of facial teeth, incrassate front femora, small scutellar spines (15% of body length), syntergum 1+2+3+4 with distinct seam between 2 and 3 and less distinct seam between 3 and 4, divided female tergum 8, rectangular female sternum 7, triangular subanal plate, rather broad female cerci, divided male sternum 5, long, slender and almost glabrous gonostyli with ratio length/width of 10, broad male cerci and phallapodeme with anterior arm one third longer than posterior arm.



Figs. 56-61. *Eurydiopsis sarawakensis*, male. – 56, head in anterior view; 57, wing; 58, dorsal view of abdomen; 59, posterior view of perianthrium with gonostyli and cerci; 60, ejaculatory apodeme and sac; 61, lateral view of phallapodeme. Scales: 1 mm (56-58), 0.1 mm (59-61). – Figs. 56, 58 holotype, 57 and 59-61, paratype, Malaysia, Sabah, Tenempok.

Eurydiopsis sarawakensis sp. n.
(figs. 8, 56-61)

Type material. – ♂ Holotype, Malaysia, Sarawak, Batu Niah, 29.xi.-27.xii.1980, A. Harman (RMNH); 1 ♂, Malaysia, Sabah (N. Borneo) or Sarawak: 1958-1959, T.C. Maa (BPBM); 1 ♂, Malaysia, Sabah (British Borneo), Tenempok, 1460m, Jesselton 30 mi. E., 10-19.ii.1959, T.C. Maa (BPBM).

Description

Measurements. – Length of body in ♂ 9.4 mm ± SE 0.3 (range 8.8-9.9), eye span in ♂ 6.6 mm ± 0.1 (range 6.5-6.8), length of wing in ♂ 7.0 mm ± 0.1 (range 6.8-7.2), length of scutellar spine in ♂ 2.46 mm ± 0.07 (range 2.33-2.54).

Head. – Central part dark brown, pollinose; ocellar tubercle blackish; frons (fig. 56) with elevation in front of ocellar tubercle and with small circular depression in front of elevation, surrounded by V-shaped depression, lateral areas almost smooth, with some very vague grooves, a circular groove around the frons; arcuate groove concolorous with central section of head; face with ridge parallel to and just below arcuate groove, face somewhat bulging centrally, a few pale hairs, facial corners angular but without distinct facial

teeth; eye span very small in male (30% smaller than the length of body); stalks brown, broad apical parts blackish, pollinose; ivb small, not more than half the length of the diameter of the eye stalk; ovb medium-sized, somewhat longer than the diameter of the stalk.

Thorax. – Collar, scutum, scutellum, scutellar spines, pleura and sterna uniformly blackish brown pollinose; scutellar spines long (26% of body length), 3.5× scutellum; almost straight, very slightly curved inward, diverging under an angle of 75°; metapleural spines large glossy, laterally directed; some hairs on thorax.

Wing. – Apical eighth almost hyaline without infuscation at the tip (fig. 57); three complete transverse bands: preapical band darkest, extending from tip of posterior crossvein to well beyond the tip of the second vein, proximal edge slightly convex and apical edge straight; central band extending from just before base of submarginal cell to just past posterior crossvein, rather vague, darker around anterior crossvein and around fifth vein; basal band very vague and irregular hardly reaching the anterior margin and constricted in anal cell, extending from base of third posterior cell to tip of anal cell; preapical band and central band broadly connected in whole of first posterior cell and in anterior part of second posterior cell,

central band and basal band connected in whole of discal cell; except for hyaline base five hyaline spots, one just not reaching tip of costal cell and extending to fourth vein, one from tip of anal cell to halfway the wing margin, one distinct one extending from anterior wing margin to third vein, one basally in second posterior cell near wing margin and one occupying the apical eighth of the wing; wing almost uniformly covered by microtrichia, glabrous sections include basal half of costal cell and basal parts of second basal cell and anal cell.

Legs. – Front leg brown, blackish brown tibia, coxa and metatarsus, paler other tarsi; coxa densely pollinose, remainder of leg thinly pollinose, with more dense pollinosity on sides of femur, mid leg and hind leg brown with darker apical half on femur 2, two dark bands on femur 3 and darker tibiae; femur 1 slender in male (ratio of length/width 5.1, range 5.0-5.2); tubercles on distal two-thirds, inner row in ♂ with 22.5 tubercles \pm SE 0.8 (range 19-24), outer row in ♂ with 20.2 tubercles \pm 0.9 (range 18-23).

Preabdomen. – Dorsally blackish brown, pollinose, base more whitish pollinose, terga 2 and 3 anterolaterally with whitish pollinose spots; tip (centre and apical edge of tergum 4, and tergum 5) whitish pollinose (fig. 58); syntergum consisting of terga 1, 2 and 3, seam between terga 2 and 3 distinct; sternum 1 dark brown, other sterna brown with whitish pollinose apical bands, pollinose.

Male postabdomen. – Terga 5 and 6 single plates; sterna 4 and 5 single rectangular sclerites; sternum 6 represented by two small kidney-shaped sclerites; sternum 7+8 a very short, band-like sclerite; spiracles 5 and 6 in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8; perianthrium (fig. 59) rounded, with about 20 pairs of hairs, covered with microtrichia; gonostyli rectangular in lateral view with rounded apical corners, slightly constricted in the middle (fig. 6), ratio length/width 1.7, in posterior view apically pointed, on outer side the apical half covered with microtrichia, inner side glabrous, on outer side some hairs on apical half; gonostyli interconnected via thin processus longi; cerci rather elongate, ratio length/width 3.1, broadest preapically, covered with microtrichia and hairs; phallapodeme (fig. 61) rather slender, not broadening anteriorly, anterior arm curving downward anteriorly and slightly longer than posterior arm; ejaculatory apodeme (fig. 60) broadening anteriorly.

Diagnosis

Eurydiopsis sarawakensis belongs to the *subnotata* complex and can be recognized by its wing pattern (no infuscation at the tip, large distal anterior spot not extending into first posterior cell), almost uniform distribution of microtrichia on the wing, small

ivb, medium-sized ovb, absence of facial teeth, slender front femora, large scutellar spines (26% of body length), syntergum 1+2+3, rectangular and in the middle somewhat constricted gonostyli with a ratio length/width of 1.7, rather elongate male cerci with a ratio length/width of 3.1 and phallapodeme with anterior arm slightly longer than posterior arm.

Eurydiopsis subnotata (Westwood, 1848) (figs. 9, 62-72)

Diopsis subnotata Westwood, 1848: 37, pl 18, fig 2. Type (♀) in BMNH, carrying a label 'identified as the type by E. E. Austen, from Philippine Is. Purchd fr. Mr. Wood 45.49'. [Examined]

Diopsis (Eurydiopsis) subnotata: Frey 1928: 71 (in part, the remainder being *glabrostylus* sp. n.).

Eurydiopsis subnotata: Steyskal 1972: 11 (in part); Steyskal 1975: 33 (in part); Feijen 1989: 62.

nec *Diopsis argenteifera* Bigot, 1874: 112.

nec '*Diopsis subnotata*'; van der Wulp 1896: 171, 1897: 192; de Meijere 1924: 60, Tan 1965: 14, 1966: 133, 1967: 36; Burkhardt & de la Motte 1983: 99, 1985: 204.

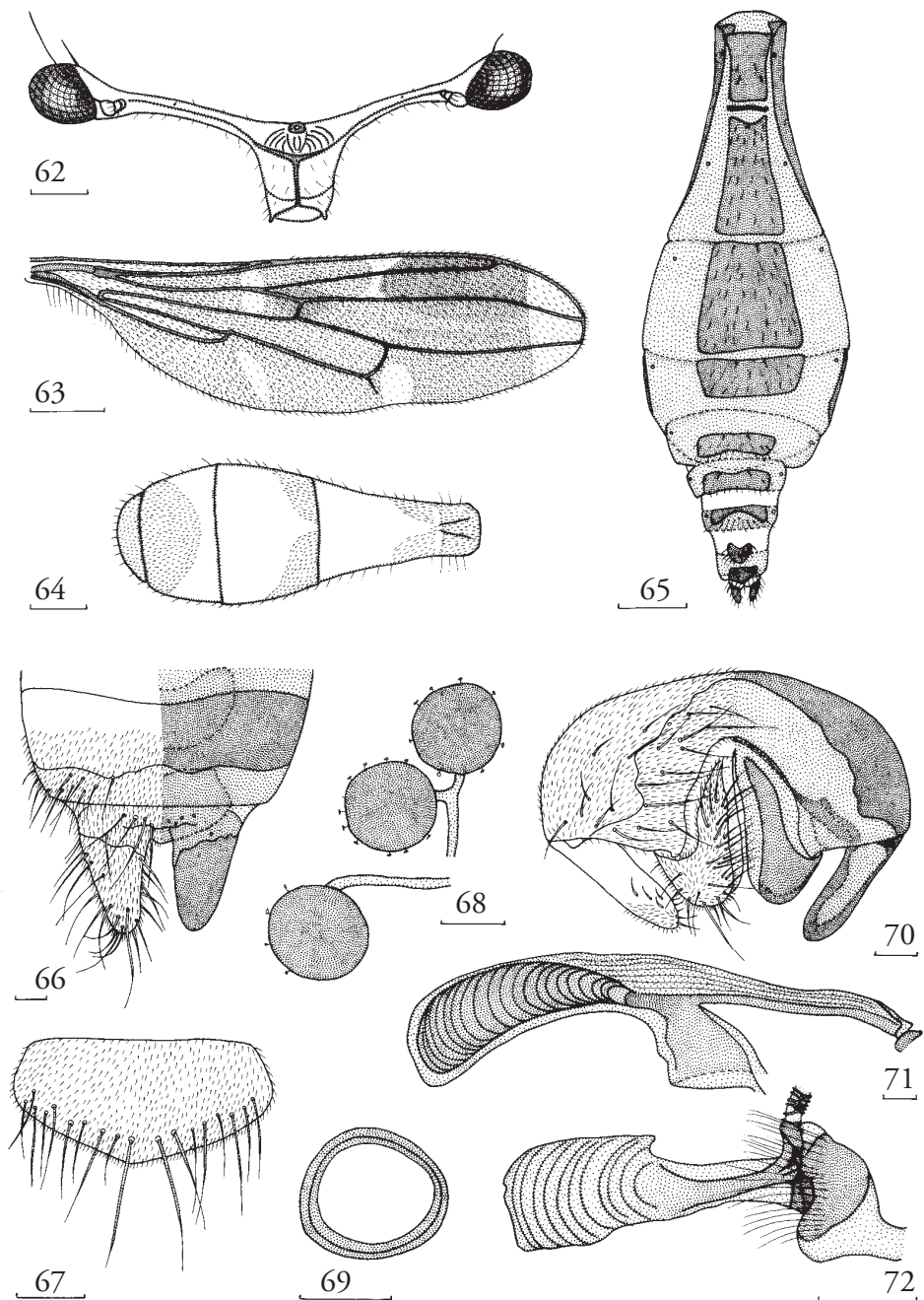
Further material. – 1 ♀, Philippines, Sororro, 17.v.1916 (UZMH); 1 ♀, Philippines, Samar, Catbalogan, iv.1915 (UZMH); 2 ♀, Philippines, Mindanao, Surigao, xi.1915 (BMNH - Received from Dr. R. Frey -, one with label '*Diopsis subnotata* Westw. Det. 1968, J.A. Tenorio'); 2 ♀, 2 ♂, Philippines, Surigao, viii.1914 (UZMH); 1 ♀, 1 ♂, Philippines, Mindanao, Surigao, xi.1915 (UZMH); 1 ♀, Philippines, Surigao, viii.1916 (UZMH).

Description

Measurements. – Length of body in ♀ 11.0 mm \pm SE 0.2 (range 10.1 -11.8) and in ♂ 9.7 mm \pm 0.5 (range 8.8-10.5), eye span in ♀ 7.5 mm \pm 0.1 (range 7.3-7.7) and in ♂ 6.9 mm \pm 0.4 (range 6.1-7.4), length of wing in ♀ 7.9 mm \pm 0.1 (range 7.4-8.2) and in ♂ 6.8 mm \pm 0.3 (range 6.2-7.3) length of scutellar spine in ♀ 2.73 mm \pm 0.06 (range 2.39-2.98) and in ♂ 2.41 mm \pm 0.05 (range 2.05-2.60).

Head. – Central part dark brown, pollinose; ocellar tubercle blackish; frons (fig. 62) with ocellar tubercle on elevation surrounded by sutures, small depression in front of ocellar tubercle, lateral areas smooth or provided with vague radiating grooves laterally and a vague ridge around the frons; arcuate groove concolorous with rest of central part of head; face with ridge parallel to just below arcuate groove, face somewhat bulging centrally, a few pale hairs, facial corners with distinct small facial teeth: eye span very small in female (32% smaller than the length of body) and very small in male (29% smaller than the length of body); stalks brown, broad apical parts blackish, pollinose; funiculus paler brown, ivb minuscule; ovb medium-sized, slightly longer than the diameter of the stalk.

Thorax. – Collar, scutum, scutellum, scutellar spines, pleura and sterna uniformly blackish brown



Figs. 62-72. *Eurydiopsis subnotata*. – 62, ♀, head in anterior view; 63, ♀, wing; 64, ♀, dorsal view of abdomen; 65, ♀, ventral view of abdomen; 66, dorsal view of ♀ terga 8, 10 and cerci; 67, ventral view of subanal plate; 68, spermathecae; 69, genital ring; 70, posterior view of perianthrium with gonostyli and cerci; 71, lateral view of phallopodeme; 72, ejaculatory apodeme and sac. Scales: 1 mm (62-65), 0.1 mm (66-72). – Figs. 62, 63, 65-72, Philippines, Mindanao, Surigao; 64, Philippines, Sororro.

pollinose, scutellar spines long (25% of body length), $3.5\times$ scutellum; almost straight, slightly curved inward, diverging under an angle of 75° ; metapleural spines large, glossy, laterally directed; few sparse hairs on thorax.

Wing. – Apex hyaline with hardly any infuscation (fig. 63) at the tip; three complete transverse bands, preapical band darkest (especially anteriorly) and slightly broader than central band, extending from tip of posterior crossvein to well beyond the tip of the second vein, apical edge of preapical band straight; central band extending from base of submarginal cell to posterior crossvein, rather vague, darker around anterior crossvein; basal band very vague and irregular, hardly reaching the anterior margin and constricted in the anal cell, extending from base of third posterior cell to tip of anal cell; preapical band and central band broadly connected in whole of first posterior cell and anterior part of second posterior cell, central band and basal band connected in whole of discal cell; except for hyaline base five hyaline spots, one from tip of costal cell extending to fourth vein, one from tip of anal cell to wing margin, one narrow one extending from anterior margin to third vein at the level of posterior crossvein, one basally in second posterior cell and one occupying the apical tenth of the wing; wing almost uniformly covered by microtrichia, only a tiny glabrous section in base of costal cell.

Legs. – Front leg brown with blackish brown coxa, tibia and metatarsus, paler other tarsi, pollinose anteriorly and basally on coxa 1 and on inner side of femur; mid leg brown with whitish basal two-fifth of femur and dark apex of femur; hind leg brown with basal eighth of femur whitish; femur 1 slender in ♀ (ratio of length/width 5.3, range 5.0–5.7) and slender in ♂ (ratio of length/width $5.3 \pm \text{SE } 0.1$, range 5.2–5.4); tubercles on distal three-quarters, inner row in ♀ with 29.0 tubercles ± 0.8 (range 22–29) and in ♂ with 24.7 tubercles ± 1.8 (range 19–29), outer row in ♀ with 22.5 tubercles ± 0.9 (range 20–27) and in ♂ with 22.5 tubercles ± 1.7 (range 17–27).

Preabdomen. – Dorsally blackish brown, pollinose, base more whitish pollinose; terga 2 and 3 anterolaterally with whitish pollinose spots; tip (centre of tergum 4 and tergum 5) also whitish pollinose (fig. 64); syntergum consisting of terga 1, 2 and 3, seam between terga 2 and 3 distinct; sternum 1 dark brown, pollinose; sternum 1 basally fused to syntergum.

Female postabdomen. – Deflexed, terga 6, 7 and 8 rectangular plates (fig. 65); basal half of tergum 8 (fig. 66) glabrous; tergum 10 with four pairs of hairs, cerci broad, ratio of length/width 1.9, covered with microtrichia and a number of hairs (fig. 66); sterna 5 and 6 single rectangular sclerites (fig. 65); sternum 7 angular anteriorly and constricted medially posterior-

ly; sternum 8 a single, triangular to V-shaped sclerite; spiracle 7 in membrane; subanal plate (figs. 66–67) somewhat pentagonal with rounded corners, posteriorly nine pairs of hairs; spermathecae (fig. 68) rounded and smooth; genital ring (fig. 69) rounded.

Male postabdomen. – Terga 5 and 6 single plates; sterna 4 and 5 single rectangular sclerites; sternum 6 represented by two small triangular plates; sternum 7+8 a very short, band-like sclerite; spiracles 5 and 6 in membrane, spiracle 7 located rather dorsally, anteriorly of sternum 7+8; periandrium (fig. 70) rounded, with about 20 pairs of hairs, covered with microtrichia; gonostyli rectangular in lateral view (fig. 9), ratio length/width 2.3, in posterior view apically pointed, distal third on outer side covered with microtrichia, on inner side glabrous with only microtrichia on apical edge, on outer side some short hairs on apical half; gonostyli interconnected via thin processus longi; cerci very slender, ratio length/width 7.6, somewhat triangular, covered with microtrichia and hairs; phallapodeme (fig. 71) rather slender, anterior arm hardly broadening anteriorly and hardly longer than posterior arm; ejaculatory apodeme (fig. 72) somewhat abruptly broadening anteriorly.

Diagnosis

Eurydiopsis subnotata gives its name to the *subnotata* complex and can be recognized by its wingpattern (almost hyaline apex, very small hyaline spot in marginal and submarginal cell), almost uniform distribution of microtrichia on the wing, depression in front of ocellar tubercle, pollinose frons, minuscule *rvb*, medium-sized *ovb*, small but distinct facial teeth, slender front femora, long scutellar spines (25% of body length), syntergum 1+2+3, rectangular ♀ tergum 8, medially constricted ♀ sternum 7, pentagonal subanal plate, broad female cerci, single male sternum 5, rectangular gonostyli with ratio length/width of 2.3, distal third of outer side of gonostyli covered with microtrichia, slender and somewhat triangular ♂ cerci and phallapodeme with almost equal-sized arms.

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