

*This contribution is published
to honor Dr. Amnon Freidberg,
a scientist, a colleague and a friend,
on the occasion of his 75th birthday.*

An annotated catalogue of the stalk-eyed flies (Diopsidae: Diptera) of India with description of new species in *Megalabops* Frey and *Teleopsis* Rondani

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ABSTRACT

An overview is given of the literature on Indian Diopsidae. An annotated catalogue is presented for the Diopsidae known to occur in India, while species erroneously reported for India are listed. *Diopsis indica* and *Diopsis assimilis* are now considered of Indian origin, while *D. assimilis* is designated as junior synonym of *D. indica*. For *D. assimilis*, lectotype and paralectotype are designated. The synonymy of the Java species *Diopsis westwoodii* and *Diopsis graminicola* with *D. indica* is rejected. *Diopsis abdominalis* is considered an Indian species. The following new combinations are proposed: *Megalabops bigotii*, *Megalabops cheni* and *Megalabops yunnana*, all *ex Teleopsis*. *Sphyracephala bipunctipennis* and *Eurydiopsis argentifera* are new for the Indian list. *Megalabops dharaensis* n. sp. from Darjeeling district is described as a species in the *Megalabops quadriguttata* species-group. *Teleopsis ammoni* n. sp. is described as the sister species of the well-known Indian *Teleopsis sykesii* (Westwood). The *T. sykesii* species-group takes up a rather isolated position in its genus. *Teleopsis ammoni* n. sp. occurs in the states of Maharashtra, Karnataka and Kerala. For *T. ammoni*, limited allometric data are presented with respect to eye span and compared with those for *T. sykesii*.

KEYWORDS: Diopsidae, *Megalabops*, *Teleopsis*, India, Oriental, biodiversity, catalogue, literature overview, new species, new synonyms, new combinations.

INTRODUCTION

Although more than ten Diopsidae species belonging to six genera occur in India, taxonomic reviews are lacking and publications are relatively scarce and scattered. An overview will be given of the literature on Indian Diopsidae, while all relevant sources will be listed. An annotated catalogue will be presented, and nomina nuda and Diopsidae erroneously recorded as occurring in India will be listed and briefly discussed. The only Indian representative for *Teleopsis* Rondani is *T. sykesii* (Westwood, 1837), which is also the type species of the genus. *Teleopsis sykesii* was re-described by Feijen and Feijen (2011), who placed it in *Teleopsis* s.str. sensu Feijen (2011), which does not include the genera *Cyrtodiopsis* Frey or *Megalabops* Frey. It now became clear that, among the very common *T. sykesii*, a second, quite similar, species occurs in the Western Ghats of India. This species will now be described

as *Teleopsis amnoni* n. sp., the second species of the *T. sykesii* species-group. For the genus *Megalabops* only *Megalabops quadriguttata* (Walker, 1857) has been reported for India. It will now be shown that this species does not occur in India. On the other hand, endemic *Megalabops* are known to be present in the country and the first one will now be described as *Megalabops dharaensis* n. sp. For the new species, a pair in the 'in copula' position was available. This enabled the production of drawings illustrating the morphological aspects of this position.

MATERIALS AND METHODS

As a basis for older literature, Shillito (1960, 1976) and Steyskal (1972) were used. For records of Indian Diopsidae, the digital Archives of the Zoological Survey of India (<http://faunaofindia.nic.in/index.php>) gave additional information. Visits were made to BMNH, MNHNP, OXUM and NZSI to study type specimens and Indian diopsids. The description of *T. amnoni* n. sp. is based on two pinned specimens and on various photographs of live specimens. For *M. dharaensis* n. sp. three specimens were available, of which two were pinned in the 'in copula' position. For the rate of dimorphism D, the difference between males and females in allometric slope for eye span on body length is used in Diopsidae (Baker & Wilkinson 2001). Details on procedures for preparing genitalia slides, and procedures for taking measurements are given in Feijen *et al.* (2018). For information on morphological terminology used and on photographic equipment used, the reader is referred to the same source.

Institutional codens

- AMNH – American Museum of Natural History, New York, USA;
- BMNH – The Natural History Museum, London, United Kingdom;
- NZSI – National Zoological Collection, Zoological Survey of India, Kolkata, India;
- MNHNP – Muséum National d'Histoire Naturelle, Paris, France;
- RMNH – Naturalis Biodiversity Center (formerly Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands;
- SMNHATAU – The Steinhardt Museum of Natural History, Tel Aviv University, Israel;
- OXUM – Hope Entomological Collections, Oxford University Museum, Oxford, United Kingdom.

The following abbreviations are applied in the text: IVS – inner vertical seta, OVS – outer vertical seta, D – rate of dimorphism, SE – standard error.

OVERVIEW OF LITERATURE ON INDIAN DIOPSIDAE

The first record of an Indian diopsid is by Donovan (1800–1804). Donovan identified his specimen as *Diopsis ichneumonea* Linnaeus, which was the only described diopsid at that time. Westwood (1837), basing himself only on Donovan's illustration (Fig. 1) and on the remark that Donovan's specimens "were brought from Bengal", described the species as *Diopsis indica*. Although some later authors indicated *D.*

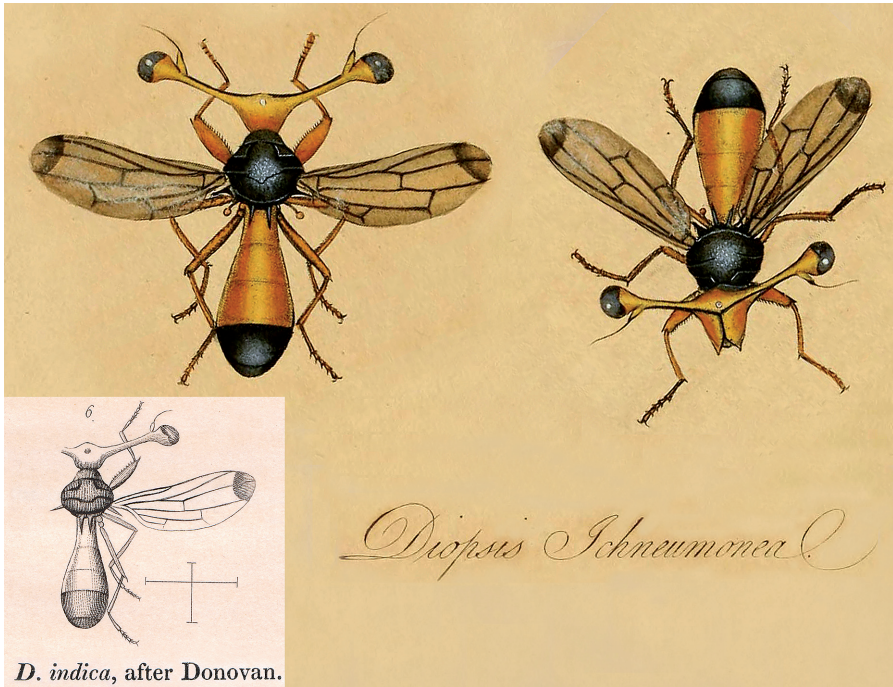


Fig. 1: The images of “*Diopsis ichneumonea*” (Donovan 1800–1804) on which Westwood (1837) based the description of *D. indica* (inset). Westwood changed the wing venation, but kept the erroneous presence of vein CuA+CuP. The sharply delineated black abdominal apex is unlikely, but a blackish apex remains a major differential character.

indica as originating from Bangladesh (e.g. Steyskal 1972), it will now be shown that the origin is more likely to have been West Bengal. Westwood also described *Diopsis sykesii* from India. In addition, he described *Diopsis assimilis* and *Diopsis abdominalis* without mentioning their location, but which will here be considered as of Indian origin. In 1845, Westwood provided a brief description of *Diopsis hearseiana* from India. In 1848, he transferred *D. hearseiana* to *Sphyracephala* Say and provided an illustration.

Alexander (1865) noted the presence of “*Diopsis indica*” in Haryana on flowers of cucumber and Indian marrow, and on windowpanes. Rondani (1875) erected the genus *Teleopsis* with *D. sykesii* as its type species. He also erected the genus *Zygocephala* with *Diopsis hearseiana* as type species. Bigot (1880) described *Teleopsis fulviventris* from India. In 1892, Bigot published a catalogue of Oriental Diopsidae in which *Diopsis circularis* Macquart, *D. ichneumonea* and *Diopsis westwoodii* Westwood were erroneously recorded as occurring in India. Van der Wulp (1896) provided a catalogue for the Diopsidae described from South Asia. Brunetti (1907) provided a note on *S. hearseiana* and a list of the Oriental spe-

cies of Diopsidae. Brunetti indicated *Diopsis subnotata* Westwood and *Diopsis quadriguttata* Walker as occurring in India, but this view will now be rejected. Howlett (1909) illustrated *S. hearseiana* and a *Diopsis* ? *indica*. A special paper on *S. hearseiana* was written by Sen (1921). The high quality of illustrations (egg, larva, pupa and imago) and information presented in this paper were way ahead of its time. Curran (1936) described *Diopsis whitei* from India. This species represents, till now, the last diopsid described from India. Curran also referred a species from "India" to *Diopsis ferruginea* Röder. However, his specimens were from Mergui in far southern Myanmar, while *Teleopsis ferruginea*, as it is now known, only occurs in Sri Lanka.

Mathur (1957) reported on clustering in *S. hearseiana*. Sets of papers on the morphology of *S. hearseiana* were produced by Nayar and Tandon (1962*a, b*, 1963), Singh *et al.* (1962) and Kumar (1978*a, b*, 1979*a, b*). Griffiths (1972) and Feijen (1989) provided some comments on these papers. Steyskal (1972, 1977) provided catalogues on the Diopsidae of the world and of the Oriental Region. A few of the taxonomic and/or geographical views in these two papers will be adjusted in this paper as far as Indian records are concerned. In a generic review of *Teleopsis*, Feijen (1998) indicated *T. sykesii* as senior synonym of *T. fulviventris*. Feijen (1999) removed *Eurydiopsis subnotata* from the list of Indian diopsids. Up till 1999 all *Eurydiopsis* species were lumped under the name *E. subnotata*, but Feijen showed *E. subnotata* to be a Philippines endemic species. Feijen and Feijen (2011) redescribed *T. sykesii* and designated *Teleopsis onopyxus* as its junior synonym. Due to mislabelling, this latter species had been described from Madagascar, but evidence was provided that it came, in fact, from India. Kotrba *et al.* (2013) included *T. sykesii* and a *Megalabops* sp. in a study on coevolution of male and female genitalia in stalk-eyed flies.

In the past 40 years, quite a number of papers were published with records of Indian Diopsidae. The most comprehensive ones are by Datta & Biswas (1985) and Mitra *et al.* (2015). Datta and Biswas gave an annotated list of Diopsidae present in NZSI. As far as Indian records are concerned, they listed *Cyrtodiopsis dalmanni* (Wiedemann) from West Bengal. This species has often been recorded from various countries, but it is likely that this taxonomically difficult species only occurs in Java. *Diopsis indica* was recorded from Gujarat to Arunachal Pradesh, but whether all records represent the real *D. indica* remains to be confirmed. Specimens from Kerala and from North-Eastern states were referred to *Diopsis* nr *indica*. *Eurydiopsis subnotata* was recorded from Assam and Meghalaya, but this species only occurs in the Philippines (Feijen 1999). The specimen from Meghalaya was later identified as *Eurydiopsis brevispinus* Feijen (Mitra *et al.* 2015). *Teleopsis quadriguttata* was recorded from Uttar Pradesh to the North-Eastern states, but these identifications now appear doubtful. Furthermore, many records were given for *T. sykesii* and *S. hearseiana*. Mitra *et al.* (2015) produced a revised checklist of stalk-eyed flies from India. They listed *C. dalmanni*, *C. whitei*, *D. indica*, *T. sykesii*, *T. fulviventris*, *T. quadriguttata*, *S. hearseiana* and *E. brevispinus*. Of these records *C. dalmanni* and

T. quadriguttata will now be rejected, while *T. fulviventris* is a junior synonym of *T. sykesii*.

Papers with brief sets of records of Indian Diopsidae will be listed in the catalogue of Indian Diopsidae presented in this paper. A few remarkable records still deserve separate mention. Ram (1968) mentions *S. hearseiana* as a parasite of the sunnhemp shoot-borer (now *Fulcrifera tricentra* (Meyrick)). This observation appears unlikely, but it is still being quoted, like in Sarkar *et al.* (2015). Ram found *S. hearseiana* while examining galls of the shoot-borer but described it as a “very rare” parasite. Feeding on frass is common in various Diopsidae, so that might give an explanation. Bhatnagar (1986), in a contribution on insect adaptations for pollination, mentioned *S. hearseiana* on flowers of *Cosmostigma* Wight. Sharma (1988) reported an observation of *Diopsis thoracica* Westwood (junior synonym of *Diopsis longicornis* Macquart) on rice in Nagaland. This species is a minor pest of rice in Africa. The flies were observed in the paddy fields from April till September. Sharma’s description of “red colouration on the abdomen” and hyaline wings with “a light brown spot at each end” lead to the conclusion that a species of the *D. indica* species-group must have been involved. Just as well, its presence in paddy fields is interesting. Agarwala (2018) provided an additional description for *C. whitei*. However, Agarwala did not refer to type material or to specimens from the type locality, so it is not clear whether his specimens are conspecific with *C. whitei*. The systematics of *C. whitei* was described as “obscure for want of the type specimens”. However, holotype and paratype are present in AMNH. The type comes from the Saranda Forest in Jharkhand at an altitude of 400 m. Agarwala’s specimens are from a forest in Tripura at about 200 m. The distance between the two sites is about 900 km across the plains of Bangladesh. The paper contains quite some errors, like vein CuA+CuP extending beyond cell cua, a character state only occurring in Centricinae and Sphyracephalinae. The morphological terminology is also weak: the phallapodeme is, for instance, indicated as a combination of ejaculatory apodeme and aedeagus.

AN ANNOTATED CATALOGUE OF DIOPSIDAE IN INDIA

Subfamily Sphyracephalinae

Genus *Sphyracephala* Say, 1828

Sphyracephala bipunctipennis (Senior-White, 1922)

(Figs 2, 4)

Teleopsis bipunctipennis Senior-White, 1922: 165, pl. 13, fig. 1 (♂ holotype, 7♀ 4♂ paratypes from Sri Lanka, Suduganga River, Indiganga, on leaves of Liliacrans [sic!] plant, 10.viii.1919 (BMNH)); Descamps 1957: 19; Steyskal 1972: 11.

Pseudodiopsis bipunctipennis (Senior-White): Shillito 1940: 150; Steyskal 1977: 35.

Sphyracephala bipunctipennis (Senior-White): Feijen 1989: 67, 1998: 50.

Distribution: India (Tamil Nadu), Sri Lanka.

Remarks: Feijen (1989) placed this species in the *Sphyracephala detrahens* species-group. Three specimens were examined from Tamil Nadu, Burlier, 38 km S Ooty,



Figs 2–5: (2, 4) *S. bipunctipennis* ♀, Tamil Nadu, 19.ix.2000, (3, 5) *S. hearseiana* ♂, Tamil Nadu, 19.ix.2000: (2, 3) habitus, (4, 5) anterior view of head. Note wing pattern and absence of IVS in *S. bipunctipennis*. Scales 0.5 mm.

19.xi.2000, I. Yarom (SMNHTAU). This forms the first record for India. Recently, specimens were received from Bhutan that look conspecific, but study of the genitalia is still required for confirmation. Meier and Hilger (2000) reported *S. bipunctipennis* from Thailand, while Baker *et al.* (2001) reported *S. bipunctipennis* from Peninsular Malaysia. However, their specimens could well represent undescribed species.

Sphyracephala hearseiana (Westwood, 1845)

(Figs 3, 5)

Diopsis hearseiana Westwood, 1845: 274 (Westwood examined a type series from various places in India, but these flies appear lost).

Sphyracephala hearseiana (Westwood) (error for *Sphyracephala hearseiana*): Westwood 1848: 37, pl. 18, fig. 3; Bigot 1892: 216; Sen 1921: 33.

Diopsis hoarseiana Westwood: Macquart 1851: 270, pl. 27, fig. 12.

Zygocephala hearsejana (Wiedemann) (error for *Zygocephala hearseiana* (Westwood)): Rondani 1875: 443, 1876: 184 (as *Zygocephala hearseiana* (Wiedemann)).

Sphyracephala hearseiana (Westwood): Loew 1873: 102; Hennig 1941a: 61; Mathur 1957: 183; Steyskal 1972: 13, 1977: 34; Kumar 1978a: 63, 1978b: 201, 1979a: 95, 1979b: 143; Feijen 1989: 67; Mitra *et al.* 2005: 151, 2011: 187; Parui *et al.* 2006: 101; Mitra & Parui 2007: 70; Mitra & Bhattacharya 2010: 394; Dutta Saha *et al.* 2012: 534; Dhamorikar 2016: 100, pl. 20c, 2017: fig. 17; Feijen *et al.* 2017: 85.

Sphyracephala hearseyana (Westwood): Osten Sacken 1882: 235; Van der Wulp 1896: 172; Brunetti 1907: 163, 1919: 369; Howlett 1909: 629; Hennig 1958: 567.

Sphyracephala hearseyiana (Westwood) (also as *hearseyiana*): Hennig 1941b: 5.

Sphyracephala hearseyana (Westwood): Nayar & Tandon 1962a: 113, 1962b: 131, 1963: 1; Singh *et al.* 1962: 79.

Not *Sphyracephala hearseyiana* sensu Bezzi 1922: 69. African records are misidentifications of *Sphyracephala beccarii* (Rondani).

Distribution: Bangladesh, India (Punjab, Himachal Pradesh, Uttarakhand, Rajasthan, Uttar Pradesh, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Tamil Nadu, Odisha, West Bengal), Pakistan (Islamabad, Punjab).

Remarks: Steyskal (1972) mentioned East Pakistan as distribution record, but he probably just interchanged Bengal with East Pakistan (like he did for *D. indica*, see below). Datta and Biswas (1985) definitely placed *S. hearseyiana* on record for Bangladesh. The Pakistan records are based on 12 specimens in BMNH (Islamabad, Daman-e-Koh, 26.iii.1985, M.E. Irwin), on Koçak and Kemal (2015: 293) and on records in the BOLD Systems database. In Tamil Nadu (Burlier, 38 km south of Ooty), the two Indian *Sphyracephala* species were collected together.

Subfamily Diopsinae

Genus *Cyrtodiopsis* Frey, 1928

Cyrtodiopsis whitei (Curran, 1936)

(Figs 6, 7)

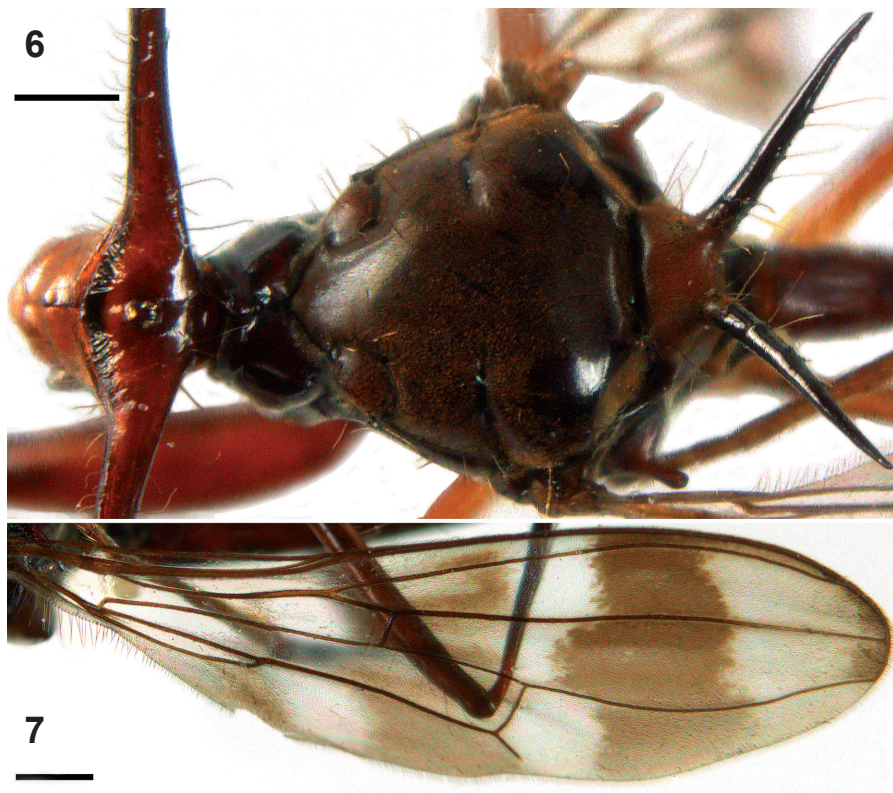
Diopsis whitei Curran, 1936: 1 (♂ holotype, ♀ paratype from India, Jharkhand, Saranda forest, Chota Nagpur plateau, ca. 22°02'N 85°34'E, 2.v.1935 (AMNH)).

Cyrtodiopsis whitei (Curran): Shillito 1940: 159; Steyskal 1972: 4, 1977: 33.

Cyrtodiopsis ? *whitei* (Curran): Shillito 1940: 159, fig. 1c; Burkhardt & de la Motte 1983: 408; Datta & Chakraborti 1985: 245; Wilkinson *et al.* 1998: 277; Baker *et al.* 2001: 90; Földvári *et al.* 2007: 40; Dutta Saha *et al.* 2012: 534; Jamalabad 2014: 22 (picture); Agarwala 2018: 12038. In many more non-taxonomic papers is referred to *C. whitei* sensu Burkhardt & de la Motte from Peninsular Malaysia.

Distribution: India: Jharkhand. *Cyrtodiopsis* from Tripura (Agarwala 2018) and from Asom (Assam), Arunachal Pradesh and Meghalaya require detailed study of the genitalia and comparison with specimens from Jharkhand to be confirmed as *C. whitei*. Steyskal (1972) tentatively reports the species also from Maharashtra. Dutta Saha *et al.* (2012) mentioned the presence of *Cyrtodiopsis* in this state, but they probably based their opinion on Steyskal (1972); it also remains to be confirmed whether it refers to *C. whitei*.

Remarks: Shillito (1940) presented a revision of *Cyrtodiopsis*. As far as *C. whitei* concerns, he correctly transferred this species from *Diopsis* to *Cyrtodiopsis*. Shillito stated that here is “nothing to add to the complete description given by Curran”. However, he presented a picture of a wing from a *Cyrtodiopsis* from Ganhati, Assam, which he had identified as *C. whitei*. Shillito had no access to the type specimens in AMNH and did not study the genitalia, so confirmation of his identification is pending. In his key, Shillito separated *C. whitei* from *C. dalmanni* by the “Dorsum brown pollinose; inner orbital bristle on a strong tubercle” for *C. whitei* and the



Figs 6, 7: *Cyrtodiopsis whitei* ♀, Meghalaya, Nongpoh Forest, 7.xi.2002: (6) dorsal view of thorax, note the glossy spots in the posterolateral corners of the scutum; (7) dorsal view of wing. Confirmation of identification will depend on comparison of genitalia with specimens from the type locality. Scales 0.5 mm.

“Dorsum glossy, not pollinose; inner orbital bristle on a weak tubercle” for *C. dalmanni*. However, the difference in size of the tubercle of the IVS is simply not there. Curran’s description of the pollinosity pattern is a bit confusing: “Thorax shining dark brown, the mesonotum with brownish pollen, leaving the sides very broadly shining behind the humeri.” All flies of the *C. whitei* complex examined by us have a characteristic pollinose scutum with a pair of glossy spots posteriorly (Fig. 6). In the *C. dalmanni*-like species a large section of the posterior scutum is glossy. Another characteristic of the *C. whitei* complex, as compared to the *C. dalmanni* complex, is the small apical wing spot (Fig. 7).

In the last 36 years the name *C. whitei* has, by a number of authors, been applied to flies from Peninsular Malaysia. However, this concerns, in all likelihood, a wrong use of the specific name *whitei*. The problem started with a publication by Burkhardt

and de la Motte (1983), who studied behaviour and vision of a Malaysian *Cyrtodiopsis*. Shillito helped them with the identification by cursorily comparing their specimens with unconfirmed “*C. whitei*” in BMNH (Burkhardt in correspondence with Shillito, and pers. comm.). From that start, the Malaysian *C. whitei* sensu Burkhardt & de la Motte entered a long range of important publications (e.g. Burkhardt & de la Motte 1985; Wilkinson *et al.* 1998; Baker *et al.* 2001; Földvári *et al.* 2007). As indicated in the literature overview, the contribution by Agarwala (2018) also requires confirmation whether his material was really conspecific with specimens from the type locality. Feijen (2011) discussed the status of *Cyrtodiopsis* as a valid genus. From the above, it is also clear that a taxonomic revision of the genus is required. However, it should be pointed out that *Cyrtodiopsis* is one of the most difficult genera in the Diopsidae.

Genus *Diopsis* Linnaeus, 1775
Diopsis abdominalis Westwood, 1837

(Fig. 8)

Diopsis abdominalis Westwood, 1837: 301 (holotype by monotypy, apparently lost, type locality unknown); Steyskal 1972: 7, 1977: 36 (as “dubious species”); Feijen 1978: 11, 1989: 61; Feijen & Feijen 2009: 703.

Distribution: Most likely India.

Remarks: Westwood did not indicate the origin of his single specimen and doubted whether it was not conspecific with his *D. assimilis*. In the description, he mainly indicated a few differences from *D. assimilis*. Main differential characters were the glossy black abdomen [*ejus nihilominus totum castaneo-nigrum est et nitidum*], the almost glossy collar [*collare et scutellum nigra subnitida*], the black scutellar spines [*spinae scutellares et metathoracicae piceo-nigrae*] and (in the *D. assimilis* description) the pollinose scutum [*niger, obscurus, haud nitidus, cinerascentisericeus*]. Feijen and Feijen (2009) already indicated that from the combination of characters given by Westwood it appears quite certain that *D. abdominalis* belongs to the *D. indica* species-group. The combination of pollinose scutum, black scutellar spines and blackish abdomen confidently points in that direction. In 1907, Austen identified specimens in BMNH as belonging to *D. abdominalis*. They originated from India, Myanmar and Thailand. At least the Indian specimens (ex coll. Bowring) conform well with Westwood’s original description in, for example, glossy collar, pollinose scutum and scutellum, small apical wing spot and almost black abdomen. In India, several species of the *D. indica* species-group with blackish abdomens occur. Of the flies now examined, specimens from Karnataka with their black scutellar spines appear to conform best (Fig. 8) and will, at a later stage, be redescribed, with designation of a neotype. As far as the colour of the dorsal abdomen in Indian *Diopsis* is concerned, care has to be taken in its use as a differential character as some intraspecific variation does occur. Larger series have to be studied, while the study of genitalia and DNA analyses are paramount.

Diopsis indica Westwood, 1837

(Figs 1, 9)

Diopsis indica Westwood, 1837: 299 (no formal type series, Westwood only based himself on “figures and meagre description” by Donovan of specimens from Bengal): Donovan 1800–1804: pl. 58 and text on next 2 pages; Brunetti 1913: 185 (in part); Datta & Biswas 1985: 220 (in part?).

Diopsis assimilis Westwood, 1837: 300, **n. syn.** (2 ♀ “syntypes” in poor condition, origin not given, identified as “cotypes” by E.E. Austen, 5.xi.1907 (BMNH). The specimen with the head is now designated as the lectotype and the other one as paralectotype): Steyskal 1972: 7; Feijen 1978: 11; Feijen & Feijen 2009: 703.

Not *Diopsis assimilis* Lindner, 1962: 11 (this is a West African species): Steyskal 1972: 7; Feijen 1978: 11.

Diopsis ? *indica* Westwood: Howlett 1909: pl. 67-7; Brunetti 1913: 184; Curran 1936: 2; Vazirani & Rathore 1976: 67; Sharma 1988: 143; Datta & Parui 1999: 30; Parui *et al.* 2006: 101; Mitra & Bhattacharya 2010: 394.

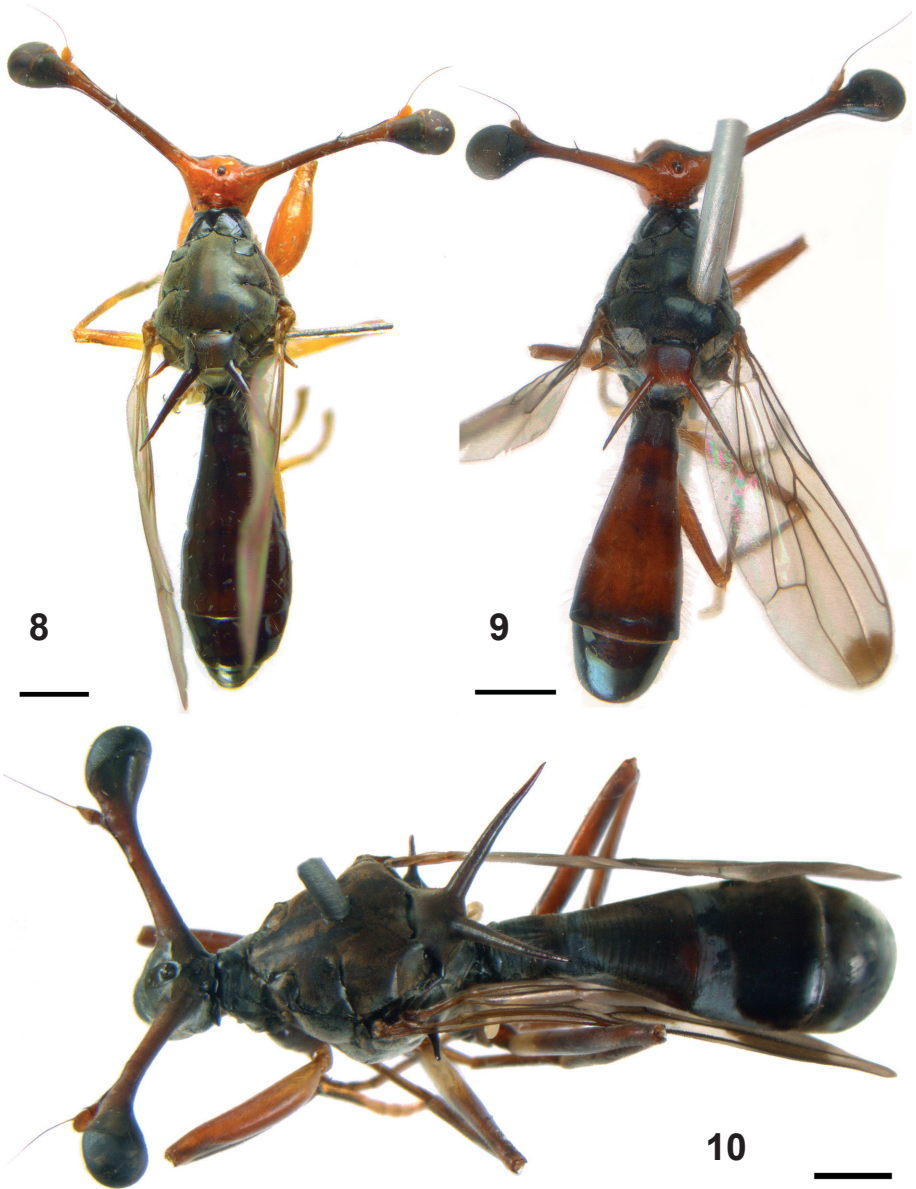
Not *Diopsis westwoodii* Westwood, 1848: pl. 18, fig. 1 (no formal type series, origin from Java. Description on explanation to plate. Westwood referred to “*Diopsis westwoodii* De Haan” in a manuscript. This is a valid species, while Westwood as author’s name is the established procedure in this case.): Van der Wulp 1897: 187; Brunetti 1907: 165; Steyskal 1977: 33.

Not *Diopsis graminicola* Doleschall, 1857: 417. Replacement name for *Diopsis apicalis* Doleschall, 1856: 413 (no surviving type specimens known, origin from Java; this is a valid species): Van der Wulp 1897: 187; Brunetti 1907: 165; Steyskal 1977: 33.

Not *Diopsis indica* auct.: Macquart 1848: 226 (Java species); Van der Wulp 1896: 171, 1897: 187 (Java species, incl. *D. westwoodii* and *D. graminicola*); Meijere 1916: 89, 1917: 328, 1919: 31 (all Sumatra); Frey 1934: 335 (Java record); Chen 1949: 2 (Chinese species, probably *Diopsis chinica* Yang & Chen, 1998: 468, 477); Steyskal 1972: 9, 1977: 33.

Distribution: India, maybe Bangladesh. Records in other countries are based on misidentifications. Steyskal (1972) erroneously included in distribution “East Pakistan to southern China, south to Java”. Vazirani and Rathore (1976) assumed that “*D. indica* is confined to the hilly tracts.”

Remarks: Westwood (1837) based his description only on Donovan’s (1800–1804) illustration and remarks: “Black; head, anterior part of the abdomen, and legs ferruginous; two spines on the posterior extremity of the thorax.” The illustrations of Donovan and Westwood have now been combined (Fig. 1). Donovan also stated: “Our own specimens (and they are most assuredly the *Diopsis Ichneumonea* of Linnaeus) were brought from Bengal, where it was discovered by Mr. Fichtel”. Westwood referred to the type locality as “Habitat in Bengaliâ. D. Fichtel.” The collector was Leopold von Fichtel (1770–1810). Rögl (1982) stated that “von Fichtel ... became famous for his collections of objects of nature and his worldwide travels bringing him even to India.” According to Kázmér and Vávra (2002), Fichtel “was a member of the ... Asiatic Society of Bengal in Calcutta.” Steyskal (1972) gave as origin of the type “Bengal (= East Pakistan)”, but Steyskal (1977) reverted to “Type-loc: Bengal.” Bengal is nowadays divided between Bangladesh and the Indian territories of West Bengal, Tripura and the Barak Valley of Assam. Given that Fichtel was a member of the Calcutta Society and collected and described Foraminifera of the east coast of India, it seems most likely that India is the origin of *D. indica* and not Bangladesh. A further indication is that *D. indica* and species nr



Figs 8–10: Habitus: (8) *Diopsis abdominalis* ♀, Karnataka, Mudigere, 9.iv.1980; (9) *Diopsis indica* ♂, Himachal Pradesh, 10.v.2003; (10) *Eurydiopsis brevispinus* ♀, Nongpoh forest, 7.xi.2002. Identification of the *Diopsis* species is provisional and will require later redescription of the species and designation of neotypes. Scales 1 mm.

D. indica are quite common in West Bengal, while we have not yet seen specimens from Bangladesh.

Like for *D. abdominalis*, Westwood gave no type origin for his *D. assimilis*. However, as it was argued for *D. abdominalis* the combination of characters places *D. assimilis* in the *D. indica* species-group with India as the most likely place of origin. Contrary to *D. abdominalis*, the type series of *D. assimilis* consists of two females housed in BMNH. The condition of these two syntypes is poor: one has no head and the other is a bit teneral. The following important character states can be mentioned: collar glossy brown, but pollinose laterally, scutum and scutellum dark brown, pollinose, round apical wing spot, incrassate front femur, strong facial teeth and brown abdomen with darker apex. Westwood's description of *D. assimilis* is somewhat superficial, but he also illustrated (Westwood 1837, figs 7, 8) both specimens, while wondering whether they were ♀ and ♂. Both figures show the characteristic black tip of the abdomen as does Westwood's description: *illo rufescenti-fulvo, apicem versus saturatius fusco*. This agrees well with the *D. indica* abdomen (Figs 1, 9). To all extent, there are no differences in the descriptions of *D. indica* and *D. assimilis* and the latter species is now considered as a junior synonym of *D. indica*. It should be pointed out that Westwood did not see *D. indica* specimens that he described. If he would have seen them, it is unlikely that he described *D. assimilis*. The same happened with other species described by Westwood for which he had no access to earlier described species: *D. thoracica* became a junior synonym of *D. longicornis* Macquart, while *Diopsis tenuipes* Westwood became a junior synonym of *Diopsis apicalis* Dalman.

In 1837, Westwood amended his description of *D. indica*, a brief description of a variety from Java: *Var. Insectum Javanicum in musaeo Dom. Hope à cel. De Haanio communicatum (sub nomine D. apicalis, Wied.) staturâ et magnitudine D. indicæ benè convenit*. However, in 1848 Westwood described and illustrated this specimen as "*Diopsis westwoodii*. De Haan." with the following remark: "Inhabits the Island of Java. Communicated by M. De Haan, with the MS. name adopted above." Westwood's very nice illustration (pl. 18, fig. 1) shows an unmistakable Java species that is very different from *D. indica*. This large and elongate species with a vague almost preapical wing spot is quite common on Java and is, in fact, the most aberrant species in the *D. indica* species-group. A closely related species occurs in Sumatra. In 1856, Doleschall described and illustrated another species from Java and named it *Diopsis apicalis*. As this name was preoccupied by Dalman (1817), Doleschall (1857) gave the species as replacement name *Diopsis graminicola*. His description and illustration are rather poor, but sufficient to distinguish the species as very different from *D. westwoodii*. Next to *D. westwoodii* and *D. graminicola* at least one more species of the *D. indica* species-group is now known to occur in Java. Van der Wulp (1897), based on cursory inspection, placed both *D. westwoodii* and *D. graminicola* as junior synonyms of *D. indica*. Van der Wulp gave a nice illustration (pl. 8, fig. 2) of what he considered *D. indica*, but this is an unmistakable

D. westwoodii with its elongate body shape and colour pattern. The synonymies proposed by Van der Wulp were accepted by Brunetti (1907) and Steyskal (1972, 1977). However, both synonymies are now rejected, and both species are considered as valid species from Java.

Diopsis spp.

Remarks: With *D. abdominalis* and *D. indica*, two species are now recognised for India in the *D. indica* species-group. There is no doubt, that more species will be described from India, especially her northern parts. Vazirani and Rathore (1976) noted “variations” within the NZSI collection of “*D. indica*.” Datta and Biswas (1985) listed next to *D. indica* also a *Diopsis* nr *indica*.

All Oriental *Diopsis* belong to the large *D. indica* species-group, one of the four *Diopsis* species-groups with a large apical wing spot (Feijen & Feijen 2009). The other three species-groups are the Afrotropical *D. apicalis* Dalman group, *D. atricapilla* Guérin-Méneville group and *D. cruciata* Curran group with a large apical wing spot (Feijen & Feijen 2012). Although there are superficial similarities between the species of the *D. indica* species-group and the three Afrotropical groups, these four species-groups do not form a monophyletic clade. Provisional DNA analyses clearly indicate the three Afrotropical species-groups do form a monophyletic clade, whereas the *D. indica* species-group might be somehow related to the Afrotropical *Diopsis circularis* species-group with a large central wing spot and at most some apical infuscation. This appears, at first sight, strange from a morphological point of view, but some similarities can be indicated. In both groups specific pollinosity patterns can occur on the abdomen, which is unusual in *Diopsis*. Furthermore, both groups are sexually homomorphic with regard to the eye span. This also forms a major difference compared to the Afrotropical species-groups with a large apical wing spot, which are all sexually dimorphic in this regard. Homomorphy appears to be the rule in the *D. indica* group. In a large sample (n=50) of an undescribed Sri Lankan species the rate of dimorphism was slightly negative: D=-0.1. In *D. westwoodii* D appears even more strongly negative, but that concerned only a very small sample (n=11).

Genus *Eurydiopsis* Frey, 1928
Eurydiopsis argentifera (Bigot, 1874)

Diopsis argentifera Bigot, 1874: 112 (two ‘cotypes’ (1♂, 1?), Indonesia, Sulawesi (OXUM)).
Diopsis argentifera Bigot (as junior synonym of *Diopsis subnotata* Westwood, 1848): Bigot 1881: 373; Osten Sacken 1882: 237; Van der Wulp 1896: 171, 1897: 192; Kertész 1899: 183; Brunetti 1907: 164; Frey 1928: 70 (as subgenus *Eurydiopsis*).
Eurydiopsis argentifera (Bigot) (as junior synonym of *Eurydiopsis subnotata* (Westwood)): Steyskal 1972: 11.
Eurydiopsis argentifera (Bigot) (as valid species, not synonymous with *E. subnotata*): Feijen 1999: 227.

Distribution: Indonesia, India (Nicobar Islands, Nancowry), Peninsular Malaya.

Remarks: This species has not earlier been recorded from India. In BMNH, 1 ♀ *Eurydiopsis* from India, Nicobars Nankaurie (= Nancowry), iv.1904, was cursorily examined. The external characters agreed with the diagnosis of *E. argentifera*. Given also the proximity of the location to both Peninsular Malaya and Sumatra, where *E. argentifera* is known to occur, it seems most likely that the specimen represents this species.

Eurydiopsis brevispinus Feijen, 1999

(Fig. 10)

Eurydiopsis brevispinus Feijen, 1999: 229 (♂ holotype, 1 ♀ paratype from Myanmar, Mt Victoria, Chin Hills (so quite close to Mizoram), iii.1938 (BMNH), 1 ♀ paratype from Myanmar, 1 ♀, 1 ♂ paratypes from Laos (UZMH)); Datta & Parui 1999: 31 (a Meghalaya specimen misidentified as *E. subnotata*, H.R. Feijen identified the same specimen as *E. brevispinus* during his visit to NZSI in 1999); Mitra *et al.* 2015: 60 (again the same Meghalaya specimen, now as *E. brevispinus*).

Distribution: India (Meghalaya), Myanmar, Laos.

Remarks: Indian *Eurydiopsis* have several times been referred to *E. subnotata* (Westwood, 1848), but Feijen (1999) questioned these identifications and indicated *E. subnotata* as a species from the south-eastern islands of the Philippines. Brunetti (1907: 164) recorded “*E. subnotata*” from Asom. Datta and Biswas (1985: 220) recorded the same Asom specimens to *E. subnotata*. During the present study, a pair of *E. brevispinus* (Fig. 10) was examined from Meghalaya, Nongpoh Forest, 7.xi.2002, A. Freidberg (SMNHTAU).

Genus *Megalabops* Frey, 1928

Megalabops dharaensis n. sp.

(Figs 11–25, 27)

Refer to a full species account below under Taxonomy.

Megalabops spp.

Distribution: Records for *Megalabops* spp. (as *Teleopsis quadriguttata* (Walker)) point to a northern Indian distribution: Uttarakhand, Uttar Pradesh, West Bengal, Asom, Meghalaya, Manipur and Arunachal Pradesh.

Remarks: The synonymy of *Teleopsis* and *Megalabops*, proposed by Steyskal (1972) and supported by Feijen (1989, 1998) and Baker *et al.* (2001), was rejected by Feijen (2011). Based on the molecular analysis by Baker *et al.* (2001), Feijen (2011) proposed to maintain *Teleopsis* s.str. and *Cyrtodiopsis* s.str. as separate genera and to reinstate a revised genus *Megalabops* as the sister group of *Cyrtodiopsis*. Frey (1928) did not produce a formal diagnosis for *Megalabops*. Only in his key to the genera he indicated a few minor and incorrect differences from *Teleopsis*. A proper revision of *Megalabops* (with *Diopsis quadriguttata* Walker, 1857 as

the type species) with a formal diagnosis is still pending. Besides the results of the DNA analyses, there are strong morphological reasons for its resurrection. All *Megalabops* species are, for instance, homomorphic with regard to the eye span and have very long IVS and OVS. Almost all *Teleopsis* are dimorphic, exceptions being the very aberrant *Teleopsis selecta* Osten Sacken and *Teleopsis sexguttata* Brunetti. The peculiar shape of the phallapodeme forms another important character of *Megalabops*. An interesting character was also indicated by Kotrba *et al.* (2013): “the spermathecal ducts have a short, strongly convoluted portion just before they enter the base of the spermathecal capsules.” From Baker *et al.* (2001), it was already clear that supra-alar spines developed convergently in *Teleopsis* s.str. and *Megalabops*.

External differences among *Megalabops* species are minor. Therefore, many species were lumped together as *Megalabops* (or *Teleopsis*) *quadriguttata* (see Steyskal 1972). We have already studied genitalia of *Megalabops* for specimens from India to Taiwan. Genitalia give useful differential characters in *Megalabops*, especially the surstyli in lateral view (Figs 26–29). It is now clear that its type species *M. quadriguttata* has a distribution extending from Peninsular Malaysia to Vietnam, but does not occur in India. *Teleopsis bigotii* Hendel, 1914 from Taiwan was earlier treated as a synonym of *M. quadriguttata* (Hennig 1941a), but is clearly a distinct species: *Megalabops bigotii* (Hendel, 1914), **n. comb.** Two *Teleopsis* species from China also fall under the resurrected *Megalabops*: *Megalabops cheni* (Yang & Chen, 1998), **n. comb.** and *Megalabops yunnana* (Yang & Chen, 1998), **n. comb.** Most of the six *Teleopsis* described by Liu *et al.* (2013) from China also probably belong to *Megalabops*.

In India, a number of undescribed species are found, especially in the northern states. Up till now these species were clustered under the name *Teleopsis quadriguttata* (Joseph & Parui 1972: 337; Datta & Biswas 1985: 221; Datta & Parui 1999: 31, 2004: 464; Mitra & Bhattacharya 2010: 394; Kotrba *et al.* 2013: 190; Mitra *et al.* 2015: 60).

Genus *Teleopsis* Rondani, 1875

Teleopsis amnoni **n. sp.**

(Figs 30, 31, 33–38, 41–51)

Refer to a full account for this species below under Taxonomy.

Teleopsis sykesii (Westwood, 1837)

(Figs 32, 39, 40, 51)

Diopsis sykesii Westwood, 1837: 310 (♀ lectotype, ♂ paralectotype, hill fort Hurreechunderghur, western Ghats (Ghats) of the Deccan, 19°23'N 73°40'E (OXUM), Westwood named G.R. Gray as author)

Teleopsis sykesii (Westwood): Rondani 1875: 442 (type species of *Teleopsis*); Brunetti 1907: 165, 1928: 270; Bainbrigge Fletcher 1914: 6; Datta & Biswas 1985: 221; Feijen 1998: 52; Nair *et al.* 2007: 125, fig. 3.4.5c; Feijen & Feijen 2011: 14 (redescription, designation

of lectotype); Dutta Saha *et al.* 2012: 534; Dhamorikar 2016: 93, pl. 20b, 2017: fig. 16 (right); Kotrba *et al.* 2013: 190, fig. 3i; Jamalabad 2014: 21 (picture).

Teleopsis fulviventris Bigot, 1880: 94 (♀ [not ♂ as stated by Bigot] holotype by monotypy, India (OXUM); Feijen 1998: 52 (junior synonym of *T. sykesii*); Mitra *et al.* 2015: 59 (overlooked status as junior synonym).

Teleopsis onopyxus Séguy, 1949: 67 (♀ lectotype, 2♀ paralectotypes, “Madagascar”, 1877, A. Sallé, (MNHNP), Feijen & Feijen (2011) showed that the type series must originate from India, where Sallé also collected *T. sykesii*): Feijen & Feijen 2011: 144 (junior synonym of *T. sykesii*).

Not *Teleopsis sykesii* auct.: Van der Wulp 1896: 171, 1897: 193 (specimens from Nias and Java (Sukabumi) represent different undescribed species, the suggestion of synonymy with *Teleopsis motatrix* rejected by Feijen 2011); Meijere 1911: 366, 1916: 89, 1917: 328, 1919: 32 (representing in total three undescribed *Teleopsis* spp. from Java and Sumatra); Feijen & Feijen 2011: 145.

Not *Teleopsis sykesi* auct.: Frey 1928: 72; Tenorio 1969: 483 (= *Teleopsis cobiae* Feijen, 2011); Feijen & Feijen 2011: 145.

Distribution: Western India, especially the Sahyadri (Western Ghats): Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu. The record from Kanha Tiger Reserve, Madhya Pradesh (Dhamorikar 2016) is well outside the known range of the Western Ghats. Two rather doubtful records are known for Myanmar (Feijen & Feijen 2011).

Remarks: *T. sykesii* is the type species of its genus. Together with its sister species *T. amnoni* n. sp. it forms an isolated *T. sykesii* species-group. The main differential characters of the two species are presented in Table 1. The difference in the wing pattern forms an especially easy way to separate them (cf. Figs 30, 31 with Fig. 32, and Figs 37, 38 with Figs 39, 40).

Nomina nuda

In OXUM and NZSI, two undescribed Bigot’s species, both from India, are present: “*Diasemopsis fenestrata*” (as *fenestratus*) and “*Diasemopsis rufithorax*”.

Diasemopsis fenestrata was already referred to by Brunetti (1907: 164, also as *fenestratus*), Steyskal (1972: 11, 1977: 34) and Feijen (1989: 51, 53). Brunetti and Steyskal (1977) placed *fenestrata* nomen nudum in synonymy with *Teleopsis quadriguttata*. However, Feijen stated that the ‘type-series’ was mixed and involved two genera: one specimen is a *Cyrtodiopsis* sp., while two specimens belong to *Megalabops* sp.

Diasemopsis rufithorax was also referred to by Brunetti (1907: 164), Steyskal (1972: 6) and Feijen (1998: 53). Brunetti remarked that “its name appears to be merely a nomen nudum”. Steyskal erroneously stated that Brunetti also referred it to *T. quadriguttata*, but Feijen stated that it concerns a *Cyrtodiopsis* sp.

Indian Diopsidae records based on misidentifications

A substantial number of Diopsidae were erroneously reported from India. Bigot (1892: 215) recorded two purely Afrotropical species *D. circularis* and *D. ichneumonea* and also *D. westwoodii* from Java. Van der Wulp (1897: 171) reported the Afrotropical *Diopsis trentepohlii* Westwood, but later (Van der Wulp 1899:

53) withdrew this record. Brunetti (1907: 165) recorded *Teleopsis longiscopium* Rondani from “India”, but this was a location in present-day Myanmar. It was anyway a misidentification. Curran (1936: 2) reported *Diopsis ferruginea* Röder from Mergui, India, but this is now in southern Myanmar. Shillito (1940: 156) stated that this was a misidentification and that it concerned *Cyrtodiopsis currani* Shillito. *Teleopsis ferruginea* (Röder) is anyway a species only occurring in Sri Lanka. Several papers (Datta & Biswas 1985: 219; Mitra *et al.* 2015: 59) reported the Java species *C. dalmanni* for India. Datta & Biswas (1985: 220) and Datta & Parui (1999: 31) reported the Philippines species *E. subnotata* from India. *M. quadriguttata* (as *Teleopsis*) was recorded by Datta & Biswas (1985: 221) and Mitra *et al.* (2015: 59). Sharma (1988: 143) reported the Afrotropical rice stem-borer *D. longicornis* (as *D. thoracica*).

TAXONOMY

Genus *Megalabops* Frey, 1928

***Megalabops dharaensis* n. sp.**

(Figs 11–25, 27)

Diopsis quadriguttata auct.: Brunetti 1907: 165 (in part, specimens from Kurseong are most likely to be conspecific with *M. dharaensis* n. sp., the distance from the type locality is about 25 km).

Megalabops spec. “A”: Kotrba *et al.* 2013: 190.

LSID: urn:lsid:zoobank.org:act:714C07DD-2F71-4EB1-905D-636E51088F5F.

Etymology: The species originates from the tea estate Gopaldhara near Darjeeling. *Gopal* was the name of a person, while *dhara* in Hindi means “stream of clear water”. Given the link of Diopsidae to the presence of water, it is considered appropriate to name this species *Megalabops dharaensis*.

Diagnosis: *Megalabops dharaensis* n. sp. can be recognised by its wing pattern (3 complete crossbands, straight distal edge of preapical crossband, 4 hyaline spots), distribution of microtrichia on the wing (glabrous base and glabrous areas in proximal anterior spot), very long IVS, long OVS, small base of IVS, absence of facial teeth, incrassate front femora with ratio length/width ~3.5, undivided, rectangular female sternum 6, somewhat curved female sternum 7, spiracle 7 in membrane in both sexes, rectangular to pentagonal subanal plate, rather elongate female cerci, convoluted sections of spermathecal ducts near spermathecae, elongate spermathecae with 20–24 protuberances, articulated, apically bilobed, surstyli with large areas of microtrichia and apically some long setulae, convex male cerci, winged and dorsally strongly curved phallapodeme, broadly fan-shaped ejaculatory apodeme and sexual homomorphy with regards to the eye span.

Megalabops dharaensis n. sp. with its two anterior and two posterior hyaline wing spots belongs to the *M. quadriguttata* species-group, one of the two species-groups in *Megalabops*.

Description: Body length ♀ 6.3 mm, ♂ 4.9 mm ± SE 0.5 (range 4.4–5.3, n=2); eye span ♀ 3.9 mm, ♂ 3.3 mm ± 0.3 (3.0–3.5, n=2); wing length ♀ 4.6 mm, ♂ 3.8 mm ± 0.4 (3.4–4.2, n=2); length of scutellar spine ♀ 0.99 mm, ♂ 0.78 mm ± 0.05 (0.74–0.84, n=2).



11



12

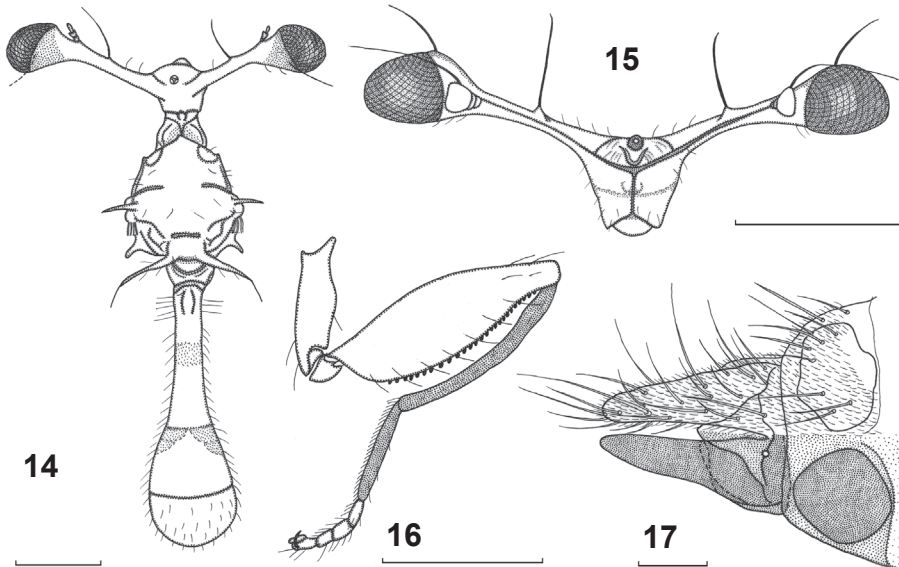


13

Figs 11–13: *Megalabops dharaensis* n. sp.: (11) holotype ♂, anterior view of head; (12) holotype ♂, habitus; (13) paratype ♂, dorsal view of wing. Scales 0.5 mm.

Head. Central part brown, thinly pollinose, on frons and posteriorly more glossy; frons (Figs 11, 15) with U-shaped depression in front of ocellar tubercle, lateral areas roughened, a ridge around frons; arcuate groove dark brown; upper half of face protruding, centrally two vague protuberances, a few pale setulae, facial corners rounded (Figs 11–15); eye span very small in ♀ and ♂ (respectively 38 % and 33 % smaller than body length); stalks brown, broad apical parts blackish, pollinose; IVS very long, 6× diameter of eye stalk, base of IVS small, just more than half the stalk diameter; OVS long, 4× stalk diameter (Figs 11, 15). [Given that only 1♀ and 2♂ were available for measurements, the rate of dimorphy D could not be calculated. Four *Megalabops* species for which large data sets were available were sexually homomorphic with regard to eye span with D varying from -0.01 to -0.05. Given that the three data points (span/body length) for *M. dharaensis* n. sp. are collinear and that *Megalabops* appears to be a uniformly homomorphic genus, it is safe to state that also *M. dharaensis* n. sp. is homomorphic with regard to the eye span.]

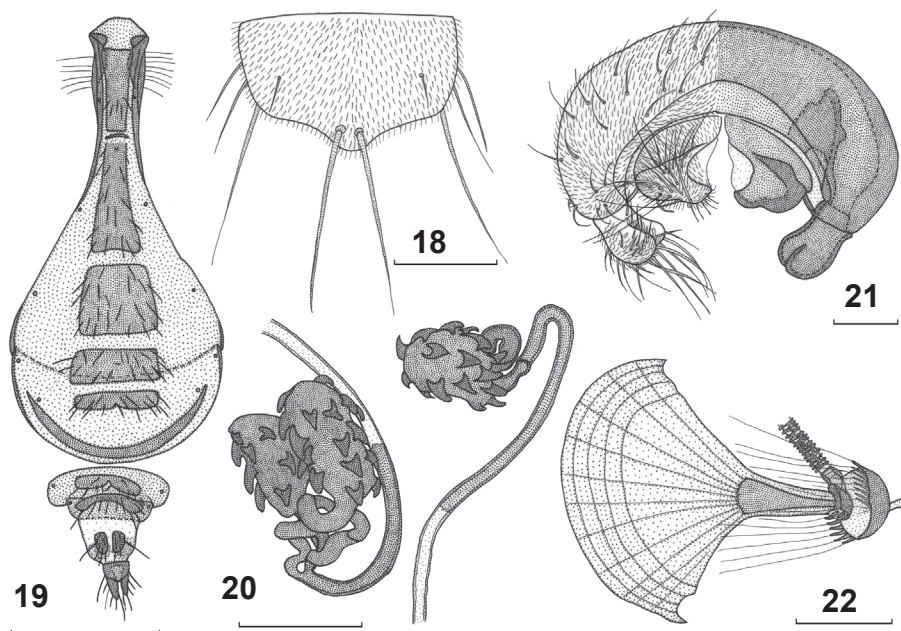
Thorax. Collar glossy brown, posterodorsally and laterally pollinose (Figs 12, 14); scutum uniformly greyish brown pollinose, scutellum brown pollinose, scutellar spines glossy dark brown, but base of spines pollinose; upper half of pleura pollinose, lower half glossy brown except for pollinose posterior area; sterna glossy brown; supra-alar spines (Figs 12–14) medium-sized, about twice as long as pleurotergal spines, laterally and upward directed; scutellar spines long, curved upward and



Figs 14–17: *Megalabops dharaensis* n. sp.: (14, 15) paratype ♂, (16, 17) paratype ♀: (14) habitus; (15) anterior view of head; (16) front femur; (17) dorsal view of terga 8 & 10 and cerci. Scale 0.1 mm in Fig. 17, other scales 1 mm.

outward, diverging under angle of 125° , ratio scutellar spine/scutellum length in ♀ 3.42 ($n=1$) and in ♂ 3.45 (range 3.41–3.49, $n=2$), ratio scutellar spine/body length in ♀ and ♂ 0.16; pleurotergal spines short, blunt, posterolaterally directed; apical seta long, 47% of length of scutellar spine, posteriorly directed; some setulae on scutum, scutellar spines with setulae on small warts.

Wing. Three crossbands (Fig. 13), preapical and central band equal in width and forming an H-configuration; wing apex (apical sixth) slightly infuscated (Figs 12, 13), a bit paler near preapical crossband; preapical band with darker anterior half and straight apical edge; central band including crossveins $r-m$ and $dm-m$; basal band narrow and irregular, broadening posteriorly; preapical band and central band linked around vein M_1 , central band and basal band linked around vein M_4 ; between the three bands four almost hyaline spots (from which the name *Diopsis quadriguttata* originated, and thus characteristic for the whole *M. quadriguttata* species-group), one spot in cells $r1$ and $r2+3$ just extending in cell $r4+5$, one spot basally in cell $m1$, one spot in cells $r1$, br and $bm+dm$ and one spot centrally in cell $m4$; slightly darker smudge from tip of cell cua ; glabrous basal areas include cell c , basal quarter of cell $r1$, parts of the anterior, proximal hyaline spot, basal half of cell br , basal third of cell $bm+dm$ and most of cell cua .

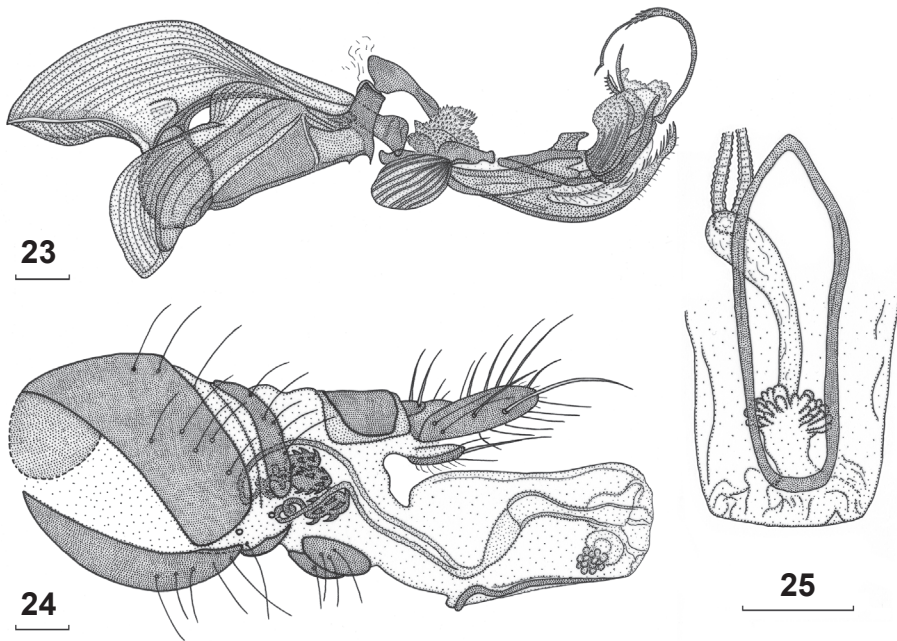


Figs 18–22: *Megalabops dharaensis* n. sp.: (18–20) paratype ♀, (21, 22) paratype ♂: (18) subanal plate; (19) ventral view of abdomen; (20) spermathecae and convolutions in ducts; (21) posterior view of epandrium with surstyli and cerci; (22) ejaculatory apodeme and sac. Scale 1 mm in Fig. 19, other scales 0.1 mm.

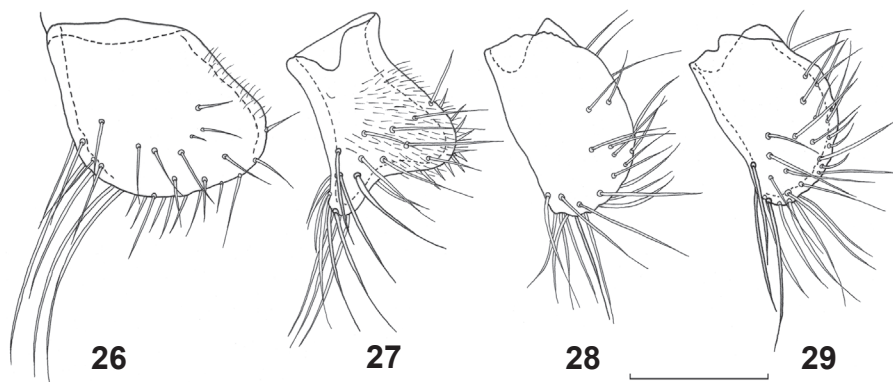
Legs. Front leg brown (Fig. 12), tibia and metatarsus darker, pollinose anteriorly and basally on coxa and inner side of femur; mid and hind leg brown with darker apex of femora and slightly darker tibiae; femur 1 (Figs 12, 16) incrassate in both sexes, ratio of length/width in ♀ 3.4 and in ♂ 3.5 (range 3.3–3.6, n=2), tubercles on distal five-sixth, inner row in ♀ with 26.5 tubercles \pm SE 0.5 (range 26–27, n=2) and in ♂ with 23.7 tubercles \pm 0.3 (range 23–24, n=3), outer row in ♀ with 23.5 tubercles \pm 0.5 (range 23–24, n=2) and in ♂ with 20.0 tubercles \pm 1.0 (range 18–21, n=3), outer row with small gap.

Preabdomen. Dorsally dark brown, thinly pollinose, almost glossy, around border area of terga 1 and 2 denser pollinosity, tergum 3 anterolaterally with densely pollinose spots (Fig. 14); seam between terga 2 and 3 visible; sternum 1 dark brown, glossy; other sterna brown pollinose; sternum 1 basally linked to syntergum (Fig. 19); spiracle 1 in tergum; intersternite well defined (Fig. 19), laterally vaguely connected to sternum 2.

Female postabdomen. Strongly deflexed, terga 6 and 7 single rectangular sclerites (Figs 19, 24); tergum 8 represented by two sclerites (Figs 17, 19), covered by microtrichia except for anterolateral corners; tergum 10 with one pair of strong setulae;



Figs 23–25: *Megalabops dharaensis* n. sp.: (23) paratype ♂, (24, 25) paratype ♀: (23) lateral view of phallapodeme, hypandrium and aedeagus in extended 'in copula' position; (24) lateral view of abdominal apex in evaginated 'in copula' position, the sclerotised ring supports the protruding part of the female genitalia; (25) ventral view of evaginated abdominal apex with sclerotised ring. Scales 0.1 mm.



Figs 26–29: Lateral view of surstylus: (26) *M. bigotii*, paratype, Taiwan, Mt Hoozan, v.1910; (27) *M. dharaensis* n. sp., paratype; (28) *M. quadriguttata*, ex West Malaysia, Gombak (reared by D. Burkhardt); (29) *M. quadriguttata*, Vietnam, Giaray, 21.ii.1921. Scale 0.1 mm.

cerci rather elongate, ratio of length/width 3.5, covered with microtrichia and a number of setulae; sterna 5 and 6 single rectangular sclerites, slightly constricted posteriorly on the meson (Fig. 19); sternum 7 single curved sclerite, slightly broadening laterally; sternum 8 represented by two rounded sclerites; spiracle 7 in membrane; subanal plate (Fig. 18) rectangular to pentagonal with somewhat pronounced medial apex, posteriorly two pairs of long setulae and two pairs of short setulae; spermathecae (Figs 20, 24) rather elongate with a large number (24 on single theca, 20 and 22 on the pair) of evenly distributed protuberances, strongly sclerotised, spermathecal ducts with the typical *Megalabops* convolutions just before they enter the base of the spermathecal capsules; sclerotised ring of ventral vagina wall (Figs 24, 25) long, anteriorly acute.

Male postabdomen. Sternum 5 a single plate, posteriorly with rounded gap on meson, sternum 6 lost in preparation; synsternum 7+8 without sclerotised connection to epandrial sclerites; left and right spiracles 7 well in membrane, right spiracle 7 at greater distance from synsternum 7+8; epandrium (Fig. 21) rounded, with about 21 pairs of setulae, covered with microtrichia; surstyli articulated, somewhat constricted sub-basally (Figs 21, 27), in lateral view (Fig. 27) concave apically, in posterior view (Fig. 21) with very typical, bilobed appearance apically, large sections of lateral, inner and posterior sides covered with microtrichia, on distal half a number of setulae and apically some rather long setulae (Figs 21, 27); surstyli connected to lateral side of cerci, not interconnected via processus longi; cerci (Fig. 21) rather small and strongly convex, ratio length/width (in posterior view, not flattened) 1.6, covered with microtrichia and setulae; phallapodeme (Fig. 23) basically very typical for *Megalabops*, very solidly built, anterior arm with small ventral wings and strongly curved dorsal edge, apodeme centrally very “high”, posterior arm almost twice as long as anterior arm, vane basally constricted; aedeagus (Fig. 23) shown in extended

'in copula' position, rather long genital process (for terminology see Kotrba *et al.* 2013) sticking out from apex; connections between phallapodeme, hypandrium and aedeagus as in Fig. 23; ejaculatory apodeme broadly fan-shaped (Fig. 22).

Holotype: ♂ **India:** Gopaldhara, Darjeeling, 3440–4720 ft (1050–1450 m), 2.ix.1916, 26°55'41"N 88°09'43"E, H. Steevens (RMNH).

Paratypes: 1♀ 1♂ (in copula), same data as holotype, except for date: 15.viii.1916. Note: The pair of paratypes was pinned in 'in copula' position. It was possible to separate the pair, while the genitalia remained in extended position.

Distribution: *M. dharaensis* n. sp. is only known from the Darjeeling district in West Bengal, India. Most *Megalabops* species have a relatively small distribution range. *M. quadriguttata* appears to form the exception with its distribution ranging from West Malaysia to Vietnam.

Remarks: *Megalabops* can be divided into two species-groups. The most common one is the *M. quadriguttata* group characterised by the two anterior and two posterior hyaline wing spots. The other species-group consists of yet to be described species characterised by absence of the H-configuration on the wing, an irregular central cross band and an incomplete basal band. For separating species, genitalia provide, by far, the most reliable characters, like, for example, the differences in surstyli between *M. bigotii*, *M. dharaensis* n. sp. and *M. quadriguttata* (Figs 26–29).

More species will eventually have to be described from India. Except for paramount differences in genitalia, these species can be distinguished by small differences in wing pattern and pollinosity patterns on the scutum.

Genus *Teleopsis* Rondani, 1875

Teleopsis ammoni n. sp.

(Figs 30, 31, 33–38, 41–51)

Teleopsis sykesii: Feijen & Feijen 2011: in part, only p. 145, fig. 3.

LSID: urn:lsid:zoobank.org:act:6C132E9F-8438-4418-9F1C-67E17142333B.

Etymology: It is a pleasure to name this species after Dr Amnon Freidberg. He made an important collection of Diopsidae and made the SMNHATA Diopsidae holdings available for our studies.

Diagnosis: *Teleopsis ammoni* n. sp. can be recognised by its size, robust habitus, lack of hairiness, wing pattern (no apical spot, uniform infuscation from preapical crossband to apex, broad preapical crossband with much darker anterior half, irregular central band with darker patches along veins, irregular narrow basal crossband, two vague paler spots between basal and central crossbands, three vague paler spots between central and subapical crossbands), wing mostly covered by microtrichia, IVS 4× stalk diameter, OVS 2–3× stalk diameter, base of IVS less than half the stalk diameter, strong facial teeth, mainly glossy collar, blackish brown pollinose scutum and scutellum, ratio scutellar spine/scutellum length ~3.0, incrassate front femora with around 45 (♀) or 50 (♂) tubercles, large glossy spot laterally on terga

Table 1. Main differences between the sister species *T. sykesii* and *T. amnoni* n. sp. In practice, the difference in pattern of the wing apex is, by far, the easiest character for identification.

Character	<i>Teleopsis sykesii</i>	<i>Teleopsis amnoni</i> n. sp.
Wing	apical spot, connected to preapical band along R4+5	distally of preapical band just uniform pale infuscation
Ratio length/width femur 1	4.1 ± 0.1 (♀), 4.5 ± 0.1 (♂)	3.6 (♀), 3.8 (♂)
No. of tubercles on femur 1	55.3 ± 0.7 (♀), 52.7 ± 0.8 (♂)	45 (♀), 50 (♂)
Terga 1 and 2	3 glossy spots laterally	1 large glossy spot laterally
♀ tergum 7 and sternum 7	with basal sclerotised band	unconnected
♀ spiracle 7	just in sclerite	well in membrane
Surstyli	short, ratio length/width 2.4, ventrally directed	long, ratio length/width 3.5, mesally directed
♂ cerci	ratio length/width 1.8, widest in the middle	ratio length/width 1.5, widest near apex

1 and 2, pair of pollinose spots on tergum 3, female sternum 5 split on meson but anteriorly still connected, female sternum 6 consisting of two plates, female sternum 7 basally not connected to tergum, female spiracle 7 well into membrane, round spermathecae with around four small pustules, left male spiracle 7 in synsternum, surstyli articulated, long and straight, mesally directed and almost touching on the meson, surstyli only with microtrichia on posterior inner side, bulging and apically broadest male cerci, ratio eye span/body length 0.84 in ♀ and 1.34 in ♂, and assumed sexual dimorphism (D) with regard to eye span of ~1.6–2.0.

T. amnoni n. sp. can be considered as the sister species of *T. sykesii* (Table 1) and, as such, forms the second representative of the *T. sykesii* species-group.

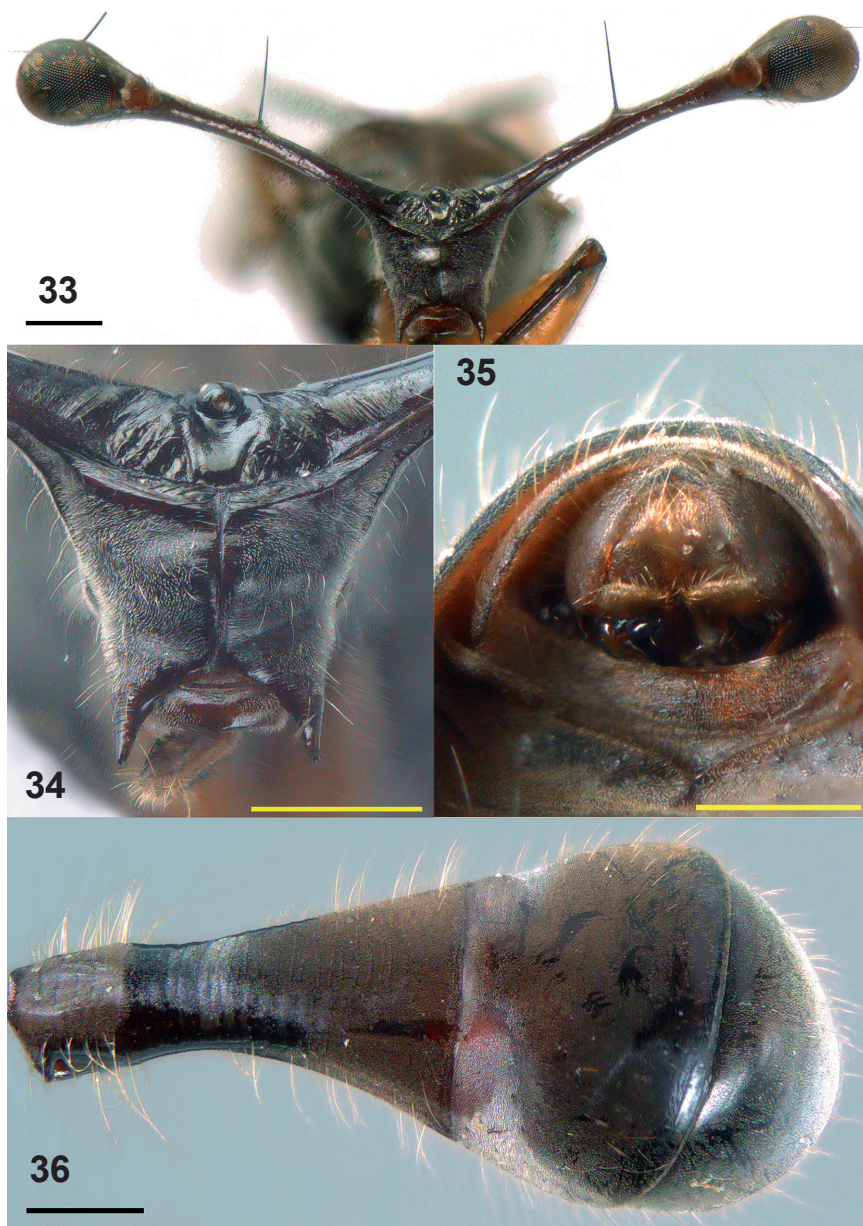
Description: Body length ♀ 6.6 mm, ♂ 6.8 mm; eye span ♀ 5.6 mm, ♂ 9.1 mm; wing length ♀ 4.8 mm, ♂ 5.3 mm; length of scutellar spine ♀ 1.40 mm, ♂ 1.42 mm.

Head. Central part dark brown (Figs 33, 34), dorsally glossy, laterally and on face pollinose, central knob on face glossy; frons (Figs 33, 34) with smooth trapezoid section centrally in front of tubercle, slightly elevated anteriorly near groove, surrounded by roughened lateral areas; arcuate groove concolorous; face with ridge parallel to and just below arcuate groove, face with central knob, strong facial teeth, a few pale setulae; eye span small in female (16% smaller than body length) and very large in male (34% longer than body length); probably moderate rate of dimorphism in eye span (if D is slightly higher than in *D. sykesii*, D could well be between 1.6–2.0, see Fig. 51); stalks dark brown, broad apical parts blackish, pollinose; IVS large, 4× diameter of eye stalk (Fig. 33), base of IVS small, less than half the stalk diameter; OVS 2–3× stalk diameter.



Figs 30–32: (30, 31) *T. amnoni* n. sp., (32) *T. sykesii*: (30, 32) Kerala, Fringe Ford, Wayanad, 30.iv.2017, photographs by Stephen Marshall; (31) Kerala, North Wayanad, x.2006, photograph by Shyamal Lakshminarayanan (this fly wrongly identified as *T. sykesii* in Feijen & Feijen 2011).

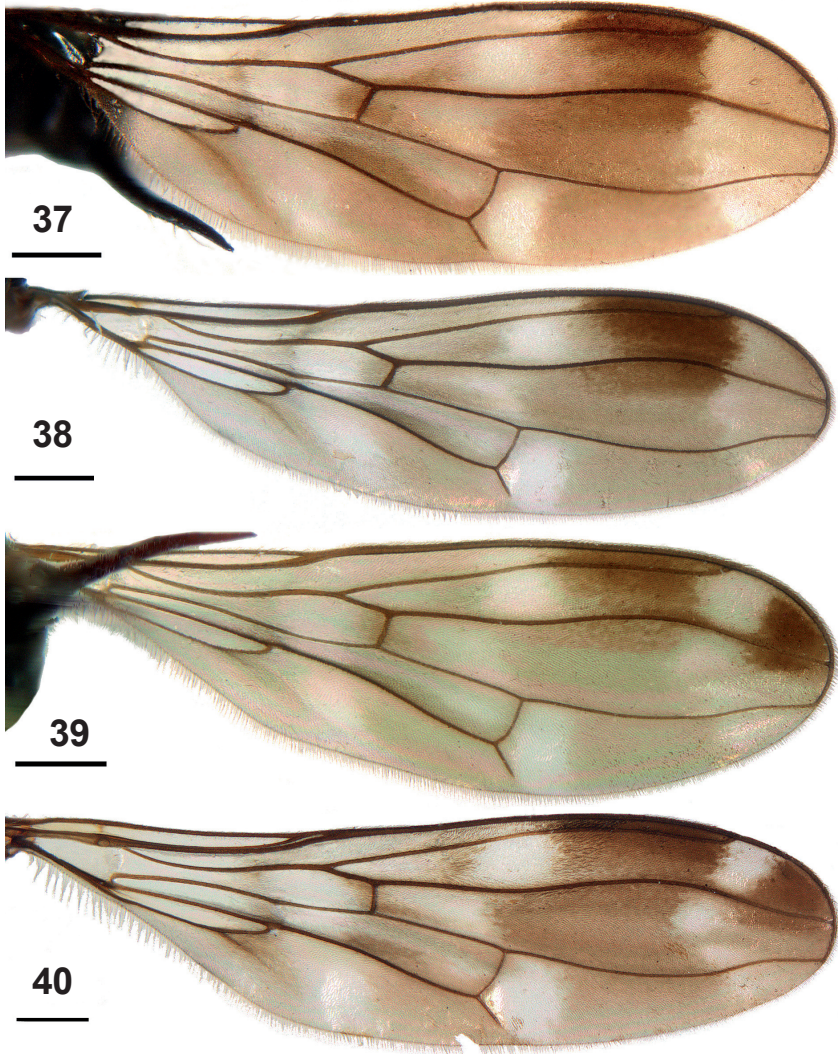
Thorax. Collar glossy blackish brown, except for pollinose ventral and posterior edges; scutum and scutellum blackish brown pollinose (Figs 30, 31), more densely pollinose on humeral calli; scutellar spines glossy except for pollinose base; pleura blackish brown, dorsal $\frac{2}{3}$ pollinose, ventral $\frac{1}{3}$ glossy except for pollinose posterior edge; supra-alar spines (Fig. 30) glossy, $3.5\times$ as long as pleurotergal spines, dorsolaterally directed; scutellar spines almost straight, diverging under an angle of 70° (Figs 30, 31), ratio scutellar spine/scutellum length in ♀ 3.05 ($n=1$) and in ♂ 2.95 ($n=1$), ratio scutellar spine/body length in ♀ and ♂ 0.21; pleurotergal spines pollinose, short and blunt, posterolaterally directed; in pinned specimens apical seta



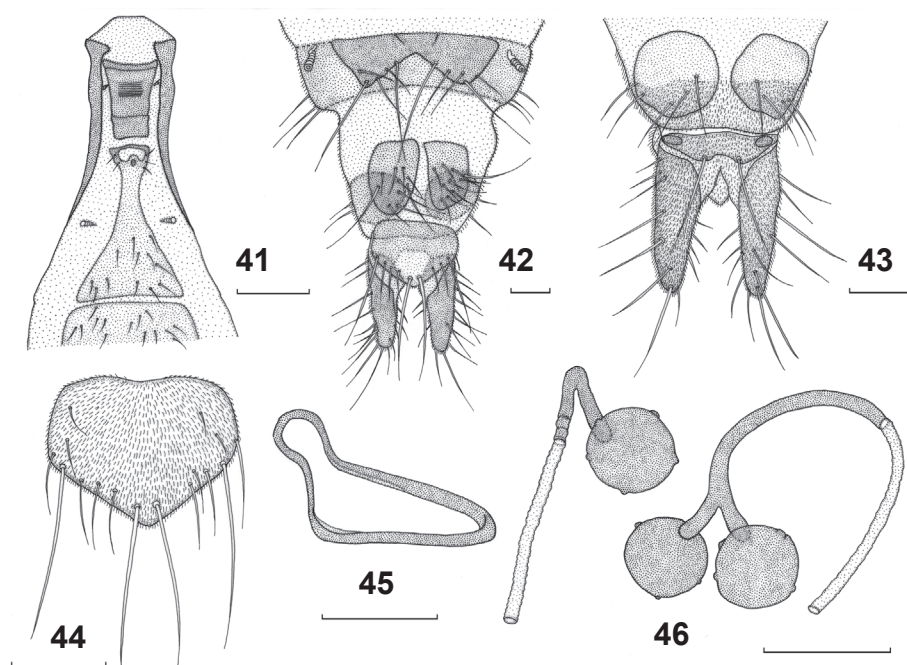
Figs 33–36: *T. ammoni* n. sp.: (33) paratype ♀, anterior view of head; (34–36) holotype ♂; (34) anterior view central section of head; (35) ventral view of abdominal apex, showing surstyli almost touching on the meson; (36) dorsolateral view of abdomen. Scales 0.5 mm.

broken off, but in one fly on photographs it could be discerned; some setulae on thorax, scutellar spines with a number of setulae on very indistinct warts.

Wing. Irrorated with three irregular crossbands (Figs 37, 38); apex (apical $\frac{1}{7}$) uniformly infuscated, no apical dark spot (Figs 30, 31); preapical band broad and well defined, anteriorly half much darker, posterior half just darker than apex, extending basally in cell r4+5, vaguely connected to central crossband in cell r1 and along



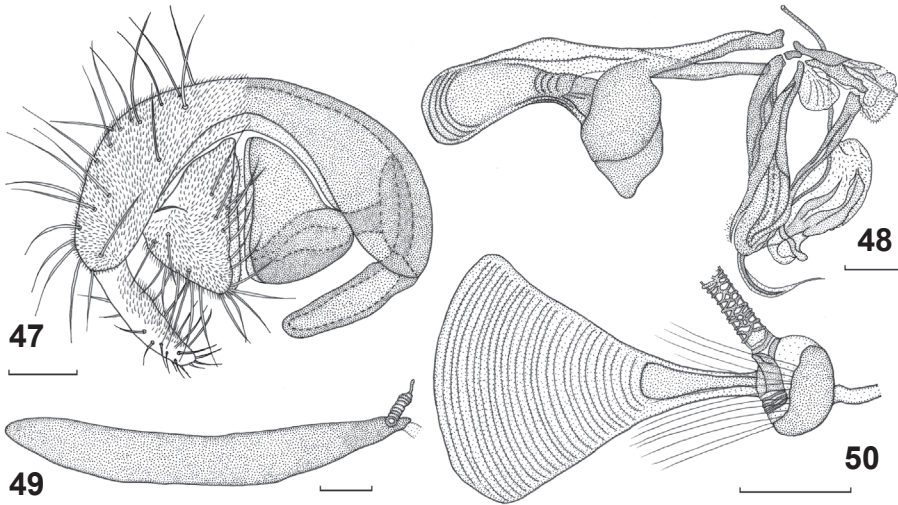
Figs 37–40: Dorsal view of wings: (37) *T. amnoni* n. sp., paratype ♀; (38) *T. amnoni* n. sp., holotype ♂; (39) *T. sykesii* ♂, Maharashtra, Matheran, 3.xi.2000; (40) *T. sykesii* ♀, Anamalai Hills, v.1960. Scales 0.5 mm.



Figs 41–46: *T. amnoni* n. sp.: (41) holotype ♂, ventral view of basal abdomen; (42–46) paratype ♀: (42) ventral view of distal section of abdomen; (43) dorsal view of terga 8 & 10 and cerci; (44) subanal plate; (45) sclerotised ring of ventral vagina wall; (46) spermathecae. Scale 0.5 mm for Fig. 41, other scales 0.1 mm.

veins R_{4+5} and M_1 ; three pale spots in between the central and preapical bands, one in cell r_{2+3} , very minor one in cell r_{4+5} and large one basally in cell m_1 ; irregular central crossband including crossveins $r-m$ and $dm-m$, reaching from edge to edge, darker around crossvein $r-m$ and veins R_{2+3} , R_{4+5} and M_4 ; irregular basal band narrow, running from apex of cell c via tip of cell cua to wing edge, vaguely connected to central band in cell r_1 , cell $bm+dm$, around vein M_4 and along wing edge, giving two indistinct paler spots in cell br and cell m_4 , a distinct vein-like dark stripe running from cell cua to more than halfway the wing edge; cell r_{4+5} narrow basally, broad centrally and narrowing towards the apex; vein M_4 from crossvein $dm-m$ onward turning downward and reaching till three-quarters of the distance to the wing edge; glabrous basal areas including basal $\frac{2}{3}$ of cell c , posterior basal tip of cell r_1 , basal half of cell br , basal quarter of cell $bm+dm$ and cell cua except for apex.

Legs. Front leg with brown coxa, trochanter and femur, tibia blackish brown, tarsus dark brown with distal segment blackish, coxa 1 pollinose anteriorly, femur 1 largely pollinose on inner side and with pollinose stripe on outer side; mid leg and hind leg brown, apical $\frac{1}{3}$ of femora 2 and 3 and tibiae 2 and 3 dark brown; femur 1 (Figs 30, 31) incrassate in both sexes, ratio of length/width in ♀ 3.6 and in ♂ 3.8, tubercles



Figs 47–50: *T. ammoni* n. sp. holotype ♂: (47) posterior view of epandrium with surstyli and cerci; (48) lateral view of phallapodeme and aedeagus; (49) ventral view of synsternum 7+8; (50) ejaculatory apodeme and sac. Scales 0.1 mm.

on distal three-quarters, inner row in ♀ with 26.5 (range 26–27, n=2) and in ♂ with 28.0 tubercles (range 28, n=2), outer row in ♀ with 19.5 tubercles (range 19–20, n=2) and in ♂ with 22 tubercles (range 22, n=2), outer row with small gap.

Preabdomen. Dorsally blackish brown, tergum 3 more chestnut brown, pollinose; on terga 1 and 2 large glossy spot laterally (Fig. 36); tergum 3 anterolaterally with densely pollinose spots; seam between terga 2 and 3 distinct; sterna dark brown, pollinose, sternum 1 less pollinose; sternum 1 basally just touching syntergum (Fig. 41); spiracle 1 in tergum; intersclerite laterally connected to sternum 2 (Fig. 41), sternum 2 very narrow anteriorly and strongly broadening posteriorly; sterna 3 and 4 broad rectangular plates.

Female postabdomen. Deflexed; terga 6 and 7 single rectangular sclerites (Fig. 42); tergum 8 represented by two rounded sclerites (Fig. 43), sclerites covered by microtrichia; tergum 10 with laterally small, delineated, more sclerotised sections and with one pair of long setulae (Fig. 43); cerci rather elongate, ratio of length/width 3.4, covered with microtrichia and a number of setulae; sternum 5 split on meson but anteriorly still connected, sternum 6 mesally narrowly divided in two plates; sternum 7 constricted posteriorly on meson and basally not connected to tergum (Fig. 42); sternum 8 represented by two rectangular sclerites, posteriorly rounded; spiracle 7 clearly in membrane; subanal plate (Fig. 44) pentagonal, posteriorly two pairs of long setulae and four pairs of short setulae; spermathecae (Fig. 46) round, strongly sclerotised, with about four small pustule-like tubercles, duct with no constriction near spermathecae; sclerotised ring of ventral vagina wall ellipsoid, with sharp double bend at one-quarter from posterior end (Fig. 45).

Male postabdomen. Sterna 5 and 6 short, broad rectangular plates, synsternum 7+8 (Fig. 49) a short broad sclerite, tapering laterally; left spiracle 7 in synsternum, right spiracle 7 probably in membrane (lost during preparation); epandrium (Fig. 47) broad, rounded, covered with microtrichia and about 21 pairs of setulae; surstyli articulate, slender, straight, ratio length/width 3.5, mesally directed almost touching on meson (Figs 35, 47), on inner posterior side with microtrichia, anterior side, apex and outer posterior side glabrous, short setulae present; surstyli connected to lateral side of cerci, not interconnected via processus longi; cerci large, broad, bulging outward in middle, apical $\frac{1}{3}$ strongly sclerotised (Fig. 47), ratio length/width 1.5, widest near apex, covered with microtrichia and along edges quite long setulae; phallapodeme (Fig. 48) quite straight, anterior arm hardly curving downward anteriorly, anterior arm $\frac{1}{3}$ longer than posterior arm, posterior arm strongly bifurcated, vane broad and strongly sclerotised; aedeagus open structure of long, narrow sclerites, intermittent organ sticking well out from apex; ejaculatory apodeme broadly wedge-shaped (Fig. 50).

Holotype: ♂ **India:** Karnataka, Hwy [= Highway] 206, 45 km E Honavar, 14°16.70'N 74°43.21'E, 550 m, 4.xii.2003, I. Yarom (SMNHATAU).

Paratype: 1♀, same data as holotype.

Additional material: Three sets of photographs are known that clearly show representatives of *T. amnoni* n. sp. One (Feijen & Feijen 2011, fig. 3) was taken by Mr Shyamal Lakshminarayanan in India, North Wayanad, Kerala (11°49'17"N 75°50'42"E) in x.2006. This photograph is now reproduced (Fig. 31) with the corrected species name. Photographs by Stephen Marshall (Fig. 30) were made in India, Fringe Ford, Wayanad, Kerala, 11°52'42.72"N 75°57'57.07"E, 1130 m, on 30.iv.2017. The first photograph by Aniruddha Dhamorikar was taken on vii.2011 in Tung, Maharashtra, India (Dhamorikar 2012, slide 96), while the second one (Dhamorikar 2017, fig. 16) from Maharashtra probably shows *T. amnoni* n. sp. on the left side and a definite *T. sykesii* on the right.

Distribution: *T. amnoni* n. sp. is known from Maharashtra, Karnataka and northern Kerala.

Biology: More is known about the habitat of *T. sykesii*, but *T. amnoni* n. sp. appears to have similar preferences as both species can be found together. As such, their environment can be described as follows: natural or slightly disturbed forest, not far from a stream and in the Sahyadri (Western Ghats). In the dry season, both *Teleopsis* can be found in or near cave-like structures. Given their distribution in western India, the two species of the *T. sykesii* species-group are geographically strongly isolated from other *Teleopsis*. The two *T. sykesii* records for Myanmar are very doubtful (Feijen & Feijen 2011). The closest other *Teleopsis* can be found in Sri Lanka: the equally isolated *T. ferruginea* species-group (Feijen 2011: 81). Otherwise the nearest *Teleopsis* members are found in Thailand and Peninsular Malaysia.

The sister species *T. sykesii* shows moderate sexual dimorphism with regard to the eye span, $D=1.51$ (Feijen & Feijen 2011). The rate of dimorphism D is calculated as the difference in allometric slope for males and females. Allometric slope is the least-squares regression slope of eye span on body length. For *T. sykesii*, these slopes are for males $2.65 \pm \text{SE } 0.10$ ($n=58$) and for females 1.14 ± 0.03 ($n=97$). Of course, D cannot be determined from two data points available for *T. amnoni*,

but their position in relation to the allometric lines for *T. sykesii* (Fig. 51), gives an indication that D for *T. amnoni* could be slightly higher than for *T. sykesii*. The difference in ratio eye span/body length is also larger in *T. amnoni* with 0.84 in ♀ (n=1) and 1.34 (n=1) in ♂. For *T. sykesii* these ratios are respectively 0.93 (n=97) and 1.23 (n=58).

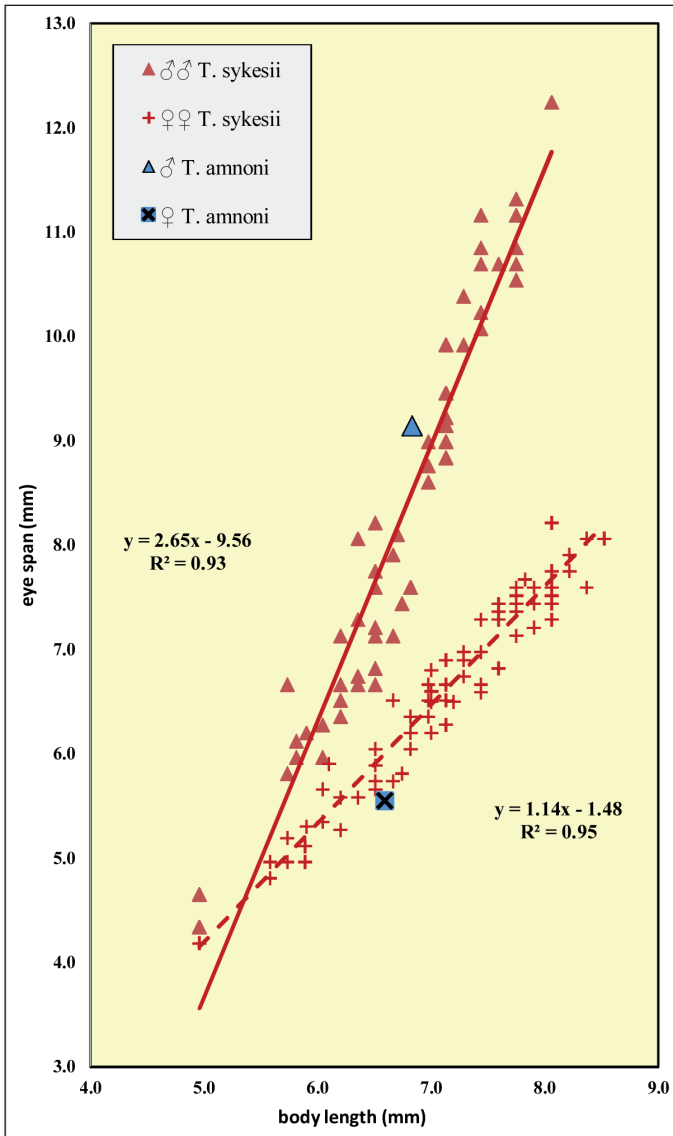


Fig. 51: *T. sykesii* and *T. amnoni* n. sp., eye span plotted against body length.

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REFERENCES

- AGARWALA, B.K. 2018. Taxonomic status and additional description of White's Stalked-eyed Fly *Cyrtodiopsis whitei* (Curran, 1936) (Diptera: Diopsidae) from India with a key to the allied species and note on its habitat. *Journal of Threatened Taxa* **10** (8): 12035–12043. <https://doi.org/10.11609/jott.3272.10.8.12035-12043>
- ALEXANDER, F.M. 1865. Notes on the habits of two Indian insects. *The Entomologist's Monthly Magazine* **2** (2): 23. <https://www.biodiversitylibrary.org/item/36349>
- BAINBRIGGE FLETCHER, T. 1914. *Some south Indian insects and other animals of importance considered especially from an economic point of view*. Government Press, Madras. <https://doi.org/10.5962/bhl.title.44262>
- BAKER, R.H. & WILKINSON, G.S. 2001. Phylogenetic analysis of sexual dimorphism and eye-span allometry in stalk-eyed flies (Diopsidae). *Evolution* **55**: 1373–1385. <https://doi.org/10.1111/j.0014-3820.2001.tb00659.x>
- BAKER, R.H., WILKINSON, G.S. & DESALLE, R. 2001. Phylogenetic utility of different types of molecular data used to infer evolutionary relationships among stalk-eyed flies (Diopsidae). *Systematic Biology* **50**: 87–105. <https://doi.org/10.1080/10635150118679>
- BEZZI, M. 1922. Note sur la présence en Algérie du *Sphyracephala Hearseiana* Westw. de l'Inde et sur la synonymie de ce Diptère. *Bulletin du Muséum National d'Histoire Naturelle* **28**: 69–72. <https://www.biodiversitylibrary.org/item/137425>
- BHATNAGAR, S. 1986. On insect adaptations for pollination in some asclepiads of Central India. In: Kapil, R.P. (Ed.), *Pollination biology – an analysis*. Inter-India Publications, New Delhi, pp. 37–57.
- BIGOT, J.M.F. 1874. Diptères nouveaux ou peu connus. I. Sur le genre *Diopsis*. Espèces nouvelles. *Annales de la Société entomologique de France* **5** (4): 107–115. <https://www.biodiversitylibrary.org/part/31549>
- 1880. Diptères nouveaux ou peu connus. XIX. Diopsidae (Macq., J. Bigot). *Annales de la Société entomologique de France* **5** (10): 90–94. <https://www.biodiversitylibrary.org/part/154996>
- 1881. Diptères nouveaux ou peu connus. 17^e partie. XXVII. Notes et corrections. *Annales de la Société entomologique de France* **6** (1): 372–374. <https://www.biodiversitylibrary.org/part/154962>
- 1892. I – Catalogue of the Diptera of the Oriental region by Mons. J. M. F. Bigot. Part 2. Communicated by the Superintendent of the Indian Museum. *Journal of the Asiatic Society of Bengal. Part 2, Natural Science* **2**: 133–236 [Diopsidae on p. 215–216]. <https://doi.org/10.5962/bhl.title.9296>
- BRUNETTI, E. 1907. Notes on Oriental Diptera. I. Note on *Sphyracephala hearseyana* Westwood, with a list of the Oriental species of Diopsinae. *Records of the Indian Museum* **1**: 163–166. <http://faunaofindia.nic.in/php/records/toc.php?vol=001&part=02>
- 1913. Zoological results of the Abor Expedition 1911–12. XI. Diptera. *Records of the Indian Museum* **8** (pt. 2): 149–190, pl. 6. <https://www.biodiversitylibrary.org/part/118026>

- 1919. Review of progress in our knowledge of Oriental Diptera during the last two decades. *Journal of the Asiatic Society of Bengal (New Series)* **14**: 358–371.
<https://www.biodiversitylibrary.org/item/99244>
- 1928. Revisionary notes on the Diopsidae (Diptera). *The Annals and Magazine of Natural History: Series* **10** (2): 266–285.
- BURKHARDT, D. & MOTTE, I. DE LA. 1983. How stalk-eyed flies eye stalk-eyed flies: observations and measurements of the eyes of *Cyrtodiopsis whitei* (Diopsidae, Diptera). *Journal of Comparative Physiology* **151** (4): 407–421.
<https://doi.org/10.1007/BF00605457>
- 1985. Selective pressures, variability, and sexual dimorphism in stalk-eyed flies (Diopsidae). *Naturwissenschaften* **72**: 204–206.
<https://doi.org/10.1007/BF01195763>
- CHEN, S.H. 1949. Records of Chinese Diopsidae and Celyphidae (Diptera). *Sinensia* **20**: 1–6.
- CURRAN, C.H. 1936. A new *Diopsis* from India, with notes on others (Diptera). *American Museum Novitates* **833**: 1–2.
<http://hdl.handle.net/2246/2148>
- DALMAN, J.W. 1817. Anmärkningur vid släktet *Diopsis*, jemte beskrifningar och teckningar på trenne dithörande nya arter. *Kongliga Vetenskaps Academiens Handlingar* **38**: 211–219.
<https://www.biodiversitylibrary.org/item/107460>
- DATTA, M. & BISWAS, M. 1985. Distributional records of stalk-eyed flies (Diptera: Diopsidae) present in Zoological Survey of India, Calcutta. *Bulletin of the Zoological Survey of India* **7** (2–3): 219–223.
<http://faunaofindia.nic.in/PDFVolumes/bulletin/007/02-03/0219-0224.pdf>
- DATTA, M. & CHAKRABORTI, M. 1985. Insecta: Diptera. *Records of the Zoological Survey of India* **82**: 231–252.
<http://faunaofindia.nic.in/PDFVolumes/records/082/01-04/0231-0252.pdf>
- DATTA, M. & PARUI, P. 1999. Insecta: Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Meghalaya, State Fauna Series 4 (Part 6, Insecta (Diptera and Lepidoptera))*. Zoological Survey of India, Kolkata, pp. 1–64.
- 2004. Insecta: Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Manipur, State Fauna Series 10 (Part 2, Insects)*. Zoological Survey of India, Kolkata, pp. 459–483.
- DESCAMPS, M. 1957. Recherches morphologiques et biologiques sur les Diopsidae du Nord-Cameroun. *Ministère de la France d'Outre Mer, Direction de l'Agriculture, de l'Élevage et des Forêts, Section Technique d'Agriculture Tropicale, Bulletin Scientifique* **7**: 1–154.
<https://gallica.bnf.fr/ark:/12148/bpt6k9743074v/f8.image.texteImage>
- DHAMORIKAR, A.H. 2012. *Afoot: exploring the Northern Western Ghats ... with an eye for insects and other living things*. A Monsoon Trails 2011 Report. 155 pp.
<https://www.slideshare.net/aniruddhahd/afoot-exploring-the-northern-western-ghats>
- 2016. *A field guide to insects & spiders of Kanha Tiger Reserve*. Resurrect Books, New Delhi, 238 pp, 1–37 pls.
- 2017. Flies matter: a study of the diversity of Diptera families (Insecta: Diptera) of Mumbai Metropolitan Region, Maharashtra, India, and notes on their ecological roles. *Journal of Threatened Taxa* **9** (11): 10865–10879, figs 1–3, images 1–75.
<https://doi.org/10.11609/jott.2742.9.11.10865-10879>
- DOLESCHALL, C.L. 1856. Eerste bijdrage tot de kennis der dipterologische fauna van Nederlandsch Indië. *Natuurkundig Tijdschrift voor Nederlandsch Indië* **10** (n.s. 7): 403–414, pls 1–12.
<https://www.biodiversitylibrary.org/part/4266>
- 1857. Tweede bijdrage tot de kennis der dipterologische fauna van Nederlandsch Indië. *Natuurkundig Tijdschrift voor Nederlandsch Indië* **14**: 377–418, pls 1–10.
<https://www.biodiversitylibrary.org/part/7324>
- DUTTA SAHA, P., SHARMA, R.M. & MITRA, B. 2012. Insecta: Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Maharashtra, State Fauna Series 20 (part 2)*. Zoological Survey of India, Kolkata, pp. 531–538.
- DONOVAN, E. 1800–1804. *An epitome of the natural history of the insects of India, and the islands in the Indian seas: comprising upwards to two hundred and fifty figures and descriptions*

- of the most singular and beautiful species, selected chiefly from those recently discovered, and which have not appeared in the works of any preceding author.* T. Bensley, London. (Diopsidae on pl. 58 published in 1803).
<https://archive.org/details/epitomeofnatural00dono/page/n6>
- FEIJEN, H.R. 1978. Diopsidae (Diptera: Acalyptratae) from Togo and Zaire. *Stuttgarter Beiträge zur Naturkunde Serie A, Biologie* **318**: 1–25.
<http://direct.biostor.org/reference/129984>
- 1989. Diopsidae. Volume IX, Cyclorrhapha III (Schizophora other than Calyptratae), Part 12. In: Griffiths, G.C.D. (Ed.), *Flies of the Nearctic Region*. Schweizerbart, Stuttgart, Germany, pp. 1–122.
- 1998. *Teleopsis* Rondani (Diptera, Diopsidae): generic review and the *ferruginea* group from Sri Lanka. *Tijdschrift voor Entomologie* **141**: 49–63.
<http://www.nev.nl/tve/pdf/te0141049.pdf>
- 1999. A revision of *Eurydiopsis* Frey (Diptera, Diopsidae) with description of four new Oriental species. *Tijdschrift voor Entomologie* **141**: 221–240.
<http://www.nev.nl/tve/pdf/te0141221.pdf>
- 2011. The genus *Teleopsis* Rondani (Diptera, Diopsidae): discussion of its taxonomic position and revision of the species occurring in the Philippines. *Zoologische Mededelingen Leiden* **85**: 79–140.
<http://www.repository.naturalis.nl/record/376602>
- FEIJEN, H.R. & FEIJEN, C. 2009. *Diopsis* (Diopsidae, Diptera) with unusual wing spots: two new species from Malawi with a longer eye span in females than in males. *Zoologische Mededelingen Leiden* **83**: 701–722.
<http://www.repository.naturalis.nl/document/141977>
- 2011. On the biogeographic range of the genus *Teleopsis* Rondani (Diptera: Diopsidae), with redescription of *Teleopsis sykesii* from India and description of a new species from Borneo. *Zoologische Mededelingen Leiden* **85**: 141–159.
<http://www.repository.naturalis.nl/document/221355>
- 2012. A new species of *Diopsis* L. (Diptera: Diopsidae) from South Africa and Swaziland, and brief review of African species with a large apical wing spot. *African Invertebrates* **53** (1): 125–142.
<https://doi.org/10.5733/afin.053.0107>
- FEIJEN, H.R., FEIJEN, F.A.A. & FEIJEN, C. 2018. *Madagopsina* gen. n. and *Gracilopsina* gen. n. (Diptera: Diopsidae) from Madagascar with description of four new species. *Tijdschrift voor Entomologie* **160** (3): 141–215.
<https://doi.org/10.1163/22119434-00002069>
- FEIJEN, H.R., MARTIN, R. & FEIJEN, C. 2017. The occurrence of Stalk-eyed Flies (Diptera, Diopsidae) in the Arabian Peninsula, with a review of cluster formation in the Diopsidae. *Tijdschrift voor Entomologie* **160** (2): 75–88.
<https://doi.org/10.1163/22119434-00002065>
- FÖLDVÁRI, M., POMIANKOWSKI, A., COTTON, S. & CARR, M. 2007. A morphological and molecular description of a new *Teleopsis* species (Diptera: Diopsidae) from Thailand. *Zootaxa* **1620**: 37–51.
<http://dx.doi.org/10.11646/zootaxa.1620.1.2>
- FREY, R. 1928. Philippinische Dipteren. V. Fam. Diopsidae. *Notulae Entomologicae, Helsingfors* **8**: 69–77.
- 1934. Diptera brachycera von den Sunda-Inseln und Nord-Australien. *Revue Suisse de Zoologie* **41** (15): 299–339.
<https://doi.org/10.5962/bhl.part.146005>
- GRIFFITHS, G.C.D. 1972. *The phylogenetic classification of Diptera Cyclorrhapha with special reference to the structure of the male postabdomen*. Series Entomologica **8**. Junk, The Hague, 340 pp.
<https://doi.org/10.1007/978-94-015-7243-9>
- HENDEL, F. 1914. H. Sauter's Formosa-Ausbeute. Acalyptrate Musciden (Dipt.) III. *Supplementa Entomologica* **3**: 90–117.
http://sdei.senckenberg.de/openaccess/index.php?befehl=Detail&C_Artikel=1461

- HENNIG, W. 1941a. Beiträge zur Kenntnis des Kopulationsapparates und der Systematik der Acalyptraten. III. Pallopteridae, Thyreophoridae, Diopsidae, *Pseudopomyza*, *Pseudodinia*. *Arbeiten über Morphologische und Taxonomische Entomologie aus Berlin-Dahlem* **8**: 54–65, pl. 3.
<http://sdei.senckenberg.de/~openaccess/02103.pdf>
- 1941b. 39c Diopsidae. In: Lindner, E. (Ed.), *Die Fliegen der palaearktischen Region*. Bd 5 (7), Lief. 143. E. Schweizerbart, Stuttgart, Germany, pp. 1–8.
- 1958. Die Familien der Diptera Schizophora und ihre phylogenetischen Verwandtschaftsbeziehungen. *Beiträge zur Entomologie* **8** (5–6): 505–688.
<https://doi.org/10.21248/contrib.entomol.8.5-6.505-688>
- HOWLETT, F.M. 1909. Diptera. - (Flies.). In: Maxwell-Lefroy, H. (Ed.), *Indian insect life: a manual of the insects of the plains (tropical India)*. Agricultural Research Institute, Pusa. Thacker, Spink & Co, Calcutta, pp. 545–664.
<https://www.biodiversitylibrary.org/item/80025#page/797>
- JAMALABAD, A. 2014. Stalk-eyed Flies. *India Wilds Newsletter* **6** (12): 21–22.
<https://indiawilds.com/forums/showthread.php?16033-Stalk-eyed-Flies>
- JOSEPH, A.N.T. & PARUI, P. 1972. Diptera from NEFA and Assam Foot Hills Part III, Siang Frontier Division and north Lakhimpur. *Records of the Zoological Survey of India* **67**: 325–342.
<http://faunaofindia.nic.in/PDFVolumes/records/067/01-04/0325-0342.pdf>
- KÁZMÉR, M. & VÁVRA, N. 2002. Micropalaeontology in Vienna at the turn of the 19th century: foraminiferan and bryozoan studies of Leopold von Fichtel and Johann Paul Carl von Moll. In: Wyse Jackson, P.N. & Spencer Jones, M.E. (Eds), *Annals of Bryozoology: aspects of the history of research on bryozoans*. International Bryozoology Association, Dublin, pp. 117–132.
<http://real.mtak.hu/id/eprint/2969>
- KERTÉSZ, K. 1899. Verzeichnis einiger, von L. Biró in Neu-Guinea und am Malayischen Archipel gesammelten Dipteren. *Természetráji Füzetek kiadja a Magyar nemzeti Múzeum* **22**: 173–195.
<https://www.biodiversitylibrary.org/part/39672>
- KOÇAK, A.Ö. & KEMAL, M. 2015. Initial results of the Entomofauna of SW Asia, based upon the info-system of the Cesa (excl. Lepidoptera). *Priamus Supplement* **35**: 1–1185.
<http://zoobank.org/References/E3DC8785-2E1D-420C-8886-1690F7F0B605>
- KOTRBA, M., HUBER, J. & FEIJEN, H.R. 2013. Coevolution of male and female genitalia in stalk-eyed flies (Diptera: Diopsidae). *Organisms, Diversity & Evolution* **14**: 187–201.
<https://doi.org/10.1007/s13127-013-0162-2>
- KUMAR, Y. 1978a. Morphology of the external and internal genital organs of male *Sphyracephala hearseiana* Westw. (Diopsidae: Diptera). *Entomon* **3** (1): 63–67.
- 1978b. Morphology of the external and internal genital organs of female *Sphyracephala hearseiana* Westw. (Diopsidae: Diptera). *Entomon* **3** (2): 201–205.
- 1979a. Mouth parts of *Sphyracephala hearseiana* (Westwood) Diopsidae: Diptera. *Entomon* **4** (1): 95–101.
- 1979b. External morphology of the head capsule of *Sphyracephala hearseiana* Westwood (Diopsidae: Diptera). *Entomon* **4** (2): 143–148.
- LINDNER, E. 1962. Studien an afrikanischen Diopsiden (Dipt.). *Stuttgarter Beiträge zur Naturkunde Serie A, Biologie* **94**: 1–18.
<https://www.biodiversitylibrary.org/part/215530>
- LIU, L-Q., WU, H. & YANG, D. 2013. Six new species and one new record species of the genus *Teleopsis* (Diptera, Diopsidae) from China. *Acta Zootaxonomica Sinica* **38** (1): 154–160.
- LOEW, H. 1873. Ueber die Arten der Gattung *Sphyracephala* Say. *Zeitschrift für die gesammten Naturwissenschaften* **42** (n.s. 8): 101–105.
<https://babel.hathitrust.org/cgi/pt?id=njp.32101075693679>
- MACQUART, J. 1848. Diptères exotiques nouveaux ou peu connus. Suite du 2.e supplément. *Mémoires de la Société royale des Sciences, de l'Agriculture et des arts de Lille* [1847] (2): 161–240, pls 1–7. <https://doi.org/10.5962/bhl.title.15792>

- 1851. Diptères exotiques nouveaux ou peu connus. Suite du 4.e supplément publié dans les mémoires de 1849. *Mémoires de la Société [Royale] des Sciences, de l'Agriculture et des arts de Lille* [1850]: 134–294, pls 15–28.
<https://doi.org/10.5962/bhl.title.15792>
- MATHUR, R.N. 1957. Large clusters of *Sphyracephala hearseyana* Westwood (Diptera: Diopsidae) at New Delhi. *Current Science* **26**: 183–184.
https://www.currentscience.ac.in/Downloads/article_id_026_06_0183_0184_0.pdf
- MEIER, R. & HILGER, S. 2000. On the egg morphology and phylogenetic relationships of Diopsidae (Diptera: Schizophora). *Journal of Zoological Systematics and Evolutionary Research* **38** (1): 1–36.
<https://doi.org/10.1046/j.1439-0469.2000.381128.x>
- MEIJERE, J.C.H. DE. 1911. Studien über südostasiatische Dipteren. VI. *Tijdschrift voor Entomologie* **54**: 258–432, pls. 18–22.
<https://www.biodiversitylibrary.org/part/25107>
- 1916. Studien über südostasiatische Dipteren. X. *Tijdschrift voor Entomologie* **58** (suppl.): 64–97.
<https://www.biodiversitylibrary.org/part/56926>
- 1917. Studien über südostasiatische Diptera. XIV. *Tijdschrift voor Entomologie* **60**: 275–369.
<https://www.biodiversitylibrary.org/part/11712>
- 1919. Beitrag zur Kenntnis der sumatranischen Dipteren. *Bijdragen tot de Dierkunde* **21** (1): 13–39, pl. 2.
<http://www.repository.naturalis.nl/document/548300>
- MITRA, B. & BHATTACHARYA, K. 2010. Insects: Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Uttarakhnad, State Fauna Series 18, Part 2 Insects*. Zoological Survey of India, Kolkata, pp. 361–411.
- MITRA, B. & PARUI, P. 2007. Insecta: Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Bannerghatta National Park (Karnataka). Conservation Area Series 33*. Zoological Survey of India, Kolkata, pp. 67–75.
- MITRA, B., PARUI, P. & SHARMA, R.M. 2011. Insecta Diptera. In: Director, ZSI, Kolkata (Ed.), *Fauna of Madhya Pradesh (Including Chhattisgarh), State Fauna Series 15 (Part-3)*. Zoological Survey of India, Kolkata, pp. 167–202.
- MITRA, B., ROY, K. & PARUI, P. 2015. A revised checklist of stalked-eyed flies (Diptera: Diopsidae) with first record of *Eurydiopsis brevispinus* Feijen from India. *Biosystematica* **8** (1–2): 59–60.
<https://www.academia.edu/11971267>
- MITRA, B., SHARMA, R.M. & PARUI, P. 2005. Inventory of the true flies (Diptera) of the Thar Desert. *Records of the Zoological Survey of India* **104** (1–2): 147–155.
<http://faunaofindia.nic.in/PDFVolumes/records/104/01-02/0147-0155.pdf>
- NAIR, P.V., RAMACHANDRAN, K.K., SWARUPANANDAN, K. & THOMAS, T.P. 2007. *Mapping biodiversity of the Myristica Swamps in Southern Kerala*. Final Report Project KFRI 452/04. Kerala Forest Research Institute, Kerala, India, 245 pp.
<http://www.docs.kfri.res.in/KFRI-RR/KFRI-RR326.pdf>
- NAYAR, J.L. & TANDON, S.K. 1962a. A note on the wing venation of *Sphyracephala hearseyana* Westwood (Diopsidae: Diptera). *Agra University Journal of Research, Science* **11**: 113–116.
- 1962b. External morphology of the head capsule of *Sphyracephala hearseyana* Westw., (Diopsidae: Diptera). *Agra University Journal of Research, Science* **11**: 131–138.
- 1963. A note on the genitalia of *Sphyracephala hearseyana* Westwood (Diopsidae: Diptera). *Agra University Journal of Research, Science* **12**: 1–4.
- OSTEN SACKEN, C.R. 1882. Diptera from the Philippine Islands brought home by Dr. Carl Semper, and described by C.R. Osten Sacken. (Fortsetzung aus Bd. XXVI Heft I). *Berliner Entomologische Zeitschrift* **26** (2): 187–252.
<https://www.biodiversitylibrary.org/itemdetails/101211>
- PARUI, P., MITRA, B. & SHARMA, R.M. 2006. Diptera fauna of Punjab and Himachal Shiwalik Hills. *Records of the Zoological Survey of India* **106** (1): 83–108.
<http://faunaofindia.nic.in/PDFVolumes/records/106/01/0083-0108.pdf>

- RAM, S. 1968. Records of parasites of sunnhemp shoot-borer, *Laspeyresia tricentra* Meyr. (Tortricidae: Lepidoptera) in Uttar Pradesh. *The Indian Journal of Entomology* **30** (1): 254.
- RÖGL, F. 1982. L. v. Fichtel und J.P.C. v. Moll und ihre wissenschaftliche Bedeutung. *Annalen des Naturhistorischen Museums in Wien, Serie A* **84**: 63–77.
<https://www.jstor.org/stable/41698430>
- RONDANI, C. 1875. Muscaria exotica Musei Civici Januensis observata et distincta. Fragmentum III. Species in Insula Bonae fortunae (Borneo), Provincia Sarawak, annis 1865–68, lectae a March. J. Doria et Doct. O. Beccari. *Annali del Museo Civico di Storia Naturale Giacoma Doria, Genova* **7**: 421–464.
<https://www.biodiversitylibrary.org/part/46051>
- 1876. Rassegna entomologica. Insetti (Ditteri). *Bullettino della Società entomologica italiana* **8** (2): 177–184.
<https://www.biodiversitylibrary.org/item/81159>
- SARKAR, S.K., HAZRA, S.K., SEN, H.S., KARMAKAR, P.G. & TRIPATHI, M.K. 2015. *Sunnhemp in India*. ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore, West Bengal, 140 pp.
https://www.researchgate.net/publication/304570874_sunnhemp_in_India
- SÉGUY, E. 1949. Diopsides de Madagascar. *Memoires de l'Institut Scientifique de Madagascar A* **3** (1): 65–76.
- SEN, S.K. 1921. Life-histories of Indian insects. Diptera: *Sphyracephala hearseyana*, Westw. *Memoirs of the Department of Agriculture in India, Entomological Series* **7** (6): 33–38.
<https://archive.org/details/n06memoirsentomo07impeuoft>
- SENIOR-WHITE, R.A. 1922. Notes on Indian Diptera. 1. Diptera from the Khasia Hills. 2. Tabanidae in the collection of the forest zoologist. 3. New species of Diptera from the Indian Region. *Memoirs of the Department of Agriculture in India, Entomological Series* **7** (9): 83–169, pls 11–15.
<https://archive.org/details/n09memoirsentomo07impeuoft>
- SHARMA, S. 1988. Occurrence of a diopsid fly on rice in Nagaland. *Bulletin of Entomology* **29** (1): 143.
- SHILLITO, J.F. 1940. Studies on Diopsidae (Diptera). *Novitates Zoologicae* **42**: 147–163.
<https://www.biodiversitylibrary.org/page/3331880>
- 1960. A bibliography of the Diopsidae (Diptera–Acalypratae). *The Journal of the Society for the Bibliography of Natural History* **3** (7): 337–350.
<https://doi.org/10.3366/jsbnh.1960.3.7.337>
- 1976. Bibliography of the Diopsidae – II. *The Journal of the Society for the Bibliography of Natural History* **8** (1): 65–73.
<https://doi.org/10.3366/jsbnh.1976.8.1.65>
- SINGH, S., NAYAR, J.L. & TANDON, S.K. 1962. External morphology of the thorax of *Sphyracephala hearseyana* Westw. (Diopsidae: Diptera). *Agra University Journal of Research, Science* **11**: 79–85.
- STEYSKAL, G. 1972. A catalogue of species and key to the genera of the family Diopsidae (Diptera: Acalypratae). *Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie)* **234**: 1–20.
<https://www.biodiversitylibrary.org/part/94956>
- 1977. Family Diopsidae. In: Delfinado, M. & Hardy, D.E. (Eds), *A catalog of the Diptera of the Oriental Region*. 3. University of Hawaii Press, Honolulu, pp. 32–36.
<https://doi.org/10.1002/mmnd.19780250411>
- TENORIO, J.A. 1969. A new species of *Teleopsis* Rondani from the Philippines (Diptera: Diopsidae). *Pacific Insects* **11**: 483–485.
[http://hbs.bishopmuseum.org/pi/pdf/11\(2\)-483.pdf](http://hbs.bishopmuseum.org/pi/pdf/11(2)-483.pdf)
- VAN DER WULP, F.M. 1896. *Catalogue of the described Diptera of South Asia*. Dutch Entomological Society, The Hague, pp. 1–220.
<https://doi.org/10.5962/bhl.title.8539>
- 1897. Aanteekeningen betreffende Oost-Indische Diptera. *Tijdschrift voor Entomologie* **40**: 181–198. <https://www.biodiversitylibrary.org/item/40960>
- 1899. Verbeteringen en aanvullingen in den Catalogue of the described Diptera from South Asia. *Tijdschrift voor Entomologie* **42**: 41–57.
<https://www.biodiversitylibrary.org/part/18015>

- VAZIRANI, T.G. & RATHORE, N.S. 1976. Note on *Diopsis indica* Westwood (Diptera: Diopsidae) from Gujarat. *Newsletter - Zoological Survey of India* **2** (2): 67–68.
- WESTWOOD, J.O. 1837. On *Diopsis*, a genus of dipterous insects, with descriptions of twenty-one species. *Transactions of the Linnean Society of London* **17**: 283–313.
<https://doi.org/10.1111/j.1095-8339.1834.tb00025.x>
- 1845. *Diopsis Harseiana*, W. Proceedings of Learned Societies. Entomological Society. January 1st, 1844. *The Annals and Magazine of Natural History, including Zoology, Botany, and Geology* **16**: 273–275.
<https://www.biodiversitylibrary.org/item/71834>
- 1848. *The Cabinet of Oriental Entomology; being a selection of some of the rarer and more beautiful species of insects, natives of India and the adjacent islands, the greater portion of which are now for the first time described and figured*. William Smith, London, pp. 1–88, pls 1–42.
<https://doi.org/10.5962/bhl.title.34273>
- WILKINSON, G.S., PRESGRAVES, D.C. & CRYMES, L. 1998. Male eye span in stalk-eyed flies indicates genetic quality by meiotic drive suppression. *Nature* **391**: 276–279.
<https://doi.org/10.1038/34640>
- YANG, C. & CHEN, H. 1998 [1996]. Family Diopsidae. In: Xue, W. & Chao, C. (Eds), *Flies of China. Vol. 1*. Liaoning Science and Technology Press, Shenyang, pp. 464–479.