

**Described a new recorded family Diopsidae of (Order Diptera) with its Species
Diopsis apicalis in Egypt**

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ABSTRACT

During rearranging and trying to identify the unidentified specimens of the order Diptera in the main reference insect collection of the Plant Protection Research Institute, 25 unidentified dipterous specimens that were collected from Armant (Assiut, Egypt) attracted the attention with its eyes that far projected from the head. These specimens were identified to the family rank (Diopsidae) by using the key. The representative specimens of this family were identified by Prof. Dr. Hans Feijen to the species (*Diopsis apicalis*).

The present study includes Description and taxonomic characters of the family and its species with illustrated species.

Key words: Diptera, Diopsidae, *Diopsis*, *Diopsis apicalis* Distribution, Egypt

INTRODUCTION

The family Diopsidae is essentially, confined to the old world tropics. It is unrepresented in the Neotropical region and there is a single species in North America. Approximately two-third of all described species of the family are Afrotropical in origin.

With the exception of *Centrioncus prodiopsis*, all diopsid adults of both sexes have characteristic eye-stalks. Their bizarre form has engendered considerable interest among taxonomists, resulted in the description of many supposed new species, often without recourse to previous work. Descamps (1957) figured some of the early stages of the common pest species, and considered their biology. Shillito (1971) and Steyskal (1972) provided keys to diopsid genera, the latter author made a catalogue of world species. Lindner (1962) provided partial keys to Afrotropical species, but the regional keys of Curran (1931) and Seguy (1955) must be used with caution. A bibliography of the literature on Diopsidae had been published by Shillito (1960, 1976). Detailed characterization of the family with an account of fossil forms can be found in Hennig (1965).

MATERIALS AND METHODS

The family Diopsidae was represented by many unidentified specimens (25 specimens) in the collection of the ministry of Agriculture in the Plant Protection Research Institute. These specimens are the source material of this study, all of them are collected from Armant by one methods (Sweeping net), at 11 February 1963, there are 19 females and 6 males. The identification occurred by Prof. Dr. Hans R. Feijen and all information are collected to serve this study. In addition, the drawings were made directly from specimens by using USB Digital Microscope and original binocular microscope.

Family Diopsidae (Stalk-eyed)

Diagnosis:

The family is distinguished by the possession of eyestalks projections from the sides of the head with the eyes at the end. Second antennal segment not cleft. No inferior orbital bristles, one or no vertical bristle, post verticals reduced or absent, Cross-vein *im* present, Costa unbroken, Sc. and anal veins continued to margin. Abdomen spiracles 2-5 in the membrane, male with 6th tergite as long as 5th, 7th sternite forming a complete ventral band, 7th tergite lost, 8th sternite large, tergite lost, 7th left spiracle in sternite. (Meyer, 2004)

Life history of Diopsid flies

Adult live near water and aquatic plants and it's prefer a shady habitat. The female lays eggs on the upper surface of young leaves and affixes them with an adhesive which prevents their bang washed off in heavy rains. Each female adult lays about 20 eggs over a 10 day's period. The emerged larvae move down the inside of the leaf sheath and feeds above the meri stem causing the dead heart symptom. Larvae about 12 -18 mm. long and 3mm. wide, the larval stage lasts 25 -35 day's pupae are normally found in rotting tissues, where the fly can easily emerge from 9 – 12 day's. Banwo O. O. (2002).

HOSTS

Main hosts; Sorghum

Alternative hosts; Rice, Millet, Sugarcane. (Hein Bijlmakers 1989)

Genus *Diopsis* Linnaeus, 1775

Diopsis Linnaeus, 1775 : 5 [1785 : 306]. Type-Species *Diopsis ichneumonea*

Linnaeus, 1775, by monotypy. Unidentified sp.-PA: Baltic Region (Eocene/Oligocene) [A] (Hennig, 1965: 64).

Subgeneric grouping of *Diopsis* Linnaeus, 1775, is briefly discussed, but the genus awaits revision.

Species groups within *Diopsis* Linnaeus, 1775 after Feijen (2009).

Diopsis remained the sole diopsid genus till Say (1828) erected *Sphyracephala*. Rondani (1875) described two more genera, all newly described diopsids were placed in *Diopsis*, except for two more *Sphyracephala*. As a result, many species were subsequently referred to later described genera. To some extent, *Diopsis* remained a default genus and a thorough revision of the genus is overdue. After Linnaeus' description "Capite bicorni, oculis terminalibus," the genus has never been redescribed. So far, only some partial keys were produced. Séguy (1955) produced two keys, one for *Diopsis* with a black or brown abdomen and the other for *Diopsis* with an abdomen that is largely or completely red. Lindner (1962) gave a key for *Diopsis* with a red abdomen. Feijen (1978) gave keys for *Diopsis* with a large apical wing spot and for dark *Diopsis* with banded wings. Feijen (1984) briefly reviewed black *Diopsis* with irregularly infuscated wings. Below, a provisional subdivision of *Diopsis* is given. This subdivision is intended as a first guide only into the genus. Subsequent subdivisions need to be based on descriptions of male and female genitalia and DNA analyses. For future species descriptions, the importance of pollinosity patterns on the dorsal thorax has to be stressed. The greater number of *Diopsis* species remains to be described, while many of the existing species need to be redescribed.

1. **The *circularis* Macquart group:** dark *Diopsis* with banded wings. This is the easiest group to recognise with a mainly dark grey to black colour, though some parts can be reddish brown. The wing has dominant dark bands; the most central one of

these dark bands is almost round. Feijen (1978) gave a key for this group and proposed a number of synonymies. However, Feijen (1984) reconsidered some of these synonymies. In any case, the group comprises *circularis* Macquart, 1835, *ornata* Westwood, 1837, *pollinosa* Adams, 1903 and *munroi* Curran, 1929. This concerns *macquartii* Guérin-Méneville, 1837-1844, *curva* Bertoloni, 1861, *aries* Hendel, 1923, *conspicua* Eggers, 1925 and *globosa* Curran, 1931.

2. **The *carbonaria* Hendel and *gnu* Hendel groups:** Blackish *Diopsis* with irregularly infuscated wings. Feijen (1984) divided the eleven black species into two groups. The first group was referred to as the *carbonaria*-group and is characterised by tiny IVB and OVB and strongly incrassate front femora. It includes *carbonaria* Hendel, 1923, *melania* Eggers, 1925, *aterrima* Brunetti, 1926, *diversipes* Curran, 1928, *baigumensis* Séguy, 1955, *nitela* Séguy, 1955 and, probably, *nigrasplendens* Feijen, 1984. The second group was referred to as the *gnu*-group and is characterised by the presence of inner and outer spines on the stalks (replacing IVB and OVB) and hardly incrassate front femora. It includes *gnu* Hendel, 1923, *acanthophthalma* Eggers, 1925, *angustifemur* Brunetti, 1926, *anthracina* Brunetti, 1928 and *orizae* Séguy, 1955.

3. **The *apicalis* Dalman group:** *Diopsis* with brown head, thorax without cross-like pattern of pollinosity and almost always a large apical wing spot, living in open habitat (savannah, swamps). This is, no doubt, the largest group of *Diopsis* with many undescribed species (Feijen, 1987). It includes *apicalis* Dalman, 1817 (= *tenuipes* Westwood, 1837) and *lindneri* Feijen, 1978, but also the well-known rice diopsid *longicornis* Macquart, 1835 (= *thoracica* Westwood, 1837 and *phlogodes* Hendel, 1923), which has only some apical infuscation on the wing. The *apicalis* group is more closely related to the *cruciata* and *fumipennis* groups than to the other groups.

4. **The *cruciata* Curran group:** *Diopsis* with brown head, thorax with cross-like pollinosity pattern and a large apical wing spot. The species in this group are (rain) forest dwellers. This group is superficially very similar to the *apicalis* group and its species are often found under '*apicalis*' labels in museum collections. So far, it only includes *cruciata* Curran, 1934, though another 15 species await description. This group might also include *eisentrauti* Lindner, 1962, but its thoracic cross is not complete and it has wrinkled, sausage-shaped spermathecae instead of the usual round spermathecae.

5. **The *fumipennis* Westwood group:** *Diopsis* with black head and a large apical wing spot. Pollinosity pattern on the thorax is variable; usually no cross-like pattern, but *fumipennis* itself has a cross. Species can occur in savannah habitat or forest habitat.

The group includes *fumipennis* Westwood, 1837, *punctiger* Westwood, 1837, (= *trentepohlii* Westwood, 1837), *atricapillus* Guérin-Méneville, 1837-1844, *fascifera* Eggers, 1925 and many undescribed species.

6. **The *indica* Westwood group:** Asian *Diopsis* with an apical wing spot, abdomen with black base or tip and sometimes completely black. For the moment, the systematics of this group is complicated given summary original descriptions and questionable origins. As this group is considerably larger than earlier anticipated, it appears better to disregard, for the moment, earlier proposed synonymies. Next to *indica* Westwood, 1837, the group then includes *graminicola* Doleschall, 1857 and *westwoodii* Westwood, 1848. It is not unlikely that *abdominalis* Westwood, 1837, and *assimilis* Westwood, 1837 are of Asian origin and would also belong to this group. A recent addition was *chinica* Yang & Chen, 1996.

7. **The *ichneumonea* Linnaeus group:** *Diopsis* with a distinctive preapical wing spot. This group might have to be split into two groups: slender forest *Diopsis* and more broadly built savannah *Diopsis*. This group is large and contains already quite some described species: *ichneumonea* Linnaeus, 1775, *arabica* Westwood, 1837, *basalis* Brunetti, 1926, *collaris* Westwood, 1837, *dimidiata* Curran, 1929, *erythrocephala* West 704 Feijen & Feijen. *Diopsis* with unusual wing spots: two new species. Zool. Med. Leiden 83 (2009) wood, 1837, *hoplophora* Hendel, 1923, *macromacula* Brunetti, 1926, *nigriceps* Eggers, 1925, *pallida* Westwood, 1837, *planidorsum* Hendel, 1923, *praeapicalis* Speiser, 1910, *rubriceps* Eggers, 1925 and *somaliensis* Johnson, 1898 (= *lunaris* Hendel, 1923).

8. **The *servillei* Macquart group:** clear winged *Diopsis*. This is not so well-defined group of rather dissimilar species. The colour varies from the common brown head, black thorax, brown abdomen to almost completely black. It includes *servillei* Macquart, 1843, *affinis* Adams, 1903, *diversipes* Curran, 1928, *fl avoscutellata* Brunetti, 1928, *sulcifrons* Bezzi, 1908 (= *maculithorax* Brunetti, 1928) and a few undescribed species. Most species are savannah-dwelling.

9. **The *absens* Brunetti group:** slender forest diopsids with no or minor wing markings, brown head, black thorax and brown abdomen with often black base. It includes *absens* Brunetti, 1926, *finitima* Eggers, 1916, *micronotata*, *malawiensis* spec. nov. and *vanbruggeni* spec. nov.

***Diopsis apicalis* Dalman, 1817**

Diopsis apicalis Dalman, 1817: 216. Sierra Leon; Widespread Afrotropical region.

Synonymy : *tenuipes* Westwood, 1837 : 298. Arabia desert.

General Characters:

Length: male 8.4 – 9.1 mm., female 1.1- 1.4 mm.

Color: Fig (I) Dorsocentral part of head glossy brown; ocellar tubercle blackish, arcuate groove dark brown; face glossy brown, slightly paler than frons, with hardly discernable fine horizontal lines glossy brown, anteriorly with a darker brown stripe towards antennae, broad apical parts blackish, pollinose; Thorax.— Collar glossy black, posterior margins pollinose dorsally pleura and sterna uniformly black pollinose, scutellum brown pollinose, dorsolaterally more blackish, scutellar spines glossy brown with a dark gradually toward tip, twice the length of scutellum. Wing.— Almost hyaline; apically, gradually darkend toward the apex especially arrowed the veins, in cell r2+3 a tiny blackish spot reaching vein R4+5 but staying clear of vein R2+3; some hardly discernable infuscation at apical tip of cell m, some minute infuscation in cell r4+5; vein R4+5 just curving upwards apically, Legs.— Front leg yellowish brown with somewhat darker tibia and tarsi, tibia with dark stripe on both sides; mid leg yellowish brown with slightly darker tibia and tarsi, femur 2 with small dark spots distally; hind leg yellowish brown with darker tibia and tarsi, femur 3 with small dark spots distally, tibia 3 with darker basal and distal third; femur

1 incrassate in both ♀ and ♂, Preabdomen.- Tergum 1 blackish, tergum 2 blackish brown but brown posterolaterally, tergum 3 brown with dark brown mesal band remaining terga yellowish brown remaining terga yellowish

brown sternum 1 glossy dark brown, not fused to syntergum, sternum 2 brown, other sterna yellowish brown

Head: Fig (II, III, IV and 1,2,3,4)

Diopsidae are unique in that both males and females of all the species within the family have some degree of head modification. *Diopsis apicalis* can be recognized by the smooth frons, elongated and pointed facial teeth, minute inner vertical bristles, Face mainly smooth, centrally with a fine granular structure, around this granular area

some very fine ridges; face slightly paler than frons, with hardly discernable fine horizontal lines, mesocentrally bulging outwards, covered with fine whitish hairs.

Thorax: Fig (V, VI and 5, 6)

Posterior margins pollinose dorsally; narrow pollinose stripe on the meson, lateroventrally pollinose; scutellar spines twice the length of scutellum, almost straight, almost in line with the dorsal scutellum, diverging under an angle of 55° (figs 6); metapleural spines; short, blunt, posterolaterally directed; some fine white hairs on thorax, scutellar spines with about ten hairs, no basal warts. Wing.- Almost hyaline; apically in cell r₂₊₃ a tiny blackish spot (figs VI, 5), reaching vein R₄₊₅; some hardly discernable infuscation at apical tip of cell m, some minute infuscation in cell r₄₊₅; vein R₄₊₅ just curving upwards apically, while vein M just curving upwards apically, leading to a cell r₄₊₅ which is distinctly broader apically than subapically; 'former' base of vein A₁+CuA₂ and place of former crossvein Bm-Cu just indicated; covered with microtrichia except for glabrous basal areas; glabrous basal areas include cell c (except for anterior apical half), basal tip of cell r₁, basal two-thirds of cell br, basal half of cell bm and basal half of cell cu. Basal wing surrounded with condensed hairs. Legs; femora 2 and 3 slightly swollen and with small apical spur.

Female postabdomen.- Straight, not deflexed; tergum (6) a rectangular sclerite, tergum (7) consisting of two rectangular sclerites, narrowly separated on the meson; tergum (8) a narrow rectangular sclerite; tergum (10) with 3 pair of hairs, cerci broad (fig. 7), ratio of length/width 1.3, covered with microtrichia and hairs; sterna (5) and 6 single rectangular sclerites; sternum (7) a single, somewhat curved rectangular sclerite with posteriorly a row of small black spines on the meson; sternum 8 represented by two rectangular sclerites; spiracle (7) in membrane; **Male postabdomen.**- Straight, sometimes slightly deflexed; epandrium rounded, with about 22 pairs of hairs, covered with microtrichia; surstyli articulated, basal half straight and slender, apically strongly broadening, apically slightly constricted in the middle, in lateral view somewhat bone-shaped, in posterior view more spatula-shaped, on apical half, especially at the tip with short hairs, no microtrichiae; surstyli interconnected via thin, hardly visible processus longi; cerci simple, somewhat triangular, broad, ratio length/width 1.8, covered with microtrichia and hairs; phallapodeme rather slender, anterior arm with rounded apical corners and about equal in length to posterior arm; ejaculatory apodeme gradually broadening anteriorly with blunt corners (Feijen, 1998).

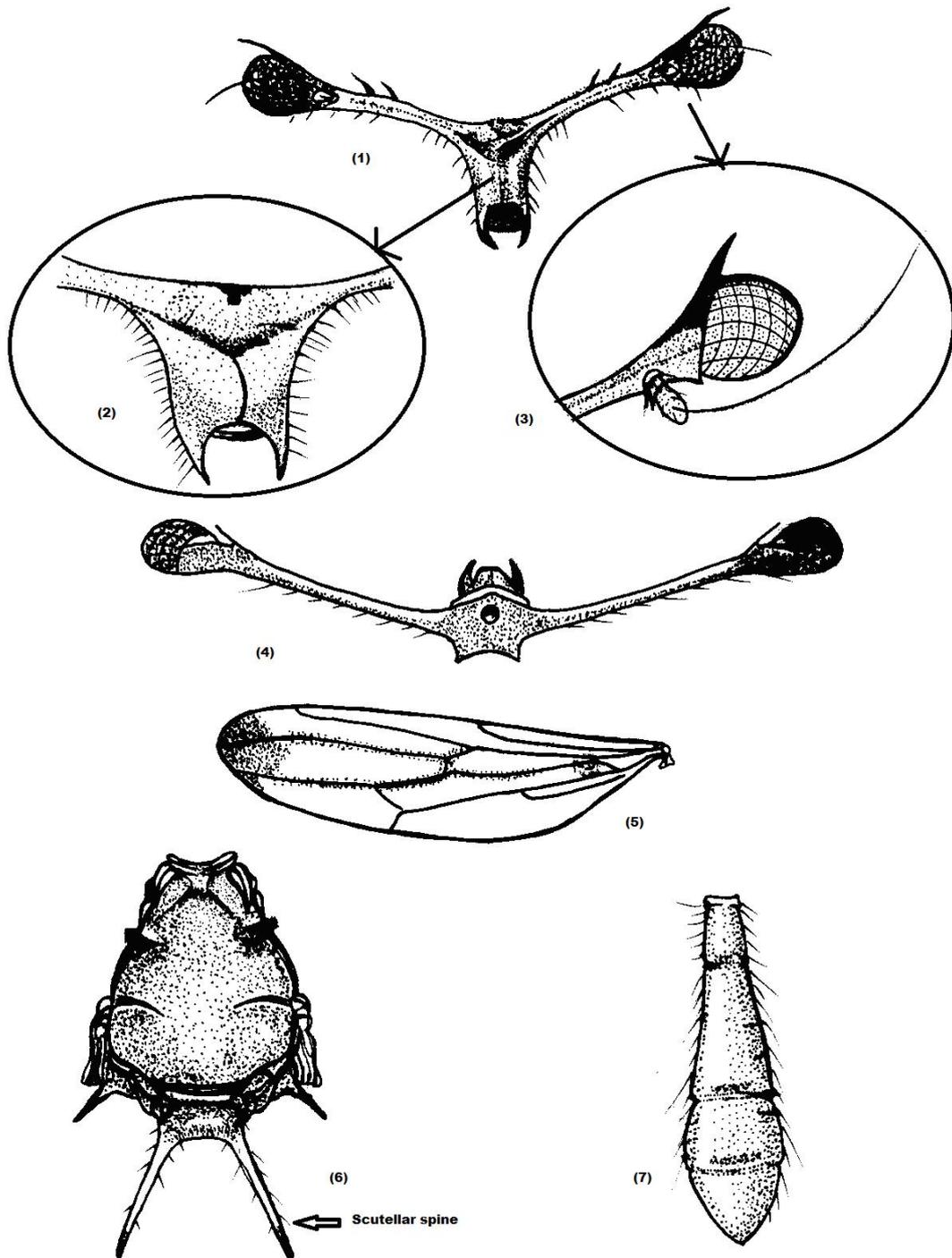
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Diopsis apicalis

- (1) Head of female, anterior view (10X). (2) Mouth part, Anterior view (20X).
(3) Antennae, ventral view (20X). (4) Head of male, Dorsal view (10X).
(5) Wing (10X). (6) Thorax, dorsal view (10X). (7) abdomen of female (10X).



Fig. (I): Adult of *Diopsis apicalis*



Fig. (II): Head of *Diopsis apicalis*



Fig. (III): mouth part of *Diopsis apicalis*
(anterior view)



Fig. (IV): mouth part of *Diopsis apicalis*



Fig. (V): thorax (Dorsal view)



Fig. (VI): Wing venation

ARABIC SUMMARY

وصف عائلة ديوبزیدی تحت رتبة ذات الجناحين التي تسجل لأول مرة في مصر والنوع التابع لها

أيمن محيي الدين ابراهيم

معهد بحوث وقاية النباتات – قسم بحوث الحصر والتصنيف

أشتملت الدراسة على وصف النوع *Diopsis apicalis* (فصيلة ديوبزیدی – رتبة ذات الجناحين) المسجل لأول مرة في مصر في هذا العمل وهو ممثل بالمجموعة الرئيسية بوزارة الزراعة بمعهد بحوث وقاية النباتات بحوالي ٢٥ عينة غير معرفة. جمعت كلها من منطقة أرمنت محافظة أسيوط سنة 1963 تم الأستعانة بمفاتيح تصنيفية عديدة في رتبة ذات الجناحين لمحاولة الوصول للعائلة التابع لها هذا النوع وكانت هي عائلة Diopsidae وهي غير ممثلة بالفونة المصرية متم تعريف النوع بواسطة البروفيسور Hans Fiejin وهذا النوع ذو أهمية اقتصادية فهو يصيب وبشكل مباشر الأرز وقصب السكر وكذلك الذرة الصيفية وهذا في الطور اليرقي لذلك كان من الضروري التعرض في هذه الدراسة لدورة حياة هذا النوع بالأضافة لأماكن تواجدة وفترات أنتشاره بالأضافة للوصف التصنيفي الكامل مع وضع الرسومات التوضيحية اللازمة والتي تبين الأجزاء الأساسية له لتسهيل تعريفه.

كذلك تم اعطاء وصف موجز للفصيلة والجنس *Diopsis* التابع لها وكذلك مجموعات الأنواع Species groups التابعة لهذا الجنس وذلك للتعريف بهذه الفصيلة ووضعها التصنيفي. وضعت كل المراجع المستخدمة في هذه الدراسة لأتاحة التعرف بشكل كامل على هذا النوع وما سببه من أضرار خاصة في دول أفريقيا وسبل مكافحته.