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 meristem 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
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 infusion 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, f. avoscutellata Brunetti i, 1928, sulcifrons Bezzi, 1908 (= maculithorax Brunetti i, 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 oft en 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.


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 tuberle 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
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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; sternum (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).
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
وصف عائلة ديوزية تحت رتبة ذات الجناحين التي تسجل لأول مرة في مصر والنوع التابع لها

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تتناول الدراسة على وصف النوع Diopsis apicalis (فصيلة ديوزية - رتبة ذات الجناحين) المسجل لأول مرة في مصر في هذا العمل وهو ممثل بالمجموعة الرئيسية بوزارة الزراعة ومعهد بحوث وقاية النباتات بحوالي 25 عينة غير معرفة. جمعت كلها من منطقة أرمنت محافظة أسوان سنة 1963 ثم الاستعانة بمفاتيح تصنيفية عديدة في رتبة ذات الجناحين لمحاولة الوصول للعائلة التابع لها هذا النوع وكانت هي عائلة Diopsidae وهي غير ممثلة بالفصول المصرية. تم تعريف النوع بواسطة البروفيسور Hans Fiejin النوع ذو أهمية اقتصادية فهو يصيب ويشكل مباشر الأرز وقصب السكر وكذلك النزعة الصيدية، ولهذا ينتشر في الصحراء. البري في ذلك كان من الضروري التعرض في هذه الدراسة لدراسة حياة هذا النوع بالإضافة لأماكن تواجد وفترات انتشاره بالإضافة إلى وصف تصنيفي الكامل مع وضع الرسومات التوضيحية اللازمة والتي تبين الأجزاء الأساسية له تفاعلية.

كذلك تم إعطاء وصف موجز للفصيلة والجنس Diopsis التابع لها وكذلك مجموعات الأنواع Species groups وظلت كل المراجع المستخدمة في هذه الدراسة لإتمام التعرف بشكل كامل على هذا النوع وما سبب

من أضرار خاصة في دول أفريقيا وسبيل مكافحتها.