

## The Dictyopharidae (Homoptera: Cicadina: Fulgoroidea) of Israel

ALEXANDER F. EMELJANOV,<sup>1</sup> TIRZA STERN,<sup>2</sup> AND AMNON FREIDBERG<sup>2</sup>

<sup>1</sup>Zoological Institute, Russian Academy of Sciences, Universitetskaya nab., 1, 199034, St. Petersburg, Russia. E-mail: hemipt@zin.ru

<sup>2</sup>Department of Zoology, The George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv 69978, Israel (E-mail: tirza@post.tau.ac.il; afdipter@post.tau.ac.il)

### ABSTRACT

Sixteen species of Dictyopharidae (*Tachorga*—2 species, *Nymphorgerius*—1 species, *Coppa*—2 species, *Dictyophara*—9 species, and *Raivuna*—2 species) are recorded from Israel, and an illustrated key for their identification is provided. The general distribution of the species and collection data in Israel are given.

KEYWORDS: Dictyopharidae, Israel, key, illustrations, distribution

### INTRODUCTION

Dictyopharidae (plant hoppers) are a moderately-large family of Fulgoroidea with about 730 species (Emeljanov, unpublished data). They are medium-sized insects (length usually 5–15 mm, but up to 26 mm), often with strongly modified head bearing a distinct cephalic process. They are primarily distributed in arid, semiarid, and tropical countries, and are obligate terrestrial phytophages usually collected from herbs, grass, and shrubs, but little is known about their life habits. Some of them are agricultural pests, such as *Retiala viridis* Fennah, which is a minor pest of coffee (Richards and Davies, 1977). The adults are mostly active in the summer, and the mode of life of the nymphs is similar to that of the adults.

Two subfamilies are known: Dictyopharinae—generally macropterous and larger (10–26 mm long), usually with anteriorly prolonged head; and Orgeriinae—brachypterous (flightless) and smaller (up to 10 mm), with thickened short tegmen and rounded body (Emeljanov, 1964).

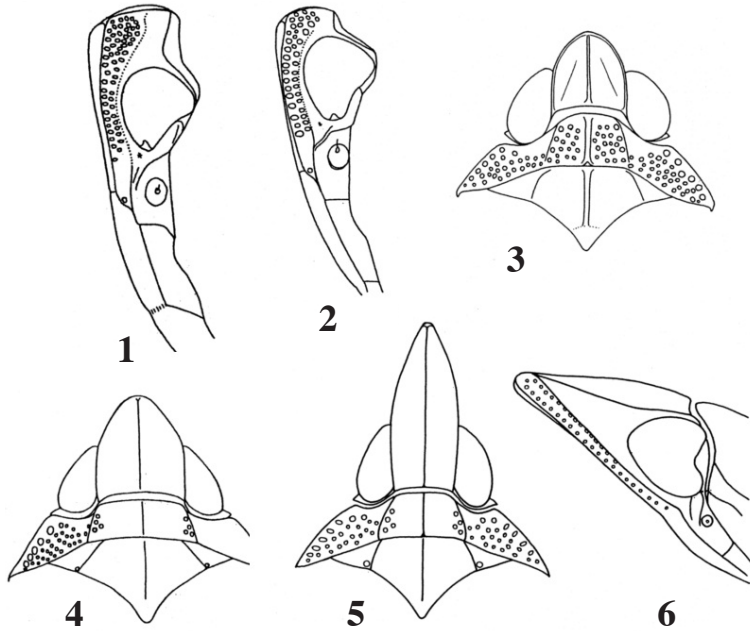
Little is known about the Dictyopharidae fauna of Israel. Bodenheimer (1937) recorded three species from Palestine (under Cixiidae): *Dorysathrus mobilicornis* Puton, *Dictyophara multireticulata* Mulsant and Rey and *D. unicolor* Signoret var. *vittata* Puton. Linnavuori (1962) recorded 9 species and 2 subspecies from Israel, including two newly described species and two newly described subspecies. The total number of known species and subspecies in Israel prior to the present publication was 10, as *Dorysathrus* Puton was transferred to the family Fulgoridae (Emeljanov, 1979).

In the present publication we record 16 (including five newly recorded) species from Israel primarily based on material from the National Collection of Insects, Department of Zoology, Tel Aviv University, Israel (TAUI). For each species we provide all available unpublished collecting records, and the general distribution is based on the literature and on AFE's unpublished records. Comments are given wherever appropriate. A key to the Israeli species is provided, with the terminology essentially following Anufriev and Emeljanov (1988) and Emeljanov (1995) (with coryphe = vertex and metope = frons).

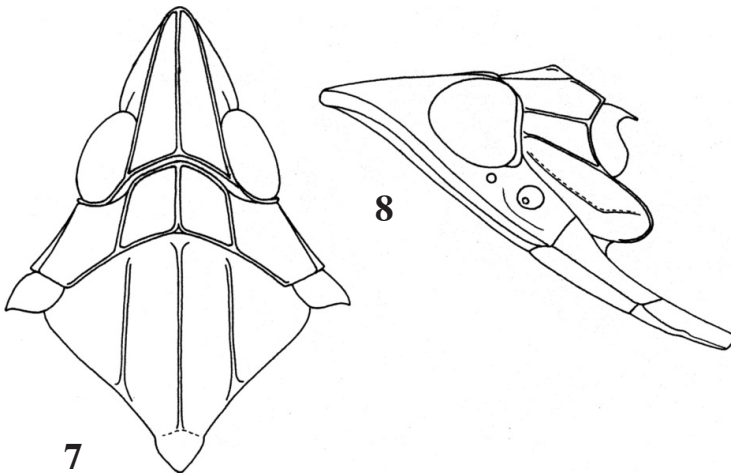
Transliterated names of localities in Israel are according to the "Israel Touring Map" (1:250,000) and "List of Settlements", published by the Israel Survey, Ministry of Labor. Where names of localities have changed, the most recent transliterated Hebrew names are given together with the old names cited in brackets, for example: 'En Hemed [Aquabella]. Erroneous spellings are also included in brackets following the corrected spelling.

### KEY TO DICTYOPHARIDAE OF ISRAEL

1. Brachypterous, most of the abdomen not covered by tegmen. Tegula absent. Ocellus absent. Head, pronotum, and abdominal tergites with sensory pits (Orgeriinae) ..... **2**
- Macropterous, abdomen completely covered by tegmen. Tegula present. Ocellus present. Sensory pits absent (Dictyopharinae) ..... **6**
2. Coryphe not flat, divided longitudinally into three sections situated at an angle to each other (*Tachorga* Emeljanov) ..... **3**
- Coryphe flat, not divided longitudinally into sections ..... **4**
3. Cephalic process protuberant, almost forming isosceles triangle in lateral view; height of triangle above dorsal margin of eye about equal to height of eye (Fig. 1); main longitudinal veins of tegmen clearly raised ..... *Tachorga recurviceps* **Linnavuori**
- Cephalic process less protuberant, forming equilateral triangle in lateral view; dorsal corner larger than right angle, triangle above dorsal margin of eye about half as high as eye (Fig. 2); main longitudinal veins of tegmen not clearly raised ..... *Tachorga adiplasta* **Emeljanov**
4. Disc (middle part) of pronotum with more than three rows of sensory pits on each side. Coryphe quite flat transversely (Fig. 3) (*Nymphorgerius* Oshanin) ..... *Nymphorgerius gemmatus* (**Horváth**)
- Disc of pronotum with one row of sensory pits on each side and one pit out of row. Coryphe slanting tectiform (*Coppa* Emeljanov) ..... **5**
5. Head rather short; coryphe 1.2-1.3 times as long as broad, about as long as pronotum and scutellum combined; less than half of coryphe length protruding anterior to eye (Fig. 4) ..... *Coppa volkovitshi* **Emeljanov**
- Head long; coryphe more than twice as long as broad, more than 1.5 times as long as pronotum and scutellum combined; about 0.6 of coryphe length protruding anterior to eye (Figs. 5, 6) .. *Coppa huldaensis* (**Linnavuori**)
6. Lateral carina of disc of pronotum present. Lateral carina of anteclypeus distinct basally and indistinct apically. Ventral part of intermediate carina more or less distinct (*Dictyophara* Germar) ..... **7**
- Lateral carina of disc of pronotum absent, at most indicated by color. Lateral carina of anteclypeus distinct throughout and nearly straight. Intermediate carina of metope ventrally indistinct (*Raivuna* Fennah) ..... **15**

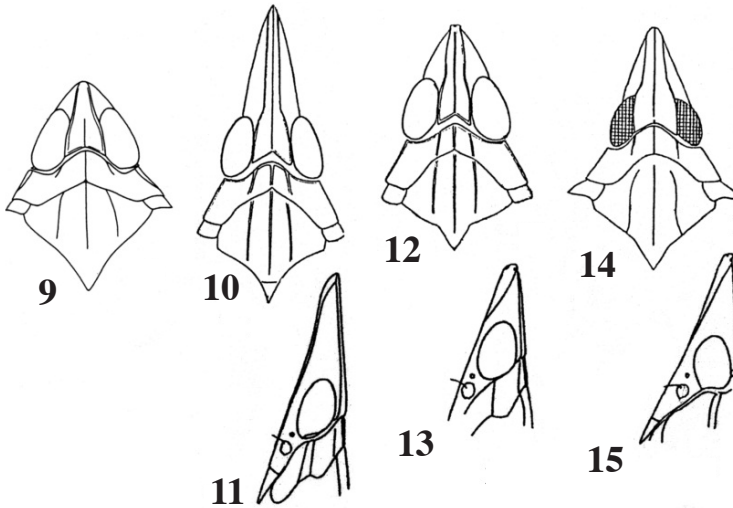


Figs. 1–6. Subfamily Orgeriinae, *Tachorga*, *Coppa* and *Nymphorgerius*. 1. *Tachorga recurviceps* Linnavuori, head, left lateral view. 2. *Tachorga adiaplasta* Emeljanov, head, left lateral view. 3. *Nymphorgerius gemmatus* (Horváth), anterior part of body, dorsal view. 4. *Coppa volkovitshi* Emeljanov, anterior part of body, dorsal view. 5. *Coppa huldaensis* Linnavuori, anterior part of body, dorsal view. 6. *C. huldaensis*, head, left lateral view (5, 6—Linnavuori, 1962, with permission).

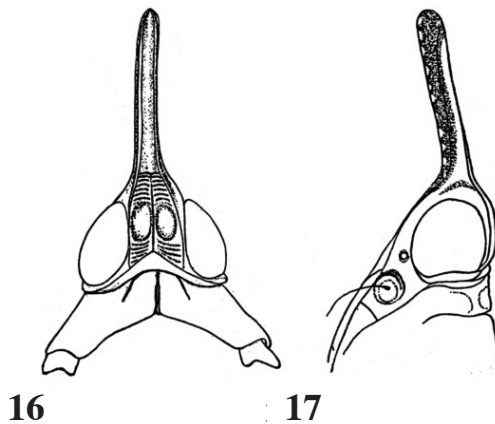


Figs. 7, 8. *Dictyophara multireticulata* Mulsant and Rey (subgenus *Euthremma* Emeljanov). 7. Anterior part of body, dorsal view; 8. Anterior part of body, left lateral view.

7. Cephalic process cuneiform in dorsal view, comparatively short, apex narrowed to subacuminate..... **8**  
 -. Cephalic process long, nearly cylindrical, apex widely rounded ..... **11**  
 8. Lateral carina of coryphe straight, without tortuosity before eye (Figs. 7, 8) (Subgenus *Euthremma* Emeljanov)..... *Dictyophara multireticulata* Mulsant and Rey  
 -. Lateral carina of coryphe with tortuosity before eye (Subgenus *Dictyophara*) ..... **9**

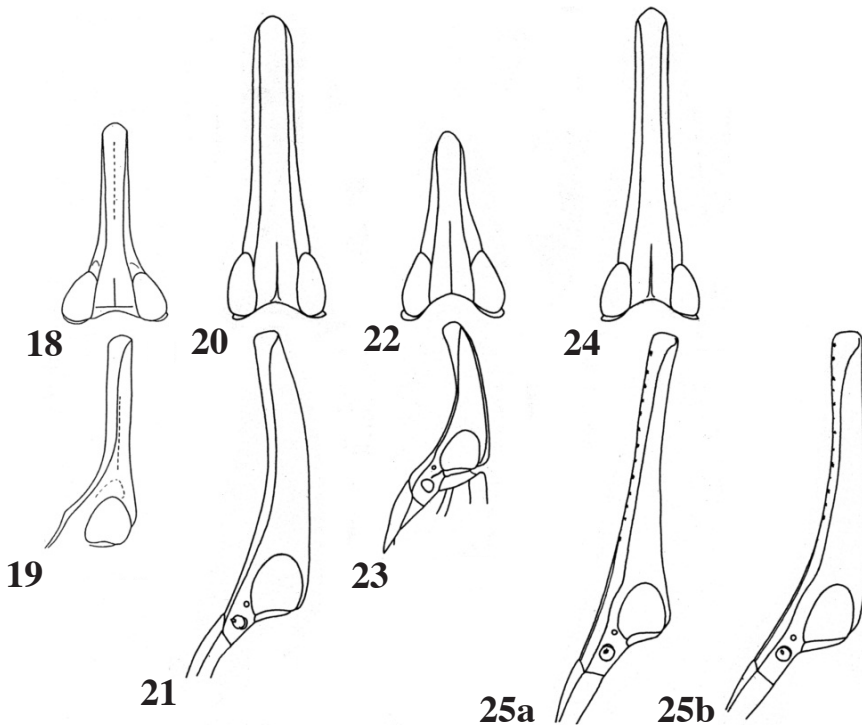


Figs. 9–15. *Dictyophara* (*Dictyophara*). 9. *D. eremica* Linnavuori. 10, 11. *D. lindbergi* Metcalf. 12–15. *D. subsimilis* Linnavuori (9, 10, 12, 14. anterior part of body, dorsal view; 11, 13, 15. anterior part of body, left lateral view). (9, 14, 15—Linnavuori, 1953, 1962, with permission; 10–13—Lindberg, 1948).

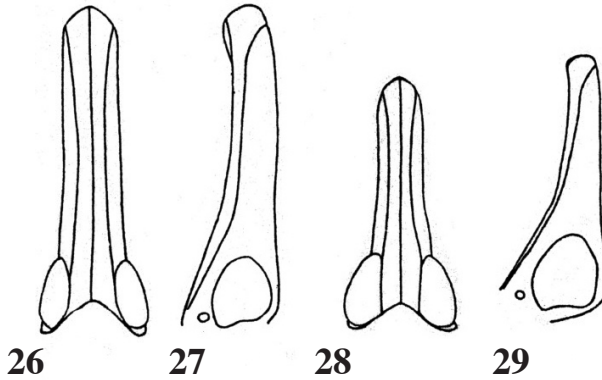


Figs. 16, 17. *Dictyophara* (subgenus *Conopenchus* Emeljanov) *pazukii* Dlabola, anterior part of body, dorsal view (16); left lateral view (17).

9. Coryphe protrudes anterior to eye by less than half of its length (Fig. 9).....  
 ..... *Dictyophara eremica* Linnavuori
- . Coryphe protrudes anterior to eye by more than half of its length..... **10**
10. Coryphe protrudes anterior to eye by about 0.75 of its length (Figs. 10, 11).....  
 ..... *Dictyophara lindbergi* Metcalf
- . Coryphe protrudes anterior to eye by no more than 0.69 of its length (Figs. 12–15) .....  
 ..... *Dictyophara subsimilis* Linnavuori
11. Cephalic process narrow, in apical 0.66 subparallel-sided. Coryphe anterior to eye tapered rather abruptly (Fig. 16) (Subgenus *Conopenchus* Emeljanov) ..... **12**
- . Cephalic process thick, coryphe anterior to eye as wide as on metope or tapered gradually (Fig. 20) (Subgenus *Chanithus* Kolenati)..... **13**
12. Metope on cephalic process about 0.25 times as wide as at hind margin of head (Figs. 16, 17)  
 ..... *Dictyophara pazukii* (Dlabola)
- . Metope on cephalic process about 0.5 times as wide as at hind margin of head (Figs. 18, 19).  
 ..... *Dictyophara pales* Linnavuori
13. Cephalic process more than four times as long as longitudinal diameter of eye. Metope weakly convex in lateral view (Figs. 20, 21) ..... *Dictyophara longirostris* Walker



Figs. 18–25. *Dictyophara* (subgenus *Chanithus* Kolenati and subgenus *Conopenchus* Emeljanov), Head, dorsal view (18, 20, 22, 24) and left lateral view (19, 21, 23, 25a,b). 18, 19. *D. pales* Linnavuori; 20, 21. *D. longirostris* Walker; 22, 23. *D. compacta* Linnavuori; 24, 25a,b. *D. xiphias* Puton (18, 19, 22, 23—Linnavuori, 1962, with permission; 24, 25—Dlabola, 1994).



Figs. 26–29. *Raivuna* Fennah, head, dorsal view (26, 28) and left lateral view (27, 29). 26, 27. *R. albostriata* Linnavuori. 28, 29. *R. striata* Oshanin (Linnavuori, 1962, with permission).

- Cephalic process less than 3.5 times as long as longitudinal diameter of eye. Metope concave or convex in lateral view ..... **14**
- 14. Apex of cephalic process in lateral view slightly bent ventrally. Metope convex (Figs. 22, 23) ..... *Dictyophara compacta* Linnavuori
- Cephalic process more or less straight, apex not bent ventrally. Metope slightly concave or straight (Figs. 24, 25a,b) ..... *Dictyophara xiphias* Puton
- 15. Cephalic process about 4 times as long as eye, not narrowed to apex in lateral view and thicker (Figs. 26, 27) ..... *Raivuna albostriata* (Linnavuori)
- Cephalic process about 3 times as long as eye, narrowed to apex in lateral view and thinner (Figs. 28, 29) ..... *Raivuna striata* (Oshanin)

## SPECIES ACCOUNT

### Dictyopharinae

#### *Dictyophara (Chanithus) compacta* Linnavuori, 1962

(Figs. 22, 23)

#### Material Examined

ISRAEL: Yerushalayim [Jerusalem], 12.vi.1959, J. Wahrman (1♂); 'Enot Qane [Ein Turaba], 8.v.1974, D.G. Furth (1♀); Mizpe Shalem Palms, South, 9.iv.1986, G. Eldar (1♂); 'En Gedi [Ein-Gedi], 9.v.1974, D.G. Furth (1♂, 6♀).

EGYPT: W[adi] A'sheikh, 25.v.1971, A. Freidberg (1♂, 1♀); Wadi Tubug, 1600 m, 23.vi.1998, A. Freidberg and F. Kaplan (1♀); Sinai Mts., El-Arbain, 14.vii.1974, F. Kaplan (1♂).

#### General Distribution

Israel, Jordan, Egypt.

**Comments**

Originally described as a subspecies of *Dictyophara xiphias* Puton.

***Dictyophara (Chanithus) longirostris* Walker, 1851**

(Figs. 20, 21)

**Material Examined**

ISRAEL: Panyas [Baniass], 9.ix.1981, A. Freidberg (1♀); 'Ez Efrayim, 14.vi.1996, L. Friedman (1♀); 'Arad, 20.v.1971, Faunistics (1♂); Naḥal Sekher [Naḥal Secher], 19.vii.1984, A. Freidberg and F. Kaplan (1♂, 3♀); 17.vii.1985, A. Freidberg and I. Susman (8♂, 8♀); Naḥal Sekher, 9.vii.2001, L. Friedman and A. Freidberg (2♂, 3♀); Bor Mashash, 16.vi.1986, A. Freidberg (3♂, 6♀); 21.vii.1986, A. Freidberg (1♂, 2♀); 16.vi.1986, F. Kaplan (1♂, 3♀); Mash'abbe Sade, 21.vii.1986, T. Feler (1♀); Sedé Boqér, 29.v.2002, A. Freidberg and L. Friedman (5♂, 5♀); 'Avedat [Avdat], 16.vi.1986, A. Freidberg (2♂); Naḥal Zin, Rt. 40, Near 'Avedat, 29.v.2002, L. Friedman (1 Juvenile); HaMeshar, 21.vi.1995, A. Freidberg (2♂); 16.vi.1986, G. Eldar (1♂); Har Ha'Negev, 29.vi.1994, I. Herold (1♂); Har Ḥarif, Rt.171, 900 m, 29.vi.1994, A. Freidberg (1♂).

**General distribution**

Portugal, Spain, Israel, Georgia, Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan.

**Comments**

New to Israel. *Chanithus hastatus* Kusnezov and *Ch. centroasiaticus* Dubovsky are treated as junior synonyms of *Dictyophara (Chanithus) longirostris*.

***Dictyophara (Chanithus) xiphias* Puton, 1884**

(Figs. 24, 25)

**Material Examined**

ISRAEL: Karmel [Carmel], 30.viii.1978, A. Freidberg (1♂); Naḥal Oren, 25.vii.2002, A. Freidberg (1♀); Naḥal Oren [N.Oren], 27.v.1999, V. Chikatunov and T. Pavlíček, Light, NFS6 (1♂); Tel 'Aran, 6.vii.1996, R. Hoffman (1♂); Naḥal Qana Reserve, Qarne Shomeron, 5 km SW, 290 m, 32°08'N 35°04'E, 9.vii.2007, T. Stern, L. Friedman, and A. Freidberg (8♂, 7♀); Naḥal Qana Reserve, Qarne Shomeron, 6.5 km SW, 120 m, 32°08'N 35°02'E, 9.vii.2007, A. Freidberg and L. Friedman (4♂, 3♀); Burma road, Naḥal Me'ir, 21.vii.2002, T. Stern (1♀); Har Tayyasim, 21.vii.2002, A. Freidberg (1♀); Keshalon, 21.vii.2002, A. Freidberg (1♂, 1♀); Kefar Ezyon, 1941, Ch. Bytinski-Salz (1♂).

**General Distribution**

Israel, Jordan.

**Comments**

Among typical specimens of *D. xiphias* are several that have longer cephalic process, possibly representing intraspecific variation.

***Dictyophara (Conopenchus) pales* Linnavuori, 1970**

(Figs. 18, 19)

**Material Examined**

ISRAEL: Berekhat haMeshushim [Brechat Ha'Meshushim, nr.], 21.v.1970, K. Yefenof (1♂); Yehudiyya [Jehudiya], 2.vi.1975, D. Gerling (1♀); Ramot Naftali, 22.v.2002, T. Stern (1♀); Kefar Naḥum [Kfar Nachum], 29.iv.1942, Y. Palmoni (1♂).

**General Distribution**

Israel.

**Comments**

Described by Linnavuori from Israel without citing specific localities.

***Dictyophara (Conopenchus) pazukii* Dlabola, 1984**

(Figs. 16, 17)

**Material Examined**

ISRAEL: Bet Guvrin [Bet Govrin], 5.vi.1969, J. Kugler (1♀); Lahav, 18.v.1978, D. Simon (1♂, 1♀).

**General Distribution**

Iran (Lorestan), Israel.

**Comments**

New to Israel.

***Dictyophara (Dictyophara) eremica* Linnavuori, 1962**

(Fig. 9)

**Material Examined**

ISRAEL: 'En Gedi, 17.v.1960, Ch. Bytinski-Salz (1♂, 1♀); 17.v.1960, Ch. Bytinski-Salz (1♀); 16.viii.1957, J. Wahrman (1♂); Naḥal Peres, 1.vi.1998A. Freidberg, Light trap (1♂).

**General Distribution**

Israel, Sudan (Kassala Province).

**Comments**

Described from Israel.



***Dictyophara (Dictyophara) lindbergi* Metcalf, 1955**

(Figs. 10, 11)

**Material Examined**

'En Zetim, 28.v.2003, A. Freidberg (1♂); Yerushalayim, 23.v.1966, Katznelson & J. Wahrman (3♂); Nizzanim, 6.vi.2000, L. Friedman (1♂).

**General Distribution**

Bulgaria, Turkey (Anatolia), Cyprus, Israel.

**Comments**

New to Israel. The name *Dictyophara acuminata* Lindberg (1948) was replaced by *Dictyophara lindbergi hispanica* Linnavuori (1965). The latter is probably distinct from *D. (D.) lindbergi* sensu stricto on the species level.

***Dictyophara (Dictyophara) subsimilis* Linnavuori, 1953**

(Figs. 12–15)

**Material Examined**

ISRAEL: Panyas, 33°15'N 35°42'E, 5.vi.2002, L. Friedman (1♂, 2♀); Tel Hay, 7.x.1973, D.G. Furth (1♂); Qiryat Shemona [Qiriat Shemona], 30.ix.1968, M. Pener et al. (1♂); Gonen, 12.v.1973, D.G. Furth (1♂); Kinneret, 14.vi.1979, D.G. Furth (1♂); 'En Te'o [En-Teo], 26.vii.1973, D.G. Furth (1♀); Ramot Naftali, 22.v.2002, T. Stern (1♀), 28.v.2003, L. Friedman (2♀); Hula, 16.x.1961, L. Fishelsohn (1♀); Gadot, 18.vi.1973, D.G. Furth (1♂); Nahal Dishon [N. Dishon], 14.v.1973, M. Kaplan (1♂); Biq'at Bet Zayda [Betecha], 6.v.1973, D.G. Furth (1♂); Biq'at Bet Zayda, Bet HaBeq, 16.vi.1975, Faunistics (1♀); Park HaYarden, 25.vii.1983, Y. Zvik (1♂, 1♀); Har Meron [Jarmaq], 16.v.1960, L. Fishelsohn (1♀); Nahal Oren, 30.v.1998, A. Freidberg (1♀); Nahal Oren, 2.vi.2003, A. Freidberg (1♂, 1♀); Tavor, 12.ix.1973, D.G. Furth (1♂, 1♀); Berekhat Ya'ar, 7.vii.2005, L. Friedman (1♂); 26.ix.2004, A. Freidberg (2♂, 1♀); Nahal Alexander, 29.vi.1996, R. Hoffman (1♂); Ein el-Fawar, Nahal Qana Reserve, Qarne Shomeron, 3 km SE, 116 m; 32°09'N 35°07'E, 9.vii.2007, A. Freidberg and L. Friedman (1♂; 2♀); Nahal Qana Reserve, Qarne Shomeron, 5 km SW, 290 m, 32°08'N 35°04'E, 9.vii.2007, L. Friedman and A. Freidberg (1♀, 1♂); W. Musrara (N[ahal]. Ayyalon), 2.vii.1932, Y. Palmoni (2♀); Rosh Ha'Ayin, 6.vii.1993, A. Freidberg and F. Kaplan, on *Typha* & *Pharagmites* (1♀); Migdal Afeq [Migdal Zedek], 25.vii.1976, A. Freidberg (1♂); Tel Aviv, 12.viii.1948, Ch. Bytinski-Salz (1♂); Nahal Yitav [W. Auja], 29.ix.1973, D.G. Furth (1♂, 1♀); Palmaḥim [W. Rubin], 27.vi.1958, R. Linnavuori (1♀); Duyuk (W. Nueima), 18.ix.1967, M. Pener (1♂); Ein Duyuk, 28.v.1971, Faunistics (2♂, 1♀); 25.vi.1974, P. Amitai (1♀); 8.vi.1978, P. Amitai (2♂, 1♀); Yeriho [Jericho], 20.v.1974, A. Freidberg (2♂); Burma road, Nahal Me'ir, 21.vii.2002, A. Freidberg (1♂); 'En Perat [Ein Farra], 5.x.1973, M. Tintpulver (1♂); Yerusha-

layim, 10.vi.1958, J. Wahrman (1♀); Nahal Qetalav [N. Ketalav], 5.vii.1979, D. Simon (1♀); Horvat Se'adim [Qaryet Saide], 11.vii.1960, J. Wahrman (5♂).

TURKEY: Dinar, 9.viii.1951, Ch. Bytinski-Salz (1♀).

### General Distribution

Turkey (Anatolia), Cyprus, Israel, Jordan.

### Comments

Linnavuori (1953) described *D. subsimilis* based on a male and a female collected in Israel ("Wadi Musrara" (= Nahal Ayyalon), at and near Tel Aviv) and compared it to several species, including *D. asiatica* Melichar, a species he later (Linnavuori, 1962) recorded from Israel (Elon and Jerusalem). Linnavuori (1953) stated that these two species are very similar, differing by *D. subsimilis* having distinctly longer head, broader pronotum and different male genitalia. We studied a large series of specimens from practically the entire northern half of Israel and failed to detect clear and consistent differences. This series indeed comprises specimens that are variable with respect to the head and pronotum dimensions (Figs. 12, 14), but we detected a continuous cline that would not allow reliable separation into two species. We therefore decided to include this entire series under the name *subsimilis*. Further study is required in order to resolve this taxonomic and faunistic problem.

### *Dictyophara (Euthremma) multireticulata* Mulsant and Rey, 1855

(Figs. 7, 8)

### Material Examined

ISRAEL: Har Hermon [Mt. Hermon], 1600 m, 25.viii.1983, I. Yarom (1♂, 1♀); 7.vii.1987, A. Freidberg (1 unknown sex); Har Hermon, 1700 m, 5.viii.2004, L. Friedman (1♂); 5.viii.2004, A. Freidberg (3♂, 1♀); 17.viii.2005, A. Freidberg (1♂); Har Meron [Mt. Meiron], 18.ix.1976, A. Freidberg (1♂); Har Meron [Mt. Meiron], 1100 m, 17.ix.1981, F. Kaplan (1♂); 12.viii.1977, A. Freidberg (1♂); Pa'ar Cave, near Sasa, 17.ix.2004, A. Freidberg (1♂)

### General Distribution

Central and southern Europe, Ukraine, Russia (Krasnodar, Daghestan), Armenia, Azerbaijan, Iran (Tebriz), Israel.

### *Raivuna albostrigata* (Linnavuori, 1962)

(Figs. 26, 27)

### Material Examined

ISRAEL: Dor [Tantura], 5.vii.1955, Ch. Lewinsohn (1♂); Herzliyya, beach, 13.x.1995, A. Freidberg (2 unknown sex); 18.x.1986, A. Freidberg, on *Polygonum* (1 unknown sex); Tel Aviv, vi.1982, R. Kopan (1♀); Bat Yam, 20.vi, Ch. Bytinski-Salz

(1♂); Burma road, near Bet Me`ir, 21.vii.2002, A. Freidberg (2♀); Nahal Besor nr. Sede Boqer, 19.vii.1984, F. Kaplan (1♀); Nahal Sekher [Nahal Secher], 17.vii.1985, A. Freidberg (1♀); Bor Hemet, 8.viii.1993, Y. Zvik (sex unknown), Light trap; Ze`elim, 16.vi.1986, A. Freidberg (1♀).

#### General Distribution

Israel.

#### Comments

Described as a subspecies of *R. striata* Oshanin.

### *Raivuna striata* (Oshanin, 1879)

(Figs. 28, 29)

#### Material Examined

ISRAEL: Park HaYarden, 16.vi.1982, A. Freidberg (2♂); 25.vii.1983, Y. Zvik (2♂); Biq'at Bet Zayda [Btecha], 12.vi.1974, A. Freidberg (1♂); Bet Zera', 14.vi.1979, D.G. Furth (1?); Nahal Tirza [W. Fara 4 km Damia], 10.ix.1967, D. Gerling (1♀); 'En Gedi [Ein Gedi], 16.viii.1957, J. Wahrman (1♂); 24.xii.1974, A. Freidberg (1♀); Sedom, 20.ix.1971, J. Kugler (2♂); Hazera, 9.ix.1969, M. Pener (1♂); Ne`ot HaKikkar, 20.v.1974, A. Freidberg (1♀); Nahal Besor, near Ze'elim [N. Bsor nr. Ze'elim], 21.vii.1986, A. Freidberg (1♀); Shivta, 9.vii.2001, A. Freidberg (1♀); Sedé Boqér [Sde Boqer], 4.viii.1970, Ch. Bytinski-Salz (1♂); Nahal Zin [Wadi Nafka], 18.viii.1957, J. Wahrman (2♂, 3♀); 'Avedat [Avdat], 16.vi.1986, A. Freidberg (1♂, 1♀); 'En Zin, 8.viii.1998, I. Yarom and V. Kravchenko, on *Tamarix sp.* (1♀); 'En 'Iddan, 20.vi.1995, A. Freidberg (2♀); Ne`ot Semadar, 17.viii.1995, A. Freidberg (1♀); 21.vi.1995, A. Freidberg (1♂); Elot [Eilot], 5.ix.1976, D. Simon (specimen lost).

#### General Distribution

Morocco, Algeria, Egypt, Israel, Jordan, Iraq, Russia (Volga delta), Azerbaijan, Kazakhstan (South), Uzbekistan, Turkmenia, Tajikistan, China (Gansu, Kashgaria).

#### Comments

This species was described from “Turkestan”. *Dictyophara vittata* Puton (recorded by Bodenheimer, 1937 as *D. unicolor* Sign. var. *vittata* Puton), described from Egypt, is a junior synonym, but was treated erroneously as junior synonym of the Indo-Malayan *Dictyophara pallida* (Donovan).

## ORGERIINAE

### *Coppa huldaensis* (Linnavuori, 1962)

(Figs. 5, 6)

#### Material Examined

ISRAEL: Nahal Me`ir (Burma road), 21.vii.2002, L. Friedman (1♂); Nahal Boqér, 7.iv.2004, K. Yossef (1♀).

**General Distribution**

Israel, Jordan.

**Comments**

Described from Israel.

***Coppa volkovitshi* Emeljanov, 1998**

(Fig. 4)

**Material Examined**

ISRAEL: Upper Nahal Keziv, 5.x.1976, A. Freidberg (3♂, 3♀).

**General Distribution**

Israel.

**Comments**

Described from Israel.

***Nymphorgerius gemmatus* (Horvath, 1929)**

(Fig. 3)

**Material Examined**

ISRAEL: Har Hermon [Mt. Hermon], 2000 m, 24.vii.1985, A. Freidberg (1♂); 5.viii.2004, A. Freidberg and I. Zonstein (2♂).

**General Distribution**

Lebanon, Israel.

**Comments**

New to Israel. This species was described from Lebanon (Bcharrei) (Horváth, 1929). It was inadvertently omitted from Metcalf's (1946) catalogue.

***Tachorga adiplasta* Emeljanov, 2003**

(Fig. 2)

**Material Examined**

Holotype, [EGYPT]: J[ebel]. Katerina, 2642 m, 14.viii.1974, L. Kinarty, Coll. "Zukei David" [ F.S.C.], Sinai, Santa Katherina (1♂). ISRAEL: Zomet Rantis, 19.iii.2002, T. Stern (1, apparently lost).

**General Distribution**

Israel, Egypt (Sinai).

**Comments**

New to Israel.

***Tachorga recurviceps* (Linnavuori, 1956)**

(Fig. 1)

**Material Examined**

ISRAEL: Be'er Sheva'—Mash'abbe Sade [Be'er Sheva'—'Asluj], 27.viii.1952, J. Wahrman (1, sex unknown); Be'er Sheva', 10 km South, 1.ix.1955 L. Fishelsohn (1♂).

**General distribution**

Israel, Egypt (Sinai).

**Comments**

Not recorded from the study area for over 55 years.

**ACKNOWLEDGMENTS**

We are grateful to A.L.L. Friedman for his assistance with the locality names, to Naomi Paz for improving the style, and to R. Linnavuori for allowing us to reproduce some of his drawings.

**REFERENCES**

- Anufriev, G.A. and Emeljanov, A.F. 1988. Suborder Cicadinea (Auchenorrhyncha). In: Ler, P.A. (ed.), *Opredelitel' nasekomykh Dal'nego Vostoka SSSR*, 2: 12–495. Leningrad: Nauka. Available online: [http://www.ndsu.nodak.edu/ndsu/rider/IHS/PDFs/KEYS\\_To\\_Cicadinea.PDF](http://www.ndsu.nodak.edu/ndsu/rider/IHS/PDFs/KEYS_To_Cicadinea.PDF)
- Bodenheimer, F.S. 1937. Prodrum Faunae Palaestinae. *Mémoires a l'Institut d'Égypte*, 33, 286 pp.
- Dlabola, J. 1994. Ergänzungen zur iranischen, israelischen und benachbarten Zikadenfaunen mit Beschreibungen 30 neue Taxone (Homoptera, Auchenorrhyncha). *Acta Musei Nationalis Pragae* 49B (1–4): 41–110.
- Emeljanov, A.F. 1964. Suborder Cicadinea (Auchenorrhyncha). Pp. 421–551. In: Bei-Bienko, G.Ya. (ed.). *Key to the insects of the European USSR*. Vol. 1. Izdatel'stvo "Nauka" Moskva, Leningrad, 1214 pp.
- Emeljanov, A.F. 1979. The problem of the family distinction between the Fulgoridae and the Dictyopharidae (Homoptera, Auchenorrhyncha). *Proceedings of the Zoological Institute of the Academy of Sciences of USSR* 82: 3–22.
- Emeljanov, A.F. 1995. On the problem of classification and phylogeny of the family Delphacidae (Homoptera, Cicadina) taking into consideration larval characters. *Entomologicheskoe obozrenie*, 74(4): 780–794. [in Russian; English translation published in *Entomological Review*, 75(9) 1996: 134–150].
- Horváth, G. 1929. Rhynchota aus Palästina und Syrien. *Sitzungsberichten der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, Abteilung I*, 138(7): 329–334.

- Lindberg, H. 1948. On the insect fauna of Cyprus. Results of the expedition of 1939 by Harald, Håkan, and P.H. Lindberg. II. Heteroptera and Homoptera Cicadina der Insel Zypern. *Commentariones Biologicae* 10(7): 23–175.
- Linnavuori, R. 1953. Contribution to the hemipterous fauna of Palestine. II. *Annales Entomologicae Fennicae* 19(3): 119–124.
- Linnavuori, R. 1962. Hemiptera of Israel. III. *Annales zoologici societatis zoologicae botanicae fennicae 'Vanamo'* 24(3): 1–108.
- Metcalf, Z.P. 1946. General catalogue of the Hemiptera, Fascicle. IV. Fulgoroidea, Part 8 Dictyopharidae. Smith College, Northampton, Mass., U.S.A., 246 pp.
- Richards, O.W. and Davies, R.G. 1977. *Imms' general textbook of entomology*. 10th Ed. Volume 2: Classification and Biology. London. Chapman and Hall. 1354 pp.