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THE DIXIDAE (DIPTERA : NEMATOCERA) OF ISRAEL AND EGYPT, WITH A NEW RECORD FROM GREECE

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ABSTRACT

Two genera and five species of Dixidae are recorded from Israel and one species from Egypt; the latter constitutes the first record of the family for this country. ***Dixa kaplani, Dixapunctata, Dixella golanensis, Dixella israelis*** (all from Israel) and ***Dixella aegyptiaca*** (from Egypt) are described as new. Two species are redescribed: ***Dixella attica*** (Pandazis) (new record for Israel) and ***Dixella fuscifrons*** (Edwards) (new record for Greece). Ecological and distributional data on dixid larvae and adults in Israel are given. Comments on collecting, preserving, mounting and examination of Dixidae are provided.

KEY WORDS: Dixidae, Diptera, adults, larvae, Israel, Egypt, Greece, new species.

INTRODUCTION

This paper is dedicated to Prof. Eliyahu Swirski, a friend and prominent entomologist, on the occasion of his 70th birthday.

The study on which this paper is based was initiated when a small collection of adult Dixidae, mostly from Israel, but also including some specimens from Egypt and Greece, was sent to R.W. for identification. Later, a relatively large collection of dixid larvae, all from Israel, was sent to the same expert. R.W. determined the adults to species and the larvae to genus and identified two genera (*Dixa* Meigen and *Dixella* Dyar and Shannon) and seven species, five of which were undescribed. Although we have not been able to associate adults with larvae, we decided to gather all the data available now on the Dixidae of Israel and publish them together. A new species is also described from Egypt comprising the first record of the family for this country.

Dixidae comprise a small family of nematocerous flies with seven genera and about 175 species world-wide. About 30 species are known from Europe (Wagner, 1978) and about 20 species have been recorded from the Mediterranean basin, almost all from the western part and Balkan Peninsula (Wagner, 1978). A short summary of adult and immature morphology, biology and behavior was recently published (Peters, 1981).

In his Prodromus Faunae Palestinae, Bodenheimer (1937) recorded two species, *Dixa aestivalis* Meigen and *Dixa pyrenaica* Seguy. None of these species were rediscovered in the study area, and we assume that these records represent misidentifications. Freidberg (1988), reporting progress made in the present study, mentioned four species from Israel, although only one of these, *Dixella attica* (Pandazis), was named. Based on adult collections, Freidberg (1988) surmised that species were restricted to the northern half of the country. However, based on the collection of

larvae reported here, the occurrence of dixids in the southern half of Israel is also established.

In this paper, all species of Dixidae known from Egypt and Israel (not including the doubtful records of Bodenheimer) plus one species from Greece are either described as new or redescribed. Redescriptions were included to augment old and inadequate original descriptions. Descriptive terminology follows Peters (1981). In addition, the following term is used: palpal segments ratio — defining the ratio of the length of the four palpal segments from base to tip. Almost all specimens on which this study is based, including holotypes of the new species (all of which are slide-mounted), are deposited in the entomological collection, Zoological Museum, Tel Aviv University. Some paratypes are also deposited in the Max-Planck-Institut, Schlitz, Museum of Natural History, London, and Smithsonian Institution, Washington, D.C.

COLLECTING, PRESERVING AND STUDYING DIXIDAE

All life stages of dixids are associated with freshwater habitats. The larvae, also known as meniscus midges, are hygropetric and occur on the shoreline of lentic or lotic aquatic systems. If disturbed, they may either dive or move out of the water, dragging a film of water with them. Larvae of *Dixa* may sometimes form a significant component of the invertebrate fauna occurring in the effluent of streams (Elliott and Minshall, 1968).

Pupae are normally found just above the water surface, e.g., on emergent objects, and the last larval skin may be found attached nearby. Pupae can be maintained in the laboratory, in damp conditions, until the adults emerge.

Adults are frequently observed swarming over streams, where they can easily be collected with a net. During most of the day, they rest on the vegetation along streams and below bridges, and can be collected there with a net or an aspirator. Dixidae often overwinter in the egg stage, but some species can probably overwinter in the larval stage.

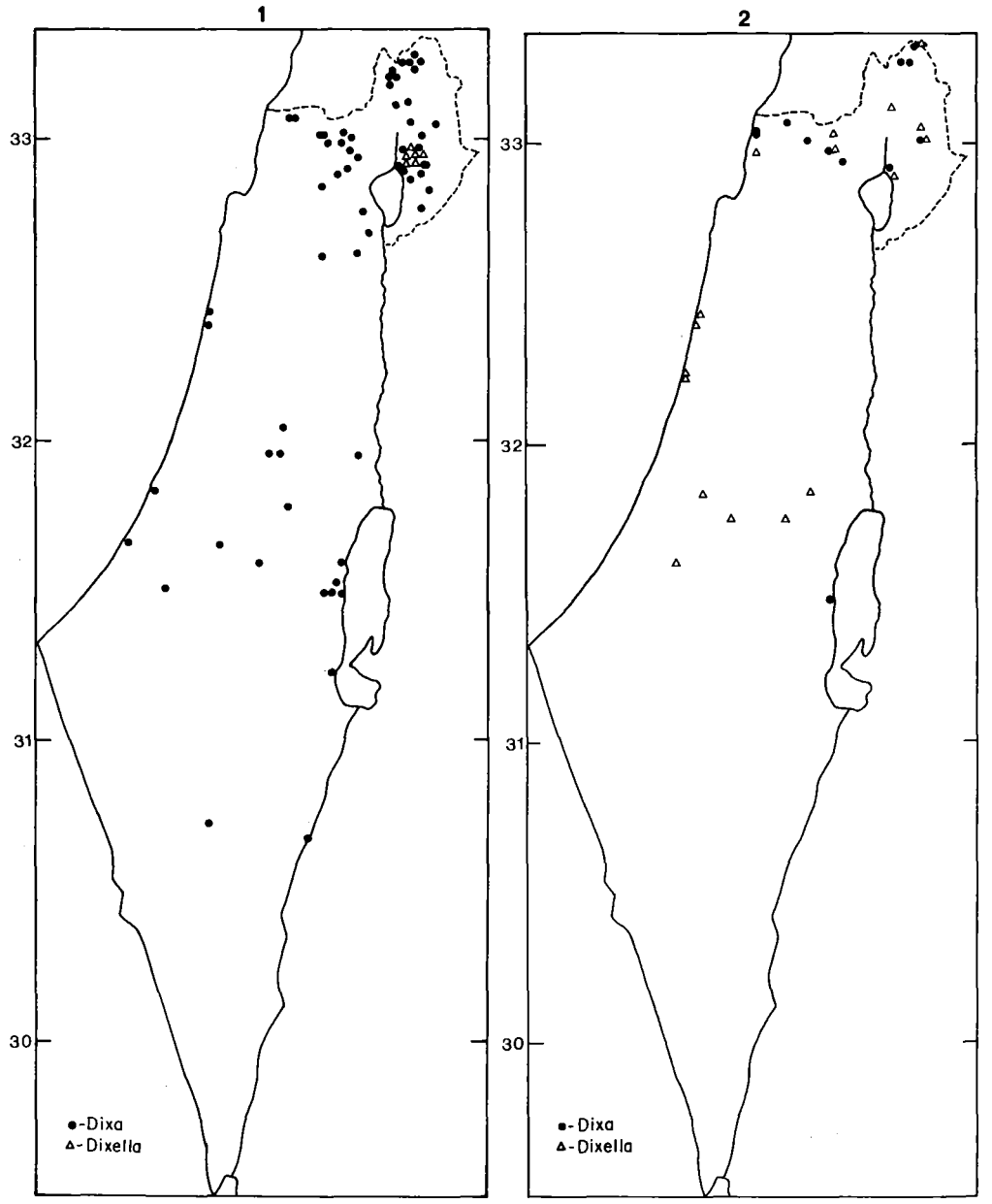
All stages should be preserved in 70–80% alcohol. Body shape, especially terminalia, is best preserved this way. For mounting, specimens should be boiled in 10% KOH for several minutes, then transferred to 96% acetic acid, to acetic acid and clove oil (1:1), and finally to pure clove oil. Wings should be removed and placed directly into acetic acid, without boiling in KOH. Specimens treated in this way can either be mounted under coverslips or kept in 70–80% alcohol. Long-term preservation can either be in alcohol or 1% solution of propylene phenoxetol (Disney, 1975). Specimens can be studied under the microscope in a droplet of clove oil on a slide, and thus can be rotated into different positions, which is especially important for studying terminalia. Alternatively, specimens can be permanently mounted with the head, wings, thorax and abdomen under separate coverslips.

ECOLOGICAL AND DISTRIBUTIONAL DATA ON DIXID LARVAE AND ADULTS IN ISRAEL

Because nothing was known about immature stages, biology or ecology of Dixidae in Israel, and in order to supplement the taxonomic section, which is based on adults, recently accumulated data on larvae (by R.O.) are given below and compared with similar data on adults.

Dixid larvae were collected in Israel during an extensive survey of freshwater bodies conducted by the Inland-Water Ecological Laboratory of the Nature Reserve Authority and the Hebrew University. The survey took place mostly between 1977–1990. About 5000 samples of organisms were taken from rivers, permanent and seasonal streams, springs, water holes, irrigation and other canals, permanent and seasonal ponds, reservoirs, lakes and lagoons, flooded areas and swamps. Only 154 samples (3.08%) yielded dixid larvae. A list of the pertinent collection localities (about 100; Fig. 1), dates and numbers of specimens can be obtained from the authors.

Most samples containing Dixidae (100, i.e., 65%) were taken near banks of streams; 42 samples (27.3%) were from springs; 6 samples (3.9%) from reservoirs and lagoons; and 6 samples



Figs. 1–2. Distribution of Dixidae in Israel. 1. Data based on larval collections. 2. Data based on adult collections.

(3.9%) from seasonal ponds. No larvae were found in the Jordan River or in its large and fast flowing tributaries. Most samples were taken from habitats of unpolluted water, pH 7.2–8.5, oxygen content 65–110%, and very low chloride level (<100 mg/litre). The current speed in lotic water was usually slow (<30–40 cm/sec).

Only six samples, all of *Dixa*, were taken from oligohaline biotopes, all in southern Israel (Dead Sea Area, Arava Valley and Central Negev). The chloride level in these localities varies between 628–1464 mg/litre, the sulphate level varies between 265–1873 mg/litre, and the magnesium level varies between 65–270 mg/litre. These conditions are so different from those in all other sites in Israel where dixid larvae are found, that larvae collected in these oligohaline biotopes probably represent a third, possibly undescribed, species of *Dixa*. However, this can only be verified if adults of this species are also found there. The possible existence of an isolated species in oligohaline biotopes in the south is also supported by the fact that larvae were neither discovered in freshwater sites in southern Israel nor in sites with oligohaline water in northern Israel.

Only a small minority of the collected larvae (39 of 549, or 7.1%) belong to *Dixella*, all collected in only six localities on the Golan Heights, rarely together with *Dixa* larvae.

The two main differences between the adult and larval sets of data concern the southernmost limit of distribution and the abundance by genus. The distribution of dixids in Israel, as discerned from adult collecting data, is predominantly north of 31° 30′ degrees latitude, with only one specimen netted near this limit, at 'En Gedi (Fig. 2). However, at 'En Gedi many larvae were collected. Furthermore, dixid larvae were collected at three sites south of 'En Gedi (latitude about 30° 30′; Fig. 1).

Three of the five species of Dixidae now known from Israel belong to *Dixella* and two to *Dixa*. Many more adult specimens of the former have been collected than of the latter. The reverse is true for larvae. Of the possible explanations for this discrepancy we shall mention four:

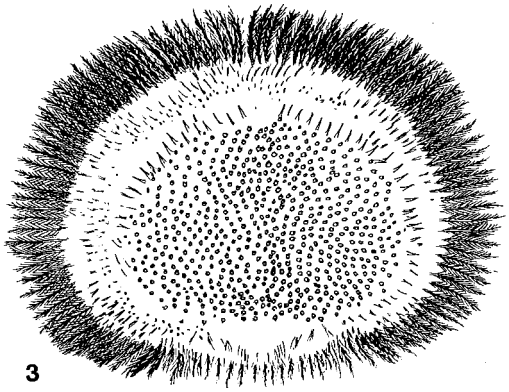
1. Insufficient collecting of both larvae and adults (note the otherwise inexplicable "collecting gap" in the central part of the country, north of 32° latitude; Figs. 1 and 2).
2. Changes in aquatic biotopes and their faunal composition during the last two decades. This may be in congruence with the fact that most of the adults were collected in the seventies, and most of the larvae in the eighties.
3. Incongruence between larval classification and adult classification (i.e., some larvae identified as "*Dixa*" could have developed to become "*Dixella*" adults).
4. Differences in life cycle strategies, with *Dixella* being dissynchronized polyvoltine and *Dixa* being synchronized oligovoltine, resulting in more adults of the former genus available to the general collector.

TAXONOMY

Dixa and *Dixella*, the two dixid genera of the East Mediterranean, can easily be distinguished in all postembryonic stages. Differences between adults are dealt with in the following key. Larvae are separated by the five or more dorsal crowns of setae, possessed by *Dixa* (Fig. 3), beginning with abdominal segment 2, but entirely lacking in *Dixella* (Fig. 4). Most larvae that were available for this study belong to *Dixa*, and they were evaluated only ecologically because species recognition at the larval stage is extremely difficult. Pupae were not available for study. Generally, *Dixa* pupae have short triangular caudal lobes with a slight incision; *Dixella* pupae have elongate caudal lobes with a wider and deeper incision. Species recognition at the pupal stage can probably be enhanced by the shape of the respiratory trumpets (Disney, 1975).

KEY TO GENERA OF DIXIDAE IN EAST MEDITERRANEAN COUNTRIES, ADULTS

1. 1st flagellomere at most 6 times as long as wide; gonocoxite of male terminalia without apical lobe (e.g., Fig. 6) . . . . . *Dixa* Meigen
— 1st flagellomere at least 8 times as long as wide; gonocoxite of male terminalia with a prominent apical lobe (e.g., Fig. 15) . . . . . *Dixella* Dyar and Shannon



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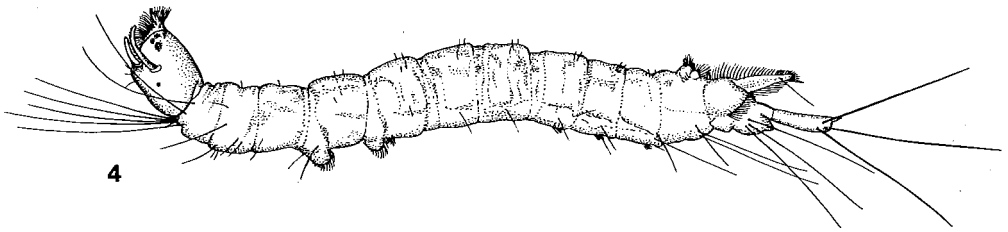

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Figs. 3–4. Larval characters in Dixidae. 3. *Dixa*, abdominal crown of setae. 4. *Dixella*, fully grown larva, lateral view.

DIXA MEIGEN
KEY TO SPECIES OF *DIXA* IN ISRAEL, ADULTS

1. Wing with larger spot in area of crossvein r–m reaching or almost reaching vein R_1; vein CuA with small white area immediately beyond middle of vein well contrasted with both proximal and distal dark areas over vein (alternate between incident and transmitted light!); dark distal area (before cubital fork) longer than white area (Fig. 5); gonocoxite without heavily sclerotized, sickle-shaped sclerite and inner hook-like appendage; slightly sclerotized, setose bridge present between gonocoxites; gonostylus as long as gonocoxite in ventral view (Fig. 6), shorter than gonocoxite in lateral view (Fig. 7) . . . . . *Dixa kaplani* n. sp.
— Wing with small round spot in area of crossvein r–m reaching about middle of cell r_1; vein CuA with white area larger, closer to cubital fork and less contrasted with distal dark area over vein; border between white and distal dark area not clear, but white area usually larger (Fig. 9); gonocoxite with heavily sclerotized, sickle-shaped sclerite and inner hook-like appendage (Fig. 12); no bridge between gonocoxites; gonostylus shorter than gonocoxite in ventral view (Fig. 10), as long as gonocoxite in lateral view (Fig. 11) . . . . . *Dixa punctata* n. sp.

Dixa kaplani n. sp.
(Figs. 5–8)

Male

Head: Light brown; a row of 3–5 setae borders hind margin of eye; palpal segments ratio: 11–16–20–26; scape cylindrical, 3 times wider than long; pedicel spherical, 2.5 times longer than scape; 1st flagellomere slightly longer than pedicel, 4 times longer than wide.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with three brown longitudinal vittae on lighter background; halter pale yellow; legs pale brown; wing (Fig. 5) with elongate dark spot around crossvein r–m reaching vein R_1; vein CuA with dark distal section before cubital fork longer than preceding white section; all veins with a single row of setae, except basal 2/3 of veins M and A and basal 1/3 of vein Cu bearing none. Wing length: 2.9–4.2 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 6, 7): T[ergite]9 and S[ternite]9 separate; gonocoxite without apical lobe; clasper and inner prologation in close contact at their bases; gonostylus as long as gonocoxite in ventral view, shorter than gonocoxite in lateral view, slightly curved, with sharp apex directed mesally; between the gonocoxites lies slightly sclerotized, setose plate with wide and deep incision; dorsally lies membranous, translucent, circular plate.

Female

Essentially similar to male. Wing length: 3.7–4.6 mm. Terminalia (Fig. 8) without overt features; surface of spermatheca with circular structures.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Golan, Qusbiya, 24.iii.1973, M. Kaplan; Allotype ♀, Upper N[ahal] Amud, 28.v.1981, F. Kaplan; Paratypes, 4 ♂, same collecting data as holotype. Additional paratypes (all from Israel): W[adi] Nemrod, 10.vi.1976 (1♂); Panyas (variously spelled as Banias(s) and Banyas), 24.iv.1982 (1♂,1♀); Park HaYarden, 18.vi.1982, Malaise trap (3 ♂); Park Hayarden, 5.iii.1978 (3 ♂,3 ♀); N[ahal] Bezet, 23.ix.1986 (1♀); Kabri, 8.i.1975 (2 ♂,2 ♀); Montfort, 9.iii.1982 (1♂); Upper N[ahal] Amud, 28.v.1981 (1♂) all A. Freidberg.

Additional specimens: Panyas, 24.iv.1982, A. Freidberg (1♂,1♀). This couple was previously considered by us as *D. punctata*, but later, due to wing characters, was placed in this species. Unfortunately their abdomens were subsequently lost, rendering final placement uncertain. 'En Gedi, 6.iv.1983, A. Freidberg (1♀). This female is doubtfully included in this species because of the geographical distance between its locality and those of the remaining specimens.

ETYMOLOGY. Named after Mr. Menachem Kaplan who collected the holotype and many other interesting Diptera.

Dixa punctata n. sp.

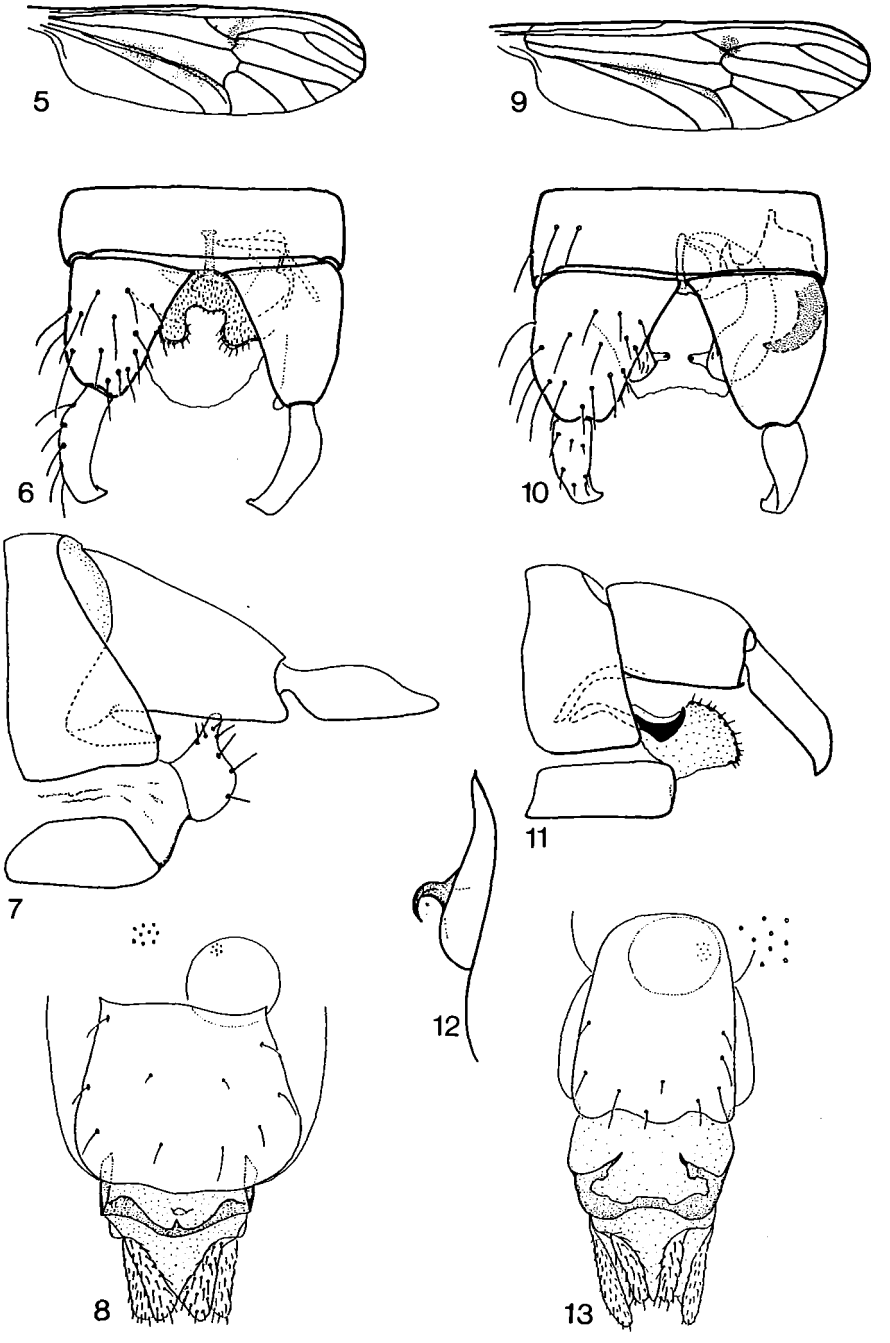
(Figs. 9–13)

Male

Head: Light brown, with row of 4–5 setae at hind margin of eye; palpal segments ratio: 9–18–25–34; scape cylindrical, wider than long; pedicel elongate spherical, twice as long as scape; 1st flagellomere less than twice as long as pedicel, 6 times as long as wide.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with three brown longitudinal vittae on lighter background; legs light brown; halter pale brown; wing (Fig. 9) with small dark spot around crossvein r–m reaching about middle of cell r_1; vein CuA with white section closer to cubital fork than its own length; veins bearing a single row of setae, except veins M and A bearing none on basal half. Wing length: 3.2–3.7 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 10–12): T9 and S9 separate; gonocoxites without apical lobe, rectangular in lateral view, narrowed apically in ventral view, as wide as long, in close contact with each other only at basimesal corner, each mesally with extrusion bearing strongly curved hook, with apex pointing ventrad; gonostylus shorter than gonocoxite in ventral view, about as long as gonocoxite in lateral view, rather straight, only apex slightly bent mesally; gonocoxite in lateral view with inner prolonged sclerite connected with dorsobasal part of clasper; clasper heavily sclerotized, blackish, apex sickle-shaped, bent towards gonocoxite; cercus fleshy, in lateral view wide, with row of longer setulae at distal margin.



Figs. 5–13. Characters of *Dixa* spp. 5–8. *Dixa kaplani* n. sp. 5. Wing. 6. Male terminalia, ventral view. 7. Same, lateral view. 8. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture. 9–13. *Dixa punctata* n. sp. 9. Wing. 10. Male terminalia, ventral view. 11. Same, lateral view. 12. Gonocoxite, with hook. 13. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture.

Female

Essentially similar to male. Wing length: 3.3–4.2 mm. Terminalia (Fig. 13) without overt features; surface of spermatheca with circular structures.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Tel Dan, 2.i.1973, A. Freidberg; Allotype ♀, Tel Dan, 13.iv.1985, A. Freidberg. Paratypes: 19 ♂, same collecting data as holotype. Additional paratypes: Tel Dan, 13.iv.1983 (2 ♂, 2 ♀), Panyas, 20.iv.1974 (3 ♂, 1♀), 18.v.1976 (1♀), 4.v.1977 (1♂), 26.iv.1984 (1♂,2 ♀), 1.vii.1986 (2 ♂,2 ♀), 6.viii.1986 (1♀), all A. Freidberg; Mt. Meron, 900 m, 17.ix.1978, F. Kaplan and A. Freidberg (2 ♂).

ETYMOLOGY. Named after the dark spot on the wing.

DIXELLA DYAR AND SHANNON
KEY TO SPECIES OF *DIXELLA* IN ISRAEL AND EGYPT, ADULTS

1. Male 2
— Female 5

2. Gonostylus bipartite distally (Figs. 15, 19) 3
— Gonostylus simple distally (Figs. 23, 27) 4

3. Gonostylus distinctly shorter than gonocoxite; apical lobe of gonocoxite distinctly broadened distally (Figs. 15, 16) . . . . . *Dixella aegyptiaca* n. sp.
— Gonostylus about as long as gonocoxite; apical lobe of gonocoxite not distinctly broadened distally (Figs. 19, 20) . . . . . *Dixella israelis* n. sp.

4. Apical lobe of gonocoxite smooth, not reaching apex of gonostylus; gonostylus without black setae apically (Fig. 23) . . . . . *Dixella attica* (Pandazis)
— Apical lobe of gonocoxite serrate mesally, reaching apex of gonostylus; gonostylus with 2 black setae apically (Fig. 27) . . . . . *Dixella golanensis* n. sp.

5. Surface of spermatheca with circular structures; cercus comparatively short (Fig. 25) . . . . . *Dixella attica* (Pandazis)
— Surface of spermatheca more or less densely grooved with curved or wavy structures; cercus variable 6

6. Surface of spermatheca densely grooved; cercus short and blunt (Fig. 29) . . . . . *Dixella golanensis* n. sp.
— Surface of spermatheca less densely grooved; cercus longer (Figs. 17, 21) 7

7. Coastal area of Israel . . . . . *Dixella israelis* n. sp.
— Coastal area of Egypt . . . . . *Dixella aegyptiaca* n. sp.

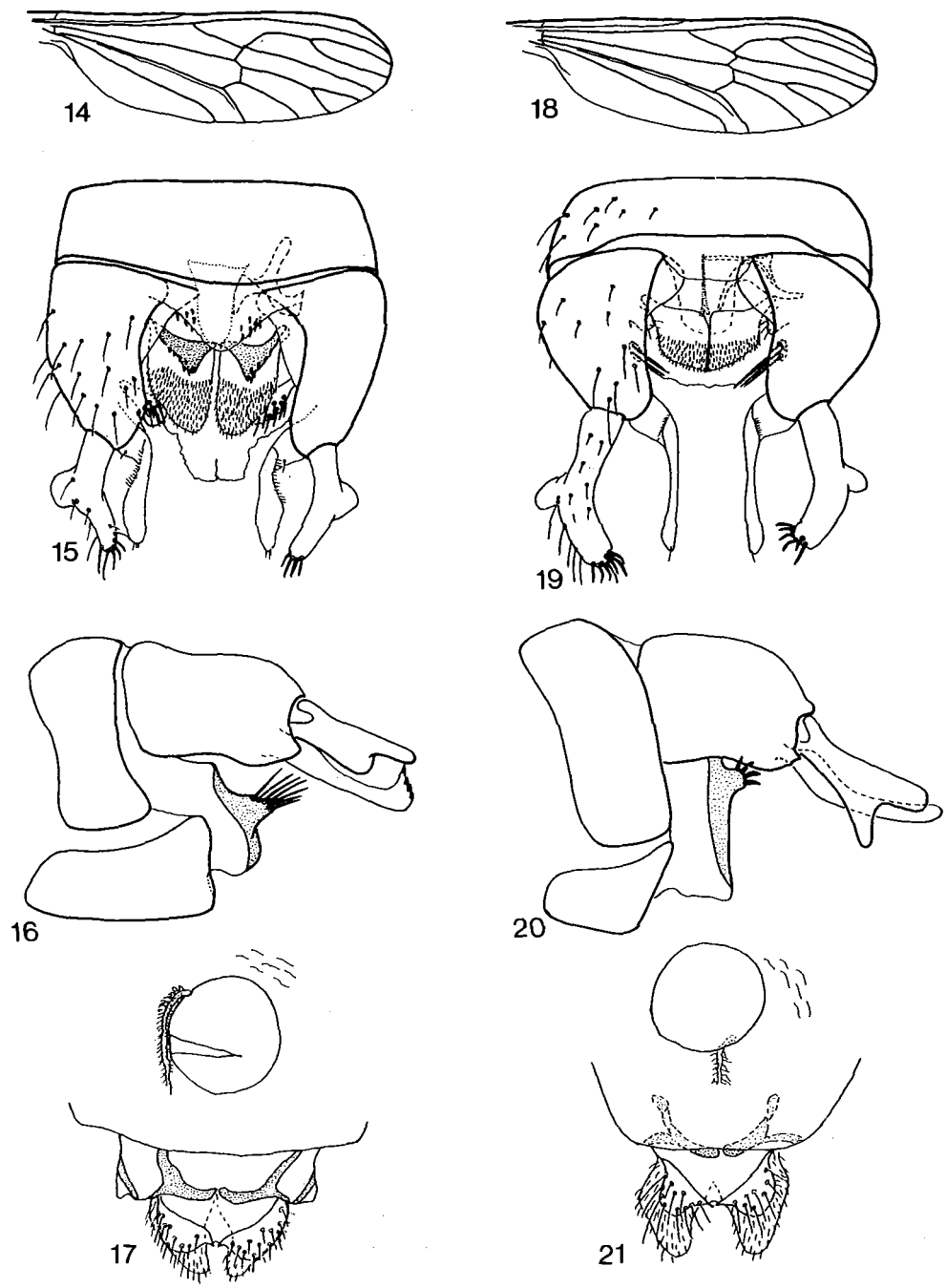
Dixella aegyptiaca n. sp.
(Figs. 14–17)

Male

Head: Light brown; a row of 3 setae bordering hind margin of eye; palpal segments ratio: 7–14–14–21; scape cylindrical, pedicel spherical, 1st flagellomere 10 times longer than wide.

Thorax: Scutum centrally yellow on lighter background, without distinct vittae; pleura with 2 longitudinal brown vittae on lighter background; legs brownish; halter pale yellowish, with brownish knob; wing (Fig. 14) hyaline, unspotted; all veins bearing a single row of setae, except basal parts of veins M and Cu bearing none. Wing length: 3.3 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 15, 16): T9 and S9 separate; gonocoxite slightly curved, with apical lobe bearing single row of fine setulae ventrally,



Figs. 14–21. Characters of *Dixella* spp. 14–17. *Dixella aegyptiaca* n. sp. 14. Wing. 15. Male terminalia, ventral view. 16. Same, lateral view. 17. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture. 18–21. *Dixella israelis* n. sp. 18. Wing. 19. Male terminalia, ventral view. 20. Same, lateral view. 21. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture.

its distal end serrate in lateral view; lobe shorter than gonocoxite, with apex near apex of gonostylus; gonostylus shorter than gonocoxite, bipartite, with short and blunt lateral protuberance and elongate distal part with 4–5 strong black setae apically; 2 heavily sclerotized, triangular plates with numerous black teeth present between gonocoxites, forming basal part of 2 elongate setulose plates (T10?); region between inner basal ends of gonocoxites covered by slightly sclerotized membrane; distal part of aedeagus short and blunt, covered by short black setae laterally; cercus short and blunt in ventral view, elongate in lateral view, with 7–8 long black spines near gonocoxite.

Female

Essentially similar to male. Wing length: 3–3.8 mm. Terminalia (Fig. 17): cercus subtriangular in dorsal view; surface of spermatheca grooved.

MATERIAL EXAMINED. Holotype ♂, EGYPT: Mit Ogba, 14.iv.1943 (collector unknown). Allotype ♀, same locality, 17.iii.1943. Paratypes: same locality, 17.iii.1943 (4 ♀), 19.iii.1943 (1♀), 20.iii.1943 (2 ♀), 14.iv.1943 (4 ♀).

ETYMOLOGY. Named after the country of origin.

Dixella israelis n. sp.

(Figs. 18–21)

Male

Head: Eye margin bordered by single row of 3–4 long setae, and few setae present in the region between eyes; palpal segments ratio: 9–19–15–24; scape approximately cubic, pedicel elongate spherical; 1st flagellomere about 10 times as long as wide.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with 2 longitudinal brown vittae on lighter background; legs yellow brown; halter light brown; wing (Fig. 18) hyaline, unspotted; all veins bearing a single row of setae, except basal 2/3 of veins Cu and A bearing none. Wing length: 3.8–4.9 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 19, 20) typical for the *fuscifrons*-group: T9 and S9 separate; gonocoxite slightly curved, 1.5 times as long as wide in ventral view, rectangular in lateral view, with apical inner lobe; apical lobe slightly longer than gonocoxite, curved near base, with single setula apically; gonostylus as long as gonocoxite, bipartite distally, with short and blunt protuberance laterally, and elongate distal part, with 6–8 distal spines; 2 distally setose, subrectangular plates present between gonocoxites (T10); aedeagus short and blunt, slightly sclerotized; cercus elongate in lateral view, with 4–5 short and stout setae near gonocoxite.

Female

Essentially similar to male. Wing length: 3.6–5 mm. Terminalia (Fig. 21): cercus short, distally setose; surface of spermatheca grooved.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Herzliy[y]a, 10.iii.1975, A. Freidberg. Allotype ♀ and paratypes, 2 ♂,14 ♀, same collecting data as holotype. Additional paratypes (all from Israel): Kib[butz] Hulata, Hula, 26.viii.1980, N.G. Gratz (1♂); Hula, xii.1965, J. Margalit (1♀); Qusbiya, 20.iv.1976, A. Freidberg (1♂,1?). Hadera, coastal zone, 12.iii.1924, O. Theodor (3 ♂,1♀), *Dixa aestivalis* Mg., det. E. Brunetti 1924; Ga'ash, 5.ii. and 10.iii.1975, F. Kaplan (2 ♀); Tel Aviv, 10.iii.1975, F. Kaplan (7 ♀); Hulda, 6.ii.1975, A. Freidberg (1♂); 'En Farah, Jerusalem district, 26.ii.1927, R. Gabrielith (1♂); Qiryat Gat, 19.iv.1977, F. Kaplan (1♂).

ETYMOLOGY. Named after the country of origin.

REMARKS. Bodenheimer's (1937) record of *Dixa aestivalis* from Palestine was probably based on a misidentification of the specimens recorded above from Hadera.

Dixella attica (Pandazis)
(Figs. 22–25)

Dixa attica Pandazis, 1933:68
Dixa (Paradixa) attica Pandazis, 1935:23

Male

Head: Light brown; a row of 3–4 setae bordering hind margin of eye; palpal segments ratio 10–20–12–26; scape cylindrical, wider than long, pedicel elongate spherical, 1st flagellomere about 15 times as long as wide.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with 2 longitudinal brown vittae on lighter background; legs yellow; halter pale yellow; wing (Fig. 22) hyaline, unspotted; all veins bearing a single row of setae, except basal 2/3 of veins M and Cu and basal half of vein A bearing none. Wing length: 3.2–3.7 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 23, 24): T9 and S9 separate; gonocoxites fused medially, less than twice as long as wide, with comparatively short and slightly curved apical lobe bearing 3 short spines distally; apex of apical lobe approximately opposite middle of gonostylus; gonostylus as long as gonocoxite, slightly curved, with blunt apex; short knob-like prolongation bearing few setae present dorsomesally at middle of gonocoxite; 2 narrow, setose, rectangular plates present between gonocoxites; cercus narrow with 6–8 long setae; aedeagus appears as slightly sclerotized hull, with single straight apodeme.

Female

Essentially similar to male. Wing length: 3.5–4.0 mm. Terminalia (Fig. 25): cercus elongate triangular in dorsal view; surface of spermatheca with circular structures.

MATERIAL EXAMINED. ISRAEL: Kurdani, 20.vii.1967, Margalit (1♂,1♀); Hulda, 6.ii.1975, A. Freidberg (3 ♂,3 ♀); Bet Shemesh, 13.xii.1976, A. Freidberg (1♂).

DISTRIBUTION: Great Britain, France, Italy, Greece, Algeria, Tunis, Israel.

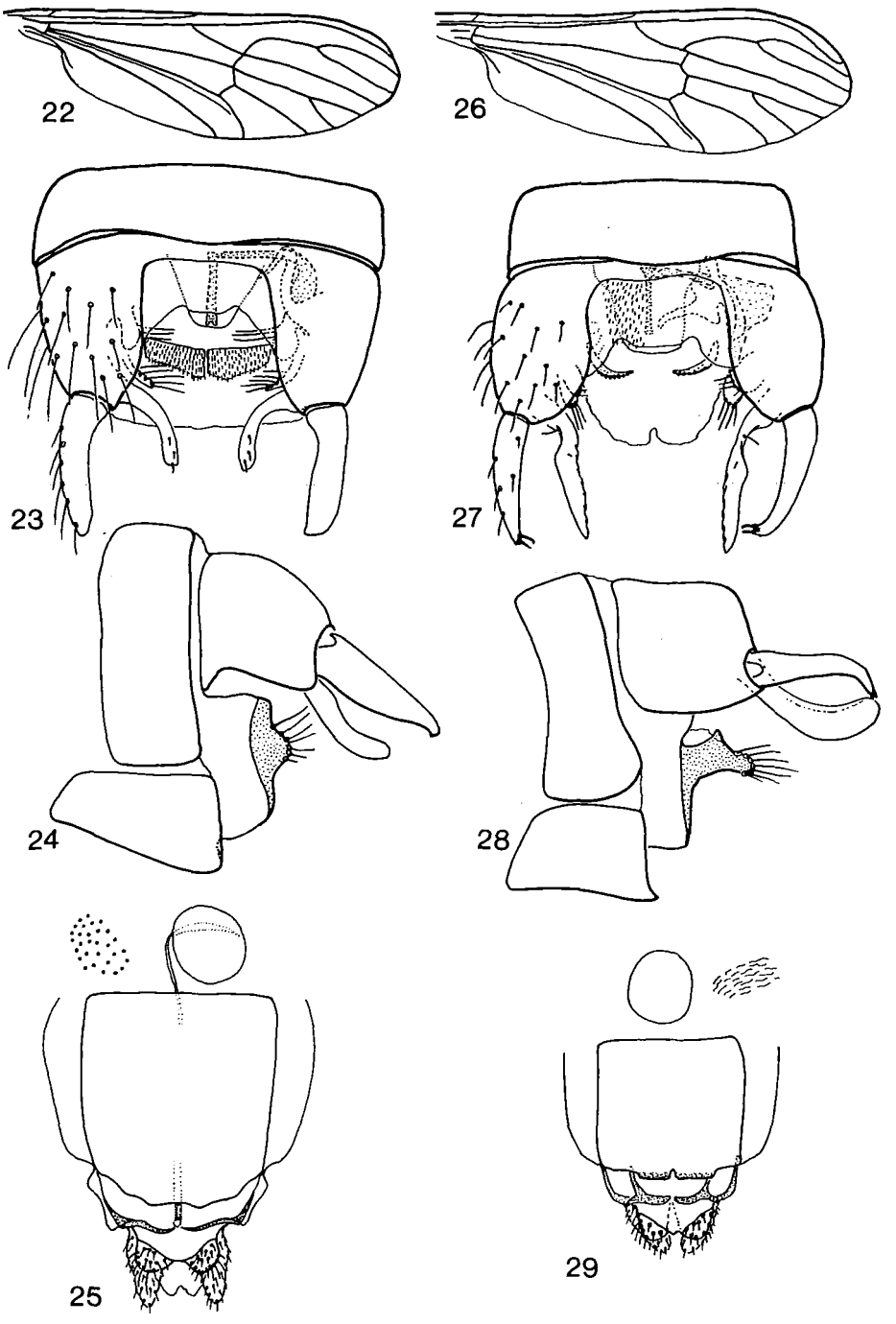
Dixella golanensis n. sp.
(Figs. 26–29)

Male

Head including antenna brown; a row of 5 setae bordering hind margin of eye; palpal segments ratio: 11–17–17–20; scape wider than long; pedicel subspherical; 1st flagellomere 13 times as long as wide.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with 2 longitudinal brown vittae on lighter background; legs pale brown; halter yellow; wing (Fig. 26) hyaline, unspotted; veins bearing a single row of setae, except basal 2/3 of veins M and A and basal 1/3 of vein CuA_2 bearing none. Wing length: 4.0–4.7 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 27, 28): T9 and S9 separate; gonocoxites twice as long as wide, quadrate in lateral view, fused basally with each other by slightly sclerotized band; apical lobe longer than gonocoxite, slightly curved, serrate mesally; gonostylus as long as gonocoxite, rather straight, with 2 strong apical setae; cercus in lateral view elongate, with 7 long setae near the blunt end; two sickle-like, serrate plates present between gonocoxites; also between gonocoxites is slightly sclerotized membrane, covering the broad aedeagus; aedeagal apodeme a single elongate sclerite.



Figs. 22–29. Characters of *Dixella* spp. 22–25. *Dixella attica* (Pandazis). 22. Wing. 23. Male terminalia, ventral view. 24. Same, lateral view. 25. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture. 26–29. *Dixella golanensis* n. sp. 26. Wing. 27. Male terminalia, ventral view. 28. Same, lateral view. 29. Female terminalia, dorsal view, with spermatheca and enlarged surface sculpture.

Female

Essentially similar to male. Wing length: 4.1–5.2 mm. Terminalia (Fig 29): cercus short triangular with blunt apex; surface of spermatheca grooved.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Golan, Nafech, 1.i.1974, A. Freidberg. Allotype ♀, 3 ♂, paratypes, same collecting data as holotype; additional paratypes (all from Israel): Golan, Nafech, 10.xii.1973 (1♂), 20.xii.1973 (2 ♂), 30.xii.1973 (1♂); 14.iii.1975 (1♂), Bteicha, 16.xi.1982 (2 ♂,7 ♀), Bar'am, 22.xi.1973 (3 ♂,2 ♀), all A. Freidberg; Mt. Meron, 29.iv.1974, D. Furth (1♂).

ETYMOLOGY. Named after the Golan Heights, the area where most of the specimens were collected.

Dixella fuscifrons (Edwards)
(Figs. 30–32)

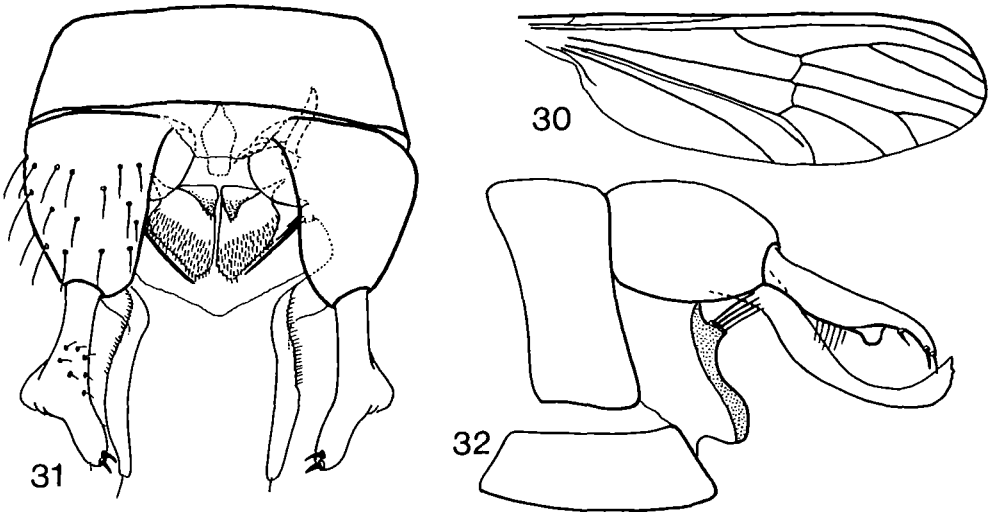
Dixa fuscifrons Edwards, 1928:168

Male

Head: Light brown; a single row of 4–5 setae bordering hind margin of eye; palpal segments ratio: 8–14–17–16; scape cylindrical, pedicel spherical; flagellum missing.

Thorax: Scutum with 3 parallel brownish vittae on lighter background, middle one more anterior; pleura with 2 longitudinal brown vittae on lighter background; legs yellow brown; halter pale brown; wing (Fig. 30) hyaline, unspotted; all veins bearing a single row of setae except basal third of veins Cu and A bearing none. Wing length: 3.8 mm.

Abdomen: Pregenital segments without overt features; terminalia (Figs. 31, 32): T9 and S9 separate; gonocoxite more than 1.5 times as long as wide, straight; apical lobe longer than gonocoxite, curved near base, with long and straight distal part, medial third bears single row of fine setulae, apex appears slightly serrate in lateral view, with single seta apically; gonostylus bipartite, longer than gonocoxite, with short, blunt, lateral protuberance and elongate distal part



Figs. 30–32. *Dixella fuscifrons* (Edwards). 30. Wing. 31. Male terminalia, ventral view. 32. Same, lateral view.

with 2 short strong spines; 2 elongate, apically setose plates with slight basal incision present between gonocoxites; aedeagus lies between bases of gonocoxites, covered by translucent membrane; cercus small in ventral view, elongate in lateral view, with about 4–6 long black setae near gonocoxite.

Female

Unknown.

MATERIAL EXAMINED: GREECE: Lamia, 4.iv.1945 (collector unknown) (1♂).

DISTRIBUTION: France (Corsica), Yugoslavia, Greece.

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