

Griffiths, Graham C. D. Studies on boreal Agrammyzidae. XIV. *Chromatomyia* miners on Monocotyledones (Diptera: Agrammyzidae). 1980. 61 pp. 60:-

Sæther, O. A. Glossary of chironomid morphology terminology (Diptera: Chironomidae). 1980. 51 pp. 75:-

Cederholm, L. (Ed.) Advances in insects systematics and phylogeny. 1981. 415 pp./Brinck, P. Carl H. Lindroth in the Old World; Ball, G. E. Carl H. Lindroth; Contributions of a Swedish naturalist to systematics and biogeography in North America; Erwin, T. & Kavanaugh, D. H. Systematics and zoogeography of *Bembidion* Latreille I. The *carthi* and *erasum* groups of W North America; Reiss, F. & Säwedal, L. Keys to the males and pupae of the Palaearctic (excl. Japan) *Paratanytarsus*, with descr. of 3 n. spp.; Andersson, G. Taxonomical studies on the post-embryonic development in Swedish Lithobiomorpha; Tuxen, S. I. The systematic importance of the "striae band" and the abdominal legs in Acerentomidae, with a tentative key to acerentomid genera; Brinck-Lindroth, G. Subspeciation of *Ctenophthalmus agyrtus* s.l. in Fennoscandia, Denmark and Iceland; Mound, L. A. & Palmer, J. M. Phylogenetic relationships between some genera of Thripidae (Thysanoptera); Smit, F. G. A. M. The song of a flea—A stridulating mechanism in Siphonaptera?; Sylvén, E. & Carlbäcker, U. Morphometric studies on Oligotrophini adults (Cecidomyiidae) including an attempt to correct for allometric deviation; Philip, C. B. Subgeneric division of the oriental *Gressittia* Horse Flies; Douwes, P. Intraspecific and interspecific variation in workers of the *Formica rufa* group in Sweden; Chyvála, M. Classification and phylogeny of Empididae, with a presumed origin of Dolichopodidae; Cederholm, L. Variation in *Thrips angusticeps* f. *macroptera* with lectotype designations (Thysanoptera); Plassmann, E. *Mycomyia lindrothi* n.sp. and *Anatella lufflooni* Plassm., two new fungusgnats; Nyholm, T. Helodiden aus Birma, gesammelt von René Malaise. I; Sæther, O. A. & Halvorsen,

G. A. Diagnoses of *Tventenia* Kieff. emend., *Dratnalia* n.gen. and *Eukiefferiella* Thien. emend. with a phylogeny of the Cardiocladius group (Chironomidae); Høegh-Guldberg, O. A cooling experiment with an F1 generation of *Polyommatus icarus* f. *melanotoxa* (Lepidoptera); Palm, Th. Zur Kenntnis der Käferfauna von Madeira 3. Die Gattung *Sipallia*; Kristensen, N. P. & Nielsen, E. S. Intrinsic proboscis musculature in non-ditrysian Lepidoptera-Glossata: structure and phylogenetic significance; Hengeveld, R. The evolutionary relevance of feedinghabits of Ground Beetles; Luff, M. L. Diagnostic characters of the eggs of some Carabidae; Franz, H. Neue, blinde subterrane Coleopteren von den Makaronesischen Inseln; Viets, K. O. Wassermilben aus dem Northeren Territory, Australia; Evgen'ev, M. B., Lako-vaara, S., Poluektova, E. V., Saura, A. & Sokolov, N. N. What is *Drosophila littoralis* Meigen?; Stary, P. & Rejmánek, M. Numbers of parasitoids per host in different systematic groups of aphids: The implications for introduction strategy in biological control; Brinck, P. *Spinosodi-nentes* (Gyrinidae) in New Guinea and adjacent islands; Sakagami, S. F. & Ito, M. Specific and subgeneric variations in tibial corbication of male bumblebees, an apparent functionless character; Birket-Smith, S. J. R. The male genitalia of Hymenoptera—a review based on morphology in Dorylidae (Formicoidea); Solem, J. O. Systematic position of *Agrypocetes crassicornis* (Trichoptera); Heie, O. E. Morphology and phylogeny of some Mesozoic aphids! 300:-

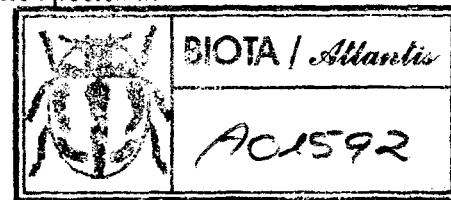
16. Sæther, O. A. Orthoclaadiinae (Diptera: Chironomidae) from the British West Indies, with description of *Antillocladius* n.gen., *Lipurometriocnemus* n.gen., *Compterosmittia* n.gen. and *Diplosmittia* n.gen. 1981 46pp. 50:-

17. Birket-Smith, S. Jörgen R. Prolegs, legs and wings in Insecta. To be published in 1982.

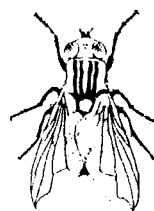
18. Enghoff, Henrik. The milliped genus *Cylindroiulus* on Madeira—an insular species *swarui* (Diptopoda, Julida: Julidae). To be published in 1982. 140:-

Canacidae of Israel, with a review of the palaearctic species of genus *Canace* Haliday (Diptera)

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Ent. scand.



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Israel occupies a pivotal position in the Palaearctic Region from the standpoint of zoography, being strongly influenced by faunal elements from Asia and Africa. The Canacidae of Israel also reflect this phenomenon, although only two species are known to occur: one species, *C. salomitana* Strobl, is typically Mediterranean, the other, *Noctisinaeensis* n.sp., represents the Indo-Pacific region. The genus *Canace*, s.str., is revised with one new species, *C. actives*, from the Canary and Madeira Islands. All species considered are keyed and figured.

Key Words: Diptera, Canacidae, beach flies, taxonomy, zoogeography.

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Beach flies (Diptera: Canacidae) are found throughout the world, primarily along shorelines of marine environments. An exception is a species complex of the genus *Procanace*, which in Hawaii has adapted to rapidly flowing, freshwater, mountain streams (Hardy & Dellinado 1980). Approximately 90 species have been described in the family, of which three were previously known from the Palaearctic Region (Becker 1926). What little is known of the natural history of beach flies indicates that they breed in various species of algae, mostly marine species, except for a few species of *Procanace*. This generalization, however, is extrapolated from natural history studies of just a few species.

In the Near East, virtually nothing is known about the canacid fauna. Becker (1903) recorded the occurrence of *Canace nasica* (Haliday) and *C. salomitana* Strobl in Egypt, and later (1926) he reiterated this information in his generalized distribution statements for these two species.

This study was prompted when Dr. Amnon Freidberg, Tel Aviv University, sent specimens of two species of Canacidae that he had recently collected in Israel. One is a new species of *Noctisinaeensis* Malloch and the second is *C. salomitana*. Determining the valid name of the *Canace*

species required a study of the pertinent literature which then led to the review presented here.

Remarks on the zoogeography of Israeli species

Israel enjoys indirect exposure to two oceans through secondary, though large bodies of water: The Atlantic Ocean via the Mediterranean Sea and the Indian Ocean via the Gulf of Aqaba, Red Sea. Of the two conduits, the Mediterranean Sea exerts a greater influence on Israel due to its much longer coastline with the coast and to the prevailing winds, which generate a blow from the Mediterranean eastward.

Although the Gulf of Aqaba and the Mediterranean Sea are relatively approximate geographically, being separated by little more than 200 km across the Negev Desert, the faunas support exhibit considerable divergence (Freidberg 1975). These contrasts are likewise evident in their respective shoreline faunas, as exemplified by Canacidae.

Only two canacid genera have been recorded in Israel, but each represents its own

anic-shoreline fauna. *Tlic gciiii* *Canace*, s. which is widespread along the eastern coast he Atlantic Ocean from southern Europe to thern Africa, includes among other species *C. nitana*. The distribution of this species nds along the eastern shores of the Mediter- an Sea to the Levant. The second genii is *icanace* which occurs widely along the sts of the Indian and Pacific Oceans. In el, the genus is represented by the newly overed *N. sinaiensis*, which was found along Gulf of Aqaba and like its congeners, is ep- ntative of the Indo-Pacific region.

Key to genera of Canacidae from Israel

sternopleural bristle lacking; anterior notopleural ristle present; acrostichal setae generally pre- ent, 2 rows, prescutellar pair larger, more widely eparated; disc of scutellum usually with setae; pical pair of scutellar bristles directed pos- eriorly; species mostly brown . . . *Canace* Haliday
 sternopleural bristle present; anterior notopleural ristle lacking; acrostichal setae totally lacking; isc of scutellum bare; apical pair of scutellar ristles upturned; species mostly gray to grayish brown *Noticanace* Malloch

Genus *Canace* Haliday

Hydra, subgenus *Canace* Haliday, 1839: 411. Type- species: *Ephydra (Canace) nasica* Haliday, by monotypy. Walker 1853: 268 [review]. *Proc. Linn. Soc.*, 1860: 29 [review]; Schiner 1863: 268 [review]. London 1877: 76, 169 [review]; Becker 1878: 27 [review]; *Diagn. Catalogue*: 1926: 106 [review]; Wirth 1951: 259 [review]. *Canace*, Malloch, 1924: 52 [misspelling]; Cresson 1924: 164 [status]; 1936: 265 [status]; Curran 1934: 156 [status].

Diagnosis: Resembling *Procanaea* Hendel, *Chaetocane* Hendel, and *Trichocanace* Wirth but differing in these and other genera by the following combina- on of character states: Mesofrons with 1-4 large, eral, generally proclinate setae; 1 pair of large, ergent postocellar bristles; mesofrons densely entose, dull appearing, not strongly differentiated m parafrons; 3 pairs of large, laterocline fronto- ital bristles; arista with branching rays short, not ger than basal arista width; 2-3 large, anacline tal bristles, 1 large anterocline genal bristle; eye ler than high; 4 pairs of dorsocestral bristles; acro- stal setae generally evident, sometimes weakly e- eposed, pale; prescutellar acrostichal bristles well e- eposed; 1 pair of supraalar bristles; scutellum usually h discal setae and 2 pairs of lateral scutellar bristles; otopleural bristles; 1 large mesopleural bristle; ster- pleural bristles lacking; both propleural and stig- tal bristles present; forefemora with 3-4 long, slen-

der posteroventral bristles, but lacking short, stout anteroventral setae; female genital lamellae slender, terminal bristle long, slender, usually acutely pointed; surstylus, in lateral view, with fingerlike, ventral pro- jection and frequently with enlarged, posteroventral process.

Discussion

The concept of *Canace*, as diagnosed here, includes only three species, all of which are only known to occur in the Palaearctic Region. The status of the New World and Afrotropical species, which I exclude from the genus, will be dealt with elsewhere.

The status of Malloch's *Canace* has differed, depending on the author, but Malloch himself considered the publication of this spelling to be a *lapsus* (Curran 1934). Cresson (1924, 1936), however, felt that if the species allied to *C. macateei* Malloch were ever accorded genus-level status, *Canace* is an available name, with *Canace macateei* as the type-species. As it is evident that Malloch's spelling was an error, and has been treated as such by most subsequent authors (Curran 1934; Wirth 1951, 1965), I am likewise treating it as a *lapsus*.

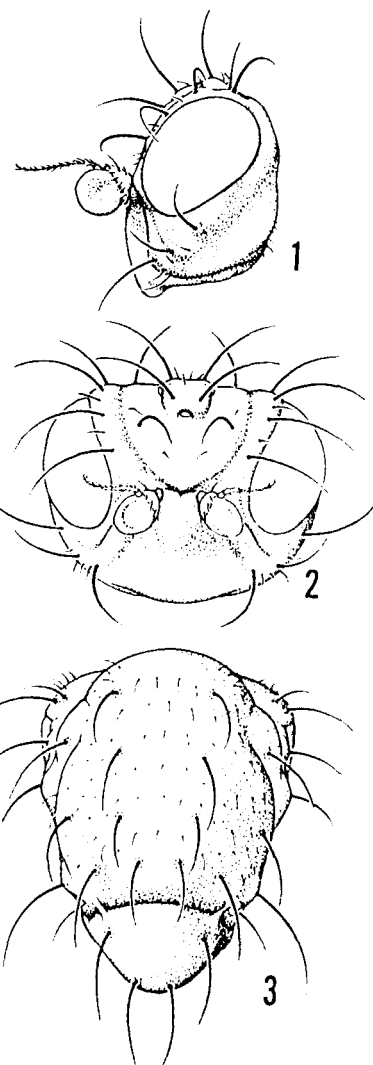
Key to species of *Canace*, s.str.

- 1. Gena with 3 large, anacline bristles below cyc (England) 2. *C. nasica* (Haliday)
- Gena with 2 large, anacline bristles below cyc . . . 2.
- 2. Mesofrons with 3-4 pairs of proclinate, marginal setae; anterior acrostichal setae strong, conspicu- ous; larger species, length 2.5 to 3.3 mm (Medi- terranean) 3. *C. salomitana* Strobl
- Mesofrons with 1-2 pairs of proclinate, marginal setae; anterior acrostichal setae weak, inconspi- cuous; smaller species, length 1.5 to 3.1 mm (Can- ary and Madeira Islands) 1. *C. actites* n.sp.

1. *Canace actites* n.sp.
Figs. 1-3, 7, 10-11

Canace salomitana of authors, not Strobl; Frey 1936: 111 [review Canary Islands]; 1949: 37 [list, Madeira Islands]; 1958a: 53 [list, Canary Islands]; Wirth 1951: 264 [review, figure of male terminalia].

Type locality: Canary Islands, Tenerife.
Type material: *Holotype* male is lithoid: "Teneriffe [Canary Islands] 46577 [last two digits in larger script] 1/XII [1 Dec, handwritten]/Collection J M Aldrich." — *Allotype and eight paratypes:* Canary Islands, Tenerife: Puerto de la Cruz, K. Frey, C. E. Dyte (3 ♂, 5 ♀; BMNH, MZH). Other paratypes as follows: Canary Islands, Gomera: San Sebastian, 11 Aug. R. Frey (2 ♀, MZH). Gran Canaria: Las Palmas, K. Frey (2 ♂, 3 ♀,



Figs. 1-3. *Canace actites* n.sp. — 1. Head, lateral view. — 2. Head, anterior view. — 3. Thorax, dorsal view.

MZH, USNM); Maspalomas, 17 Jun 1966, Gabel and Ward (1 ♀; BMNH). Hierro: Puerto Estaca Frey (6 ♀; MZH). Tenerife: 46577, 1 Dec. T. Beck ♂, 3 ♀; HU, USNM); Garachico, R. Frey (1 ♀; MZ; San Andres, R. Stora (1 ♀; MZH). Madeira Isla Madeira: Funchal, sea shore, 17-23 Jan 1977, A. Stubbs (2 ♀; BMNH). The holotype is double mou- (minute nadel in plastic block), is in good condi- although the thorax is slightly greasy, and is depos- in the Nat. Mus. Nat. Hist., Smithsonian Inst. US- type number 76783.

Diagnosis: Similar to other congeners but differing the following combination of character states: B appearing less hairy; setae, especially of head and rax, generally less evident and fewer; frons with rarely 2, pair of intrafrontal lateral, proclinate bris- 2 large, anacline genal bristles; acrostichal setae sent but much reduced; setae on disc of scute either lacking or with a single seta, rarely with 2.

Etymology: The species epithet *actites* is der- from the Greek noun *aktites*, meaning "beach d- ler," and refers to the habitat of this species. The n- stands in apposition to the generic name.

Description

Small to medium-sized beach flies, length 1 to 3.07 mm; mostly olivaceous brown, become more orangish brown dorsally.

Head: (Figs. 1-2) Eye in profile more obli- ely oriented; anterodorsal portion of head, r- juncture with antenna, less protruding or ang- te; frons mostly olivaceous brown but v- bronzish to lightly lavender or orangish col- tion, concolorous with mesonotum. Frons us- ly with 1 pair of intrafrontal, proclinate, lat- bristles, rarely with 2, if 2, second pair m- smaller; gena with several bristles but onl- large, anacline ones and 1 anterocline pa-

Thorax: (Fig. 3) Acrostichal setae and of setae generally finer, fewer, inconspicuous, though principal setae present; disc of scute generally bare, rarely with 1-2 setae. Fine, v- tral hairs of sternopleuron and midcoxa mo- black.

Abdomen: Male terminalia (Fig. 7) with pl- of surstylus in lateral view nearly straight- becoming gradually broader ventrally, somew- evenly rounded and with straight ventral p- posterior lobe not distinctly formed; ventral p- cess digitiform, nearly parallel sided. Len- terminalia (Fig. 10) and spermatheca (Fig. 11) illustrated.

Geographic Distribution: Canary Isla- (Gomera, Gran Canaria, Hierro, and Teneri- Madeira Islands.

Remarks: This species has been misidentified by recent authors, and only after comparing specimens from the Canary Islands with those from Israel was the discovery made that two species were involved. Subsequent examination of the type of *C. salomitana* established that the specimens from the Canary Islands represented a new species.

2. *Canace nasica* (Haliday)
Figs. 4-6, 8, 12-13

Ephydra (*Canace*) *nasica* Haliday, 1839: 411; Walker 1853: 269 [review].
Canace nasica, Loew 1860: 29 [review]; 1874: 80 [review]; Schiner 1863: 269 [review]; Rondani 1875: 170 [review]; Becker 1896: 247 [list]; 1903: 183 [list, Egypt]; 1905: 215 [catalogue]; 1926: 106 [review]; Seguy 1934: 401 [review, figure of wing and head]; 1936: 21 [list, Azores, Canary Islands]; Frey 1936: 110 [review, Canary Islands]; 1945: 81 [review, Azores]; 1949: 37 [list, Madeira Islands]; 1958a: 53 [list, Canary Islands]; 1958b: 48 [list, Cape Verde Islands]; Wirth 1951: 262 [review, figure of male terminalia]; Hinton 1967: 319 [natural history, especially of plastron respiration, figures of puparium]; Cogan 1976: 87 [list, Britain]; 1980: 694 [catalogue].

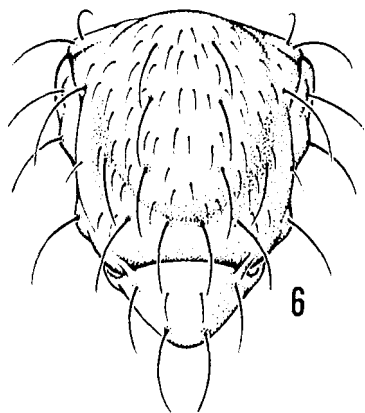
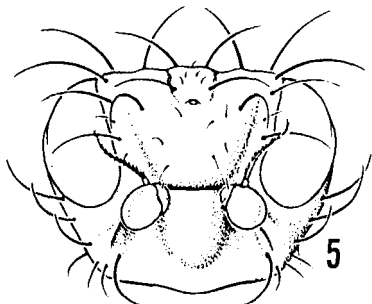
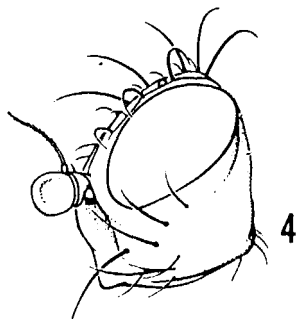
Type locality: England.

Type material: In his original description of *C. nasica*, Haliday (1839) stated that the specimen(s) he described was from England and was sent to him by F. Walker. Through the courtesy of Dr. James P. O'Connor, National Museum of Ireland, Dublin, I was sent a specimen labeled as the type but from the county of Kerry, Ireland. Although the handwriting on the label is in Haliday's hand and the specimen does represent the concept of *C. nasica* of authors and probably Haliday, the locality and data preclude it from being the type or a syntype. Hence, it cannot be designated as the lectotype. Dr. O'Connor (personal communication) also sent the following explanation concerning Haliday's collection.

"At the turn of the century, J. N. Halbert began to work on the Irish Diptera, research which he unfortunately never had the opportunity to finish. As part of this work, he went through the Haliday Material which was housed in store-boxes and mainly selected out the Irish specimens. It is possible therefore that Haliday's original material of *nasica* remains unrecognized in one of these store-boxes. Alternatively, it may have been destroyed. In one of his letters, Haliday complains about psocids eating his specimens. A complicating factor is that some of the collection was lost during Haliday's own lifetime.

"... the type label was subsequently added by someone other than Haliday—perhaps J. E. Collin."

Although the apparent holotype of *C. nasica* has not been located, if indeed it is extant, the specimen I examined from Haliday's collection does represent the species identified by authors, including Haliday, as *C. nasica*.



Figs. 4-6. *Canace nasica* (Haliday). — 4. Head, lateral view. — 5. Head, anterior view. — 6. Thorax, dorsal view.

Diagnosis: Similar to both congeners but differing by the following combination of character states: Body appearing moderately hairy; setae, especially of head and thorax somewhat evident; frons with 2-3 pairs of intrafrontal, lateral, proclinate bristles; gena with 3 large anaclinate bristles; acrostichal setae conspicuous; setae on disc of scutellum numbering 2, usually without other smaller setae.

Description

Small to moderately small beach flies, length 1.92 to 2.93 mm; mostly olivaceous to grayish brown.

Head: (Figs. 4-5) Eye in profile only slightly obliquely oriented; anterodorsal portion of head, near juncture with antenna protruding and angulate; frons mostly olivaceous brown with some more greenish coloration, especially toward vertex. Frons usually with 2-3 pairs of intrafrontal, proclinate, lateral bristles, rarely with less than 2; gena with 3 large, anaclinate bristles and a few smaller setae with varying orientation.

Thorax: (Fig. 6) Acrostichal setae and other setae generally conspicuous, evident; disc of scutellum with 2 setae, symmetrically arranged, lacking smaller setae. Sternopleuron with fine, ventral hairs, these and hairs of midcoxa entirely pale.

Abdomen: Male terminalia (Fig. 8) with surstylus distinctly L-shaped; posterior lobe narrow, angularly rounded apically, length nearly equal to surstylar height minus ventral lobe; ventral lobe curved anteriorly, acutely pointed apically; anteroventral surface of surstylus with distinct row of pale setae. Female terminalia (Fig. 12) and spermatheca (Fig. 13) as illustrated.

Other specimens examined: EGYPT, Alexandria, May [T. Becker collection] (1 ♂, 1 ♀; HU). ENGLAND, Devon: Brixham, Berry Head, 1 Sep 1960, J. R. Vockeroth (4 ♂, 3 ♀; USNM). Isle of Wight: Ventnor, 5 Octo (1 ♀; USNM). Kent: Isle of Grain, on shore, 14 Aug 1968, R. I. Vane-Wright (7 ♂, 4 ♀; BMNH). Surrey: Walton, 7 Jun 1908, J. E. Collin (1 ♂, 1 ♀; USNM). Sussex: Hasting, 16 Sep 1929, O. W. Richards (4 ♂; USNM). IRELAND, Kerry: (1 ♀; NMD). PORTUGAL, Azores, Pico: Madalena, 6-9 Jul, R. Frey (5 ♂ MZH). Terceira: Angra do Heroismo, 29 May-6 Jun, R. Frey (1 ♂; MZH). Madeira Islands, Madeira: Calheta, 7 May, R. Frey (2 ♂, 1 ♀; MZH); Mchul, 17-23 Jan 1977-18 May, R. Frey, A. E. Stubbs (7 ♂; BMNH, MZH). SPAIN, Staudinger collector (1 ♂; MZH). Alicante: Villajoyosa, 18 Apr 1969, G. Dyte (2 ♂, 1 ♀; BMNH). Canary Islands, Gomera: San Sebastian, 11 Aug, R. Frey (3 ♀; MZH). Gran Canaria: Las Palmas, R. Frey, (3 ♂, 3 ♀; MZH).

Hierro: Puerto Estaca, R. Frey (2 ♀; MZH). La Palma: Santa Cruz, R. Frey (1 ♂, 1 ♀). Tenerife: (3 ♂, 1 ♀; HU, USNM); Lanzarote, 14 Sep 1976, M. Baez (2 ♂; USNM); San And Stora (2 ♂, 3 ♀; MZH).

Geographic distribution: Coasts of W Europe below 55° north latitude (England, France, Ireland, and Spain), Mediterranean (Egypt), and islands of the eastern Atlantic Ocean (Azores, Canary Islands, Cape Verde Islands, and Madeira Islands).

Natural history: In England, along the coast of Devon, Dorset, and Bristol Channel Carmarthen Bay, Hinton (1967) found both of puparia of *C. nasica* among the external growths of *Enteromorpha*; the larvae of this species apparently feed on the algae. In addition to a description of the spiracular gill-plastron respiratory mechanism, Hinton provided an outline illustration of the puparium.

Remarks: The locality data from Egypt I initially anticipated that the specimens had been misidentified but have since examined Becker's specimens from Alexandria, collected by him, and indeed they are of *C. nasica*. In the absence of any other verified records from the Mediterranean shoreline, and except for the possibility that the specimens were mislabeled, this species probably occurs there. At least it once did.

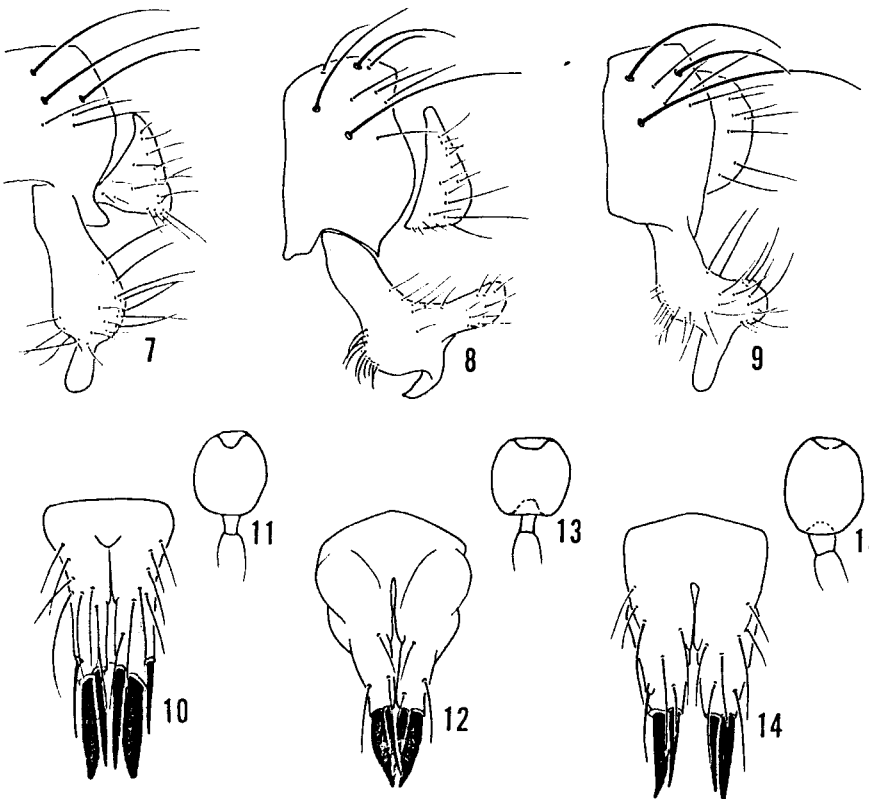
3. *Canace salomitana* Strobl
Figs. 9, 14-18

Canace salomitana Strobl, 1900: 635; Becker 1903: 215 [catalogue]; 1926: 107 [review].

Type locality: Salona [Dalmatia, Yugoslavia].

Type material: The holotype female is not accompanied by an accompanying label, on a separate pin: "*Canace salomitana* m. ♀. Salona [green with marginal and marginal black border]". The specimen is glued to a card on its right side and the underside of the card has the number 36 handwritten on it. The holotype is teneral, the legs are dried flat, and the apical spines of the female terminalia are short. Otherwise the specimen is in fairly good condition. Strobl's original description states that the specimen was collected in May, 1900, by Strobl, but no accompanying label or the detached label holotype is deposited in the Admont collection, Austria (Dr. G. Morge, curator). The label appears to be in Strobl's hand.

Diagnosis: Resembling other congeners but differing by the following combination of character states: Body appearing hairy; setae, especially of head and thorax, conspicuous and numerous; frons with 3-4



Figs. 7-15. Terminalia of *Canace* spp. — 7. *Canace acitites*, male terminalia, lateral view. — 8. *C. nasica*, male terminalia, lateral view. — 9. *C. salomitana*, male terminalia, lateral view. — 10. *C. acitites*, female terminalia, dorsal view. — 11. *C. acitites*, spermatheca, lateral view. — 12. *C. nasica*, female terminalia, dorsal view. — 13. *C. nasica*, spermatheca, lateral view. — 14. *C. salomitana*, female terminalia, dorsal view. — 15. *C. salomitana*, spermatheca, lateral view.

intrafrontal, lateral, proclinate bristles; 2 large, anaclinate genal bristles; acrostichal setae present and evident, conspicuous; setae on disc of scutellum numbering 2-5, usually with 1 pair larger.

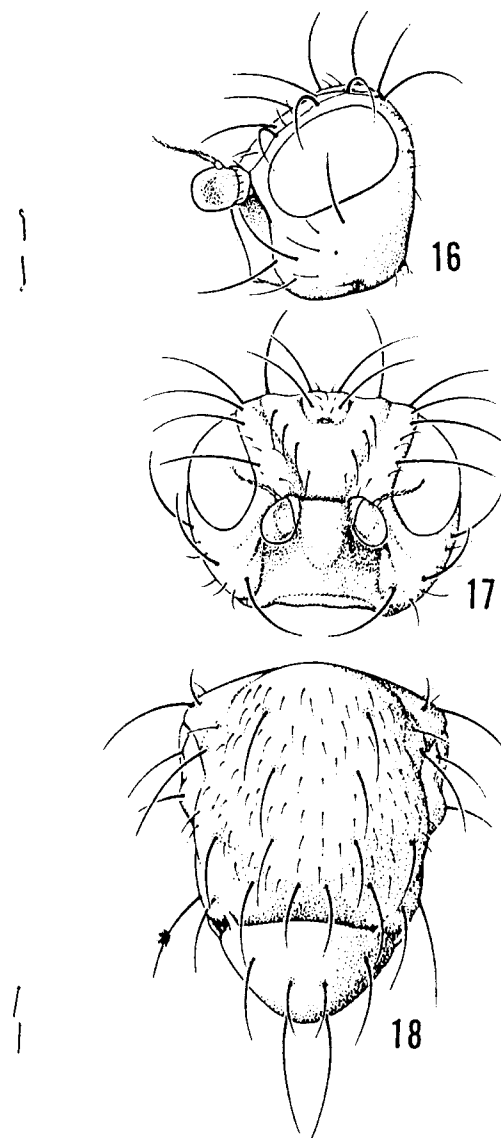
Description

Moderately small to medium sized beach flies, length 2.56 to 3.3 mm; mostly olivaceous to grayish brown.

Head: (Figs. 16-17) Eye in profile only slightly obliquely oriented; anterodorsal portion of head,

near juncture with antenna more protrudent and angulate; frons mostly olivaceous to bronzy brown. Frons usually with 3-4 pairs of intrafrontal, proclinate, lateral bristles, rarely with less than 3; gena with 2 large, anaclinate bristles and several smaller setae with orientation varying from anaclinate to anteroclinate.

Thorax: (Fig. 18) Acrostichal setae and other setae generally conspicuous; disc of scutellum with 2-5 setae, frequently irregularly inserted and usually with 1 pair larger. Fine, ventral hairs



Figs. 16-18. *Canace salomitana* Strobl. — 16. Head, lateral view. — 17. Head, anterior view. — 18. Thorax, dorsal view.

of sternopleuron and hairs of midcoxa black.

Abdomen: Male terminalia (Fig. 9) with stylus distinctly angulate in profile, genitalia U-shaped and with a straight ventral lobe, 1-sided; posterior lobe distinct and evenly rounded posteriorly. Female terminalia (Fig. 10) and spermatheca (Fig. 15) as illustrated.

Other specimens examined: Crete, Kandia, [Becker collection] (1 ♀; HU). Israel, Akhziv 1972, A. Freidberg (1 ♂; TAU). Dor, 19 May 1972, A. Freidberg (9 ♂, 9 ♀; USNM). Herzliya, 21 May-23 Oct. 1971-1980, A. Freidberg, W. Mathis, 21 ♀; TAU, USNM). Herzliya, 25 Mar 1971, Freidberg, W. Mathis (54 ♂, 61 ♀; USNM). Mikhael, 26 Mar 1980, W. Mathis (7 ♂, 13 ♀; TAU). Shave Ziyon, 25 Sep 1976, A. Freidberg (5 ♂; TAU).

Geographic distribution: Coast of the Mediterranean Sea (Yugoslavia, Crete, Egypt).

Natural history: Nearly all specimens of Freidberg and I collected in Israel were taken sweeping over rocky beaches, especially where the abrasive action of the waves had carved holes. Only an occasional specimen was collected along the sandy beach, and in these few cases a rocky beach was nearby.

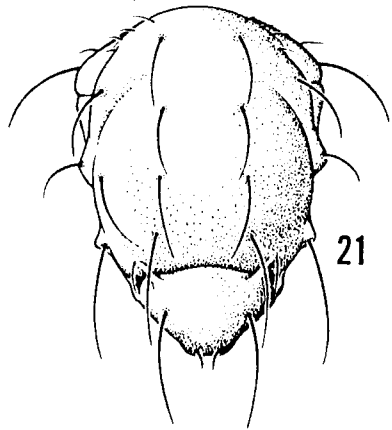
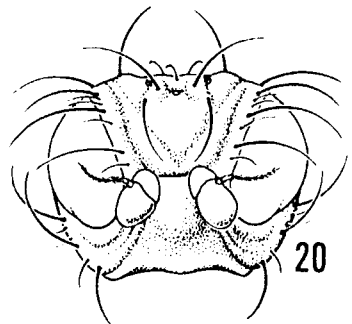
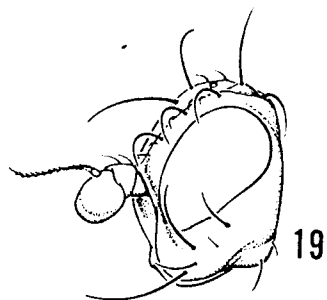
Remarks: Prior to this study, the record of this species to Israel was Becker's from Egypt. We found the species to be spread and abundant along the Mediterranean coast of Israel, from Herzliya to Akhziv; undoubtedly the species will be found wherever a rocky beach occurs.

Genus *Nocticanace* Malloch

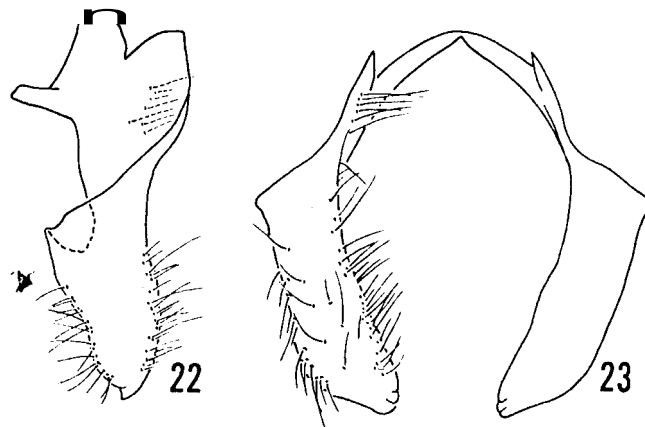
Nocticanace Malloch, 1933: 4. Type-species *Canace peculiaris* Malloch, by original designation and monotypy. Wirth 1951: 269 [review].

Diagnosis: Similar to *Canaceoides* Cresson and *Canace* Mathis and Wirth, but differing from either other genera by the following combination of characters: Generally dark colored; head in profile not more than wide; 1 pair of intrafrontal bristles, inserted laterally and nearly aligned with median ocellus; 3 large, lateroanclinate fronto-orbital bristles; posterior bristles lacking; mesofrons undifferentiated from frons, densely tomentose, appearing dull; genal hairs of smaller setae; arista with branching rays, length less than width of arista at base; eye high, not more than wide; 2 large, anaclinate genal bristles and 1 large, anteroclinate genal bristle, number of

anal setae variable; 4 pairs of dorsocentral bristles; crostichal setae lacking; disc of scutellum bare; frequently apical pair of scutellar bristles anaclinate; 1 pair of postalar bristles; 1 pair of supra-alar bristles frequently anterior notopleural bristle lacking; sternopleuron and mesopleuron each with 1 large bristle; distal spines of tarsomeres 3 and 4 usually not flattened; midfemora lacking conspicuous row of spinelike setae along posteroventral surface; female eighth tergum with 2 very long marginal hairs, reaching apices of genital lamellae; female genital lamellae with long fine hairs on dorsal side, with 2 long, stout, apical bristles; male atrial sclerotization oval in outline; surstylus generally separated from ninth tergum by suture or constriction, variously shaped.



Figs. 19-21. *Nocticanace sinaiensis* n.sp. — 19. Head, lateral view. — 20. Head, anterior view. — 21. Thorax, dorsal view.



Figs. 22-23. *Nocticanace sinaiensis* n.sp. — 22. Terminalia, surstylus, ventral view. — 23. Male surstylus, posterior view.

Discussion

Nocticanace occurs along the shorelines of the Pacific and Indian Oceans. About 20 species have been described, and numerous others remain to be named, especially from the Neotropics and islands of the South Pacific. The species being described below is the first from the western Palaearctic Region.

Nocticanace sinaiensis n.sp. Figs. 19-23

Type locality: Israel: Sinai. Ras Burka.

Type material: *Holotype* male is labeled: "Israel: Sinai: Ras Burka 23 Mar 1980 Freidberg & Mathis coll[ect]o[ri]s." — *Allotype* female and 22 *paratypes* (8 ♂, 14 ♀), with same locality data as the holotype. Other paratypes as follows: ISRAEL: Sinai: Nevi'ot, 8 km N, 20 May 1981, W. N. Mathis (8 ♂, 7 ♀); Eilat, 23 May 1981, W. N. Mathis (15 ♂, 17 ♀). The holotype is double mounted (minute nadel in plastic block), is in excellent condition, and is deposited in the Nat. Mus. Nat. Hist., Smithsonian Inst., USNM type number 76784. Paratypes are in the Nat. Mus. Nat. Hist., Brit. Mus. (Nat. Hist.), and Tel Aviv University.

Diagnosis: This species is similar to others of the *peculiaris* species group (*N. peculiaris* (Malloch), *N. malchensis* (Lamb), *N. sinensis* Delgado, *N. zimmermani* Wirth) but differs consistently by the shape of the surstylus.

Etymology: The specific epithet *sinaiensis* is derived from the name of the peninsula from which these flies were collected.

Description

Small to moderately small beach flies, length 1.58 to 2.71 mm; mostly gray, darker dorsally.

Head: (Figs. 19-20) As in generic diagnosis.

Thorax: (Fig. 21) Anterior notopleural bristle lacking. Apical scutellar bristles anaclinate, gra-

dually curved. Legs concolorous, mostly gray to blackish gray.

Abdomen: Male terminalia (Figs. 22-23) with surstylus a simple ventral projection, tapering ventrally to pointed apex; posterior margin in lateral view broadly and evenly rounded, setulose; anterior margin sinuate, setulose; apex slanted medially.

Geographic distribution: Although we have collected this species from the shores of the Gulf of Aquaba only, I suspect that it will be found to occur along most of the shoreline of the Red Sea.

Natural history: All of the specimens were collected by rapidly sweeping over and around shoreline rocks. Specimens were usually caught singly and first had to be flushed and then quickly netted.

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