

Lygaeinae of Turkey (Heteroptera, Lygaeidae)

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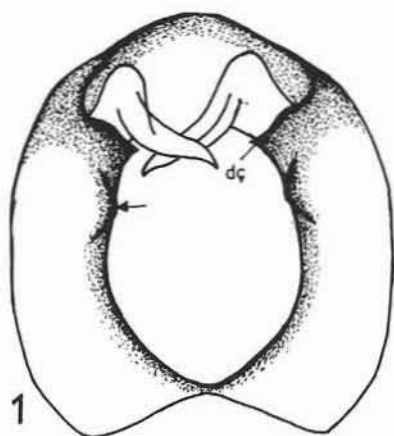
Heteroptera, Lygaeidae, Turkey, taxonomy, keys, faunistics.

Abstract: The subfamily Lygaeinae is represented in Turkey by 8 genera and 17 species (Hoberlandt; 1955, Tuatay et al.; 1972, Lodos et al., 1978). In the present study the male genitalia, pygophore, paramere and phallus of *Arocatus longiceps* Stal, 1872, *A. melanocephalus* (Fabricius; 1798), *Melanocoryphus albomaculatus* (Goeze, 1778), *M. tristrami* (Douglas and Scott, 1868), *Horvathiolus superbus* (Pollich, 1781) and *Paranysius fraterculus* Horvath, 1895 were examined and their systematic importance attempted to be shown. Besides brief morphological description and distributions of them were given with diagnostic key for the species recorded from Turkey. *Tropidothorax leucopterus* (Goeze, 1778), *Spilostethus saxatilis* (Scopoli, 1763), *Spilostethus pandurus* (Scopoli, 1763), *Lygaeus equestris* (Linnaeus, 1758), *Lygaeus creticus* Lucas, 1854, *Graptostethus servus* (Fabricius, 1787), *Caenocoris nerii* (German, 1847) were previously examined by the author (Aysev 1974) so they were given with additional records only. Besides *Paranysius fraterculus* Horváth, 1895, found to be new record for Turkey.

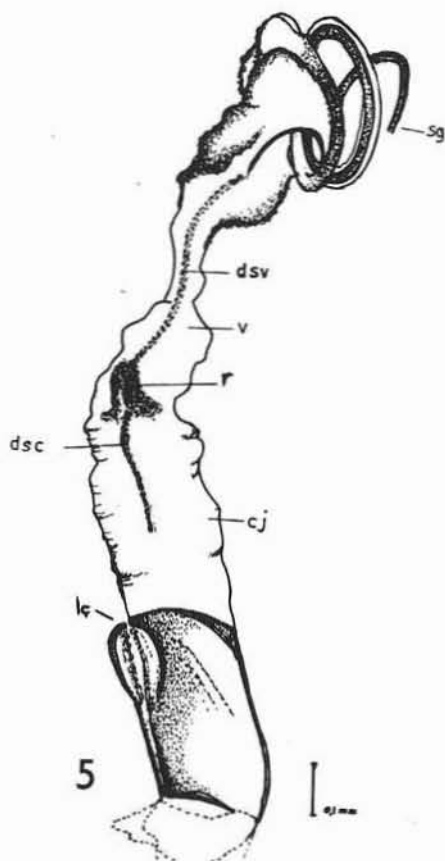
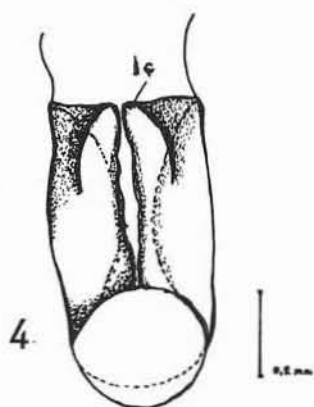
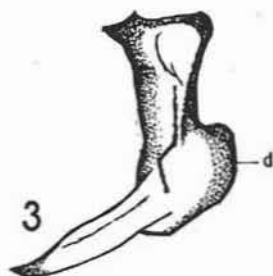
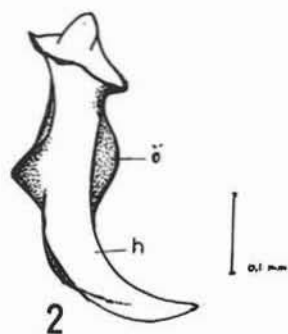
Specimens in the collections of the Entomology Department of Agricultural College, Aegean University, Izmir, in the collection of Zoology Department of Science Faculty, Hacettepe University, Ankara and in the collection of the Plant Protection Institute, Plant Protection Museum, Ankara, constitute the material of this work.

Key to the species of *Arocatus* Spinola

- 1 Median of head as long as synthlipsis or longer, exocorium entirely or partly red 2
- Median of head shorter than synthlipsis, exocorium black, male genitalia as in Fig. 6 - 12 *melanocephalus* (F.)
- 2 Median of head prominently longer than synthlipsis, exocorium entirely red, rostrum hardly passing hind coxae; male genitalia as in Fig. 1 - 5 ... *longiceps* Stal
- Median as long as synthlipsis, exocorium proximally red medially and distally black, rostrum reaching at most hind coxae *roeseli* (Schl.)



0.1 mm



***Arocatus longiceps*, Stal, 1872**

Synonymy: *Arocatus grasii* Picco, 1920

General coloration dirty yellowish-brown; head light yellowish-brown to dark, 1st antennal segment projecting little beyond apex of head, 2nd segment slightly longer than 3rd, 4th longer than 3rd; pronotum dirty yellow-brown, irregularly punctuated except proximal margin, with slight median carina and distal transversal black split; scutellum yellowish-brown to dark, with latero-distal black margin; wings yellowish-brown; corium with black round spot fairly spread membrane brown, reaching slightly beyond apex of abdomen; thoracic tergum golden yellow; prosternum reddish yellow-brown, meso and metasternum black; legs yellow-brown; abdominal sterna light yellow-brown, laterally brownish; 5–5.6 mm in length.

Pygophore longer than wide and distally convex; dorso-lateral processes convex at upper margin, slightly concave at lower margin and sharply pointed; anterior genital opening longer than broad somewhat „U“ shaped (Fig. 1); hypophysis of paramere moderately long, flat and sharply pointed; outer process considerably broad like angle; fore process slighter, as round projection of body extending to base (Fig. 2, 3); theca cylinder shaped, lightly pigmented but stronger at lateral faces; with unpigmented, narrow longitudinal band like part dorso-medially; lateral processes latero-medially placed, not prominent and apically round; conjunctiva long; reservoir moderately developed; vesica comparatively wide with complete curle toward distal portion; ductus seminis very thin; processus gonopori comparatively wider with complete circle; secondary gonopore quite narrow (Fig. 4, 5).

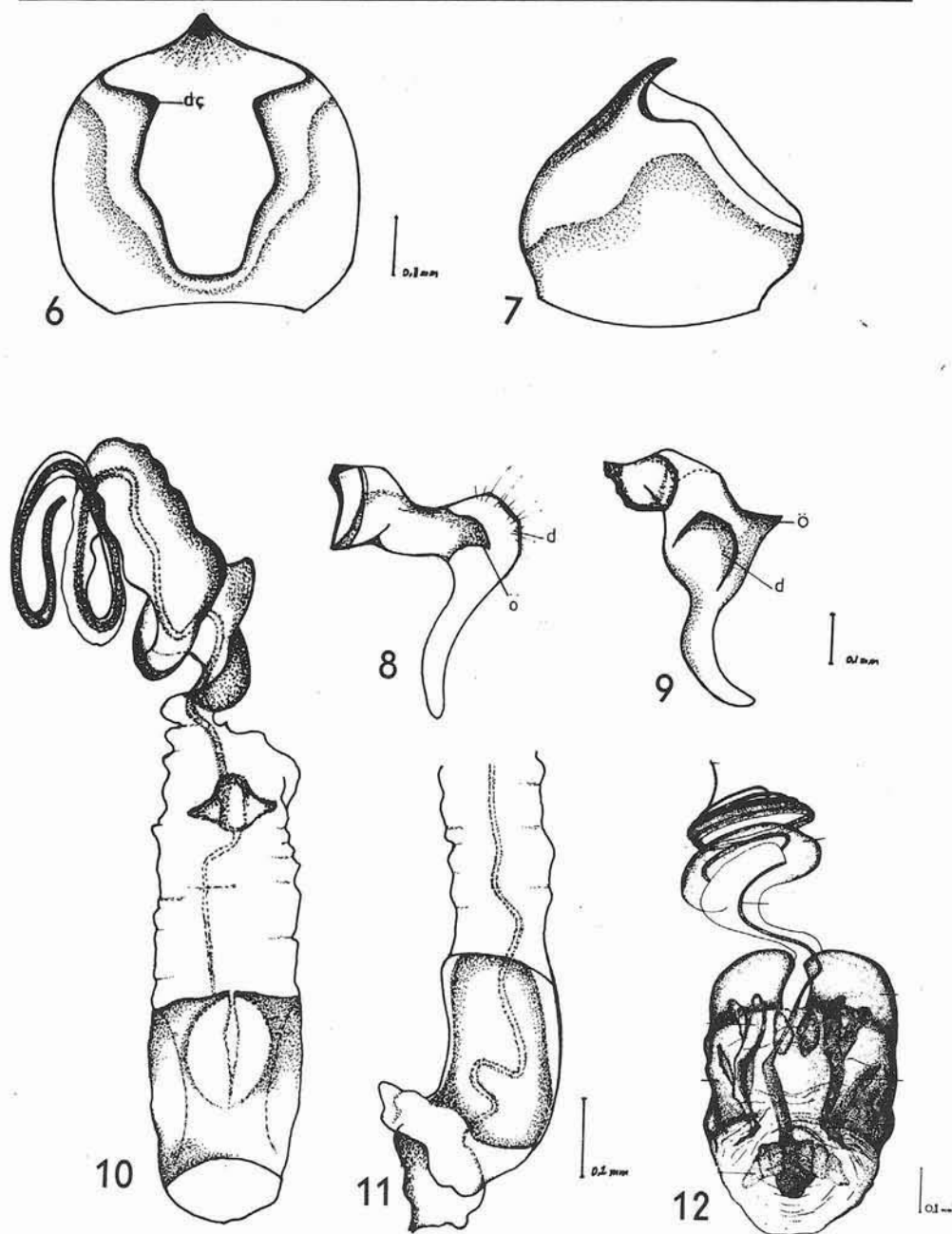
Material examined: Bafra, 4.6.1973, 1♀; Samsundagi, 2.7.1973, 1♂; Bozdog, 26.7.1971, 1♀; Ankara, 13.6.1970, 4♂♂, 5♀♀

***Arocatus melanocephalus*, F., 1798**

Synonymy: *Lygaeus pruinosus* Eversman, 1873

General coloration black, contrasting with red; antennae black, 3rd and 4th segments reddish to brown; pronotum red with „M“ shaped black mark proximally; scutellum black; clavus red with blackish terminal margin; corium red, distal portion black up to anal corner; membrane black; thoracic terga red, each tergite with lateral black spot, paratergites red; proximal and lateral margins of meso and meta pleura red; femora black except red distal part, tibiae yellowish-red basally black, 1st

Figs. 1–5: *Arocatus longiceps* Stal. Fig. 1: pygophore (dorsal), figs. 2–3: parameres, fig. 4: theca (dorsal), fig. 5: phallosome (latero-dorsal). Abbreviations: dc – dorso-lateral process, h – hypophysis, o – outer process, f – fore process, lc – lateral process of theca, cj – conjunctiva, v – vesica, dsv – ductus seminis vesicae, dsc – ductus seminis conjunctivae, sg – secondary gonophore, gp – processus gonopori.



Figs. 6–11: *Arocatus melonocephalus* (Fab.). Fig. 6: pygophore (dorsal), fig. 7: pygophore (lateral), figs. 8–9: parameres, fig. 10: phalloteca (dorsal), fig. 11: theca (lateral). Fig. 12: *Caenocoris nerii* (Germ.) – phalloteca (dorsal, Aysev 1974).

and 2nd tarsal segment yellowish-red, 3rd segment black; abdominal sterna red, stigmatae having black rings, parasternites red, with black proximal corner; 6–6.5 mm in length.

Pygophore exceptionally different in shape, with big, roundly pointed dorso-distal projection curving to dorsal aspect; dorso-lateral process wide, right angle shaped and pointed; lateral margins of anterior genital chamber slightly concave from medial to proximal (Fig. 6,7); hypophysis of paramere moderately long and apically rounded, outer process broad, similar to that of *A. longiceps*, fore process also big and strongly pointed; phallus very much similar to that of *A. longiceps* but dorso-medial unpigmented band-shaped longitudinal part shorter, descending to medial of theca (Fig.10, 11).

Material examined: Kusadasi, Samsundagi, 2.7.1975, 2♂♂, 1♀; Caycuma 16.7.1979, 1♂; Ödemis, 24.1.1972, 3 ♂♂, 2 ♀♀; Kula, 6.9.1979, 1♂; Sinop, 4.6.1973, 1♂; Denizli, 6.7.1975, 13♂♂, 12♀♀; Marmoris, 7.6.1973, 1♂; Tekirdag, 20.6.1986, 5♂♂.

***Tropidothorax leucopterus* Goeze, 1778**

This species was studied by the author (Aysev 1974) so only additional records were given.

Material examined: Konya, 22.4.1964, 2♂, 3♀♀; Bartın, Inkum, 21.9.1978, 7♂, 6♀♀; Beypazari, 28.8.1964, 2♂♂, Canakkale, 11.7.1968, 2♂♂, 1♀; Ankara: Bala, 5.10.1978, 1♂; Konya 2.9.1982, 3♂♂.

***Spilostethus saxatilis* Scopoli 1763**

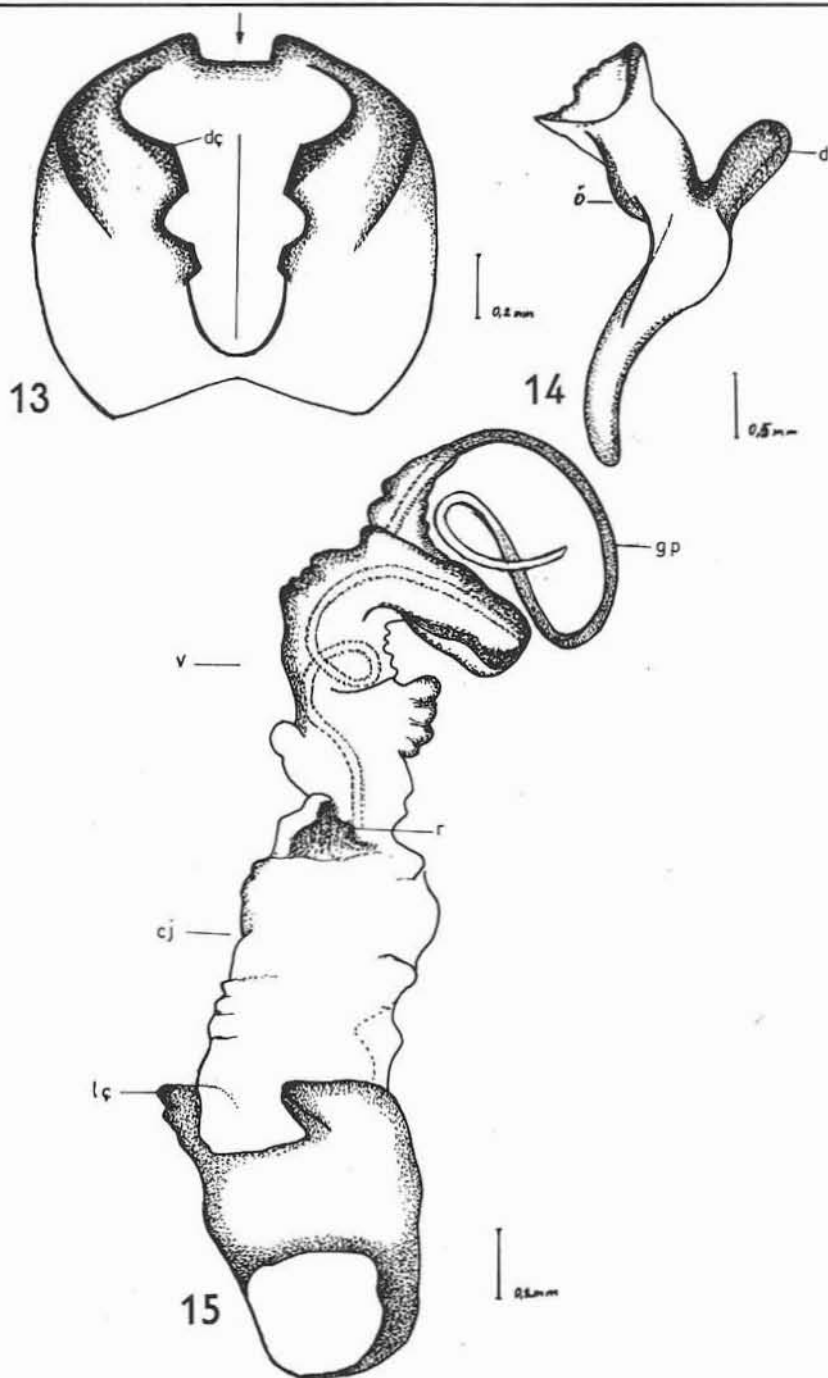
This species was studied by the author (Aysev 1974). So only additional records were given.

Material examined: Altinova, 12.8.1962, 3♂♂, 5♀♀; Hakkari, 4♂♂, 4♀; Ankara: Camlidere, 4.9.1975, 2♂♂, 1♀; Keskin, 27.8.1975, 1♂; Ankara: Etimesgut, 3.8.1961, 1♂; Burdur, 22.10.1975, 1♂♂, 2♀♀; Yozgat, 9.7.1971, 1♂; Ankara: Beynam, 17.5.1980, 2♂♂; Fethiye, 27.5.1978m 1♂; Ankara: Gölbası, 25.6.1981, 1♂, 2♀♀.

***Spilostethus pandurus* Scopoli 1763**

This species was examined by the author (Aysev 1974), so only additional records were given.

Material examined: Elmadag, 30.5.1961, 1♂; Elazığ, 14.5.1966, 2♂♂; Islahiye, 12.-4.1962, 1♀; Kozan, 22.4.1962, 2♂♂; Hakkari, 1♀; Kayseri, 14.6.1961, 2♂♂; Baskale, 22.7.1979, 2♂♂; Elazığ, 8.8.1968, 1♂, 1♀; Köycégiz, 24.7.1967, 1♂; Finike, 7.6.1963, 1♂; Iskenderun, 17.7.1961, 5♂♂; Afyon, 12.11.1966, 2♂♂; Isparta, 7.5.1962, 1♂; Osmaniye, 22.4.1966, 1♂; Gönen, 10.8.1075, 2♂♂; Aydın, 5.8.1980, 2♂♂; Eskisehir, 5.5.1980, 1♂; Mugla, 30.5.1081, 2♂♂; Adana, 3.4.1975, 2♂♂, 1♀; Burdur, 26.10.1986, 1♂.



Lygaeus equestris (L. 1758)

This species was examined by the author (Aysev 1974), so only additional records were given.

Material examined: Gönen, 10.5.1975, 3♂♂; Erzurum, 20.8.1978, 1♂; Kemaliye, 18.10.1971, 1♀, 1♂; Burdur: Tefenni, 22.10.1975, 3♂♂; Artvin, 7.7.1974, 6♂♂, 3♀♀; Inspir, 22.7.1974, 1♀; Hakkari, 18.7.1979, 6♂♂, 8♀♀; Izmir: Bergama, 25.6.1964, 1♂, 1♀♀; Denizli, 25.6.1964, 3♂♂; Elazig, 23.7.1961, 1♂; Kayseri: Malya, 15.8.1961, 1♂, 1♀♀; Ankara: Cubuk, 29.8.1968, 2♂♂; Kayseri: Yenisehir, 17.5.1967, 1♂; Konya, 9.10.1969, 1♂; Gaziantep, 8.4.1962, 1♂; Nevsehir: Gören, 2.9.1969, 1♂; Konya: Ilgin, 2.9.1962, 2♂♂; Bandirma, 6.6.1980, 1♂, 1♀; Corum, 20.6.1973, 3♂♂; Gölbası, 16.1981, 3♂♂, 1♀; Ankara: Camkoru, 4.7.1975, 3♂♂, 4♀♀; Izmir: Ilica, 21.7.1967, 2♂♂; Ayas: Beypazari, 29.9.1985, 1♂, 1♀; Gaziosmanpasa, 15.9.1985, 20♂♂, 25♀♀.

Lygaeus creticus Lucas, 1854

This species was examined by the author (Aysev 1974). So only additional records were given.

Material examined: Altinova, 12.8.1962, 5♂♂, 3♀♀; Hakkari, 25.5.1966, 1♂, 2♀♀; Ankara, 27.8.1967, 4♂♂, 4♀♀; Ankara, 23.7.1968, 4♂♂, 4♀♀; Ankara: Camlidere, 4.9.1975, 2♂♂, 1♀; Keskin, 27.8.1975, 1♂.

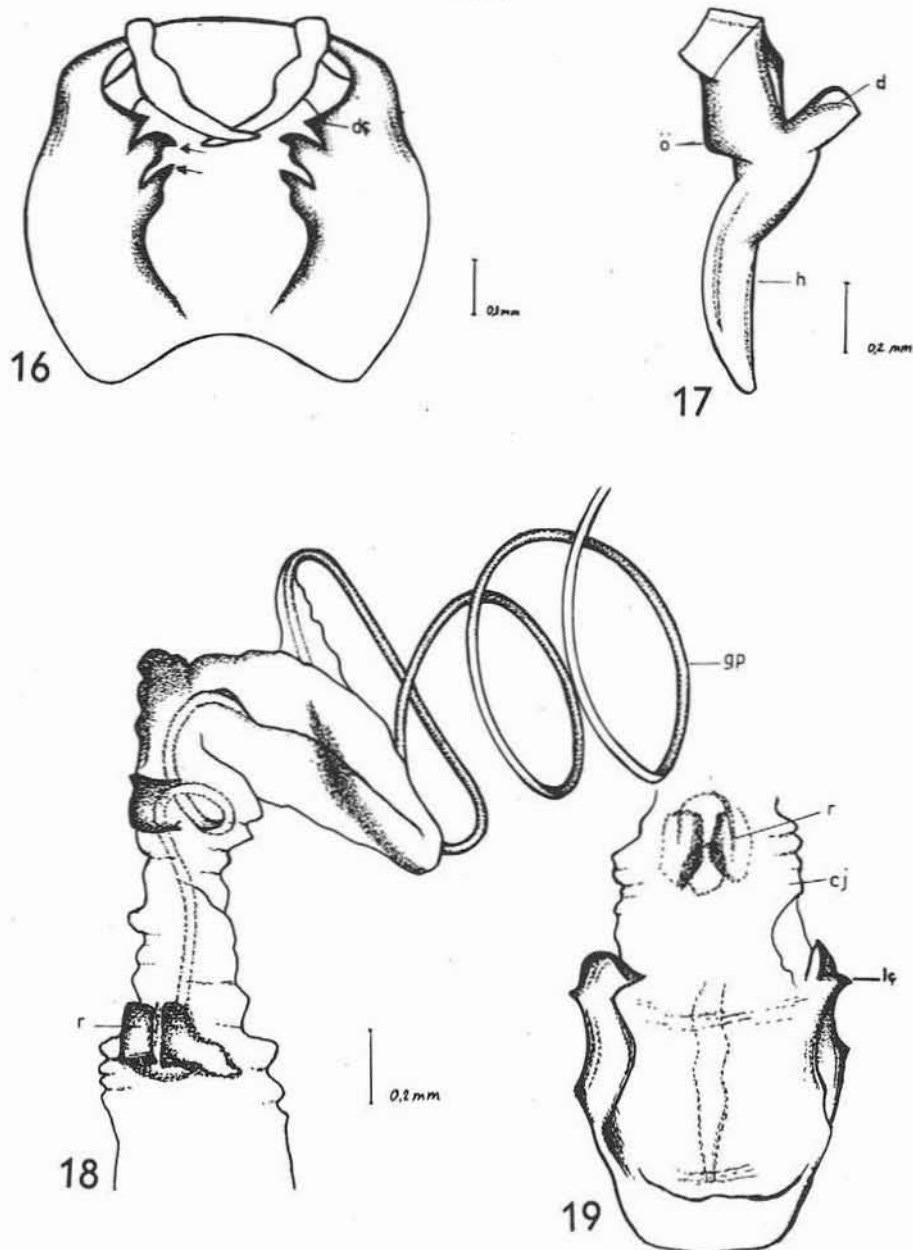
Key to the species of *Melanocoryphus* Stal and *Horvathioulus* Josifov

- 1 Corium with medial black spot; clavus black or dark-brown 2
- Corium with black spot touching lateral margin; clavus red, with black spot or black line distally 3
- 2 Abdominal sternum red distally and proximally black, with lateral black spot; male genitalia as in Fig. 13–15 *M. albomaculatus* (Gz)
- Abdominal sternum black; male genitalia as in Fig. 16–19 *M. tristrami* (Dgl.Sc.)
- 3 White spot on apex of membrane longer than broad; more than 5 mm in length *H. syriacus* (Rent.)
- White spot on apex of membrane not longer than broad, more or less rounded; almost 5 mm in length; male genitalia as in Fig. 20–21 *H. superbur* (Pol.)

Melanocoryphus albomaculatus (Goeze, 1778)

Synonymy: *Cimex migrostriatus* Goeze, 1778, *C. vilburgensis* Pollich, 1779, *C. nobilis* Geoffroy, 1785

Figs. 13–15: *Melanocoryphus albomaculatus* (Goeze). Fig. 13: pygophore (dorsal), fig. 14: paramere, fig. 15: phalloteca (latero-dorsal).



Figs. 16-19: *Melanocoryphus tristrami* (Dgl. Sc.). Fig. 16: pygophore dorsal, fig. 17: paramere, fig. 18: vesica, fig. 19: theca.

General coloration red contrasting with black; head black; antennae black; pronotum red, distal margin black and slightly convex, with convex black line medially discontinued and latero-medial black bands beginning from proximal margin and then turning inward to each other like a reversed „L“; scutellum black, distal corner red; clavus dark brown to black; corium red with black round spot; membrane black, one small white spot at anal corner and another one at proximal margin, big roundish white spot medially situated, distal margin white; thoracic terga red, paratergites red with black proximal spot; thoracic sterna black; legs black; abdominal sterna red proximally black, 6th and genital sterna black; parasternites red with black spot proximally 7–8 mm in length.

Pygophore little broader than long, with triangular shaped hollow on medio-distal surface; dorso-lateral process like wide angle with straight margins; anterior genital opening not simple, lateral margin with concave hollows posterior to dorso-lateral process, prominent lateromedial projections distally straight (Fig. 13); hypophysis of paramere longer than body and apically rounded, outer process considerably long, thick finger shaped and broadly round at apex; inner process contrastingly slight (Fig. 14); theca with lateral process turning inward, ventrally sclerotized, dorsally wide bend shaped; conjunctiva long; reservoir well developed; vesica partly pigmented, comparatively thicker at proximal part, making whole curl towards apex; processus gonopori short, having about one complete turn; secondary gonopor narrow (Fig. 15).

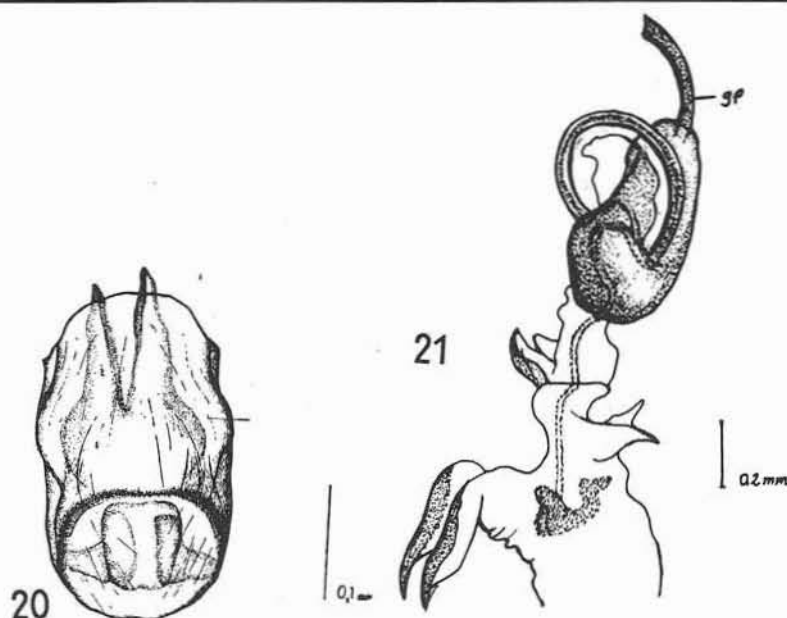
Melanocoryphus tristrami (Douglas and Scott, 1868)

Synonymy: *Lygaeus punctum* Kolenati, 1845, *Lygaeus (Melanocoryphus) affinis* Jakolev, 1875

General coloration red contrasting with black; head black; antennae black; pronotum red, distal margin black, arch-shaped black transversal cut distally placed; two black longitudinal bands coming from proximal margin and medially curving across to each other; scutellum black; wings reaching up to apex of abdomen; hardly reaching to 4th tergite in brachypterous forms; corium red with black spot medially; membrane blackish with white medial spot; thoracic sterna black; legs black; abdominal sterna red proximally black, 6th and genital sterna black; 6,9–8 mm in length.

Pygophore slightly broader than long, distally straight rather than convex, dorso-lateral process simple and sharply pointed; two more prominent and unusually different shaped similar process posterior to dorso-lateral process (Fig. 16); parameres similar to those of *Lygaeus* as in *M. alboamaculatus* but outer process apically straight and hypophysis shorter and thicker (Fig. 17); theca having beak like prominently pointed lateral process curved inward (Fig. 19); conjunctiva long; reservoir well developed; vesica partly pigmented with whole curl resembling that of *M. alboacuminatus*, processus gonopori lighter, thinner and very long with many curls (Fig. 18) (Processus gonopori was partly shown in Fig. 18).

Material examined: Ankara: Beynam, 17.5.1980, 6♂♂, 7♀♀; Gölbaşı, 20.6.1981,



Figs. 20-21: *Horvathiolus superbis* (Poll.). fig. 20: theca (dorsal, Ayasev 1974), fig. 21: endosoma (lateral). Figs 22-26: *Paranysius fraterculus* Horv. Fig. 22: pygophore (dorsal), figs. 23-24: parameres, fig. 24: theca (latero-dorsal), fig. 26: endosoma (dorsal).

1♂, 3♀♀; Ankara: Beynam, 25.3.1980, 4♂♂, 6♀♀; Ankara: Beynam, 8.4.1975, 2♂♂, 3♀♀; Ankara: Beytepe, 5.6.1981, 2♂♂.

***Horvathiolus superbis* (Pollich, 1779)**

Synonymy: *Cimex punctataguthatus*, *C. discolor* Gmelin, 1790, *Lygaeus schumme-
lii* Schilling, 1829, *Melanocoryphus persimilis* Horvath, 1919.

General coloration black contrasting with red; head black; antennae black; pronotum reddish with latero-proximal black transverse marks separated from each other; scutellum black; wings reddish reaching apex of abdomen in brachypterous forms (rarely existing) hardly extending up to 6th tergite; clavus with black dot at apex; corium with round black spot medially touching lateral margin; membrane black with two roundish white spots medially and distally, distal spot not longer than broad, anal corner white; thoracic sterna black in general, latero and distal margins of prosternum red; legs black; abdominal sterna red, 6th sternum black; prosternites red with black dots proximally; 4-5 mm in length.

The male genitalia were studied by the author (Aysev and Sisli 1974), so only the endosoma was examined as an addition and figure of the theca (Fig. 20) was given again for discussion. Conjunctiva comparatively short; reservoir well developed; vesi-

ca with pointed lobes, two big dorsal ones across to reservoir, two other small ventral ones anterior to reservoir, besides two more lobelike process toward medial; vesica with complete and compact turn darkly pigmented medio-distally; ductus seminis becoming very thick distally; processus gonopori short and thick; secondary gonopore slightly flared (Fig. 21).

Material examined: Ankara, 5.5.1963, 2♂♂; Izmir, 19.4.1973, 1♂, 1♀; Izmir: Bornova, 13.3.1975, 2♂♂; Izmir: Zeytinova, 12.4.1976, 2♂♂; Izmir: Balcova, 19.4.1979, 1♂; Ödemiş, 24.1.1972, 1♂, 1♀.

Graptostethus servus (Fabricius, 1787)

Synonymy: *Lygaeus omatus* Uhler, 1890

This species was examined by the author (Aysev 1974), so it was given only with the additional records.

Material examined: Marmaris, 5.6.1979, 2♂♂, 1♀; Antalya 18.8.1979, 1♂, 1♀; Ankara: Beynam, 8.7.1980, 2♀♀.

Caenocoris nerii (Germar, 1847)

Synonymy: *Lygaeus semirubens* Walker, 1872

This species was examined by the authors (Aysev 1974), so only figure of the phallus from Aysev and Sisli (1974) and additional records were given for discussion.

Material examined: Aydin, 2.6.1973, 15♂♂, 11♀♀; Mugla, 4.5.1972, 1♂; Izmir, 23.1.1973, 2♂♂, 2♀♀; Marmaris, 5.7.1980, 15♂♂, 17♀♀; Antalya, 15.8.1981, 7♂♂, 5♀♀.

Paranysius fraterculus Horvath, 1895

General coloration light reddish orange; head black, broader than long; antennae black, 1st segment extending little beyond apex of tylus, 2nd segment noticeably longer than 3rd, 4th longer than other; pronotum coarsely punctated proximally; distal part with transverse linear groove and covered with two black patches, proximal margin, with two black spots; scutellum black, coarsely punctated; clavus black, terminal margin and side of commissure narrowly white; corium light reddish-orange, anal and distal margins black, lateral margins red; membrane black, margin and veins white; thoracic sterna orange laterally black; legs black; abdominal sterna orange, laterally black; 3,4–3,5 mm in length.

Pygophore with straight lateral faces rather than round; dorso-lateral process wide, pointed, like right angle with slightly curved margins; anterior genital opening „U“ shaped (Fig. 22); hypophysis of paramere flat, proximally very wide as continuation of body, apically pointed, lateral face at the side of outer process longitudinally curved inward from base to apex; outer process round and moderately prominent; fore process slighter (Fig. 23, 24); theca simple shaped without lateral process contrasting with those of all other Lygaeinae (Fig. 25); conjunctiva long with spine-shaped latero-distal processes; reservoir not well developed; vesica with whole curl distally, wit-

hout lobe; ductus seminis quite thin in conjunctival part, prominently wide in vesical section; processus gonopori unusually thin wire-shaped; secondary gonopore very narrow, like a point (Fig. 26).

Material examined: Diyarbakir: Karacadag, 1500, 18.

Conclusion

Pygophores of the species in the genus *Arocatus* and *Melanocoryphus* are varied with the shape of dorsal surface, dorso-lateral process and anterior genital opening as in the other examined species (Aysev, 1974) of Lygaeinae. While parameres of *A. longiceps* and *A. melanocephalus* are similar in basic characters, they are highly alike in *M. tristrami* and *M. albomaculatus*. This paramere shape, especially with the thick-finger formed outer process is represented by the examined species (Aysev and Sisli, 1974) of the genus *Lygaeus* and *Tropidothorax*. So, this can be a general pattern to the paramere of the subfamily Lygaeinae. But *H. superbus* shows a quite different structure with the simple shape and without prominent fore process and outer process. Phallosome of *A. longiceps* and *A. melanocephalus* so much looking like each other that it is very difficult to differentiate them. Round and slight lateral process of the theca latero-medially situated, but not lateral, which seems quite unusual. This position of the lateral process can not be seen in the other examined group of the subfamily Lygaeinae excepting *C. nerii* (Fig. 12). So we may conclude that the genus *Arocatus* and *Caenocoris* can be closely related which Hamid and Maher (1976) had pointed out by their external resemblance. Phallus of *M. albomaculatus* and *M. tristrami* both possess about the same principle diagnostic characters with the ones those of the genus *Lygaeus*, the genus *Tropidathorax* and even the subfamily Lygaeinae in general.

The only noticeable difference between *M. albomaculatus* and *M. tristrami* is the length of processus gonopori and degree of coiling. It is very long and with many coils in *M. tristrami*, but short and having only one coil in *M. albomaculatus*. As to the phallus of *M. superbus* is unusually different than those of two mentioned species of *Melanocoryphus* and even the subfamily Lygaeinae, especially in the vesical lobes. It is seen that *M. superbus* has not been included in the principle diagnostic genital characters of the genus *Melanocoryphus* and the subfamily Lygaeinae at all. This species is classified with the name of *Horvathiolus superbus* by Josifov (1965). The other members of these groups should be examined in order to discuss their relation with *M. superbus*, and then systematic position of *M. superbus* and the other questions specially about *C. nerii* can be enlightened.

Paranysius fraterculus looking like a passage between the subfamily Lygaeinae and Orsillinae. Including well developed reservoir and lateral process of the theca are the principle systematic genital characters of the subfamily Lygaeinae. But *P. fraterculus* shows genital characters of the subfamily Orsillinae by having the theca without lateral process and undeveloped reservoir. On the contrary it has simple conjunctiva without lobes and distal pigmentation as in the subfamily Lygaeinae, that

makes it different from the subfamily Orsillinae. Besides, paramere of this species entirely different from those of the species in the subfamily Orsillinae (Aysev and Sisli, 1974), but more similar to the ones in Lygaeinae in spite of less prominent outer process.

Summary

In the present study, the male genital organs of *Arocatus longiceps* Stal 1872, *A. melanocephalus* (F., 1796), *Melanocoryphus albomaculatus* (Goeze, 1778), *M. tristrami* (Douglas and Scott, 1868), *M. superbus* (Pollich, 1779), *Paranysius fraterculus* Horvath, 1895 were taxonomically studied. The male genitalia pygophore, paramere and phallus of these species which imply very important taxonomic characters were illustrated and described. *Tropidathorax leucopterus* (Goeze, 1778), *Spilostethus saxalis* (Scopoli, 1763), *S. pandurus* (Scopoli, 1763), *Lygoeus equestris* (Linnaeus, 1758), *L. creticus* Lucas 1854, *Graptostethus servus* (Fabricius, 1787), *Caenocaris nerii* (Germar, 1847) were examined previously; so they were given with the additional records only in addition, *Paranysius fraterculus* Horvath is found to be new record for Turkey.

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