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RESULTS OF THE ZOOLOGICAL SCIENTIFIC EXPEDITION OF THE NATIONAL MUSEUM IN PRAHA TO TURKEY.

2.

HEMIPTERA - HETEROPTERA I.

The Aquatic and Semiaquatic Heteroptera of Turkey.

By

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Introduction.

In the months May — September 1947 the National Museum in Praha undertook a zoological expedition to Turkey. Collecting was carried on in Central and South Anatolia. As the first part of a study on *Hemiptera* based on the material collected, I here present a study of the *aquatic* and *semiaquatic Heteroptera* which were collected in several localities of the following vilâyet: Edirne, Kocaeli, Bolu, Ankara, Kırşehir, Kayseri, Niğde, Seyhan, Gaziantep, İçel, Konya, Afyonkarahisar and Eskişehir. All documentary material of the expedition is deposited in the collections of the National Museum in Praha.

Besides the working proper of the results of the expedition of the National Museum I include in the present paper the interesting material of *aquatic* and *semiaquatic Heteroptera* collected predominantly in the eastern areas of Anatolia in the years 1939—1947, which Prof. Dr Curt Kosswig of İstanbul lent me to work. This documentary material is deposited in the Zooloji Enstitüsü (Müftülük binasında), İstanbul.

I use also some data obtained during my visit from the following institutes: Merkez ziraat mücadele enstitüsü, Ankara, and Teknik bahuvalık okulu, Alata (Mersin).

Further I add some species, collected in 1931 by Dr J. V. Staněk in the Ilgaz dağları mountains.

All species determined were found in 47 localities not yet listed for an *aquatic* and *semiaquatic Heteroptera* fauna. Our previous knowledge of the *aquatic* and *semiaquatic Heteroptera* of Anatolia was based on

chance finds in 21 localities. Basing myself on our previous knowledge I go on to give a complete picture of the *aquatic* and *semiaquatic Heteroptera* of Turkey.

Previous Knowledge of the Aquatic and Semiaquatic Heteroptera of Anatolia.

The fauna of the *Heteroptera* is worked in a few articles, all of them of earlier date. Isolated remarks and descriptions were given by O. M. REUTER, G. HORVÁTH, H. LINDBERG, a. o.

The first paper to give a list of the species collected in Anatolia is that by A. da COSTA: *Relazione di un viaggio per l'Egitto, la Palestina e la costa della Turchia asiatica per ricerche zoologiche*. — *Atti della R. Accademia delle Scienze fisiche e matematiche*, 7, 40pp. Napoli 1874. This paper lists only two species of *Heteroptera*:

Phytocoris sp. and *Leptorus sardous* COSTA = *Leptopus hispanus* RAMBUR from Alessandretta = İskenderun.

More material together with a list of the species is given in the paper: *Heteroptera Anatolica in regione Brussae collecta enumeravit* Dr G. HORVÁTH. — *Természeti Füzetek*, VII, pp. 21—30, 1883. The author lists especially the terrestrial *Heteroptera* from the district of the town Bursa. Only six families of *aquatic Heteroptera* are included and following species are listed:

Hydrometra stagnorum L.

Velia rivulorum Fab. var. *ventralis* PUT.

Gerris Costae H. SCH.

Salda saltatoria L. = *Saldula saltatoria* (LIN.)

Pelogonus marginatus LATR. = *Ochterus marginatus marginatus* (LATR.)

Corisa Geoffroyi LEACH. = *Corixa punctata* (ILL.)

E. ESCHERICH gives a list of the *Heteroptera* of the district of Ankara: *Beitrag zur Hemipterenfauna Kleinasiens*. — *Entomologische Nachrichten*, XXIII, pp. 124—127, 1897, but does not mention any *aquatic Heteroptera*.

In 1901 G. HORVÁTH published another, longer list: *Hémiptères du voyage de M. Martinez Escalera dans l'Asie-Mineure*. — *Természeti Füzetek*, XXIV, pp. 469—485, 1901. HORVÁTH lists here 130 species from Central, Western and Eastern Anatolia. Some of his localities are, however, today not included within the frontiers of Turkey. For the present territory of Turkey he lists the following species of *aquatic* and *semiaquatic Heteroptera*:

Salda subcoriacea HORV. — Aidin (Aydm).

Notonecta glauca L. — Hamidie (Hamidiye).

In 1905 G. HORVÁTH worked the *Heteroptera* as part of the results of the Austrian expedition to the Erciyas dağı: *Ergebnisse einer naturwissenschaftlichen Reise zum Erdschias-Dagh (Kleinasien)*. — *Annalen des K. K. Naturhistorischen Hofmuseums*, XX, pp. 179—189, 1905. This paper contains only families of *terrestrial Heteroptera*.

A. N. KIRITSHENKO in his study of the *Caucasian Heteroptera*: *Hemiptera-Heteroptera faunae Caucasicae* — *Mémoires du Musée du Cauca-*

case, *Serie 17, No. 6, pp. 1—177, 1918*, lists for *semiaquatic Heteroptera* two localities, which are situated in present-day Turkey:

Gerris lateralis SCHUMM. — Artvin, Ararat (Büyük Ağrı).

G. HORVÁTH worked also the *Heteroptera* material of the scientific expedition of F. Tölg: *Ergebnisse einer mit Unterstützung der Kais. Akademie der Wissenschaften in Wien ausgeführten zoologischen Forschungsreise von weiland Prof. Dr Franz Tölg nach Kleinasien (Amanus-Gebirge). V. Rhynchota. — Archiv für Naturgeschichte, Jhrg. 85, Abt. A, pp. 146—147, 1919*. He lists three species of *aquatic Heteroptera*:

Notonecta fuscata FABR. = *Notonecta obliqua obliqua* GALLÉN. — Marasch (Maras).

Nepa cinerea L. — Marasch (Maras).

Gerris gibbifer SCHUMM. — Marasch (Maras).

In 1922 H. LINDBERG published *Verzeichnis der von John Sahlberg und Uno Saalas in den Mittelmeergebieten gesammelten semiaquatischen und aquatischen Heteropteren. — Notulae Entomologicae II, pp. 15—19, 46—49, 1922*. It is the result of several expeditions in the Mediterranean. It is the expedition of 1903—1904 into the eastern part of the Mediterranean which is relevant for the present paper. He lists from Asia Minor:

Hebrus pusillus FALL. — Bulghar Dagh, Turunschli, Smyrna (Bulgar dağı, Turunçlu; İzmir).

Hydrometra stagnorum L. — Bulghar Dagh, Turunschli.

Gerris ventralis FIEB. — Bulghar Dagh, Turunschli; Baba Dagh, Asia Minor, (Bulgar dağı, Turunçlu; Baba dağı).

Gerris thoracicus SCHUMM. — Smyrna, Ilidja; Hermos-Tal bei Menemen; in der Nähe des Flusses Menderes am Saraiköi. (İzmir. Ilca; Menemen; Sarayköy). *Salda muelleri* GMEL. — Smyrna in der Nähe von Ilidja.

Acanthia variabilis H. SCH. = *Saldula variabilis* (H. SCH.) — Smyrna, Jamanlar Dagh (İzmir, Yamanlar dağı).

Acanthia amplicollis REUT. = *Saldula amplicollis* (REUT.) — Smyrna, Jamanlar Dagh.

Acanthia arenicola SCHOLTZ = *Saldula arenicola* (SCHOLTZ) — Smyrna.

Ochterus marginatus LATR. — Bulghar Dagh, Turunschli; Saraiköi am Flusse Meandros; Baba Dagh.

Ranatra linearis F. — Hermostal (Asia Minor), in der Umgebung von Menemen.

Arctocoris hieroglyphica DUF. = *Sigara* (*Vermicorixa*) *lateralis* *lateralis* (LEACH.) — Bulghar Dagh, Turunschli.

In the same year H. LINDBERG described under the title: *Neue Micronecta-Arten (Hem. Het.). — Notulae Entomologicae, II, pp. 114—117, 1922*, a new species of the family *Corixidae*:

Micronecta anatolica LINDB. — Patria: Anatolien: Hermos-Thal, in der Nähe des Bahnhofs von Menemen.

J. FAHRINGER in his paper: *Eine Rhynchotenausbeute aus der Türkei, Kleinasien und den benachbarten Gebieten. — Konowia, I, pp. 137—144, 296—307, 1922*, lists the species he and F. Tölg collected in the years 1909—1914. The material was determined by G. Horváth and L. Melichar, and the list includes five families of *aquatic and semiaquatic Heteroptera*:

86. *Hydrometra stagnorum* L. — Aus einem Tümpel am Hochplateau des Bithyn, Olymp, 1911, ca 1000 m (Ulu dağı).

87. *Gerris thoracicus* SCHUMM. — Wie vorige aus einem Tümpel von demselben Fundorte.

88. *Gerris lacustris* L. — Wie vorige aus der versümpften Uferregion des Sabandja-Sees, 1913 (Sapanca gölü).

89. *Nepa cinerea* L. — Wie vorige aus der versümpften Uferregion des Sabandja-Sees, 1913; auch aus Marasch, Amanus-Gebirge 1914, leg. Dr Tölg (Sapanca gölü; Maraş, Gyaour dağıları).

90. *Notonecta glauca* L. — Zahlreiche Stücke aus einem Tümpel am Hochplateau des Bithyn. Olymp. cca 1000 m, 1911.

91. *Notonecta glauca* L. var. *furcata* F. = *Notonecta obliqua obliqua* GALLÉN — Aus den Sümpfen von Adana 1913 leg. Dr Tölg, auch vom Amanus-Gebirge, Marasch 1914, leg. Dr Tölg (Adana; Maraş).

92. *Corixa Geoffroyi* LEACH = *Corixa punctata* (ILL.) — Mehrere Stücke von demselben Fundorte wie Nr. 90.

In 1924 A. N. KIRITSCHENKO in his paper: *Beitrag zur Hemipteren Fauna des südlichen Armenien*. — *Wiener Entomologische Zeitung*, 41, pp. 1—5, 1924, worked a small collection of *Heteroptera* from the region of Muş, Erzincan and Hınıs. He lists one species of aquatic *Heteroptera*:

Notonecta glauca L. — Mamachatun (Tercan).

R. POISSON published two papers on the aquatic and semiaquatic *Heteroptera* of Asia Minor: *Hémiptères aquatiques d'Asie Mineure recueillis par M. H. Gadeau de Kerville en 1912. Remarques sur les Notonectes*. — *Bulletin de la Société entomologique de France*, 1925, pp. 327—330, figs. 1—3. In this paper he lists the following 13 species:

Gerris gibbifer SCH. — Régions de Smyrne et d'Angora; ♂♂ et ♀♀ (İzmir, Ankara).

Gerris gibbifer SCH. var. *flaviventris* PUT. — 1 ♀ provenant de la région de Smyrne.

Gerris thoracicus SCH. — Régions de Smyrne et d'Angora; ♀♀, ♂♂.

Gerris costae H. SCH. — 1 ♀ Région de Smyrne.

Hydrometra stagnorum L. — Région d'Angora; ♀♀, ♂♂.

Corixa Geoffroyi LEACH = *Corixa punctata* (ILL.) — Régions de Smyrne et d'Angora; ♀♀, ♂♂.

Corixa affinis LEACH = *Corixa affinis affinis* LEACH — Régions de Smyrne et d'Angora; ♀♀, ♂♂.

Arctocorisa Linnei (FIEB.) = *Hesperocorixa linnei* (FIEB.) — 2 exemplaires ♂ de la région d'Angora.

Arctocorisa Fabricii (FIEB.) = *Sigara* (*Vermicorixa*) *nigrolineata* (FIEB.) — Régions de Smyrne et d'Angora; ♀♀, ♂♂.

Arctocorisa hieroglyphica (DUF.) = *Sigara* (*Vermicorixa*) *lateralis* *lateralis* (LEACH) — Quelques exemplaires; Régions de Smyrne et d'Angora.

Notonecta glauca L. — Régions de Smyrne et d'Angora; ♀♀, ♂♂.

Notonecta viridis DELC. — Région d'Angora; ♀♀, ♂♂.

Notonecta furcata FAB. = *Notonecta obliqua meridionalis* POISSON - 4 ♀♀ et 2 ♂♂ de la région de Smyrne.

In his paper: *Arctocorisa Kervillei*, espèce nouvelle de Corise d'Asie Mineure (*Hem. Corixidae*). — *Bulletin de la Société entomologique de France*, 1927, pp. 164—166, fig. 1—2. R. POISSON describes the new species:

Arctocorisa Kervillei POISSON = *Sigara* (*Subsigara*) *kervillei* POISSON — Région d'Angora.

In his paper: *Les espèces françaises du Genre Notonecta et leurs principales formes affines paléarctiques*. — *Annales de la Société entomologique*

de France, CII, pp. 317—358, fig. 1—26, pl. VIII—XI, R. POISSON describes in 1933 the new *Notonecta*:

Notonecta glauca kervillei POISSON — Smyrne et Angora.

H. B. HUNGERFORD too described a new *Notonecta* in his monograph: *The Genus Notonecta of the World (Notonectidae — Hemiptera)*. — *The University of Kansas Science Bulletin*, XXI, No. 1, pp. 5—195, figs. 1—7, Pl. I—XVII. 1933:

Notonecta glauca poissoni HUNG. — Erzerum.

In his paper: *Notes on some Palaearctic Aquatic and Semi-aquatic Heteroptera, chiefly from South-Eastern Europe*. — *Annales Musei Zoologici Polonici*, X, pp. 267—288, Pl. XLVI—XLVII, 1934, T. JACZEWSKI lists for Turkey:

Notonecta maculata FABRICIUS — Adjı Badem, 21. VIII. — 31. VIII. 1927, (Adjı Badem).

The last paper on *Heteroptera* of Asia Minor is the list by H. GADEAU DE KERVILLE: *Voyage zoologique d'Henry Gadeau de Kerville en Asie Mineure (Avril — Mai 1912)*, Tome premier, I. partie. Hémiptères pp. 116—125, Paris 1939. He lists the following 13 species:

Hydrometra stagnorum L. — région d'Angora, dans les fossés, les mares et les lacs, avril 1912; et région de Smyrne, dans les fossés, mai 1912.

Gerris costae H. SCH. — Région de Smyrne, dans les mares, mai 1912.

Gerris thoracicus SCHUMM. — Région d'Angora, dans les fossés, les mares et les lacs, avril 1912; et région de Smyrne, dans les fossés et les mares, mai 1912.

Gerris gibbifer SCHUMM. — Région d'Angora, dans les fossés, les mares et les lacs, avril 1912. Région de Smyrne, dans les mares, mai 1912.

Gerris gibbifer SCHUMM. var. *flaviventris* PUT. — Région de Smyrne, dans les mares, mai 1912.

Plea Leachi MC GREGOR et KIRK. — Région d'Angora, dans les fossés, les mares et lacs, avril 1912.

Notonecta glauca L. subsp. *Kervillei* POISSON — Région d'Angora, dans les fossés, les mares et les lacs, avril 1912, et région de Smyrne, dans les mares, mai 1912.

Notonecta obliqua GALLÉN subsp. *meridionalis* POISSON — Région de Smyrne, dans les mares 1912.

Notonecta viridis DELCOURT subsp. *mediterranea* HUTCH. — Région d'Angora, dans les fossés, les mares et les lacs, avril 1912; et région de Smyrne, dans les mares, mai 1912.

Corixa punctata ILLIG. — Région d'Angora et de Smyrne, dans les mares, avril et mai 1912.

Corixa affinis affinis LEACH — Région d'Angora, dans les fossés, les mares et les lacs, avril 1912; et région de Smyrne, dans les mares mai 1912.

Sigara (Anticorixa) Linnei FIEB. = *Hesperocorixa linnei* (Fieb.) — Région d'Angora, dans les fossés et les mares, avril 1912.

Sigara (Sigara) lateralis LEACH = *Sigara (Vermicorixa) lateralis* (LEACH) — Région d'Angora et Smyrne, dans les fossés et les mares, avril et mai 1912.

Sigara (Sigara) Kervillei POISSON = *Sigara (Subsigara) kervillei* (Poisson) — Région d'Angora, dans une petite mare, avril 1912.

Sigara (Sigara) nigrolineata FIEB. = *Sigara (Vermicorixa) nigrolineata* (FIEB.) — Région d'Angora, dans les fossés et les mares, avril 1912, et région de Smyrne, dans les mares, mai 1912.

R. POISSON (*Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord*, XXVII, p. 243, 1926) mentions for the occurrence of *Heliocoris vermiculata* (PUTON) also Turkey, without stating the locality.

Also in the two catalogues of palaearctic *Heteroptera* several species are listed for Turkey.

V. OSHANIN: *Verzeichnis der palaearktischen Hemipteren, Bd. I—III. 1906—1910:*

Hebrus pusillus FALL., Turcia — I. p. 482.
 Gerris (Hygrotrechus) ventralis FIEB., Turcia — I. p. 493.
 Gerris (Gerris) costae H. SCH., Asia Minor — I. p. 494.
 Acanthia (Sciadopterus) subcoriacea HORV., Asia Minor — I. p. 584.
 Acanthia (Acanthia) amplicollis REUT., Asia Minor — I. p. 591.
 Acanthia (Acanthia) lateralis FALL., Asia Minor — I. p. 599.
 Plea minutissima FAB., Asia Minor — I. p. 971.
 Notonecta glauca L., Asia Minor — I. p. 974.
 Notonecta glauca var. marmorea FAB., Asia Minor — I. p. 975.
 Notonecta glauca var. furcata FAB., Asia Minor — I. p. 975.
 Notonecta glauca var. maculata FAB., Asia Minor — I. p. 975.
 Macrocorixa geoffroyi LEACH, Asia Minor — I. p. 978.
 Macrocorixa affinis LEACH, Asia Minor — I. p. 979.
 Corixa confluens FIEB., Asia Minor — I. p. 981 = Sigara (Vermicorixa) lateralis LEACH.

V. OSHANIN: *Katalog der paläarktischen Hemipteren. Berlin 1912:*

Gerris (Hygrotrechus) ventralis (FIEB.), Turcia europea.
 Gerris (Gerris) costae (H. SCH.), Asia Minor.
 Halosalda lateralis (FALL.), Asia Minor.
 Salda subcoriacea HORV., Asia Minor.
 Acanthia amplicollis REUT., Asia Minor.
 Plea minutissima (FÜSSL.), Asia Minor.
 Arctocorixa confluens (FIEB.), Asia Minor, p. 91 = Sigara (Vermicorixa) lateralis LEACH.

Taxonomic list of Aquatic and Semiaquatic Heteroptera in Turkey.

CORIXIDAE.

Micronectinae.

***Micronecta (Micronecta) anatolica* LINDBERG 1922.**

Menemen (LINDBERG 1922b).

Species of uncertain systematic position, probably very close to *M. (M.) wui* LUNDBL.

POISSON (1939b) gives this species with a question mark also for Trans-Caucasia: Geok-tapa.

***Micronecta (Micronecta) perplexa* HORVÁTH 1899.**

1 ♂, 1 ♀, Abacılar (Çakıt), 7. VIII. 1947 (Exp. N. Mus.).

1 ♀, Afrin River near Musabeyli, 20. VIII. 1947 (Exp. N. Mus.).

This species was described by HORVÁTH from Armenia and Hungary, without the localities being given. KIRITSHENKO (1930) gives the first accurate localities of this species according to HORVÁTH, Erivan and Aresh from Armenian SSR and the river basin of the Terek on the NE slopes of the Caucasus. It is difficult to determine the distribution of this species, but it is probably an East Mediterranean element with a northwestern extension.

Lit.: *Micronecta perplexa* HORVÁTH 1899, p. 103.

POISSON 1939a, pp. 101—102.

JORDAN 1943, p. 240.

***Micronecta (Micronecta) wui* LUNDBLAD 1933.**

The distribution of this species stretches from East Asia via High Asia, where according to HUTCHINSON it seems to be the most abundant representative of the genus, to the southeastern area of Iran.

The typical specimens described by LUNDBLAD from Peiping measure only 1,4 mm, and it is interesting that the subspecies described by HUTCHINSON from the westernmost regions of Asia are all strikingly larger. *M. (M.) wui kashmirica* HUTCH. is of medium size ♂ 2,21 mm and ♀ 2,25 mm and the transition types between *wui wui* and *wui kashmirica* are of medium size ♂ 1,9 mm, ♀ 1,91 mm. The westernmost specimens have been described as *M. (M.) wui seistanica* HUTCH. and attain ♂ 1,98 mm and ♀ 1,83 mm. All these races are well distinguishable by numerous morphological features and also the genital organs show characteristic differences.

In Anatolia were found in many places a great number of specimens which belong to the racial sphere of the species *Micronecta (M.) wui* LUNDBLAD. All these specimens are again very small and are very closely allied to the East Asiatic form. The Anatolian specimens vary in size between ♂♀ 1,56—1,79 mm and ♂ 1,48—1,52 mm, ♀ 1,52—1,67 mm. The specimens living in the larger slowly running rivers in the steppe and stony steppe regions belong to a well defined race different from the specimens found in higher regions, in mountains, partly forested areas with small but rather rapid streams.

***Micronecta (Micronecta) wui alkani* ssp. n. (Fig. 74.)**

Minute specimens of a relatively narrow shape, considerably dark coloured, slightly shining. General colour of the body yellowish brown, here and there considerably darkened. Head yellowish brown, paler in front, and only in the middle perceptibly darkened. Eyes dark brown. Pronotum yellowish brown, with a grayish tinge, lateral regions of the pronotum slightly darkened, and a narrow stripe around the posterior margin of the pronotum paler. Scutellum of the same colour as the pronotum, in some specimens slightly paler. Hemelytra (figs. 65—68) yellowish brown, considerably darker than the pronotum and also with a grayish tinge; paler in the basal region of the clavus, embolium very pale, the posterior suture of the corium and also the whole outer angle of the exocorium paler; membrane of almost the shade as the pale end of the corium; on the hemelytra there are, however, numerous darker spots, coloured a rich brown: a great spot along the outer suture of the clavus, broad especially in the basal portion, the exocorium has in its lateral portion two oval spots, which do not extend to the margin itself of the wings; membrane in the centre with an irregular darker spot. Sternum grayish yellow. Tergum grayish brown, venter black, the eighth ventrite and the lateral lobes of the seventh ventrite yellow. Legs pale yellowish brown with darker apices of the last tarsal joints and claws on the middle legs.

Head (figs. 1, 2, 3) regularly convex, four times broader including the eyes than long in the medial part (16 : 4); vertex of the head considerably broad and its ratio to the breadth of the head as 9 : 16; posterior

margin of the head regularly curved; head finely sculptured and nearly dull. Pronotum (figs. 1, 2, 3) nearly twice as long as the head (7 : 4) and more than twice as broad as long (16 : 7); lateral margins of the pronotum distinct and in the ratio to the length of the pronotum of 2 : 7; their length corresponds to half the posterior margin of the eye. Disc of the pronotum regularly convex, distinctly transversally rastrate. Scutellum triangular (2 : 2). Hemelytra project over the end of the body and are irregularly rastrate, more distinctly along the median suture.

Relative lengths of legs:

Middle	Trochanter	Femur	Tibia	Tarsus	Claws
	3	15	6	7	6
Hind	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
	4	11	9	8	5

♂ — Anterior femur (figs. 4, 5) in its whole length of equal width or only slightly narrowed towards the apex. Anterior tibiae towards the apex distinctly enlarged, on its inner side in the apical part two spinulous bristles. Pala short, oval, towards the end more or less narrowed; extensor margin with 3—4 long bristles, anterior flexor margin with 14 short spines, the posterior margin with 14 powerful bristles enlarging regularly in the direction towards the apex. Claws very narrow.

Right side of the abdominal tergite in front of the strigil expanded into a broad, fairly regular, rounded lobe; the margin of the lobe carries in its rearmost part about 10 bristles; region of the left side of the segment less regularly rounded, carrying numerous bristles.

The sixth tergite carries a strigil of 0,051 mm.

Lateral regions of the seventh tergite regularly rounded; the posterior region carries 4 bristles, shifted a little to the left side. The inner lobe (figs. 6, 7) of the eighth tergite enlarged strongly towards the end, the inner and outer angles are distinctly rounded, the posterior region is slightly bent.

Right paramere (figs. 8, 9) of nearly equal width, slightly bent; point drawn out and slightly turned upwards.

Left paramere (figs. 10, 11, 12) slightly bent in an upward direction; before the end is a small tubercle directed dorsally.

♀ — as male, but without above mentioned sexual characters.

♂, length 1,56—1,79 mm; mean 1,65 mm.

♀, length 1,56—1,79 mm; mean 1,66 mm.

1♂ (holotype), 1♀ (allotype), 15♂♂ and 18♀♀ (paratypes) — Alacakilise, 21. III. 47 (Exp. Nat. Mus.).

4♂♂ and 6♀♀ (paratypes) — Suluhan, East Toros (Taurus), about 1.000 m, 11. VIII. 1947 (Exp. Nat. Mus.). All specimens collected in the East Taurus are larger than the specimens from Alacakilise (♂ 1,67 : 1,64 mm, and ♀ 1,68 : 1,65 mm).

1♂ and 1♀ (paratypes), 1 larva — Armutlu, stream supplied by hot springs, 7. VIII. 1944 (C. Kosswig coll.).

Species named after *Prof. Dr Bekir Alkan, Merkez Ziraat Mücadele Enstitüsü, Ankara*, who during our stay in Ankara helped us in all our official negotiations with exceptional kindness.

***Micronecta (Micronecta) wui kosswigi* ssp. n.**

Slightly larger than the typical specimens described from China. The whole body is of a very pale yellowish brown colour with numerous light yellowish places and a few slightly darkened places. Head yellow, in the middle of the vertex slightly roseate, eyes dark brown. Pronotum light yellowish brown with a paler stripe along its posterior region and occupying the whole width of the lateral margin of the pronotum. Scutellum yellowish. Hemelytra (fig. 69) pale yellowish brown, the entire suture of the clavus yellow, embolium and outer part of the endocorium pale, in the basal and apical thirds of the endocorium is a small, slightly darker spot; another similar spot, more or less distinct, is found nearly to the clavus and another in the inner posterior angle of the corium. Thorax brownish. Tergum yellowish brown, venter yellowish gray, posterior margin of the respective segments and genital segments yellowish. Legs yellow.

Head (figs. 13, 14) in front regularly convex, four times wider than long (16 : 4); vertex in the ratio to the width of the head of 6,5 : 16; eyes slightly convex, in ♂ slightly markedly so than in ♀; posterior edge of the head forming a blunt angle, while in the middle it forms a slight keel-shaped tubercle.

Pronotum (figs. 13, 14) three times broader than long (15 : 5), lateral margins of the pronotum straight, to the length of the pronotum in the ratio of 1,5 : 5, and corresponding in the length to one third of the posterior margin of the eye; disc of the pronotum with punctured sculpture, which here and there passes into a rastrated one. Scutellum slightly rastrated.

Hemelytra regularly rastrated, especially on the clavus, endo and mesocorium; hemelytra covered with short yellowish hairs, especially thickly in the posterior portion of the corium and at the base of the membrane.

Relative lengths of legs:

Middle	Trochanter	Femur	Tibia	Tarsus	Claws
	4	15	5	7	6
Hind	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
	3	11	8	9	4

♂ — outer sexual character of the anterior legs (fig. 15) and abdomen as in *M. (M.) wui alkani* ssp. n.

Inner lobe (fig. 16) of the eighth tergite strongly widening towards the end; posterior margin distinctly sigmoidally curved; setae at the outer angle divided into two brushes.

Right paramere (figs. 17,18) more closely bent. Left paramere (fig. 19) similar as in *M. (M.) wui alkani* ssp. n.

♀ — without special sexual characters.

♂, length 1,48—1,52 mm; mean 1,5 mm.

♀, length 1,52—1,67 mm; mean 1,59 mm.

1♂ (holotype); 1♀ (allotype), 8♂♂ and 11♀♀ (paratypes) — Afrin River near Musabeyli, 20. VIII. 1947 (Exp. Nat. Mus.).

1♀ (paratype) — Çakıt River near the village of Abacılar northwest of Adana, 7. VIII. 1947 (Exp. Nat. Mus.).

I venture to call this species after *Prof. Dr Curt Kosswig, Zooloji Enstitüsü, İstanbul*, who has recently contributed much to the survey of the fauna of Anatolia.

Both subspecies listed from Turkey are very close to the typical form *M. (M.) wui wui* LUNDBLAD. In size they constitute transition forms between the typical form and the subspecies *kashmirica*. It is not possible to determine the affinity of *M. (M.) wui* with its subspecies to *Micronecta anatolica* LINDBERG, as the detailed study of the type of this species has not yet been made.

Key to the Subspecies of *Micronecta (M.) wui* LUNDBL.

1. Lateral margins of the pronotum distinctly longer than half the posterior margin of eye; drawing of the hemielytra grayish brown 2.
- Lateral margins of the pronotum of the same length as half the posterior margin of the eye, or distinctly shorter 3.
2. Size — 1,4 mm *M. (M.) wui wui* LUNDBL.
- Size ♂ 2,21 mm, ♀ 2,5 mm (smaller specimens 1,8 — 1,98 mm give a transition form to *M. wui wui*) *M. (M.) wui kashmirica* HUTCH.
3. Lateral margins of the pronotum of the same length as half the length of the posterior margin of the eye 4.
- Lateral margins of the pronotum $\frac{1}{3}$ — $\frac{1}{4}$ of the length of the posterior margin of the eye. Pale yellowish brown specimens; ♂ 1,5 mm, ♀ 1,59 mm *M. (M.) wui kosswigi* ssp. n.
4. Size ♂ 1,98 mm, ♀ 1,83 mm, specimens with a reddish brown drawing *M. (M.) wui seistanica* HUTCH.
- Size ♂ 1,65 mm, ♀ 1,66 mm, brown specimens with a dark brown drawing *M. (M.) wui alkani* ssp. n.

Micronecta (Micronecta) vitticeps HORVÁTH 1899. (Fig. 73.)

Large, dark coloured specimens, of broad oval shape. As ground we may consider the dark olive brown colour; vertex yellowish, with three reddish longitudinal stripes, in ♀ these stripes are almost imperceptible; posterior margin of the head slightly darkened, head slightly shining; eyes blackish. Pronotum very dark olive brown, slightly shining; posterior and lateral margins of the pronotum with a more (♂) or less (♀) broad pale stripe. Thorax unicoloured yellowish brown. Scutellum pale brown. Ground colour of the hemielytra (fig. 70) dark olive brown, base of the hemielytra and suture along the scutellum broadly pale brown,

lateral part of the posterior half of the corium with a transversal pale stripe, which continues also across the membrane; embolium with two darker spots, and also in the middle of the corium are two longitudinal, parallel, short, darker stripes. Tergum black, venter grayish brown (♂) or blackish (♀) with paler, transversal margins of the respective segments and paler genital segments. Legs pale yellowish brown.

Head (figs. 20, 21) strongly convex, especially in ♂, where the frons is distinctly extended forward; in ♀ it is regularly arched convex; head three times broader than long in the middle (25 : 8); the width of the vertex is smaller than half the width of the head (11 : 25); eyes slightly convex; posterior margin of the head slightly bent back and in the middle raised in a low but distinct keel; head near the eyes and at the synthlipsis transversally rastrated. Pronotum (figs. 20, 21) of the same length as the head (8 : 8), slightly narrower than the head (24 : 25); lateral margins of the pronotum distinct, a little longer than one third of its length (3 : 8) and about equalling half the length of the posterior margin of the eye; disc of the pronotum slightly convex and distinctly transversally rastrated. Scutellum great, triangular, shorter by one half than the pronotum (4 : 8). Hemelytra distinctly projecting over the end of the body, clavus irregularly and finely transversally rastrated; corium in the basal portion slightly, in the distal portion regularly, punctate; corium with fine pale hairs, distinctly closer together in the direction backwards; exocorium distinctly separated, of uniform width. Membrane nearly smooth and strongly shining.

Relative lengths of legs:

Middle	Trochanter	Femur	Tibia	Tarsus	Claws
	4	23	7	11	8
Hind	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
	6	15	13	14	6

♂ — The anterior femur (fig. 22) in its basal and medial parts with some irregularly distributed, minute spines; outer margin with a row of minute, but very dense spines. Tibia with a few sporadic spines in the medial part and two larger spines in the apical part. Pala oval, only a little more irregular towards the apical end; extensor margin with five long bristles, anterior part of flexor margin has 16 considerably long and thick bristles, distinctly longer in the direction towards the apical end; posterior part of the flexor margin has 14 bristles, regularly increasing in size in the direction towards the end.

The fifth abdominal tergite without any specific characters; posterior border with long hairs in the whole of its width.

The sixth abdominal tergite carries a strigil.

The seventh abdominal tergite without a specific characteristic shape.

Inner lobe (fig. 23) of the eighth tergite has parallel sides, outer ciliated angle considerably extended, but blunt, inner one broadly rounded.

The right paramere (fig. 24) very narrow and long, regularly and slightly bent, the point itself beak-shaped, base considerably enlarged; the whole paramere turned screw-like and narrowest in the middle.

Left paramere (figs. 25, 26) stout, slightly bent, the apex itself turned backward; the whole surface with minute tubercles, which increase in size towards the point, until they pass into blunt hooks pointing backwards.

♀ — like ♂, but without special sexual characters.

♂, length 2,51 mm.

♀, length 2,58—2,66 mm.

3♂♂ and 3♀♀ — Edirne, Meriç Nehri (Marica River) in the frontier zone between Turkey, Greece and Bulgaria; 10. VI. 1947 (Exp. Nat. Mus.).

HORVÁTH in his monograph of the palearctic species of the genus *Micronecta* describes this species only in the key and places it in the group *M. minutissima* L. For the Bosnian specimens HORVÁTH gives a length of 2,0 mm. The specimens collected in Meriç River at Edirne are distinctly larger, but indubitably they belong to the species described by HORVÁTH in 1899 from Bosnia. *M. (M.) vitticeps* HORV. stands very close to the species *M. (M.) minuscula* POISSON and *M. (M.) griseola* HORV., and seems to be specially close to *ssp. lusitanica* POISSON. The pronotum of the species *vitticeps* is broad, distinctly three times broader than long. — The vertex in the middle is not markedly longer than at the sides of the eye. By this feature and the paramere it approaches very closely *M. (M.) griseola* especially *ssp. lusitanica* POISSON.

Cymatinae.

Cymatia rogenhoferi (FIEBER 1864).

2♀♀ — Emir gölü, 9. III. 1947; 4♀♀, 20. IV. 1947 (C. Kosswig coll.).

10♂♂, 14♀♀ and 2 nymphs — Moğan gölü, 8.—12. VII. 1947 (Exp. Nat. Mus.).

1♂ — Erçek gölü, 20. VII. 1947 (C. Kosswig coll.).

This species has been listed from southeastern Europe, South Russia; in Central Europe it has been found in southern Austria, and in South Moravia in Czechoslovakia (TEYROVSKÝ 1929, 1937); further its occurrence has been reported from Italy, Algeria, the Caucasus, and Turkestan. HUTCHINSON (1940), reports the occurrence of this species in southeastern Iran (Seistan). All localities given from Turkey are the first localities from which it has been reported in Asia Minor. It is a species with a southeastern distribution penetrating to the northwest.

Corixinae.

Heliocoris vermiculata (PUTON 1874).

The only Eremic element among the aquatic *Heteroptera* of Turkey. Its exact locality in Turkey has not been recorded, but POISSON (1926) includes Turkey in the region of the distribution of this species. For South-West Asia it was recorded from Iraq (JACZEW-

SKI, 1927), from Trans-Caucasia: Geok-tapa (POISSON 1939b), and from the eastern part of Iran (HUTCHINSON 1940).

***Corixa punctata* (ILLIGER 1807).**

1♀ — Ilgaz dağları, 2000 m, VI. 1931 (J. V. Staněk coll.).

1♂, 2♀♀ — Beyşehir, Çandar, 1112 m, 5. VIII. 1941 (C. Kosswig coll.).

3♂♂, 2♀♀ — Dağılyan pınar, Acıgöl, 836 m, XI. 1945 (C. Kosswig coll.).

1♂, 1♀ — Emir gölü, 9. III. 1947 (C. Kosswig coll.).

5♀♀ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

1♀ — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).

3♀♀ — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Up till now ascertained in Turkey: Bursa (HORVÁTH 1883), Ulu dağ (FAHRINGER 1922), İzmir, Ankara (POISSON 1925, KERVILLE 1939).

Abundant species all through Europe, extending eastward to Chinese Turkestan. It is an Angaran element. In the Middle East it has been found in Palestine, Trans-Caucasia and in southern Iran.

***Corixa affinis affinis* LEACH 1818.**

8♂♂, 6♀♀ — Beyşehir, Çandar, 1112 m, 5. VIII. 1941 (C. Kosswig coll.).

1♂, 3♀♀ — Dağılyan pınar, Acıgöl, 836 m, XI. 1945 (C. Kosswig coll.).

1♂, 4♀♀ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

1♀ — Abacılar, 6. VIII. 1947 (Exp. Nat. Mus.).

12♂♂, 38♀♀ — Konya, 31. VIII. 1947 (Exp. Nat. Mus.).

9♂♂, 22♀♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

12♂♂, 51♀♀ — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Up till now found in Turkey at İzmir and Ankara (POISSON 1925, KERVILLE 1939).

Species with the same distribution as *Corixa punctata* (ILL.), more abundant in the maritime regions. In the Middle East it has been found in Egypt, Trans-Caucasia, Syria, Palestine, in southern Iran, Baluchistan and on Cyprus.

***Corixa panzeri* (FIEBER 1848).**

1♂, 1♀ — Dağılyan pınar, Acıgöl, 836 m, XI. 1945 (C. Kosswig coll.).

2♂♂, 7♀♀ — Emir gölü, 20. IV. 1947 (C. Kosswig coll.).

3♂♂, 9♀♀ — Konya, 31. VIII. 1947 (Exp. Nat. Mus.).

4♀♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Euro-Siberian element with southeastern extension.

***Corixa dentipes* (THOMSON 1869).**

1♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Angaran element. From South-Western Asia it is known from Trans-Caucasia and southern Iran.

***Callicorixa concinna* (FIEBER 1848).**

1 ♀ — Dağılyan pınar. Aeigöl, 836 m, XI. 1945 (C. Kosswig coll.).

1 ♂ — Emir gölü, 9. III. 1947 (C. Kosswig coll.).

9 ♂♂, 22 ♀♀ and 3 nymphs — Moğan gölü, 8. VII. 1947 (Exp. Nat. Mus.).

2 ♀♀, 1 nymph — Nazik gölü, 1870 m, 2. VII. 1947 (C. Kosswig coll.).

Angaran element found in South-West Asia, hitherto only in Armenian S. S. R.

All specimens (♂♂, ♀♀) collected in lake Moğan gölü are unusually pale coloured. The black drawing is suppressed especially on corium and clavus, and in some parts it disappears completely. In all other respects these specimens correspond to the European specimens.

***Hesperocorixa occulta* (LUNDBLAD 1929).**

3 ♂♂, 2 ♀♀ and 1 nymph — Ilgaz dağları, 2300 m, VI. 1931 (J. V. Staněk coll.).

As far as ascertained up till now this is a species restricted in its distribution exclusively to mountain regions. LUNDBLAD (1929) described this species from the northeastern part of Afghanistan (Waghan) and from eastern Bucharra (Shugnan), from mountain regions rising far above 3000 m. LUNDBLAD does not give, however, in his paper any details about the character of the localities. HUTCHINSON (1940) lists further localities situated east of the typical locality: Indian Tibet (Kangral). The locality lies at an altitude of 3380 m.

The Turkish specimens were collected at an altitude of about 2300 m. Though all these sporadic finds thousands of kilometers from each other, the species can be considered to be widely distributed in the massif of South-Western Asia and in High Asia.

***Hesperocorixa linnei* (FIEBER 1848).**

This species has been found in Turkey up till now only in one locality: Ankara (POISSON 1925, KERVILLE 1939). Euro-Siberian species. In the regions adjoining Turkey it has been found in Trans-Caucasia and northern Iran.

***Sigara (Sigara) assimilis* (FIEBER 1848).**

2 ♀♀ — Van gölü, VIII. 1939 (C. Kosswig coll.).

14 ♂♂, 9 ♀♀ and 12 nymphs — Adilcevaz, Arin gölü, 1720 m, 5. VII. 1947 (C. Kosswig coll.).

3 ♂♂, 2 ♀♀ — Erçek gölü, 1890 m, 20. VII. 1947 (C. Kosswig coll.).

Species of eastern origin with a northwestern distribution. Listed in the Middle East from Trans-Caucasia and northern Iran (MOUGEL 1937).

***Sigara (Sigara) striata* (LINNAEUS 1758).**

1 ♂, 1 ♀ — Beyşehir Çandar, 5. VIII. 1941 (C. Kosswig coll.).

1 ♂, 6 ♀♀ — Emir gölü, 9. III. 1947; 1 ♂, 2 ♀♀, 20. IV. 1947 (C. Kosswig coll.).

2♂♂, 1♀ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

2♂♂, 5♀♀ and 1 nymph — Beyşehir gölü, 1116 m, 3. IX. 1947 (Exp. Nat. Mus.).

2♀♀ — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Holarctic element with general distribution in the whole of Europe and Asia. In the Middle East it is known from the following regions: Trans-Caucasia (KIRITSHENKO 1918, 1930), northern Iran (MOUGEL 1937), and Palestine (BODENHEIMER 1937).

***Sigara (Sigara) albiventris* (HORVÁTH 1911).**

1♂, 4♀♀ and 1 nymph — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).

The occurrence of this species in the relatively western Anatolia seems to be very interesting. For a long time this species was known only from Syria (HORVÁTH 1911, JACZEWSKI 1934), and only POISSON (1939b) lists a further locality: Geok-tapa (Trans-Caucasia).

***Sigara (Subsigara) kervillei* (POISSON 1927).**

An endemic species of the Turkish fauna. Known up till now from Ankara (POISSON 1927a, KERVILLE 1939).

Lit.: *Arctocoris* *Kervillei* POISSON 1927a, pp. 164—166.

Sigara kervillei POISSON 1935, p. 536.

***Sigara (Subsigara) samani* sp. n.**

Head yellowish brown, eyes brown. Pronotum yellowish brown with 7 regular, brownish black, transversal stripes (fig. 27), which are upon the whole but slightly wider than the pale interspaces. Sternum yellowish brown. Clavus (fig. 71) with 5 basal yellow stripes, which are very broad, enlarging in the direction inwards; further transversal, distinctly narrower stripes on the inner side do not reach the suture, the last one anastomoses more or less. Corium (fig. 71) with irregular, yellowish brown stripes, here and there interrupted and here and there anastomosing, which form along the side of the clavus and along the outer side of the corium a more or less regular longitudinal black stripe; ectocorium grayish yellow and passing into a dark brown spot. Membrane (fig. 71) dark brown with yellow wavy drawing. Abdomen and legs yellowish brown.

Head (fig. 27) in front broadly drawn out, of almost the same length as the width of the vertex (15 : 16), and three times wider than its length (46 : 15), eyes relatively slightly convex; vertex with low, longitudinal carine in the middle of two rows of 5 black punctures; a row of punctures also along the inner margin of the eye.

Pronotum (fig. 27) a little longer than half of its width (23 : 40), drawn out on the sides in rounded angles which curve slightly back; disc of the pronotum strongly convex and entirely strongly longitudinally striated. Lateral lobes of the prothorax (fig. 28) tongue-shaped, the longitudinal margins converge a little to the end, and the lower angle is rounded. Metaxiphus (fig. 29) distinctly longer than broad, rounded behind.

The middle legs have much reduced swimming hairs. The femur has on the inner margin some irregular rows of short spines; the distal part

of the extensor margin with individual small spines placed far apart. Tibia with several irregular rows of spines, on the flexor margin and on the sides some long spines; the extensor margin has long swimming hairs. Tarsus on the extensor margin with far-apart spines, on extensor side with swimming ciliae, apex of the tarsus terminated by two larger spines. Claws slightly curved.

Extensor margin of the posterior femur in the distal part with 4 small spines, tibia on the inner side with three teeth and numerous hairs, borders with a row of stout spines and numerous swimming hairs. Tarsi with numerous spines and with numerous swimming hairs close together.

Relative lengths of legs:

Middle	Trochanter	Femur	Tibia	Tarsus	Claws
	11	54	26	17	25
Hind	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
	8	33	29	34	16

♂ — Frontal fovea on the head very deep and long, comprising the width of the vertex.

Anterior coxae in the distal part with a dense pubescence; trochanters also with numerous hairs which, especially in the basal part, reach a considerable length; anterior femur (fig. 30) with a strongly developed stridulation area; the regular hairs close together reach almost from the base of the femur to the middle, in which part they turn into spinulose bristles; the distal part of femur with short spines far apart; almost in the middle of the inner surface of the femur is a row of obliquely arranged, stout teeth (fig. 31) which form groups of 2, 5 and 1 teeth; in the apical part of the femur are 3 stout spines. Tibiae short, strongly bent at the base. Pala (fig. 30) of subtriangular shape, upper margin at the base strongly convex; flexor margin with inner row of 25 short bristles, the outer row is composed of 21 long bristles, stridulation pegs arranged in two rows, the basal row almost parallel to the flexor margin and composed of 15 regular teeth, the apical row is nearly parallel to the extensor margin and is composed of 11 pegs, longer especially before the end; the extensor margin has 6 long bristles; on the surface between the basal row of stridulation pegs and the basal convexity are three minute teeth.

Fifth tergite (fig. 32) without special characters.

Sixth tergite (fig. 33) with a large strigil (fig. 36), composed of 7 combs, of which the basal one does not comprise the whole width of the strigil, one of which, the last one, is very short; the posterior margin of the tergite has sporadic small teeth and long hairs widely spaced.

Seventh tergite (fig. 34) with considerably broad median lobe whose left side is strongly convex, the right one concave. The surface of the lobe carries small teeth placed irregularly and far apart, the posterior margin has a thick brush of long hairs.

Apex of the ninth segment (fig. 37) divided, ventral side shorter than dorsal side. Sheath of the penis at the end anchor-shaped.

Right-hand clasper (fig. 38) sickle-shaped, inner side regularly bent, outer side in its basal part convex and in the direction towards the end slightly curved; the end itself pointed. Left-hand clasper (fig. 39) much more stout.

♀ — like ♂, without special sexual characters.

♂, length 5,13 mm.

♀, length 5,5 mm.

1♂ (holotype) and 1♀ (allotype) — Mersin, pool with brackish water on the shore of the Mediterranean Sea, 25. VIII. 1947 (Exp. Nat. Mus.).

This species has been called after my friend *Mr. G. Saman*, Professor of Turkish in the *Oriental Institute*, Praha.

The new species belongs to the subgenus *Subsigara* STICH. 1935. It distinguishes itself from all other representatives of this subgenus very easily by the drawing of the pronotum, pala, genital organs and by its general aspect. In size it is reminiscent of *Sigara (Subsigara) scotti* (FIEBER).

***Sigara (Retrocorixa) limitata* (FIEBER 1848).**

2♂♂, 1♀ — Ilgaz dağları, 2300 m, VI. 1931 (J. V. Staněk coll.).

Holarctic element with a general distribution in southeast, central and northern Europe. In South-West Asia it has been found only in the Tiflis region.

***Sigara (Vermicorixa) nigrolineata* (FIEBER 1848).**

2♂♂, 1♀ and 2 nymphs — Armutlu (hot spring, 24° C), 19. III. 1944; 1♂, 2♀♀, 2. V. 1944 (C. Kosswig coll.).

1♀ — Edirne, 12. VI. 1947 (Exp. Nat. Mus.).

7♂♂, 18♀♀ — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).

2♂♂, 6♀♀ and 8 nymphs — Kilis, 20. VIII. 1947 (Exp. Nat. Mus.).

1♂ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

7♂♂, 6♀♀ and 20 nymphs — Sivrihisar, 7. IX. 1947 (Exp. Nat. Mus.).

Localities known up till now in Turkey: İzmir, Ankara (POISSON 1925, KERVILLE 1939).

Very abundant and usual species in the whole of Europe and adjoining regions. Known also from Trans-Caucasia, northern Iran, Palestine and Cyprus.

***Sigara (Vermicorixa) lateralis lateralis* (LEACH 1818).**

2♀♀, 2 nymphs — Armutlu (hot spring, 38°–44° C), 7. VII. 1944 (C. Kosswig coll.).

52♂♂, 101♀♀ and 2 nymphs — Edirne, the pools on the bank of Meriç Nehri (Marica River), 12. VI. 1947 (Exp. Nat. Mus.).

5♂♂ 3♀♀ — Mollafeneri, 21. VI. 1947 (Exp. Nat. Mus.).

85♂♂, 161♀♀ and 12 nymphs — Moğan gölü, 5. — 12. VII. 1947 (Exp. Nat. Mus.).

1♀ — Bűrücke, Middle Toros, 1200 m, 31. VII. 1947 (Exp. Nat. Mus.).

7♂♂, 8♀♀ — Abacılar, 6. VIII. 1947 (Exp. Nat. Mus.).

1♂, 2♀♀ — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).

2♂♂, 3♀♀ — Kilis, 20. VIII. 1947 (Exp. Nat. Mus.).

11♂♂, 25♀♀ — Mersin, pool with brackish water. 25. VIII. 1947 (Exp. Nat. Mus.).

1♂, 3♀♀ — Erdemli, pool with brackish water, 27. VIII. 1947 (Exp. Nat. Mus.).

52♂♂, 75♀♀ and 17 nymphs — Konya, 31. VIII. 1947 (Exp. Nat. Mus.).

3♀♀ — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).

1♂, 1♀ — Sivrihisar, 7. IX. 1947 (Exp. Nat. Mus.).

Up till now found in Turkey in the following localities: Bulgar dağ, Turunçlu (LINDBERG 1922 a), İzmir, Ankara (POISSON 1925, KERVILLE 1939).

The most distributed species in Europe reaching far to the south-east. In South-West Asia known from Trans-Caucasia, north and southeast Iran, Syria and Palestine, Baluchistan and Cyprus.

***Sigara (Halicorixa) mayri* (FIEBER 1861).**

50♂♂, 68♀♀ and 27 nymphs — Erdemli, pool with brackish water, 27. VII. 1947 (Exp. Nat. Mus.).

East Mediterranean element. This species has been found up till now in Egypt, where it is very abundant, in Italy and in Rumania (Dobrudja).

Key to the Determination of *Cymatinae* and *Corixinae* in Turkey.

1. Pronotum unicoloured brown or with only slight indications of an interrupted short wavy pattern. Anterior tarsus long and cylindrical. Eyes considerably protruding. The right paramere (♂) is lacking. Rostrum not cross-ridged. *Cymatia rogenhoferi* (FIEB.).
- Pronotum with alternating dark and pale, always distinct bands. Anterior tarsus short and flattened. Eyes not markedly protruding. Both parameres are developed in ♂. Rostrum cross-ridged 2.
2. Male asymmetry sinistral. Strigil in ♂ situated on the left side. Lateral lobes of the prothorax short and broad, at the end obliquely truncated. Pronotum more or less shining, not at all or only slightly transversally rastrate 3.
- Male asymmetry dextral. Strigil in ♂, if present, on the right side. Lateral lobes of prothorax elongate, tongue-form. Pronotum transversally rastrate 7.
3. Small species, less than 5 mm. Stridulation pegs in ♂ at base only, distal half of smaller pegs closer together than the proximal *Heliocorisa vermiculata* (PUT.).
- Larger species, more than 8 mm. in length. Stridulation pegs on the pala (♂) forming a long homogeneous row, regularly ascending 4.

4. Larger species, length 12—13 mm. Claws of the middle legs shorter than the tarsi.....5.
- Smaller species, length 8—11 mm. Claws of the middle legs of equal length or longer than the tarsi.....6.
5. Proximal part of the middle tibiae not cut out.....*Corixa punctata* (ILL.).
- Proximal part of the middle tibiae cut out.....*Corixa dentipes* (THOMS.).
6. Larger specimens, length 10,5—11, mm. Black bands broader than light one. ♂ frontal fovea broader and deeper. Pala with more than 30 stridulation pegs. ... *Corixa panzeri* (FIEB.).
- Smaller specimens, length 8—9 mm. Black stripes narrower than light one. ♂ frontal fovea smaller and shallower. Pala with less than 30 stridulation pegs. *Corixa affinis* LEACH.
7. Without strigil. Posterior tarsi with a black spot at the end.....*Callicorixa concinna* (FIEB.).
- ♂ has always a strigil. Posterior tarsi without a black spot at the end.8.
8. Lateral lobes of the prothorax trapezoid. Extensor edge of the pala (♂) at the base with a keel. Metaxyphus ending very sharply.9.
- Extensor edge of pala (♂) without a keel at the base. Lateral lobes of the prothorax narrow, irregularly tongue-form. Metaxyphus not ending sharply, generally rounded.....10.
9. Pronotum with 9—10 pale transverse stripes.....*Hesperocorixa occulta* (LUNDBL.).
- Pronotum with 6 transverse pale stripes.....*Hesperocorixa linnei* (FIEB.).
10. Anterior pala (♂) with two discontinuous rows of stridulation pegs11.
- Anterior pala (♂) with one uninterrupted row of stridulation pegs across the whole length of the pala15.
11. Posterior femur with 2—3 short spines, not situated in one row. Claws of the middle legs of equal length as the tarsi.....12.
- Posterior femora with one row of 4—12 short spines. Claws of the middle legs longer than the tarsi.....14.
12. Pronotum with 6 transversal, pale stripes13.
- Pronotum with 9—10 transversal, pale stripes.....*Sigara (Sigara) assimilis* (FIEB.).
13. Size 6,5—8 mm. Strigil very large, oval, carrying 10 rows of combs *Sigara (Sigara) striata* (LINN.).
- Size 5—6,2 mm. Strigil small, composed only of 6—7 combs. Yellow pattern of the hemielytra more regular and marked.....*Sigara (Sigara) albiventris* (HORV.).
14. Pronotum with 5 transversal dark stripes, pale stripes much broader than dark ones. Hemielytra with narrow, more or less

- irregular, black pattern. Strigil with 4 combs.....
 *Sigara (Subsigara) kervillei* (POISS.).
- Pronotum with 7 dark transverse stripes; the black and the pale pattern on the pronotum of equal width. Hemelytra with broad, fairly regular, black pattern. Strigil of 7 combs.....
 *Sigara (Subsigara) samani* sp. n.
15. Corium transversally rastrated 16.
- Corium not rastrated, often covered with hairs..... 17.
16. The pattern on the hemelytra confluent into 2 longitudinal, dark stripes, one near the inner, the other near the outer margin, in the middle often a third, less distinct stripe.....
 *Sigara (Retrocorixa) limitata* (FIEB.).
- Pattern of the hemelytra not confluent into longitudinal, dark stripes *Sigara (Vermicorixa) nigrolineata* (FIEB.).
17. Pale pattern much broader than dark one. ♂ frontal fovea simple..... *Sigara (Vermicorixa) lateralis* (LEACH).
- Pale pattern of equal width as or narrower than the dark one. ♂ frontal fovea divided by a transversal carine between the anterior angles of eyes. Length 6,5—6,75 mm.....
 *Sigara (Halicorixa) mayri* (FIEB.).

NOTONECTIDAE.

Anisopinae.

***Anisops (Anisops) sardea sardea* HERRICH SCHÄFFER 1849.**

1♂, 1♀ — Abacılar, northwestern from Adana, 6. VIII. 1947 (Exp. Nat. Mus.).

2♂♂, 11♀♀ and 5 nymphs — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).

10♂♂, 17♀♀ and 16 nymphs — Kilis, 20. VIII. 1947 (Exp. Nat. Mus.).

10♂♂, 31♀♀ and 7 nymphs — Mersin, pool with brackish water on the shore of the Mediterranean Sea, 25. VIII. 1947. (Exp. Nat. Mus.).

9♂♂, 54♀♀ — Erdemli, pool with brackish water, 27. VIII. 1947 (Exp. Nat. Mus.).

Ethiopian element. Very abundant species in Africa (it is remarkable that it is completely lacking in southernmost part of Africa) and in the regions adjoining the Mediterranean Sea. In South-Western Asia generally distributed. Besides this species there occurs in Arabia and Syria *Anisops varia* FIEB., and recently a third species of this genus, *Anisops persica* LINDB. 1941 has been recorded for West Asia from Iran.

Notonectinae.

***Notonecta (Notonecta) glauca glauca* LINNAEUS 1758.**

2♂♂, 4♀♀ — Ilgaz dağları, VI. 1931 (J. V. Staněk coll.).

1♂, 1♀ — Işaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Hamidiye (HORVÁTH 1901), Ulu dağ (FAHRINGER 1922), Tercan (KIRITSHENKO 1924), İzmir, Ankara (POISSON 1925).

Species generally distributed in Central and Northern Europe; in its typical form it extends only little into more southern regions. In the Middle East it has been found only in Trans-Caucasia, northern Iran and Palestine.

***Notonecta (Notonecta) glauca kervillei* POISSON 1933.**

Hitherto known only from Anatolia: İzmir, Ankara (POISSON 1933b, KERVILLE 1939).

Lit.: *Notonecta glauca kervillei* POISSON 1933b, pp. 347—348.

***Notonecta (Notonecta) glauca poissoni* HUNGERFORD 1933.**

Hitherto known only from northeastern Anatolia: Erzurum (HUNGERFORD 1933).

Lit. *Notonecta glauca poissoni* HUNGERFORD 1933, pp. 26 and 49—50.

***Notonecta (Notonecta) glauca hybrida* POISSON 1933.**

5♂♂, 7♀♀ — Suluhan, East Toros, 10. VIII. 1947 (Exp. Nat. Mus.).

1♀ — Mollafeneri, 21. VI. 1947 (Exp. Nat. Mus.).

Subspecies of Palaeomediterranean distribution.

***Notonecta (Notonecta) obliqua obliqua* GALLÉN 1787.**

1♂, 2♀♀ — Mollafeneri, 21. VI. 1947 (Exp. Nat. Mus.).

2♂♂ — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Maraş (HORVÁTH 1919, FAHRINGER 1922), Adana (FAHRINGER 1922).

By no means abundant species, but occurring everywhere in Central and Northern Europe.

***Notonecta (Notonecta) obliqua meridionalis* POISSON 1926.**

1♀ — Mollafeneri, 21. VI. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İzmir, Ankara (POISSON 1925, KERVILLE 1939).

Subspecies with Palaeomediterranean distribution.

***Notonecta (Notonecta) viridis viridis* DELCOURT 1909.**

1♀ — Emir gölü, 20. IV. 1947 (C. Kosswig coll.).

1♀ — Ankara-Baraj, 3. VII. 1947 (Exp. Nat. Mus.).

1♂, 2♀♀ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

1♀ — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İzmir, Ankara (POISSON 1925).

Distributed in the whole of Europe. In the Mediterranean this typical form is less represented than *N. viridis mediterranea* HUTCH. Hemelytra of the Anatolian specimens more pigmented than in the Central Europe specimens.

***Notonecta (Notonecta) viridis mediterranea* HUTCHINSON 1928.**

- 3 ♀♀ — Acıpınar, Acıgöl, 836 m, X. 1945 (C. Kosswig coll.).
 2 ♂♂, 2 ♀♀ — Dağılyan pınar, Acıgöl, 836 m, XI. 1945 (C. Kosswig coll.).
 3 ♂♂, 1 ♀ — Emir gölü, 9. III. 1947 (C. Kosswig coll.).
 2 ♂♂, 3 ♀♀ — Beynam, 28. VI. 1947 (Exp. Nat. Mus.).
 6 ♀♀ — Ahlat, Nazik gölü, 1870 m, 2. VII. 1947 (C. Kosswig coll.).
 1 ♂ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).
 2 ♀♀ — Edremit, Van gölü, 1720 m, 20. VII. 1947 (C. Kosswig coll.).
 3 ♂♂, 10 ♀♀ — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).
 23 ♂♂, 17 ♀♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).
 7 ♂♂, 13 ♀♀ — İşaklı, 5. IX. 1947 (Exp. Nat. Mus.).
 1 ♀ — Sivrihisar, 7. IX. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İzmir, Ankara (KERVILLE 1939).

East Mediterranean element. It seems to be the most widely distributed representative of the genus *Notonecta* LINN. in Turkey.

Among the specimens collected at Kızılviran and Suluhan were found some specimens (♂♂) which in the colouring of the hemielytra were reminiscent of the species *N. obliqua obliqua* GALL. They are specimens with unusually pigmented hemielytra (fig. 72). The other characters as well as the genital organs correspond entirely to *N. v. mediterranea* HUTCH.

***Notonecta (Notonecta) maculata* FABRICIUS 1794.**

From Turkey known only from İstanbul: Acı Badem (JACZEWSKI 1934).

A Mediterranean species with northwestern extension.

Key to the Determination of *Notonectidae* of Turkey:

1. Commissure of the hemielytra enlarged at the base to a small pit. Middle femora without subapical tooth. ♂ genital organs asymmetrical, ♂ head drawn out into a cephalic horn *Anisops (A.) sardea* H. SCH.
- Middle commissure of the hemielytra not enlarged at the base into a pit. Middle femora in the subapical part with one large tooth. ♂ genital organs symmetrical. 2.
2. Anterior angles of the pronotum sharp, drawn out, embracing the basal part of the eyes. 3.
- Anterior angles of the pronotum short and blunt, not embracing the base of the eyes. 4.
3. Hemielytra yellowish green, on the margins dark coloured, end of the hemielytra with a dark drawing in the shape of an „X“ *Notonecta viridis viridis* DELC.
- Hemielytra considerably spotted. *N. viridis mediterranea* HUTCH.

4. Last abdominal sternite ♀ not narrowed before the end. Metanotum and tergum yellowish, except tergites 2nd to 4th, and half of the 5th, and two small spots on both sides of the base of the metanotum *Notonecta maculata* FAB.
- Last abdominal sternite ♀ is narrowed before the end. Metanotum and tergum black, or blackish brown.....5.
5. Hemelytra yellowish or yellowish brown.....6.
- Hemelytra blackish or reddish to brownish, with or without spots.7.
6. Hemelytra yellowish or yellowish brown, with brown or blackish spots, often confluent along the outer side, and often a transversal spot at the end of the clavus and in the inner angle of the corium. *N. glauca glauca* LINN.
- Hemelytra yellowish or yellow brown with a broad, transversal, black stripe which occupies the distal third of the corium, the end of the clavus and the basal part of the membrane..... *N. glauca poissoni* HUNG.
7. Hemelytra reddish or brownish, without or with spots.....8.
- Hemelytra velvet black with one or two yellowish stripe at the base 9.
8. Hemelytra more or less spotted, with a longitudinal paler stripe at the base of the clavus, or with two similar stripes, one on the clavus and the other on the corium... *N. glauca hybrida* POISS.
- Hemelytra yellowish brown with a row of spots more or less regular along the inner margin of clavus; transparent part of the membrane strongly darkened, with the drawing reaching to the chitinous part. *N. glauca kervillei* POISS.
9. Size 15—16 mm. Hemelytra with 2 yellowish stripe at the base, the one on the corium is slightly shorter than the other, which is situated on the clavus. *N. obliqua obliqua* GALL.
- Size 13—14 mm. Hemelytra with 2 yellowish stripes; the stripe on the corium is more or less reduced, or only the stripe on the clavus is visible, but there are always at last some spots on the corium. *Notonecta obliqua meridionalis* POISS.

PLEIDAE.

Plea leachi MAC GREGOR 1899.

2♀♀ — Acıpinar, Acıgöl, 836 m, X. 1945 (C. Kosswig coll.).

2♂♂ — Dagıyan pınar, Acıgöl, XI. 1945 (C. Kosswig coll.).

55♂♂, 72♀♀ — Emir gölü, 9. III. 1947 (C. Kosswig coll.).

40♂♂, 31♀♀ — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

1♂, 1♀ and 1 nymph — Suluhan, East Toros, 10. VIII. 1947 (Exp. Nat. Mus.).

38♂♂, 40♀♀ and 9 nymphs — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Ankara (KERVILLE 1939).

Species distributed all over Europe and common in the whole of the Mediterranean. In South-West Asia ascertained in Trans-Caucasia, northern Iran, Palestine and Cyprus.

NEPIDAE.

Nepa cinerea LINNAEUS 1758.

1 nymph — Dağilyan pınar, Acıgöl, 836 m, XI. 1945 (C. Kosswig coll.).

1 nymph — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

2♂♂ — Erciyas dağ, 1800 m, 24. VII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Maraş (HORVÁTH 1919), Sapanca gölü (FAHRINGER 1922).

Species of Angaran origin, generally distributed.

Ranatra linearis (LINNAEUS 1758).

1♂, 1♀ — Konya, 31. VIII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Menemen (LINDBERG 1922a).

Angaran element, in Europe very abundant.

BELOSTOMATIDAE.

Lethocerus niloticus (STAL 1854).

3 specimens — Adana, 1945 (Merkez Ziraat Mücadele Enstitüsü, Ankara).

1 specimen — Alata (Mersin), 1947 (Teknik bahuvarlık okulu, Alata).

Ethiopian element. Relatively abundant species in the whole of the Eastern Mediterranean, reaching in the West to Dalmatia, and to the North to the Balaton Lake in Hungary. The Pontic limit of its distribution is Burgaz in Bulgaria. I was unable to find in the literature any report on its occurring in Anatolia. During my travels in Turkey I saw documentary specimens in the collections of some institutes. They are the first specimens from Anatolia known to me. From the other countries of South-West Asia this species is known from Syria, Iran, Iraq and Palestine.

NAUCORIDAE.

Ilyocoris cimicoides (LINNAEUS 1758).

8♂♂, 11♀♀ — Emir gölü, 9. III. 1947 (C. Kosswig coll.).

1 nymph — Obruk, 6. VIII. 1947 (C. Kosswig coll.).

2♀♀ — Konya, 31. VIII. 1947 (Exp. Nat. Mus.).

3♂♂, 1♀ — Işaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Angaran element, very common species in the whole of Europe.

Naucoris maculatus FABRICIUS 1798.

3 specimens — Alata (Mersin), 1947 (Teknik bahuvarlık okulu, Alata).

Palaeomediterranean element. In South-West Asia it had hitherto been found only in Palestine.

APHELOCHEIRIDAE.***Aphelocheirus aestivalis*** (FABRICIUS 1803).

2♀♀ — Zeylan (northern of Van gölü), 13. VIII. 1947 (C. Koss-wig coll.).

Species with European distribution.

OCHTERIDAE.***Ochterus marginatus marginatus*** (LATREILLE 1804).

1♀ — Ulukışla, 28. VII. 1947 (Exp. Nat. Mus.).

2♀♀ — Bürücek, Middle Toros, 1200 m, 29. VII. 1947 (Exp. Nat. Mus.).

2 nymphs — Sivrice, Hazer gölü, 30. VII. 1947 (C. Kosswig coll.).

2♀♀ and 2 nymphs — Abacılar (bank of Çakit River), 7. VIII. 1947 (Exp. Nat. Mus.).

1♀ and 3 nymphs — Alacakilise, 21. VIII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Bursa (HORVÁTH 1883), Bulgar dağ, Turunçlu, Sarayköy, Baba dağ (LINDBERG 1922a).

Palaeomediterranean species, reaching far to the East to India.

LEPTOPODIDAE.***Leptopus hispanus*** RAMBUR 1842.

1♀ — Gyaur dağ, on the eastern slope, about 15 km from Fevzi-paşa, 16. VIII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İskenderun (A. DA COSTA 1874).

Species of Palaeomediterranean distribution.

Patapius spinosus (ROSSI 1790).

1♂, 1♀ — Abacılar, 7. VIII. 1947 (in flight) (Exp. Nat. Mus.).

Palaeomediterranean element. In South-West Asia this species was collected in Trans-Caucasia (Armenian SSR), Syria (*f. nigriceps* HORV.) and in Palestine.**SALDIDAE.*****Halosalda lateralis*** (FALLEN 1807).

This species has been listed for Asia Minor by OSHANIN (1906).

Salda muelleri (GMELIN 1788).

Hitherto known from Turkey: İzmir-İlica (LINDBERG 1922a). Angaran element.

Salda subcoriacea HORVÁTH 1901.

An endemic species of Asia Minor. Hitherto known from Aydın (HORVÁTH 1901).

***Saldula variabilis* (HERRICH-SCHÄFFER 1835).**

1 ♀ — Gerede, 22. VI. 1947 (Exp. Nat. Mus.).

6 ♂♂, 3 ♀♀ and 6 nymphs — Ayaş, 17. VII. 1947 (Exp. Nat. Mus.).

1 ♀ — Bürücek, Middle Toros, 1200 m, 29. VII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Yamanlar dağları (LINDBERG 1922a).

Species distributed in the whole of Europe, restricted to higher mountain sites. In the Middle East found also in Trans-Caucasia and in Palestine.

***Saldula saltatoria* (LINNAEUS 1758).**

1 ♂ — Ilgaz dağları, VI. 1931 (J. V. Staněk coll.).

1 ♀ and 2 nymphs — Alahan, Middle Toros, 29. VIII. 1947 (Exp. Nat. Mus.).

1 ♀ and 2 nymphs — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: Bursa (HORVÁTH 1883).

Holarctic element, the most common species of the genus *Saldula* in Europe. To the southeast it reaches as far as Trans-Caucasia and Palestine.

***Saldula saltatoria f. westhoffi* (VERHOEF 1891).**

1 ♂, 4 ♀♀ — Alahan, Middle Toros, 29. VIII. 1947 (Exp. Nat. Mus.).

Distributed like the typical form.

***Saldula melanoscela* (FIEBER 1859).**

1 ♂, 1 ♀ — Bürücek, Middle Toros, 1200 m, 29. VII. 1947 (Exp. Nat. Mus.).

Species with Euro-Siberian distribution, occurring especially in the mountains. The Turkish specimens collected in the Middle Toros show trifling divergences from the Central European and North European specimens. In the European material the antennae seem to be rather stronger and little shorter (I : II : III : IV :: 8 : 12 : 9 : 11), whereas in the specimens from the Taurus the antennae are slender, especially the first joint, and also distinctly longer (I : II : III : IV :: 9 : 13 : 10 : 11), (figs. 40, 41). — The claspers are in the specimens from the Taurus bent at a more obtuse angle (figs. 42, 45) than in the specimens collected in Northern Europe — but none of these features seem to be characteristic for any form peculiar to this area. The general habitus and all other characters agree completely with the European specimens. In the Middle East this species was collected in Trans-Caucasia and recently on Cyprus (LINDBERG 1948).

***Saldula amplicollis* (REUTER 1891).**

3 ♂♂, 4 ♀♀ — Çamlıdere, İşik dağları, 900 m, 23. VI. 1947 (Exp. Nat. Mus.).

1 ♂ — Beynam, 28. VI. 1947 (Exp. Nat. Mus.).

1 ♀ — Yeniköy, Middle Toros, 1000 m, 30. VIII. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Yamanlar dağları (LINDBERG 1922a).
Species with Palaemediterranean occurrence.

***Saldula hirsuta* (REUTER 1888).**

2♀♀ — Bürücek, Middle Toros, 1200 m 29. VII. 1947. (Exp. Nat. Mus.).

Hitherto this species had been found in Monfalcone (Illyria). It is presumably an East Mediterranean element.

Lit.: *Acanthia hirsuta* REUTER, Revue d'Entomologie, VII. pp. 60—61, 1888.

Acanthia hirsuta REUTER, Acta Societatis Sc. Fennicae, XXI, No. 2, pp. 19, 26 and 47, 1895.

***Saldula pallipes* (FABRICIUS 1794).**

3♂♂, 1♀ and 2 nymphs — Erciyas dağ, 1800 m, 24. VII. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İzmir, İlica, Menemen (LINDBERG 1922a).

Holarctic element, common in the whole of the Mediterranean and in northern Iran.

***Saldula pallipes f. confluens* (REUTER 1891).**

1♂ — Erciyas dağ, 1800 m, 24. VII. 1947 (Exp. Nat. Mus.).

Distributed together with the typical form.

***Saldula pallipes f. dimidiata* (CURTIS 1835).**

1♀ — Sivrihisar, 7. IX. 1947 (Exp. Nat. Mus.).

Same distribution as the typical form.

***Saldula arenicola* (SCHOLTZ 1846).**

5♂♂, 6♀♀ and 3 nymphs — Edirne, 8.—13. VI. 1947 (Exp. Nat. Mus.).

1♂ and 13 nymphs — Kızılcahamam, 14. IX. 1947 (Exp. Nat. Mus.).

Hitherto known from Turkey: İzmir (LINDBERG 1922a).

Angaran element; very common species on the bare and sandy banks of European waters.

***Saldula arenicola f. simulator* (REUTER 1895).**

2♂♂, 14♀♀ — Edirne, banks of Meriç Nehri, 8.—13. VI. 1947 (Exp. Nat. Mus.).

9♂♂, 7♀♀ and 2 nymphs — Moğan gölü, 12. VII. 1947 (Exp. Nat. Mus.).

13♂♂, 9♀♀ and 45 nymphs — Akşehir gölü, 4. IX. 1947 (Exp. Nat. Mus.).

1♂ — Sivrihisar, 7. IX. 1947 (Exp. Nat. Mus.).

Occurs together with the typical form.

***Saldula arenicola f. connectens* (REUTER 1895).**

2♂♂, 2♀♀ — Edirne, the banks of Meriç Nehri, 8.—13. VI. 1947 (Exp. Nat. Mus.).

1♀ — Kızılcahamam, 14. IX. 1947 (Exp. Nat. Mus.).
Distributed like the preceding form.

***Saldula arenicola f. nigripes* WAGNER 1940.**

1♀ — Kızılcahamam, 14. IX. 1947 (Exp. Nat. Mus.).
Distribution: hitherto known only from Central Europe.

***Chartoscirta cocksi* (CURTIS 1835).**

1♀ — Moğan gölü, 5. VII. 1947 (Exp. Nat. Mus.).
1♀ — Gyaurları, nearly 15 km from Fevzipaşa, 16. VIII. 1947. (Exp. Nat. Mus.).
2♀♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).
Euro-Siberian species reaching into the northern part of the Mediterranean. In the Middle East ascertained in Trans-Caucasia.

HEBRIDAE.

***Hebrus pusillus* (FALLEN 1807).**

3♂♂, 3♀♀ — Armutlu, 2. VII. 1944 (C. Kosswig coll.).
10♂♂, 24♀♀ and 3 nymphs — Çakıt River near Abacılar, 7. VIII. 1947 (Exp. Nat. Mus.).
1♂, 7♀♀ — Gyaurları, 16. VIII. 1947 (Exp. Nat. Mus.).
1♂, 5♀♀ — Afrin River, near Musabeyli, 20. VIII. 1947 (Exp. Nat. Mus.).
4♂♂, 5♀♀ — Alacakilise, 21. VIII. 1947 (Exp. Nat. Mus.).
5♂♂, 4♀♀ — Alahan, Middle Toros, 29. VIII. 1947 (Exp. Nat. Mus.).
3♂♂, 9♀♀ — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).
1♀ — Kızılcahamam, 14. IX. 1947 (Exp. Nat. Mus.).
Hitherto known from Turkey: Bulgar dağ, Turunçlu, İzmir (LINDBERG 1922a).
Angaran element. In South-West Asia found in Trans-Caucasia and in Palestine.

***Hebrus pusillus f. rufescens* REY 1893.**

1♂, 2♀♀ — Armutlu, mud in the area of hot springs, 2. VII. 1944 (C. Kosswig coll.).
22♂♂, 6♀♀ — Çakıt River near Abacılar, 7. VIII. 1947 (Exp. Nat. Mus.).
3♂♂, — Afrin River near Musabeyli, 20. VIII. 1947 (Exp. Nat. Mus.).
7♂♂, 1♀ — Alahan, Middle Toros, 29. VIII. 1947 (Exp. Nat. Mus.).
Occurs together with the typical form.

MESOVELIIDAE.

***Mesovelia vittigera* HORVÁTH 1895.**

1♂, 1♀, apterous forms and 4♂♂, 1♀, macropterous forms — Erdemli 27. VIII. 1947 (Exp. Nat. Mus.).

Species of African origin. Very abundant in South, East and Central Africa. Further its distribution extends the whole of North Africa and southern France. In South-West Asia it has been found in Syria, Palestine, and now also in southern Anatolia.

VELIIDAE.

Microvelia pygmaea (DUFOR 1833).

3♂♂, 20♀♀, *apterous forms* and 3♂♂, 6♀♀, *macropterous forms*; 3 nymphs — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Mediterranean species whose distribution reaches far to the North. In the Middle East it has been found in Trans-Caucasia, Syria, Palestine, on Cyprus and in Egypt.

Microvelia hozari sp. n. (Fig. 75.)

The ground colour is fuscous brown with pale yellow contrasts. Head blackish brown, in apterous forms with a pale brown vertex. Clypeus yellowish brown, bacculae and rostrum yellow, eyes brown; antennae yellow, apex of the first and third joint brownish, and the larger part of the fourth joint brown. Pronotum blackish brown, in the anterior part with a yellow transversal stripe comprising the width of the vertex; lateral angles of the pronotum and the whole posterior margin of the pronotum in apterous forms distinctly yellow. Sternum blackish brown, acetabula yellow. Metanotum and abdomen yellowish brown, tergum more or less brownish; connexivum, posterior half of the seventh tergite and sternite, and genital segments yellow. Legs of the apterous forms entirely pale yellow, only the apex of the femora, tibiae and the ends of the tarsal joints with narrow brown band. The whole body and legs with silver and golden pubescence, antennae also with darker, longer bristles. Hemielytra grayish brown with darker venation and with whitish spots arranged as in fig. 55. In macropterous forms the femora of the middle and hind legs have on the flexor margin in the distal half a dark stripe.

♂ — *Apterous form*.

Body (fig. 46) very narrow, elongated, three times longer than broad, abdomen in the direction backwards distinctly narrowed, with straight margins. Head strongly convex, in the direction forwards strongly sloping, distinctly longer than the width of the vertex between the eyes (8 : 6), the width of the head with the eyes included is nearly twice the width of the vertex (11 : 6). Eyes large, strongly projecting to the sides; ocelli small and situated rather at the sides of the head. The total length of the head has a longitudinal, fine, black, shining furrow; clypeus bluntly rounded. Ratio of the respective joints of antennae (fig. 47) I : II : III : IV :: 5 : 4,5 : 5 : 7,5. The first joint of the antennae is the strongest, at base and apex regularly bent; the second segment slightly slender; the third and fourth joints slenderest, the third cylindrical, the fourth fusiform. Rostrum projecting with its point over the anterior coxae.

Pronotum distinctly broader than long (14 : 10), leaving free only the triangular angles of the metanotum; posterior margin of the pronotum regularly and broadly rounded; anterior margin nearly straight, only in

the middle slightly, sinuated; lateral margins of the pronotum almost in the middle narrowly sinuated. Pronotum has in the middle a broad, but little marked longitudinal keel, which does not reach either the anterior or the posterior margins; parallel to the posterior margin of the pronotum is a strong depression with one irregular row of black punctures, which separates the dark coloured part of the pronotum from the yellow margin; the yellow transversal stripe of the anterior part of the pronotum is bordered with regular black deep punctures. The whole disc of the pronotum with close and regular large black deep punctures, which are somewhat sparse and more irregular only in the part beyond the transversal light stripe. The whole pronotum is covered with a dense silvery pubescence, which is somewhat thinner on the keel, and in the anterior part again somewhat longer. Sternum and metanotum with a pale pubescence. Tergum three times longer than broad (23 : 7,5); second to fifth tergites short, all of nearly equal length, the sixth tergite is somewhat longer, the seventh tergite long, nearly square (5 : 6). Connexivum narrow, with straight margins, erect. Tergum and venter covered with pale pubescence, which is distinctly longer on the seventh segment.

Relative lengths of legs:

	Trochanter	Femur	Tibia	Tarsus 1	Tarsus 2
Front	5	9	8,5	5	—
Middle	5	11	10	4	4
Hind	6	14	16	4	4

Femora of the anterior legs (fig. 48) straight, slightly swollen, tibiae towards the apex distinctly dilated and slightly sinuated and at apex on inner side strongly produced; tibiae before the apex with a comb of 10—12 pegs. Anterior legs with a pubescence, especially on the inner side with longer bristles.

Femora and tibiae of the middle legs straight, tibiae prolonged on the lower side in a short spur, on the inner side before the apex with a transversal comb of 10—12 pegs. Femora of the hind legs slightly bent towards the end, tibiae straight. Legs with short pubescence.

Eighth abdominal segment (fig. 49) distinctly longer than broad (9 : 7,5). Right clasper (figs. 50, 51) stout, more or less broad, irregularly bent, in the proximal part numerous bristles. Left clasper (fig. 52) elongate.

Length 1,44—1,63 mm; mean 1,55 mm.

♀ — *apterous form*.

Somewhat more robust (fig. 53) than male. Pronotum transverse, distinctly broader than long (19 : 11); posterior margin very broadly rounded, longitudinal keel and punctures along the posterior margin of the pronotum less distinct than in male. Abdomen slightly broader than in male, only twice longer than its maximum width (30 : 15). Connexivum erect, in the distal part overturned, covering the tergum. Genital segments with a very long pubescence. In all other respects as in male.

Length 1,56—1,9 mm; mean 1,75 mm.

♂ — *macropterous form*.

Pronotum (fig. 54) about one fourth broader than long (20 : 16); disc of the pronotum strongly convex, humeral angles extended and distinctly raised upwards; longitudinal keel scarcely visible, posterior margin strongly extended and narrowly rounded. Abdomen subparallel, connexivum erect upwards. Hemelytra projecting over the abdomen; grayish brown with whitish spots arranged as in fig. 55.

Length 1,6—1,71 mm; mean 1,66 mm.

♀ — *macropterous form*.

Similar to male, abdomen somewhat narrower; connexivum overturned over the hemelytra.

Length 1,75—1,98 mm; mean 1,87 mm.

1 ♂ (holotype) and 1 ♀ (allotype), 28 ♂♂ and 35 ♀♀ (paratypes), *apterous forms*; 24 ♂♂ and 29 ♀♀ (paratypes), *macropterous forms*; 4 nymphs — Kilis, 20. VIII. 1947 (Exp. Nat. Mus.).

3 ♀♀ (paratypes), *apterous forms* — Suluhan, East Toros, 10. VIII. 1947 (Exp. Nat. Mus.).

2 ♂♂ and 1 ♀ (paratypes), *macropterous forms* — Afrin River near Musabeyli, 20. VIII. 1947 (Exp. Nat. Mus.).

I name this species after His Excellency *Faik Hozar*, former Ambassador of the Turkish Government in Praha, who by his personal interest contributed much to the realisation of our expedition to Turkey.

All specimens of this new species were collected on small water surfaces (at the Afrin River, unfar the course proper of the river in tiny puddles formed by the hoofs of cattle) exposed to constant insolation, without special vegetation. *Microvelia pygmaea* (Duf.) was always found by me on waters with abundant bank-vegetation or with duckweed. The new species is very reminiscent of *M. pygmaea* (Duf.), but differs from it by a number of special features:

Microvelia pygmaea (Duf.)

♂ *apterous*, 1,65—1,76 mm.

Pronotum transverse, in the anterior part with a yellow transverse stripe; posterior margin of the pronotum of the same colour, dark, without marked depression.

Abdomen less than twice longer than broad; tergum about twice longer than broad; connexivum broad, outer margin convexly arched.

Seventh tergite broader than long. Right clasper fine, narrow, bent regularly in sickle-shape. Left clasper short.

Legs brown at least in part.

Microvelia hozari sp. n.

♂ *apterous*, 1,44—1,63 mm.

Pronotum transverse, in the anterior part with a yellow transverse stripe and with a broad yellow border along the posterior margin of the pronotum; a striking depression parallel to the posterior margin of the pronotum.

Abdomen very narrow, twice longer than broad; tergum three times longer than broad; connexivum narrow, outer margin straight.

Seventh tergite square.

Right clasper stout, broad, irregularly bent. Left clasper elongate.

Legs entirely yellow.

♀ *apterous*: 1,71—2,04 mm.
Connexivum more or less horizontally enlarged.

Macropterous ♂, 1,75—1,98 mm
♀, 1,98—2,9 mm

Humeral angles of the pronotum not especially raised upwards.

♀ *apterous*: 1,56—1,9 mm.
Connexivum overturned, covering the posterior part of the tergum.

Macropterous ♂, 1,6—1,71 mm.
♀, 1,75—1,98 mm.

Humeral angles of the pronotum distinctly raised upwards.

***Velia rivulorum f. ventralis* PUTON 1881.**

Hitherto found in Turkey: Bursa (HORVÁTH 1883).
This form is distributed in the Mediterranean.

***Velia nervosa* HORVÁTH 1896.**

1♂, 4♀♀ *macropterous forms* — Bürücek, Middle Toros, 1200 m 29. VII. 1947 (Exp. Nat. Mus.).

2♂♂, 2♀♀ *macropterous forms* — Yeniköy, Middle Toros, 1000 m, 30. VIII. 1947 (Exp. Nat. Mus.).

The present finds of this species are not only the first in Anatolia, but they are also the first finds outside the region of Persia, whence this species was originally described. HORVÁTH 1896 lists *V. nervosa* HORV. from northern Iran (Shahrud). LINDBERG 1941 gives a redescription of this species and lists its further locality, also in Iran, Shan Bazan. I was able to compare the Turkish specimens of this species with specimens from Shan Bazan, and they do not show any divergences. The two Turkish localities, Bürücek and Yeniköy are situated in large mountain, the first at an altitude of about 1200 m and the second near the village of Yeniköy at an altitude of about 1000 m. This species must be regarded as an Irano-Turanian element.

Lit.: *Velia nervosa* HORVÁTH 1896, pp. 326—327.

Velia nervosa LINDBERG 1941, pp. 18—20.

Velia nervosa TAMANINI 1947, p. 40.

***Velia filippii* TAMANINI 1947.**

1♂ *apterous forms*, 132 ♂♂ and 37 ♀♀ *macropterous forms* — Bürücek, Middle Toros, 1200 m, 29. VII. 1949. (Exp. Nat. Mus.).

This species was described by TAMANINI from Balkans, South Italia and Rhodos. Its further find in Anatolia leads us to suppose that it is distributed all through the Mediterranean region or at least through its eastern part.

The specimens collected in Taurus, should be possible, regarding to some colour and morphological differences, as I have been informed by L. TAMANINI, to take for an another form.

GERRIDAE.

***Gerris (Gerris) costae* (HERRICH-SCHÄFFER 1853).**

2♂♂, 7♀♀, *macropterous forms* — Mollafeneri, 21. VII. 1947 (Exp. Nat. Mus.).

1♂, *macropterous form* — Beynam, 28. VI. 1947 (Exp. Nat. Mus.).

6♂♂, 5♀♀, *macropterous forms* — Ankara-Baraj, 3.—4. VII. 1947 (Exp. Nat. Mus.).

1♂, *macropterous form* — Çagırgan, 22.VII. 1947 (Exp. Nat. Mus.).

2♂♂, 2♀♀, *macropterous forms* and 4 nymphs — Ulukışla, 28.VII. 1947 (Exp. Nat. Mus.).

4♂♂, 3♀♀, *macropterous forms* and 1 nymph — Ilgaz dağları, VI. 1931 (V. J. Staněk coll.).

Hitherto found in Turkey: Bursa (HORVÁTH 1883), İzmir (POISSON 1925, KERVILLE 1939).

European species with more southern spread, towards the south more abundant. In South-Western Asia ascertained in Trans-Caucasia, Syria and Palestine.

***Gerris (Gerris) thoracicus* SCHUMMEL 1832.**

1♀, *macropterous form* — Armutlu, 19. III. 1944 (C. Kosswig coll.).

2♂♂, *macropterous forms* — Edirne, 8.—13. VI. 1947 (Exp. Nat. Mus.).

4♂♂, 2♀♀, *macropterous forms* — Ankara-Baraj, 3.—4. VII. 1947 (Exp. Nat. Mus.).

3♂♂, 2♀♀, *macropterous forms* — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

4♂♂, 4♀♀, *macropterous forms* and 2 nymphs — Suluhan, East Toros, 10. VIII. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Ulu dağ (FAHRINGER 1922), İzmir, Ilica, Menemen, Sarayköy (LINDBERG 1922a), İzmir, Ankara (POISSON 1925, KERVILLE 1939).

Angaran element, abundant in the whole of Europe, North Africa and the Mediterranean islands. In the regions adjoining Turkey it was also found in Trans-Caucasia, Iran and Cyprus.

***Gerris (Gerris) lateralis* SCHUMMEL 1832.**

1♀, *macropterous form* — Kızılviran, 2. IX. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Artvin (Çoruh), Ararat (KIRITSHENKO 1918).

The species occurs in whole of Europe, but it seems to decrease in the more southern parts. In the Middle East known also from Trans-Caucasia, Iran and Iraq.

***Gerris (Gerris) gibbifer* SCHUMMEL 1832.**

1♂, 3♀♀, *macropterous forms* — Edirne, 8.—13. VI. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Maraş (HORVÁTH 1919), İzmir, Ankara (POISSON 1925, KERVILLE 1939).

Euro-Siberien species with southern spread.

***Gerris (Gerris) gibbifer f. flaviventris* PUTON 1879.**

This form was found in Turkey at İzmir (POISSON 1925, KERVILLE 1939).

Distributed in the Mediterranean, found also in Germany.

Gerris (Gerris) lacustris (LINNAEUS 1758).

1♂, 2♀♀ *macropterous forms* — İstanbul, 20. VIII. 1938 (P. Novotný coll.).

1♀, *macropterous form* — Gerede, 22. VI. 1947 (Exp. Nat. Mus.).

1♀, *macropterous form* — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

1♀, *micropterous form* — Kilis, 20. VIII. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Sapanca gölü (FAHRINGER 1922).

Species with Euro-Siberian distribution, very abundant in the whole of Europe and North Africa.

The micropterous female, collected near Kilis, distinguishes itself from all specimens of this species by its small size 6,69 mm, unusually strong lustre, especially of the tergum, the unusually pale coloured venter and sternum, and the two basal yellow coloured joints of rostrum. This specimen was collected on slightly running water, which formed in several steps above each other swampy pools with very warm and unclean water without vegetation. The air temperature in the limestone ravine, at whose bottom this specimen was caught, was 58° C.

Gerris (Gerris) argentatus SCHUMMEL 1832.

1♂, *macropterous form* — Suluhan, East Toros, 1000 m, 10. VIII. 1947 (Exp. Nat. Mus.).

Euro-Siberian element. In the adjoining regions found in Trans-Caucasia, Iran and Palestine.

Gerris (Aquarius) paludum (FABRICIUS 1794).

2♀♀, *macropterous forms*; 9♂♂, 9♀♀, *brachypterous forms*; 4 nymphs — Edirne, 8.—13. VI. 1947 (Exp. Nat. Mus.).

1♀, *brachypterous form* — Ulukişla, 28. VII. 1947 (Exp. Nat. Mus.).

1♂, 3♀♀, *macropterous forms*; 6♂♂, 8♀♀, *brachypterous forms*; 2 nymphs — Taşçı, 4. VIII. 1947 (Exp. Nat. Mus.).

3♂♂, *macropterous forms*; 1 nymph — Mersin, pool with brackish water on the shore of Mediterranean Sea, 25. VIII. 1947 (Exp. Nat. Mus.).

Euro-Siberian species which extends to the southeast. This species was also collected in Trans-Caucasia, Iran, Syria and Palestine.

Gerris (Aquarius) ventralis (FIEBER 1861).

3♂♂, 3♀♀ *apterous forms* and 4 nymphs — Düzce, 11. IX. 1946 (B. Alkan coll.).

1♂, *apterous form* — Taşçı, 4. VIII. 1947 (Exp. Nat. Mus.).

86♂♂, 77♀♀, *apterous forms*; 5♂♂, 6♀♀, *macropterous forms*; 17 nymphs — Suluhan, East Toros, 1000 m, 11. VIII. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Bulgar Dağ, Turunçlu, Baba dağ (LINDBERG 1922a).

Distributed in the southern part of Balkans and now, apparently, a common species also in Asia Minor and on Cyprus.

I saw a number of specimens from several localities in Anatolia and on Cyprus, and the species seems to be very variable in size and in

colour as well as in the configuration of the connexival angles of the seventh tergite. FIEBER (1861) in his original description gives a length of 7^m for the *macropterous form* (♀). HORVÁTH (1907) gives for the *apterous form* ♂ a length of 10–10,5 mm and for ♀ a length of 13,5 to 15 mm.

In the East Taurus I had the opportunity to collect this species in great quantities. All these specimens are in mean smaller than given by HORVÁTH and FIEBER. *Apterous* ♂♂ vary between 9,03–10,93 mm, the *apterous* ♀♀ between 11,59–15,58 mm. To a relatively large number of *apterous* specimens came only 11 *macropterous* ones; the length of the *macropterous* ♂♂ is 11,31–11,97 mm, of the *macropterous* ♀♀ 12,63–13,97 mm. The specimens collected in northwestern Anatolia at Düzce are surprisingly small: *apterous* ♂♂ 8,36–8,74 mm, *apterous* ♀♀ 11,21–11,59 mm. Though these latter specimens are strikingly small and differ in colour, they show no other special characters. The *apterous* ♂ from the lowland of Adana is 9,37 mm. The connexival angles of seventh tergite are very variable in shape as well as in their length in proportion to the genital segments. In figs. 56–64 I figure some types of the connexival angles of the seventh segment of this species.

Lit.: *Hydrometra ventralis* FIEBER, 1861, p. 107.

Gerris ventralis HORVÁTH 1907, p. 306.

HYDROMETRIDAE.

Hydrometra stagnorum (LINNAEUS 1758).

1♀, *brachypterous form* — Gerede, 22. VI. 1947 (Exp. Nat. Mus.).

1♀, *brachypterous form* — Ahlat, Van gölü, 30. VI. 1947 (C. Kosswig coll.).

6♂♂, 7♀♀, *brachypterous forms* — Ayaş, 17. VII. 1947 (Exp. Nat. Mus.).

5♂♂, 6♀♀, *brachypterous forms* — Çagırgan, 22. VII. 1947 (Exp. Nat. Mus.).

1♂, *brachypterous form* — Bürücek, Middle Toros, 29. VII. 1947 (Exp. Nat. Mus.).

6♂♂, *brachypterous forms* — Suluhan, East Toros, 10. VIII. 1947 (Exp. Nat. Mus.).

2♂♂, 3♀♀, *brachypterous forms* — Gyaur dağları, on the aestern slope, about 15 km from Fevzipaşa, 17. VIII. 1947 (Exp. Nat. Mus.).

1♀, *brachypterous form* — Işaklı, 5. IX. 1947 (Exp. Nat. Mus.).

Hitherto found in Turkey: Bursa (HORVÁTH 1883), Bulgar dağ, Turunçlu (LINDBERG 1922a), Ulu dağ (FAHRINGER 1922), Ankara (POISSON 1925, KERVILLE 1939), İzmir (KERVILLE 1939).

Species with great distribution all though Europe and adjoining regions. In South-West Asia recorded from Trans-Caucasia, Syria and Palestine.

Sketch of the Geographical Division of Anatolia and List of the Localities*) of the Material Used.

At the end of Tertiary and at the beginning of the Pleistocene Asia Minor was still completely connected with the *Balkans* and the present *Russian Platform*. The separation of *Anatolia* from *Europe* took place in the late Pleistocene by the downfaulting of the *Pontus*, the *Marmara* and the *Aegean Seas*. Thus was formed the peninsula of *Anatolia*. The long connection with *Europe* helps to explain the presence of a vast number of European fauna elements in the Anatolian biosphere.

Anatolia lies in three regions of the *Eurasian mountain ranges*. They are the *Aegean region*, the *Inner Anatolian region* and the *Ararat region*, which latter, however, belongs probably, at least in part, already to the *Iranian region*. They are divided into two wholes by the narrowing of the mountains, i. e. the *West Anatolian Upland* in the region of the divide between the *Aegean Sea* and *Central Anatolia*, and the *East Anatolian Mountains* in the region of the *Upper Euphrates (Murat)*. The south-eastern part of *Anatolia* is surrounded by the high mountains of the *Taurus (Toros)*. The name of *Taurus* is mostly used for the whole mountain system of southeast *Anatolia* without a more accurate delimitation. Already in 1902 F. SCHÄFFER (Zur Geotektonik des südöstlichen Anatolien) tried to characterise this term more accurately and in 1939 H. Louis (Das natürliche Pflanzenkleid Anatoliens geographisch gesehen) used for the ridges *Bulgar dağ* of the *Taurus proper*, *Karanfil* and *Ala dağ* the collective name of *Middle Taurus*. West of *Eğirdir gölü* and west of the bay of *Antalya* are mountains, geologically related with the *Middle Taurus*, but with a north-southwestern direction. These mountains have the characters of parallel mountain ranges as far as the depression *Kurkudeli — Elmalı*. The mountain region in the territory of ancient *Lykia*, delimited by *Karie* and *Pisidie*, is often called *Lykian Taurus* — but in modern Turkey this name is unknown among the local population and has been completely forgotten for national reasons. Recently the name of *Western Taurus* was selected for this region, which thus forms a united whole with the *Middle Taurus*. As in the West so also in the East of the *Taurus proper*, south of the region of the volcanic mass of the *Erciyes dağı* and further on the lower *Yenice Irmak*, another gigantic southern border mountain region of *Anatolia* attaches itself to the *Middle Taurus*. East of the large lowland of *Adana* this border region consists of the small, narrow, but very high mountains of the *Misis dağ* and east of the bay of *İskenderun* of the *Gyaur dağ (Amanus or Nur dağları)*, and may be regarded as forming the link between the *Middle* and the *Eastern Taurus*. In contradistinction to the *Middle Taurus* the *Eastern Taurus* is divided into numerous parallel zones distinctly distinguishable from each other. The innermost of these zones rises with its northwestern lobe as *Erciyes dağı*, and its ridge runs north of the line *Kangal Divriği* and *Erzincan* to east of *Bayburt* — it is the main divide between the rivers of the Black Sea and of the Mediterranean Sea. South and southeast of this dividing ridge the valley regions of *Upper Yenice Irmak*, *Uzunyayla* and *Upper Euphrates (Fırat, Murat)* are separated from each other by ridges

*) Map 86 (plate XVI).

of the central zone of the *Eastern Taurus*. Among these ridges are the mountains which are often called *Antitaurus*. This name is completely unknown to the local population. The main ridge of this system is called after its terminal pillar *Canbaz dağları*, which is visible south of *Kangal*. The third member of the *Eastern Taurus* rises as the outer ridge system. It begins with the *Gyaur dağ* and *Misis dağ*, attaches to the summits *Malatya*, *Ergani-Maden*, *Bitlis* and *Hakkâri*. From the *Central Taurus* it is separated by the valleys and lowlands of the *Upper Euphrates* via *Muş* and *Elbistan* to the lowland of *Adana*. This part was known in literature as *Aman* or *Kurdic Taurus*, but today it is called *Outer Eastern Taurus*. From the West to the region of *Muş* these mountains are connected with the central ridge of the *Eastern Taurus*. Geologically they are related to the *Little Zap*. Beside the *Outer Eastern Taurus* thus delimited there is still as an independent whole the *Hakkâri-Taurus*, considered to be the piedmont zone of the *Outer Eastern Taurus* at its southern foot.

Against the *Taurus* as the southern border of *Anatolia* stand in the North mountains of an entirely different character — a broadly spreading, flat zone whose direction runs parallel to the whole coast. This broad and high zone along the *Black Sea* is called the *North Anatolian Mountain Rampart*. To the East the flat character of the *North Anatolian Rampart* changes into the *North Anatolian Coast Range*. This system is known in Europe under the name of *East Pontic High Mountains*. But this name is not known or used in the country itself. After the most important pass, the *Zigana*, this whole mountain region in the East to the Turkish frontier has recently been called *Zigara dağları*. East of *Erzurum* the *Zigana* turns to the northeast, and spurs of the inner zone of the *Taurus* turn to the Southeast. This highland is called after the highest volcanic mass in the East the *Ararat Highland*.

1. Ilgaz dağları — part of the North Anatolian Mountain Rampart, collected at an altitude of about 2300 m, VI. 1931 (J. V. Staněk).
2. İstanbul — 20. VIII. 1938, (P. Novotný coll.).
3. Van gölü — Eastern Anatolia, 1720 m, VIII. 1939 (C. Kosswig coll.).
4. Armutlu — Western Anatolia; hot springs near the coast of the Marmara Sea, 19. III., 2. V., 2. and 7. VII. 1944 (C. Kosswig coll.).
5. Acıpınar — Acıgöl, 836 m, southwest Anatolia, X. 1945 (C. Kosswig coll.).
6. Dağılyan pınar — Acıgöl, 836 m, southwest Anatolia, XI. 1945 (C. Kosswig coll.).
7. Düzce — in northwest Anatolia, 11. IX. 1946 (B. Alkan coll.).
8. Emir gölü — south of Ankara, 9. III., 20. IV. 1947 (C. Kosswig coll.).
9. Edirne — Meriç Nehri and pools near the river, 8.—13. VI. 1947 (Exp. Nat. Mus.).
10. Mollafeneri — northwest Anatolia, north of the Bay of İzmit, 21. VI. 1947 (Exp. Nat. Mus.).
11. Gerede — in northwest Anatolia, 22. VI. 1947 (Exp. Nat. Mus.).
12. Çamlıdere — İşik dağları, 900 m, Central Anatolia, 23. VI. 1947 (Exp. Nat. Mus.).

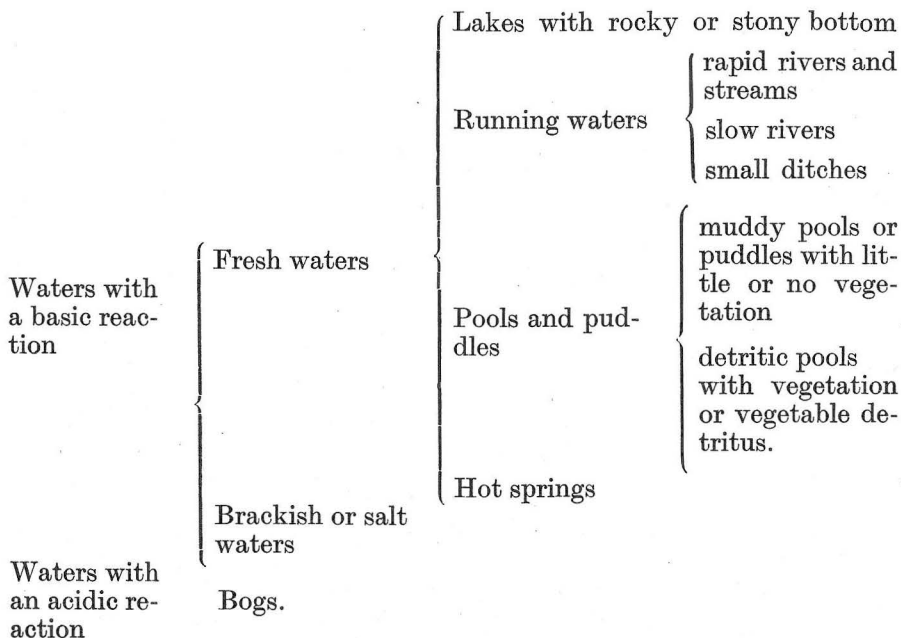
13. Beynam — southeast of Ankara, 28. VI. 1947 (Exp. Nat. Mus.).
14. Ahlat — on northwestern shore of the Van gölü, 1720 m, 30. VI. 1947 (C. Kosswig coll.).
15. Nazik gölü — northwest of the Van gölü, 1870 m, 2. VII. 1947 (C. Kosswig coll.).
16. Ankara-Baraj — 3.—4. VII. 1947 (Exp. Nat. Mus.).
17. Arin gölü — 1720 m, north of the Van gölü, 5. VII. 1947 (C. Kosswig coll.).
18. Moğan gölü — south of Ankara, 8.—12. VII. 1947 (Exp. Nat. Mus.).
19. Zeylan — valley north of the Van gölü, 13. VII. 1947 (C. Kosswig coll.).
20. Ayaş (Abdüsselam dağı) — 600 m, Central Anatolia, 17. VII. 1947 (Exp. Nat. Mus.).
21. Erçek gölü — 1890 m, east of the Van gölü, 20. VII. 1947 (C. Kosswig coll.).
22. Edremit — on the eastern shore of the Van gölü, 1720 m, 20. VII. 1947 (C. Kosswig coll.).
23. Çağırğan — Central Anatolia, northwest of Kırşehir, 22. VII. 1947 (Exp. Nat. Mus.).
24. Erciyes dağ — 1800 m, 24. VII. 1947 (Exp. Nat. Mus.).
25. Ulukışla — 1300 m, on the northern slopes of the Middle Taurus in the area of the Bulgar dağ, 28. VII. 1947 (Exp. Nat. Mus.).
26. Bürücek — plateau in the Middle Taurus between Bulgar dağ and Ala dağ, 29.—31. VII. 1947 (Exp. Nat. Mus.).
27. Sivrice — Hazer gölü 1115 m, vilâyet Elâzığ, 30. VII. 1947 (C. Kosswig coll.).
28. Taşçı — south of Adana on the river Seyhan, 4. VIII. 1947 (Exp. Nat. Mus.).
29. Beyşehir — southwest Anatolia, 5. VIII. 1947 (C. Kosswig coll.).
30. Obruk — south of Tuz gölü, 6. VIII. 1947 (C. Kosswig coll.).
31. Abacılar — settlement near the river Çakıt northwest of the town of Adana, 6. and 7. VIII. 1947 (Exp. Nat. Mus.).
32. Suluhan — in the Central zone of the East Taurus, 1000 m, 10.—11. VIII. 1947 (Exp. Nat. Mus.).
33. Gyaur dağ — east of the Bay of İskenderun (locality on the eastern slope about 15 km from Fevzipaşa, 900 m — 16. VIII. 1947 (Exp. Nat. Mus.).
34. Kilis — at the northwestern frontier of Syria, 20. VIII. 1947 (Exp. Nat. Mus.).
35. Afrin River — east of the settlement of Musabeyli, at the northwestern frontier of Syria, 20. VIII. 1947 (Exp. Nat. Mus.).
36. Alacakilise — east of İslâhiye, 700 m, 21. VIII. 1947 (Exp. Nat. Mus.).
37. Mersin — on the southeast Turkish coast of the Mediterranean Sea, 25. VIII. 1947 (Exp. Nat. Mus.).
38. Erdemli — west of Mersin, 27. VIII. 1947 (Exp. Nat. Mus.).
39. Alahan — between Mut and Silifke, in riverbasin of Göksu, 900 m, 29. VIII. 1947 (Exp. Nat. Mus.).

40. Yeniköy — on the northern slopes of the Middle Taurus, 900 m, 30. VIII. 1947 (Exp. Nat. Mus.).
41. Konya — Central Anatolia, 31. VIII. 1947 (Exp. Nat. Mus.).
42. Kızılviran — west of Konya, 2. IX. 1947 (Exp. Nat. Mus.).
43. Beyşehir gölü — southwest Anatolia, 3. IX. 1947 (Exp. Nat. Mus.).
44. Akşehir gölü — southwest Anatolia, 4. IX. 1947 (Exp. Nat. Mus.).
45. Işaklı — in West Anatolia between Akşehir and Afyonkarahisar, 5. IX. 1947 (Exp. Nat. Mus.).
46. Sivrihisar — southwest of Ankara, 7. IX. 1947 (Exp. Nat. Mus.).
47. Kızılcahamam — north of Ankara, 14. IX. 1947 (Exp. Nat. Mus.).
48. Bursa — western Anatolia (HORVÁTH 1883).
50. Aydın — western Anatolia (HORVÁTH 1901).
50. Hamidiye — central Anatolia (HORVÁTH 1901).
51. Artvin — northwestern Anatolia (KIRITSHENKO 1918).
52. Büyük Ağrı (Ararat) — eastern Anatolia (KIRITSHENKO 1918).
53. Maraş — southeastern Anatolia (HORVÁTH 1919, FAHRINGER 1922).
54. Bulgar dağ, Turunçlu — Middle Taurus (LINDBERG 1922a).
55. Baba dağ — western Anatolia (LINDBERG 1922a).
56. İzmir — (LINDBERG 1922a, POISSON 1925, KERVILLE 1939).
57. Ilica — (LINDBERG 1922a).
58. Menemen — west Anatolia (LINDBERG 1922a).
59. Sarayköy — west Anatolia (LINDBERG 1922a).
60. Yamanlar dağları — western Anatolia (LINDBERG 1922a).
61. Ulu dağ — western Anatolia (FAHRINGER 1922).
62. Sapanca gölü — northwestern Anatolia (FAHRINGER 1922).
63. Adana — southern Anatolia (FAHRINGER 1922).
64. Tercan — northeastern Anatolia (KIRITSHENKO 1924).
65. Ankara — (Poisson 1925, 1927, 1933b, KERVILLE 1939).
66. Erzurum — northeastern Anatolia (HUNGERFORD 1933).
67. İstanbul-Acı Badem (JACZEWSKI 1934).
68. İskenderun — southern Anatolia (COSTA 1874).

Biotopes of the Aquatic and Semiaquatic Heteroptera in Turkey.

The living conditions in the localities where the material of *aquatic* and *semiaquatic Heteroptera* was collected differed very much and included a large part of the known types of continental waters. Besides several large lakes and rivers there were mostly water formations with a small or tiny water area. In the following survey I list the types*) of the waters in some of the regions of Turkey, where we collected this material on the expedition.

*) After BALFOUR-BROWNE F., 1940, and BROWN E. S. 1943.



Lakes with Rocky or Stony Bottom.

Beyşehir gölü — (fig. 76) fresh water lake with an area of 650 sq. km, situated at an altitude of 1160 m. The depth of the lake varies greatly, but does not exceed 10 m. The lake forms countless Alpine fjords with an abundant vegetation. About the reeds was found:

Sigara (Sigara) striata (LINN.).

C. Kosswig found in the lake besides this species also two other species:

Corixa punctata (ILL.)

Corixa affinis LEACH.

Rapid Rivers and Streams.

Gerede — stony, fairly rapid stream, forming numerous calm waters and bays. Without vegetation. On and near the water were found:

<i>Saldula variabilis</i> (H. SCH.)	25%
<i>Saldula amplicollis</i> (REUT.)	25%
<i>Gerris (Gerris) lacustris</i> (LINN.)	25%
<i>Hydrometra stagnorum</i> (LINN.)	25%

Çamlidere — stony stream, at an altitude of about 900 m, with many overfalls and calms. *Heteroptera* were found only on the surrounding grass:

Saldula amplicollis (REUT.).

Ayaş — very narrow stream flowing in a rocky defile, at an altitude of about 600 m. The stream forms many overfalls and calms and is without any vegetation. On the stones was found:

<i>Saldula variabilis</i> (H. SCH.)	53,57%
<i>Hydrometra stagnorum</i> (LINN.)	46,43%

Bürücek — stream in the region of coniferous trees (1200 m), flowing in a limestone valley. The bed of stream is exclusively stony, without any vegetation, and the water forms many pools and overfalls of considerable swiftness. The width of the stream varies between 1 and 2 m. On large flat stones exposed to direct insolation many representatives of *Shore Bugs* were found:

<i>Ochterus marginatus</i> (LATR.)	28,57%
<i>Saldula variabilis</i> (H. SCH.)	14,29%
<i>Saldula melanoscela</i> (FIEB.)	28,57%
<i>Saldula hirsuta</i> (REUT.)	28,57%

In one of the pools of this stream was caught one specimen of the species: *Sigara (Vermicorixa) lateralis* (LEACH).

Where the stream flows through parts of the valley heavily overgrown with plane-trees, a waterfall over tuffs, about 3 m high, falls into the stream. All around the stones are heavily overgrown with moss, and the lower part of the whole growth is strongly calcified and forms extensive passages. The passages and hollows were filled with small *Carabidae* and *Staphylinidae*. In this environment moved also great quantities of *Velia*, and it is very interesting that in the whole length of the stream examined, which seemed to be so typical for torrenticol animals such as are the members of the family Veliidae, not one single specimen was found. Two species of the genus *Velia* were collected:

<i>Velia nervosa</i> HORV.	3,0%
<i>Velia filippii</i> TAM.	96,5%

Hydrometra stagnorum (LINN.) 0,5% in a humid environment, in the neighbourhood of the waterfall.

Suluhan (11. VIII. 1947) — (fig. 77) strong stream flowing in a deep valley overgrown predominantly with oleanders and pines. The width of the stream varies between one and two meters; it flows in the dense shade of plane-trees and forms many overfalls, backwaters and calms. The bottom is largely stony with many large boulders, and sand is accumulated in the bends. The depth of the stream varies and rises in the pools to more than $\frac{1}{2}$ m. There is no proper vegetation in the stream.

In the places of the strongest current and hard on the overfall of the water moved great numbers mainly of pairing *Gerris (Aquarius) ventralis* (FIEB.). Except for a few specimens they were *apterous forms*. It is interesting that in the whole length of the course explored of the stream of this region no member of the genus *Velia* was found. The only insect co-inhabitant of the running sections of the stream was *Gyrinus* spp.

In the sandy, somewhat moderately flowing bends in very shallow water (cca 10—15 cm) occurred:

Micronecta (Micronecta) wui alkani ssp. n.

Kilis — (fig. 78) narrow ravine on whose bottom flows a stream, here and there quite rapidly, forming many overfalls and basins arranged in steps one above the other, filled with sand and detritus. The vegeta-

tion is very poor and occurs only on the rims of the different basins. The following species of *Heteroptera* were found in the basins.

<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	9,25%
<i>Sigara (Vermicorixa) nigrolineata</i> (FIEB.)	14,85%
<i>Anisops sardea sardea</i> H. SCH.	75,90%

On the surface near the bank were found two species of *water-striders*:

<i>Microvelia hozari</i> sp. n.	97,58%
<i>Gerris (Gerris) lacustris</i> (LINN.)	2,42%

Alacakilise — (fig. 79) stream in gentle hill country (cca 700 m) with bushy, scanty growths of green oaks. Here and there the stream runs quite rapidly and its width varies around 1 m. The stony bottom alternates in the bends with alluvial sand. There is no proper vegetation in the stream. The only insect inhabiting this running water was *Micronecta (M.) wui alkani* ssp. n., which was very abundant near the bank to a depth of about 15 cm.

On the sandy and stony bank around the water we found only:

<i>Ochterus marginatus</i> (LATR.)	30,76%
<i>Hebrus pusillus</i> (FALL.)	69,24%

Slow Rivers.

Edirne — Meriç Nehri (Marica River) about 7 km North of Edirne on the Turkish-Bulgarian-Greek frontier itself. The river flows through very low terrain (about 60 m above sea level) and forms many bends. The river itself is in these places very shallow, and the bottom is sandy, here and there composed of small stones. The course of the river is very slow. At the bank, only to a distance of about $1\frac{1}{2}$ m, where the water was about 15 cm deep, moved a minute *Corixid*:

Micronecta (M.) vitticeps HORV.

Ankara-Baraj — Ankara (Çubuk), steppe river with muddy bank. The difference of the water level in summer and winter is very striking. At the outflow from the dam (Baraj) north of Ankara the river is fairly rapid and flows through cultivated land.

In the considerably rapid course was caught 1 specimen:

Notonecta viridis viridis DELC.

On the surface two species of the genus *Gerris*:

<i>Gerris (Gerris) costae</i> (H. SCH.)	64,68%
<i>Gerris (Gerris) thoracicus</i> SCHUMM.	35,32%

Çagırgan — broad stream with gently running water, with strongly overgrown banks and dense aquatic vegetation. The stream forms many muddy pools. In the water were found two species of *Heteroptera*:

<i>Notonecta obliqua obliqua</i> GALL.	66,70%
<i>Notonecta viridis viridis</i> DELC.	33,30%

On the surface of the running water the following species were found:

<i>Gerris (Gerris) costae</i> (H. SCH.)	33,40%
<i>Gerris (Gerris) lateralis</i> SCHUMM.	5,55%
<i>Hydrometra stagnorum</i> (LINN.)	61,05%

Taşçı — free broad current of the River Seyhan, about 7 km south of Adana. In the bends in the backwaters lived two species of the genus *Gerris*:

<i>Gerris (Aquarius) paludum</i> (FAB.)	95,24%
<i>Gerris (Aquarius) ventralis</i> (FIEB.)	4,76%

Abacılar (7. VIII. 47) — (fig. 80) Çakıt River near the village of Abacılar, running already in the Adana lowland. The river flows in a sandy bed and has a very small fall. At the river in very shallow water were found:

<i>Micronecta (M.) perplexa</i> HORV.	66,67%
<i>Micronecta (M.) wui kosswigi</i> ssp. n.	33,33%

On the bank were found:

<i>Ochterus marginatus</i> (LATR.)	7,05%
<i>Hebrus pusillus</i> (FALL.)	92,95%

Afrin — (fig. 81) the river east of the village of Musabeyli flows through a region of stony steppe. Here and there it flows in a completely stony bed, and in the bends is alluvial sand. The river is very shallow and has a gentle flow, and in the period of summer drought it often dries up. Where there is a sandy bank occur at a very small distance from the bank:

<i>Micronecta perplexa</i> HORV.	4,55%
<i>Micronecta wui kosswigi</i> ssp. n.	95,45%

In the pools on the bank were found:

<i>Hebrus pusillus</i> (FALL.)	75,00%
<i>Microvelia hozari</i> sp. n.	25,00%

İşaklı — large stream considerably overgrown with vegetation, running from the South into the Eber Lake. The course of the water is very slow and here and there it forms large pools. In the standing pools a number of aquatic *Heteroptera* was found:

<i>Corixa punctata</i> (ILL.)	2,94%
<i>Corixa affinis affinis</i> LEACH	61,76%
<i>Sigara (Sigara) striata</i> (LINN.)	1,96%
<i>Sigara (Sigara) albiventris</i> (HORV.)	5,88%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	2,94%
<i>Notonecta glauca glauca</i> LINN.	1,96%
<i>Notonecta viridis mediterranea</i> HUTCH.	18,64%
<i>Ilyocoris cimicoides</i> (LINN.)	3,92%

Of semiaquatic *Heteroptera* only one specimen of *Hydrometra stagnorum* (LINN.) was found.

Small Ditches.

Erci yas dağ — tiny streamlet flowing through a mountain meadow at an altitude of about 1800 m. In the muddy bank was found:

Nepa cinerea LINN.

In the grassy land around the streamlet:

Saldula pallipes (FAB.).

Yeniköy — very narrow stream with stony bottom in meadow land. On the water were found:

Velia nervosa HORV.

On the grass around the stream:

Saldula amplicollis (REUT.)

Konya — (fig. 82) irrigation canal leading across the steppe, here and there with slightly running water, here and there with completely standing water. Bottom of the irrigation canal muddy, without vegetation. The following species of aquatic *Heteroptera* were found:

<i>Corixa affinis affinis</i> LEACH.....	18,86%
<i>Corixa panzeri</i> (FIEB.).....	10,38%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH).....	68,68%
<i>Ranatra linearis</i> (LINN.).....	1,04%
<i>Ilyocoris cimicoides</i> (LINN.).....	1,04%

Muddy Pools with Little or no Vegetation.

Edirne — The Marica River forms in the section between Svilengrad and Edirne many arms and pools. The banks on both sides of the river are throughout very low. The pools on the Turkish side are very shallow and are filled with alluvial mud. The fauna of aquatic *Heteroptera* seems to be very poor in these pools in a number of species, but the dominant species occurred in very large numbers:

<i>Sigara (Vermicorixa) lateralis</i> (LEACH).....	99,36%
<i>Sigara (Vermicorixa) nigrolineata</i> (FIEB.).....	64%

On the surface of these pools were represented 3 species of the family *Gerridae*:

<i>Gerris (Gerris) thoracicus</i> SCHUMM.	6,70%
<i>Gerris (Gerris) gibbifer</i> SCHUMM.	13,35%
<i>Gerris (Aquarius) paludum</i> (FAB.).....	79,95%

The pools on the bank were separated from the river proper by sand. Here the only representative of the family *Saldidae* was, with several forms:

Saldula arenicola (SCHOTZ).

Beynam — muddy spring with off-flow, situated in meadow land. In the water was found:

Notonecta viridis mediterranea HUTCH.

Of the family *Gerridae* was found on the surface only one specimen of:

Gerris (Gerris) costae (H. SCH.).

In the grassy land around was found:

Saldula amplicollis (REUT.).

Abacılar (6. VIII. 1947) — puddle in the ditch beside the road, considerably dirty and muddy. Three species of *aquatic Heteroptera* were found:

<i>Corixa affinis affinis</i> LEACH.	5,60%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	83,25%
<i>Anisops sardea sardea</i> H. SCH.	11,15%

Suluhan (10. VIII. 1947) — very shallow puddle fed in part by an unfar spring, situated beside a mountain path at an altitude of about 1000 m. The puddle spills over into its grassy neighbourhood, and has itself quite a rich vegetation. On this tiny water area 12 species of *aquatic* and *semi-aquatic Heteroptera* were found:

<i>Corixa punctata</i> (ILL.)	1,35%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	4,05%
<i>Sigara (Vermicorixa) nigrolineata</i> (FIEB.)	33,75%
<i>Anisops sardea sardea</i> H. SCH.	24,30%
<i>Notonecta glauca hybrida</i> POISS.	16,25%
<i>Notonecta viridis mediterranea</i> HUTCH.	16,25%
<i>Plea leachi</i> MAC GREGOR	4,05%

On the surface species of four families were found:

<i>Hebrus pusillus</i> (FALL.)	16,65%
<i>Microvelia hozari</i> sp. n.	16,65%
<i>Gerris (Gerris) thoracicus</i> SCHUMM.	55,60%
<i>Gerris (Gerris) argentatus</i> SCHUMM.	5,55%
<i>Hydrometra stagnorum</i> (LINN.)	5,55%

Detritic Pools with Vegetation or Vegetable Detritus.

Mollafeneri — (fig. 83) maintained well, covered in part with vegetation. The bottom is covered with vegetable detritus. The following species of *Heteroptera* were found:

<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	64,31%
<i>Notonecta glauca hybrida</i> POISS.	7,18%
<i>Notonecta obliqua obliqua</i> GALL.	21,37%
<i>Notonecta obliqua meridionalis</i> POISS.	7,14%

On the surface was found:

Gerris (Gerris) costae (H. SCH.).

Ulukışla — small well of an area of about one square meter; slightly overgrown around. Bottom covered with vegetable detritus. Two species of the family *Gerridae* were found:

<i>Gerris (Gerris) costae</i> (H. SCH.)	88,89%
<i>Gerris (Aequarius) paludum</i> (FAB.)	11,11%

Hot Springs.

Armutlu — many hot springs (24°, 38°—44° C), which distinctly warm the area and especially the surrounding mud. These hot springs are in a narrow valley about 3 km inland from the coast of the Marmara Sea.

The springs are drained by a stream, which is already considerably cooled. (After a written communication from Prof. Dr C. Kosswig of İstanbul.)

In the water and mud in the area of these hot springs C. Kosswig collected the following species of *Heteroptera*:

Micronecta (M.) wui alkani ssp. n. — stream draining the springs.

Sigara (Vermicorixa) lateralis (LEACH) — 38°—44° C.

Sigara (Vermicorixa) nigrolineata (FIEB.) — 24° C.

Hebrus pusillus (FALL.) — hot mud.

Brackish and Salt Water.

Mogan gölü — salt lake, about $4,5 \times 0,75$ km of water surface, situated in a region about 960 m above sea level. The salinity of this lake varies from 1‰ (in spring) to 4‰ (in autumn). The depth of the lake is in spring 4 m, at the end of summer, however, the level is markedly lowered. Southeastern shore stony and sandy, without vegetation. South-western corner of the lake sandy, with abundant vegetation. In the North the lake is muddy and heavily overgrown. Most of the material comes from the southwestern corner of the lake, only *Callicorixa concinna* (FIEB.) was collected in the southeastern part of the lake in shore alluvium.

The following species were collected:

<i>Cymatia rogenhoferi</i> (FIEB.)	6,40%
<i>Corixa affinis</i> LEACH.	1,25%
<i>Corixa panzeri</i> (FIEB.)	0,75%
<i>Callicorixa concinna</i> (FIEB.)	8,05%
<i>Sigara (Sigara) striata</i> (LINN.)	0,75%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	64,40%
<i>Notonecta viridis viridis</i> DELC.	0,75%
<i>Notonecta viridis mediterranea</i> HUTCH.	0,25%
<i>Plea leachi</i> MAC GREGOR	17,40%

On the shore sand was found in one specimen *Chartoscirta cocksi* (CURT.) and *Saldula arenicola* (SCHOLTZ) in numerous forms and considerable numbers.

Akşehir gölü — swampy lake without outlet, with brackish water, of an area of 110 sq. km, at an altitude of 970 m. The shores of the lake are very flat and densely overgrown with reed. The level of the lake varies greatly, depending on precipitations. On the dry mud among the reeds was found with a greater number of species of small *Carabidae* one species of *Heteroptera*: *Saldula arenicola* (SCHOLTZ).

Mersin — (fig. 84) pool with brackish water in a sandy area, about 2 m from the surf zone of the sea. The fauna of aquatic *Heteroptera* was represented by:

<i>Sigara (Subsigara) samani</i> sp. n.	2,70%
<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	48,65%
<i>Anisops sardea sardea</i> H. SCH.	48,65%

On the surface was found one species only of the family *Gerridae*:

Gerris (Aquarius) paludum (FAB.)

Erdemli — (fig. 85), tiny puddle with brackish water as remnant of a completely dried-up stream, about 8 m from the sea in completely stony terrain. The bottom is muddy, on one side of the puddle is scanty vegetation. In the water besides several species of *Dytiscidae* were found three species of *Heteroptera*, of which the dominant one occurred in a great number of specimens:

<i>Sigara (Vermicorixa) lateralis</i> (LEACH.)	2,11%
<i>Sigara (Halicorixa) mayri</i> (FIEB.)	76,98%
<i>Anisops sardea sardea</i> H. SCH.	29,91%

At the rim in the scanty vegetation was found:

Mesovelis vittigera HORV.

Bogs.

Gyaurları — mountain spring, whose water spills over and forms a bog. In the bog vegetation and under numerous stones were found 3 species of *Heteroptera*:

<i>Leptopus hispanus</i> RAMB.	14,30%
<i>Chartoscirta cocksi</i> (CURT.)	14,30%
<i>Hydrometra stagnorum</i> (LINN.)	71,40%

Alahan — mountain spring with the water spilling widely and forming a bog overgrown with *Carex* sp. Under the stones and on the small water surfaces between the stones and timothy grass tufts were found 2 species of *Heteroptera*:

<i>Saldula saltatoria</i> (LINN.)	29,20%
<i>Hebrus pusillus</i> (FALL.)	70,80%

Kızılviran — mountain spring gathered in a stone reservoir to water cattle. The overflowing water forms a swamp overgrown with timothy grass tufts. In the basins the following species of *aquatic Heteroptera* were found:

<i>Corixa affinis</i> LEACH.	17,73%
<i>Corixa panzeri</i> (FIEB.)	2,39%
<i>Corixa dentipes</i> (THOMS.)	0,62%
<i>Sigara (Vermicorixa) nigrolineata</i> (FIEB.)	0,62%
<i>Notonecta viridis mediterranea</i> HUTCH.	26,68%
<i>Plea leachi</i> MAC GREGOR	51,96%

The following species were found in the surrounding swampy terrain and on the overgrown puddles:

<i>Saldula saltatoria</i> (LINN.)	5,57%
<i>Chartoscirta cocksi</i> (CURT.)	5,72%
<i>Hebrus pusillus</i> (FALL.)	22,22%
<i>Microvelia pygmaea</i> (DUF.)	60,92%
<i>Gerris (Gerris) lateralis</i> SCHUMM.	1,85%
<i>Hydrometra stagnorum</i> (LINN.)	3,72%

Sivrihisar — stone trough with water flowing through to water the cattle, in a swamp. The following *Heteroptera* were found in the trough:

<i>Sigara (Vermicorixa) lateralis</i> (LEACH)	6,07%
<i>Sigara (Vermicorixa) nigrolineata</i> (FIEB.)	90,90%
<i>Notonecta viridis mediterranea</i> HUTCH.	3,03%

In the vegetation was collected: *Saldula pallipes* (FAB.).

Through most of the species of *aquatic* and *semiaquatic* *Heteroptera* listed for the fauna of Turkey are *eurytopic* species, we found several species proper to a certain biotope:

Running water, whether smaller stream (Suluhan, Kilis, Alacakilise) with stony or sandy bed, or longer rivers (Çakıt, Afrin) mostly with a sandy bottom, have the following species in common:

- Micronecta (M.) perplexa* HORV. (2)*
- Micronecta (M.) wui alkani* ssp. n. (2)
- Micronecta (M.) wui kosswigi* ssp. n. (2)
- Micronecta (M.) vitticeps* HORV. (1)
- Velia nervosa* HORV. (1)
- Gerris (Aquarius) ventralis* (FIEB.) (2)

These species may be regarded as species limited exclusively to running water, the species of *Micronecta* besides to a sandy substratum with a very shallow depth of water. In consideration to these few *torrenticol* species a great number were found in standing water only.

- Cymatia rogenhoferi* (FIEB.) (1)
- Corixa punctata* (ILL.) (2)
- Corixa affinis affinis* LEACH (5)
- Corixa panzeri* (FIEB.) (2)
- Corixa dentipes* (THOMS.) (1)
- Callicorixa concinna* (FIEB.) (1)
- Sigara (Subsigara) samani* sp. n. (1)
- Sigara (Sigara) striata* (LINN.) (3)
- Sigara (Sigara) albiventris* (HORV.) (1)
- Sigara (Vermicorixa) nigrolineata* (FIEB.) (5)
- Sigara (Halicorixa) mayri* (FIEB.) (1)
- Anisops sardea sardea* H. SCH. (4)
- Notonecta glauca hybrida* POISS. (2)
- Notonecta obliqua meridionalis* POISS. (1)
- Plea leachi* MAC GREGOR (3)
- Ilyocoris cimicoides* (LINN.) (2)
- Gerris (Gerris) gibbifer* SCHUMM. (1)

There is quite a number of species common to localities with running water and stagnant water:

- Sigara (Vermicorixa) lateralis* (LEACH) (running water 1, stagnant water 11)
- Notonecta obliqua obliqua* DELC. (running water 1, stagnant water 1)
- Notonecta viridis viridis* DELC. (running water 2, stagnant water 1)
- Notonecta viridis mediterranea* HUTCH. (running water 1, stagnant water 5)

*) Indicates the number of localities.

Hebrus pusillus (FALL.) (Running water 1, stagnant water 5)
Microvelia hozari sp. n. (Running water (?) 1, stagnant water 2)
Gerris (*Gerris*) *costae* (H. SCH.) (running water 3, stagnant water 2).
Gerris (*Gerris*) *thoracicus* SCHUMM. (running water 1, stagnant water 2)
Gerris (*Aquarius*) *paludum* (FAB.) (running water 1, stagnant water 2)

A number of species was found in swamp. As true *helocrenous* species we may regard the following three:

?*Leptopus hispanus* RAMB. (1)
Saldula saltatoria (LINN.) (2)
 ?*Chartoscirta cocksi* (CURT.) (2)

The other species found in swamps were:

Hebrus pusillus (FALL.) (2)
Gerris (*Gerris*) *lateralis* SCHUMM. (1)
Hydrometra stagnorum (LINN.) (2).

In strongly salt water on the shore of the Mediterranean Sea several species of *aquatic Heteroptera* were found:

Sigara (*Subsigara*) *samani* sp. n.
Sigara (*Vermicorixa*) *lateralis* (LEACH.)
Sigara (*Halicorixa*) *mayri* (FIEB.)
Anisops sardea sardea H. SCH.
Mesovelia vittigera HORV.

As true *halobiontes* we may, however, regard only:

?*Sigara* (*Subsigara*) *samani* sp. n.
Sigara (*Halicorixa*) *mayri* (FIEB.).

On sandy and stony terrain without vegetation the following species were found:

Hebrus pusillus (FALL.) (2)
Ochterus marginatus (LATR.) (4)
Saldula variabilis (H. SCH.) (3)
Saldula melanoscela (FIEB.) (1)
Saldula hirsuta (REUT.) (1)
Saldula arenicola (SCHOTZ) (3)

Species found exclusively on dense vegetation are:

Saldula amplicollis (REUT.) (3)
Saldula pallipes (FAB.) (2).

Remarks on the Distribution of the Species with Regard to the South-West Asia.

By the present finds the number of *aquatic* and *semiaquatic Heteroptera* in Turkey was increased to 69 species and 9 forms. Of the 29 genera found in Turkey not one has an endemic distribution for Anatolia or at last for the South-West Asia. They are genera with a wide geogra-

phical distribution, and the greater part of the *aquatic* and *semiaquatic* *Heteroptera* is identical with the fauna of Central Europe. Only 3 genera found in Anatolia do not extend their distribution to Central Europe, but their representatives have been found in the Balkans or in the whole Mediterranean area. They comprise the genus *Anisops* SPIN., whose species *sardea* H. SCH. is distributed all through the Mediterranean and South-Western Asia. It is an Ethiopic element with northeastern spread. In South-Western Asia occurs as a further species of this genus *Anisops varia scutellaris* FIEB. (Sinai Peninsula, FIEBER 1852, Palestine, PUTON 1881, HUTCHINSON 1929, BODENHEIMER 1937). Some years ago another species, *Anisops persica* LINDB. 1941 (KAISER 1940) was described from Iran (Bushir). A great number of species of the genus *Anisops* is known from the Ethiopian region, Palaearctic Africa, from southern Palaearctic Asia, the whole oriental region, and Australia, New Zealand and some Pacific islands. *Anisops* is a genus of East Gondwana origin. The genus *Lethocerus* MAYR with one palaearctic species *niloticus* STÅL, is listed from the Mediterranean regions of Anatolia. Its distribution in the Eastern Mediterranean extends from Iran, where it is regarded already as a western element. It has also been found in Arabia, Iraq, Egypt, the Sudan and East Africa. The genus *Ochterus* LATR. represented by many species in all parts of the world extends into Asia Minor with the one, widely distributed species *O. marginatus marginatus* (LATR.). The distribution of this species extends through the whole Mediterranean region to India and the Far East.

All other genera of *aquatic Heteroptera* are represented also in Central Europe. Several species or subspecies of the genus *Micronecta* KIRK. have been found up till now only in Anatolia. They are *Micronecta* (*M.*) *anatolica* LINDB. 1922, *Micronecta* (*M.*) *wui alkani* ssp. n., and *M.* (*M.*) *wui kosswigi* ssp. n. Into Turkish Thracia *M.* (*M.*) *vitticeps* HORV. extends from the more northern Balkans. *M.* (*M.*) *perplexa* HORV. is an East Mediterranean species with northwestern spread. It was found in Anatolia, in Trans-Caucasia and in Hungary. In the following table I give a survey of the species from South-West Asia of the genus *Micronecta* KIRK.

Cymatia rogenhoferi (FIEB.), species of southeastern distribution with northwestern spread is probably generally distributed in Turkey, through hitherto it has been found in three localities only. Besides Turkey it has been found in South-West Asia in Seistan (HUTCHINSON 1940) and in Trans-Caucasia together with *C. bonsdorfii* (C. SHLB.) and *coleoptrata* (FAB.) The genus *Sigara* FABRICIUS is represented in Anatolia by 9 species of 5 subgenera. Some species may be considered very characteristic for the whole of this region. These are two very closely related species: *Sigara* (*Subsigara*) *kervillei* (POISSON) from the region of Ankara, and *S.* (*Subsigara*) *samani* sp. n. from the coast of the Mediterranean Sea. As an Irano-Turanian element from the genus *Sigara* FAB. in the fauna of Turkey has to be mentioned *Sigara* (*Sigara*) *albiventris* (HORV.). The hitherto known localities have been listed from Syria (HORVÁTH 1911, JACZEWSKI 1928) and Trans-Caucasia (POISSON 1939b). Işaklı in the western portion of Central Anatolia is a new locality, the westernmost of its occurrence. Of the East Mediterranean elements of

	Turkey							Trans-Caucasia	Iran	Palestine	Arabia (Aden)	Bosnia	Hungary
	Menemen	Armutlu	Edirne	Abacilar	Suluhan	Afrin	Alacakilise						
M. (M.) anatolica LINDB.	×							×					
M. (M.) mesmini POISS.								×					
M. (M.) perplexa HORV.				×		×		×					×
M. (M.) isis HORV.										×			
M. (M.) wui alkani ssp. n.		×			×		×						
M. (M.) w. kosswigi ssp. n.				×		×							
M. (M.) w. seistanica HUTCH.									×				
M. (M.) minutissima (LINN.)										×			
M. (M.) vitticeps HORV.			×									×	
M. (?) parvula LINDB.										×			
M. (?) plicata (COSTA)										×			
M. (?) annandalei HORV.										×			
M. (?) perparva HORV.										×			
M. (B.) s. scutellaris (STÅL)											×		
M. (Dich.) scholtzi (FIEB.)								×					
M. (Dich.) desertana DIST.									×				

the family *Corixidae* are represented in the fauna of Anatolia: *Sigara* (*Sigara*) *assimilis* (FIEB.) and *Sigara* (*Halicorixa*) *mayri* (FIEB.). Both species show signs of a northwestern spread. The other species of the genus *Sigara* FAB. and of the genus *Corixa* GEOFFR. found in Anatolia are identical with the fauna of Central Europe. Some species prove that various parts of Anatolia belong to the Irano-Turanian and Eremic regions: the Eremic element *Heliocorisa vermiculata* (PUT.) is listed for Turkey (POISSON 1926) without more detailed indication. It will undoubtedly be found also in Anatolia, for it has been listed from Trans-Caucasia (POISSON 1939b), Basra (JACZEWSKI 1927), and Seistan (HUTCHINSON 1940). In the Ilgaz dağları is the westernmost locality found up till now of the distribution of the species *Hesperocorixa occulta* (LUNDBL.); this is the fourth locality of this species in the mountain zone of South-West Asia. All localities, northeastern Afghanistan, Eastern Buchara and Indian Tibet are situated at greater altitudes above sea-level. Also the Turkish specimens were found at a considerable altitude (2300 m). It is an Irano-Turanian element.

In the following table I give a survey of the distribution of the family *Corixidae* in South-Western Asia.

The genus *Notonecta* LINN. is represented in Asia Minor by species and subspecies, most of which have a Palaemediterranean distribution. *Notonecta maculata* FAB. has been found in Turkey up till now at Istanbul. Its distribution goes from Baluchistan to the coast of the Atlantic Ocean (England). Also *Notonecta glauca hybrida* POISS. *N. obliqua meridionalis* POISS. and *N. viridis mediterranea* HUTCH. are Palaemediterranean species. The former was listed also from northern Iran (MOUGEL 1937), and *N. obliqua meridionalis* POISS. from Kashmir.

Survey of the Distribution of the Cymatinae

	Turkey											
	Bursa	Turunçlu	Izmir	Ulu dağ	Ankara	İlgaz dağ	Van gölü	Armuthu	Aeğöl	Emir gölü	Edirne	Mollafeneri
<i>Cymatia coleoptrata</i> (FAB.)												
<i>Cymatia bornsdorffi</i> (C. SHLB.)												
<i>Cymatia rogenhoferi</i> (FIEB.)										×		
<i>Helicorisa vermiculata</i> (PUT.)												
<i>Corixa punctata</i> (ILL.)	×		×	×	×	×			×	×		
<i>Corixa affinis affinis</i> LEACH			×		×				×			
<i>Corixa panzeri</i> (FIEB.)									×	×		
<i>Corixa dentipes</i> (THOMS)												
<i>Corixa jakovlevi</i> (HORV.)												
<i>Callicorixa preusta</i> (FIEB.)												
<i>Callicorixa concinna</i> (FIEB.)									×	×		
<i>Callicorixa caspica</i> (HORV.)												×
<i>Callicorixa gebleri</i> (FIEB.)												
<i>Hesperocorixa linnei</i> (FIEB.)					×							
<i>Hesperocorixa occulta</i> (LUNDBL.)						×						
<i>Hesperocorixa sahlbergi</i> (FIEB.)												
<i>Hesperocorixa parallela</i> (FIEB.)												
<i>Arctocorisa carinata</i> (SHLB.)												
<i>Sigara</i> (<i>Parasigara</i>) <i>transversa</i> (FIEB.)												
<i>Sigara</i> (<i>Sigara</i>) <i>striata</i> (LINN.)										×		
<i>Sigara</i> (<i>Sigara</i>) <i>assimilis</i> (FIEB.)							×					
<i>Sigara</i> (<i>Sigara</i>) <i>albiventris</i> (HORV.)												
<i>Sigara</i> (<i>Sigara</i>) <i>seistanensis</i> (DIST.)												
<i>Sigara</i> (<i>Subsigara</i>) <i>falleni</i> (FIEB.)												
<i>Sigara</i> (<i>Subsigara</i>) <i>kervillei</i> (POISS.)												
<i>Sigara</i> (<i>Subsigara</i>) <i>samani</i> sp. n.					×							
<i>Sigara</i> (<i>Subsigara</i>) <i>distincta</i> (FIEB.)												
<i>Sigara</i> (<i>Vermicorixa</i>) <i>lateralis</i> (LEACH.)		×	×		×							
<i>Sigara</i> (<i>Vermicorixa</i>) <i>nigrolineata</i> (FIEB.)			×		×			×			×	×
<i>Sigara</i> (<i>Retrocorixa</i>) <i>limitata</i> (FIEB.)											×	
<i>Sigara</i> (<i>Halicorixa</i>) <i>stagnalis</i> (LEACH)						×						
<i>Sigari</i> (<i>Halicorixa</i>) <i>selecta</i> (FIEB.)												
<i>Sigara</i> (<i>Halicorixa</i>) <i>mayri</i> (FIEB.)												
<i>Sigara</i> (<i>Tropocorixa</i>) <i>choprai</i> (HUTCH.)												

N. glauca glauca LINN., *N. viridis viridis* DELC., and *N. obliqua obliqua* GALLEN are Angaran elements. In the regions of the Middle East these species are listed from Palestine, Northern Iran and Trans-Caucasia (Nachitchevan and Abhazia). *N. g. poissoni* HUNG. and *N. g. kervillei* POISS. may be regarded as endemic subspecies for Anatolia. Further

and *Corixinae* in the South-West Asia.

Turkey													Trans-Caucasia	Northern Iran	South Iran	Syria	Palestine	Iraq	Afghanistan	Baluchistan	Buchara	Indian Tibet	Cyprus
Moğan gölü																							
Erçek gölü																							
Bürücek																							
Abacılar																							
Suluhan																							
Kilis																							
Mersin																							
Erdemli																							
Konya																							
Kızılıran																							
Beyşehir																							
İsaklı																							
Sivrihisar																							
Trans-Caucasia																							
Northern Iran																							
South Iran																							
Syria																							
Palestine																							
Iraq																							
Afghanistan																							
Baluchistan																							
Buchara																							
Indian Tibet																							
Cyprus																							

N. lutea MÜLL. (Trans-Caucasia) and *N. arabiensis* HUNG. (Arabia) have been listed from the other regions of South-West Asia.

The following table gives a survey of the distribution of the family *Pleidae*, *Nepidae*, *Naucoridae* and *Aphelocheiridae* in South-Western Asia:

	Turkey													Trans-Caucasia	Northern-Iran	Iraq	Palestine	Cyprus
	Maras	Menemen	Sapance gölü	Ankara	Aciğöl	Emir gölü	Moğan gölü	Zeylan	Erciyes dağ	Suluhan	Obruk	Konya	Kızıliran	İsaklı	Alata			
<i>Plea leachi</i> MAC GREGOR				×	×	×	×			×			×			×	×	×
<i>Plea letourneuxi</i> SIGN.																×	×	
<i>Nepa cinerea</i> LINN.	×		×		×				×							×	×	
<i>Ranatra linearis</i> (LINN.)		×										×				×	×	
<i>Ranatra vicina</i> SIGN.																×	×	
<i>Ranatra filiformis</i> FABR.																	×	
<i>Ilyocoris cimicoides</i> (LINN.)						×					×	×		×		×	×	
<i>Naucoris maculatus</i> FAB.													×				×	
<i>Apheloch. aestivalis</i> (FAB.)								×									×	
<i>Apheloch. breviceps</i> HORV.															×			
<i>Apheloch. nigrita</i> HORV.															×			
<i>Heleocoris minuscula</i> (WALK.)																	×	

Only the two following species of the family *Leptopodidae* are known from Anatolia and also from other parts of South-West Asia: *Leptopus hispanus* RAMB. from İskenderun, Gyaur dagları and Trans-Caucasia and *Patapius spinosus* (ROSSI) from Abacılar and Trans-Caucasia, Syria and Palestine. *Erianotus lanosus* (DUF.) is known only from Erivan and Palestine. All these species have Palaeomediterranean distribution. The family *Saldidae* is represented in Turkey by 8 species. *Saldula amplicollis* (REUT.), a species with Palaeomediterranean distribution, and *S. hirsuta* (REUT.), an East Mediterranean species, are the only representatives which do not extend into Central Europe. In the following survey I give the distribution of the *Shore Heteroptera* in South-Western Asia.

Among the *water striders* in Turkey several interesting finds were made. The numerous finds of the species *Gerris (Aquarius) ventralis* (FIEB.) in Anatolia are characteristic for the distribution of the East Mediterranean species, which *ventralis* indubitably is (Greece, Cyprus). Also the species *Velia filippii* TAM. must be regarded as an East Mediterranean species. It has been found in Balkans, South Italy and on Rhodos (TAMANINI 1947). *Velia nervosa* HORV. is an Irano-Turanian element, whose finds in the Middle Taurus are hitherto the westernmost ones. Up till now the occurrence of this species had been recorded only from Iran. *Microvelia hozari* sp. n. was found hitherto in some localities of South Anatolia only. The Ethiopian fauna of this group of *Heteroptera* is represented by the species *Mesovelia vittigera* HORV. from Erdemli, on the eastern coast of the Mediterranean Sea. The following table gives a survey of the distribution of the *water-striders* in South-Western Asia.

Whereas most species were found at different altitudes above sea level, without apparent relation to the altitude environment, only one species, *Hesperocorixa occulta* (LUNDBL.), was found which is perhaps

Distribution of the Families Ochteridae, Leptopodidae, Saldidae and Hebridae in the South-West Asia

	Turkey																																							
	Bursa	Aydın	Turunçlu	Baba dağı	İzmir	İlca	Menemen	Sarayköy	Yamanlar dağı.	İskenderun	İlgaz dağı.	Armutlu	Edirne	Gerede	Çamlidere	Beynam	Moğan gölü	Ayaş	Erciyes dağı.	Ulukışla	Bürecek	Hazer gölü	Abacılar	Gyaur dağı.	Afrin	Alacakilise	Alahan	Yeniköy	Kızılören	Akşehir gölü	Sivrihisar	Kızılcahamam	Trans-Caucasia	Syria	Palestine	Sinai	Arabia (Oman)	Cyprus		
<i>Ochterus marginatus</i> (LATR.)	×		×	×				×												×	×	×	×									×	×					×		
<i>Ochterus strigicollis</i> HORV.																											×													
<i>Patapius spinosus</i> (ROSSI)																																								
<i>Leptopus hispanus</i> RMB.											×													×																
<i>Erianotus lanosus</i> (DUF.)																								×																
<i>Omania coleoptrata</i> HORV.																																								
<i>Halosalda lateralis</i> (FALL.)																																								
<i>Salda littoralis</i> (L.)																																								
<i>Salda subcoriacea</i> HORV.		×																																						
<i>Salda muelleri</i> (GMEL.)							×																																	
<i>Saldula variabilis</i> (H. SCH.)									×					×				×																						
<i>Saldula scotica</i> (CURT.)																					×																			
<i>Saldula orthochita</i> (FIEB.)																																								
<i>Saldula saltatoria</i> (L.)											×																													
<i>Saldula melanoscela</i> (FIEB.)																																								
<i>Saldula amplicollis</i> (REUT.)					×				×							×						×																		
<i>Saldula opacula</i> (ZETT.)																																								
<i>Saldula hirsuta</i> (REUT.)																																								
<i>Saldula pallipes</i> (F.)					×	×	×												×																					
<i>Saldula arenicola</i> (SCHOLTZ)						×							×																											
<i>Saldula xanthochila</i> (FIEB.)																																								
<i>Saldula pallidipennis</i> (REUT.)																																								
<i>Teloleuca brancziki</i> (REUT.)																																								
<i>Chartoscirta cineta</i> (H. SCH.)																																								
<i>Chartoscirta elegantula</i> (FALL.)																																								
<i>Chartoscirta longicornis</i> (JAK.)																																								
<i>Chartoscirta cocksi</i> (CURTIS)																																								
<i>Hebrus pusillus</i> (FALL.)			×		×							×																												
<i>Hebrus montanus</i> (KOL.)																																								
<i>Hebrus syriacus</i> (HORV.)																																								

Distribution of the Water-

	Turkey											
	Bursa	Artvin	Ararat	Maras	Turunclu	Baba dag	Izmir	Ilca	Menemen	Saraykoy	Ulu dag	Sapanca gölü
Mesovelia rittigera HORV.												
Microvelia pygmaea (DUF.)												
Microvelia hozari sp. n.												
Velia currens (FAB.)												
Velia rivulorum (FAB.)	×											
Velia nervosa HORV.												
Velia filippii TAM.												
Rhagovelia nigricans (BURM.)												
Limnogonus leptocerus REUT.												
Gerris (Gerris) costae (H. SCH.)	×						×					
Gerris (Gerris) thoracicus SCHUMM.							×	×				
Gerris (Gerris) lateralis SCHUMM.		×	×						×	×	×	
Gerris (Gerris) gibbifer SCHUMM.				×			×					
Gerris (Gerris) lacustris (LINN.)												
Gerris (Gerris) odontogaster (ZETT.)												×
Gerris (Gerris) argentatus SCHUMM.												
Gerris (Limnoporus) rufoscutellatus (LATR.)												
Gerris (Aquarius) paludum (FAB.)												
Gerris (Aquarius) najas (DE GEER)												
Gerris (Aquarius) ventralis (FIEB.)					×	×						
Cylindrostethus bergrothi LINDB.												
Naboandelus bergevini BERGR.												
Hydrometra stagnorum (LINN.)	×				×		×					
Hydrometra gracilentia HORV.												
Hydrometra eremobia KIRITSCH.												

restricted to alpine localities. In Turkey it was found at an altitude of 2300 m in the İlgaz dağları mountains. Its finds outside Turkish territory have hitherto been made at altitudes around 3000 m (?) (Afghanistan, Bucharra) and at an altitude of 3380 m (Indian Tibet).

Into higher altitudes reach in Turkey still *Sigara* (*Sigara*) *assimilis* (FIEB.), 1720 m (Van gölü, Arin gölü) and 1890 m (Erçek gölü), *Sigara* (*Retrocorixa*) *limitata* (FIEB.), 2300 m (İlgaz dağları).

Some species have a great range of vertical distribution in Turkey. They were found in very low lying localities as well as at considerable altitudes. *Cymatia rogenhoferi* (FIEB.) reaches up to an altitude of 1890 m (Erçek gölü), *Corixa punctata* (ILL.) to 2300 m (İlgaz dağları), *Calli-corixa concinna* (FIEB.) to 1870 m (Nazik gölü), and *N. viridis mediterranea* HUTCH. to altitudes of 1720 m (Van gölü) and 1870 m (Nazik gölü).

Species of southern and southeastern origin						Species of northern origin	
Palaeo-mediterranean elements	East-Mediterranean elements	Irano-Turanian elements	Endemic species	Eremian elements	Ethiopian elements	Angaran elements	Holarctic elements
16,17%	11,82%	5,88%	11,74%	1,47%	4,41%	44,10%	4,41%

The following species and forms may be regarded as *Palaeomediterranean*:

Cymatia rogenhoferi (FIEB.)
Notonecta glauca hybrida POISS.
Notonecta obliqua meridionalis POISS.
Notonecta viridis mediterranea HUTCH.
Notonecta maculata FAB.
Naucoris maculatus FAB.
Ochterus marginatus marginatus (LATR.)
Leptopus hispanus RAMB.
Saldula amplicollis (REUT.).
Microvelia pygmaea (DUF.).
Velia rivulorum f. ventralis PUT.
Gerris (Gerris) gibbifer f. flaviventris PUT.

The *East Mediterranean species* are represented as follows:

Micronecta perplexa HORV.
Micronecta wui alkani ssp. n.
Micronecta wui kosswigi ssp. n.
Sigara (Sigara) assimilis (FIEB.)
Sigara (Halicorixa) mayri (FIEB.)
Saldula hirsuta (REUT.)
Microvelia hozari sp. n.
Velia filippii TAM.
Gerris (Aquarius) ventralis (FIEB.)

Purely *Irano-Turanian elements* occur in very small number of species. They are:

Hesperocorixa occulta (LUNDBL.)
Sigara (Sigara) albiventris (HORV.)
Velia nervosa HORV.

The following 6 species may be regarded as *endemites* of Asia Minor:

Micronecta (M.) anatolica LINDB.
Sigara (Subsigara) kervillei (POISS.)
Sigara (Subsigara) samani sp. n.
Notonecta glauca kervillei POISS.
Notonecta glauca poissoni HUNG.
Salda subcoriacea HORV.

Ethiopian and *Eremian* elements reach into Asia Minor from the South:

Anisops sardea sardea H. SCH.
Lethocerus niloticus (STÅL)
Mesovelgia vittigera HORV.

Heliocorisa vermiculata (PUT.)

The majorite of the whole fauna of *aquatic* and *semiaquatic* *Heteroptera* of Asia Minor is formed by species of *Angaran* origin:

Corixa punctata (ILL.)
Corixa affinis LEACH.
Corixa panzeri (FIEB.)
Corixa dentipes (THOMS.)
Callicorixa concinna (FIEB.)
Hesperocorixa linnei (FIEB.)
Sigara (Sigara) striata (LINN.)
Sigara (Retrocorixa) limitata (FIEB.)
Sigara (Vermicorixa) lateralis lateralis (LEACH.)
Sigara (Vermicorixa) nigrolineata (FIEB.)
Notonecta glauca glauca LINN.
Notonecta obliqua obliqua GALL.
Notonecta viridis viridis DELC.
Plea leachi MAC GREGOR.
Nepa cinerea LINN.
Ranatra linearis (LINN.)
Ilyocoris cimicoides (LINN.)
Aphelocheirus aestivalis (FAB.)
Halosalda lateralis (FALL.)
Salda muelleri (GMELIN.)
Saldula variabilis (H. SCH.)
Saldula melanoscela (FIEB.)
Saldula arenicola (SCHOLTZ.)
Chartoscirta cocksi (CURTIS.)
Hebrus pusillus (FALL.)
Gerris (Gerris) costae (H. SCH.)
Gerris (Gerris) thoracicus SCHUMM.
Gerris (Gerris) lateralis SCHUMM.
Gerris (Gerris) gibbifer SCHUMM.
Gerris (Gerris) lacustris (LINN.)
Gerris (Gerris) argentatus SCHUMM.
Gerris (Aquarius) paludum (FAB.)
Hydrometra stagnorum (LINN.)

The following two species with *Holarctic* distribution have been ascertained:

Saldula saltatoria (LINN.)
Saldula pallipes (FAB.)

The greatest percentage of *Mediterranean* species was found in the marginal parts of Anatolia falling into the Mediterranean region

proper. But this percentage is far smaller than that of the species with *Euro-Siberian distribution*. In contradistinction to the Central Anatolian region there intrude into this region a number of other southern elements. *Mediterranean species* together with *endemites* and with the other elements spreading here from the South and East totalize 49,23% of the whole fauna against 50,77% of *Angaran species* and of species with a *holarctic distribution*. The following table and map 87 gives an analysis of the fauna of *aquatic Heteroptera* in the Mediterranean region of Asia Minor:

Palaeomediterranean elements	East-Mediterranean elements	Irano-Turanian elements	Endemic species	Erebian elements	Ethiopian elements	Angaran elements	Holarctic elements
17,31%	13,06%	4,35%	8,71%	1,45%	4,35%	47,87%	2,90%

Central Anatolia and the high mountain regions in the East, included in the faunistic Irano-Turanian region, show far greater uniformity in the specific representation of the *aquatic* and *semi-aquatic Heteroptera*. Whereas the percentage of *Euro-Siberian species* is considerably higher (69,84% on the contrary 47,87% in the Mediterranean regions), the *Ethiopian elements* are completely lacking. The following table and map 87 shows the percentages of the representations of the different elements in this region.

Angaran elements	Irano-Turanian elements	Endemic species	Palaeomediterranean elements	East-Mediterranean elements	Holarctic elements
69,84%	6,96%	6,96%	9,28%	2,32%	4,64%

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PLATE I.

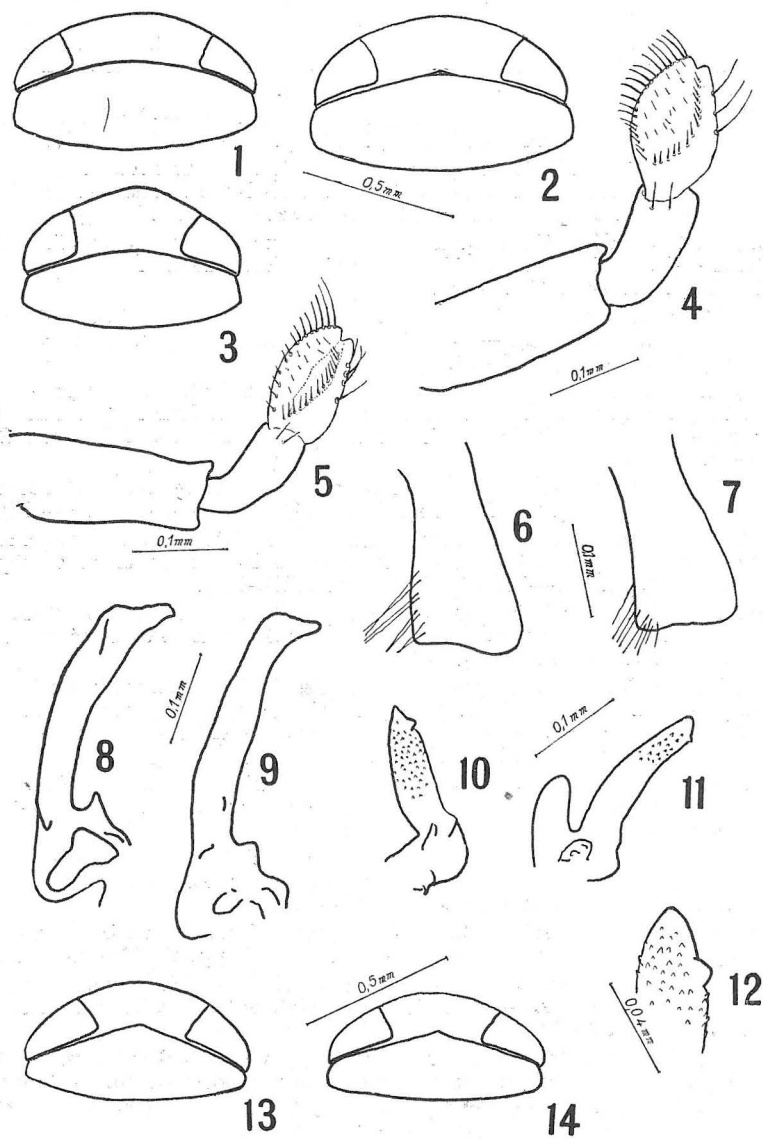


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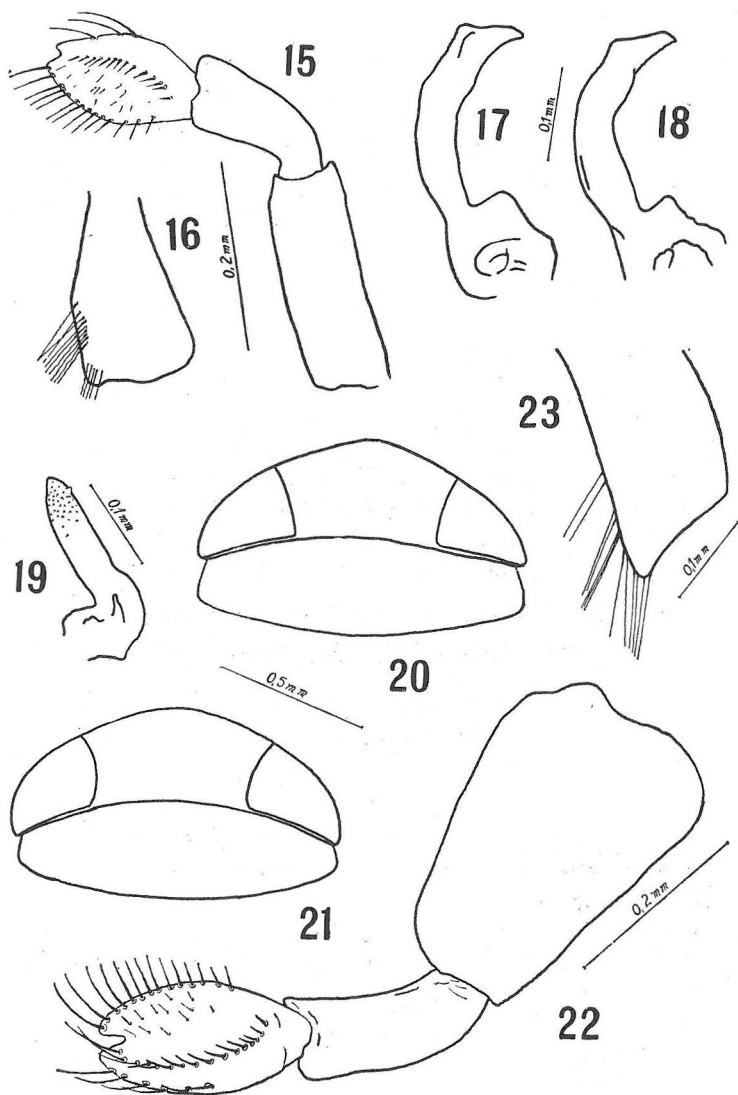


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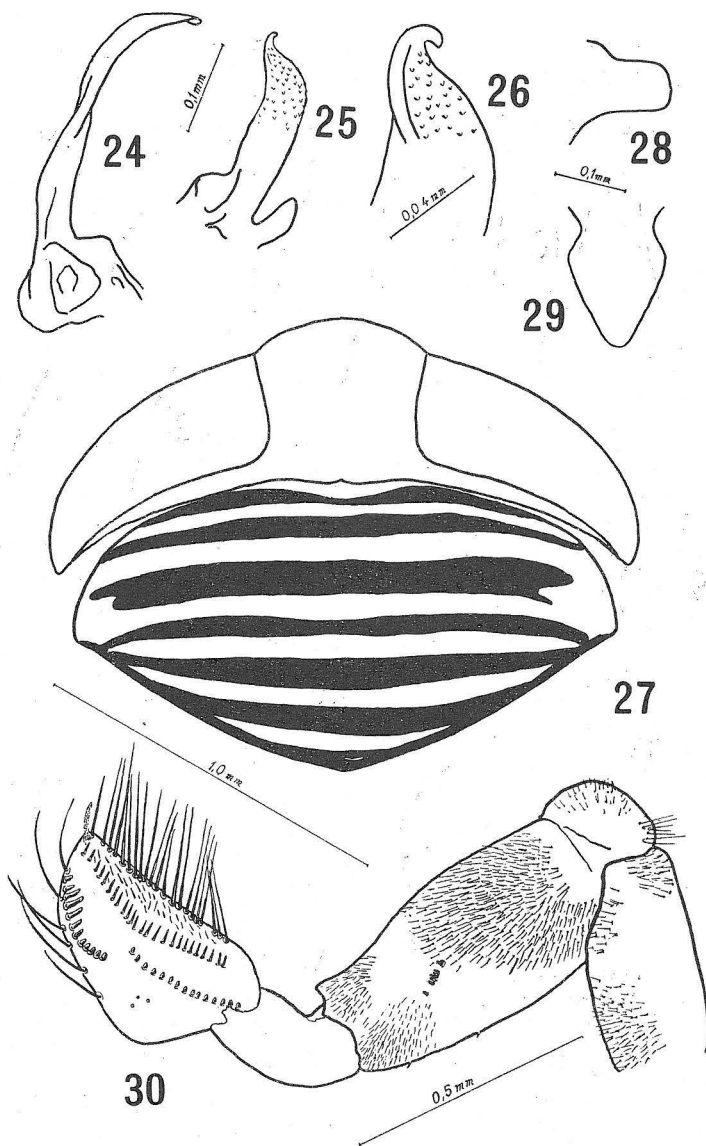


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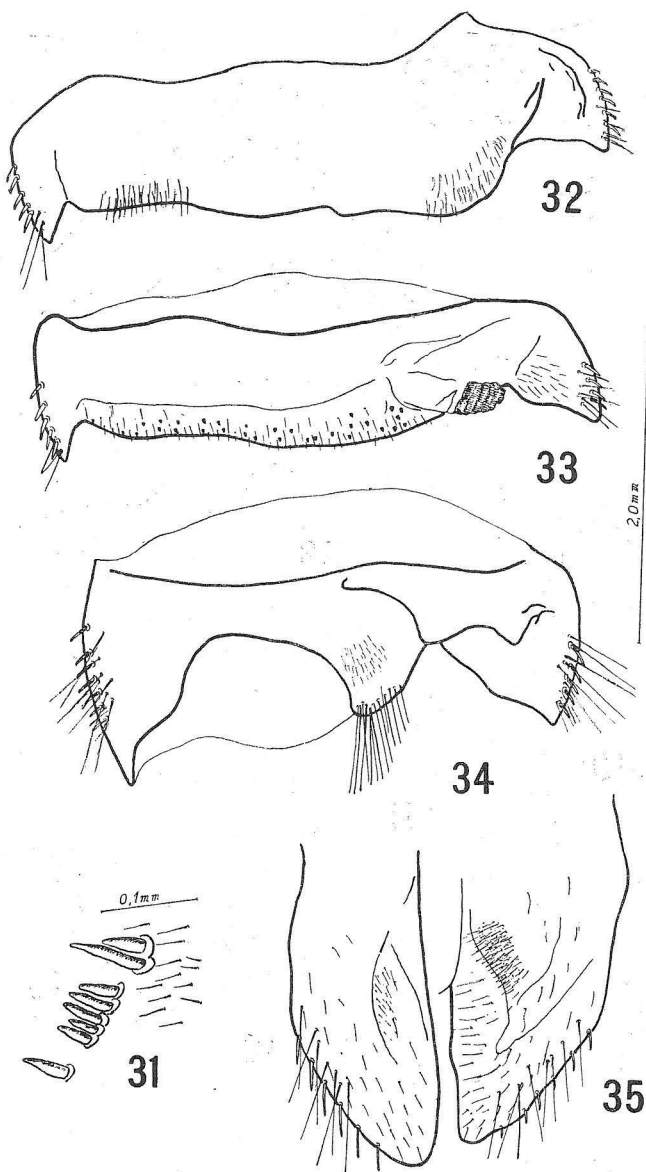


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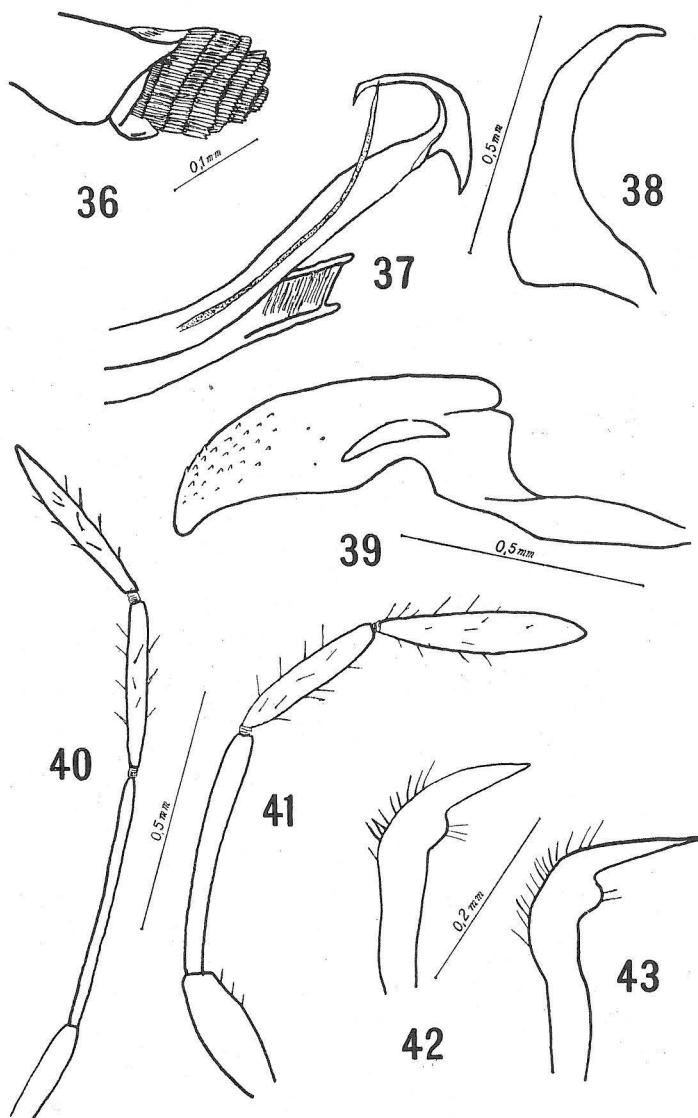


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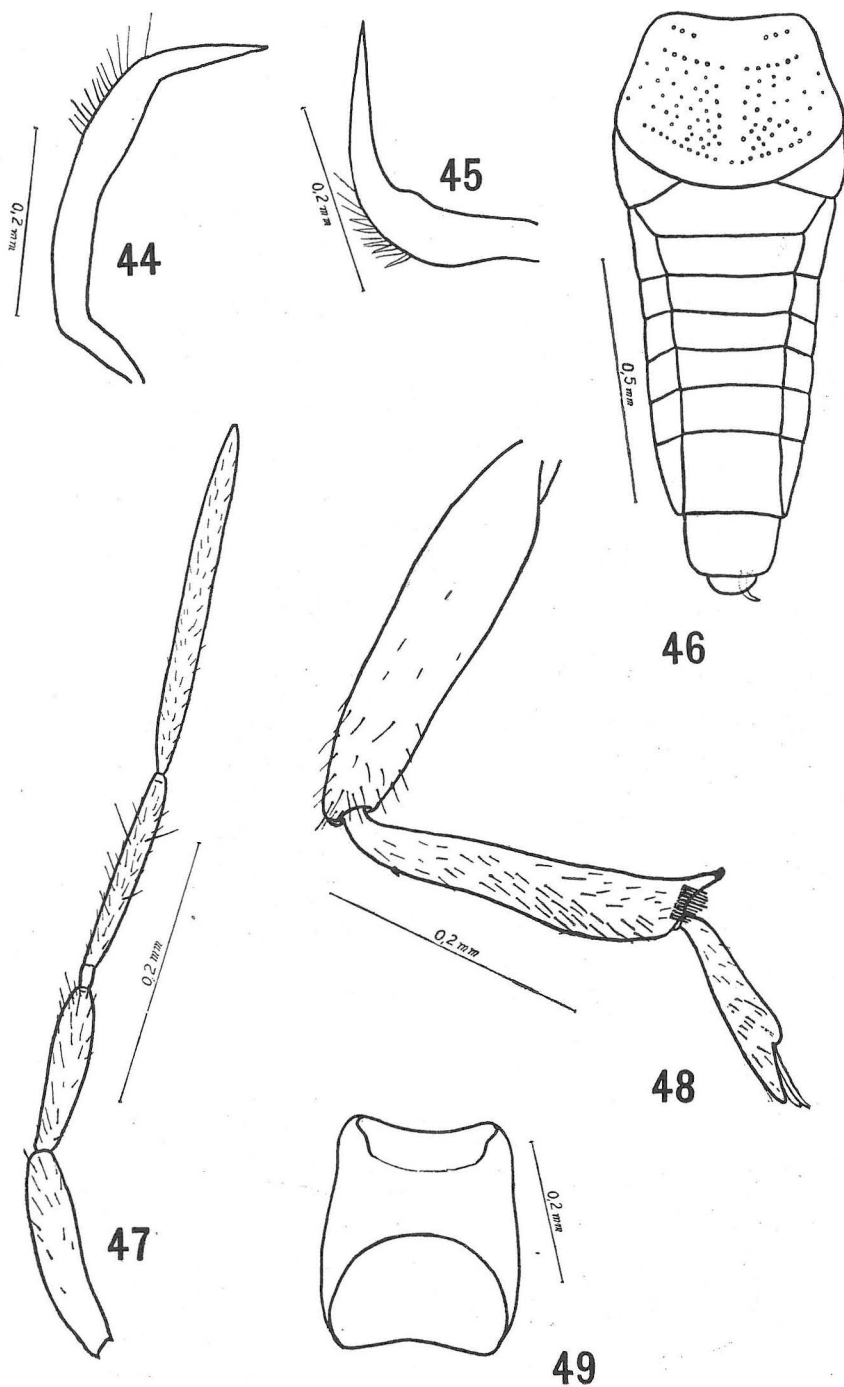


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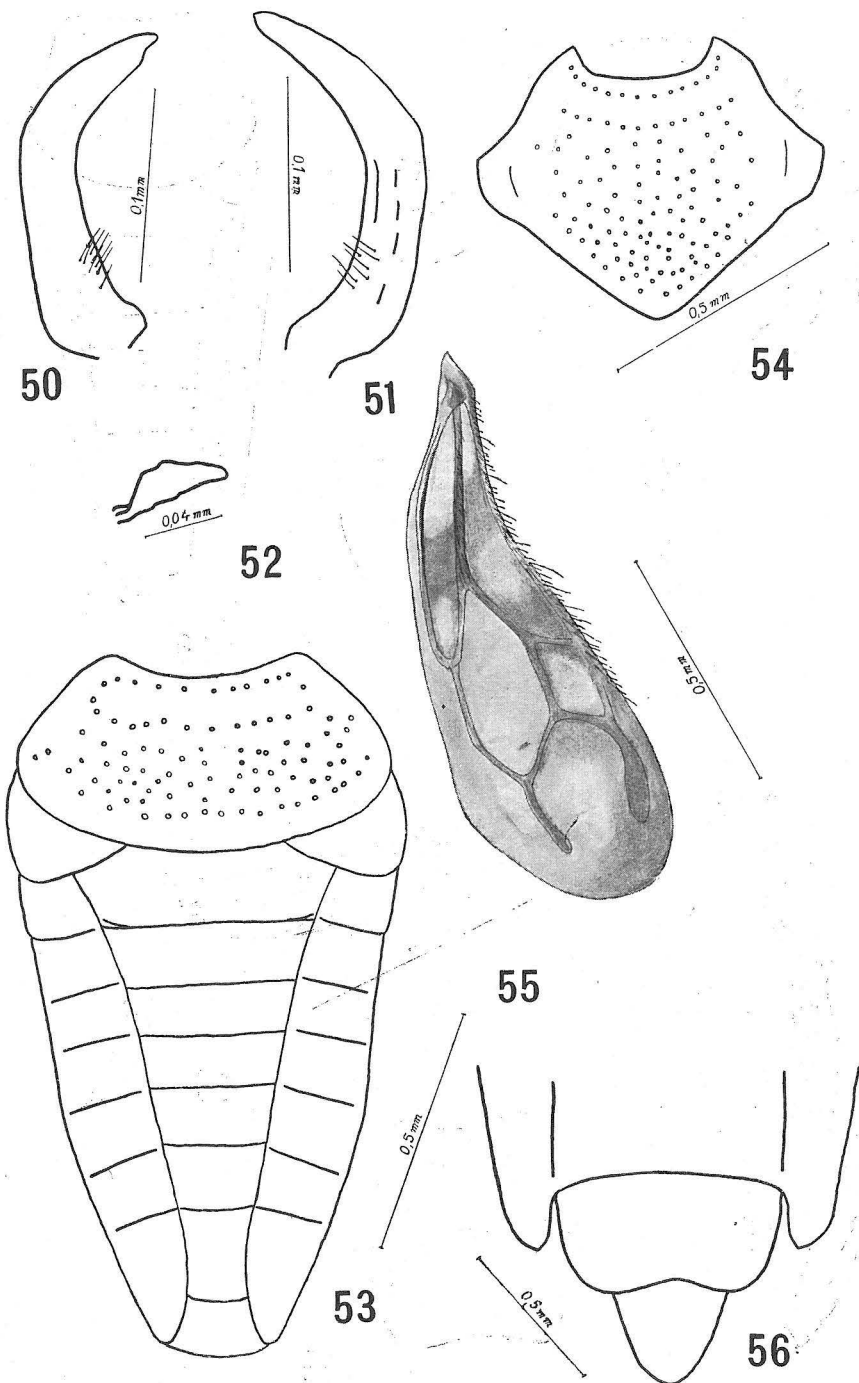


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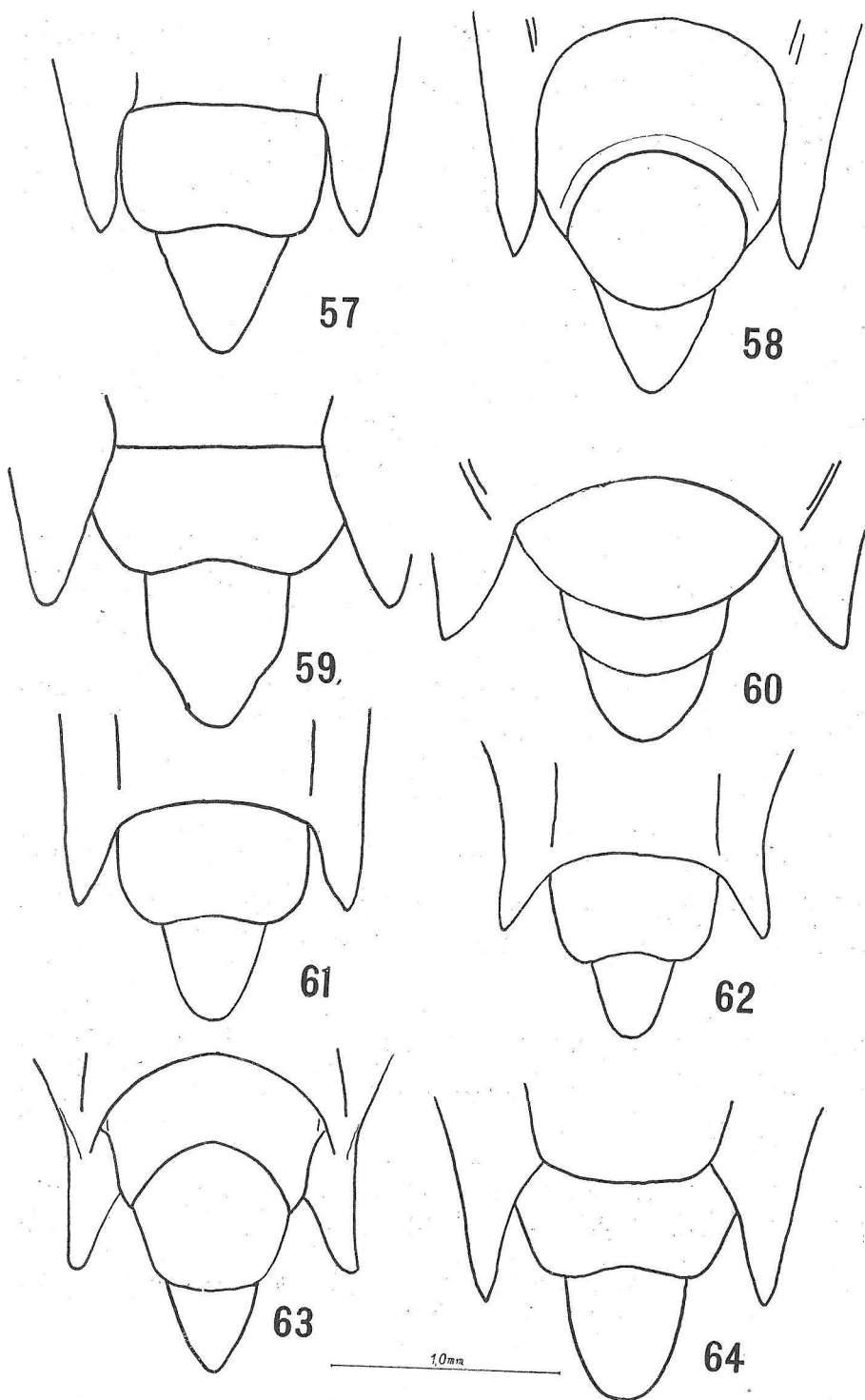


Plate I.

Micronecta (M.) wui alkani ssp. n., male (*paratype*). Fig. 1: head and pronotum (specimen from Alacakilise); fig. 2: head and pronotum (specimen from Suluhan); fig. 3: head and pronotum (specimen from Armutlu); fig. 4: anterior leg (specimen from Alacakilise); fig. 5: anterior leg (specimen from Suluhan); fig. 6: inner lobe of the eighth tergite (specimen from Alacakilise); fig. 7: inner lobe of the eighth tergite (specimen from Suluhan); fig. 8: right paramere (specimen from Alacakilise); fig. 9: right paramere (specimen from Suluhan); fig. 10: left paramere (specimen from Alacakilise); fig. 11: left paramere (specimen from Suluhan); fig. 12: apex of the left paramere (specimen from Alacakilise).

Micronecta (M.) wui kosswigi ssp. n., (*paratype*). Fig. 13: head and pronotum (male from Afrin); fig. 14: head and pronotum (female from Çakıt, Abacılar).

Plate II.

Micronecta (M.) wui kosswigi ssp. n., male (*paratype*). Fig. 15: anterior leg (specimen from Afrin); fig. 16: inner lobe of the eighth tergite (specimen from Afrin); fig. 17: right paramere (specimen from Afrin); fig. 18: right genital hook (another specimen from Afrin); fig. 19: left paramere (specimen from Afrin).

Micronecta (M.) vitticeps HORV. Fig. 20: head and pronotum (male from Edirne); fig. 21: head and pronotum (female of Edirne); fig. 22: anterior leg of male (specimen from Edirne).

Plate III.

Micronecta (M.) vitticeps HORV., male. Fig. 23: inner lobe of the eighth tergite; fig. 24: right paramere; fig. 25: left paramere; fig. 26: apex of the left paramere.

Sigara (Subsigara) samani sp. n., male (*holotype* from Mersin). Fig. 27: head and pronotum; fig. 28: lateral lobe of prothorax; fig. 29: metaxyphus; fig. 30: anterior leg.

Plate IV.

Sigara (Subsigara) samani sp. n., male (*holotype* from Mersin). Fig. 31: detail of the teeth in the middle of the inner surface of the anterior femur; fig. 32: fifth abdominal segment; fig. 33: sixth abdominal segment; fig. 34: seventh abdominal segment; fig. 35: eighth abdominal segment.

Plate V.

Sigara (Subsigara) samani sp. n., male (*holotype* from Mersin). Fig. 36: strigil; fig. 37: apex of the ninth segment and sheath of the penis; fig. 38: right paramere; fig. 39: left paramere;

Saldula melanoscela (REUT.) male. Fig. 40: antenna (specimen from Bürücek in Taurus); fig. 41: antenna (specimen from Central Europe); fig. 42: right paramere (specimen from Bürücek in Taurus); fig. 43: right paramere (specimen from Central Europe).

Plate VI.

Saldula melanoscela (REUT.), male. Fig. 44: left paramere (specimen from Bürücek in Taurus); fig. 45: left paramere (specimen from Central Europe);

Microvelia hozari sp. n., male (*paratype* from Kilis). Fig. 46: body, dorsal aspect; fig. 47: antenna; fig. 48: anterior leg; fig. 49: eighth abdominal segment from below.

Plate VII.

Microvelia hozari sp. n., (*paratype* from Kilis). Fig. 50: right paramere; of male; fig. 51: right paramere (of another male and from another side); fig. 52: left paramere of male; fig. 53: body of female, dorsal aspect; fig. 54: pronotum of *macropterous* male; fig. 55: hemielytron of male;

Gerris (Aquarius) ventralis (FIEB.), *apterous* form, male from Cyprus. Fig. 56: genital segments, dorsal aspect.

Plate VIII.

Gerris (Aquarius) ventralis (FIEB.), apterous form. Fig. 57: genital segments of male, dorsal aspect (specimen from Suluhan); fig. 58: genital segments of male, ventral aspect (specimen from Suluhan); fig. 59: genital segments of female, dorsal aspect (specimen from Suluhan); fig. 60: genital segments of female, ventral aspect (specimen from Suluhan); fig. 61: genital segments of male, dorsal aspect (specimen from Taşçı); fig. 62: genital segments of male, dorsal aspect (specimen from Düzce); fig. 63: genital segments of male, ventral aspect (specimen from Düzce); fig. 64: genital segments of female, dorsal aspect (specimen from Düzce).

Plate IX.

Micronecta (M.) wui alkani ssp. n., male (paratype from Alacakilise). Fig. 65: left hemielytron; fig. 66: right hemielytron; fig. 67: left hemielytron (specimen from Suluhan); fig. 68: right hemielytron (specimen from Suluhan).

Micronecta (M.) wui kosswigi ssp. n., male (paratype from Afrin). Fig. 69: left hemielytron.

Micronecta (M.) vitticeps HORV., male (specimen from Edirne). Fig. 70: right hemielytron.

Sigara (Subsigara) samani sp. n., male (holotype from Mersin). Fig. 71: left hemielytron.

Notonecta viridis mediterranea HUTCH., male (specimen from Kizilviran). Fig. 72: left hemielytron.

Plate X.

Fig. 73: *Micronecta (M.) vitticeps* HORV., male (Edirne).

Fig. 74: *Micronecta (M.) wui alkani* ssp. n., male (paratype from Alacakilise).

Fig. 75: *Microvelia hozari* sp. n., apterous male (paratype from Kilis).

Plate XI.

Fig. 76: Suluhan in the Central Zone of the Eastern Taurus — calm of the stream flowing in the dense shade of plane-trees. Locality for *Micronecta (M.) wui alkani* ssp. n. Photograph taken August 11, 1947.

Fig. 77: Kilis — narrow ravine with a stream forming overfalls and basins. Locality for *Sigara (V.) lateralis* (LEACH), *Sigara (V.) nigrolineata* (FIEB.), *Anisops sardea* H. SCH., *Microvelia hozari* sp. n. and *Gerris (G.) lacustris* (LINN.). Photograph taken August 20, 1947.

Plate XII.

Fig. 78: Beyşehir gölü — eastern shore with reeds. Locality for *Sigara (Sigara) striata* (LINN.). Photograph taken September 3, 1947.

Fig. 79: Alacakilise — stream in gentle hill country with bushy, scanty growths of green oaks. Locality for *Micronecta (M.) wui alkani* ssp. n., *Ochterus marginatus* (LATR.) and *Hebrus pusillus* (FALL.). Photograph taken August 21, 1947.

Plate XIII.

Fig. 80: Çakıt River near the village of Abacilar in the Adana lowland. Locality for *Micronecta (M.) perplexa* HORV., *Micronecta (M.) wui kosswigi* ssp. n., *Ochterus marginatus* (LATR.) and *Hebrus pusillus* (FALL.). Photograph taken August 7, 1947.

Fig. 81: Afrin River east of the village of Musabeyli flowing through a region of stony steppe. Locality for *Micronecta perplexa* HORV., *Micronecta wui kosswigi* ssp. n., *Hebrus pusillus* (FALL.) and *Microvelia hozari* sp. n. Photograph taken August 20, 1947.

Plate XIV.

Fig. 82: Irrigation canal leading across the steppe southern of KONYA. Locality for *Corixa affinis* LEACH, *Corixa panzeri* (FIEB.), *Sigara (V.) lateralis* (LEACH), *Ranatra linearis* (LINN.) and *Ilyocoris cimicoides* (LINN.). Photograph taken August 31, 1947.

Fig. 83: Maintained well near Mollafeneri. Locality for *Sigara (V.) lateralis* (LEACH), *Notonecta glauca hybrida* POISS., *Notonecta obliqua* GALL., *Notonecta obliqua meridionalis* POISS. and *Gerris (G.) costae* (H. SCH.). Photograph taken June 21, 1947.

Plate XV.

Fig. 84: Mersin — lagoon with brackish water in a sandy area near the surf zone of the sea. Locality for *Sigara (Subsigara) samani* sp. n., *Sigara (V.) lateralis* (LEACH), *Anisops sardea* H. SCH. and *Gerris (A.) paludum* (FAB.). Photograph taken August 25, 1947.

Fig. 85. Remnant of a completely dried-up stream with brackish water near Erdemli. Locality for *Sigara (V.) lateralis* (LEACH), *Sigara (Halicorixa) mayri* (FIEB.), *Anisops sardea* H. SCH. and *Mesovelgia vittigera* HORV. Photograph taken August 27, 1947.

Plate XVI.

Fig. 86: Map of Anatolia with numbers of localities referred to the pages 37—39.

Plate XVII.

Fig. 87. Map of Anatolia showing the distribution of biogeographical elements of aquatic and semiaquatic Heteroptera. Density of lines shows proportionate distribution of respective biogeographical elements. Continuous lines show predominant elements, interrupted lines show recessive elements.

PLATE IX.



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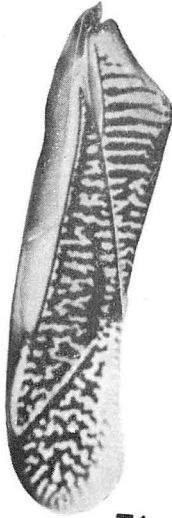
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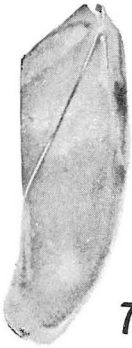
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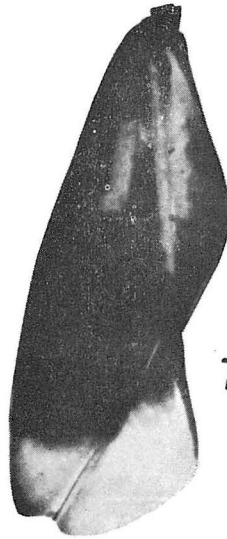
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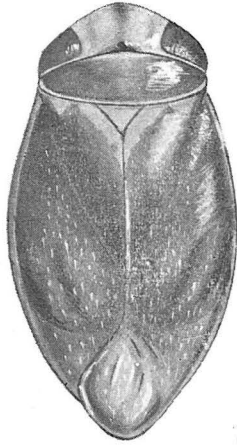


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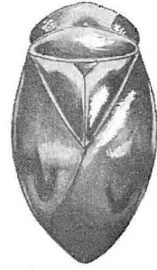


72

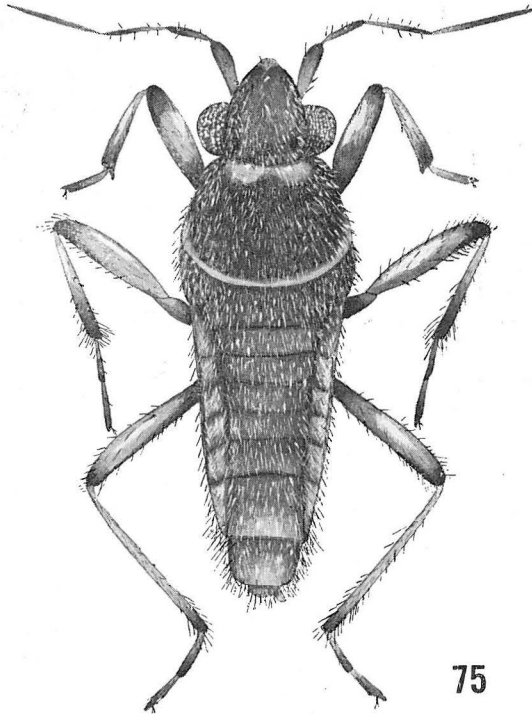
PLATE X.



73



74



75

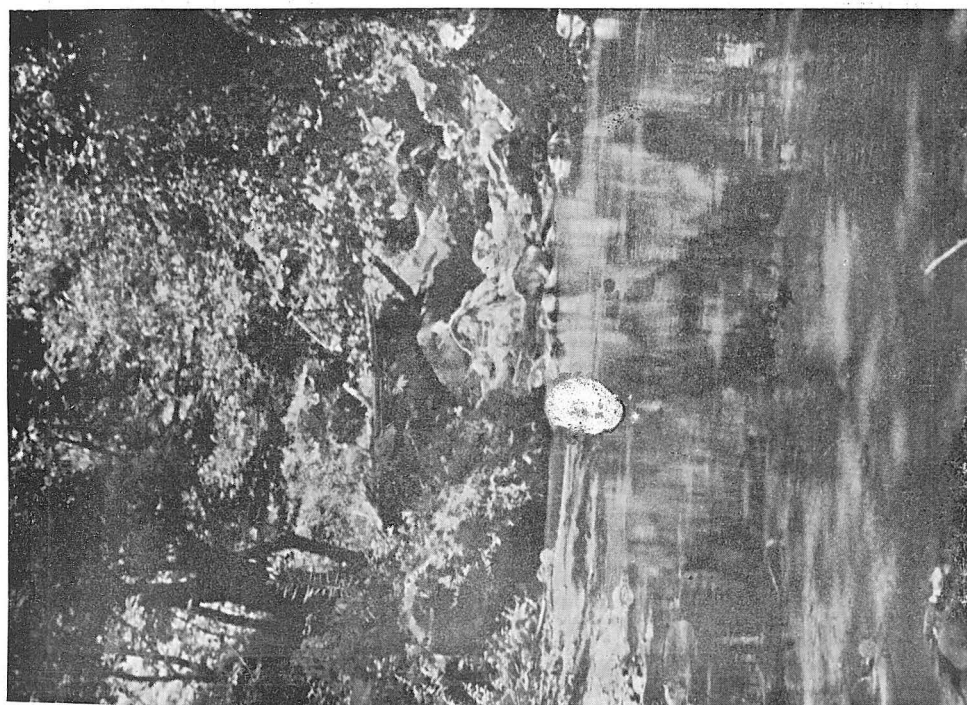




PLATE XII.



PLATE XIII.



PLATE XIV.



PLATE XV.



PLATE XVI.

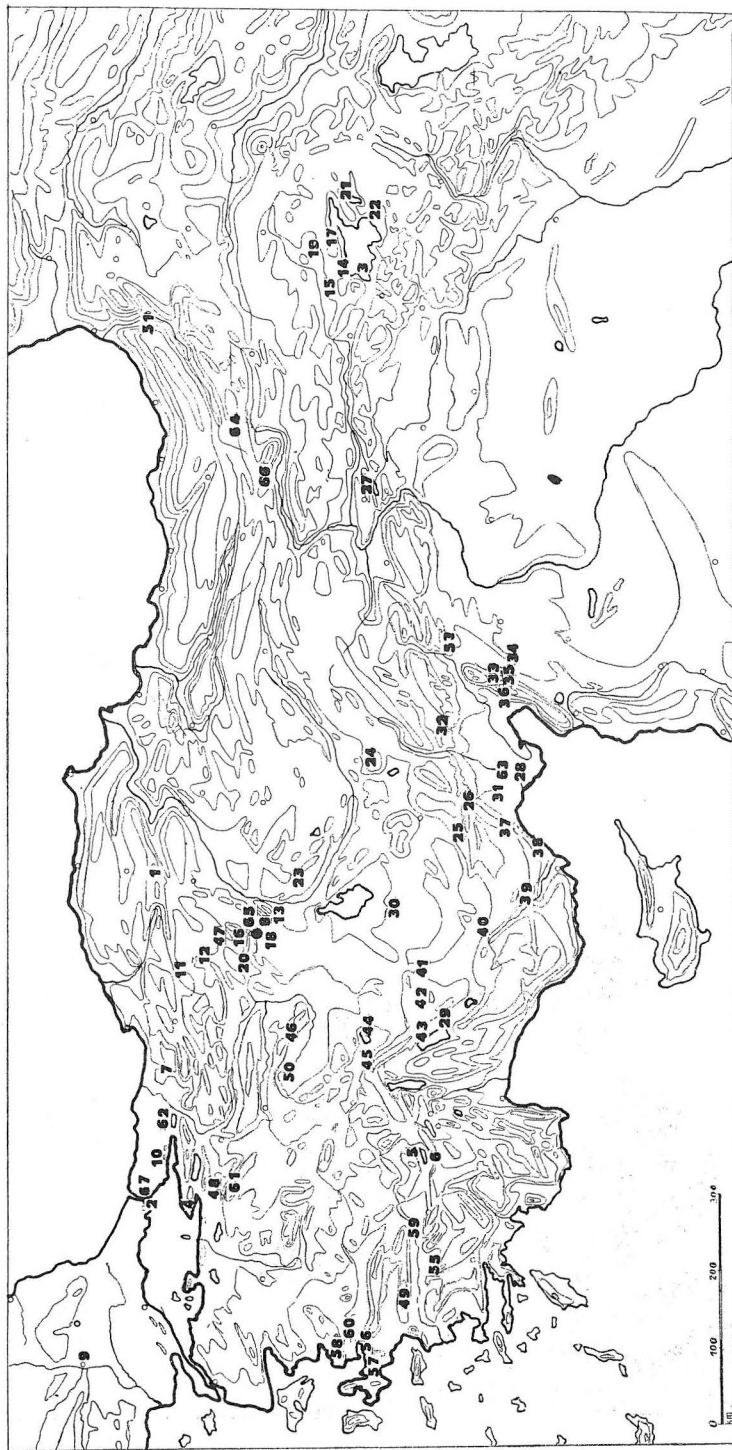
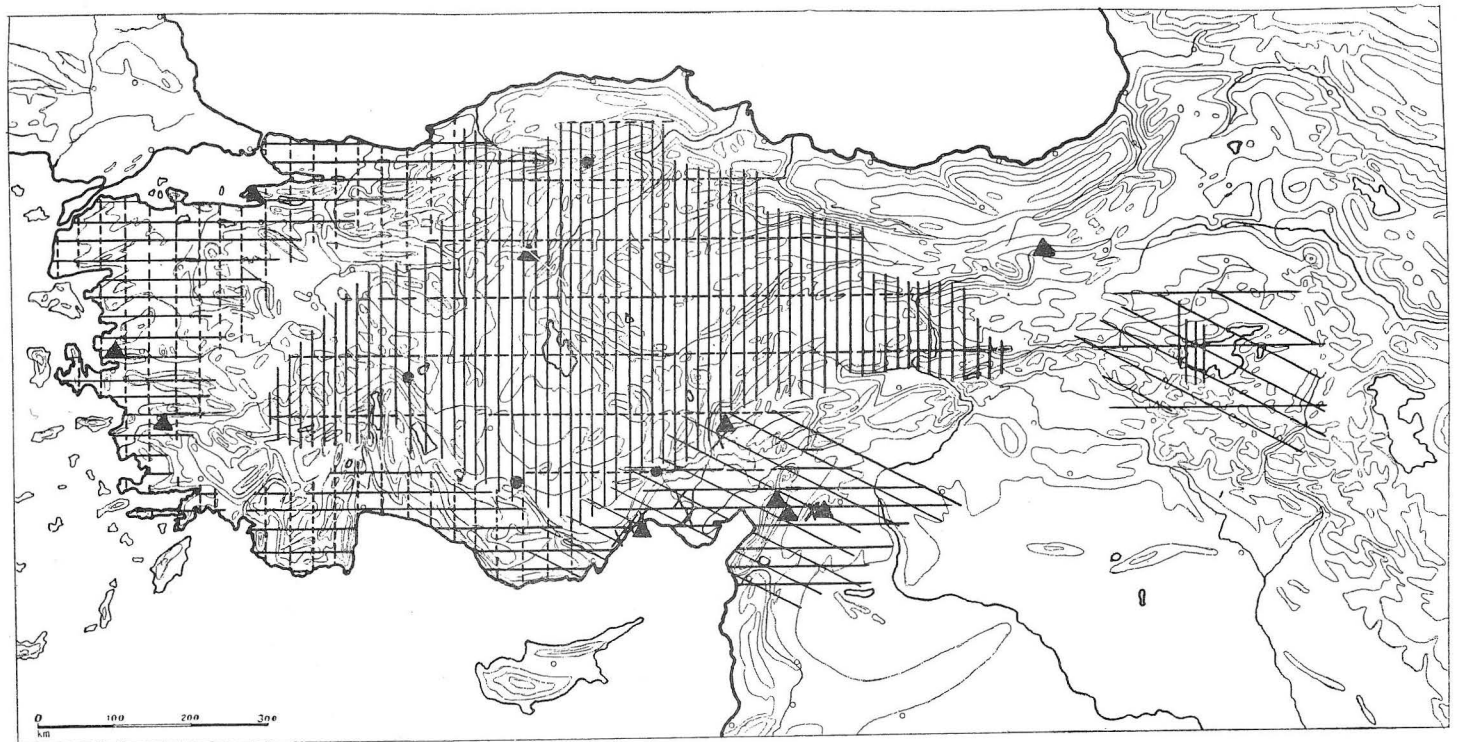
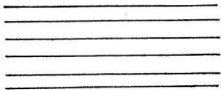
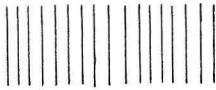



PLATE XVII.




 Palaeomediterranean elements.


 Angaran elements.


 East-mediterranean elements.

● Iranoturanian elements.
 x Ethiopian elements.
 ▲ Species with endemic distribution.