



Entomofauna

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Studies on Eumenidae of Aegean Region (Insecta: Hymenoptera)

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Abstract

This study is based on 569 specimens of Eumenidae collected from Aegean Region (Western Turkey) between the years 1991 and 1993. At the end of the study totally 23 species belonging to 15 genera were determined. From these *Euodynerus variegatus variegatus* (FABRICIUS, 1793), *Eumenes dubius cyrenaicus* BLÜTHGEN, 1938, *Cephalochilus labiatus hispanicus* (MEDINA, 1892), *Eustenancistrocerus blanchardianus* (SAUSSURE, 1855), *Alastorynerus perezi* (BERLAND, 1927) are new records for the turkish fauna.

Zusammenfassung

In dieser Studie werden 569 Eumenidae (Insecta: Hymenoptera) bearbeitet, die in der Ägäischen Region (Westtürkei) in den Jahren 1991 und 1993 gesammelt wurden. Es wurden 23 Arten in 15 Gattungen festgestellt. *Euodynerus variegatus variegatus* (FABRICIUS, 1793), *Eumenes dubius cyrenaicus* BLÜTHGEN, 1938, *Cephalochilus labiatus hispanicus* (MEDINA, 1892), *Eustenancistrocerus blanchardianus* (SAUSSURE, 1855), *Alastorynerus perezi* (BERLAND, 1927) sind neu für die türkische Fauna.

Introduction

The family Eumenidae is represented by approximately 3000 species in the world. They are very slender, solitary living predator wasps which make their nests out of mud and collect Lepidoptera (Geometridae, Tortricidae) caterpillars and Coleoptera (Curculionidae, Chrysomelidae) larvae for their offsprings (GAULD & BOLTON 1988). For this reason they have an important role in biological control.

There are different papers on Eumenidae in the palaearctic region dealing with the

turkish fauna. Some of them are BLÜTHGEN 1959; BYTINSKI-SALZ 1956, 1957; GIORDANI SOIKA 1970; GUSENLEITNER 1966, 1967; ÖZBAY & BILGIN 1997; YILDIRIM & ÖZBEK 1994, 1996; TÜZÜN & TANYOLAÇ 1987, 1988a, 1988b. These and other studies related to the turkish Eumenidae fauna have shown that the Aegean Region has a very rich fauna.

The aim of this study is to make a contribution to the fauna of the Aegean Region (Western Turkey) which has various habitats because of macro- and microclimatic differentiation.

Material examined, diagnostic characters, phenology and distribution of the species are given in this study. For the determination of species and the preparation of identification keys BERLAND (1928), GUSENLEITNER (1994, 1995, 1996, 1997) and BLÜTHGEN (1938) were used.

Key to Genera of Eumenidae

- | | | |
|----|--|----------------------------|
| 1 | Abdomen petiolate | 2 |
| - | Abdomen non-petiolate | 5 |
| 2 | First abdominal segment as wide as long, first sternum with a groove transversely .. | <i>Paraeumenes</i> |
| - | First abdominal segment longer than wide, first sternum without a groove transversely | 3 |
| 3 | Lateral sides of first abdominal segment parallel to each other . | <i>Ischnogasteriodes</i> |
| - | First abdominal segment enlarged from middle to backward | 4 |
| 4 | Second tergum with a narrow lamella apically | <i>Eumenes</i> |
| - | Second tergum without lamella | <i>Delta</i> |
| 5 | First tergum cornered at the apex | 6 |
| - | First tergum rounded at the apex | 9 |
| 6 | Vertex of female with two large hairy hollows, first tergum longitudinally grooved | 7 |
| - | Vertex of female with only one hollow or without any, first tergum non-grooved | 8 |
| 7 | The distance between hollows is shorter than diameter of ocelli, diameter of each hollow is longer than the distance between ocelli | 13 |
| - | The distance between hollows is equal to the distance between ocelli, diameter of each hollow is shorter than that of ocelli | <i>Symmorphus</i> |
| 8 | Clypeus is as wide as long or a little wider | <i>Ancistrocerus</i> |
| - | Clypeus is much wider than length | <i>Eustenancistrocerus</i> |
| 9 | Second cubital cell of forewing is petiolate | <i>Alastor</i> |
| - | Second cubital cell of forewing is non-petiolate | 10 |
| 10 | Posterior part of first tergum is swollen laterally, that of second with a groove transversely | <i>Alastorynerus</i> |
| - | Without above characteristics | 11 |
| 11 | Labial palpi with three segments, segments with long hairs | <i>Cephalochilus</i> |
| - | Labial palpi with four segments | 12 |
| 12 | The last three segments of maxillary palpi are of same length | <i>Rhynchium</i> |
| - | The last three segments of maxillary palpi are getting smaller to the apex | <i>Pseudopipona</i> |
| 13 | Median segment has hook-shaped projections on corners, postscutellum dented and with a transverse carina, apex of first tergum stout which is equal or rarely narrower than the second one | <i>Euodynerus</i> |

- Median segment is stepped and has no projections on corners, apex of first tergum is rounded and usually narrower than the second one 14
- 14 Metanotum in back-view with tooth-like lateral projections on underside, mesonotum with a fold from middle to back *Parodontodynerus*
- Metanotum in back-view without any projections, mesonotum without any fold either *Allodynerus*

Genus *Pareumenes* SAUSSURE, 1955, Ét. Fam. Vesp. 3: 133

***Pareumenes (Nortonia) intermedius* (SAUSSURE, 1853)**

Odynerus (Leionotus) intermedius SAUSSURE, 1853, Et. Fam. Vesp. 1: 155.

Diagnostic characters. Male: Last flagellomere of male is yellow and curved to the eleventh flagellomere. Tergites 1-5 are equal to those of female, sixth and seventh are black.

Female: Clypeus heart-shaped, free margin notched and yellow; mandibles brown, teeth black. Scape yellow ventrally, black dorsally, pedicel reddish-yellow ventrally. First tergum has small, yellow punctation laterally, which is absent in some specimens, tergites 2-5 have yellow bands distally. Second tergum has yellow punctation basally and laterally. Sixth tergum black.

Material examined (5♀♀, 9♂♂). Balıkesir: Burhaniye (10m.) 18.08.1992 2♀♀. Izmir: Bornova (20m) 24.06.1992 1♀ 4♂♂; Buca (20m) 23.06.1992 2♂♂; Dikili (3m) 15.07.1992 1♂; Tire (100m) 06.07.1992 1♂. Manisa: Bozköy (85m) 29.07.1992 1♂; Gürle (95m.) 04.08.1992 1♀; Uzunçınar (75m) 30.09.1992 1♀.

Phenology: June-September.

Distribution (figure 1). World: France, North Africa (BERLAND 1928). Turkey: Aegean Region (TÜZÜN et al. 1988). Vertical distribution recorded: 3-100m.

Genus *Ischnogasteroides* MAGRETTI, 1884, Boll. Soc. Ent.

Ital. 15 (1883): 251; Annali Mus. civ. stor. nat. Genova 21: 603

***Ischnogasteroides picteti picteti* (SAUSSURE, 1852)**

Eumenes picteti SAUSSURE, 1852, Ét. Fam. Vesp. 1: 67.

Diagnostic characters: Male: Dominant body colour is yellow and black. Clypeus of male is yellow, longer than wide, free margin notched and half-moon shaped and teeth stout. Mandibles black. Scape black dorsally, yellow ventrally. The last flagellomere orange-yellow, sharp pointed, recurved to eleventh flagellomere. Rest of the flagellomeres are black.

Female: First tergum with two yellow spots laterally and a wide yellow band which is divided into two distally. There is a yellow band which is widened to mid-anterior and has black punctation medially. There are two free yellow punctations laterally. Third and fourth tergites have yellow bands distally, tergites 6-7 black.

Material examined (3♀♀, 3♂♂). Izmir: Gümüşsu (30m) 05.07.1992 1♀. Manisa: Millipark (71m) 01.08.1992 1♀ 1♂, 02.08.1992 1♂; Akhisar (93m) 08.08.1992 1♂. Muğla: Bodrum (10m) 03.06.1993 1♀.

Phenology: June-August

Distribution (figure 1). World: South Europe (VAN DER VECHT et al. 1972). Turkey: Manisa, Akhisar (TÜZÜN et al. 1988), Diyarbakır, Mardin, Şanlıurfa (ÖZBAY et al. 1997).

Vertical distribution recorded: 10-93m.

Genus *Eumenes* LATREILLE, 1802, Hist. Nat. Crust. Ins. 3: 360

***Eumenes dubius dubius* SAUSSURE, 1852**

Eumenes dubia SAUSSURE, 1852, Ét. Fam. Vesp. 1: 32.

Diagnostic characters. Dominant body colours are black and yellow. Male: Clypeus long, free margin is smooth and bright yellow. Mandibles orange yellow, spotted basally.

Female: Scape ventrally yellow, dorsally orange-yellow and it has a thin black line on flagellomeres 3-9, these are black dorsally, rest of them orange-yellow. The last flagellomere recurved to the middle of tenth flagellomere.

Material examined (1♂). Izmir: Dikili (3m) 15.07.1992 1♂.

Phenology: June.

Distribution (figure 1). World: South Europe, North Africa (VAN DER VECHT et al. 1970), Spain, France, Italy, Bulgaria, Greece, Cyprus, Israel, Lebanon, Syria, Russia, Persia (ÖZBAY et al. 1997). Turkey: Antakya (GUSENLEITNER 1966), Adana, Amasya, Artvin, Erzincan, Erzurum (YILDIRIM & ÖZBEK 1994), Diyarbakır, Mardin, Şanlıurfa (ÖZBAY et al. 1997). Vertical distribution recorded: 3m.

***Eumenes pomiformis pomiformis* (FABRICIUS, 1781)**

Vespa pomiformis FABRICIUS, 1781, Spec. Insect. 1: 467.

Diagnostic characters. Male: Clypeus yellow, mandibles black. Scape yellow ventrally, black dorsally. The last flagellomere mat yellow recurved hook-shaped to the eleventh flagellomere. Sixth and seventh tergites black, the rest with yellow bands.

Female: Clypeus yellow, longer than wide and free margin is toothed. Mandibles black. First and second tergites yellow spotted laterally and with bands which are divided U-shaped medially. Tergites 3-5 with yellow bands, 6th tergum black. Second sternum is different spotted. Scape yellow ventrally, black dorsally. Pedicel and flagellum black.

Material examined (22♀♀, 65♂♂). Aydın: Didim (20m) 24.09.1991 4♂♂, 25.09.1991 1♂; Kuşadası (22m) 29.09.1991 1♂; Kalamaki Milliparkı (15m) 10.09.1993 1♂; Nazilli (60m) 19.05.1991 1♂; Merkez (60m) 24.05.1993 1♀. Balıkesir: Altınoluk (150m) 12.08.1992 1♂; Ören (10m) 16.08.1992 1♂; Altınova (25m) 19.08.1992 1♂, 22.08.1992 1♂; Havran (50m) 21.08.1992 1♂; Kızılköçü (25m) 23.08.1992 1♂. Denizli: Kale (1000m) 12.08.1992 1♂. Izmir: Buca (20m) 22.06.1993 1♀ 1♂; Gümüşsu (30m) 05.07.1992 2♀♀ 10♂♂; Tire (100m) 06.07.1992 1♀ 1♂, 11.07.1993 12♀♀, 07.07.1992 4♂♂; Seferihisar (30m) 08.07.1992 5♂♂, 09.07.1992 2♂♂; Urla (50m) 13.07.1992 1♀ 4♂♂; Dalyan (20m) 19.06.1993 1♂; Ödemiş (118m) 12.09.1993 1♂; Alaçatı (25m) 15.09.1993 1♀; Gaziemir (30m) 29.06.1992 1♀. Kütahya: Merkez (969m) 20.05.1991 1♀; Karagöl (850m) 29.05.1991 1♀. Manisa: Bozköy (85m) 29.07.1992 1♂; Millipark (71m) 01.08.1992 2♂♂, 03.08.1992 2♂♂; Keçili (90m) 06.08.1992 3♂♂; Gürle (95m) 06.08.1992 2♂♂; Akhisar (93m) 08.08.1992 1♂. Muğla: Uzunyali (3m) 08.08.1991 1♂; Iskele (3m) 09.08.1991 1♂; Gümbet (10m) 12.08.1991 1♂; Milas (53m) 02.06.1993 1♂; Güllük (10m) 01.06.1993 2♂♂; Bodrum (10m) 30.05.1993 1♀ 2♂♂, 03.06.1993 3♂♂.

Phenology: May–September.

Distribution (figure 1). World: France, Europe, North Africa, Asia, America (BERLAND 1928), Netherland, Austria, Switzerland, France, Italy, Spain, Yugoslavia, Russia, Bulgaria, Tunisia, Lebanon (ÖZBAY et al. 1997). Turkey: Aydın, Balıkesir, Denizli, Izmir,

Kütahya, Manisa, Muğla (TÜZÜN et al. 1988), Artvin, Erzurum, Kars (YILDIRIM & ÖZBEK 1994), Diyarbakır, Mardin, Şanlıurfa (ÖZBAY et al. 1997). Vertical distribution recorded: 10-1000m.

***Eumenes dubius cyrenaicus* BLÜTHGEN, 1938**

Eumenes dubius cyrenaicus BLÜTHGEN, 1938, Dt. Ent. Z. 2: 464-468.

Diagnostic characters. Male: Clypeus narrow and long and free margin smooth. Scape yellow ventrally, black dorsally, the last 8 flagellomeres black dorsally and orange-brown ventrally, the rest of flagellum orange-brown. The last flagellomere recurved to the beginning of the ninth. Base of first tergum is black, which makes various patterns to distal part, 2nd, 3rd and 4th.

Female: Dominant colour of body mat yellow and reddish-brown. Clypeus of female transverse, its width is almost equal to length. Colour is mat yellow, free margin reddish-brown. Flagellum reddish-brown, the last four flagellomeres black dorsally. Pronotum reddish-brown. The part of first tergite joining the thorax is black, reddish-brown distally. Second tergum has a wide yellow band distally, yellow punctation laterally. Other tergites yellow. Tergites have wide yellow bands. There are lateral spots on second tergum.

Material examined (32♀♀ 12♂♂). Aydın: Kuşadası (22m) 28.08.1991 1♀, 07.08.1992 1♀. Balıkesir: Küçükuyu (3m) 15.08.1992 1♀ 1♂; Altınoluk (150m) 12.07.1992 1♀, 12.08.1992 2♀♀ 1♂; Ören (10m) 16.08.1992 1♀ 2♂♂, 25.08.1992 1♀; Altınova (25m) 24.08.1992 1♀. İzmir: Dikili (3m) 15.07.1992 1♂; Tire (100m) 07.07.1992 1♀. Manisa: Gürle (95m) 06.08.1992 1♀ 2♂♂; Millipark (71m) 30.07.1992 1♀, 01.08.1992 1♀, 02.08.1992 1♀ 2♂♂; Bozköy (85m) 30.07.1992 1♂, Uzuncınar (75m) 27.07.1992 15♀♀ 1♂; Turgutlu (69m) 03.08.1992 1♂; Karaoğlanlı (80m) 27.07.1992 1♀. Muğla: Çetibeli (110m) 07.06.1993 1♀; Marmaris (3m) 27.10.1992 1♀.

Phenology: June-October.

Distribution (figure 1). World: From Syria to the boundry of Egypt (BLÜTHGEN 1938). Turkey: First record. Vertical distribution recorded: 3-150m.

Genus *Delta* SAUSSURE, 1855, Ét. Fam. Vesp. 3: 130, 132, 143

***Delta unguiculatum unguiculatum* (VILLERS, 1789)**

Vespa unguiculata VILLERS, 1789, C. Linnaei. Entom. 3: 282.

Diagnostic characters. Male: Scape and pedicel yellow ventrally, rust-coloured dorsally. Flagellum reddish ventrally, black dorsally. The last two flagellomeres and half of third are blackish-brown.

Female: Dominant body colour is brown and yellow. Head is as wide as pronotum. Clypeus is yellow and its width is almost equal to length. Mandibles rust-coloured.

Material examined (25♀♀ 14♂♂). Aydın: Kuşadası (22m) 29.09.1991 2♀♀; Kalamaki Milli Parkı (22m) 10.09.1992 2♀♀; Sultanhisar (70m) 16.05.1993 1♀; Didim (20m) 25.09.1991 1♀. Balıkesir: Burhaniye (10m) 13.08.1992 2♀♀, 17.08.1992 1♀; Küçükuyu (3m) 15.08.1992 1♀ 1♂; Tahtakuşlar (20m) 22.08.1992 2♂♂; Ören (10m) 14.08.1992 1♀ 1♂; 16.08.1992 1♂, 25.08.1992 1♀; Altınoluk (150m) 12.08.1992 1♀ 1♂; Altınova (25m) 19.08.1992 1♀. Denizli: Çal (850m) 22.09.1992 1♂; Kale (1000m) 20.09.1992 2♀♀ 1♂. İzmir: Hatay (20m) 25.06.1992 1♀ 2♂♂; Gaziemir (30m) 01.07.1992 1♂; Seferhisar (30m) 08.07.1992 1♂; Dalyan (20m) 18.06.1993 1♂; Alaçatı (25m) 17.06.1993 1♀; Ilıca (10m) 12.07.1992 1♀; Alsancak (5m) 14.06.1992 1♀. Manisa: Akhisar (93m) 07.08.1992

1♀ 1♂, 08.08.1992 1♀; Millipark (71m) 01.08.1992 1♀. Muğla: Merkez (466m) 11.06.1992 1♀; Marmaris (3m) 27.10.1992 1♀.

Phenology: May-October.

Distribution (figure 1). World: Bulgaria (GIORDANI-SOIKA 1951), South Europe, Portugal, Bulgaria, Armenia, Anatolia (YILDIRIM & ÖZBEK 1996), Italy, Portugal, Bulgaria, Albania, Persia, Turkey (VAN DER VECHT et al. 1972). Turkey: Diyarbakır, Mardin, Şanlıurfa (ÖZBAY et al. 1997), Kuşadası, Manisa, Konya (GUSENLEITNER 1966), Adana (Pozantı), Ankara (Kavaklıdere), Erzurum, (Azort) (GIORDANI-SOIKA 1970), Antalya, Erzurum, Hakkari, İzmir (YILDIRIM & ÖZBEK 1996), Ege Bölgesi (TÜZÜN et al. 1988). Vertical distribution recorded: 3-1000m.

Genus *Symmorphus* WESMAEL, 1836, Bull. Acad. r. Belg. 3: 45

***Symmorphus gracilis gracilis* (BRULLÉ, 1832)**

Odynerus gracilis BRULLÉ, 1832, Expéd. Sci. Morée, Zool. 2: 362.

Diagnostic characters. Male: Dominant body colour yellow-black and the whole body punctated. Clypeus of male is yellow, free margin toothed. Mandibles are yellow. Scape black dorsally and yellow ventrally, pedicel and flagellum black. The last flagellomere recurved to the 11th. Distal margins of tergites 1-6 with yellow bands, 7th tergum black.

Female: Top margin of clypeus in female rounded, narrowing below, apex slightly indented or smooth. Upper part of clypeus yellow, lower part black, black colour indented into yellow one. Mandibles black yellow punctated basally but brown to the apex.

Material examined (3♀♀ 13♂♂). İzmir: Ilica (10m) 10.07.1992 2♂♂; Dikili (3m) 15.07.1992 1♂; Urla (50m) 13.07.1992 2♂♂; Ödemiş (118m) 12.09.1993 1♂; Alaçatı (25m) 15.09.1993 1♀; Seferihisar (30m) 08.07.1992 1♂. Manisa: Millipark (71m) 01.08.1992 1♀. Muğla: Marmaris (3m) 10.08.1991 1♂; Bodrum (10m) 02.06.1993 1♂; Yerkesik (600m) 05.06.1993 1♂; Milas (53m) 04.06.1993 1♂; Ula (600m) 06.06.1993 1♀; Datça (100m) 27.09.1993 1♂; Merkez (646m) 20.09.1993 1♂.

Phenology: June-September.

Distribution (figure 1). World: From Middle and North Europe to the South of Sweden (BERLAND 1928), Turkey, Armenia, Europe, Medio Oriente, Pamir (GIORDANI-SOIKA 1970), Austria, Belgium, Czechoslovakia, Denmark, Germany, Greece, Hungaria, India, Persia, Italy, Lebanon, Netherlands, Poland, Portugal, Romania, Spain, Sweden, Switzerland, England, Russia, Yugoslavia (YILDIRIM & ÖZBEK 1996). Turkey: Mersin (Sertavul geçidi) (GIORDANI-SOIKA 1970), Erzurum, Gümüşhane (YILDIRIM & ÖZBEK 1996). Vertical distribution recorded: 3-646m.

Genus *Ancistrocerus* WESMAEL, 1836, Bull. Acad. R. Belg. 3: 45

***Ancistrocerus auctus auctus* (FABRICIUS, 1793)**

Vespa aucta FABRICIUS, 1793, Entom. System. 2: 272.

Diagnostic characters. Male: Clypeus narrow, long and notched. Mandibles yellow, dark brown apical. Scape yellow ventrally, pedicel and flagellum black, the last flagellomere recurved to the beginning of the tenth. Tergites 1-5 with yellow bands distally, 6th tergum with small, yellow punctation, 7th black.

Female: Dominant body colour yellow-black. Clypeus heart-shaped, yellow and with an arrow-shaped black punctation. Mandibles black, with yellow punctation basally.

Scape yellow ventrally and black dorsally, pedicel and flagellum black. Tergites 1-5 and sternites have yellow bands distally, 6th tergum completely black.

Material examined (14♀ ♀ 1♂). Aydın: Merkez (57m) 20.05.1993 1♀. Balıkesir: Burhaniye (10m) 13.08.1992 1♀. İzmir: Gaziemir (30m) 01.07.1992 1♀; Urla (50m) 13.07.1992 6♀ ♀; Güzelbahçe (10m) 22.06.1993 1♀. Manisa: Karaoğlanlı (80m) 29.07.1992 1♀. Muğla: Göktepe (600m) 10.06.1993 1♀; Turunç (10m) 25.09.1993 1♀; Yatağan (376m) 30.09.1993 1♂. Kütahya: Merkez (969m) 28.09.1993 1♀.

Phenology: May-September.

Distribution (figure 2). World: Armenia, Erivan (GIORDANI-SOİKA 1970), Italy, from South-East Europe to the Mahrere and North Slovakia, from East to Central Asia and Middle East Countries, Portugal, Bulgaria, Albania, Iraq, Armenia (VAN DER VECHT et al. 1972), Greece, Middle and South Europe (YILDIRIM & ÖZBEK 1996). Turkey: Istanbul, Şile, Tokat, Amasya, Bursa, Kütahya (Simav), Ankara (Kavaklıdere), Erzurum (Kopdağı) (GIORDANI-SOİKA 1970), Aydın, Erzincan, Erzurum, Eskişehir, Gümüşhane, Iğdır, İçel, Kars, Sinop (YILDIRIM & ÖZBEK 1996), Denizli (Pamukkale), Hatay (GUSENLEITNER 1966), Kızılcahamam (GUSENLEITNER 1967). Vertical distribution recorded 10-969m.

Ancistrocerus longispinosus longispinosus (SAUSSURE, 1855)

Odynerus (Ancistrocerus) longispinosus SAUSSURE, 1855, Ét. Fam. Vesp. 3: 213.

Diagnostic characters. Male: Clypeus is black, yellow spotted upper and lateral parts. Mandibles black. Tergites 1-4 with yellow bands distally, tergites 5-6 black. Clypeus transverse, apex nearly smooth. Tergites 1-6 with yellow bands distally. Seventh tergum black.

Female: Dominant body colours are black and yellow. Head with long hairs. Top margin of clypeus rounded, narrowing below.

Material examined (6♀ ♀ 1♂). Balıkesir: Burhaniye (10m) 13.08.1993 1♂. İzmir: Sefirhisar (30m) 08.07.1992 1♀. Kütahya: Emet (700m) 03.06.1991 1♀. Muğla: Merkez (646m) 21.09.1993 1♀; Marmaris (3m) 06.08.1991 1♀, 08.06.1993 1♀; Yerkesik (600m) 05.06.1993 1♀.

Phenology: June-September.

Distribution (figure 2). World: France, Bordox, Algeria (BERLAND 1928), Western Europe, North Africa, East Mediterranean Countries (GUSENLEITNER 1995), East Mediterranean (VAN DER VECHT et al. 1972). Turkey: Istanbul (Aydos) (BYTINSKI-SALZ 1957), Amanos, Nurdağı, Pamukkale, Konya, Hatay, İçel (Silifke), Antalya (Demre), Istanbul, Bursa (Karacabey), Muğla, Ankara, Kırıkkale, Antalya, Erzincan, Erzurum (YILDIRIM & ÖZBEK 1996). Vertical distribution recorded: 3-700m.

Ancistrocerus parietum (LINNAEUS, 1758)

Vespa parietum LINNAEUS, 1758, Syst. Nat., Ed. 10, 1: 572.

Diagnostic characters. Male: Dominant body colours are yellow and black. Clypeus of male is almost as wide as long. Apex with stout teeth. Clypeus and mandibles are yellow. Scape yellow ventrally and black dorsally, pedicel and flagellomeres black. The last flagellomer recurved to beginning of the eleventh. Tergites 1-5 with yellow bands, 6th and 7th black.

Material examined (39♂♂). Aydın: Merkez (57m) 16.05.1993 1♂, 20.05.1993 1♂; Kuşadası (22m) 10.09.1993 1♂; Nazilli (60m) 16.09.1993 1♂, 17.09.1993 1♂. Balıkesir: Burhaniye (10m) 13.08.1992 2♂♂. İzmir: Hatay (20m) 05.06.1991 1♂; Gümüşsu (30m)

04.07.1992 1♂; Tire (100m) 07.07.1992 3♂♂, 10.09.1993 1♂, 11.09.1993 1♂; Ilıca (10m) 10.07.1992 1♂; Urla (50m) 13.07.1992 6♂♂; Dikili (3m) 14.07.1992 1♂, 15.07.1992 1♂; Şifne (10m) 21.06.1993 1♂; Cumaovası (80m) 23.06.1993 1♂; Gaziemir (25m) 23.06.1993 1♂; Kaymakçı (300m) 14.09.1993 1♂. Muğla: Milas (53m) 04.06.1993 1♂; Yerkelik (600m) 05.06.1993 1♂; Ula (600m) 06.06.1993 1♂; Çetibeli (110m) 07.06.1993 2♂♂; Göktepe (600m) 10.06.1993 1♂; Yatağan (600m) 18.09.1993 1♂; Marmaris (3m) 24.09.1993 1♂; Cennet (10m) 2♂♂; Datça (100m) 27.09.1993 1♂, 28.09.1993 1♂.

Phenology: May-September.

Distribution (figure 2). World: Europe, Asia-Manchuria, North America (VAN DER VECHT et al. 1972), Europe, North-West Europe, Maderina, Asia-Manchuria, a part of North America (GUSENLEITNER 1995). Turkey: Ege Bölgesi (TÜZÜN et al. 1988), Erzurum, Iğdır, Kahramanmaraş, Kars, Samsun (YILDIRIM & ÖZBEK 1996), Gavurdağı (BLÜTHGEN 1959). Vertical distribution recorded: 3-600m.

Genus *Eustenancistrocerus* BLÜTHGEN, 1938, Dt. Ent. Z. 2: 443-460

***Eustenancistrocerus blanchardianus* (SAUSSURE, 1855)**

Odynerus (*Odynerus* div. *Epsilon*) *blanchardianus* SAUSSURE, 1855, Ét. Fam. Vesp. 3: 276.

Diagnostic characters. Male: Clypeus yellow, much broader than long, free margin half-moon shaped. Mandibles black basally and getting brighter distally. Scape yellow ventrally, one third of dorsal part is yellow and the rest is black. Pedicel and flagellum black, the last flagellomere smooth, not curved. Second tergum very wide and swollen. Tergit 1-5 with yellow bands distally, sixth one black.

Material examined (1♂). Muğla: Datça (100m) 27.09.1993 1♂.

Phenology: September.

Distribution (figure 3). World: Spain, North Africa, Syria (BERLAND 1928), South-West Europe, North-West Africa (VAN DER VECHT et al. 1972). Turkey: First record. Vertical distribution recorded: 100m.

Genus *Alastor* LEPELETIER, 1841, Hist. Nat. Ins. Hym. 2: 668

***Alastor atropos* LEPELETIER, 1841**

Alastor atropos LEPELETIER, 1841, Hist. Nat. Ins. Hym. 2: 669.

Diagnostic characters. Female: Head completely black. Tergites 1-4 with yellow bands distally, the others black.

Material examined (1♀). Izmir: Ödemiş (118m) 13.09.1993 1♀.

Phenology: September.

Distribution (figure 1). World: Central and South Europe, Syria, from Middle East to Transcaucasia (GIORDANI-SOİKA 1970), South Europe, North Africa (BERLAND 1928), Iberian Peninsula, S. France, Italy, Sweden, Syria, Germany (GUSENLEITNER 1996). Turkey: Aegean Region (TÜZÜN et al. 1988). Vertical distribution recorded: 118m.

**Genus *Alastorynerus* BLÜTHGEN, 1938, Konowia 16 (1937): 294;
Dt. Ent. Z. 2 (1938): 447**

***Alastorynerus perezi* (BERLAND, 1927)**

Odynerus (*Microdynerus*) *perezi* BERLAND, 1927, Anns. Soc. Ent. Fr. 96: 110.

Diagnostic characters. Male: Dominant body colour yellow-black. Clypeus yellow, free

margin deeply notched and sharply toothed. Mandibles yellow with black teeth. Scape ventrally yellow, dorsally only basal half yellow, the rest black. The last three flagellomeres and half of the fourth one yellow ventrally, other flagellomeres black dorsally. The last flagellomere curved to the tenth. First tergum narrower than the second one, tergites 1-6 with yellow bands distally, seventh one black.

Material examined (1♂). Muğla: Çetibeli (110m) 07.06.1993 1♂.

Phenology: June.

Distribution (figure 3). World: Wien, Middle France, Spain (BERLAND 1928), France, Spain (VAN DER VECHT et al. 1972). Turkey: First record. Vertical distribution rec.: 110m.

Genus *Cephalochilus* BLÜTHGEN, 1939, Mitt. Ent. Ges. Halle 17: 13

***Cephalochilus labiatus hispanicus* (MEDINA, 1892)**

Pterochilus hispanicus MEDINA, 1892, An. Soc. Esp. Hist. Nat. 21 (Actas): 144.

Diagnostic characters. Female: Dominant body colours black and yellow. Clypeus yellow, wider than long, free margin is smooth. Mandibles yellow, toothed, reddish-brown-black towards the apex. Scape yellow, pedicel and flagellum entirely black. Tergites 1-6 with yellow bands distally but bands of the first and second ones extend laterally to the apical end.

Material examined (4♀♀). Balıkesir: Havran (50m) 21.08.1992 1♀. Manisa: Keçili (90m) 05.08.1992 1♀. Muğla: Bodrum (10m) 02.06.1993 1♀; Göktepe (600m) 10.06.1993 1♀.

Phenology: June-August.

Distribution (figure 2). World: Spain, South France (GUSENLEITNER 1994), Spain, Algeria (BERLAND 1928). Turkey: First record. Vertical distribution recorded: 10-600m.

Genus *Rhynchium* SPINOLA, 1806, Insect. Ligur. 1: 84

***Rhynchium oculatum oculatum* (FABRICIUS, 1781)**

Vespa oculata FABRICIUS, 1781, Spec. Insect. 1: 463.

Diagnostic characters. Female: Body colour is brown and mat yellow. Free margin of clypeus is quite narrow and rounded apically. Head completely brown. First tergum completely brown. Second tergum has a yellow band which is elongated laterally. Rest of tergites are orange-yellow.

Morphology of males similar to that of females.

Material examined (51♀♀ 115♂♂). Aydın: Kuşadası (22m) 20.08.1991 1♀, 28.09.1991 1♀ 1♂, 29.09.1991 2♀♀, 30.09.1991 1♀, 20.08.1993 3♀♀; Merkez (57m) 17.05.1993 1♀, 20.05.1993 3♂♂; Çine (90m) 22.05.1993 1♂; Nazilli (60m) 21.05.1993 2♂♂; Söke (75m) 23.05.1993 2♂♂. Balıkesir: Burhaniye (10m) 13.08.1992 2♀♀ 7♂♂, 15.08.1992 2♂♂; Havran (50m) 17.08.1992 3♀♀; Ören (10m) 11.08.1992 2♀♀ 2♂♂, 15.08.1992 1♂; Altınoluk (150m) 12.08.1992 1♂, 19.08.1992 2♀♀; Kızılköçili (25m) 22.08.1992 1♂; Güre (20m) 20.08.1992 1♂. Izmir: Buca (20m) 19.06.1993 1♀, 23.06.1992 1♀; Dikili (3m) 15.07.1992 6♀♀ 4♂♂, 20.07.1992 1♀; Urla (50m) 13.07.1992 1♀ 11♂♂; Gümüşsu (25m) 05.07.1992 3♀♀ 6♂♂; Tire (100m) 05.07.1992 2♀♀ 12♂♂, 07.07.1992 3♀♀ 12♂♂, 10.09.1993 1♂; Güzelbahçe (10m) 22.06.1993 1♀; Ödemiş 22.09.1993 1♀; Seferihisar (30m) 05.07.1992 4♀♀, 06.07.1992 5♂♂, 07.07.1992 9♂♂; Alaçatı (25m) 17.06.1993 1♀; Ilica (10m) 11.07.1992 1♀, 12.07.1992 1♀ 1♂; Alsancak (5m) 13.06.1993 1♂; Bornova

(20m) 24.06.1992 1♂; Cumaovası (80m) 23.06.1993 1♂. Manisa: Millipark (71m) 01.08.1992 3♀♀ 6♂♂, 30.07.1992 4♂♂, 29.05.1993 1♂; Merkez (71m) 30.07.1992 1♀; Gürle (95m) 06.08.1992 2♂♂, Akhisar (93m) 07.08.1992 1♂. Muğla: Marmaris (3m) 05.08.1991 1♀, 23.05.1993 1♂, 08.06.1993 1♂, 21.09.1993 1♂, 29.09.1993 1♂; Merkez (100m) 29.05.1993 1♂, 04.06.1993 1♂, 11.06.1993 1♀; Çetibeli (110m) 22.08.1992 1♂; Ula (600m) 06.06.1993 2♂♂; Bodrum (10m) 03.06.1992 1♂, 12.05.1993 1♂, 01.06.1993 1♂; Gökçe ada (600m) 10.06.1993 1♂.

Phenology: May-September.

Distribution (figure 3). World: Spain, Italy, The Balkans, Syria, North Africa, Mediterranean (BERLAND 1928), South Europe, Egypt (VAN DER VECHT et al. 1972), Greece (YILDIRIM & ÖZBEK 1996). Turkey: Aegean Region (TÜZÜN et al. 1988), Aydın, Eskişehir, Samsun, Balıkesir, İzmir, Manisa, Muğla (YILDIRIM & ÖZBEK 1996), Nazilli, Manisa (GUSENLEITNER 1966). Vertical distribution recorded: 3-600m.

Genus *Pseudopipona* SAUSSURE, 1856, Ét. Fam. Vesp. 3: 309

***Pseudopipona herrichii* (SAUSSURE, 1856)**

Odynerus (*Epipona* div. *Pseudopipona*) *herrichii* SAUSSURE, 1856, Ét. Fam. Vesp. 3: 309

Diagnostic characters. Female: Dominant body color yellow-black. Clypeus heart-shaped, free margin slightly depressed, with small teeth which are curved outwards. Upper part yellow, lower part black with yellow punctation basally. Tergites 1-5 with yellow bands distally.

Material examined (9♀♀). Aydın: Söke (75m) 23.05.1992 1♀. Balıkesir: Burhaniye (10m) 13.08.1992 1♀. İzmir: Bornova (20m) 24.06.1992 1♀; Tire (100m) 06.07.1992 1♀; Ilıca (10m) 10.07.1992 1♀, 12.07.1992 1♀. Muğla: Merkez (646m) 09.06.1993 1♀; Bodrum (10m) 03.06.1993 1♀; Datça (100m) 28.09.1993 1♀.

Phenology: May-September.

Distribution (figure 2). World: Middle and South Europe, eastward to Manchuria (VAN DER VECHT et al. 1972), Germany, Spain, Siberia, China, Shanghai (BERLAND 1928), Holland, Romania, France, Spain, Italy, Hungary, Crimea, East Europe, Greece, England (YILDIRIM & ÖZBEK 1996). Turkey: Erzurum (Kopdağı) (GIORDANI-SOİKA 1970), Erzurum (YILDIRIM & ÖZBEK 1996). Vertical distribution recorded: 10-646m.

Genus *Euodynerus* DALLA TORRE, 1904, Genera Insect. 19: 38

***Euodynerus dantici dantici* (ROSSI, 1790)**

Vespa dantici ROSSI, 1790, Fauna Etrusca 2: 89.

Diagnostic characters. Male: Dominant colour black, yellow. Clypeus has projections medio-laterally, it narrows towards bottom. Distal end sharply dentated, completely yellow. Mandibles bright yellow, toothed parts dark brown. Scape yellow ventrally, reddish brown dorsally. Pedicel and the first two flagellomeres reddish brown, rest of flagellum black. Abdomen yellow banded till 7th tergum distally, first sternum thin yellow lined.

Female: Upper part of clypeus arcuate, lateral parts stout, tapering downwards, free margin depressed to form a half-moon shape. Colour yellow, black lined longitudinally. Scape yellow ventrally and black dorsally. Pedicel and flagellum black. Tergites 1-5 with yellow bands distally, 6th one has yellow punctation basally.

Material examined (8♀♀ 22♂♂). Aydın: Didim (20m) 25.09.1991 1♀; Kuşadası 09.08.

1992 1♀. Balıkesir: Burhaniye (10m) 13.08.1992 2♂♂. Izmir: Buca (25m) 23.06.1992 1♂; Hatay (20m) 25.06.1992 1♂; Alsancak (5m) 27.06.1992 1♂, 21.06.1993 1♂; Gaziemir (30m) 01.07.1992 1♂; Gümüşsu (30m) 01.07.1992 1♂, 02.07.1992 1♂, 03.07.1992 1♂; Tire (100m) 07.07.1992 1♂; Seferihisar (30m) 09.07.1992 2♀♀ 2♂♂; Ilica (10m) 10.07.1992 1♂, 11.07.1992 2♂♂, 12.07.1992 1♂; Urla (50m) 13.07.1992 1♀ 2♂♂. Manisa: Gürle (95m) 06.08.1992 1♂. Muğla: Bodrum (10m) 03.06.1993 1♀ 1♂; Yerkesik (600m) 05.06.1993 1♀ 1♂; Göktepe (600m) 10.06.1993 1♀.

Phenology: June-September.

Distribution (figure 3). World: Middle Europe, Mediterranean (VAN DER VECHT et al. 1972), from Mediterranean sides to Middle Europe (GUSENLEITNER 1997), Lebanon, Syria, Turkey (GIORDANI-SOİKA 1970), Greece, Middle and South Europe, North Africa, Japan (YILDIRIM & ÖZBEK 1996). Turkey: Erzincan, Erzurum, Aydın, Izmir, İçel (YILDIRIM & ÖZBEK 1996), Adapazarı, Ereğli, Pozantı, Konya, Tekirdağ, Malkara, Ankara, Elmadağ, Osmaniye, Adana, Karataş, Bursa, Karacabey (GIORDANI-SOİKA 1970). Vertical distribution recorded: 5-600m.

Euodynerus velutinus BLUTHGEN, 1951

Euodynerus velutinus (KOSTYLEV) BLUTHGEN, 1951, Mitt.Münch.Ent.Ges. 41: 172, 195.

Diagnostic characters. Male: Clypeus yellow, half-elliptic shaped, tapering to the lower part and free margin is toothed. Mandibles black basally, toothed end brownish yellow. Scape yellow ventrally and black dorsally, rest of antennae black. Last flagellomere thin, long tip of it stout and recurved to the 10th. All tergites have yellow bands distally.

Material examined (1♂). Izmir: Ilica (10m) 10.07.1992 1♂.

Phenology: July.

Distribution (figure 3). World: East Mediterranean (VAN DER VECHT et al. 1972), South Balkans, Cyprus (GUSENLEITNER 1997). Turkey: Ankara (Elmadağ) (GIORDANI-SOİKA 1970). Vertical distribution recorded: 10m.

Euodynerus variegatus variegatus (FABRICIUS, 1793)

Vespa variegata FABRICIUS, 1793, Entom. Syst. 2: 269.

Diagnostic characters. Female: Dominant body colour black and yellow. Clypeus longer than wide, upper margin indented, free margin half-moon shaped. Base of mandibles black with fine yellow punctation and the rest is honey colored. Scape yellow ventrally, base of dorsal part brown and becoming gradually black. Tergites 1-5 with yellow bands distally, 6th one yellow spotted on distal end.

Material examined (15♀♀). Aydın: Didim (20m) 25.09.1991 5♀♀, 27.09.1991 5♀♀. Izmir: Gümüşsu (30m) 05.07.1992 1♀; Seferihisar (30m) 09.07.1992 1♀. Muğla: Marmaris (3m) 06.08.1991 1♀; Bodrum (Gümbet) (10m) 12.08.1991 1♀; Bodrum (10m) 31.05.1993 1♀.

Phenology: May-September.

Distribution (figure 3). World: South France, Iberia, South-West Africa (GUSENLEITNER 1997), South-West Europe, North Africa (VAN DER VECHT et al. 1972). Turkey: First record. Vertical distribution recorded: 3-30m.

Euodynerus (Pareodynerus) quadrifasciatus quadrifasciatus (FABRICIUS, 1793)

Vespa quadrifasciata FABRICIUS, 1793, Entom. Syst. 2: 266.

Diagnostic characters. Male: Dominant body color yellow-black. Clypeus is as wide as

long, lower end slightly depressed and has a fine tooth. Mandibles yellow, tip of which are slightly reddish brown. Scape yellow ventrally, flagellomeres completely black, the last flagellomere very small, stout and recurved. Tergites 1-5 with yellow bands distally, tergites 6 and 7 black. First sternum with a thin yellow band, second one punctated laterally and yellow banded distally. Tergites 3-5 black.

Material examined (35♂♂). Balıkesir: Burhaniye (10m) 13.08.1992 7♂♂. Izmir Urla (50m) 13.07.1992 15♂♂; Dikili (3m) 14.07.1992 1♂; Seferihisar (30m) 08.07.1991 1♂. Manisa: Keçili (90m) 05.08.1992 1♂. Muğla: Bodrum (10m) 03.06.1993 2♂♂; Merkez (646m) 06.09.1993 1♂, 20.06.1993 1♂; Marmaris (3m) 08.06.1993 1♂, 27.09.1993 1♂; Cennet (10m) 26.09.1993 2♂♂; Datça (100m) 28.09.1993 1♂; Göktepe (600m) 10.06.1993 1♂.

Phenology: June-September.

Distribution (figure 3). World: From Asia to Siberia, North-West Africa, Erivan (GUSENLEITNER 1997), North-Middle Europe, Siberia, Turkey (VAN DER VECHT et al. 1972). Turkey: Amasya, Ankara (Karagöl) (GIORDANI-SOİKA 1970). Vertical distribution recorded: 3-646m.

***Euodynerus (Syneuodynerus) egregius egregius* (HERRICH-SCHÄFFER, 1839)**

Odynerus egregius HERRICH-SCHÄFFER, 1839, Fauna Insect Germ. pt. 173: 10.

Diagnostic characters. Female: Dominant body color yellow-black. Clypeus wider than long, upper margin indented, lower part convex and free margin is toothed. Clypeus has yellow bands on upper parts, lower parts black, toothed part is slightly punctated. Mandibles basally black and slightly punctated, reddish brown to the end. First tergum has a yellow band transversely on distal part which is interrupted medially. Tergites 3-5 have also transverse yellow band, the band on 6th one is V-shaped.

Material examined (1♀). Muğla: Marmaris (3m) 27.09.1993 1♀.

Phenology: September.

Distribution (figure 3). World: Central Asia (GIORDANI-SOİKA 1970), from South Germany to Middle Europe (VAN DER VECHT et al. 1972), South Europe, Cyprus (GUSENLEITNER 1997). Turkey: Hatay, Iskenderun, Ankara, Kavaklıdere, Mersin, Sertavul Geçidi (GIORDANI-SOİKA 1970), Beyşehir, Kuşadası, Manisa, Antakya, Mut, Konya (GUSENLEITNER 1966). Vertical distribution recorded: 3m.

Genus *Parodontodynerus* BLÜTHGEN, 1938, Konowia 16 (1937): 280;

Dt. ent. Z. 1938: 452, 459

***Paraodontodynerus ephippium ephippium* (KLUG, 1817)**

Eumenes ephippium KLUG, 1817, in GERMOR: Reise nach Dalmat. 2: 264.

Diagnostic characters. Female: Dominant body colours are yellow and black. Clypeus is as wide as long, free margin is half-moon shaped. There is a wide yellow band on upper part of clypeus, lower end is black. Mandibles black. Tergites 1-2 with yellow bands distally, other tergites black.

Material examined (11♀♀). Aydın: Çine (90m) 21.05.1993 1♀; Nazilli (60m) 18.05.1993 1♀. Izmir: Dalyan (20m) 20.06.1993 1♀. Manisa: Millipark (71m) 01.08.1992 1♀. Muğla: Merkez (646m) 29.05.1993 1♀; Yatağan (376m) 01.06.1993 1♀; Güllük (10m) 02.06.1993 3♀♀; Bodrum (10m) 03.06.1993 2♀♀.

Phenology: May-August.

Distribution (figure 2). World: Persia, Armenia, South Europe, South-East Asia (VAN DER VECHT et al. 1972), Greece (YILDIRIM & ÖZBEK 1996), France, South Europe (BERLAND 1928). Turkey: Kütahya, Gediz, Halkalı, Pozantı (GIORDANI-SOİKA 1970), Denizli, Manisa, Nazilli, Antakya, Konya (GUSENLEITNER 1966), Pamukkale, Beyşehir, Kuşadası, Kızılcahamam (GUSENLEITNER 1967), Artvin, Erzurum (YILDIRIM & ÖZBEK 1996). Vertical distribution recorded: 10-646m.

Genus *Allodynerus* BLÜTHGEN, 1938, Konowia 16 (1937): 280;
Deut. Ent. Z. 2: 452, 458

Allodynerus floricola floricola SAUSSURE, 1853

Allodynerus floricola floricola SAUSSURE, 1853, Ét. Fam. Vesp. 1: 155, 196.

Diagnostic characters. Male: Clypeus yellow, free margin sharp toothed. Mandibles yellow. Scape yellow ventrally, black dorsally. Pedicel and flagellum black. The last flagellomere curved to the eleventh. First tergum large and depressed to the second one. Tergites 1-6 with yellow lines distally, 7th black.

Material examined (26♂♂). Aydın: Merkez (57m) 22.05.1993 3♂♂; Didim (20m) 24.09.1991 1♂; Nazilli (60m) 12.05.1993 1♂. Balıkesir: Burhaniye (10m) 13.07.1992 1♂. İzmir: Gaziemir (30m) 24.06.1993 1♂; Gümüşsu (30m) 05.07.1992 5♂♂; Seferihisar (30m) 08.07.1992 3♂♂, 09.07.1992 2♂♂; Urla (50m) 13.07.1992 2♂♂. Muğla: Yatağan (376m) 30.05.1993 1♂; Milas (53m) 01.06.1993 3♂♂; Bodrum (10m) 03.06.1993 2♂♂; Yerkesik (600m) 05.06.1993 1♂.

Phenology: May-September.

Distribution (figure 2). World: France, Spain, Algeria (BERLAND 1928), Central and South Europa, Turkey, Armenia (VAN DER VECHT et al. 1972), Greece (YILDIRIM & ÖZBEK 1996). Turkey: Aydın, Erzurum (YILDIRIM & ÖZBEK 1996), Konya (VAN DER VECHT et al. 1972). Vertical distribution recorded: 10-600m.

Results

At the end of the study *Eumenes variegatus variegatus*, *Eumenes dubius cyrenaicus*, *Cephalochilus labiatus hispanicus*, *Eustenancistrocerus blanchardianus*, *Alastorynerus perezi* are species newly recorded for the turkish fauna.

Pseudopipona herrichii, *Euodynerus velutinus*, *Euodynerus quadrifasciatus quadrifasciatus* are species newly recorded for the Aegean region.

Species that are newly recorded for provinces of the Aegean region are as follows: *Delta unguiculatum unguiculatum*: Balıkesir, Denizli and Muğla. *Symmorphus gracilis*: İzmir, Manisa and Muğla. *Ancistrocerus auctus auctus*: Balıkesir, İzmir, Manisa and Muğla. *Ancistrocerus longispinosus longispinosus*: Balıkesir, İzmir and Kütahya. *Ancistrocerus parietum*: Aydın, Balıkesir and İzmir. *Euodynerus dantici dantici*: Balıkesir, Muğla and Manisa. *Euodynerus egregius egregius*: Muğla. *Parodontodynerus ephippium ephippium*: Aydın, İzmir and Muğla.

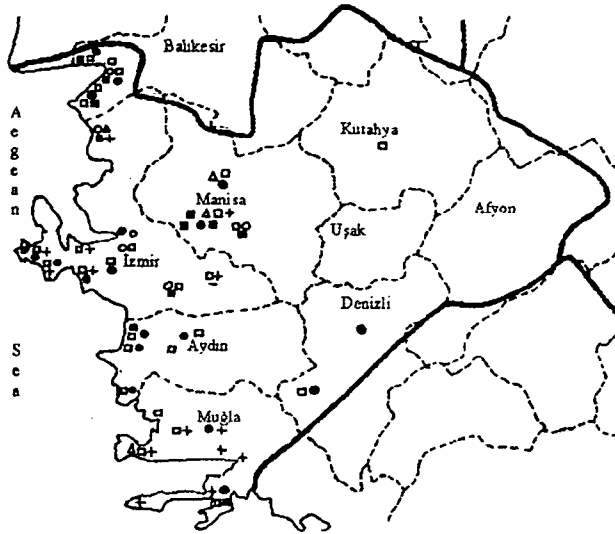


Fig. 1: Δ = *I. picteti*, \blacktriangle = *E. dubius*, \square = *E. pomiformis*, \blacksquare = *E. cyrenaicus*, \circ = *N. intermedius*, \bullet = *D. unguiculatum*, $+$ = *S. gracilis*, $-$ = *A. atropos*.

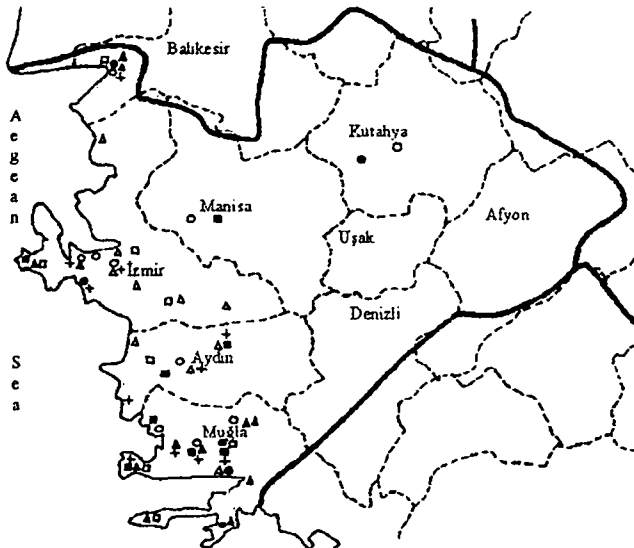


Fig. 2: Δ = *A. parietum*, \blacktriangle = *C. hispanicus*, \square = *P. herrichi*, $+$ = *A. floricola*, \circ = *A. auctus*, \bullet = *A. longispinosus*, \blacksquare = *P. ehippium*.

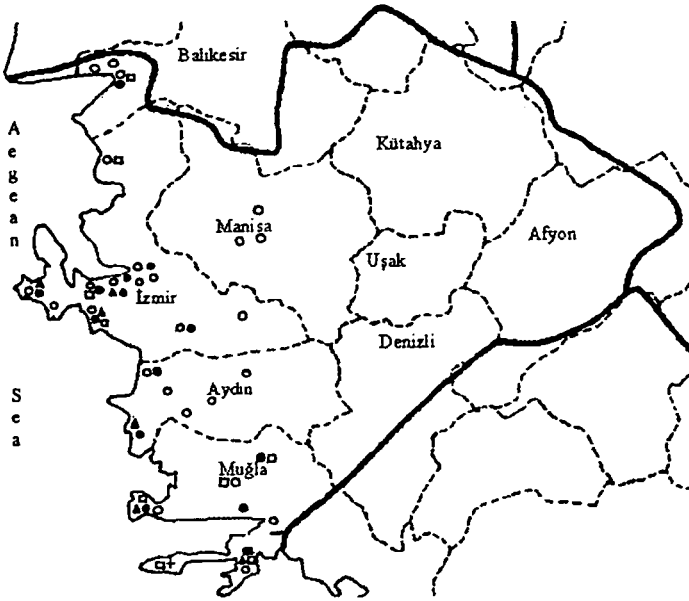


Fig. 3: Δ = *E. velutinus*, \blacktriangle = *E. variegatus*, \square = *E. quadrifasciatus*, \blacksquare = *E. egregius*, \circ = *R. oculatum*, + = *E. blanchardianus*, - = *A. prerei*.

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