

ODONATA OF THE WESTERN BLACK SEA REGION OF TURKEY, WITH TAXONOMIC NOTES AND SPECIES LIST OF THE REGION

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40 spp./sspp. from 58 localities were recorded during 2003 and 2005-2007. *Sympecma fusca*, *Erythromma lindenii*, *Somatochlora meridionalis*, *Orthetrum albistylum* and *Sympetrum pedemontanum* are new for the region. *S. meridionalis* records are the easternmost within its range. Geographical distribution of some other spp. is discussed, and notes on the morphology and taxonomic status of the regional *Calopteryx splendens*, *C. virgo*, *Ischnura elegans* and *Cordulegaster insignis* are provided. The distributions of *Coenagrion pulchellum*, *C. scitulum*, *Pyrrhosoma n. nymphula*, *Aeshna cyanea*, *Cordulia aenea* and *Sympetrum depressiusculum* in Turkey are still largely unknown. Based on all available records, a list of the 51 spp./sspp. currently known from the Western Black Sea Region is presented.

INTRODUCTION

The Black Sea Region extends from the eastern edge of Sakarya plain in the West, to Georgia in the East. It is divided in three subregions: the West, Centre and East (Fig. 1). The Western Black Sea Region studied extends from the East of Sakarya plain and Bilecik province to the West of the Kızılırmak delta. It includes the northern parts of Ankara and Çankırı provinces, and the eastern parts of Sakarya and Bilecik provinces (Fig.1).

Physically, the North Anatolian mountains extend in East-West direction and are cut by rich water sources, such as streams, brooks and ponds. The region was an important refugium during glacial periods for organisms coming as well from Europe as from the Caucasus (Boreal elements) (DEMİRİSOY, 1996).

Although many papers discuss the odonate fauna of Turkey, the Western Black Sea Region has attracted only few studies (DUMONT, 1977; DEMİRİSOY, 1982; SCHNEIDER, 1986a; KALKMAN et al., 2003; VAN PELT, 2004; KALKMAN

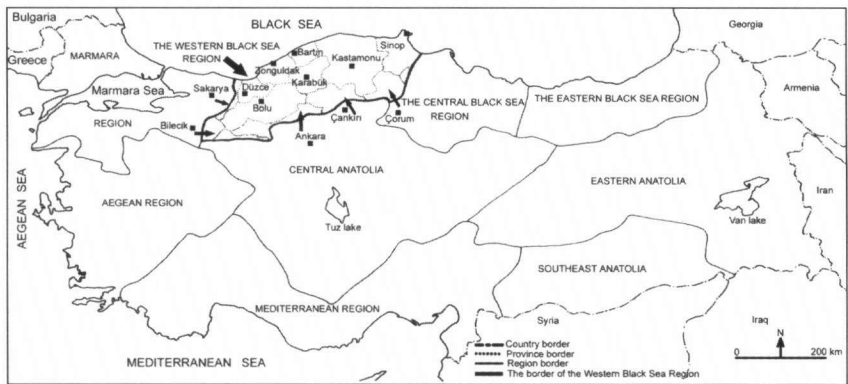


Fig. 1. Map of Turkey, with the geographic regions indicated.

et al., 2004a; KALKMAN & VAN PELT, 2006a, 2006b), mostly dealing with the vicinity of Bolu. To date, the most intense study of the region was carried out by VAN PELT (2004), who recorded 41 spp./sspp. Recently, KALKMAN et al. (2004a) added one and KALKMAN & VAN PELT (2006a, 2006b) another 2 new species for the region. However, there are still provinces that have not been studied in detail. The objective of this study was to contribute to the knowledge on the odonate fauna of these unexplored provinces. A checklist for the whole region is also provided.

The study material (imagoes only) was collected during 2003 and 2005-2007. All data are given in the list of collecting sites. The localities are listed in alpha-

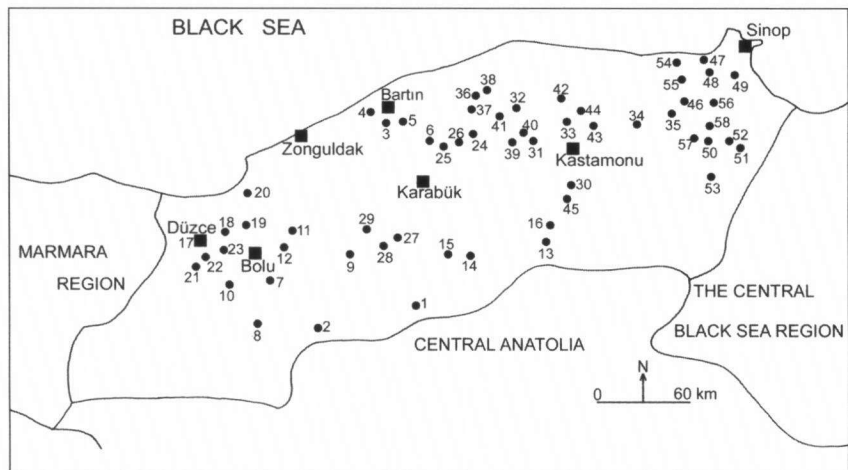


Fig. 2. Collecting sites in the Western Black Sea Region. For explanation of the numbers, see the locality list.

betical order for each province and are shown in Figure 2. The specimens are kept in the collections of the Biology Department of the Trakya University, Edirne, Turkey.

COLLECTING SITES IN THE WESTERN BLACK SEA REGION, TURKEY

- (1) Ankara: ca 5 km road from Kızılcahamam to Çamlıdere, brook along road; 8-VIII-2007, 984 m, 40°30'N, 32°36'E.
- (2) Ankara: road between Beypazarı and Kırıbrıcık, Karagöl lake; 8-VIII-2007, 1419 m, 40°21'N, 31°55'E.
- (3) Bartın: Akmanlar village, water channel side of a cultivated field; 14-VII-2005, 74 m, 41°32'N, 32°14'E.
- (4) Bartın: road between Bartın and İnkum, river along road near Gürgenpınar; 15-VII-2005, sea level, 41°39'N, 32°15'E.
- (5) Bartın: road Bartın-Safranbolu, near Alibaş village, river with stony ground; 15-VII-2005, 226 m, 41°28'N, 32°38'E.
- (6) Bartın: road Bartın-Safranbolu, before ca 28 km from Safranbolu, near Uluyayla, vicinity of drinking fountain; 15-VII-2005, 1100 m, 41°34'N, 32°38'E.
- (7) Bolu: Aladağlar, Gölçük lake; 28-VI-2003, 2000 m, 40°40'N, 31°36'E.
- (8) Bolu: Seben (Yörük mountain-Köroğlu brook); 28-VI-2003, 1300 m, 40°24'N, 31°34'E.
- (9) Bolu: road Gerede-Bolu, the exit of Gerede, marshy place; 16-VII-2005, 6-VIII-2007, 1331 m, 40°47'N, 32°10'E.
- (10) Bolu: Abant lake; 9-VIII-2007, 1332 m, 40°36'N, 31°16'E.
- (11) Bolu: Yedigöller (Deringöl lake); 10-VIII-2007, 831 m, 40°56'N, 31°44'E.
- (12) Bolu: road Yedigöller-Bolu, woodland place; 10-VIII-2007, 1433 m, 40°55'N, 31°42'E.
- (13) Çankırı: Ilgaz, Devrez stream; 27-VI-2006, 899 m, 40°54'N, 31°37'E.
- (14) Çankırı: roadside between Kurşunlu and Çerkeş, marshy place; 3-VII-2006, 1248 m, 40°50'N, 32°26'E.
- (15) Çankırı: Çerkeş, brooklet near bridge; 3-VII-2006, 1166 m, 40°48'N, 32°55'E.
- (16) Çankırı: Ilgaz-Kırkpınar plateau; 3-VII-2007, 1797 m, 41°00'N, 33°37'E.
- (17) Düzce: brooklet; 11-VII-2005, 156 m, 40°48'N, 31°10'E.
- (18) Düzce: the east of Düzce, Gürcüçiftlik village, brooklet; 12-VII-2005, 177 m, 40°53'N, 31°13'E.
- (19) Düzce: Yığılca-İğneler village, brook; 12-VII-2005, 279 m, 40°56'N, 31°21'E.
- (20) Düzce: between Yığılca and Alaplı, brook in woodland near road; 13-VII-2005, 486 m, 40°00'N, 31°25'E.
- (21) Düzce: Efteni lake; 11-VIII-2007, 137 m, 40°45'N, 31°03'E.
- (22) Düzce: road between Efteni lake and Düzce, brooklet in a cultivated field; 11-VIII-2007, 137 m, 40°46'N, 31°07'E.
- (23) Düzce: Kurugöl lake; 12-VIII-2007, 478 m, 40°48'N, 31°17'E.
- (24) Karabük: Eflani-Kadıköy pond; 26-VI-2007, 930 m, 41°27'N, 32°59'E.
- (25) Karabük: Ovacuma, river with stony ground; 26-VI-2007, 324 m, 41°27'N, 32°43'E.
- (26) Karabük: Eflani-Bostancılar pond; 26-VI-2007, 931 m, 41°26'N, 32°56'E.
- (27) Karabük: Eskipazar, the entrance of Büyükyayalar village, brook; 7-VIII-2007, 854 m, 40°55'N, 32°28'E.
- (28) Karabük: Eskipazar-Adiller village, Adiller pond; 7-VIII-2007, 1457 m, 40°52'N, 32°18'E.
- (29) Karabük: Eskipazar-Mengen road, ca 20 km before Mengen, brook; 7-VIII-2007, 796 m, 40°56'N, 32°16'E.
- (30) Kastamonu: road between Ilgaz and Kastamonu, near Beşdeğirmenler village, brook; 28-VI-2006, 1044 m, 41°11'N, 33°47'E.

- (31) Kastamonu: Kastamonu-Daday road, ca 9 km from Daday, brook side of a cultivated field; 29-VI-2006, 818 m, 41°28'N, 33°35'E.
- (32) Kastamonu: Azdavay-Küre road, 5 km from the exit of Azdavay, stream; 29-VI-2006, 29-VI-2007, 827 m, 41°39'N, 33°21'E.
- (33) Kastamonu: Küre-Kastamonu road, ca 40 km from Kastamonu; 29-VI-2006, 1107 m, 41°40'N, 33°42'E.
- (34) Kastamonu: ca 17 km on Taşköprü-Sinop road, Kıvrıncı stream; 30-VI-2006, 515 m, 41°35'N, 34°19'E.
- (35) Kastamonu: Hanönü, near the exit of Aşağıcakırçay, rice fields; 30-VI-2006, 384 m, 41°37'N, 34°32'E.
- (36) Kastamonu: Küre Mountains National Park, 27-VI-2007, 527 m, 41°41'N, 33°05'E.
- (37) Kastamonu: Pınarbaşı-İllica, brook; 27-VI-2007, 415 m, 41°39'N, 33°08'E.
- (38) Kastamonu: Kokurdan plateau; 27-VI-2007, 1029 m, 41°43'N, 33°07'E.
- (39) Kastamonu: Daday-Taşçılar pond; 28-VI-2007, 992 m, 41°28'N, 33°23'E.
- (40) Kastamonu: Daday-Yumurtacı pond; 28-VI-2007, 938 m, 41°28'N, 33°26'E.
- (41) Kastamonu: Pınarbaşı-Azdavay road, stream near the exit of Pınarbaşı; 29-VI-2007, 822 m, 41°38'N, 33°17'E.
- (42) Kastamonu: Seydiler-Kepez village, Beyler dam; 29-VI-2007, 1118 m, 41°41'N, 33°47'E.
- (43) Kastamonu: Devrekani-Belovacık village, Balıklı lake; 30-VI-2007, 1272 m, 41°36'N, 34°01'E.
- (44) Kastamonu: Devrekani-Çatalzeytin road, 10 km from Devrekani; 30-VI-2007, 1131 m, 41°40'N, 33°55'E.
- (45) Kastamonu: Ilgaz-Kastamonu road, ca 1 km from Çatören, brook; 3-VII-2007, 1226 m, 41°07'N, 33°46'E.
- (46) Sinop: Boyabat, near Uzunçay village, woodland place; 30-VI-2006, 1329 m, 41°41'N, 34°38'E.
- (47) Sinop: Ayancık-Ağaçlı village, brook; 1-VII-2006, 4 m, 41°56'N, 34°43'E.
- (48) Sinop: between Selbeyi and Erfelek, Çaykaşı bridge, river; 1-VII-2006, 137 m, 41°53'N, 34°55'E.
- (49) Sinop: Karapınar village, river in woodland; 1-VII-2006, 264 m, 41°50'N, 34°57'E.
- (50) Sinop: Boyabat-Çatpınar village, rice fields; 2-VII-2006, 252 m, 41°27'N, 34°51'E.
- (51) Sinop: Durağan-Durağan barrage lake; 2-VII-2006, 198 m, 41°24'N, 35°05'E.
- (52) Sinop: Durağan-Dağdelen village, brook; 2-VII-2006, 223 m, 41°25'N, 34°57'E.
- (53) Sinop: Saraydüzü-Yaylacılı village, water channel side of road near rice fields; 2-VII-2006, 2-VII-2007, 231 m, 41°15'N, 34°52'E.
- (54) Sinop: Çatalzeytin-Tevfikiye road, ca 1 km from Tevfikiye, river; 30-VI-2007, 354 m, 41°52'N, 34°33'E.
- (55) Sinop: between Ayancık and Hanönü, 15 km, stream with rocky ground; 01-VII-2007, 174 m, 41°51'N, 34°37'E.
- (56) Sinop: Akgöl lake; 1-VII-2007, 1024 m, 41°41'N, 34°35'E.
- (57) Sinop: Boyabat-Koçak, brook; 1-VII-2007, 340 m, 41°36'N, 34°38'E.
- (58) Sinop: Boyabat-Bektaş village, Bektaş dam; 2-VII-2007, 361 m, 41°32'N, 34°46'E.

RESULTS

Forty taxa were collected or sighted. *Sympecma fusca*, *Erythromma lindenii*, *Somatochlora meridionalis*, *Orthetrum albistylum* and *Sympetrum pedemontanum* represent first records for the study region. For others, the present records extend their known range in Turkey. The present study, together with available records, increases the number of known species in the region up to 51.

LIST OF SPECIES

Calopterygidae

Calopteryx splendens amasina Bart.

Material: – (3): 1 ♀; – (5): 1 ♂; – (8): 1 ♂, 1 ♀; – (13): 10 ♂, 3 ♀; – (17): 1 ♂, 1 ♀; – (19): 1 ♂; – (30): 1 ♂; – (31): 7 ♂, 3 ♀; – (32): (29.VI.2006), 3 ♂, (29.VI.2007), 1 ♀; – (33): 3 ♂; – (35): 1 ♂, 1 ♀; – (41): 10 ♂, 3 ♀; – (47): 1 ♂; – (48): 1 ♂; – (51): 1 ♂; – (52): 3 ♂, 1 ♀; – (57): 4 ♂, 1 ♀.

Sighting: – (24): 1 ♂, 1 ♀; – (47): 1 ♂.

Calopteryx virgo festiva (Brullé)

Material: – (3): 4 ♂, 1 ♀; – (5): 1 ♂; – (11): 1 ♂; – (17): 1 ♀; – (18): 2 ♂, 2 ♀; – (27): 1 ♂, 2 ♀; – (28): 3 ♂, 1 ♀; – (31): 2 ♂; – (37): 2 ♀; – (45): 2 ♂; – (47): 4 ♂; – (55): 1 ♂, 1 ♀.

Sighting: – (1): 1 ♂; – (24): 1 ♂, 1 ♀.

Euphaeidae

Epallage fatime (Charp.)

Material: – (18): 1 ♂; – (47): 4 ♂, 2 ♀; – (49): 1 ♂, 2 ♀.

Sighting: – (37): 1 ♂.

Lestidae

Lestes barbarus (Fabr.)

Material: – (9): (16.VII.2005), 4 ♂, 3 ♀.

Lestes dryas Kirby

Material: – (8): 2 ♂, 5 ♀; – (9): (16.VII.2005), 1 ♀; – (16): 1 ♂.

Lestes sponsa (Hans.)

Material: – (9): (6.VIII.2007), 1 ♂, 1 ♀; – (15): 6 ♂; – (23): 1 ♂.

Lestes virens (Charp.)

Material: – (9): (6.VIII.2007), 1 ♀; – (38): 1 ♀.

Sympecma fusca (Vander L.)

Material: – (9): (6.VIII.2007), 1 ♀; – (10): 1 ♂; – (16): 5 ♂, 2 ♀; – (35): 6 ♂, 4 ♀; – (40): 1 ♂; – (50): 7 ♂; – (52): 1 ♂; – (56): 10 ♂, 3 ♀; – (58): 1 ♂, 2 ♀.

Coenagrionidae

Coenagrion puella (L.)

Material: – (6): 2 ♂, 2 ♀; – (8): 1 ♂; – (9): (16.VII.2005), 12 ♂, 2 ♀; – (10): 1 ♀; – (11): 2 ♂; – (13): 9 ♂; – (15): 19 ♂; – (16): 2 ♂; – (24): 2 ♂; – (30): 4 ♂, 1 ♀; – (31): 1 ♀; – (32): 1 ♂; – (33): 10 ♂, 2 ♀; – (35): 1 ♂; – (38): 1 ♂; – (39): 5 ♂, 2 ♀; – (40): 10 ♂, 1 ♀; – (41): 1 ♂; – (43): 8 ♂; – (56): 4 ♂.

Coenagrion pulchellum (Vander L.)

Material: – (14): 15♂.

Coenagrion scitulum (Ramb.)

Material: – (15): 6♂, 2♀.

Enallagma cyathigerum (Charp.)

Material: – (7): 1♂; – (9): (16.VII.2005), 2♂; – (10): 2♂, 1♀; – (15): 2♂, 1♀; – (40): 6♂; – (42): 13♂, 2♀; – (43): 2♂; – (58): 1♂.

Erythromma l. lindenii (Sel.)

Material: – (1): 4♂; – (26): 11♂.

Erythromma viridulum (Charp.)

Material: – (9): (16.VII.2005), 1♂; – (23): 2♂, 1♀.

Ischnura elegans (Vander L.)

Material: – (1): 1♂, 1♀; – (2): 1♂; – (7): 3♂, 3♀; – (9): (16.VII.2005), 1♂, 2♀, (6.VIII.2007), 1♂, 1♀; – (10): 3♂, 2♀; – (11): 2♂, 1♀; – (13): 1♂, 6♀; – (14): 4♂; – (15): 2♂, 2♀; – (22): 1♂, 2♀; – (23): 1♂, 1♀; – (24): 1♂, 1♀; – (26): 1♀; – (39): 1♂; – (40): 2♂, 1♀; – (42): 1♂, 1♀; – (43): 2♂, 1♀.

Ischnura pumilio (Charp.)

Material: – (9): (16.VII.2005), 1♀; – (16): 1♂; – (33): 2♂, 2♀; – (58): 1♂, 2♀.

Pyrrhosoma n. nymhula (Sulz.)

Material: – (24): 1♀; – (38): 1♂, 2♀.

Platycnemididae

Platycnemis p. pennipes (Pall.)

Material: – (1): 3♂, 1♀; – (3): 2♂, 1♀; – (4): 3♂, 1♀; – (7): 2♂; – (13): 9♂; – (15): 1♂, 1♀; – (17): 1♂, 1♀; – (18): 1♀; – (19): 7♂, 2♀; – (20): 1♀; – (23): 1♂, 2♀; – (24): 2♂; – (29): 2♂; – (30): 2♂; – (31): 3♂; – (32): (29.VI.2006), 1♂, (29.VI.2007), 1♂; – (33): 2♂; – (35): 2♂, 2♀; – (37): 4♂; – (38): 2♂, 1♀; – (41): 3♂; – (47): 1♂; – (48): 1♂; – (50): 2♂, 1♀; – (57): 1♂, 1♀.
Sighting: – (11): 2♂.

Aeshnidae

Aeshna cyanea (Müll.)

Material: – (11): 2♂; – (56): 4♂.

Aeshna isoceles (Müll.)

Material: – (4): 1♀; – (50): 2♂.

Sighting: – (35): 1♂.

Anax imperator Leach

Material: – (7): 1 ♂; – (15): 2 ♂, 1 ♀; – (42): 1 ♂ (exuviae).

Sighting: – (1): 1 ♂; – (24): 1 ♂; – (26): 1 ♂; – (39): 1 ♂; – (40): 1 ♂.

Caliaeschna microstigma (Schneider)

Material: – (20): 1 ♂; – (38): 1 ♂.

G o m p h i d a e

Gomphus schneideri Sel.

Material: – (17): 2 ♂; – (24): 1 ♂; – (41): 1 ♂.

Onychogomphus forcipatus albotibialis Schmidt

Material: – (5): 2 ♂; – (18): 2 ♂; – (25): 1 ♀; – (32): (29.VI.2006), 2 ♀, (29.VI.2007), 1 ♂; – (34): 1 ♂, 1 ♀; – (39): 1 ♂; – (45): 3 ♂; – (48): 4 ♂; – (52): 1 ♂; – (54): 1 ♂.

Sighting: – (28): 1 ♂; – (47): 1 ♂; – (51): 1 ♂.

C o r d u l e g a s t r i d a e

Cordulegaster insignis ssp.

Material: – (46): 1 ♂.

Cordulegaster picta Sel.

Material: – (20): 1 ♂; – (28): 1 ♂.

C o r d u l i i d a e

Cordulia aenea (L.)

Material: – (43): 6 ♂; – (56): 2 ♂.

Somatochlora flavomaculata (Vander L.)

Material: – (10): 3 ♂.

Somatochlora meridionalis Nielsen

Material: – (24): 1 ♂; – (38): 2 ♂.

L i b e l l u l i d a e

Crocothemis erythraea (Brullé)

Material: – (23): 1 ♂, 1 ♀; – (26): 1 ♀; – (40): 1 ♂; – (51): 1 ♀.

Sighting: – (35): 1 ♀.

Libellula depressa L.

Material: – (13): 1 ♂; – (15): 1 ♂; – (18): 1 ♀; – (32): (29.VI.2006), 1 ♂; – (38): 1 ♂; – (42): 1 ♂; – (43): 1 ♂; – (44): 2 ♂.

Sighting: – (15): 1 ♂; – (24): 1 ♂; – (35): 1 ♂; – (39): 1 ♂; – (40): 1 ♂; – (51): 1 ♂.

Orthetrum albistylum (Sel.)

Material: – (23): 1 ♂.

Orthetrum brunneum (Fonsc.)

Material: – (1): 3 ♂, 2 ♀; – (3): 1 ♂; – (15): 1 ♂; – (17): 2 ♂, 1 ♀; – (27): 1 ♂; – (28): 1 ♂; – (29): 1 ♀; – (32): (29.VI.2006), 2 ♂, 1 ♀, (29.VI.2007), 1 ♂; – (36): 1 ♂, 1 ♀; – (39): 1 ♂; – (48): 1 ♀; – (49): 1 ♀; – (58): 3 ♀.

Orthetrum cancellatum (L.)

Material: – (2): 2 ♂, 1 ♀; – (7): 1 ♀; – (23): 1 ♂, 3 ♀; – (51): 1 ♂.

Orthetrum coerulescens (Fabr.)

Material: – (4): 1 ♀; – (14): 1 ♂; – (21): 1 ♂; – (29): 1 ♂; – (36): 1 ♂; – (37): 1 ♀.

Sympetrum depressiusculum (Sel.)

Material: – (1): 1 ♀; – (50): 2 ♂, 2 ♀; – (52): 5 ♂, 3 ♀; – (53): (2.VII.2006), 1 ♂, 8 ♀, (2.07.2007), 1 ♂, 6 ♀.

Sympetrum flaveolum (L.)

Material: – (9): (16.VII.2005), 1 ♂; – (16): 1 ♂; – (28): 1 ♀.

Sympetrum fonscolombi (Sel.)

Material: – (1): 1 ♂; – (2): 3 ♂, 2 ♀; – (12): 1 ♂; – (22): 4 ♂, 1 ♀; – (29): 1 ♂, 1 ♀; – (35): 5 ♂; – (40): 1 ♀; – (42): 2 ♂; – (50): 2 ♂; – (51): 3 ♀; – (52): 1 ♂; – (53): (2.VII.2007), 1 ♀; – (57): 1 ♂, 2 ♀; – (58): 1 ♀.

Sympetrum pedemontanum (Müll. in Allioni)

Material: – (1): 5 ♂, 1 ♀.

Sympetrum sanguineum (Müll.)

Material: – (4): 2 ♂; – (9): (16.VII.2005), 1 ♂; – (10): 6 ♂; – (14): 2 ♀; – (21): 5 ♂; – (23): 2 ♂; – (24): 1 ♂; – (40): 3 ♂, 2 ♀.

Sympetrum striolatum (Charp.)

Material: – (1): 1 ♂, 1 ♀; – (9): (6.VIII.2007), 1 ♂; – (15): 1 ♀.

REVIEW OF THE HITHERTO KNOWN SPECIES AND THEIR DISTRIBUTION IN THE REGION

Source of information: *: present paper; – 1: DUMONT (1977); – 2: DEMİRİSOY (1982); – 3: SCHNEIDER (1986a); – 4: KALKMAN et al. (2003); – 5: VAN PELT (2004); – 6: KALKMAN et al. (2004a); – 7: KALKMAN & VAN PELT (2006a, 2006b).

Species	Provinces									
	Ankara (north part)	Bartın	Bolu	Çankırı (north part)	Düzce	Karabük	Kastamonu	Sakarya (east part)	Sinop (west part)	Zonguldak
<i>Calopteryx splendens amasina</i> Bartenev, 1912		*	*,5	*,5	*	*	*	5	*	
<i>Calopteryx virgo festiva</i> (Brullé, 1832)	*,5	*	*,5		*	*,5	*,5		*	6
<i>Epallage fatime</i> (Charpentier, 1840)					*		*	5	*	
<i>Lestes barbarus</i> (Fabricius, 1798)			*	5						6
<i>Lestes dryas</i> Kirby, 1890	5		*,5	*,5			5	5		
<i>Lestes sponsa</i> (Hansemann, 1823)	5		*,5	*,5	*		5			
<i>Lestes virens</i> (Charpentier, 1825)			*				*,5			
<i>Sympecma fusca</i> (Vander Linden, 1820)			*	*			*		*	
<i>Coenagrion ornatum</i> (Selys, 1850)	5		5	5			5	5		
<i>Coenagrion puella</i> (Linnaeus, 1758)	5	*	*,3,5	*,5		*,3	*,3,5	5	*	6
<i>Coenagrion pulchellum</i> (Vander Linden, 1825)			3,6,7	*						
<i>Coenagrion scitulum</i> (Rambur, 1842)	5			*						
<i>Enallagma cyathigerum</i> (Charpentier, 1840)	5		*,1,5,6	*,5			*		*	
<i>Erythromma lindenii</i> (Selys, 1840)	*					*				
<i>Erythromma viridulum</i> (Charpentier, 1840)			*,5		*					
<i>Ischnura elegans</i> (Vander Linden, 1820)	*,5		*,5,6	*,5	*	*	*			
<i>Ischnura pumilio</i> (Charpentier, 1825)	5		*,5,6	*,5			*,1		*	
<i>Pyrrhosoma n. nymphula</i> (Sulzer, 1776)			4,5,7			*	*			

<i>Platynemesis p. pennipes</i> (Pallas, 1771)	*,5	*	*,5	*,5	*	*	*	5	*	6
<i>Aeshna affinis</i> Vander Linden, 1820	5		5					5		
<i>Aeshna cyanea</i> (Müller, 1764)			*,4,5,7				5		*	
<i>Aeshna isoeles</i> (Müller, 1767)		*	5				*		*	
<i>Aeshna mixta</i> Latreille, 1805							5			
<i>Anax ephippiger</i> (Burmeister, 1839)										6
<i>Anax imperator</i> Leach, 1815	*,5	2	*,5	*		*	*	5		
<i>Anax parthenope</i> (Selys, 1839)		2								
<i>Callaeschma microstigma</i> (Schneider, 1845)	5		5		*		*,5	5		
<i>Gomphus schneideri</i> Selys, 1850					*	*	*,1	5		
<i>Onychogomphus forcipatus</i> <i>albotibialis</i> Schmidt, 1954	5	*	1,4,5	5	*	*	*	4,5	*	
<i>Cordulegaster insignis</i> spp. nov. Schneider, 1845			5	5		5	5	5		
<i>Cordulegaster insignis</i> spp.	5									*
<i>Cordulegaster picta</i> Selys, 1854	5		5	5	*	*,5	5	5		
<i>Cordulia aenea</i> (Linnaeus, 1758)			4,5,7				*		*	
<i>Somatochlora flavomaculata</i> (Vander Linden, 1825)			*,7							
<i>Somatochlora meridionalis</i> Nielsen, 1935						*	*			
<i>Crocothemis erythraea</i> (Brullé, 1832)			5		*	*	*		*	
<i>Leucorrhinia pectoralis</i> (Charpentier, 1825)			7							
<i>Libellula depressa</i> Linnaeus, 1758	5		5	*,5	*	*	*,5	5	*	
<i>Libellula pontica</i> Selys, 1887								5,7		
<i>Libellula quadrimaculata</i> Linnaeus, 1758			5,6,7							
<i>Orthetrum albistylum</i> (Selys, 1848)					*					
<i>Orthetrum brunneum</i> (Fonscolombe, 1837)	*,5	*	5	*		*	*	5	*	6
<i>Orthetrum cancellatum</i> (Linnaeus, 1758)	*		5		*				*	
<i>Orthetrum coerulescens</i> (Fabricius, 1798)		*	5	*,5	*	*	*,5	5		
<i>Sympetrum depressiusculum</i> (Selys, 1841)	*		4,5				4,5		*,7	
<i>Sympetrum flaveolum</i> (Linnaeus, 1758)	5		*,5	*,5		*	5			
<i>Sympetrum fonscolombei</i> (Selys, 1840)	*,5		*,5		*	*	*,5		*	6
<i>Sympetrum meridionale</i> (Selys, 1841)			5							

<i>Sympetrum pedemontanum</i> (Müller in Allioni, 1766)	*									
<i>Sympetrum sanguineum</i> (Müller, 1764)		*	*,5	*,5	*	*	*			
<i>Sympetrum striolatum</i> (Charpentier, 1840)	*		*,5	*				5		
Total number of species per province	25	11	39	23	18	20	34	17	20	6

DISCUSSION

To date, different subspecies of *Calopteryx splendens* and *Calopteryx virgo* have been described from Anatolia. According to KALKMAN (2006), it is difficult to determine their distributional borders based on available characters. Specimens of *C. virgo* from the study region possess the features of subspecies *festiva* given by KALKMAN (2006). The wing spot is light-brown in about the first ten antenodal cells of the wing base, and the ventral surfaces of 9th and 10th abdominal segments and inferior appendages are red. *C. splendens* from the region resembles subspecies *amasina* (Fig. 3), although the wingspots are unusually narrow and the width of the spot varies even in samples from the same locality.

Of *Ischnura elegans*, subspecies *pontica* has been recorded from Turkish Thrace and subspecies *ebneri* from Anatolia (HACET & AKTAÇ, 2004; SALUR & ÖZSARAÇ, 2004; SALUR & KIYAK, 2006, 2007; MİROĞLU & KARTAL, 2008). According to DUMONT (1991), *ebneri* occurs in southern and central Anatolia, and is replaced by *pontica* in northern Anatolia. The material from the study region was found to have the characters of subspecies *ebneri* (distal part of the pronotum in males and females longer than wide, inner branches of male superior appendages crossed). Thus, *I. e. pontica* does not occur in the West of northern Anatolia. According to KALKMAN (2006), the infraspecific identity of *I. elegans* is not clear. Since the identification of the subspecies is controversial, *I. elegans* is considered here at the specific level only.

Although *Platycnemis p. pennipes* is common in Turkish Thrace and western Anatolia, the few records from the Western Black Sea Region are mainly from Bolu, Sakarya and Ankara provinces (VAN PELT, 2004; KALKMAN et al., 2004a; KALKMAN & VAN PELT, 2006a). Taking into consideration all records, a gap appeared to exist in the central part of the study region (KALKMAN & VAN PELT, 2006a). However, the

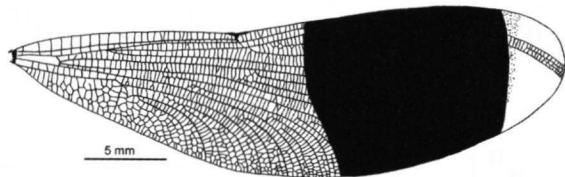


Fig. 3. *Calopteryx splendens*: spot pattern in the right forewing.

present records show that this is not the case.

Sympecma fusca has a wide distribution between Europe and central Asia (DIJKSTRA & LEWINGTON, 2006). There are only two records from Turkish Thrace (HACET & AKTAÇ, 1997, 2004) although it is widespread in Anatolia (DUMONT, 1977; DEMİRİSOY, 1982; DUMONT et al., 1988; SALUR & KIYAK 2000; DIJKSTRA & KALKMAN, 2001; VAN PELT, 2004; KALKMAN et al., 2004a, 2004b; SALUR & ÖZSARAC, 2004; SALUR & KIYAK, 2006, 2007; HOPE, 2007). *S. fusca* is known from the Central Black Sea Region (the vicinity of Samsun province) and central Anatolia (South of Çorum province), close to the study region (KALKMAN et al., 2004a; KALKMAN & VAN PELT, 2006a; SALUR & MESCI, 2007). Now, records from 9 localities in the study region indicate that it is common here too.

The range of *Erythromma lindenii* includes southern Europe, northern Africa and Turkey. It is abundant in southern Europe (DIJKSTRA & LEWINGTON, 2006), and is known from both Turkish Thrace and Anatolia (MORTON, 1922; DUMONT, 1977; DUMONT et al., 1988; ARDIÇ & UYGUN, 1996; HACET & AKTAÇ, 1997; DIJKSTRA & KALKMAN, 2001; HACET & AKTAÇ, 2004; VAN PELT, 2004; KALKMAN et al., 2004a, 2004b; HOPE, 2007; SALUR & KIYAK, 2007). Specimens from the study region match the nominate subspecies, recorded by HACET & AKTAÇ (2004) from Thrace. There were no previous records from the Black Sea Region although the species was recorded in two localities (Çorum and Samsun provinces) at its border.

The main range of *Sympetrum meridionalis* is southeastern Europe. Outside Europe, there are four records from Anatolia: Polonezköy and Şile (İstanbul province), and Karacabey (Bursa province) and Çetibeli (Muğla province), all in western Anatolia (KEMPNY, 1908; DEMİRİSOY, 1982; SCHNEIDER, 1986b; HOPE, 2007). According to KALKMAN & VAN PELT (2006b), the presence of this species in Muğla province shows that the species has more wide an extension than its known distributional area. New records from northern Anatolia represent the easternmost limits of its range.

Cordulia aenea in Turkey is known from the Black Sea Region in northern Anatolia (Bolu province in the Western Black Sea Region and Artvin province in the Eastern Black Sea Region). Two new records in this paper are from an area between

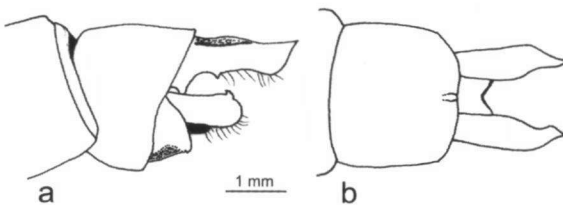


Fig. 4. *Cordulegaster insignis* ssp., male abdominal appendages: (a) lateral view, – (b) dorsal view.

Bolu and Artvin provinces, located far from each other. Its habitat in Kastamonu and Sinop provinces is woodland lakes. The species also occurs in Bulgaria and Greece (BESCHOVSKI, 1994; LOPAU & WENDLER,

1995), therefore it is likely it occurs in the Istranca mountains of northern Thrace, close to the border with Bulgaria.

Anatolian records of *Orthetrum albistylum* come from the Central Black Sea Region and south-western Anatolia (DUMONT, 1977; DEMİRİSOY, 1982; VAN PELT, 2004; KALKMAN et al., 2004a; KALKMAN & VAN PELT, 2006a; MİROĞLU & KARTAL, 2008). It is known from the vicinity of Samsun, close to the study region. In the present study, it was recorded from a single locality, a lake surrounded with trees. Its discovery from more localities is to be expected.

Sympetrum pedemontanum is rare in Turkey. It has been reported from seven provinces (Kırklareli, İzmir, Bursa, Malatya, Erzurum, Van, Artvin). Its distribution extends from the Pyrenees to the Kuril Islands (POPOVA, 2004). It is often observed along slow flowing waters with vegetation and irrigation canals in western Europe (DIJKSTRA & LEWINGTON, 2006). *S. pedemontanum* was recorded from a single locality in the study region, a brook along a road.

Cordulegaster insignis found in Sinop province is known from Bulgaria, Greece, Turkey, Caucasus and Iran (BESCHOVSKI, 1994; LOPAU & WENDLER, 1995; KALKMAN et al., 2003; KALKMAN, 2006). Five subspecies are known from Turkey (KALKMAN, 2006). Our single specimen has small abdominal yellow markings and short inferior appendages, different from the nominate subspecies (Fig. 4). Because a single specimen was obtained, it is provisionally classified as *Cordulegaster insignis* ssp.

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