

NOTES ON FLIGHT PERIODS AND DISTRIBUTIONS OF SOME DRAGONFLIES IN TURKEY

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ABSTRACT: In this study new data on the flight periods of 11 spp. collected during 1996, 1997, 2001, 2002 and 2005-2009 years are presented. Among the species determined, *Anax ephippiger* (Burmeister) is the first dragonfly recorded in February in Turkey so far. In addition, new localities reported for *Coenagrion scitulum* (Rambur), *Aeshna mixta* Latreille, *Anax ephippiger*, *Gomphus flavipes* (Charpentier), *Gomphus vulgatissimus* (Linnaeus) and *Somatochlora meridionalis* Nielsen, which are poorly known from Turkey, are added to their distributional ranges.

KEY WORDS: dragonfly, flight period, distribution, Turkey

The studies concerned with Odonata fauna of Turkey so far have focused mainly on the distributions and descriptions of the species. Although the available studies, except for several early ones, include exact information about the record dates of the species, there was no special study so far emphasizing the flight periods of Turkish dragonflies. Recently, Kalkman & Van Pelt (2006a) prepared histograms for the flight periods based on present records of the mature specimens in order to reveal the seasonal ecology of the species occurring in Turkey in their review on flight periods of Turkish dragonflies. Similarly, Hope (2007) gave data on the flying season of dragonflies recorded in the south-west of Turkey.

Dragonfly records reported from Turkey thus far are limited mostly in a period between May and August, a time when the specimens are actively collected, and records for any other time outside this period are rather rare (Kalkman & Van Pelt, 2006a). Taking into consideration this available data on flying season of dragonflies, it appears that there is still lack of satisfactory data on both distributions and flight times of Turkish dragonflies.

The purpose of this study is to make contribution to the knowledge of flight period of Turkish dragonflies. Also, some localities where *Coenagrion puella*, *Coenagrion scitulum*, *Aeshna mixta*, *Anax ephippiger*, *Gomphus flavipes*, *Gomphus vulgatissimus* and *Somatochlora meridionalis* were recorded, are given as additional locality data for distributional ranges of these species.

MATERIAL AND METHODS

The material was collected in the different periods of 1996, 1997, 2001 and 2002 and between 2005 and 2009. Among the materials collected only those providing new data on distributions and flight periods of Turkish dragonflies were included in the study.

Localities for the recorded specimens are given below. Collecting dates of the species are indicated with the number of locality in result section according to the order listed in the collecting sites.

Collecting sites:

- Antalya province: (1) Antalya- Center (36° 91'N, 30° 68'E); (2) about 1 km east of Antalya Airport (36° 55'N, 30° 48'E); (3) Çakırlar (36° 50'N, 30° 33'E); (4) Elmalı (36° 44'N, 29° 55'E).
 - Kırklareli province: (5) Çağlayık, (42° 03'N, 27° 31'E); (6) Demirköy- Velika stream, (41° 53'N, 27° 32'E); (7) between Devletliagaç and Malkoçlar, 6. km, (42° 01'N, 29° 00'E); (8) between İğneada and Sislıoba, (41° 85'N, 27° 79'E); (9) İğneada (41° 87'N, 27° 98'E); (10) Kıyıköy- Kıyıköy dam, (41° 53'N, 27° 57'E); (11) Kurudere, (41° 5'N, 27° 32' E); (12) Yiğitbaşı (41° 93'N, 27° 65'E).
 - Edirne province: (13) Edirne- Center, (41° 40'N, 26° 31'E); (14) Enez, (40° 43'N, 26° 04'E); (15) Lalapaşa- Uzunbayır, (41° 91'N, 26° 61'E); (16) Sarayıçi- Tavuk woodland, (41° 41'N, 26° 33'E); (17) Siloğlu, (41° 61'N, 26° 54'E); (18) Trakya University Campus, (41° 38'N, 26° 37'E).

RESULTS***Coenagrion puella* (Linnaeus, 1758)**

Material Examined: loc.7, 24.05.2008, 3 males; loc.8, 26.06.2008, 2 males, 1 female; loc.11, 23.06.2008, 1 male; loc.17, 24.05.2002, 1 male; loc.18, 15.05.2002, 1 male; 31.05.2006, 2 males; 24.04.2007, 2 males; 09.05.2007, 4 males, 2 females; 16.05.2007, 4 males, 2 females; 23.05.2007, 4 males, 2 females; 20.06.2007, 1 male; 17.04.2008 1 male, 1 female (teneral); 01.05.2008, 2 males, 2 females (one female- teneral); 15.05.2008, 1 male; 21.05.2008, 1 male, 1 female.

***Coenagrion scitulum* (Rambur, 1842)**

Material Examined: loc.15, 05.07.1997, 1 male, 1 female; loc.18, 01.06.2006, 1 male; 23.06.2006, 1 male; 23.05.2007, 3 males, 1 female; 20.06.2007, 3 males, 1 female; 26.06.2007, 1 male.

***Ischnura elegans* (Vander Linden, 1820)**

Material Examined: loc.18, 17.04.2007, 1 male; 24.04.2007, 1 male, 1 female; 25.04.2007, 2 males.

***Aeshna mixta* Latreille, 1805**

Material Examined: loc.1, 13.10.1996, 1 female; loc.6, 26.07.2001, 1 female; loc.13, 09.10.2007, 1 male; loc.14, 09.07.2008, 1 female.

***Anax ephippiger* (Burmeister, 1839)**

Material Examined: loc.2, 01.02.2009, 2 females; loc.3, 20.08.1996, 1 male; loc.4, 17.09.2008, 1 female; loc.18, 17.10.2002, 1 female.

***Gomphus flavipes* (Charpentier, 1825)**

Material Examined: loc.18, 30.05.2007, 1 male.

***Gomphus vulgatissimus* (Linnaeus, 1758)**

Material Examined: loc.5, 17.07.2001, 1 male; loc.10, 18.06.2001, 1 male; loc.16, 12.05.2002, 8 males, 6 females; 21.05.2002, 1 male; 25.05.2002, 1 male, 1 female; 06.06.2002, 1 male, 2 females; loc.18, 16.05.2007, 1 female.

***Cordulegaster insignis* Schneider, 1845**

Material Examined: loc.18, 18.05.2001, 1 female; 06.06.2001, 2 males, 3 females; 04.06.2002, 1 male; 31.05.2006, 1 male; 23.06.2006, 1 male; 25.05.2007, 1 female; 21.05.2008, 1 male, 1 female.

***Somatochlora meridionalis* Nielsen, 1935**

Material Examined : loc.9, 14.08.1997, 1 male; loc.12, 26.07.2001, 1 male.

***Orthetrum albistylum* (Selys, 1848)**

Material Examined : loc.13, 30.07.2007, 1 female; loc.16, 21.05.2002, 1 male; loc.18, 28.05.2002, 1 male; 23.05.2007, 1 female; 01.05.2008, 1 female.

***Sympetrum striolatum* (Charpentier, 1840)**

Material Examined : loc.18, 16.12.2005, 1 female.

DISCUSSION

Turkey has different climate characteristics due to its geographical location and irregular topography. There are significant differences in terms of temperature between the geographical regions of Turkey from north to south and from west to east. Temperature has a noteworthy effect not only on the larval development of dragonflies but also on the length of flight seasons of adults. Consequently, one might expect the dragonflies in the Mediterranean region to the south of the country where the climate is temperate to have longer flying seasons than those recorded in the north of the country. Data based on a comparison of flight periods of the dragonflies recorded in the southwestern Turkey and Europe support this expectation (Hope, 2007). Despite the fact that our knowledge of Turkish dragonflies increased especially by the studies of the research of the last decade, what we know currently about the flight periods of dragonflies and especially about the distributions of rare species in Turkey are still very limited. When flying seasons of Turkish dragonflies are considered, it appears that there are missing time gaps within the known flying seasons of many species during which the species was not recorded. Also the records reported within months except May-August period are also rare. One of the reasons for such time gaps is that the aims of the studies were primarily to reveal the distributions of the species, and the studies performed during months outside the May-August flight periods are generally rare in number.

The early records of *Coenagrion puella* are known from April in Europe (Dijkstra & Lewington, 2006), but, this species has not been recorded within this month from Turkey so far. However, it was recorded on 17 April 2008 from Edirne province, Turkish Thrace.

Coenagrion scitulum is known among the uncommon dragonflies in Turkey. The species was found in a new locality to the north of Edirne province. Taking into consideration the former records of *C. scitulum*, it appears that the earliest flight period of this species is known from mid May (Kalkman, 2006). This species was also recorded from Turkish Thrace during this time, but, there exist no record for *C. scitulum* within early June from Turkey so far. However, a record dating 01 June 2006 from Turkish Thrace within this study was added to its flight knowledge.

Flight period of *Ischnura elegans* lies from late April to late September in central and north Europe (Dijkstra & Lewington, 2006). There are a few records of this species during April from Anatolia (Kalkman et al., 2004; Salur & Kiyak, 2006, 2007). Similarly, it was also found in middle and late April in Turkish Thrace.

According to the present data, *Aeshna mixta* is a rarely distributed in Turkey, and there are large gaps in the western-Anatolia and the southeastern Anatolia regions within its distributional range in the country (Kalkman & Van Pelt, 2006a). Recently, *A. mixta* was reported from only Muğla province in the western Anatolia (Hope, 2007; Salur & Kiyak, 2007). Although this species is known from Alanya (Kalkman et al., 2004), it was also given from Antalya province located in

the east of Muğla province with this study, which is a new locality for its distributional range.

Anax ephippiger is one of the best-known migrant dragonflies, and the distributional range of the species includes Africa, Arabia and India in the east (Corbet, 1999). Although its distribution in Turkey is not well known, it is obvious that there has been an increase in records since 2005. Moreover, Hope (2008a) proved for the first time that *A. ephippiger* breeds in Turkey. The exuviae of the species were recorded in Muğla province in southwestern Anatolia. According to the histograms of flight periods and the last reported distributional data of the species, the records do not come from February, October and December (Kalkman & Van Pelt, 2006a; Salur & Kıyak, 2006, 2007; Hope, 2007, 2008a; Miroğlu & Kartal, 2008). Moreover no adult dragonfly has been recorded so far in February in Turkey. On 01 February 2009 many active *Anax ephippiger* specimens, of which two females were caught, were observed in about 1 km east of Antalya Airport, Antalya province. The cuticles of the specimens were not entirely hard, the blue saddles on the 2nd abdominal segment were not developed yet. So, regarding these features, it is most likely that the species also breeds within this area. *A. ephippiger* is also given firstly from October in this study.

The adult season of *Gomphus flavipes* is from early June to early October (Dijkstra & Lewington, 2006). This species was found in the last week of May in Trakya University Campus, Edirne province. Consequently, adult *flavipes* is likely to be encountered in an earlier date of May in the region in the future. Although this species is already known from Edirne province (Hacet & Aktaş, 2008), our present record belongs to a different locality.

Gomphus vulgatissimus is known from a few sites in Turkish Thrace in Turkey (Yazıcıoğlu, 1982; Hacet & Aktaş, 1994, 2004, 2008; Kalkman & Van Pelt, 2006b). Kıyıköy and Çağlayık towns of Kırklareli province are two new localities recorded for the species. Also, the record dates of *G. vulgatissimus* given in this paper are contributory data for its flight period.

Early records of *Cordulegaster insignis* came from mid May by Hope (2007) and Salur & Kıyak (2006, 2007) from Anatolia. The species was also recorded early within this period from Turkish Thrace.

Somatochlora meridionalis has a flying duration continuing from the end of May to August in its distributional range, southeastern Europe (Dijkstra & Lewington, 2006). There are few records of the species from western Anatolia (Kemny, 1908; Demirsoy, 1982; Schneider, 1986; Hope, 2008b). *S. meridionalis* is relatively well known from Turkish Thrace (Yazıcıoğlu, 1982; Hacet & Aktaş, 1997, 2004). The species was found here, in August, and two new localities were added to its Turkish Thrace distribution.

The adult season of *Orthetrum albistylum* in Europe is from the end of May to mid September (Dijkstra & Lewington, 2006). There is no record of this species from May in Turkey so far. All *O. albistylum* records given in May-period in this present study are new data for its flight period in Turkey. Moreover, although the beginning of the flight period of the species is reported as the end of May in Europe (Dijkstra & Lewington, 2006), it was found on an earlier date on 01 May 2008 in Turkish Thrace.

Sympetrum striolatum is one of the dragonflies found within autumn season in Europe (Dijkstra & Lewington, 2006). The adult season in Europe starts in early June and lasts in November with rare records in December (Dijkstra & Lewington, 2006). A record on 6 January 2005 in the Czech Republic is an interesting one for the species (Dolný & Pavlík, 2007). In Turkish Thrace, one

alive female specimen was found in the greenhouse in the garden of Department of Biology in the Campus of Trakya University on 16 December 2005.

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