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Editorial address: Odonatologica Editorial Office, P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands
(for the personal addresses of the Members of the Editorial Board see the last page)

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EARLY SPRING RECORDS OF ODONATA FROM SOUTHERN TURKEY, WITH SPECIAL REFERENCE TO THE SYMPATRIC OCCURRENCE OF *CROCOTHEMIS ERYTHRAEA* (BRULLÉ) AND *C. SERVILIA* (DRURY) (ANISOPTERA: LIBELLULIDAE)

K.-D.B. DIJKSTRA and V.J. KALKMAN
Naturals, P.O. Box 9517, NL-2300 RA Leiden, The Netherlands, dijkstra@naturals.nm.nl,
kalkman@naturals.nm.nl

Abstract — Dragonfly records collected from 29 March to 9 April 1999 are presented. They are among the earliest ever published for Turkey. New localities of *Lestes macrostigma* (Göksu Delta) and *Anax immaculifrons* (Antalya) are noteworthy. *Crocothemis erythraea* and *C. servilia* were found emerging from the same ditch in the Göksu Delta. Notes on their identification in teneral state and as exuviae are added.

Introduction

Not much is known about the start of the flying season of dragonflies in the eastern Mediterranean. In the early spring of 1999 we spent several days on the south coast of Turkey. Although relatively few dragonflies were encountered, the records provide an insight into the earliest dates that the adults of these species emerge. Most records were obtained in the Göksu Delta near the town of Şifike. The northern half of the delta is entirely agricultural.

The southern half is dominated by the large brackish lagoon Akgöl, which is surrounded by dunes and marshes. Among the dunes lie several shallow (probably largely ephemeral) pools, some of which are quite large. Especially the strip between Akgöl and the sea south of Denizkent has various such pools, records from which were previously published by ARLT (1999). Additional records, mostly of larvae, were collected from a stream near Antalya.

Localities

- (1) Western side of Akgöl near Denizkent, 8 km S of Şifike, Göksu Delta, Içel (Mersin) province (36°17'N 33°56'E). Dunes with shallow, open pools. 29-III-1999.
- (2) Dalyan, area between Hurma and mouth of Göksu River, S of Kurtuluş, 11 km SE of Şifike, Içel province (36°18'N 34°02'E). Pools between dunes. 30-III-1999.

- (3) Northern side of Akgöl, W of Kurtuluş, 6 km S of Sifhke, Gökusu Delta, Içel province. Reedy canal through arable land (36°19'N 33°58'E). 31-III-1999.
- (4) Between Alitkum and mouth of Gökusu River, E of Kurtuluş, 13 km E of Sifhke, Içel province (36°20'N 34°04'E). Dunes. 1-IV-1999.
- (5) Kurtuluş, 8 km ESE of Sifhke, Gökusu Delta, Içel province (36°20'N 34°00'E). Small ditch in village. 2-IV-1999.
- (6) Limonlu Stream N of Limonlu village, 36 km NE of Sifhke, Içel province (36°34'N 34°14'E). Stream through orchards. 4-IV-1999.
- (7) Western side of Akgöl near Denizkent, 8 km S of Sifhke, Gökusu Delta, Içel province (36°17'N 33°56'E). Dunes with shallow, open pools. 5-IV-1999.
- (8) Karaman Stream at Yukarkaraman, 16 km NW of Antalya, Antalya province (36°58'N 30°34'E). Rocky stream with numerous shallow pools. 9-IV-1999.

List of recorded species

Collected material is indicated first. Additional sight records are also given. Teneral specimens are indicated with t.

- *Calopteryx splendens intermedia* Selys: (6) 1 ♂.
- *Lestes macrostigma* Eversmann: (7) 7 ♂, 2 ♀, 54 exuviae. At least a hundred tenerals and countless exuviae were present.
- *Sympetrum fusca* (Vander Linden): (7) 4 ♂. Ten males were seen.
- *Cercion lindemii* (Selys): (7) 1 t♂, 1 t♀. At least ten tenerals seen.
- *Ischnura elegans* (Vander Linden): (1) 3 ♂, 3 ♀ (7) 2 ♂, 2 ♀ (8) 1 t♂, 18 larvae. Sightings: (1) (2) (3) (4) (5) (7) (8) numerous at all these sites but apparently just emerging at the last, (6) 2.
- *Ischnura pumilio* (Charpentier): (7) 1 ♀.
- *Platycnemis pennipes* (Pallas): (8) 21 larvae.
- *Anax immaculifrons* Rambur: (8) 1 larva.
- *Anax imperator* Leach: (6) 3 exuviae (8) 1 larva. Sighting: (3) 1 ♂.
- *Anax parthenope* Selys: (2) 1 t♀. Sightings: (2) 2 t(4) 2 t(7) 2 tandem, 1 ♀.
- *Hemianaux ephippiger* (Burmeister): (6) 1 ♂. Sightings: (1) 1 ♀ (3) 2 (6) 2.
- *Ornithogomphus forcipatus albithalidis*

- Schmidt: (8) 7 larvae.
- *Crocothemis erythraea* (Burtell): (2) 3 t♀, 3 exuviae (5) 2 t♂. Total of five tenerals at (2).
- *Crocothemis servilla* (Drury): (5) 1 t♂, 4 t♀, 2 exuviae.
- *Crocothemis erythraea / servilla*: (5) 26 exuviae (8) 2 larvae.
- *Orithetrum cf. brunneum* (Fonscolombe): (8) 4 larvae.
- *Orithetrum cf. chrysostrigma* Burmeister: (8) 1 larva.
- *Orithetrum coerulecens anceps* (Schneider): (8) 10 larvae. All lack dorsal spines.
- *Orithetrum sabina* (Drury): (5) 2 t♂, 2 exuviae. Exuviae are diagnostic due to the presence of dorsal spines on segments 4-7 and seven palpal setae.
- *Sympetrum fonscolombii* (Selys): (7) 1 exuviae, 1 larva (8) 1 exuviae. Sightings: (1) 1 ♀ (2) 5 (3) 4 (7) 5 (8) 1 t.
- *Sympetrum striolatum* (Charpentier): (5) 1 t♂, 1 exuviae.
- *Sympetrum cf. striolatum*: (7) 48 larvae (8) 10 larvae.
- *Tritemis annulata* (Palisot de Beauvois): (5) 1 t♀, 1 exuviae.
- *Tritemis cf. annulata*: (7) 12 larvae (8) 15 larvae.

Discussion

Although we were very early in the season, we were able to observe imagines of fifteen species. Eight of these were only seen in teneral condition and it is therefore assumed that we were at the start of their flight period. It is possible that the adult *Anax imperator*, *A. parthenope*, *Hemianaux ephippiger* and *Sympetrum fonscolombii* are partly wanderers from more southerly regions. It is interesting to note that all the observed species have long flight periods, many of them probably having several generations a year. At least seven of the recorded species are still on the wing in the second half of September (JÖDÖCKE, 1998).

With the exception of *Lestes macrostigma*, *Anax immaculifrons* and *Crocothemis servilla*, all recorded species are widely distributed in Turkey. *L. macrostigma* is now known from six localities (DUMONT, 1977; DUMONT et al., 1988; SEIDENBUSCH, 1995). The ephemeral, brackish pool where we recorded it is a typical habitat for the species. Five of the six Turkish records were

made in the direct vicinity of the Mediterranean Sea. So far the species has not been recorded in Central Anatolia, where suitable habitat appears to be present around saline lakes.

Anax immaculifrons is widespread in the Indian Subcontinent, but becomes rare West of Pakistan. Scattered records have been published from Iran, Lebanon, Israel and several Greek islands (BATTIN, 1990; LOHMANN, 1990; VAN PELT, 1999). The record near Antalya is the fourth from Turkey, other localities being Samsat, Alanya and Köyceğiz (BUSSE, 1993; DUMONT, 1977). It is remarkable that, although suitable habitat seems to be present all over southern Turkey, the species appears to be rare. At the end of July, BATTIN (1990) only found early stage larvae on Karpathos, Greece, one of which measured 30 mm. This suggests a life cycle of two or more years. Our larva was only 14 mm long, which is in accordance with this finding.

The most interesting record is undoubtedly the emergence of the closely related species pair, *Crocothemis erythraea* and *C. servilla*, from the same water body. Both are among the most successful species of the Old World Tropics, the first being African and the second Asian in origin. Probably as a consequence of their great colonisation abilities, the two overlap over a large area of West Asia. In the West *servilla* is found as far as Israel and Central Turkey (DE MARMEIS, 1995; SCHNEIDER, 1985a, 1985b), whilst *erythraea* is known as far East as SW Tajikistan and Nepal (BORISOV, 1987; CLAUDSITZER & WESCHKE, 1996). LOHMANN (1981) even mentions the latter for Assam. Our record is the first of sympatric reproduction in the western extension of their shared range, although adults have been collected at the same localities (DE MARMEIS, 1995; SCHNEIDER, 1995a). KHALIQ et al. (1995) report larvae of both species from the same water body in Pakistan.

Although both species are extremely alike morphologically, they are strikingly dissimilar when teneral. The following distinguishing features between freshly emerged individuals (five of each species) were noted:

- (1) *Erythraea* is slightly larger and more robust than *servilla*, with somewhat broader abdomen and wings. Fore wing: *erythraea* 29.5-32 mm, *servilla* 28-30.5 mm. Average (and range) of the number of cells in the anal loop: *erythraea*

21.4 (19-26), *servilla* 17.8 (17-19).

- (2) *Servilla* has distinct creamish white antehumeral stripes. These stand out sharply because the front of the synthorax is darker than the sides (more so than in *erythraea*). In *erythraea* a vague stripe may be discernible, but this is not paler than the sides of the synthorax.

- (3) *Servilla* has a thin black line along the entire length of the dorsal carina of the abdomen (segments 2-10), which is absent or restricted to segments 8-10 in *erythraea*.

- (4) *Servilla* has all wings broadly yellow along the anterior edge and brownish wingtips. *Erythraea* has the wings clear besides basal yellow patches, which are of a deeper orange hue.

Combined, these features give *erythraea* a rather uniform overall impression. With the bold markings on wings and body, *servilla* is not reminiscent of its relative at first glance at all. The usefulness of this distinction probably decreases as the individuals mature. The cream antehumeral and costal yellow of *servilla* fade. Nonetheless, the mentioned characters can assist in the identification of these species based on structural features as exemplified by SCHNEIDER (1985b).

According to KHALIQ et al. (1995) the larvae of the two species differ in the relative length of the prementum (shorter in *servilla*) and the number of palpal and premental setae (less in *servilla*). In our small sample of exuviae associated with an adult, those of *servilla* did appear to have a shorter prementum, the hinge reaching up to or slightly past the anterior edge of the mesocoxae. In *erythraea* it reaches to at least halfway the mesocoxae. The sample was too small to express a reliable difference in serial numbers. A series of 21 exuviae from our unspecified *Crocothemis* material from Kurtuluş did not show two types of setation, nor was there any relation between prementum length and the number of setae. On average they had 10.6 (ranging from 10 to 11) palpal and 14.0 (12 to 16) premental setae. There is no correlation between the number of palpal and premental setae. Even if the species differ on average, it will be of little use in identifying individual specimens: variation within species is probably greater than between them. The usefulness of the premental length must be tested with more specimens of a known identity.

The few differences between *erythræa* and *servilia* led PINHEY (1979) to regard them only subspecifically distinct, but his opinion was renounced by LOHMANN (1981) and SCHNEIDER (1985b) based on genitalial characters. The sharing of breeding habitat and the surprising difference between tenebrals supports the conclusion that they are specifically distinct.

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