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Early spring observations of Odonata from Cyprus

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Abstract

During a two-week visit to the island of Cyprus in April 2012, 17 species of dragonfly were observed. In particular, the discovery of a large population of *Lestes macrostigma* is worth mentioning, as this species has not been reported in Cyprus for over 60 years. Concerning the flight period, very early records in the season for the eastern Mediterranean were noted for *Epallage fatime*, *Onychogomphus forcipatus albotibialis*, *Orthetrum taeniolatum* and *Selysiothemis nigra*. For the latter, this is the earliest observation date ever reported. Furthermore, several very old individuals of *Sympetrum meridionale* and *S. striolatum* were seen in early April, providing strong evidence for these species to be able to overwinter in small numbers as adults. These are the first worldwide records of overwintering for *S. meridionale* in the adult stage.

Zusammenfassung

Frühjahrsbeobachtungen von Libellen aus Zypern – Während eines zweiwöchigen Aufenthaltes auf der Insel Zypern wurden 17 Libellenarten im April 2012 beobachtet. Besonders erwähnenswert ist die Entdeckung einer großen Population von *Lestes macrostigma*, da die Art zuvor während mehr als 60 Jahren nicht auf Zypern nachgewiesen worden war. Jahreszeitlich sehr frühe Beobachtungen für den östlichen Mittelmeerraum gelangen für *Epallage fatime*, *Onychogomphus forcipatus albotibialis*, *Orthetrum taeniolatum* und *Selysiothemis nigra*. Für die zuletzt genannte Art handelt es sich dabei um das früheste jemals genannte Beobachtungsdatum. Außerdem wurden Anfang April mehrere sehr alte Individuen von *Sympetrum meridionale* und *S. striolatum* nachgewiesen. Dies deutet stark darauf hin, dass die Art in geringer Anzahl auch als Imago überwintern kann. Dies sind die ersten Beobachtungen überwinternder *S. meridionale*-Imagines weltweit.

Introduction

Cyprus is situated in the eastern part of the Mediterranean and is, with a land area of 9,251 km^2, the third largest island in the Mediterranean Sea. It is positioned

only 70 km from the south coast of Turkey, 100 km east of Syria and Lebanon and 380 km to the north of Egypt. Its distance from mainland Greece is 800 km. Although it is a member of the European Union, the island is considered part of the Middle East from a zoogeographical point of view. Given its proximity to Turkey and Syria, its known fauna is more closely related to that of the Middle East than to mainland Greece and Europe (Baier et al. 2009).

Cyprus has a typical Mediterranean climate, with long, hot dry summers and warm wet winters and is the hottest and driest large island in the Mediterranean. The sun shines for 340 days a year, with most rain falling from November to March. The average rainfall over the whole island is around 480 mm per year, but there are strong local variations such as on the uppermost slopes of Troodos Mountain, with 1,200 mm rainfall per year (Baier et al. 2009). As a result of the pronounced seasonality in rainfall pattern, none of the streams and rivers flows continuously into the sea. The only perennial running waters can be found higher upstream in the Troodos mountain range. At lower altitudes, for up to eight months a year, the rivers are either completely dry or are reduced to a series of pools along the riverbed. To ensure water supplies during the summer, more than 100 reservoirs, such as dam lakes and ponds, have been constructed since the 1960s.

The winter prior to our visit was very wet and was characterised by high precipitation lasting until the end of March. This high precipitation in combination with the melting of snow on the Troodos summits resulted in completely filled reservoirs. The enormous amount of water even created local floods and several dams significantly overflowed. During the days before our arrival, there was a warm wind blowing from the south-east.

Although the dragonfly fauna of the island has been investigated by several authors (e.g. Martin 1894; Valle 1952; Kiauta 1963), a thorough survey of the fauna did not take place until the early 1990s (Lopau & Adena 2002). These authors made a compilation of all hitherto known records, which consisted of published records (180), specimens present in museum collections, their own records from a fieldtrip in 1994, and unpublished observations by various other visitors from the period 1983-2001. Most of the 955 unpublished observations included had been made in June. Observations from high summer and autumn are almost completely absent. Spring observations are scarce and include only three species seen in March and 13 species observed in April.

Since the publication of Lopau & Adena (2002), no significant contribution has been published about the dragonfly fauna of Cyprus. In 2007, two new species, *Brachythemis leucosticta* and *Trithemis arteriosa,* were added to the fauna of Cyprus (Cottle 2007), although the latter had been present for some time, but surprisingly never published. Previous research on the dragonfly fauna was mainly carried out in the southern, Greek Cypriot part of the island. Based on literature,

observations and recent sightings from Lopau & Adena (2002) the northern, Turkish-occupied, part has only been sporadically investigated for dragonflies, with published observations from six localities only.

In this paper, we present the results of a two-week field trip to Cyprus, undertaken during the first half of April 2012. Our aim was to cover both the larger southern part of the island and the smaller northern one and, additionally, to include both running and standing water, the latter in the form of dam lakes and artificial ponds.

List of localities

The sites visited (Fig. 1) are listed below, together with their geographic coordinates in the international geodetic WGS84 system, the altitude above sea level and the date of the visit. Place names are primarily based on the roadmaps of Cyprus, namely the Selas roadmap for the southern part of the island and the tourist road map of northern Cyprus. For the localities (nr. 18-26) in the northern part of Cyprus we also added the Turkish names as road signs in the north no longer display the former Greek place names. More local maps were available for some regions.

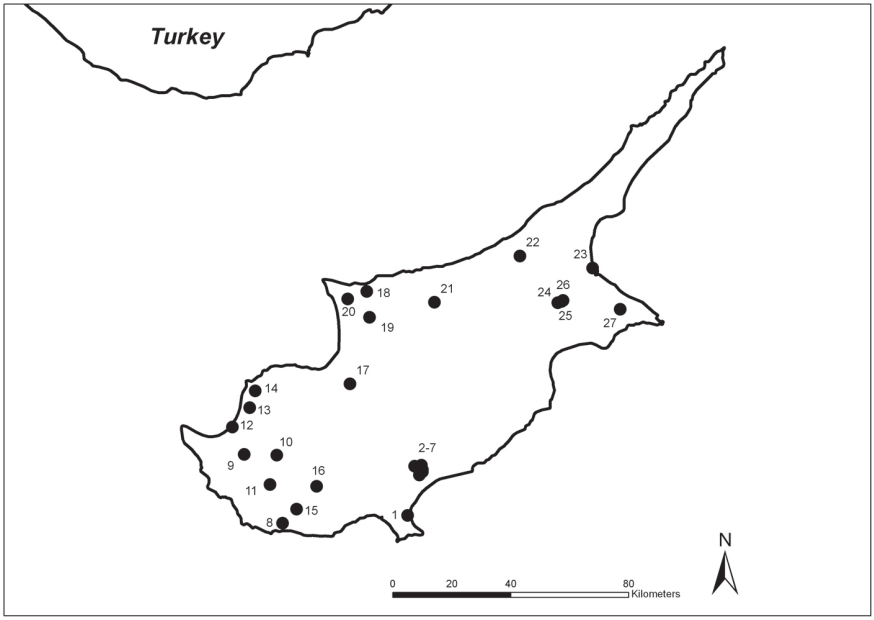

Figure 1. Localities visited during this study. – Abbildung 1: Lokalitäten, die im Rahmen dieser Arbeit besucht wurden.

Loc. 1. Akrotiri Salt Lake, Zakaki pools. Salty shallow pools near Lady's Mile; 34°38'01''N, 33°00'17''E; 0 m a.s.l.; 01-iv-2012

Loc. 2. Germasogeia, stream outlet some 500 metres below dam; 34°44'30''N, 33°05'05''E; 58 m a.s.l.; (a) 02-iv-2012, (b) 16-iv-2012

Loc. 3. Germasogeia, dam lake, easternmost part of the lake near the inlet of a small stream, with well-developed shore vegetation; 34°45'16''N, 33°06'02''E; 90 m a.s.l.; (a) 02-iv-2012, (b) 16-iv-2012

Loc. 4. Germasogeia, peninsula on the eastern side of the dam lake, along the southern trail; 34°45'20''N, 33°05'40''E; 81 m a.s.l.; 02-iv-2012

Loc. 5. Germasogeia, western part of dam lake near the old road from Germasogeia to Akrounta; 34°44'54''N, 33°04'54.5''E; 103 m a.s.l.; 16-iv-2012

Loc. 6. Germasogeia, Kyparissia River before entering the dam lake, very fast flowing river bordered by a small zone of riparian forest; 34°46'05.5''N, 33°06'05.3''E; 173 m a.s.l.; 16-iv-2012

Loc. 7. Akrounta, small stream with partly stagnant water; 34°46'19''N, 33°04'34''E; 148 m a.s.l.; 02-iv-2012

Loc. 8. Asprogremnos, pools and stream just below dam lake; the pools had been washed away by high water during the previous months; 34°43'27''N, 32°33'07''E; 38 m a.s.l.; 03-iv-2012

Loc. 9. Evretou, southern side of the dam lake; 34°57'37''N, 32°28'45''E; 165 m a.s.l.; 04-iv-2012

Loc. 10. Kannaviou, eastern side of dam lake; 34°55'45''N, 32°35'43''E; 420 m a.s.l.; 04-iv-2012

Loc. 11. Letymvou, stream; 34°50'55.6"N, 32°32'36.6"E; 214 m a.s.l.; 06-iv-2012

Loc. 12. Polis, temporary pond as a result of iron and copper open mining exploitation, very turbid water and nearly devoid of vegetation; 35°03'05''N, 32°27'46''E; 53 m a.s.l.; 07-iv-2012

Loc. 13. Gialia, crossing point of track over stream in forested area; 35°05'34''N, 32°32'33''E; 181 m a.s.l.; 07-iv-2012

Loc. 14. Pomos, most upstream part of dam lake, southern side; 35°08'14.7''N, 32°34'39''E; 157 m a.s.l.; 07-iv-2012

Loc. 15. Fasoula, Diarizos River, just upstream from the bridge; 34°45'09''N, 32°36'56''E; 109 m a.s.l.; 08-iv-2012

Loc. 16. Kidasi, Diarizos River, small fordable crossing point of the river, with much slow running water and abundant riparian vegetation; 34°48'06.3''N, 32°42'29.4''E; 351 m a.s.l.; 08-iv-2012

Loc. 17. Linou, small dammed farm pond, just near the river Atsas; 35°04'20.0''N, 32°55'25''E; 294 m a.s.l.; 08-iv-2012

Loc. 18. Geçitköy (Panagra), along the southern, well vegetated, side of the dam lake. This dam lake is also called Dagderi Göleti; 35°19'39''N, 33°04'18''E; 92 m a.s.l.; 09-iv-2012

Loc. 19. Kalkanli (Kalo Chorio), Çiftlik stream, meandering stream of some metres width located in open steppe-like rolling hills, with many boulders in the streambed; 35°14'58''N, 33°03'23''E; 107 m a.s.l.; 09-iv-2012

Loc. 20. Koruçam (Kormakitis), northern side of dam lake, water level very low and presence of extensive reed bed along northern side, species list incomplete due to bad weather; 35°19'23''N, 32°59'46''E; 101 m a.s.l.; 11-iv-2012

Loc. 21. Gonyeli (Kioneli), dam lake visited from the southeastern part; 35°14'01.5''N, 33°18'14''E; 166 m a.s.l.; 11-iv-2012

Loc. 22. Gönendere (Knodara), western part of dam lake; 35°17'23''N, 33°39'19''E; 121 m a.s.l.; 11-iv-2012

Loc. 23. Salamis, archeological site; 35°11'10''N, 33°54'10.5''E; 6 m a.s.l.; 14-iv--2012

Loc. 24. Köprülü (Kouklia), west of the dam lake amid agricultural fields; 35°07'04''N, 33°44'38''E; 24 m a.s.l.; 15-iv-2012

Loc. 25. Köprülü (Kouklia), reed marsh, small pond and stream just east of dam lake; 35°07'09''N, 33°45'56''E; 14 m a.s.l.; 15-iv-2012

Loc. 26. Köprülü (Kouklia), southern side of dam lake; 35°07'02''N, 33°45'32''E; 20 m a.s.l.; 15-iv-2012

Loc. 27. Paralimni, salt lake, small pools at the western side of the dried out salt lake. Pools are bordered by abundant *Juncus* vegetation; 35°02'23''N, 33°57'38.5''E; 70 m a.s.l.; 15-iv-2012

List of recorded species

Eighty-five observations pertaining to seventeen species, six Zygoptera and eleven Anisoptera, were recorded and are listed below together with the corresponding localities.

Calopteryx splendens amasina (Bartenef, 1911)

Loc. 16 (1♂, 1♀)

***Epallage fatime* (Charpentier, 1840)**

Loc. 6 (50 tenerals, 5 adults)

***Lestes macrostigma* (Eversmann, 1836)**

Loc. 27 (1,000 adults, 100 tenerals, 20♀ oviposition)

***Sympecma fusca* (Vander Linden, 1820)**

Loc. 3a (1♂, 2♀ oviposition), 4 (1♂, 1 copula), 9 (1♂, 1 adult), 11 (1♂, 1♀ oviposition), 17 (1 adult), 18 (50 adults, oviposition), 21 (1 adult), 25 (1♂), 26 (2 adults)

***Erythromma lindenii* (Selys, 1840)**

Loc.11 (2♀)

***Ischnura elegans ebneri* Schmidt, 1838**

Loc. 2a (2♂), 2b (1♂), 3a (3♂), 4 (1♀), 6 (20 adults), 7 (3 adults), 8 (1♂), 9 (15 adults, 2 copulae), 10 (1♂), 11 (20 adults), 13 (1♂), 14 (3♂, 1♀), 15 (1♂), 16 (2♂, 1♀), 17 (1♂), 18 (250 adults, tenerals), 19 (1♂), 20 (1♂, 1♀), 21 (200 adults), 22 (2♂), 25 (3♂, 1♀), 26 (10 adults), 27 (100 adults)

***Anax parthenope* Selys, 1839**

Loc. 3a (1♂), 3b (1♂), 4 (oviposition), 6 (1♂), 9 (1♂), 18 (3♂, 1♀ oviposition), 25 (1♂)

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

Loc. 1 (2 adults), 6 (1♂), 26 (1♂, 1♀), 27 (1♂)

Onychogomphus forcipatus albotibialis

Loc. 16 (1 teneral ♂)

***Crocothemis erythraea* (Brullé, 1832)**

Loc. 2a (1♂), 2b (3♂), 3b (3♂), 4 (1♂), 5 (2♂), 18 (3♂), 21 (2♂), 26 (5♂), 27 (2♂)

***Orthetrum brunneum* (Fonscolombe, 1837)**

Loc. 2b (1♂)

***Orthetrum chrysostigma* (Burmeister, 1839)**

Loc. 2b (1♂), 16 (1 adult)

***Orthetrum taeniolatum* (Schneider, 1845)**

Loc. 19 (adults, 10 tenerals), 24 (1 teneral)

***Selysiothemis nigra* (Vander Linden, 1825)**

Loc. 4 (1 adult)

***Sympetrum fonscolombii* (Selys, 1840)**

Loc. 1 (2 adults), 3b (15 adults), 5 (10 adults), 9 (1♂), 12 (1♂), 18 (1♂), 20 (1 teneral), 21 (10 adults, 50 tenerals), 22 (1♂), 23 (2 tenerals), 25 (100 adults, copulae), 26 (200 adults, tenerals, copulae), 27 (50 adults, 300 tenerals)

***Sympetrum meridionale* (Selys, 1841)**

Loc. 2a (2♂), 3b (1♂), 9 (1♂), 11 (1♂), 14 (1♂)

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

Loc. 3a (2♂), 9 (3 adults), 10 (2♂), 13 (1♂), 18 (1♂)

Annotations to selected species

Epallage fatime

Epallage fatime is the only Mediterranean representative of this family. Its distribution extends from Afghanistan and Pakistan in the east to Greece, Bulgaria and Macedonia in the west (Boudot et al. 2009; Bedjanic & Vinko 2012; V. Kalkman pers. comm.). It is known from several localities in Cyprus, where it is mainly found along streams and small rivers in the area of the Troodos Mountains. At one locality, Kyparissia River before entering the dam lake of Germasogeia (Fig. 2), we noticed on 16 April at least 50 individuals, most of them looking teneral and probably having emerged just a few days previously or even that same day. In the first ten days of our visit we did not observe this species, despite conscious efforts to find it. This makes it likely that emergence had just started. The earliest record from Greece is on 8 April from the island of Lesbos (Lopau 2010). In Turkey, this species is on the wing from the end of April onwards (Kalkman & van Pelt 2006).

Lestes macrostigma

The last reported observation of *L. macrostigma* from Cyprus, dated from 1948, despite field work conducted since then (Lopau & Adena 2002). Voucher specimens exist for the period 1931–1948, when the species was collected at four coastal brackish lagoons and wetlands at Larnaka, Akrotiri, Salamis and the area just south of Lemesos (Lopau & Adena 2002). We found a large population at two pools within the Paralimni wetland in eastern Cyprus, which is a new site for this species. Most of the imagines were already in the adult stage and copulation and oviposition were noticed several times. In addition, some hundred teneral individuals were observed, indicating that emergence was continuing. We conclude

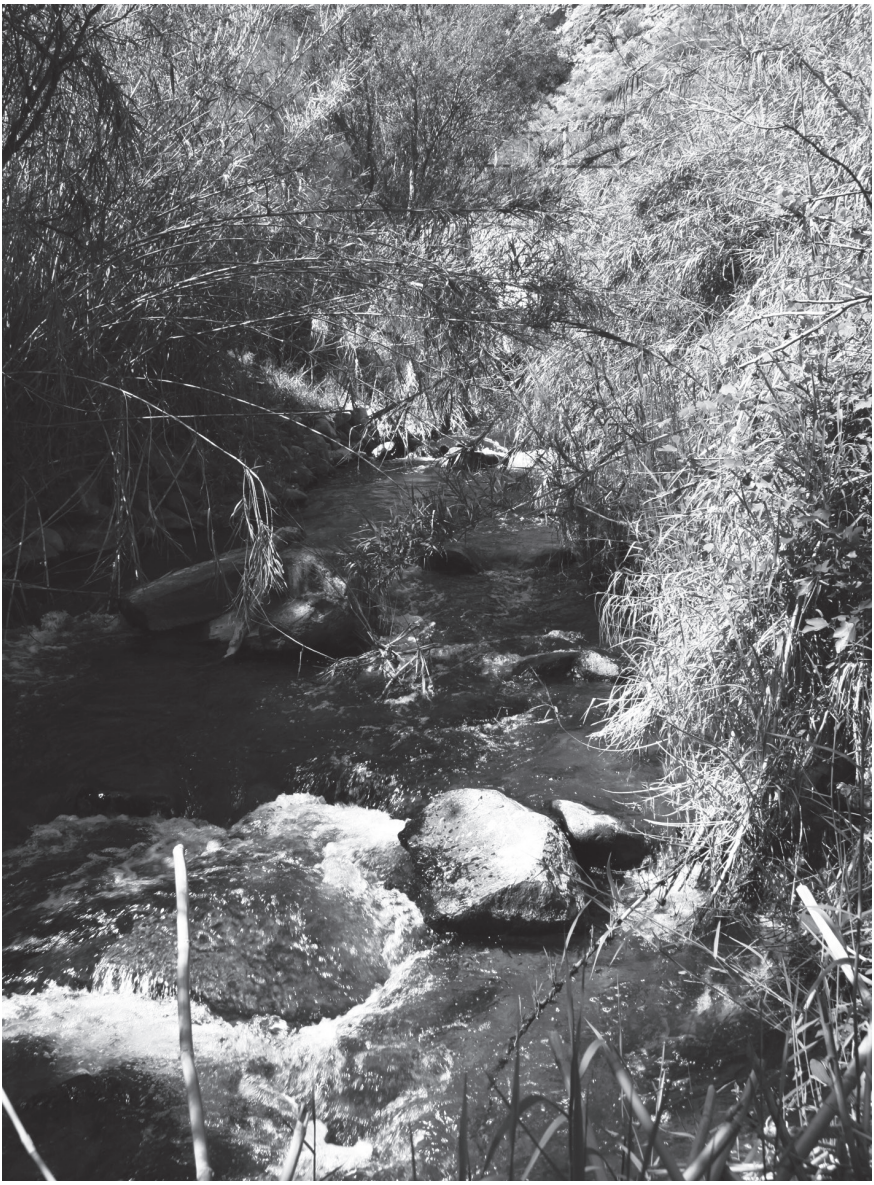

Figure 2. Kuparissia river, the habitat of *Epallage fatime*, just before entering the dam lake of Germasogeia, Cyprus (16-iv-2012). – Abbildung 2: Kuparissa, Habitat von *Epallage fatime*, direkt oberhalb der Mündung in den Stausee von Germasogeia, Zypern (16.04.2012). Photo: GDK

that emergence had already started in March, probably even as early as the end of February.

Paralimni is the only remaining large brackish wetland in Cyprus from which there are no records of Odonata available (see Lopau & Adena 2002). We presume that the population of *L. macrostigma* had already been present there for a long time as it is an established habitat. The list we provide here is the first one for this locality, which is also the most important site for the endemic Cyprus grass snake (*Natrix natrix cypriaca*) (Blosat 2008; Baier et al. 2009) a species mentioned in the Annexes II and IV of the Habitats Directive. *L. macrostigma* is a threatened species in Europe (Kalkman et al. 2010). The two ponds present are the remains of a lake of originally 288 ha. The north-eastern corner of the wetland has already been developed into a residential area. The remaining part is now only flooded during winter and early spring after sufficient rainfall in winter (Blosat 2008). This site is highly threatened by water drainage and urban development.

Anax ephippiger

Anax ephippiger was observed at four localities in the coastal region, each record pertaining to one or two individuals. This species is well known for its mass migrations, especially in springtime, from the African Sahel region across the Sahara or the Arabian Peninsula and the Mediterranean Sea towards Europe (Dumont & Desmet 1990; Mediani et al. 2012). On 1 April, we witnessed the arrival at Akrotiri Salt Lake of at least one individual of *Anax ephippiger* arriving over the sea. Our observations coincide with the time of the year when migrants coming from the south can be seen in Europe. It is very likely that the individuals arriving in spring can develop a secondary summer generation in Cyprus, as has been suggested for Rhodes (Peters & Günther 2000) and Turkey (van Pelt & Kalkman 2004).

Onychogomphus forcipatus albotibialis

This is a typical species of streams and rivers where larval development takes three years (Suhling & Müller 1996). It is possible that larval development can be shorter, as an obligate larval winter diapause does not necessarily apply for this species in the Mediterranean, as has been demonstrated for *Orthetrum cancellatum* (Flenner et al. 2010). Outside the Troodos area, there are no permanent rivers or streams in Cyprus (Baier et al. 2009). We observed this rheophilic species in a river valley lower down the Troodos area where the stream nearly desiccates each year during summer. We suppose that the larvae survive in small stretches or pools in the riverbed. It is not impossible that larvae could survive the long dry summer in wet sediments in the dry riverbed. The flight period of *Onychogomphus forcipatus* in nearby Turkey starts in mid-May (Kalkman & van Pelt 2006) and the earliest imago in Greece was seen on 15 April (2008) (Lopau 2010). Our observation of a very young male on 8 April along the

Diarizos River near the village of Kidasi seems to be the earliest reported date of this species.

Orthetrum taeniolatum

The distribution area of *O. taeniolatum* ranges from the Indian Subcontinent in the East to southern and western Turkey and the neighbouring Greek islands of Lesbos, Samos and Rhodos (Boudot et al. 2009; Lopau 2010). To the south, it reaches the Levant. It is relatively widespread in Cyprus (Lopau & Adena 2002), especially along streams and rivers without bank vegetation and sometimes also dam lakes. On 9 April, we found several freshly emerged imagines (Fig. 3a) along a stream with many bare stretches along the water (Fig. 3b). A second observation of this species was made along a dirt road amidst arable fields west of the Köprülü (Kouklia) dam lake. The earliest records for Turkey are from the start of May (Kalkman & van Pelt 2006). The earliest available spring record is from 1 April at the island of Rhodes (Lopau 2010). Our observation from 9 April roughly coincides with the first observations from the islands, indicating that emergence starts at the beginning of April on the islands and one month later on the mainland of Turkey.

Sympetrum meridionale and *S. striolatum*

Altogether, we observed six individuals of *S. meridionale* at five localities and nine individuals of *S. striolatum* at five localities. All were characterised by a dull dark red coloration of the thorax and the abdomen, and by partly torn wings, clearly indicating that they were of considerable age. As they were all observed in the first two weeks of April, they should have emerged during the previous season, having survived the short Cyprus winter. We saw no freshly emerged individuals of either species, indicating that emergence had not yet started. The flight period in Turkey of *S. striolatum* starts in early April (Dijkstra & Kalkman 2001) and only in the second decade of May were the first individuals of *S. meridionale* seen (Kalkman & van Pelt 2006). The earliest (or the latest) observation of *S. meridionale* from Greece dates from 29 March (1989) and the species is on the wing there until November, with the last observation on 28 November (1998) (Lopau 2010). Emergence of *S. striolatum* in Greece seems to start in the second half of April and some very late individuals could even be seen in December, January and February (Lopau 2010). The only record from March was made by Kemp (1990) in western Cyprus, when an ovipositing female was observed. All this provides strong evidence that *S. striolatum* has, for a dragonfly, an unusually long lifespan as an adult, which was already noted by Jödicke & Lopau (2000). The prolonged lifespans of *S. meridionale* and *S. striolatum* correspond with a long pre-reproductive aestivation (Samraoui et al. 1998). Our observations of very old individuals of *S. meridionale* in the beginning of April are the first proof that this species can also overwinter as an adult.

Figure 3. Freshly emerged female of *Orthetrum taeniolatum* perching on the ground (a); Kalkanli (Kalo Chorio), Çiftlik stream (b), Cyprus (09-iv-2012). – Abbildung 3: Frisch geschlüpftes Weibchen von *Orthetrum taeniolatum* auf dem Boden sitzend (a); Kalkanli (Kalo Chorio), Fluss Çiftlik (b), Zypern (09.04.2012). Photo: GDK

Selysiothemis nigra

Selysiothemis nigra was first reported for Cyprus by Lopau & Adena (2002). They found the species at eight localities, which are clustered in the southern part of the island. Our observation was made at Germasogeia Dam Lake, one of their eight localities. The earliest spring observations from Greece date from 15 May 2007 in Lesbos and mainland Greece (Lopau 2010) and from the beginning of June from neighbouring Turkey (Kalkman & van Pelt 2006). Our observation from 2 April is more than one month earlier than hitherto known for the Mediterranean. The specimen was completely black and seemingly fully mature. As we saw the species at the site where reproduction was observed by Lopau & Adena (2002), it is not impossible that the species had already emerged locally. However, given the very early date of our sighting it is more likely that our specimen was a nomadic individual originating from the Levant or from further away. Migration and swarm dispersal *of S. nigra* has previously been noted in May in Jordan (Schneider 1981), and recently also in June on the Greek island of Évia (Holuša 2011) and in July in southern Montenegro (De Knijf et al. 2013). However, it cannot be ruled out that the species also survived the winter as an adult (see Discussion).

Discussion

During a two-week trip in early April 2012, we were able to observe 17 of the 36 known dragonfly species of Cyprus, which is nearly half of the local odonatological fauna (see Boudot et al. 2009). This is a very high percentage given the time of the year. Despite its geographical position close to Turkey and the Levant, Cyprus has a poor Odonata fauna compared with Turkey or the Levant (Dumont 1991; Kalkman & van Pelt 2006; Boudot et al. 2009). The Cypriot fauna is very similar to that found in nearby Turkey or Syria, but with many species missing, especially the Palearctic species (e.g. *Pyrrhosoma, Coenagrion*, *Somatochlora*, *Libellula*) and many species of running water, like members of the genera *Platycnemis*, *Gomphus* and *Cordulegaster*. This is very remarkable as most of them occur along the south coast of Turkey (Kalkman & van Pelt 2006; Boudot et al. 2009). Although Cyprus does not harbour major permanently flowing rivers, the island has a wide diversity of aquatic habitats, which should be able to support viable populations of species of the genera *Pyrrhosoma, Coenagrion*, *Platycnemis* and *Libellula*. In view of their presence along the south coast of Turkey and the availability of suitable habitats on Cyprus, it rather seems that the reason for their absence must be found in their lack of ability to colonise the island in historic or present times. This looks very surprising, as only 70 km separates Cyprus from southern Turkey, a distance that does not seem to be a major problem to overcome for damselflies and especially not for *Libellula* species.

In northern Africa, various species like *Lestes virens*, *Aeshna mixta*, *Sympetrum meridionale* and *S. striolatum* are known to emerge early in the season, move to

upland refuges for aestivation and undergo a pre-reproductive stage in a physiologic diapause before maturation and returning to lowland sites to reproduce by the onset of the rainy season in autumn (Samraoui et al. 1998; Samraoui & Corbet 2000). This strategy allows several species to survive the long dry summer period. Most of those autumn breeders reproduce in temporary pools, which contain water in autumn and winter (Samraoui & Corbet 2000), and maintain univoltinism by avoiding mortality of the aquatic stages. The pattern of adult maturations also occurs elsewhere in the Mediterranean region, like *Lestes barbarus* in Italy (Utzeri et al. 1984) and *Lestes viridis* in southern Spain (Agüero-Pelegrin et al. 1999). Kalkman et al. (2003) suggest that this probably also happens in the southern parts of Turkey for species like *Lestes parvidens* and *S. striolatum*. Apart from the Troodos, the only water habitats that do not become dry in Cyprus are the many, mostly recently constructed, dam lakes, not surprisingly the places that harbour most generalist species. Our data of very old individuals of *S. striolatum* and *S. meridionale* in the beginning of April is a strong indication that both species can survive the short Cyprus winter in the adult stage. Although data are lacking of a long pre-reproductive aestivation, we can expect that, like elsewhere in the Mediterranean region (Utzeri et al. 1984; Samraoui et al. 1998; Agüero-Pelegrin et al. 1999; Samraoui & Corbet 2000), this also happens in Cyprus when dragonflies can disperse to the much cooler Troodos Mountains. This upland movement has also been stated for some butterfly species (E. John, coordinator Cyprus Butterfly Study Group, pers. comm.).

On 2 April 2012, we observed a fully coloured individual of *Selysiothemis nigra*, which is more than one month earlier than any other record in Europe. As our observed specimen was already fully coloured on 2 April, emergence must have occurred at least by mid-March, i.e. nearly two months earlier than in Greece or Turkey (Lopau 2010; Kalkman & van Pelt 2006). The origin of this specimen is not clear. It is possible that emergence already took place in March, or that the specimen was able to overwinter in Cyprus and displayed the same life history strategy as *S. striolatum* and *S. meridionale*, and finally that it just concerns a migrant coming from outside Cyprus. The latter seems very likely, as this time of the year several individuals of *A. ephippiger* were observed, some even just arriving on the island (see above), indicating that there were favourable conditions for migration.

It is clear that for a thorough understanding of the seasonal ecology of Odonata in Cyprus in particular, and the Mediterranean in general, much more data is needed, preferably collected over the whole season and over several years. Although we only collected a limited amount of data, this already resulted in several very early seasonal records such as for *E. fatime*, *O. forcipatus albotibialis*, *O. taeniolatum* and *S. nigra*. Further, our data strongly suggest that several individuals of *S. striolatum* and *S. meridionale* had overwintered as adults, as a result of a long adult lifespan and, presumably, to a long pre-reproductive aestivation. As the amount of data is

expected to increase in the coming years, this will certainly help to clarify how many generations a certain species has per year. There is in particular the need to document the seasonal occurrence of larvae, metamorphosis and emergence.

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