

The distribution and flight period of the dragonflies of Turkey

V.J. Kalkman & G.J. Van Pelt

Introduction

In 1999 the initiative was taken to build a database containing all available records of Turkish dragonflies. For details on this database the reader is referred to the article by VAN PELT & KALKMAN (2004). In the present article distributional maps and flight histograms of all Turkish species are given. These are based on 6681 published and 2469 unpublished records (a species on a day on a locality). A selection of the latter is published in this volume (KALKMAN & VAN PELT, 2006). Records published prior to 1977 were taken from DUMONT (1977). A small number published records were found to be incorrect or doubtful and have been omitted.

The papers by SALUR & KIYAK (2006a, b) were published in 2006 and could not be incorporated in the maps and flight histograms. Some of the more interesting records in these papers are mentioned in KALKMAN & VAN PELT (2006). We became aware of the first Turkish record *Zygonyx torridus* published in ASKEW (2004) only in 2006 by the paper of KUNZ *et al.*, 2006 and therefore the species is absent from the maps and flight histograms. There is still much unknown on the distribution and the flight period of Turkish dragonflies and this article must be seen as an review of what we known in order to stimulate further research.

Availability of data on the distribution of the dragonflies of Turkey

The locality-information of 8726 records was detailed enough to use them for the distribution maps. The number of records prior to 1970 is very low and therefore almost nothing can be said on the historic distribution of the Turkish species. Since 1970, and especially since 1990, the number of records increased sharply (Figure 1). Figure 2 gives all localities for which records were available. The European part of Turkey and the southern coast, from the Mugla

province to the province of Antakya, are especially well investigated. The first is mainly due to the work by HACET & AKTAÇ (1997, 2004), while the second shows the favorite holiday destination of West-European odonatologist. A few regions are poorly explored. Parts of the coastland of western Turkey have been neglected, especially the area north of Izmir and west of Bursa. Also poorly explored is the mountainous region between Erzurum and Sivas. The most important gap in our knowledge is the SE of Turkey, especially when taking in account the relatively high number of interesting species occurring in this region.

For *Sympecma paedisca*, *Aeshna serrata*, *Ophiogomphus reductus* and *Orthetrum ransonnetii* only old records, lacking detailed information on the locality, are available. In these cases the location of the record is given as a circle. No detailed locality information was present for *Orthetrum trinacria* and for this species no map is presented (see notes on selected species).

Several species (*Calopteryx splendens*, *C. virgo*, *Erythromma lindenii*, *Ischnura elegans*, *Gomphus flavipes*, *Onychogomphus forcipatus*),

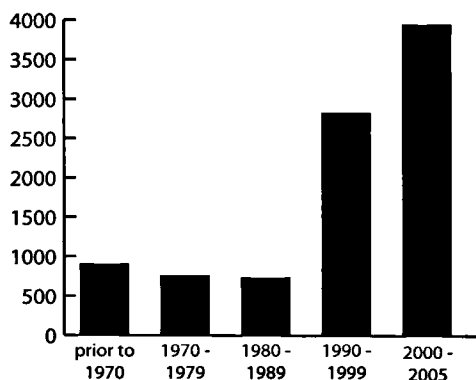


Figure 1
Number of records of Odonata from Turkey per decade.

tus, *Cordulegaster insignis*, *Sympetrum sanguineum*, *Sympetrum striolatum*) have more than one subspecies present in Turkey. The identification of the subspecies is often problematic (e.g. *Ischnura elegans* and *Cordulegaster insignis*) and for many of the records no information on the subspecies is given. For this reason no maps were made for subspecies. Information on the occurrence and distribution of the subspecies can be found in KALKMAN *et al.*, 2003 and KALKMAN, 2006.

Availability of data on the flight period of the dragonflies of Turkey

The histograms of the flight period are based on 7558 records. Only records pertaining to adult specimens for which both the month and the day were known were used. The records are not evenly distributed across the year and for this reasons the histograms give only an indication of the flight period. Figure 3 gives a histogram based on all records of all species. Many odonatologist from Western Europe visit the south of Turkey in spring, which explains the peak in May. The peak in July and August is largely due to the fieldwork of the second author on the genus *Cordulegaster* taking place in this period. Records outside the period May-August are relatively scarce although

many species can be found in this period, especially in the south.

No flight histogram is given for *Sympecma paedisca*, *Pseudagrion syriacum*, *Aeshna serrata*, *Ophiogomphus reductus*, *Ortetrum ransonnetii* and *O. trinacria* as no records with information on both the day and month of observation are known.

Notes on selected species

Sympecma paedisca

This species is only known from two records from Antakya and Malatya already published by SÉLYS (1887). The fact that the species has not been found since seems to indicate that the species has decreased. Recently the species was

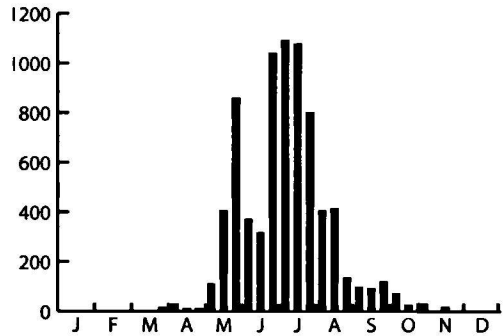


Figure 2.

Localities in Turkey from which Odonata records are available.



Figure 3.

Histogram of the flight period based on all records.

recorded close to the Turkish border in Armenia which makes it likely that the species is present in the east of Turkey (pers. com. M. TAILLY).

Coenagrion vanbrinkae

LOHMANN (1993) described *C. vanbrinkae* on the basis of specimens from Iran and Turkey. The species is largely identical to *C. ornatum*. The authors have problems distinguishing between these two and therefore all records are given as *C. ornatum*, with the exception of the two records present in the original description of the species.

Ophiogomphus reductus

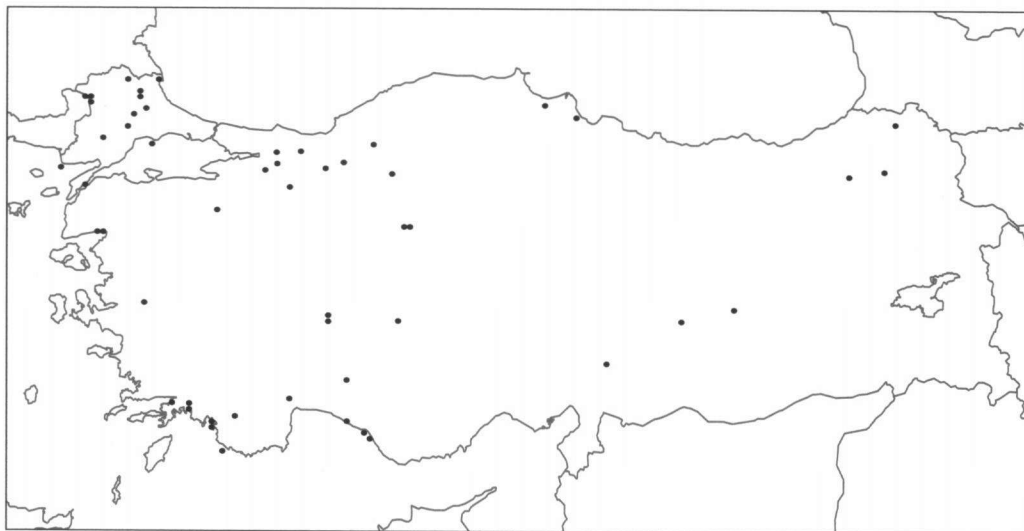
The record from Malatya published by SÉLYS (1887) is still the only Turkish record of this species (see KALKMAN *et al.* 2003 for more information). The nearest locations where this species is found are in Turkestan and Afghanistan. Its close relative, *Ophiogomphus cecilia*, has not seldom small unobtrusive populations and it is therefore possible that also *O. reductus* has been overlooked during fieldwork in the last decades.

Orthetrum trinacria

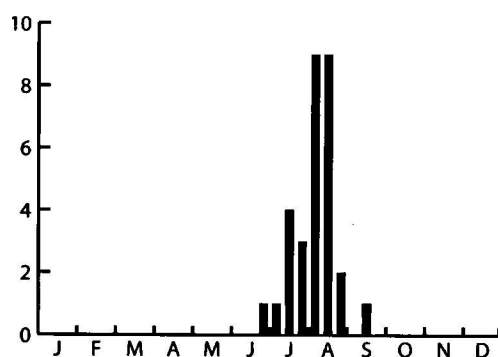
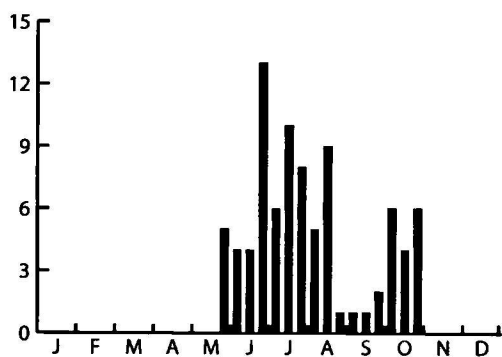
The presence of *Orthetrum trinacria* in Turkey is based on a record from 'Klein-Asien' from which DUMONT (1977) stated that it probably comes from Amik Göl (Antakya province). Other records were published by DEMIRSOY from various parts of Turkey (1982). The identification of these records is doubtful as the species has not been found since. For this reason no Turkish record is available with sufficient detail and no map could be presented.

Orthetrum ransonnetii

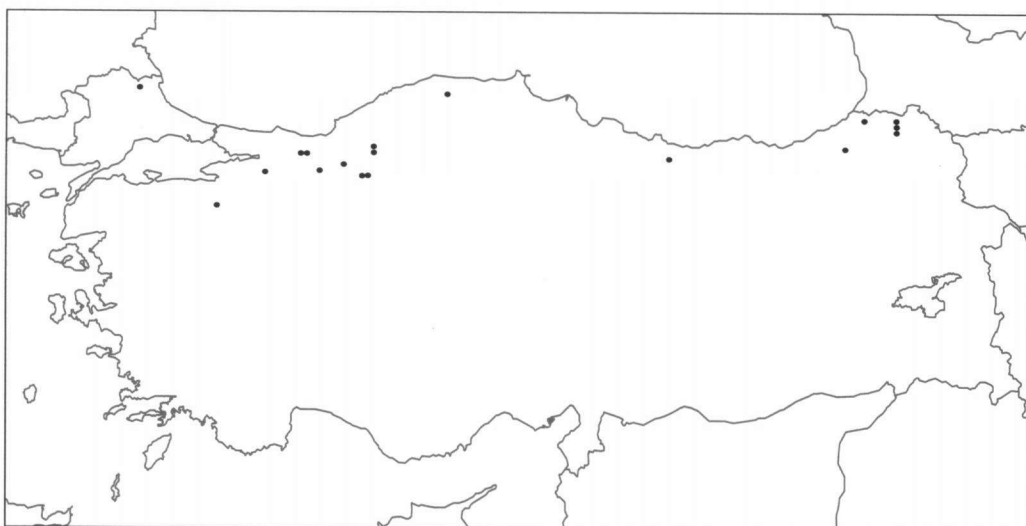
The record from Malatya published by SÉLYS (1887) is still the only Turkish record of this species (see KALKMAN *et al.* 2003 for more information). Especially the males can easily be confused with one of the commoner species of *Orthetrum* and the species might be easily overlooked.

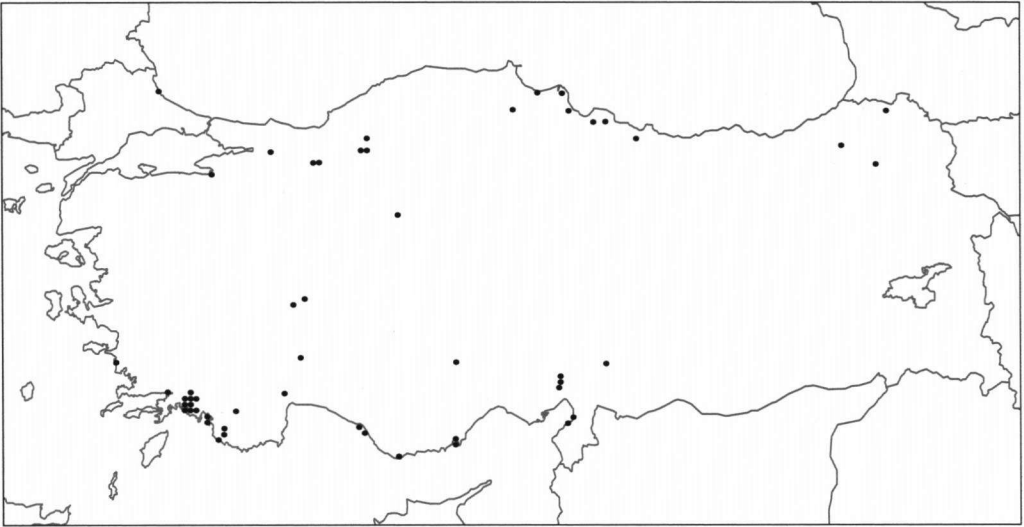


Aeshna affinis

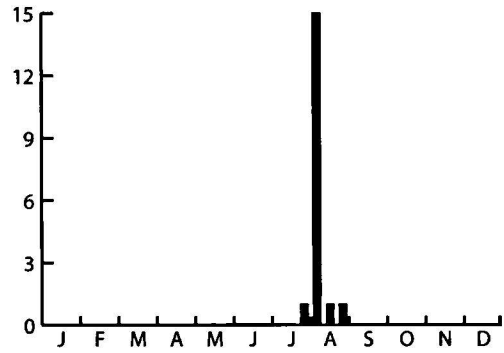
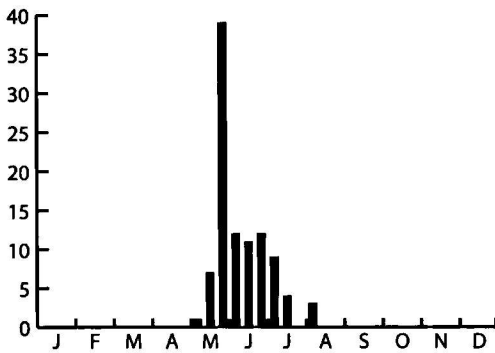


Aeshna cyanea

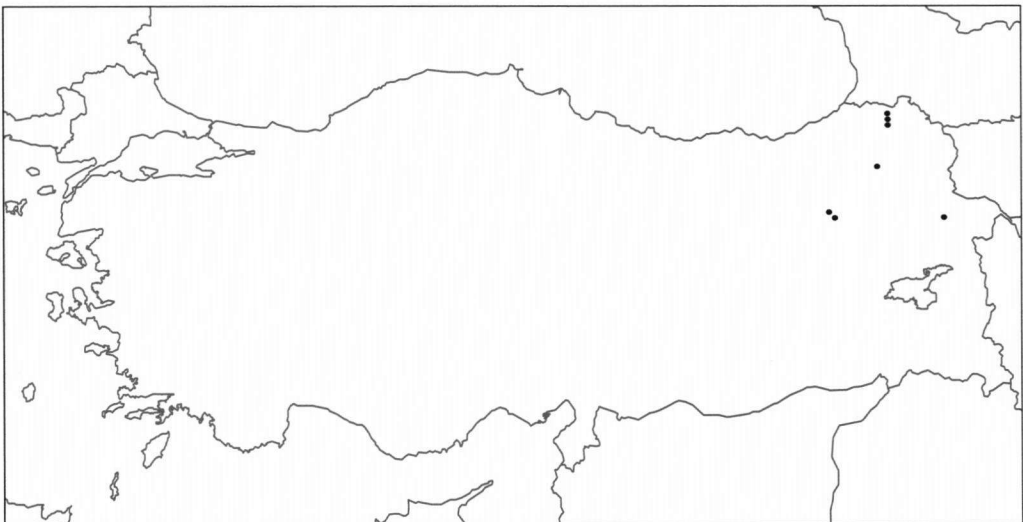


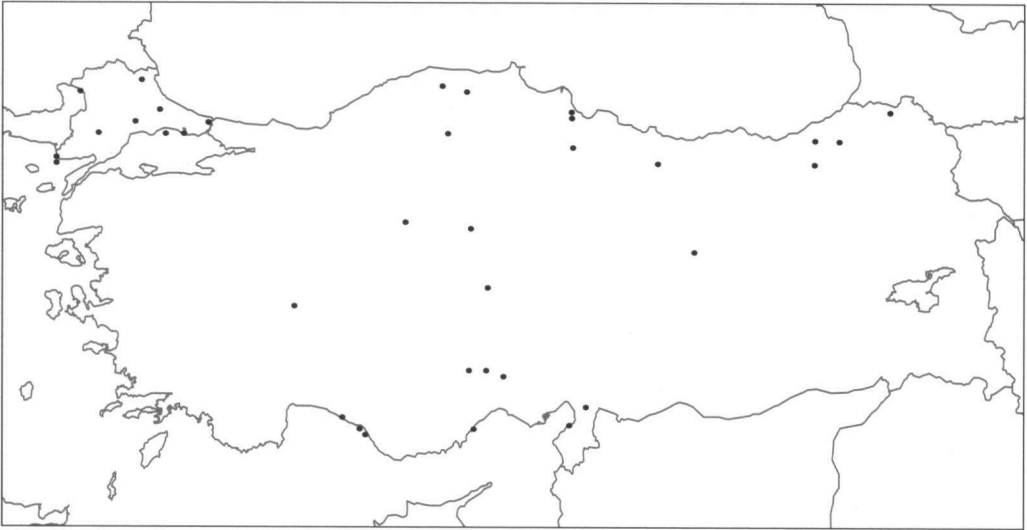


Aeshna isoceles

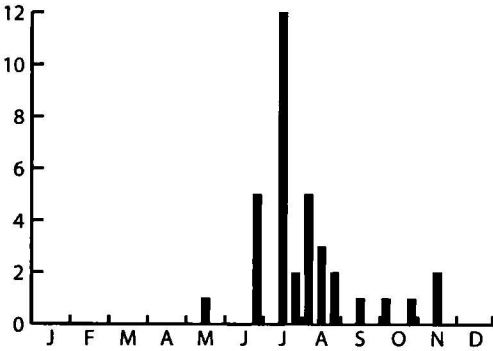


Aeshna juncea

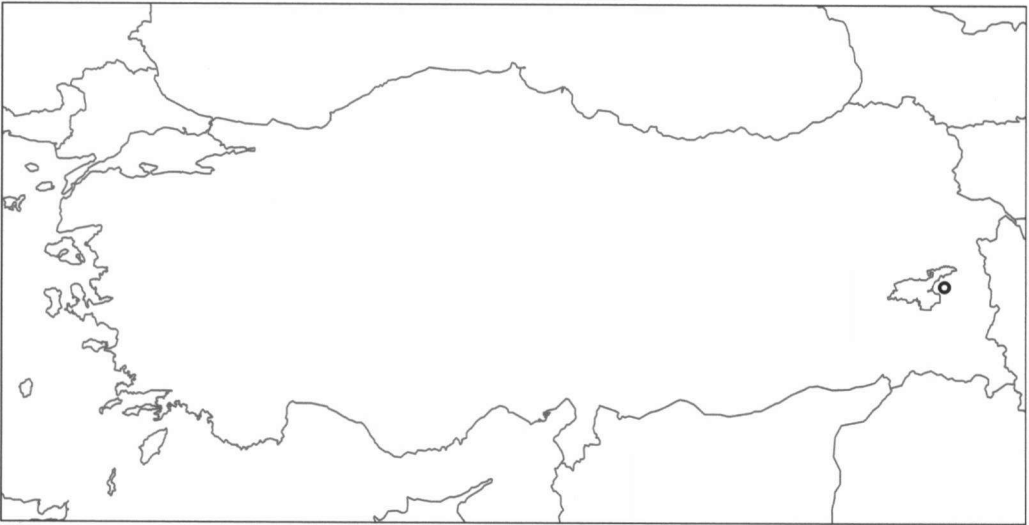


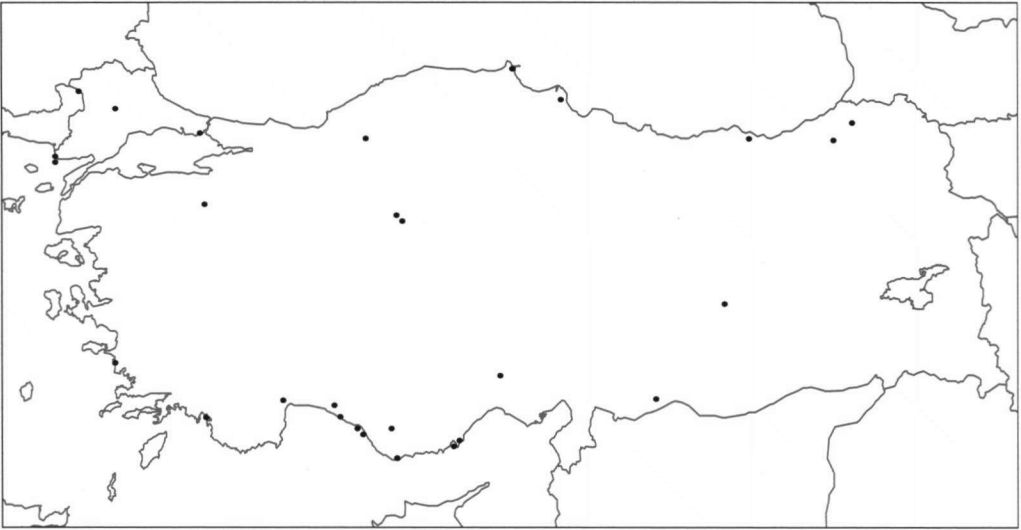


Aeshna mixta

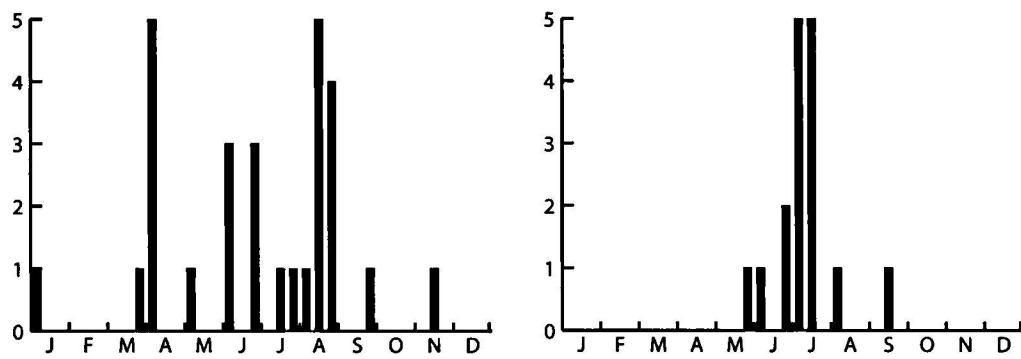


Aeshna serrata

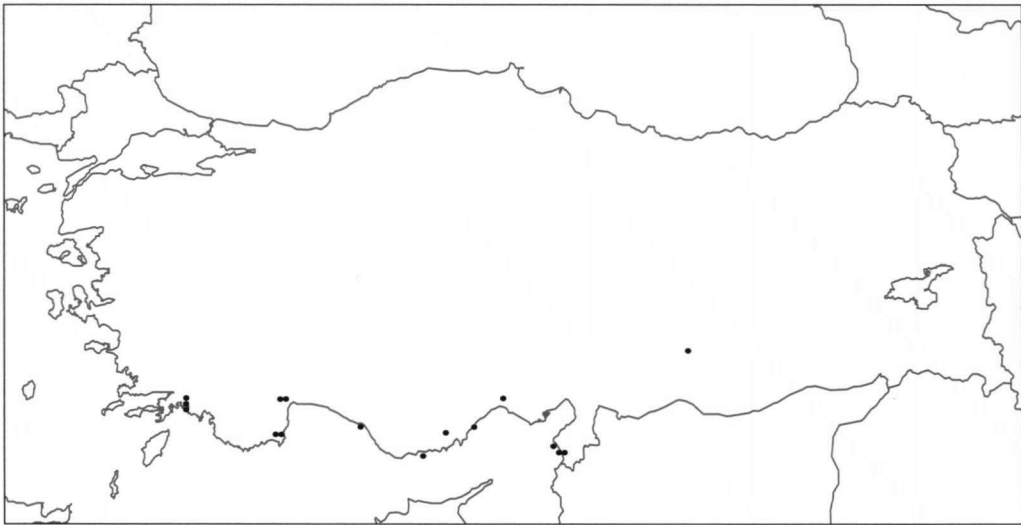


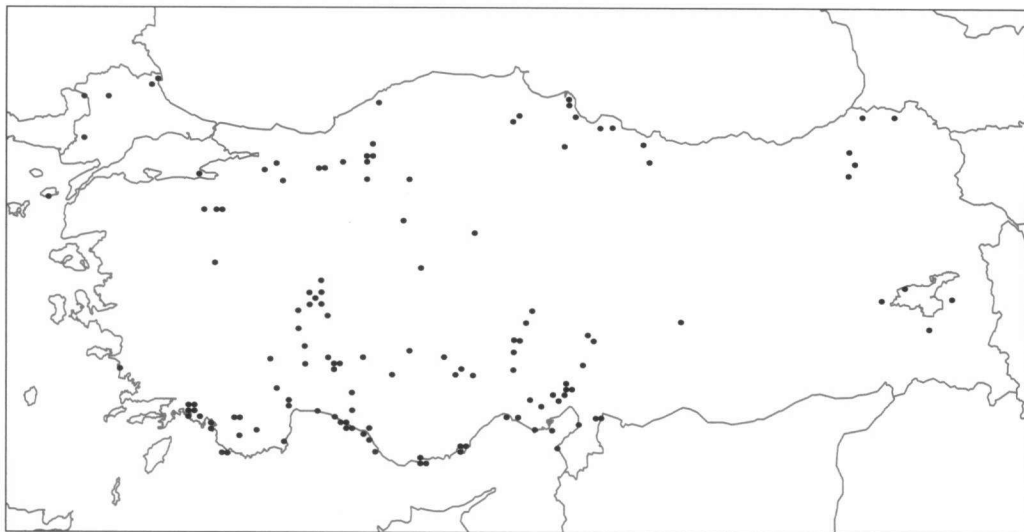


Anax ephippiger

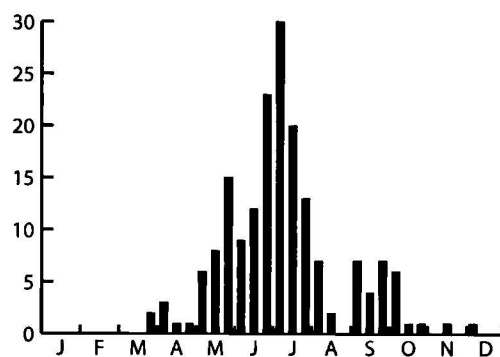
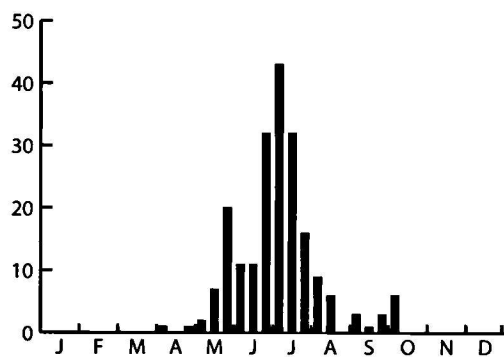


Anax immaculifrons



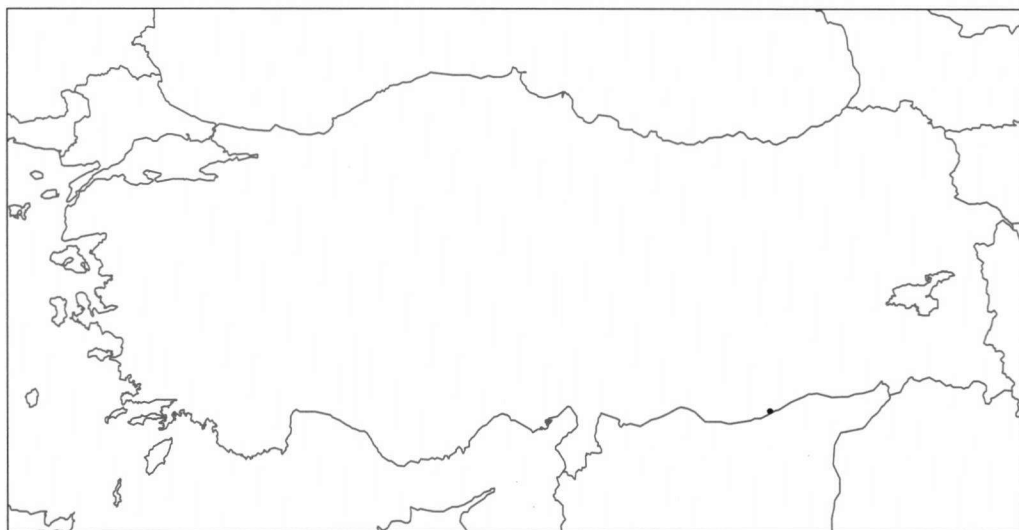


Anax imperator

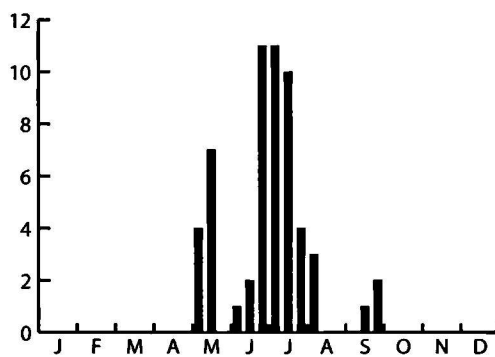
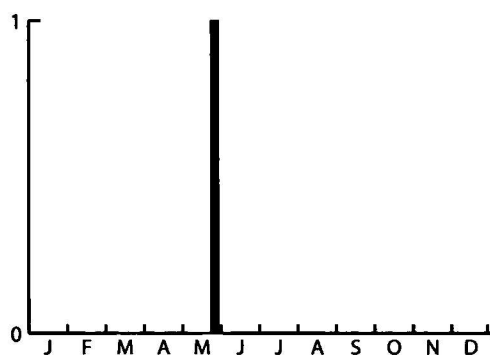


Anax parthenope

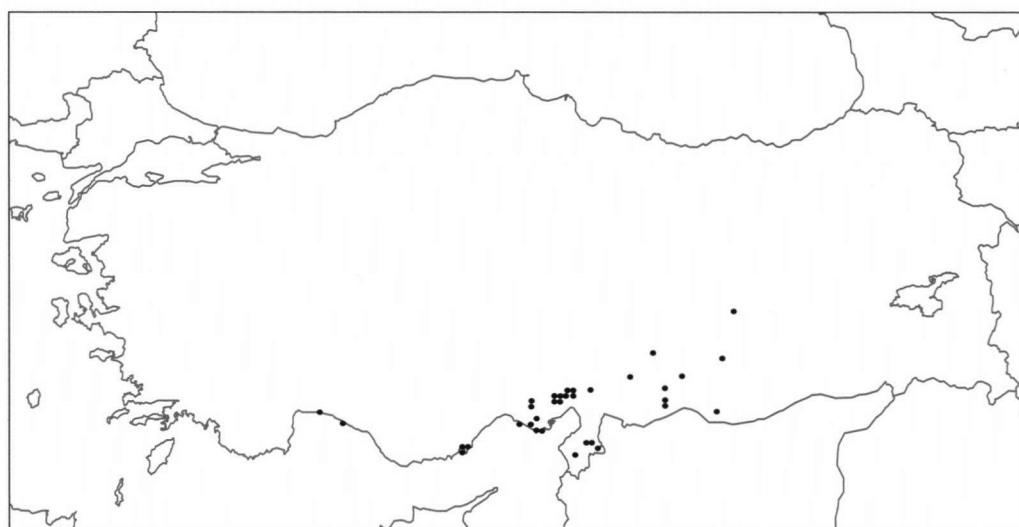


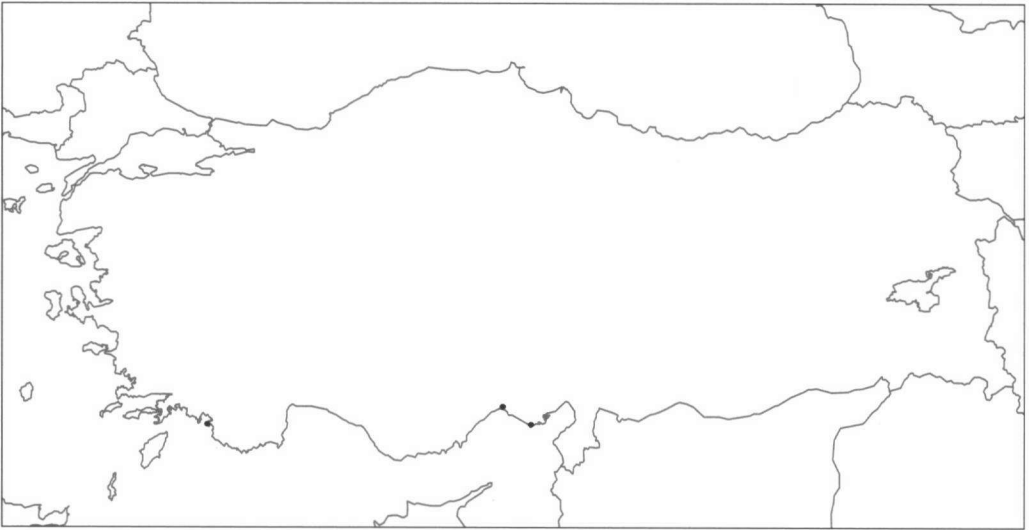


Anormogomphus kiritshenkoi

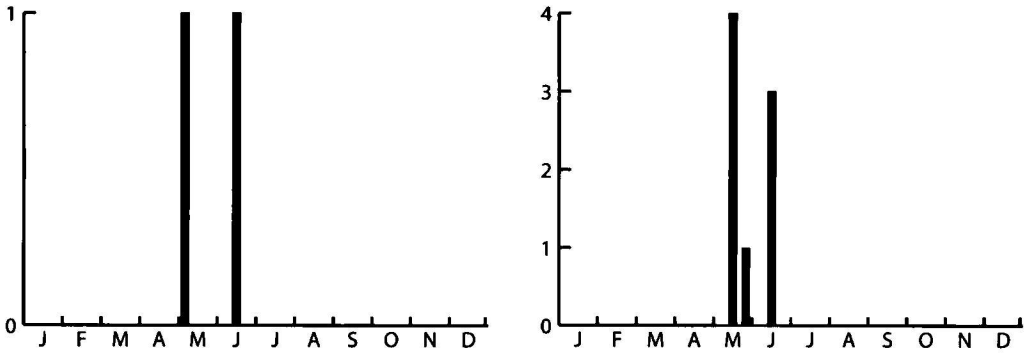


Brachythemis fuscopalliata

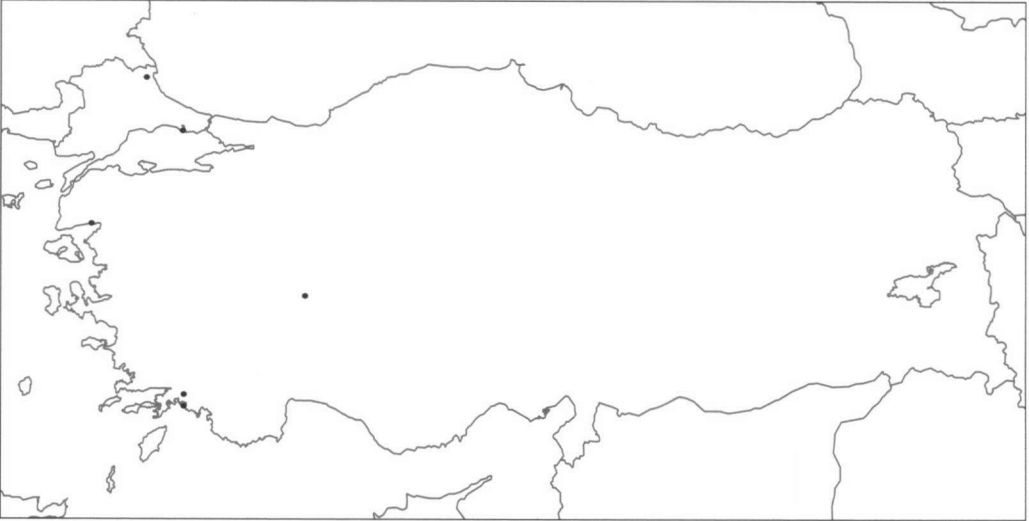


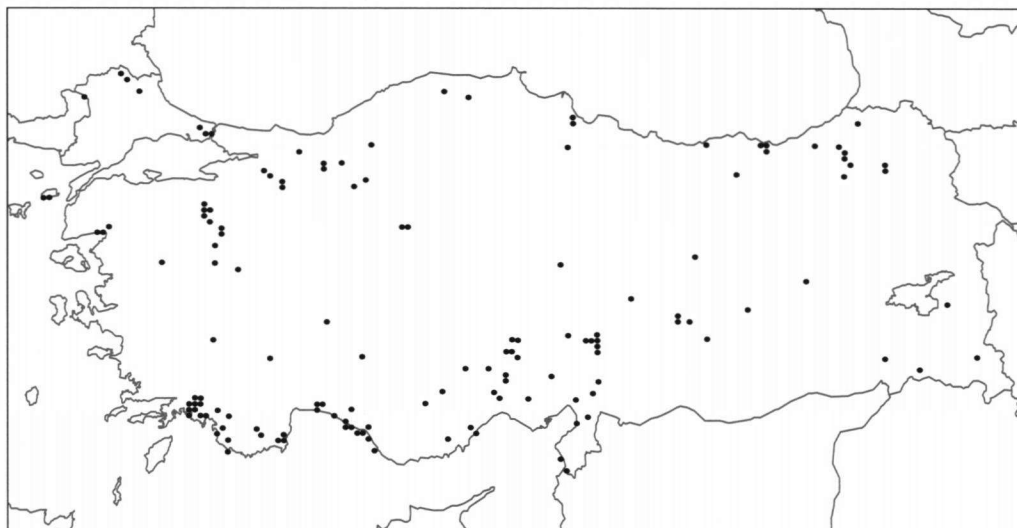


Brachythemis leucosticta

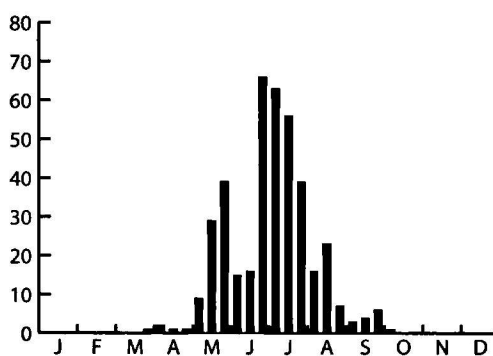
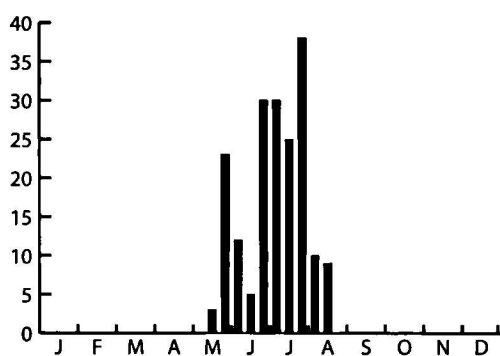


Brachytron pratense

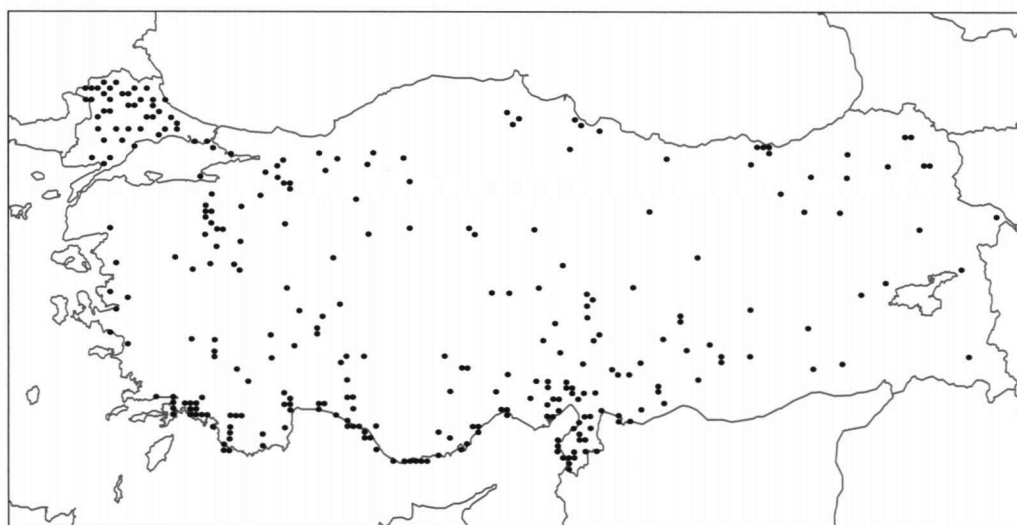


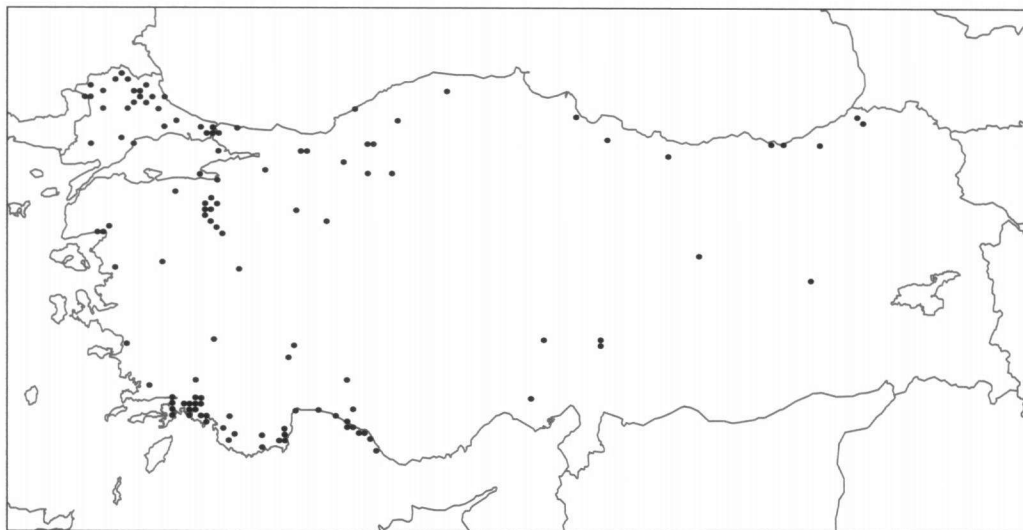


Caliaeschna microstigma

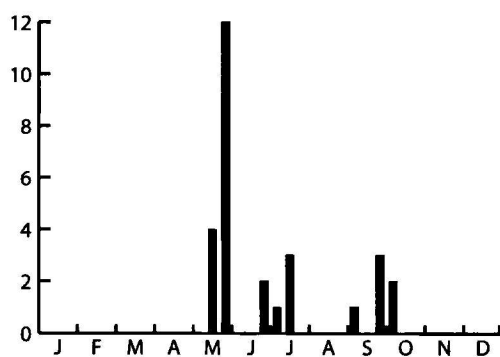
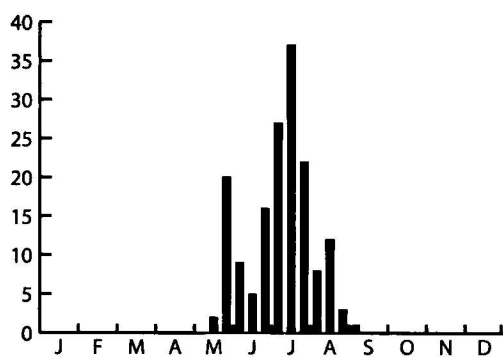


Calopteryx splendens ssp.

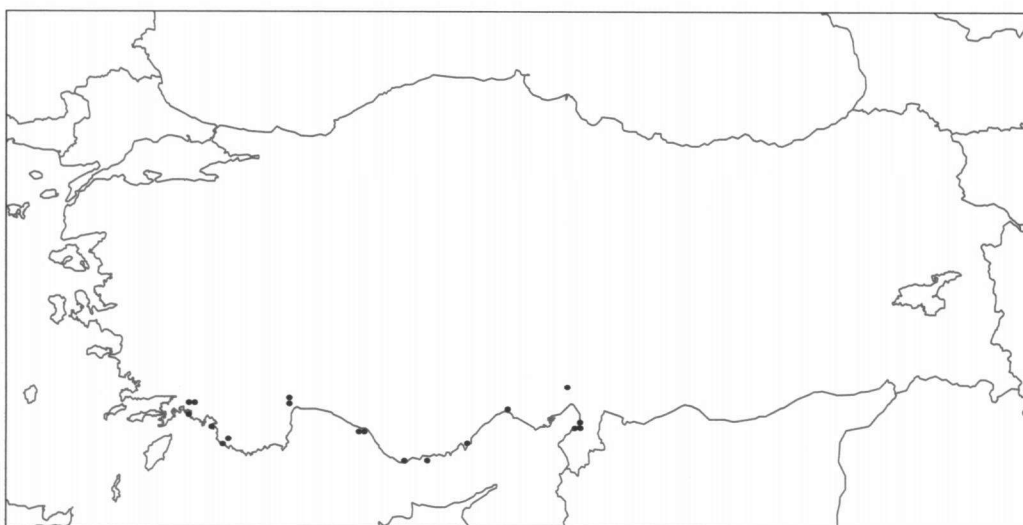




Calopteryx virgo ssp.

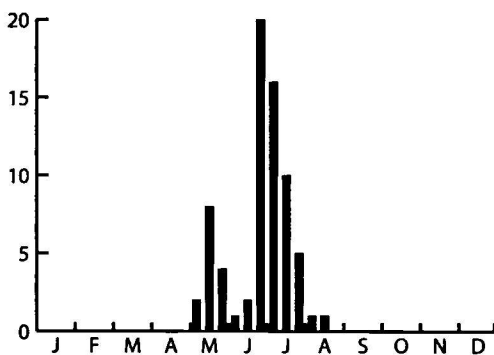
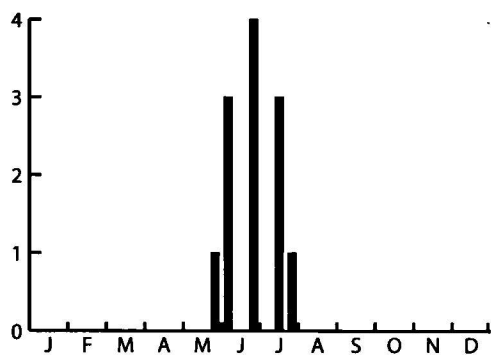


Ceriagrion georgifreyi

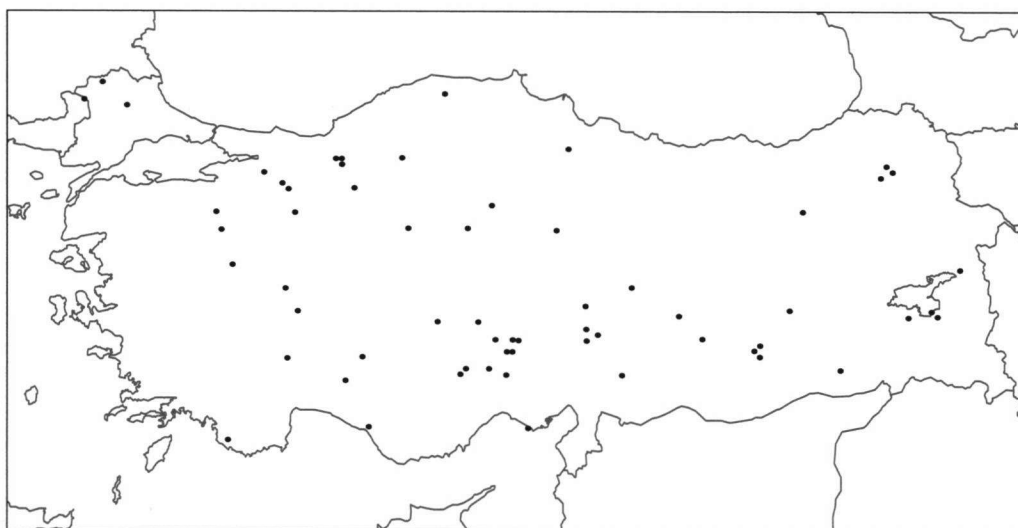


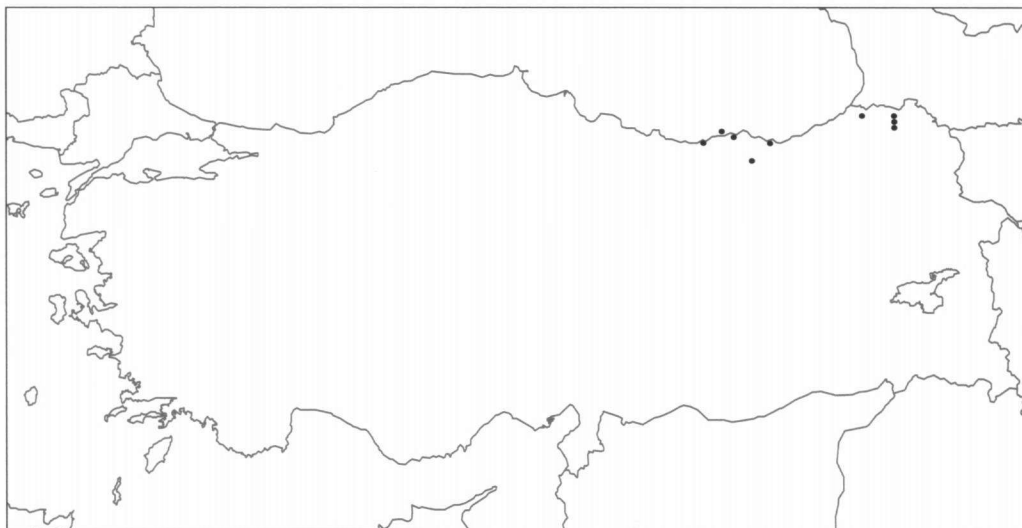


Coenagrion lunulatum

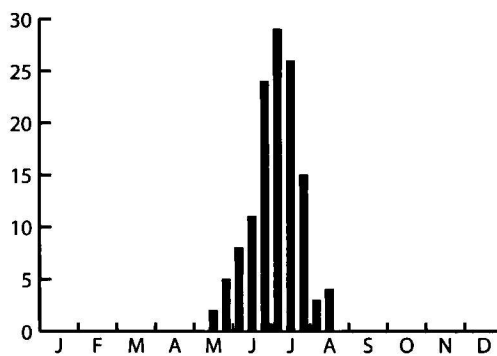
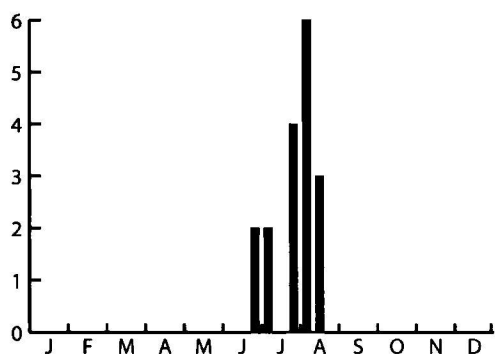


Coenagrion ornatum

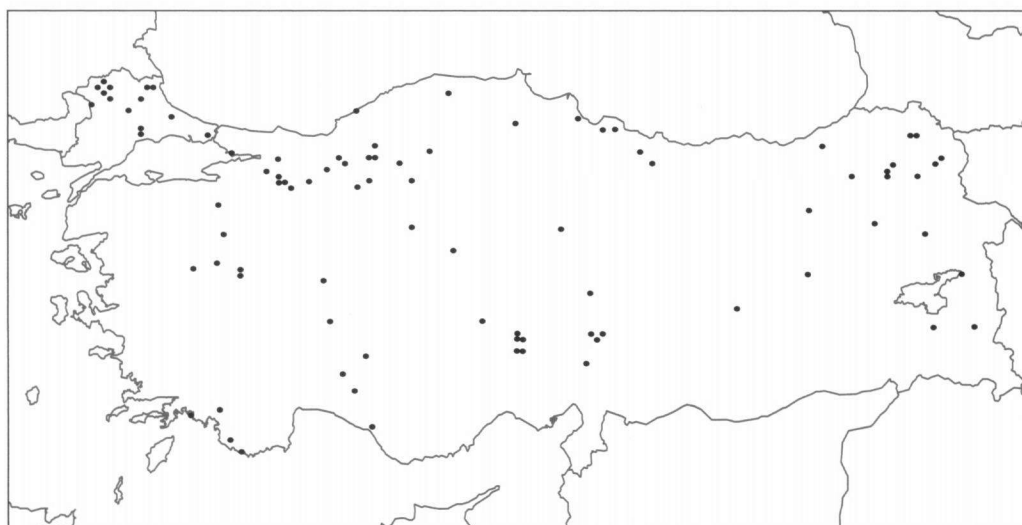




Coenagrion ponticum

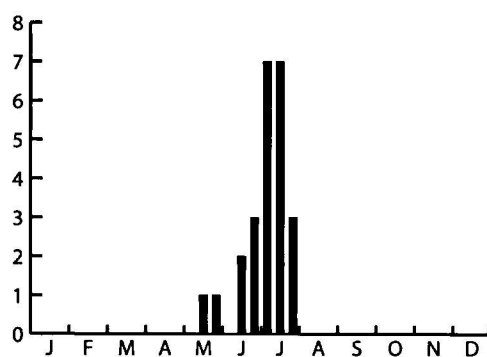
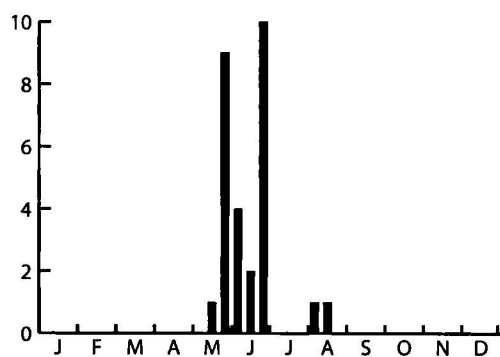


Coenagrion puella

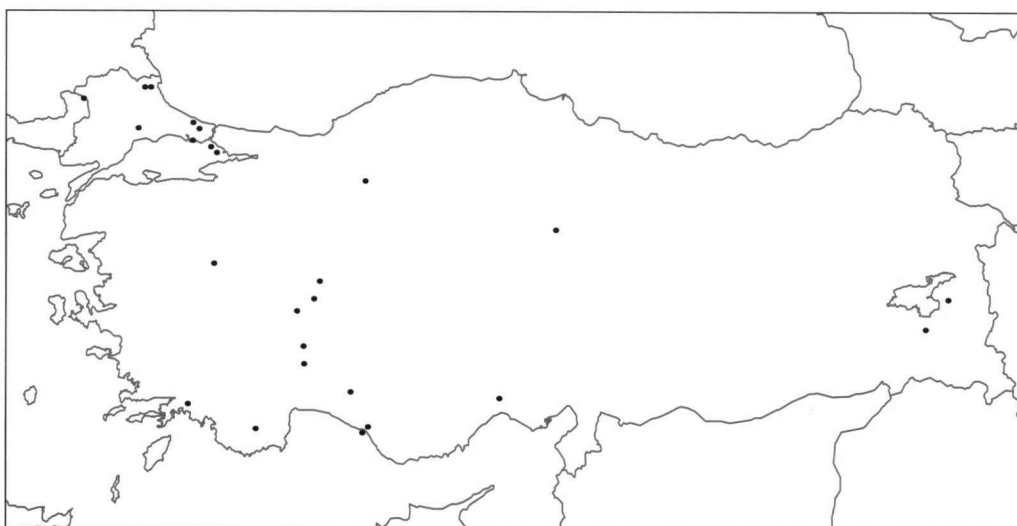


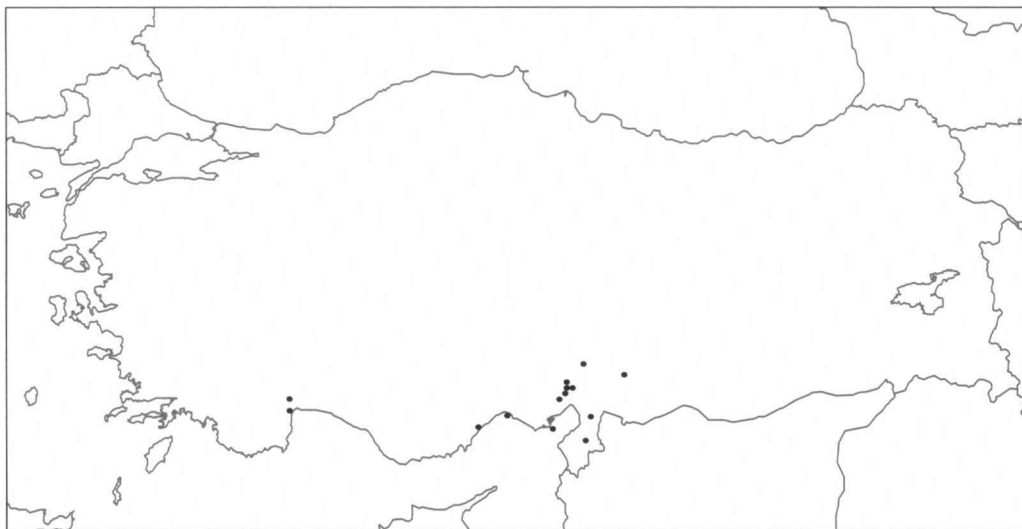


Coenagrion pulchellum ssp.

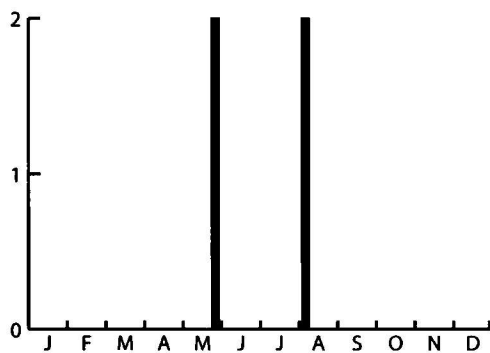
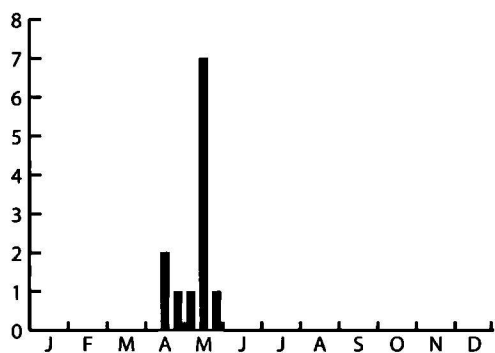


Coenagrion scitulum



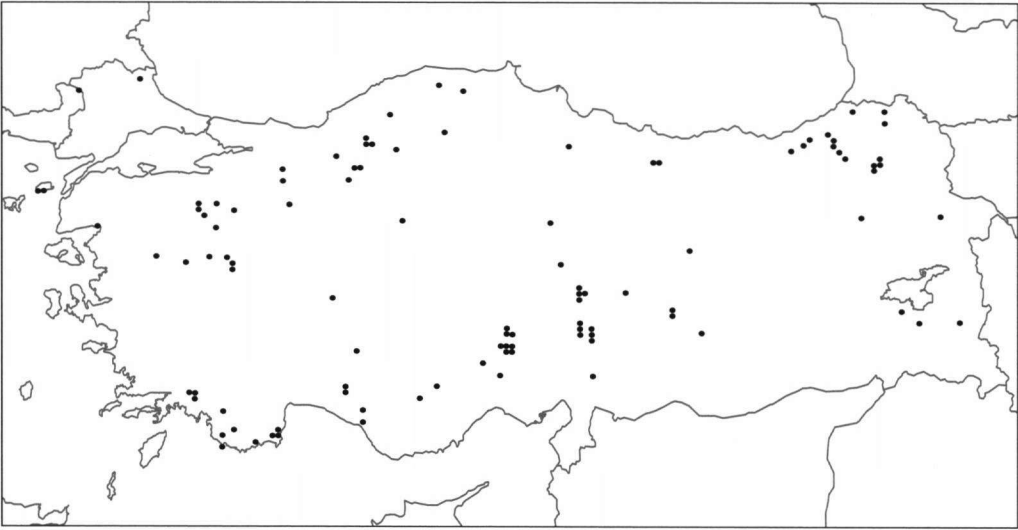


Coenagrion syriacum

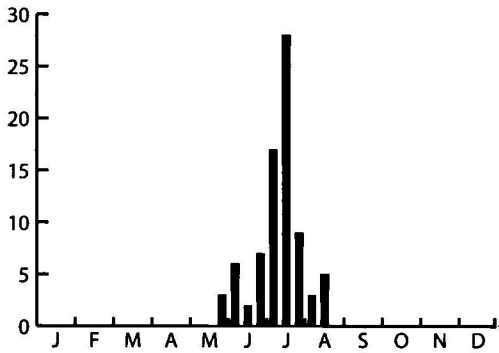
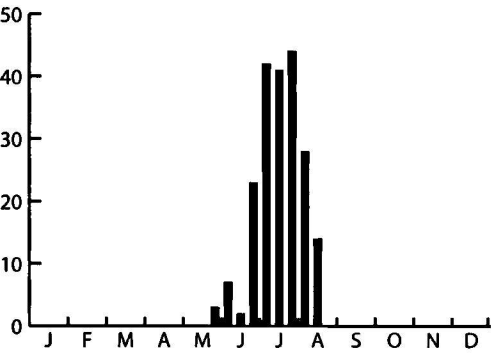


Coenagrion vanbrinkae



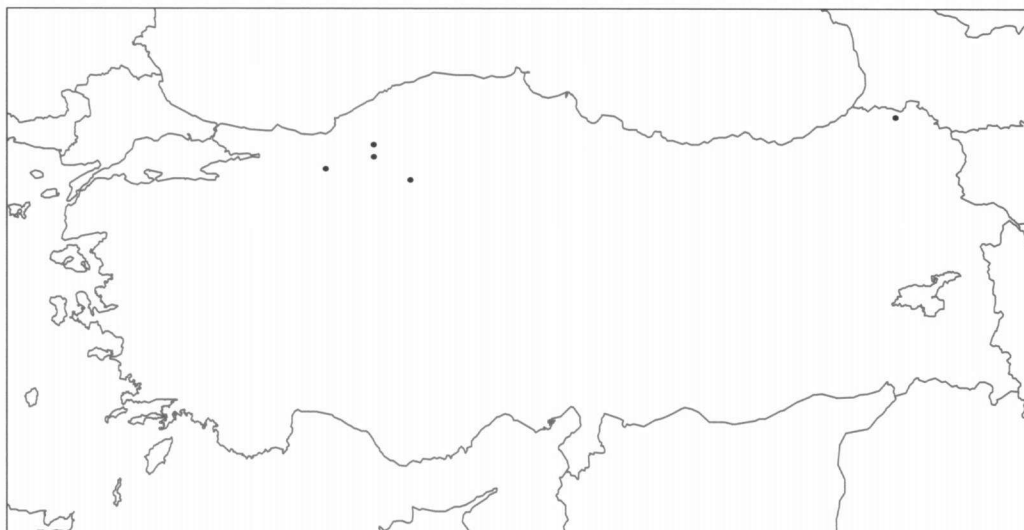


Cordulegaster insignis ssp.

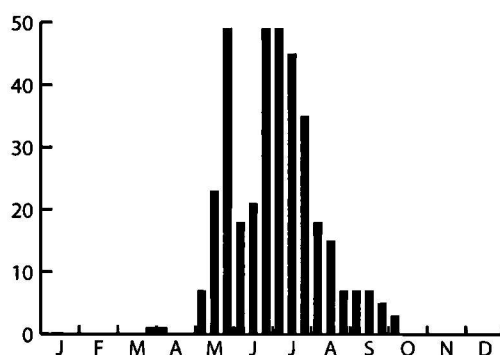
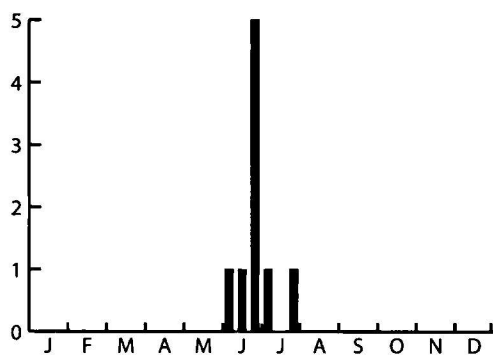


Cordulegaster picta

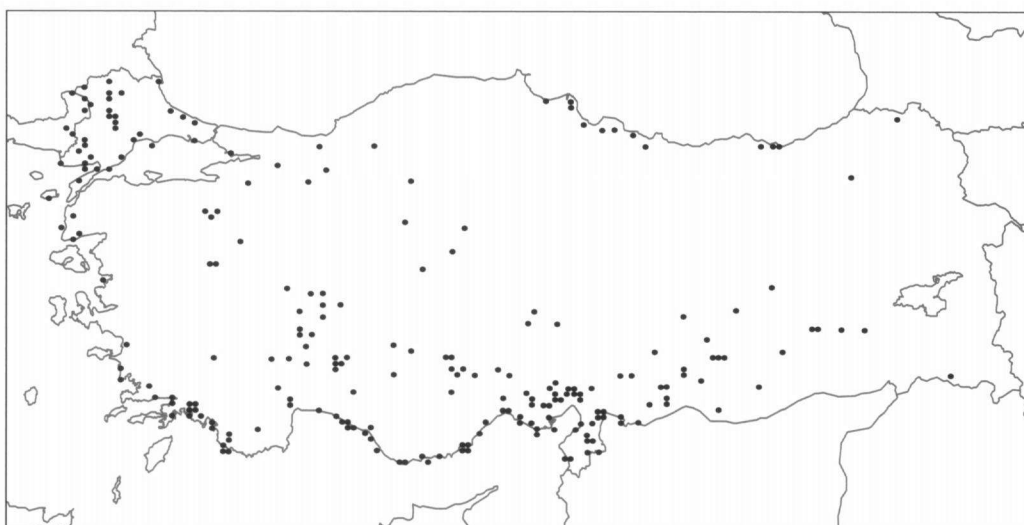




Cordulia aenea

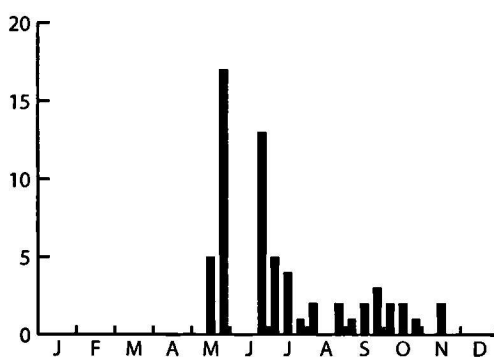
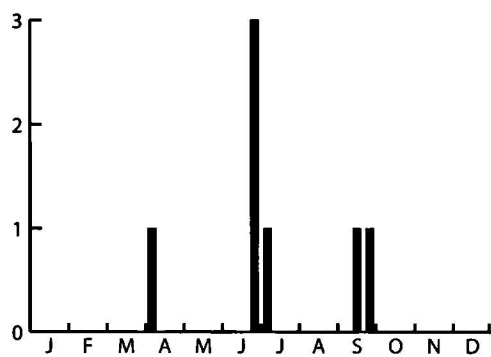


Crocothemis erythraea erythraea

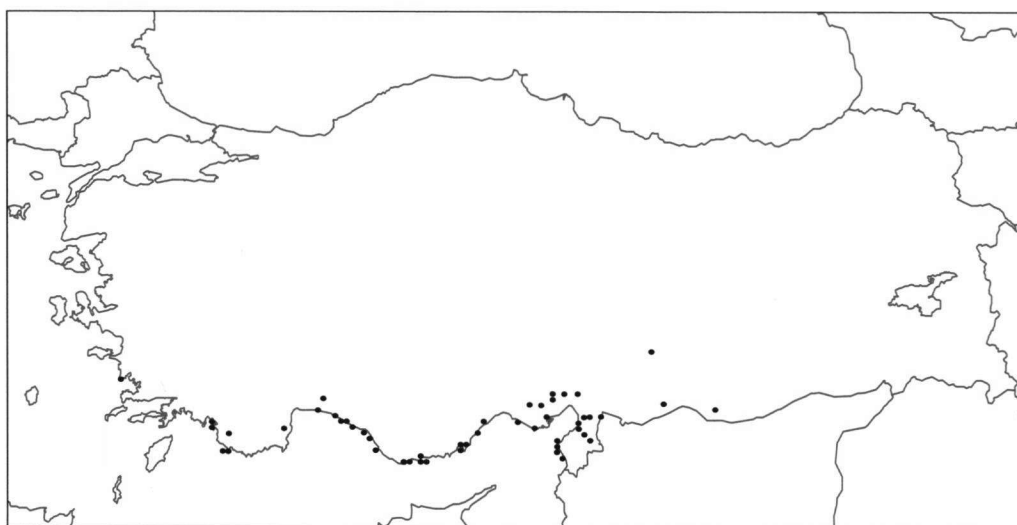




Crocothemis servilia

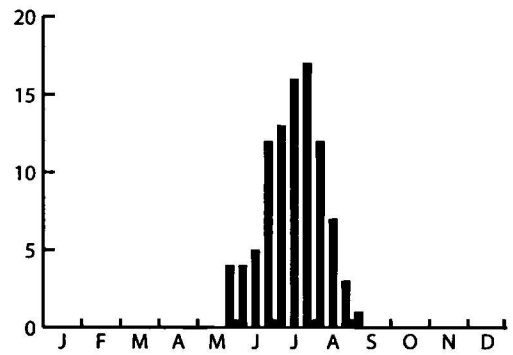
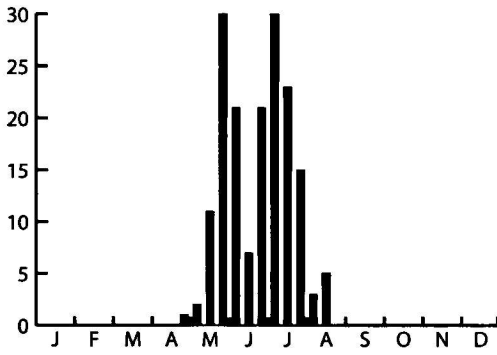


Diplacodes lefebvrii

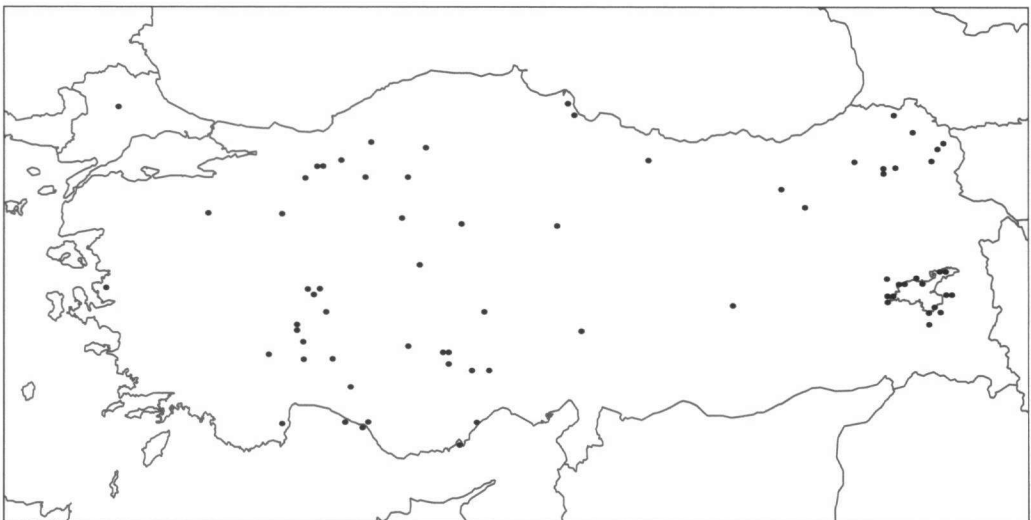


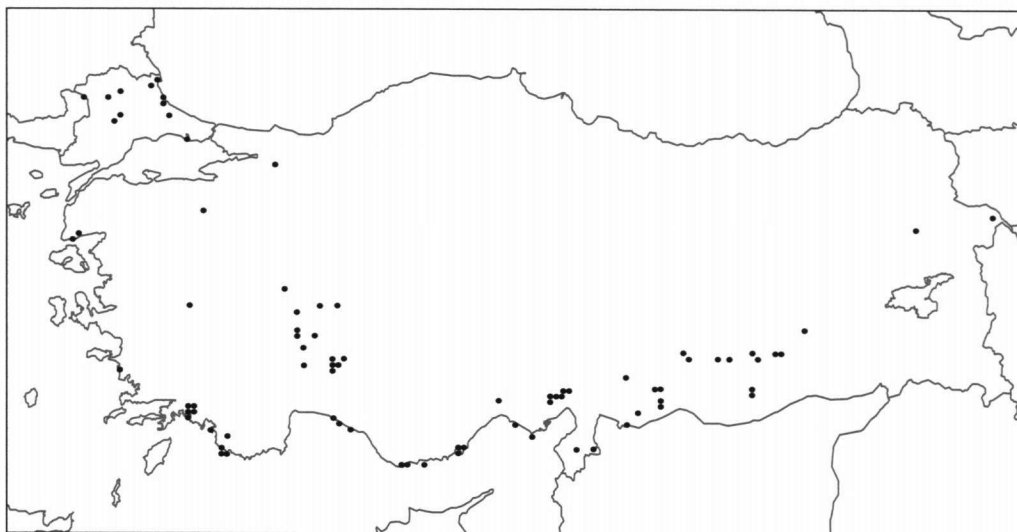


Epallage fatime

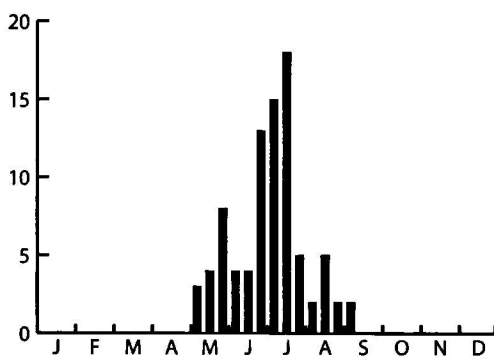
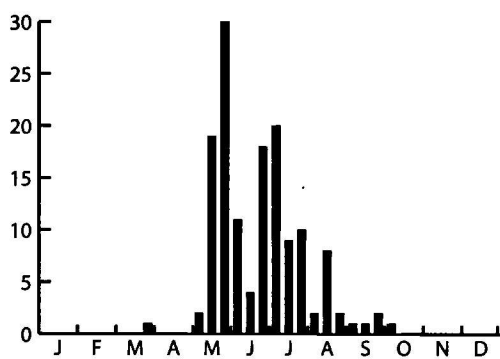


Enallagma cyathigerum

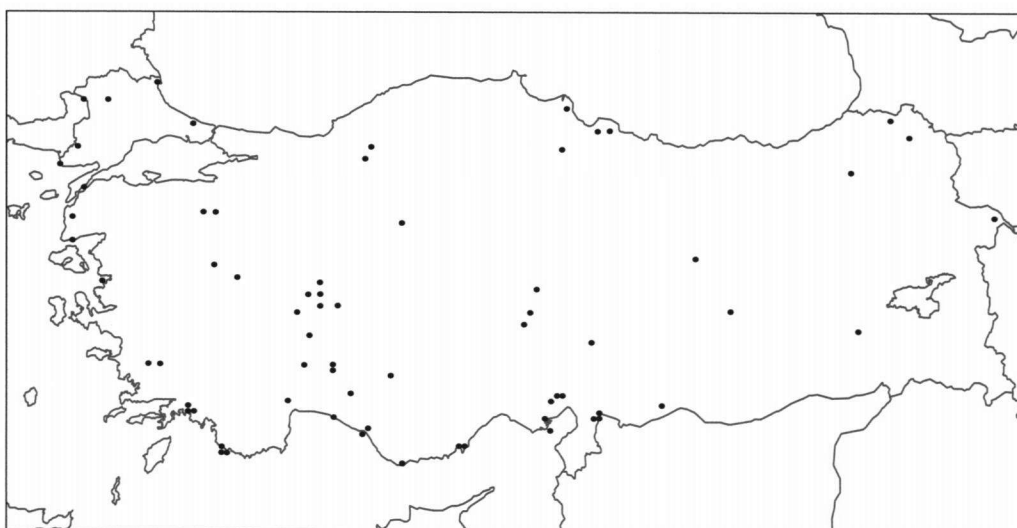


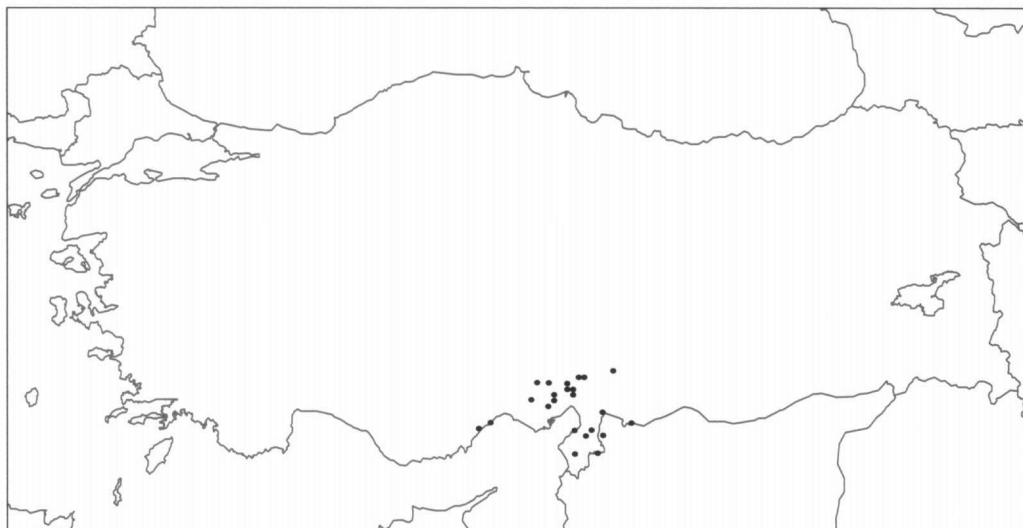


Erythromma lindenii ssp.

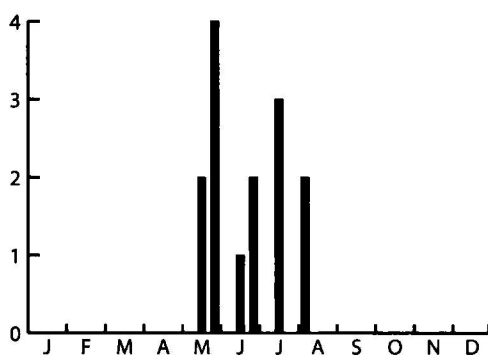
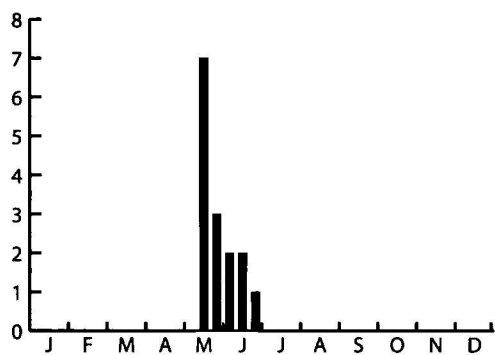


Erythromma viridulum

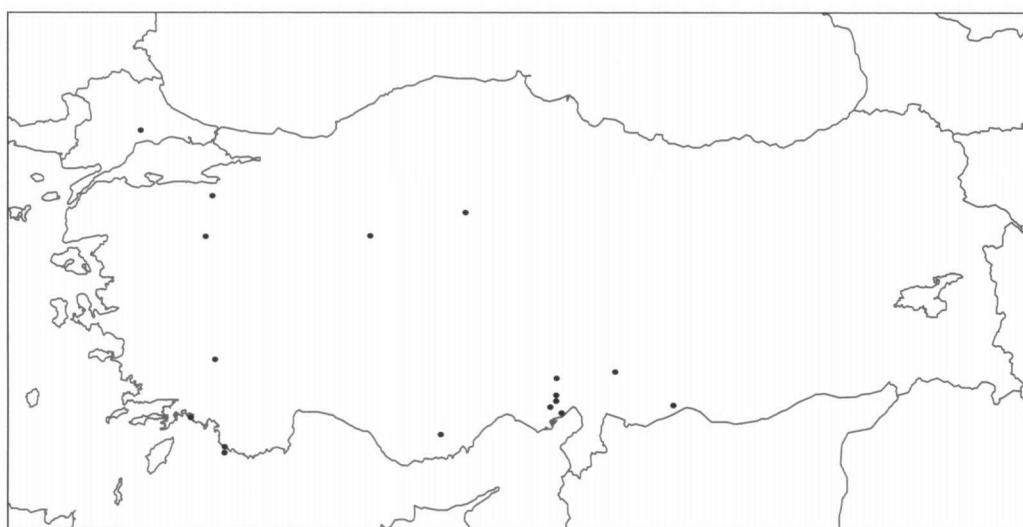


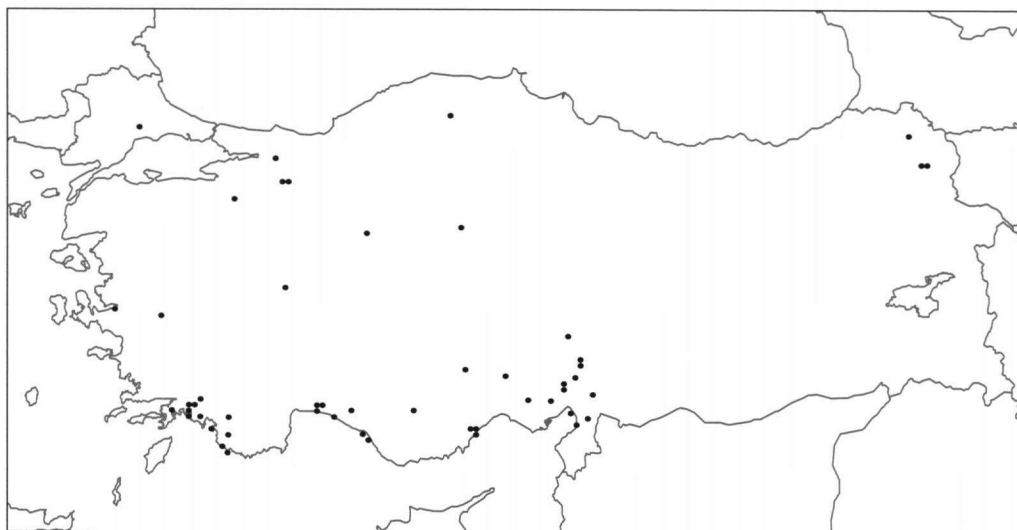


Gomphus davidi

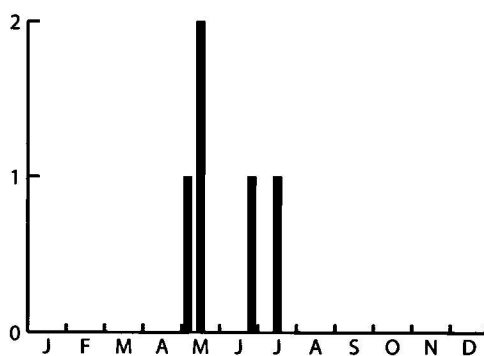
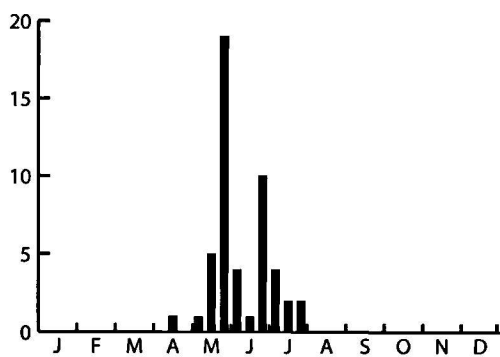


Gomphus flavipes ssp.

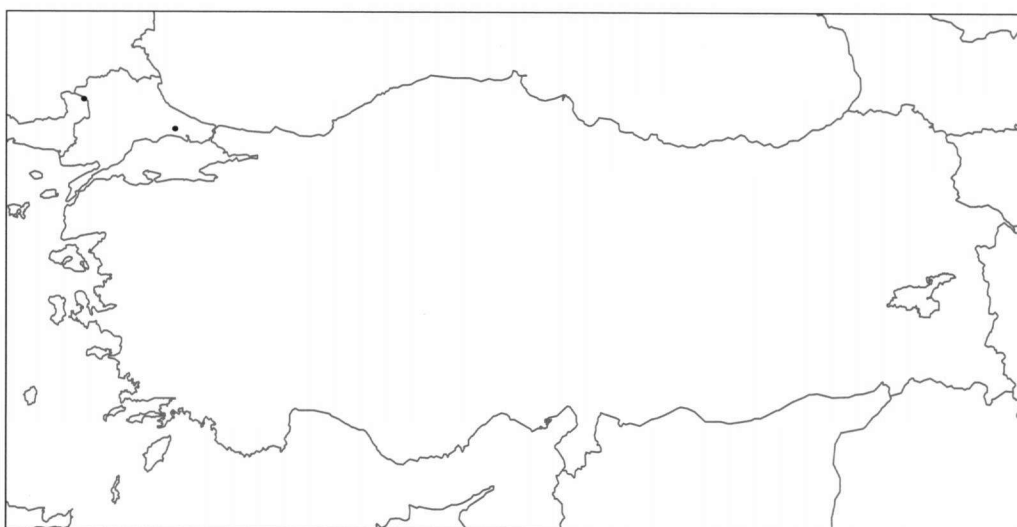




Gomphus schneiderii

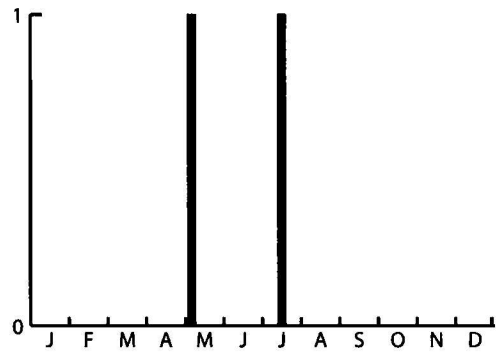
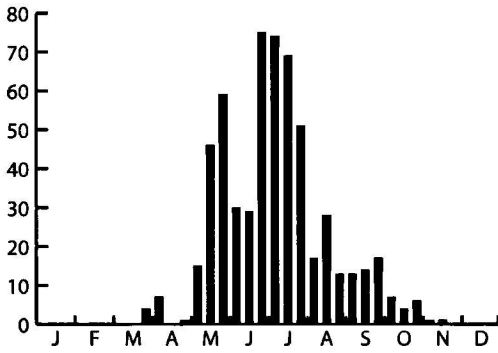


Gomphus vulgatissimus





Ischnura elegans ssp.

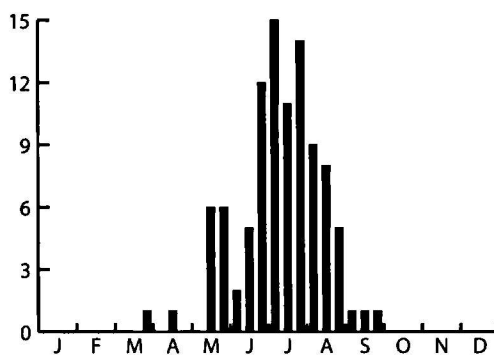
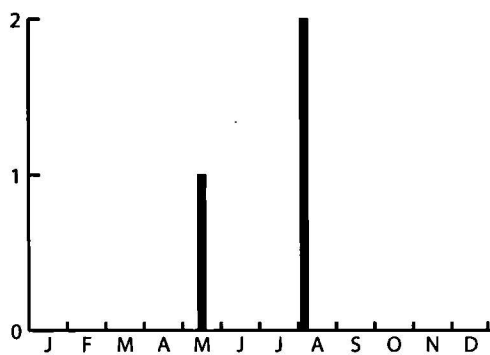


Ischnura fountaineae

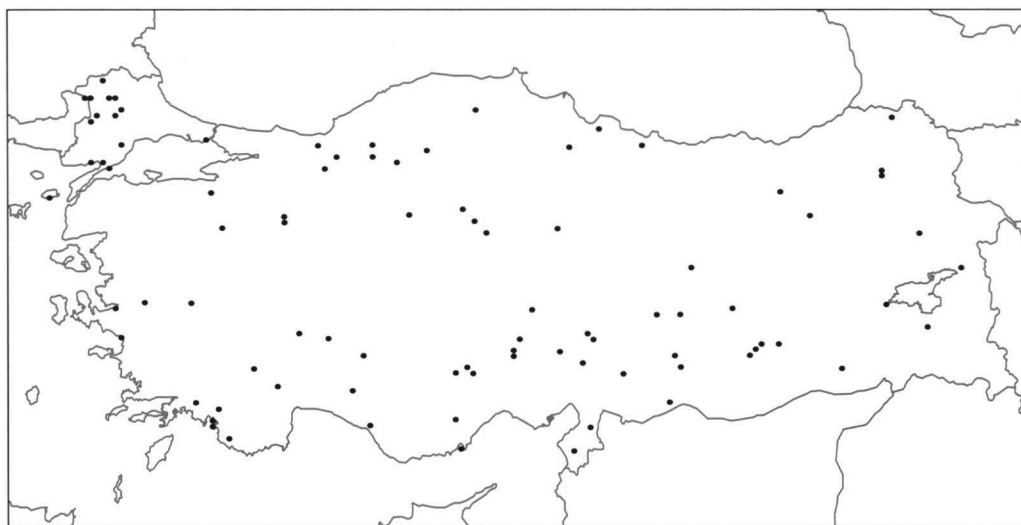


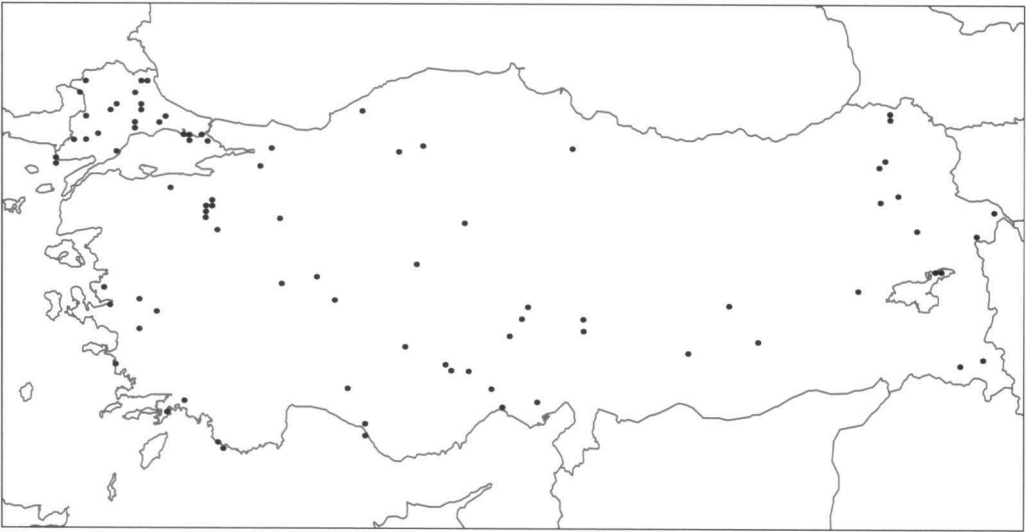


Ischnura intermedia

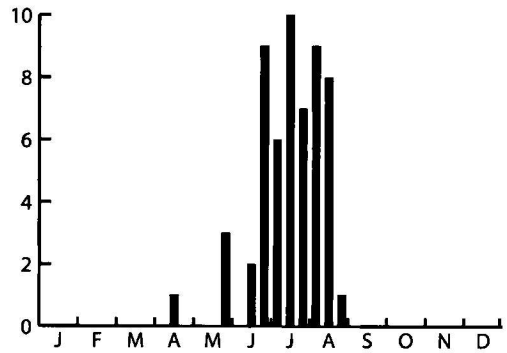
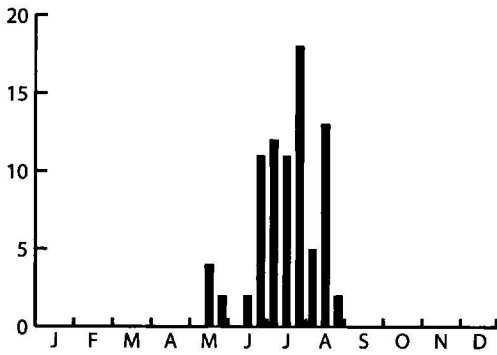


Ischnura pumilio





Lestes barbarus

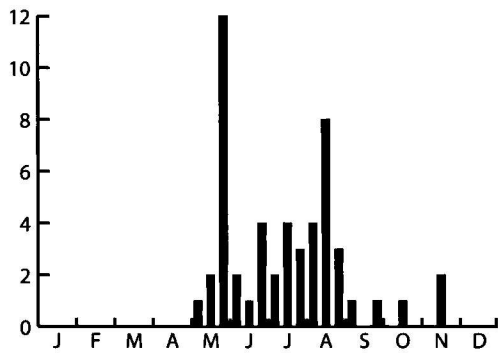
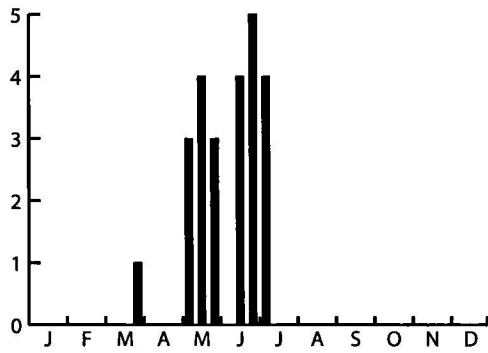


Lestes dryas

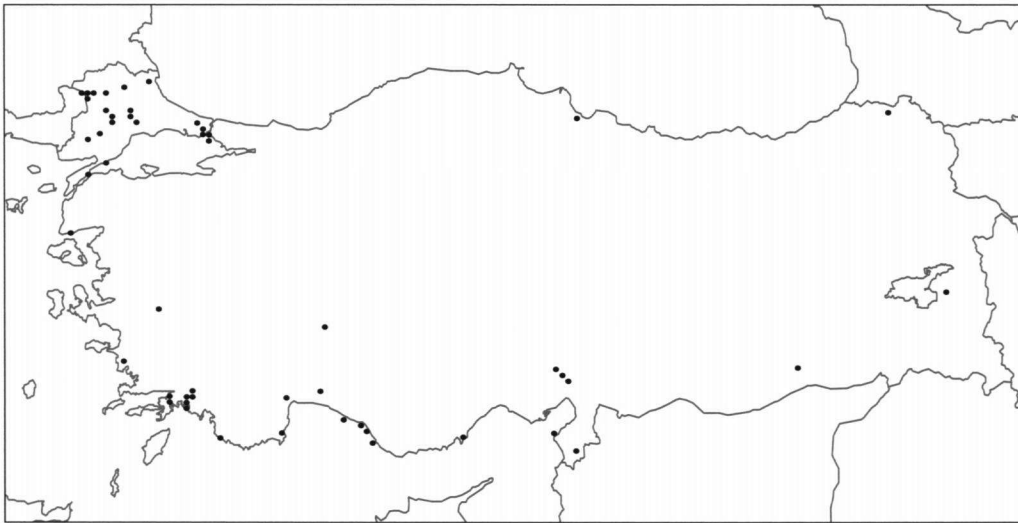


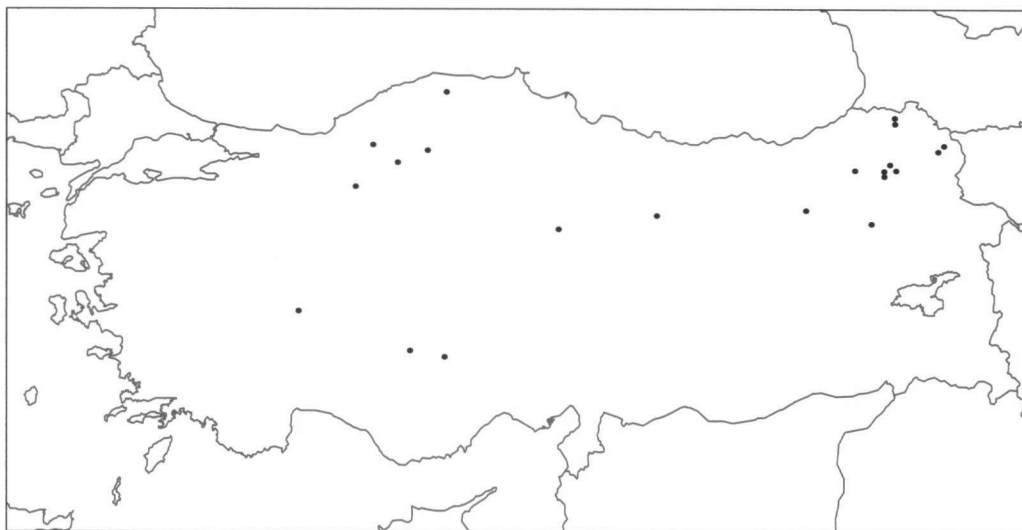


Lestes macrostigma

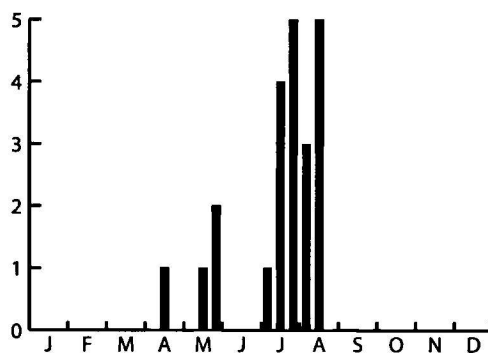
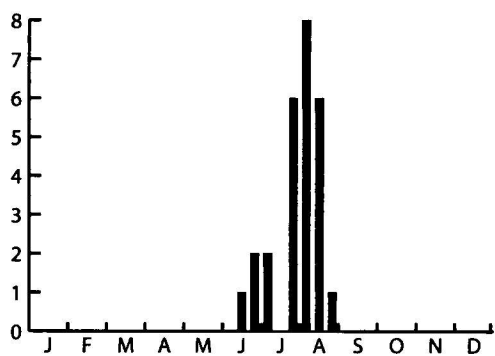


Lestes parvidens





Lestes sponsa

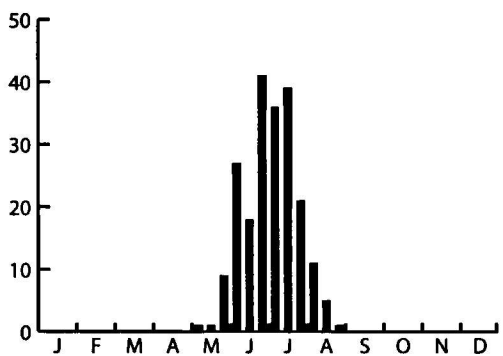
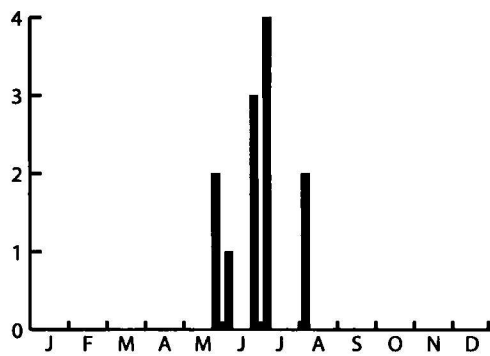


Lestes virens





Leucorrhinia pectoralis

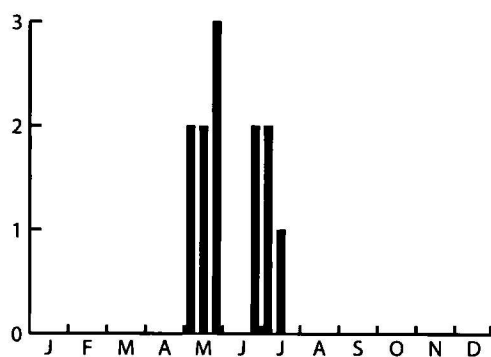
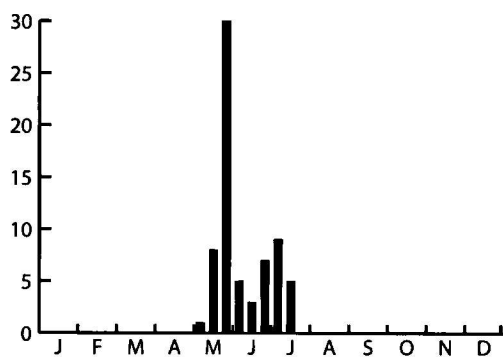


Libellula depressa

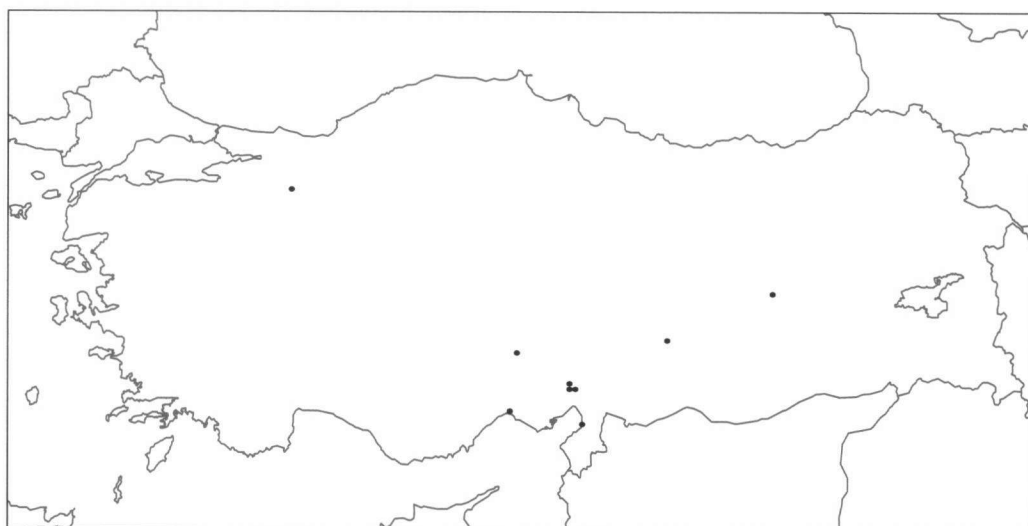


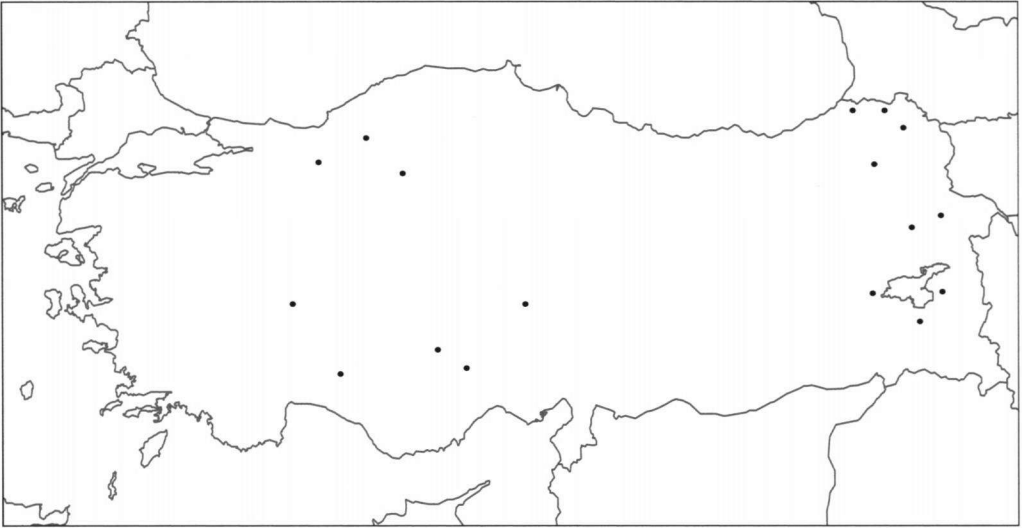


Libellula fulva

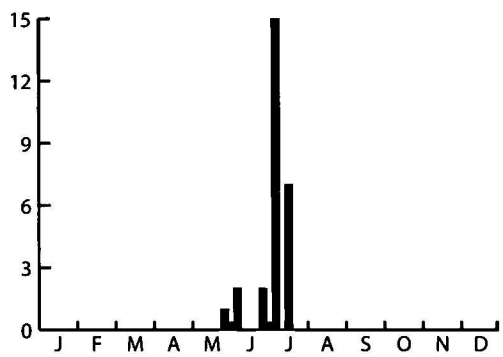
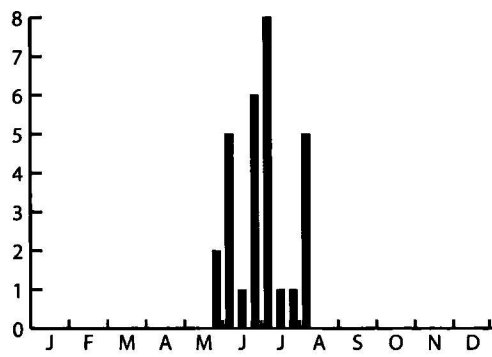


Libellula pontica

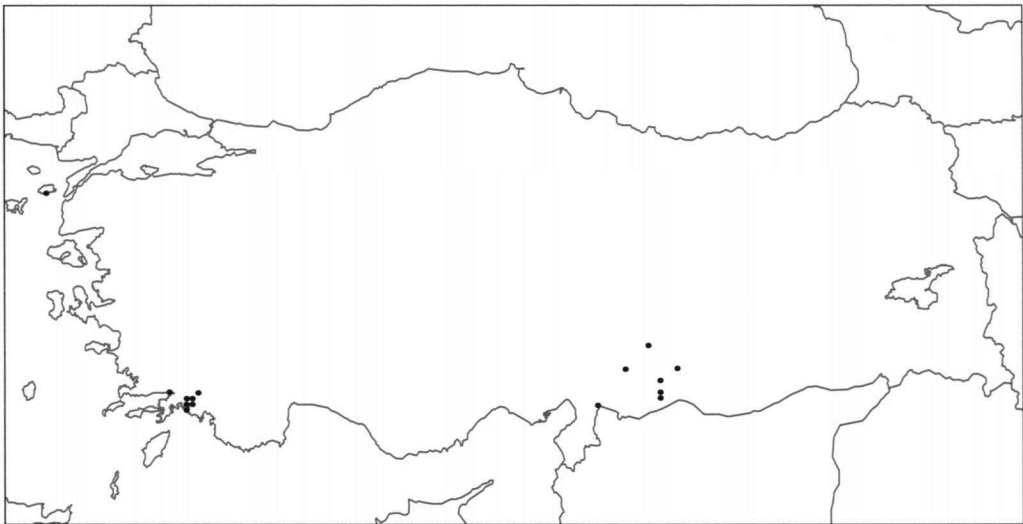


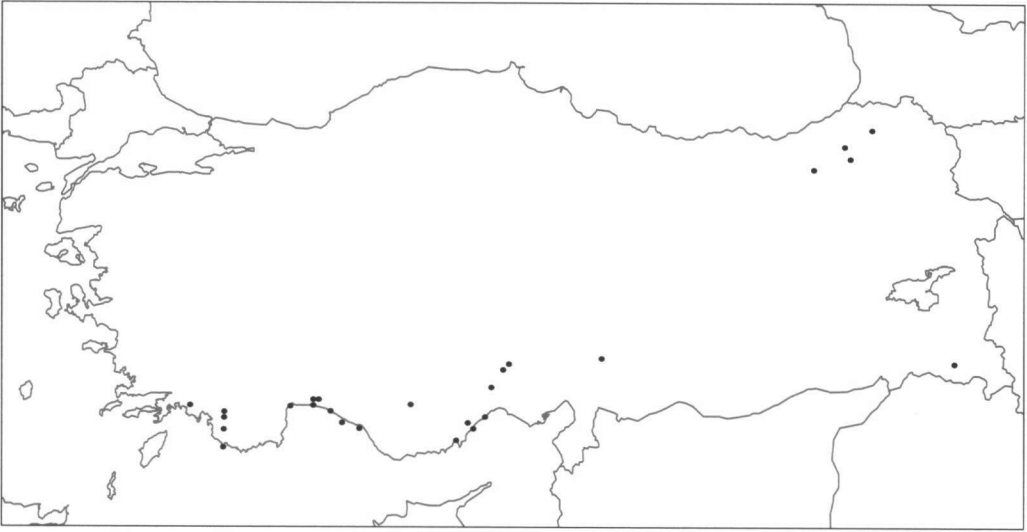


Libellula quadrimaculata

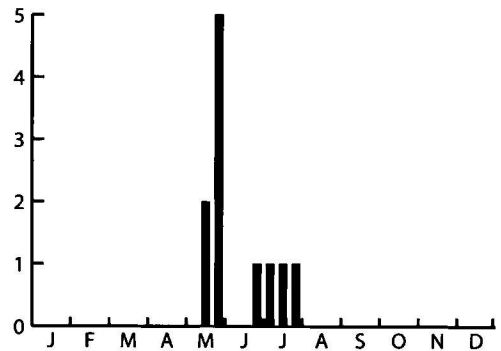
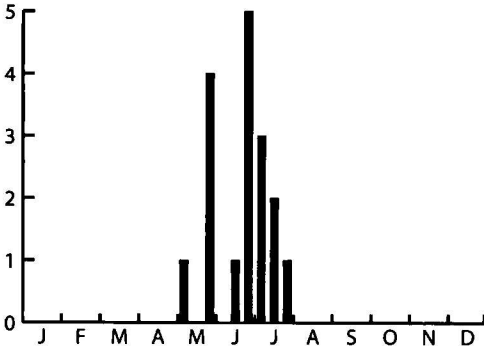


Lindenia tetraphylla

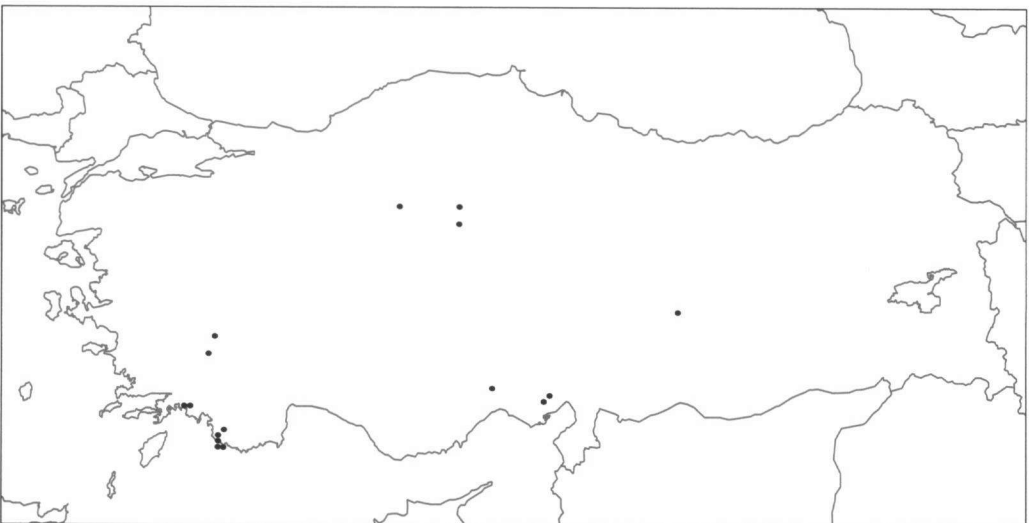


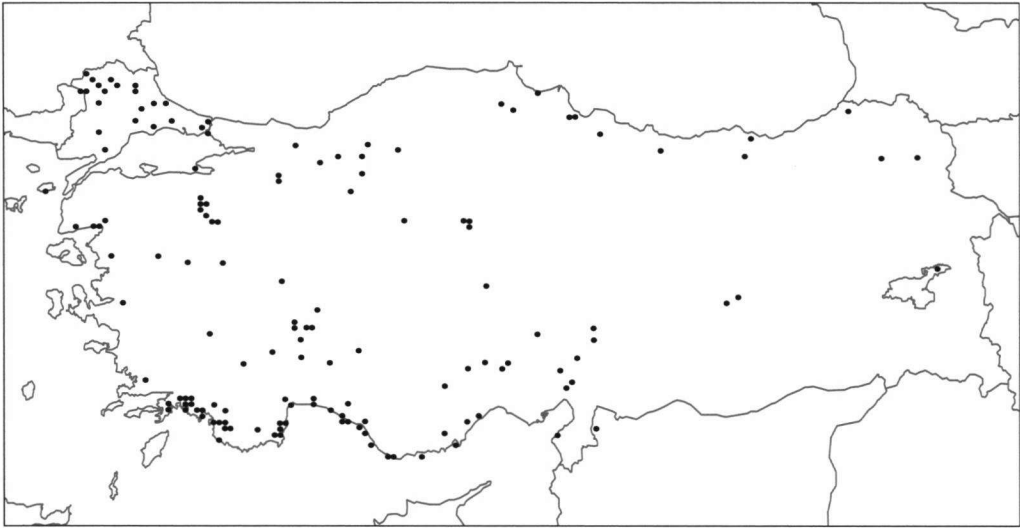


Onychogomphus assimilis

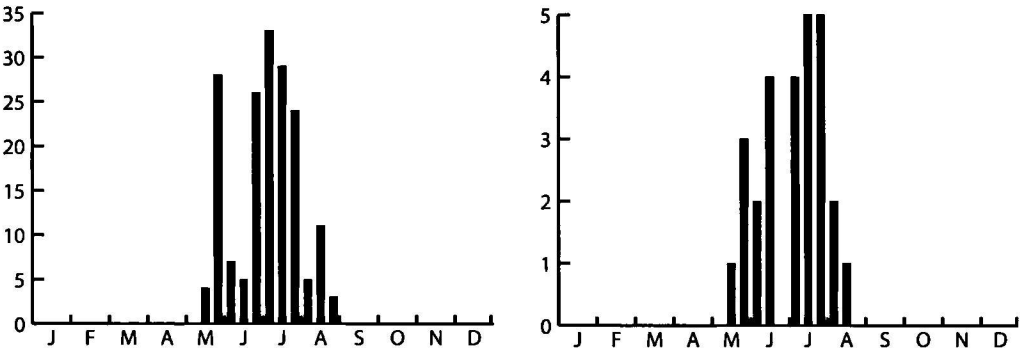


Onychogomphus flexuosus



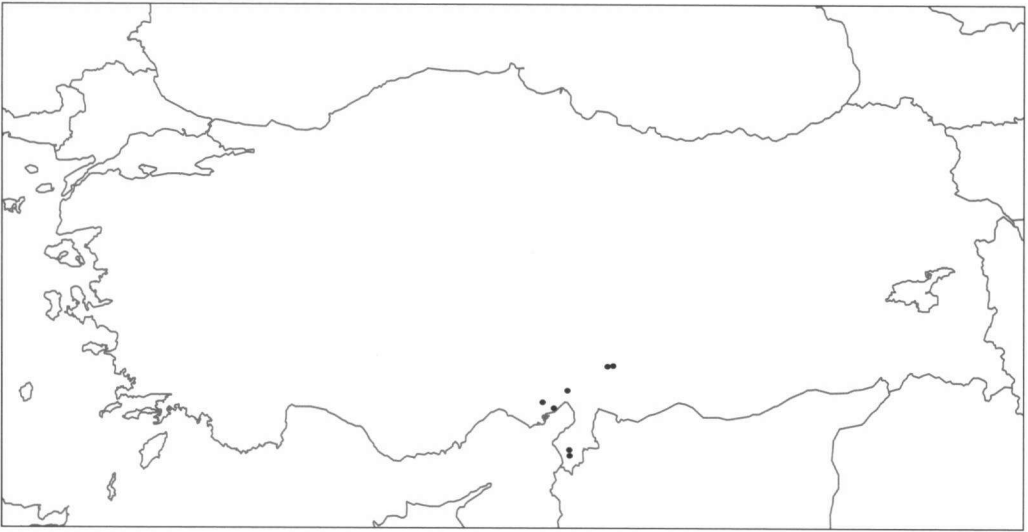


Onychogomphus forcipatus ssp.

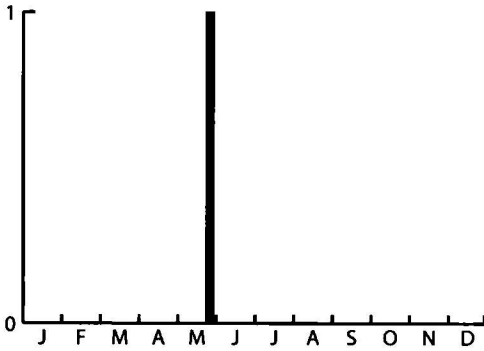


Onychogomphus lefebvrei

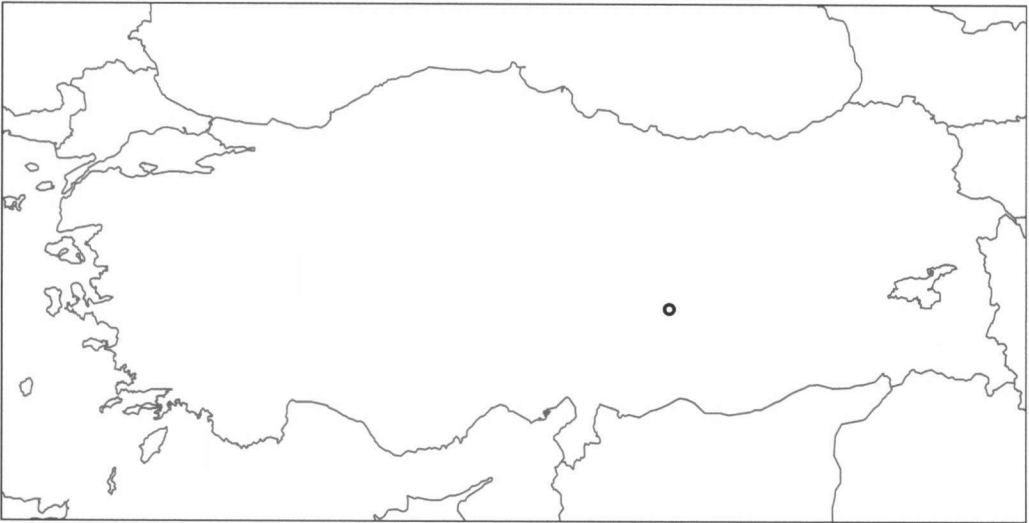


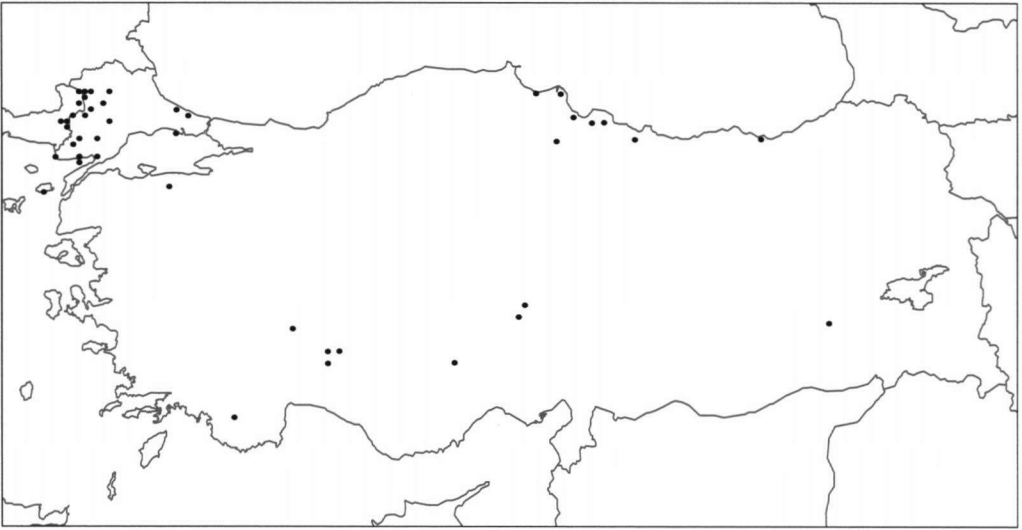


Onychogomphus macrodon

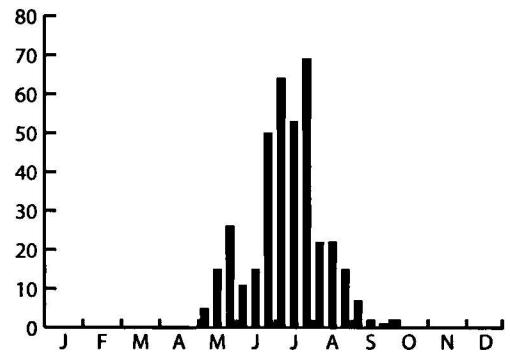
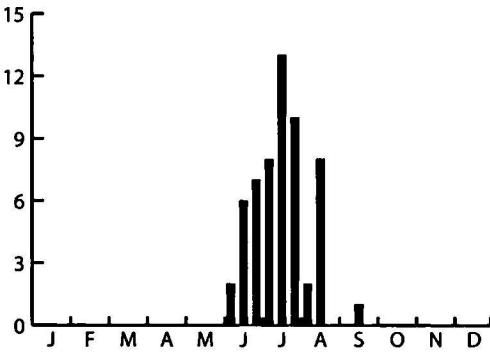


Ophiogomphus reductus

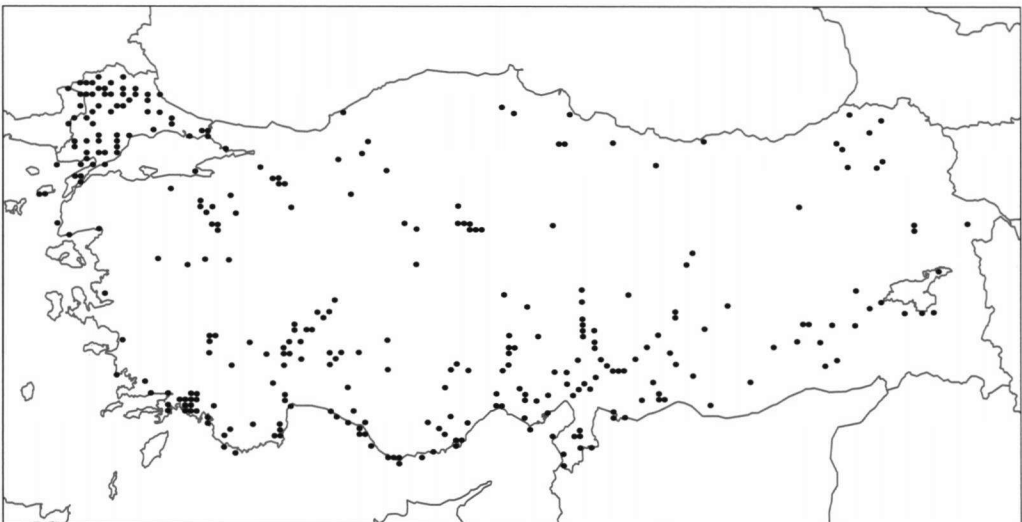


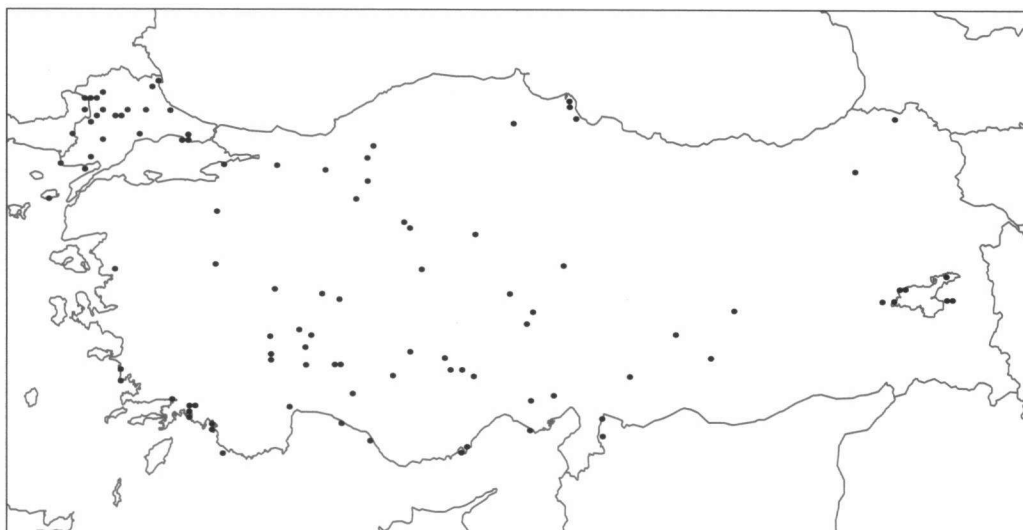


Orthetrum albistylum

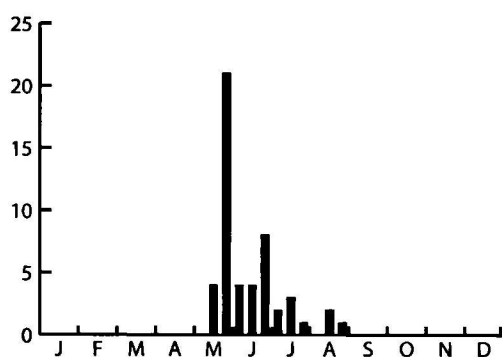
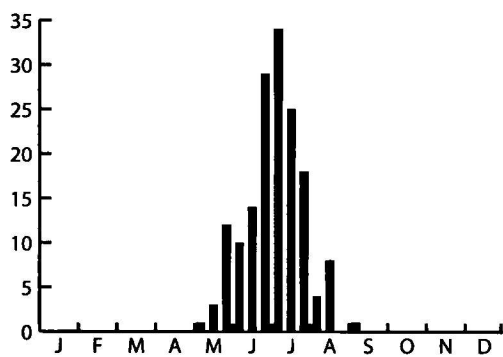


Orthetrum brunneum

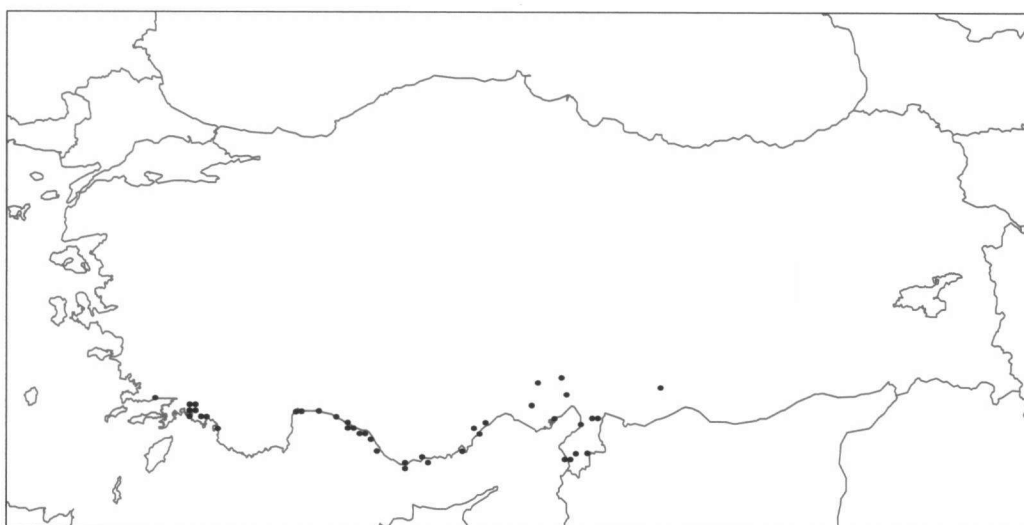




Orthetrum cancellatum

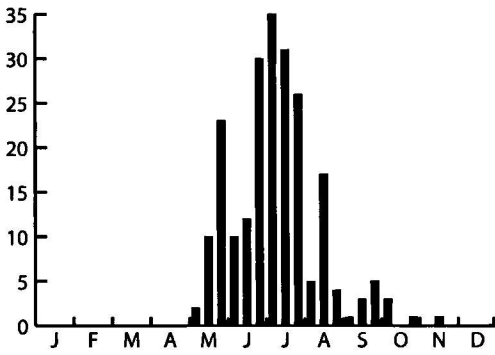


Orthetrum chrysostigma

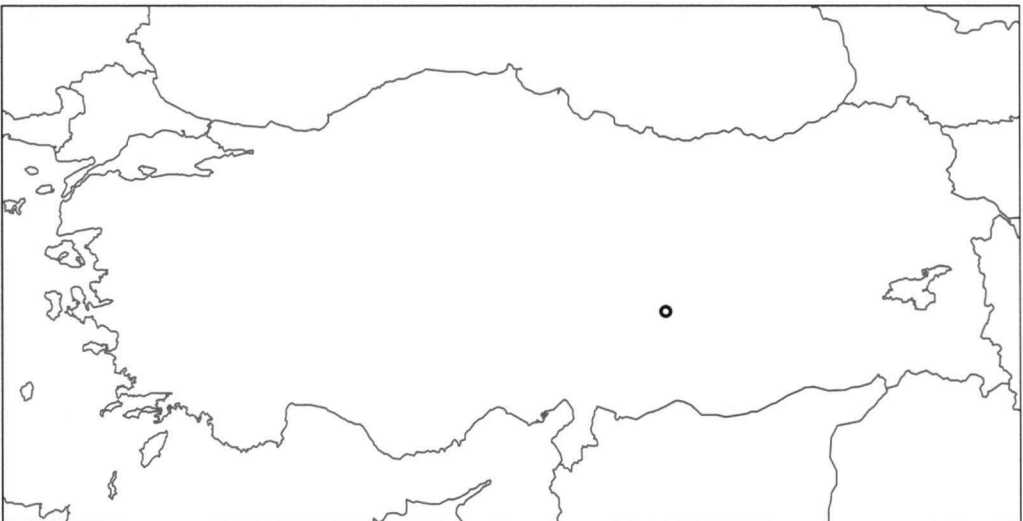


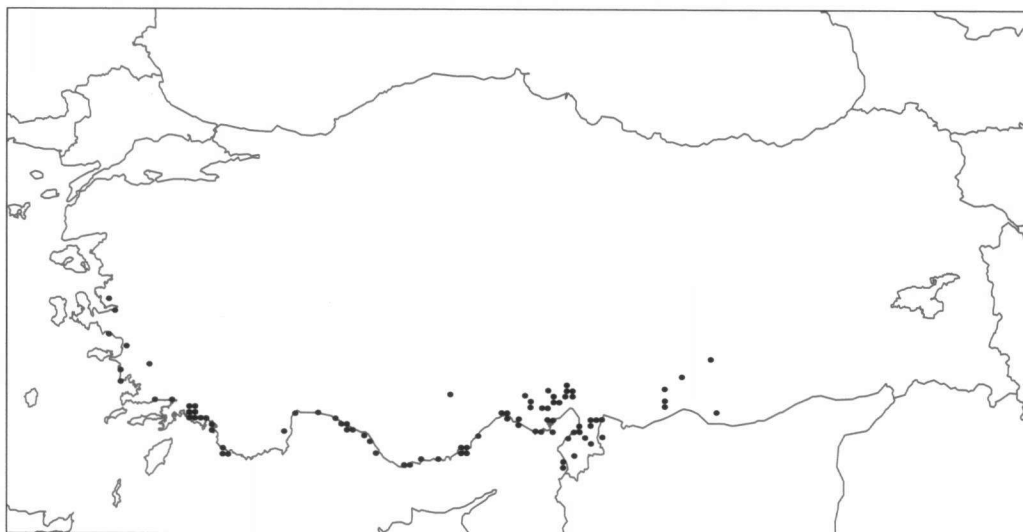


Orthetrum coerulescens

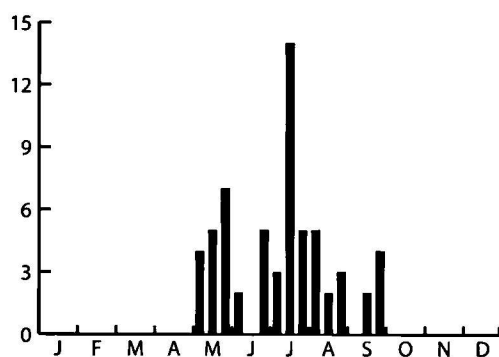
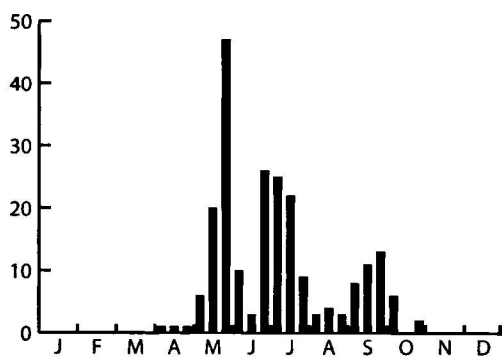


Orthetrum ranssonnetii

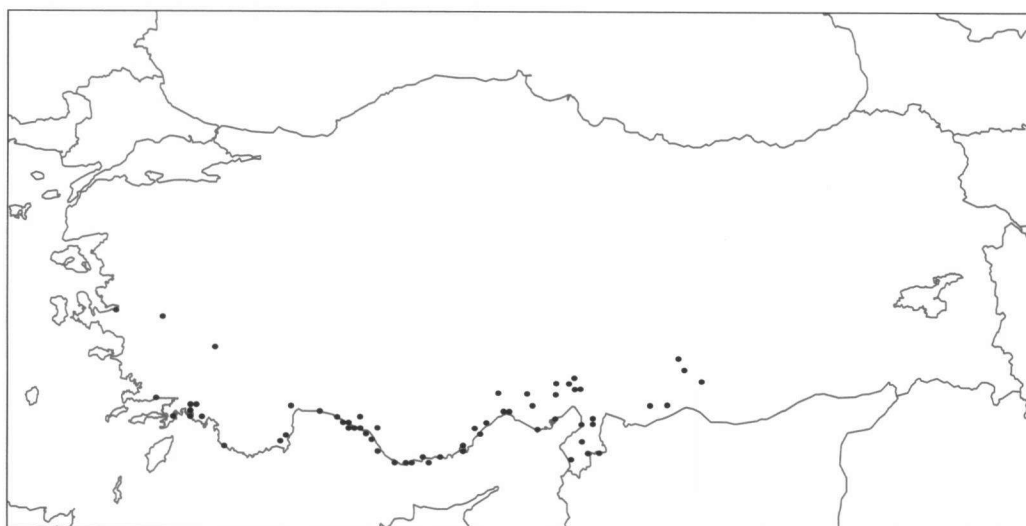


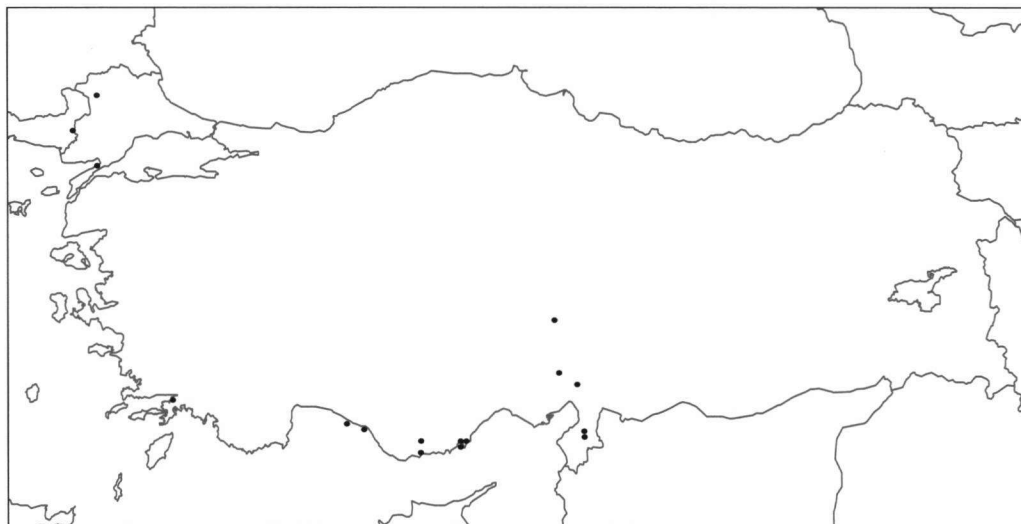


Orthetrum sabina

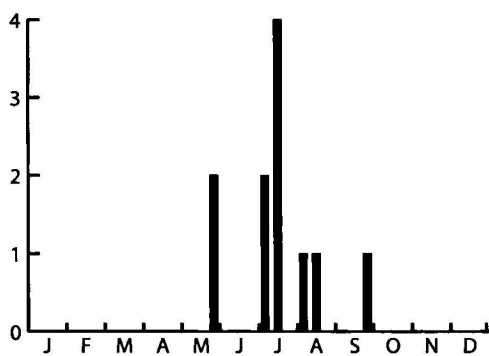
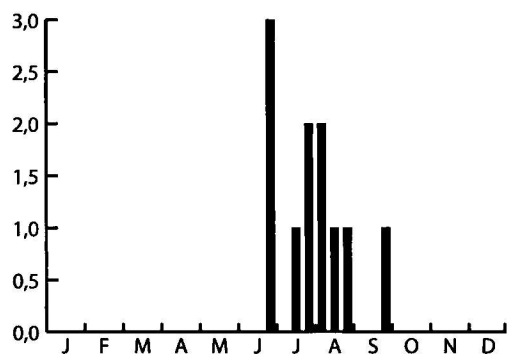


Orthetrum taeniolatum

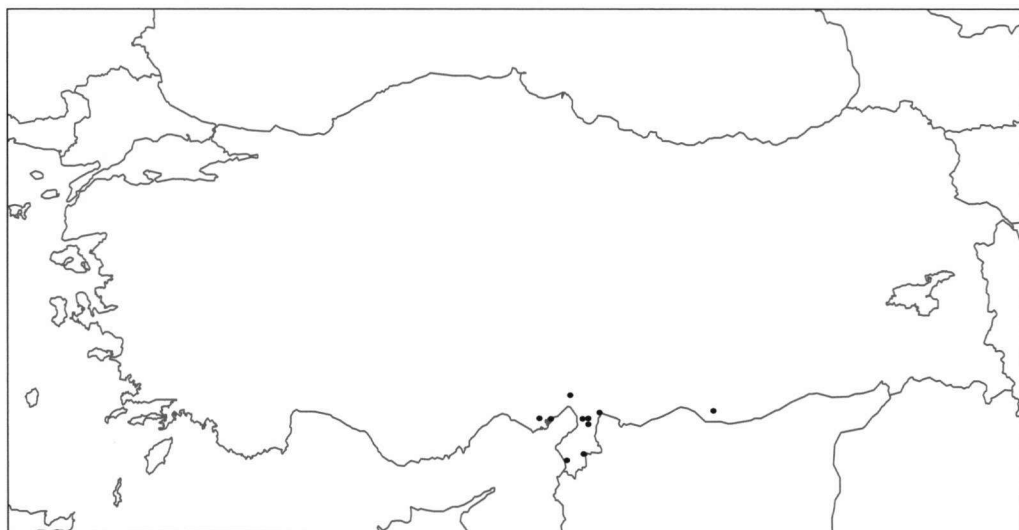


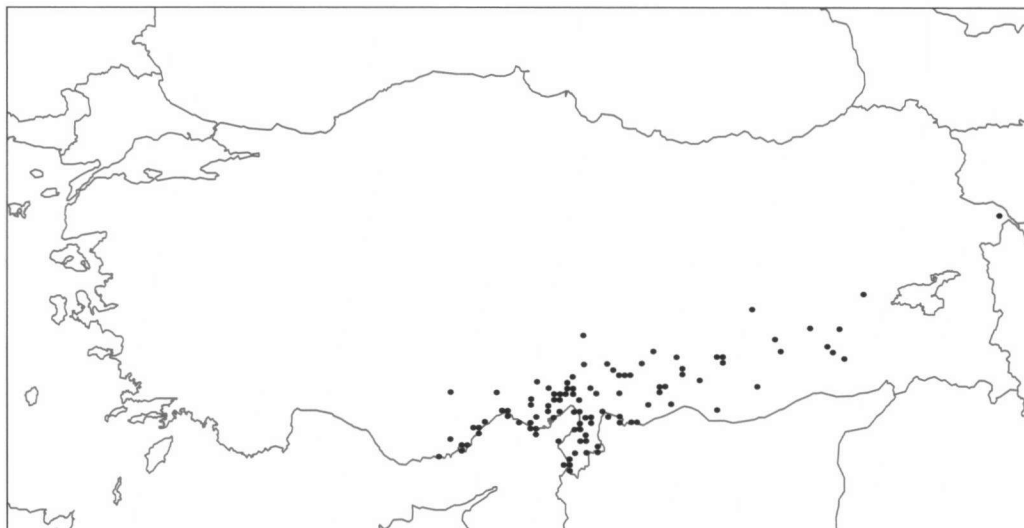


Pantala flavescens

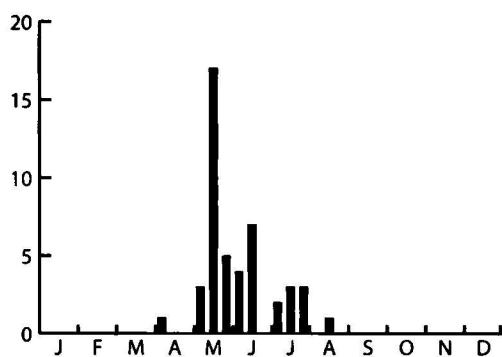
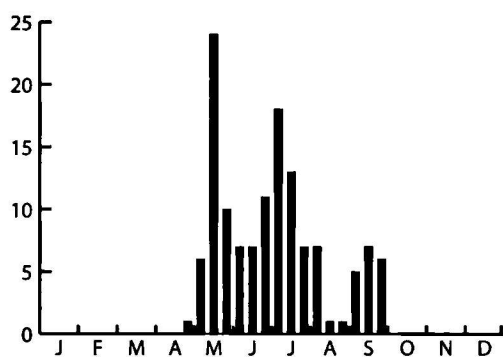


Paragomphus lineatus

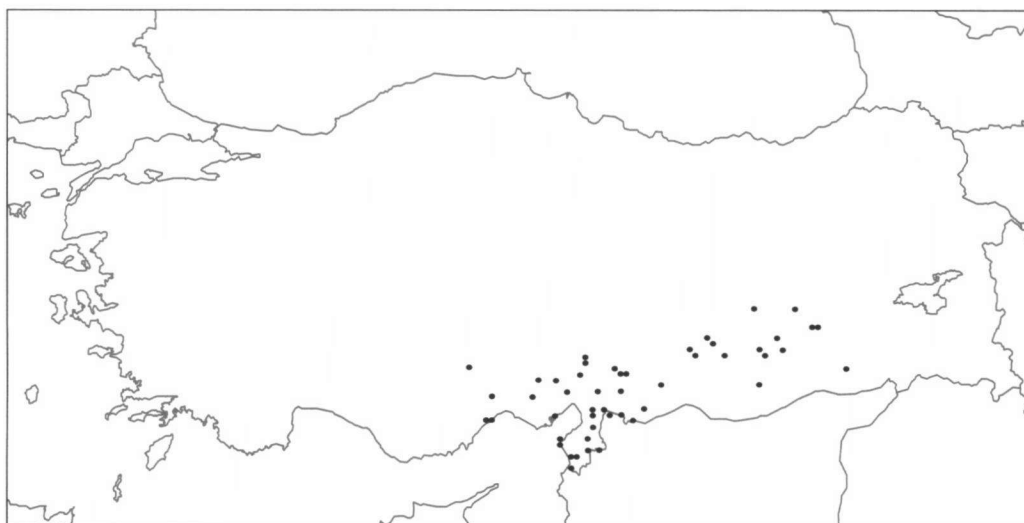


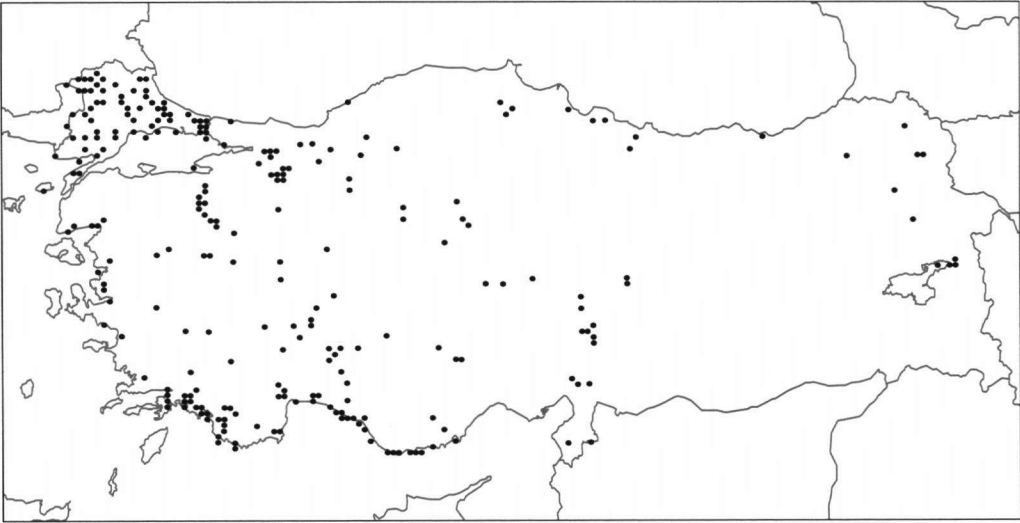


Platycnemis dealbata

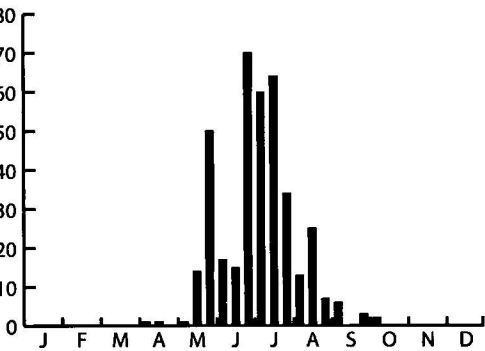


Platycnemis kervillei



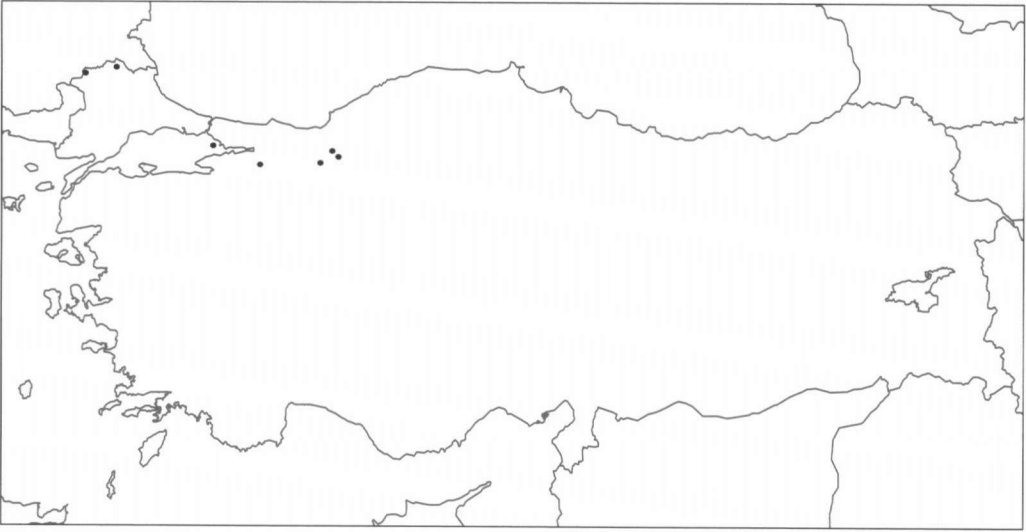


Platycnemis pennipes pennipes

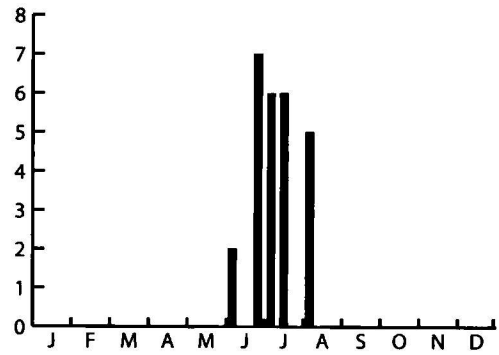
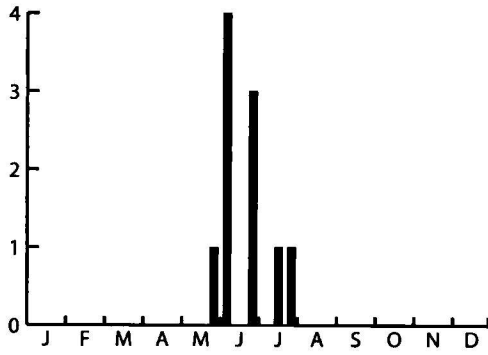


Pseudagrion syriacum

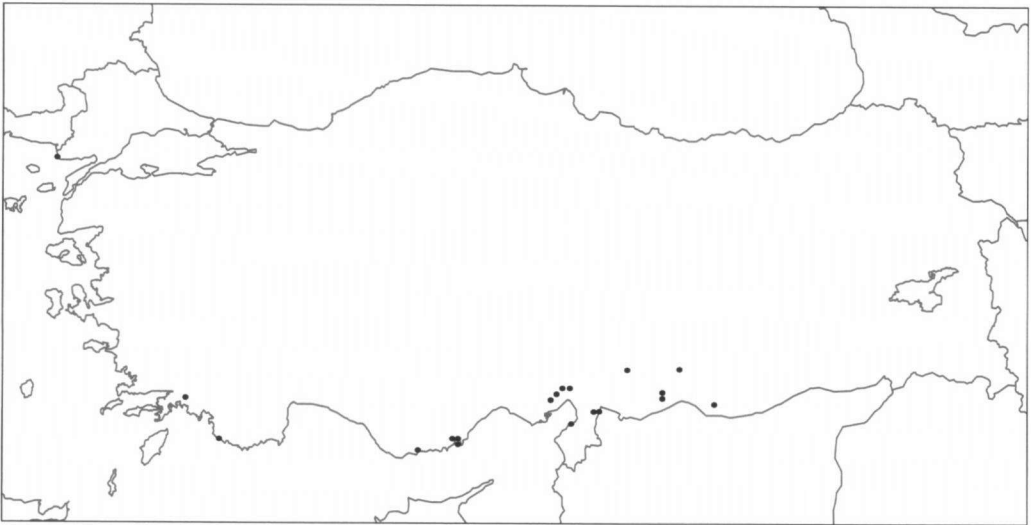


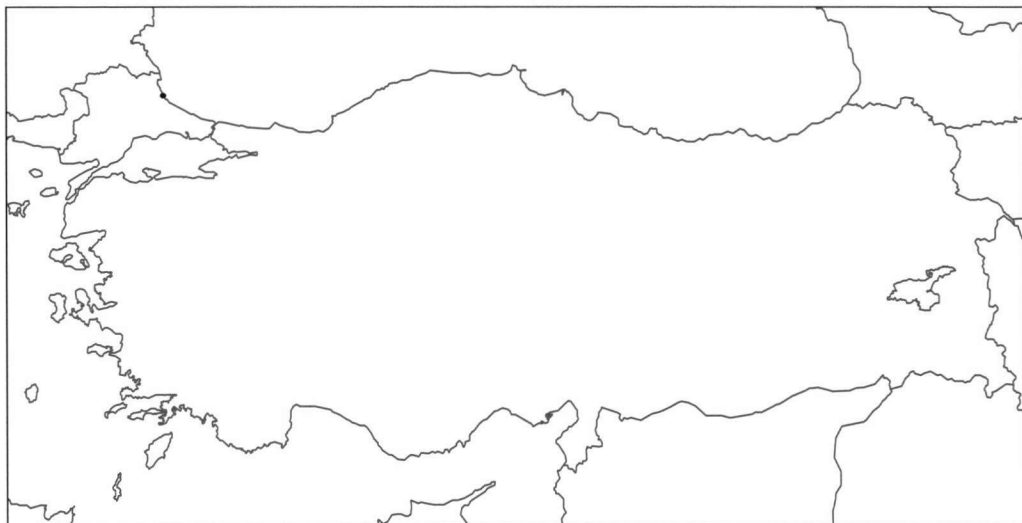


Pyrrhosoma nymphula

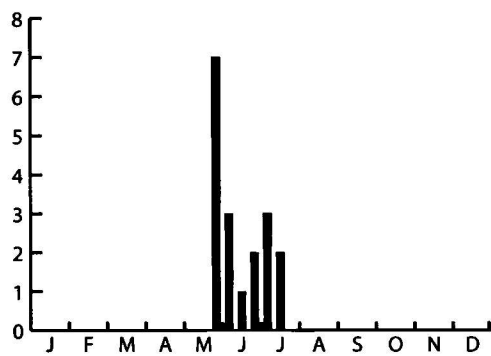
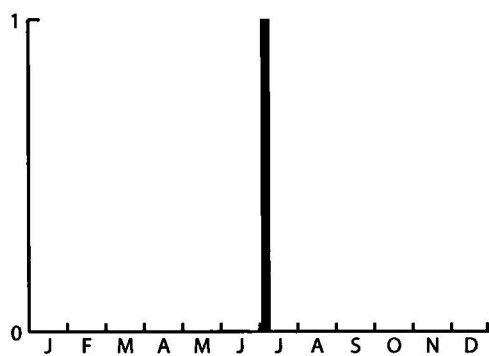


Selysiotthemis nigra



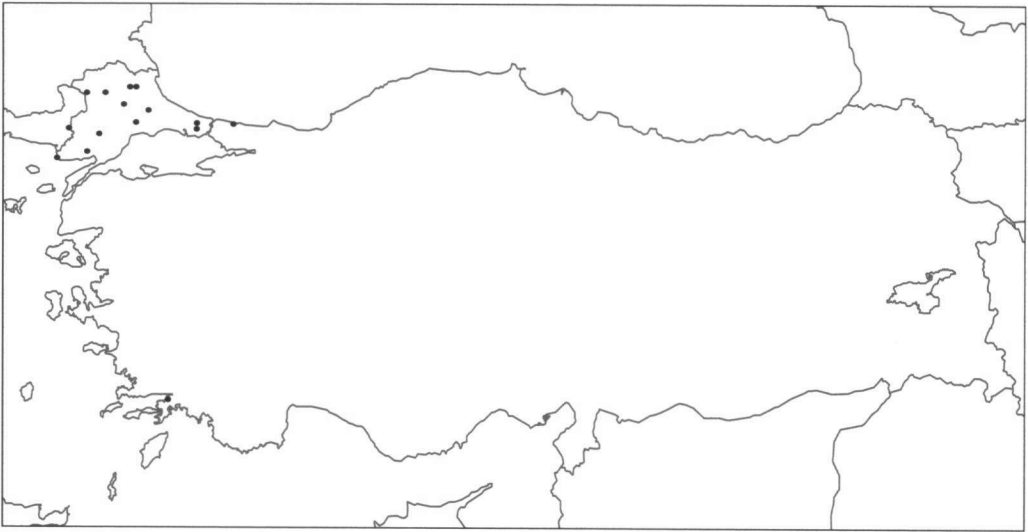


Somatochlora borisi

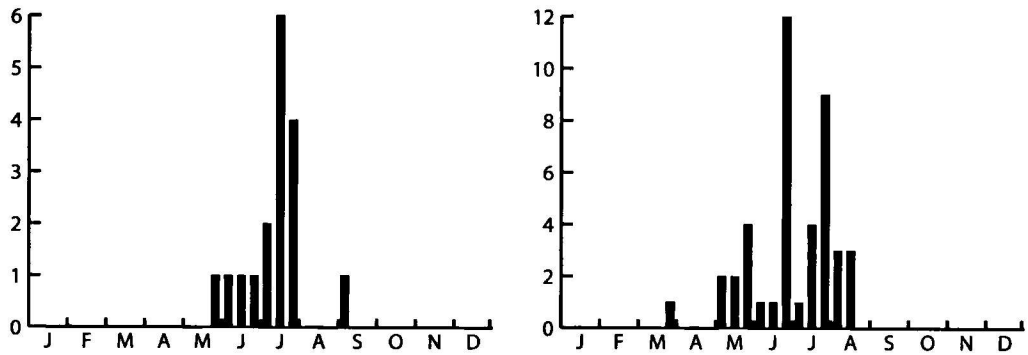


Somatochlora flavomaculata

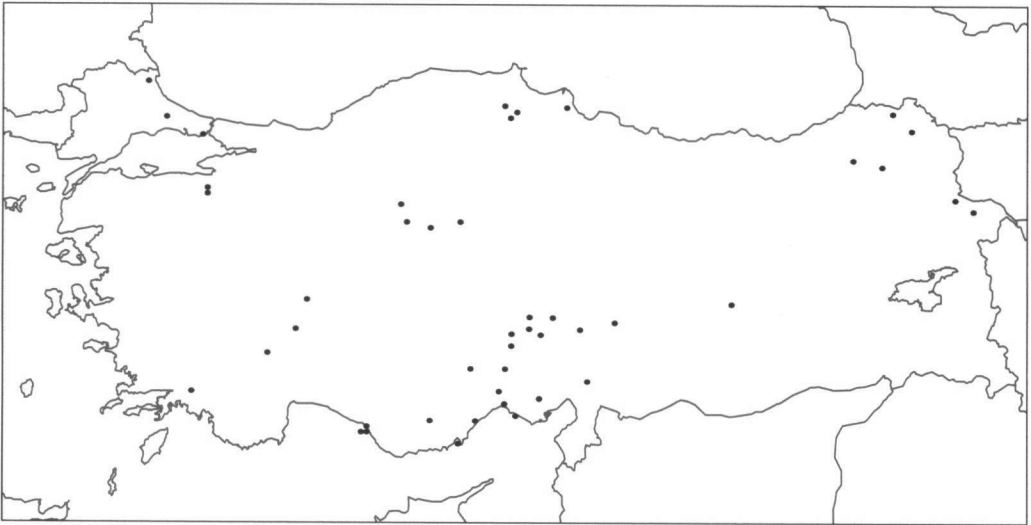




Somatochlora meridionalis

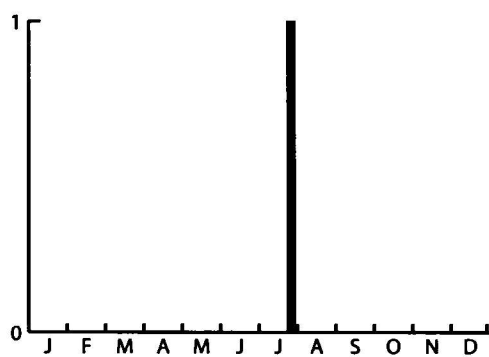


Sympecma fusca



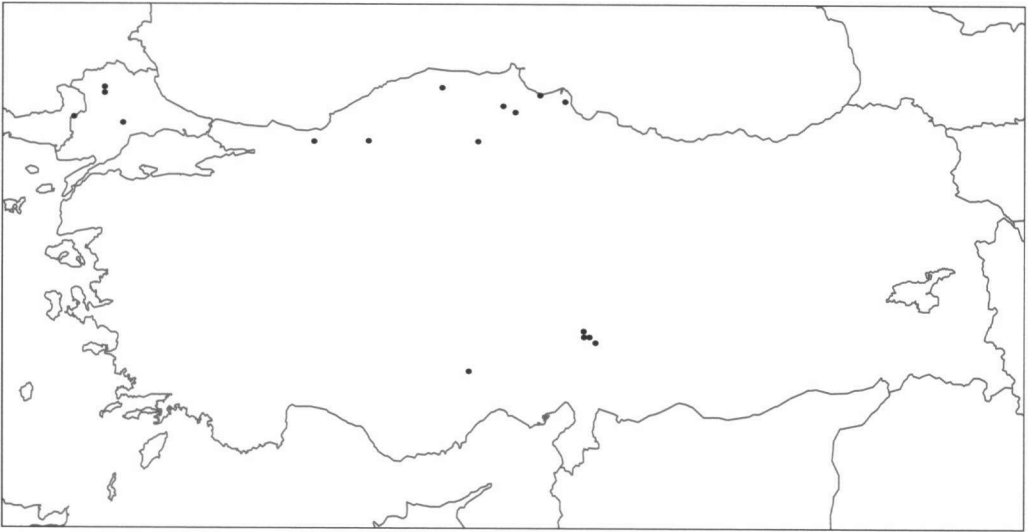


Sympecma paedisca

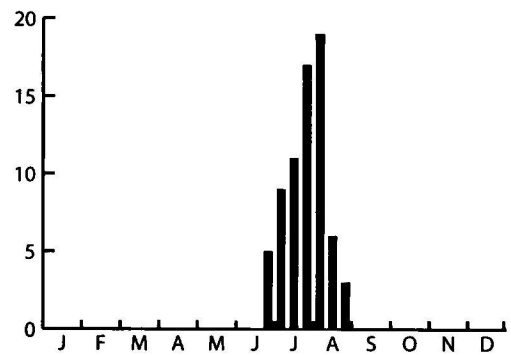
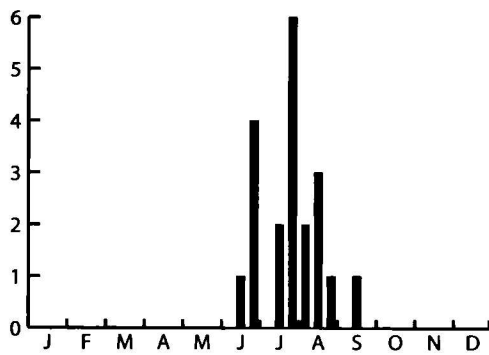


Sympetrum arenicolor

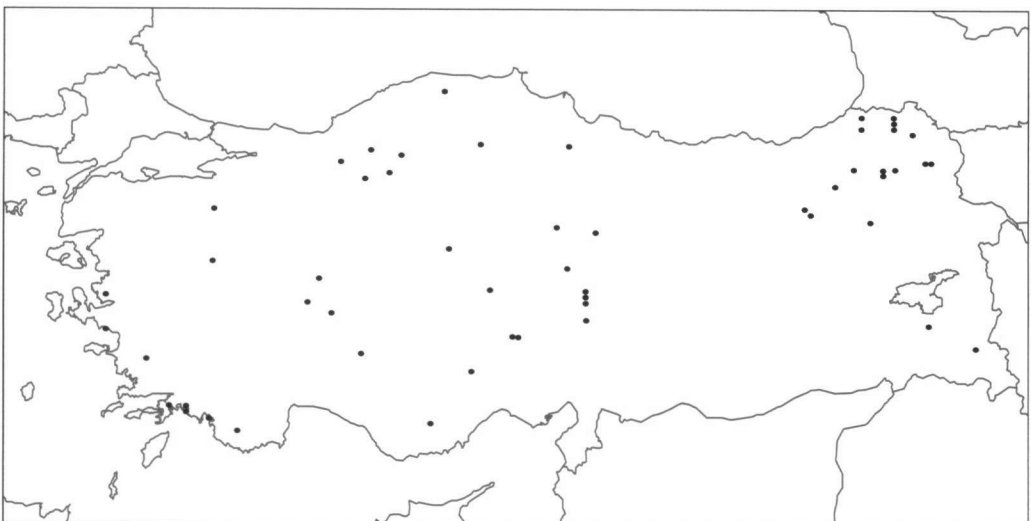




Sympetrum depressiusculum

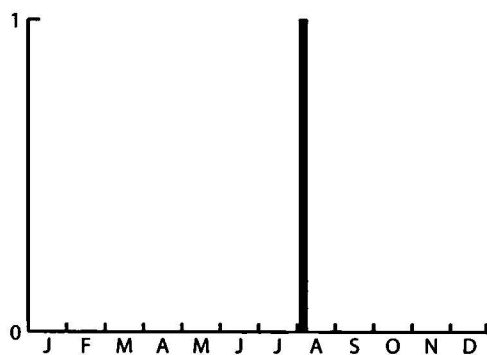
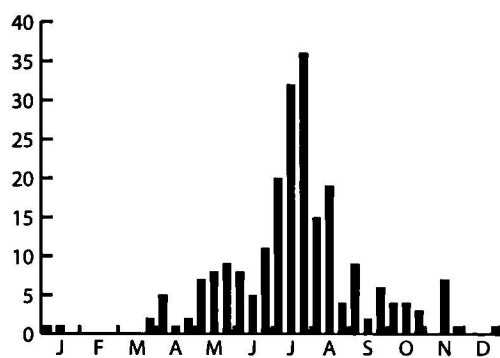


Sympetrum flaveolum





Sympetrum fonscolombii

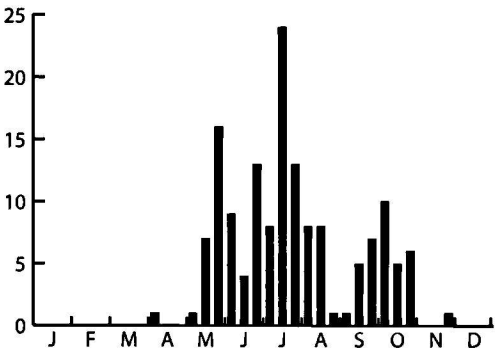
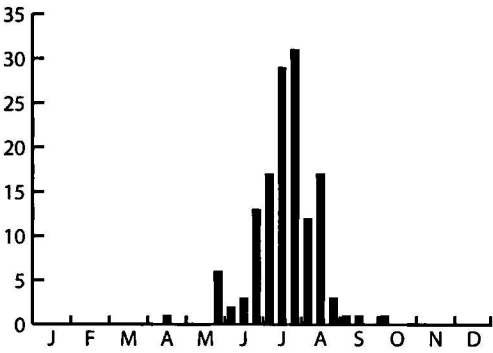


Sympetrum haritonovi

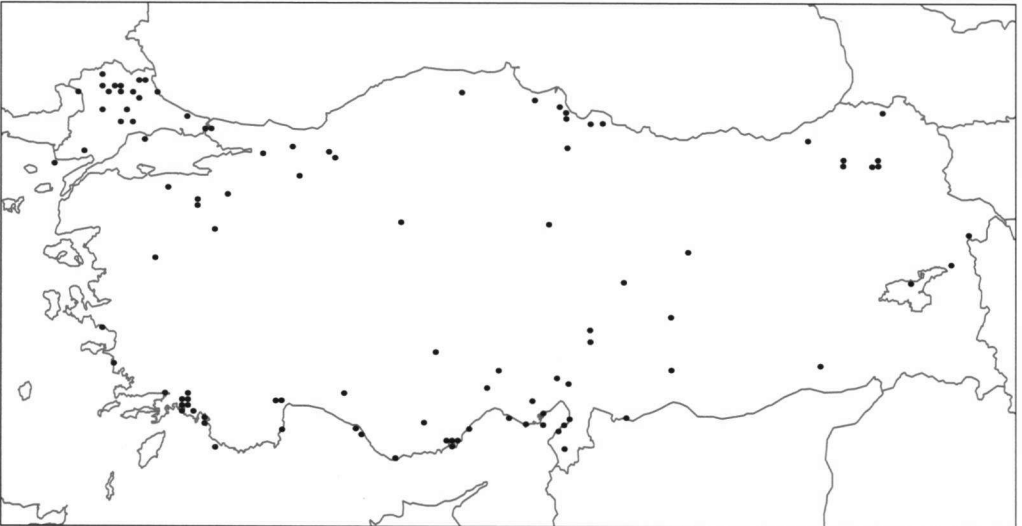


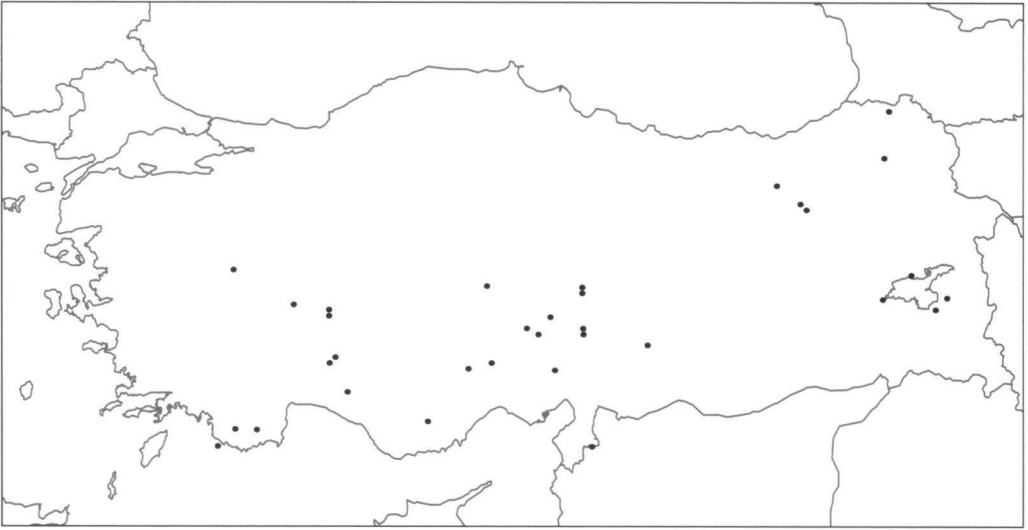


Sympetrum sanguineum

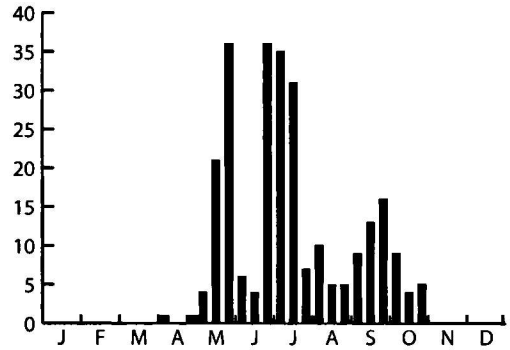
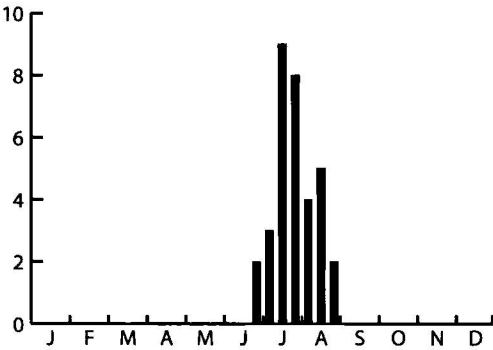


Sympetrum striolatum ssp.

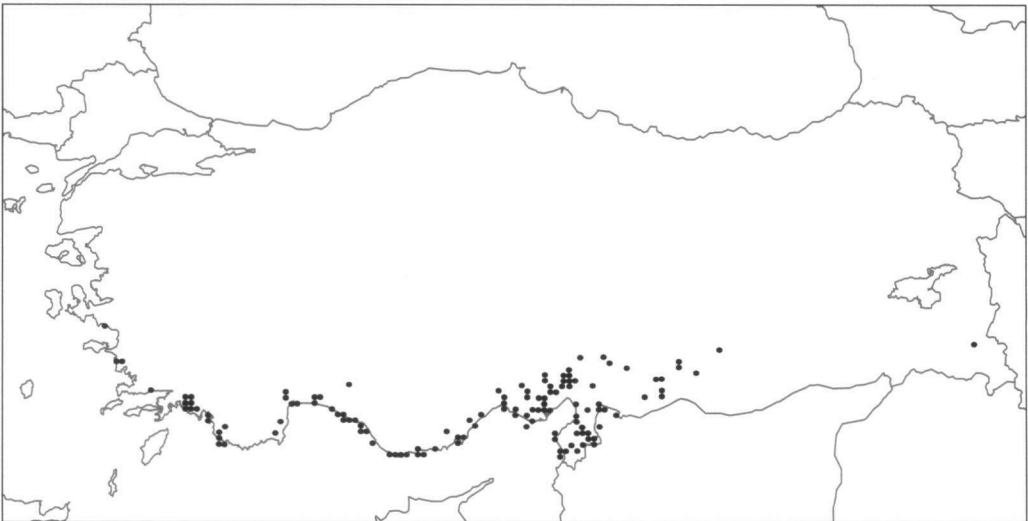


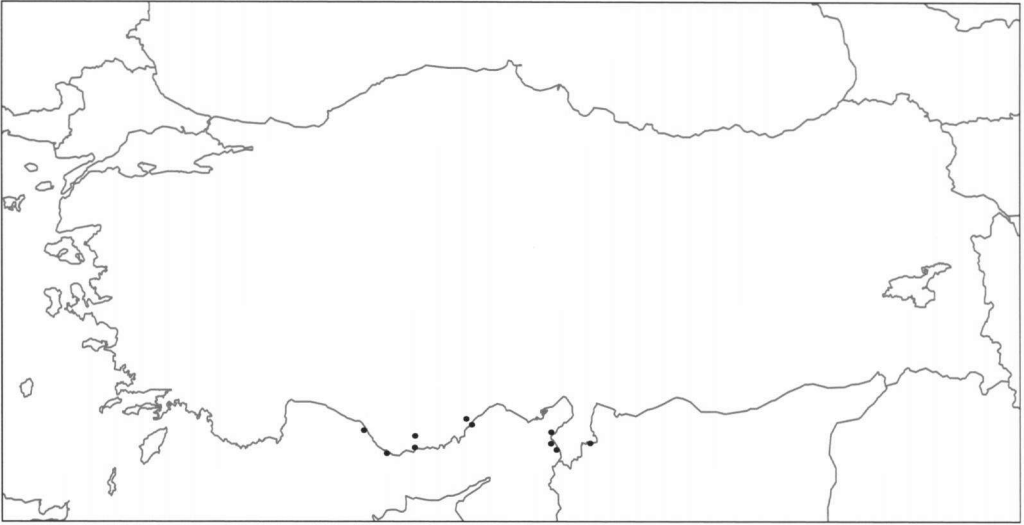


Sympetrum vulgatum decoloratum

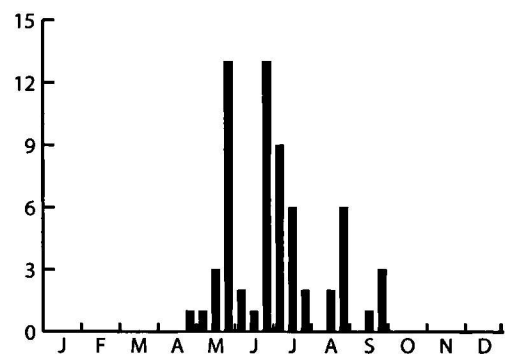
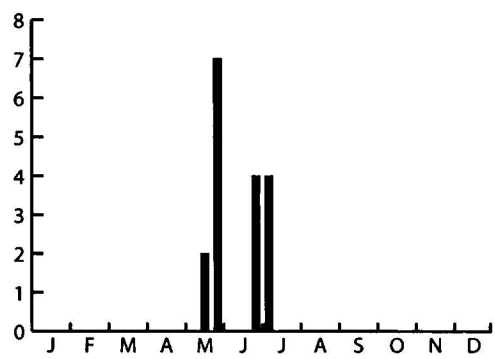


Trithemis annulata

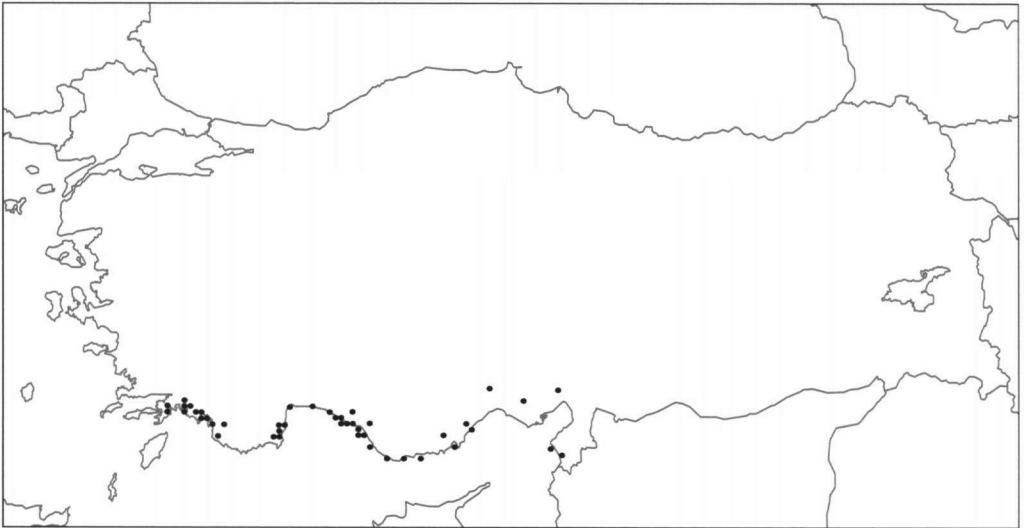




Trithemis arteriosa



Trithemis festiva





Turkey, Icel province, Limonlu stream N of Limonlu village, 36 km NE of Silifke. The gorge of the Limonlu çay is one of the spectacular sites for dragonflies that Turkey has to offer. *Gomphus schneiderii*, *Onychogomphus assimilis* and *Anax immaculifrons* all occur here. (Photo: Vincent Kalkman)

Turkey, Artvin province, Ca. 16 km NEE of Borcka: lake Karagöl. In Turkey, *Aeshna cyanea* appears to be confined to the mountains in the north. At this locality it co-occurs with species like *Coenagrion ponticum*, *Libellula quadrimaculata* and *Sympetrum flaveolum*. (Photo: Vincent Kalkman)



Turkey, Artvin province, ca. 16 km NE of Savsat: lake Horetba Gölü. The dragonfly fauna of the mountains of northern Turkey is very similar to that in central Europe. At this site species like *Lestes dryas*, *Libellula quadrimaculata*, and *Leucorrhinia pectoralis* occur. *Coenagrion ponticum*, which replaces *Coenagrion puella* in NE-Turkey, is very abundant at this locality. (Photo: Vincent Kalkman)





Bulgaria, river Veleka, a few km from the Black Sea. Only one record of *Somatochlora borisi* is known for Turkey but it is likely that populations exist in the European part of Turkey in rivers running towards the Black Sea. The species occurs in larger brooks and rivers bordered by forest. (Photo: Vincent Kalkman)

Turkey, Van province, Lake Van at Kasimbagi, 4 km S of Ercis. Van is the largest lake in Turkey and is situated at an altitude of over 1600 meter. The lake is alkaline and the surrounding marshes hold mainly common species such as *Lestes barbarus*, *Enallagma cyathigerum*, *Ischnura elegans*, *Orthetrum cancellatum* and *Sympetrum fonscolombii*. It is probably a locality where *Aeshna serrata* may occur. It is probably best to search for this species in July at reed marshes and nearby scrubs. (Photo: Vincent Kalkman)

Turkey, Kars province, 15 km E of Ardahan, brooks at the junction of the roads to Ardahan, Cildir and Posof. Large parts of eastern Turkey consist of gently sloping steppe. Marshes in this area can hold *Coenagrion lunulatum* and *Leucorrhinia pectoralis*. In rivers like this species such as *Calopteryx splendens tshaldirica*, *Platynemis pennipes* and *Gomphus schneiderii* occur. (Photo: Vincent Kalkman)





Turkey, Van province, ca. 19 km S of Gevas, lake above Gufkan (= Yapili mezra), ca. 3 km SW of Kayabogaz (= Görentas). *Coenagrion lunulatum* is rare in Turkey and only occurs in the east at large lakes and marshes such as this one. Others species encountered here are *Enallagma cyathigerum*, *Coenagrion puella*, *Anax imperator*, *Libellula quadrimaculata* and *Sympetrum flaveolum*. (Photo: Gert Jan van Pelt)

Armenia, surroundings of lake Arpi (2030 m asl) in NW Armenia at less than 10 km from the Turkish border. Here, in July 2006 *Coenagrion armatum* was discovered for the first time in Armenia. The habitat looks like the habitats preferred by *armatum* in Europe: vegetations of *Carex* or *Equisetum* often standing in shallow water. However the landscape is rather different than the areas were *armatum* is found in Europe. This picture might give a clue which habitats (high steppe at about 2000 m) to explore when searching for this species in Turkey. (photo: Marc Tailly)

Armenia, Meghri pond. A manmade pond in the Arax valley in Armenia at the border with Iran at about 500 m asl. *Crocothemis erythraea* and *C. servilia*, *Orthetrum sabina*, *O. brunneum*, *O. coerulescens anceps*, *Platynemis dealbata*, *Erythromma viridulum*, *Enallagma cyathigerum*, *Anax imperator* and *A. parthenope* are among the dragonflies found here. (photo: Marc Tailly)





Armenia, Solonchaks near Armash village. Salty marshes in the Arax valley (about 800 m asl) at the foot of Mt. Ararat at a few kilometres from the Turkish border, S of the town of Artashat. Here lives *Sympecma paedisca* and elsewhere in the area *Lestes macrostigma* and *Selysiotthemis nigra* were found. Both species should be present also on the Turkish side of the valley. (photo: Vasil Ananian)

Turkey, Mugla province, Dalamançay at 3 km NE of Ortaca, N of old bridge. Although the Dalamançay in northwest Turkey is locally used for grind mining it holds a population of *Onychogomphus flexuosus*. Other species occurring here are some which are common in large parts of south Turkey such as *Orthetrum chysostigma*, *O. sabina* and *Trithemis annulata*. (Photo: Vincent Kalkman)

Turkey, Mugla province, ca. 15 km Ssw of Köycegiz: ancient harbour of Kaunos. At this small lake widespread southern species as *Anax parthenope*, *Crocothemis erythraea*, *Sympetrum meridionale* and *Trithemis annulata* were found. Besides *Erythromma lindenii*, *Aeshna isosceles* and *Libellula fulva* were found although these probably reproduce in the nearby lake Koycegiz and not at this site. (Photo: Vincent Kalkman)





Brachythemis leucosticta (male), Cyprus (Photo: Yiannis Christofides).

Caliaeschna microstigma (male), Greece (Photo: Jean-Pierre Boudot).





Caliaeschna microstigma (ovipositing female), Greece (Photo: Jean-Pierre Boudot).

Coenagrion syriacum (male), Turkey (Photo: Harm Niesen).





Coenagrion vanbrinkae (male), Armenia (Photo: Marc Tailly).

Epallage fatime (female), Greece (Photo: Peter de Knijff).





Epallage fatime (male), Turkey (Photo: Vincent Kalkman).

Orthetrum trinacria (male), Uganda (Photo: Hans-Joachim Clausnitzer).





Pantala flavescens (male) Thailand (Photo: Oleg Kosterin).

Platynemesis dealbata (male), Turkey (Photo: Jean-Pierre Boudot).





Somatochlora borisi (female), Bulgaria (Photo: Vincent Kalkman).

Selysiothemis nigra (male), Turkey (Photo: Vincent Kalkman).





Somatochlora meridionalis (male), France (Photo: Jean-Pierre Boudot).

Sympecma gobica (male), Kazakhstan (Photo: Arnold Wijker).





Sympecma gobica (female), Kazakhstan (Photo: Arnold Wijker).

Sympetrum arenicolor (female), Kazakhstan (Photo: Arnold Wijker).





Sympetrum haritonovi (male), Turkey (Photo: Jean-Pierre Boudot).

Sympetrum vulgatum decoloratum (female), Turkey (Photo: Jean-Pierre Boudot).





Tholymis tillarga (male), Thailand (Photo: Oleg Kosterin).



Trithemis arteriosa (male), Uganda (Photo: Hans-Joachim Clausnitzer)

Trithemis aurora (male), Thailand (Photo: Oleg Kosterin).



Acknowledgements

The following persons have contributed to this article by submitting records for the database: Jörg Arlt, Eus van der Burg, Frank Bos, Jean-Pierre Boudot, Etienne van Dissel, Pim Ede-laar, Heinrich Fliedner, Kay Fuhrmann, Rob Felix, Rolf Franke, Kees Goudsmits, Antoine van der Heijden, Herbert Henheik, Marcel Hos-pers, Mathias Hartung, Menno Homman, Paul Hope, Geraldo Ihssen, Gilles Jacquemin, Arjan Kop, Haruki Karube, Jens Kählert, Wolfgang Lopau, Kees Mostert, Harm Niesen, Hans-Jürgen Pelný, Jürgen Ruddek, Marijke Roos, Menno Reemer, John Smit, Paul Schrijvers-hof, Wolfgang Schneider, Marcel Wasscher, Theo Zeegers. Henri Dumont and Wolfgang Schneider helped with advice and literature. Marcel Wasscher contributed greatly to the project by making and maintaining the inter-netsite on Eastern Mediterranean dragonflies (<http://fly.to/epallage>) which has been a major stimulus for this project.

Vincent. J. Kalkman & Gert Jan van Pelt
National Museum of Natural History,
P.O. Box 9517,
NL-2300 RA Leiden,
The Netherlands
e-mail: kalkman@naturalis.nnm.nl
& gj.vanpelt@wolmail.nl

Summary

Kalkman, V.J. & G.J. van Pelt, 2006. The dis-tribution and flight period of the dragonflies of Turkey. *Brachytron* 10(1): 83-153.

Based on a database containing 9150 records (a species on a day on a locality) distribution maps and flight histograms are presented for all Turkish dragonflies. Notes are given for a small number of species.

Keywords

Odonata, Turkey, distribution, distribution maps, phenology, database, records
Libellen, Turkije, verspreiding, verspreidings-kaarten, fenologie, database, waarnemingen

References

- ASKEW, R.R., 2004. The Dragonflies of Europe (revised edition). Harley Books, Colchester.
- DEMIRSOY, A., 1982. Odonata. *Türkiye Faunası*, 8 (4) 8. Ankara [Turkish]
- DUMONT, H.J., 1977. A review of the dragonfly fauna of Turkey and adjacent Mediterranean islands (Insecta: Odonata). *Bulletin et Annales de la Societe Royale d'Entomologie de Belgique* 113: 119-171.
- HACET, N. & N. AKTAÇ, 1997. Istanca Dağları Odonata Faunası [Odonata Fauna of Istanca Mountains]. *Turkish Journal of Zoology* 21: 275-289 [Turkish, with English summary]
- HACET, N. & N. AKTAÇ, 2004. Considerations on the odonate fauna of Turkish Thrace, with some taxonomic notes. *Odonatologica* 33: 237-352.
- KALKMAN, V.J. & G.J. VAN PELT, 2006. New records of rare uncommon dragonflies in Turkey (Odonata). *Brachytron* 10: 154 - 162.
- KALKMAN, V.J., 2006. Key to the dragonflies of Turkey, including species known from Greece, Bulgaria, Lebanon, Syria, the Trans-Caucasus and Iran. *Brachytron* 10: 3 - 82.
- KALKMAN, V.J., M. WASSCHER & G.J. VAN PELT, 2003. An annotated checklist of the Odonata of Turkey. *Odonatologica* 32: 215-235.
- KUNZ, B., S.V. OBER & R. JÖDICKE, 2006. The distribution of *Zygonyx torridus* in the Palaearctic (Odonata: Libellulidae). *Libellula* 25: 89-108.
- LOHMANN, H., 1993. *Coenagrion vanbrinki* spec. nov. und *C. persicum* spec. nov. aus vorderasien (Zygoptera: Coenagrionidae). *Odonatologica* 22: 203-211.
- VAN PELT, G.J. & V.J. KALKMAN, 2004. Research on dragonflies in Turkey: present status and future aims (Odonata). *Libellula Supplement* 5: 167-192.
- SALUR, A. & S. KIYAK, 2006a. An interesting dragonfly record, *Pseudagrion syriacum* (Selys, 1887), from Turkey (Odonata: Coenagrionidae). *Munis Entomology and Zoology* 1: 171-172.
- SALUR, A. & S. KIYAK, 2006b. Additional records for the Odonata fauna of the east Mediterranean region of Turkey. *Munis Entomology and Zoology* 1: 239-252.
- SÉLYS E. DE, 1887. Odonates de l'Asie mineure et Revision de ceux des autres parties de la faune dite européenne. *Annales de la Societe Entomologique de Belgique* 31: 1-85.