

The distribution and flight period of the dragonflies of Turkey

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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 These are based on 6681 published and 2469 unpublished records (a species on a day on a locality).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 know 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*)

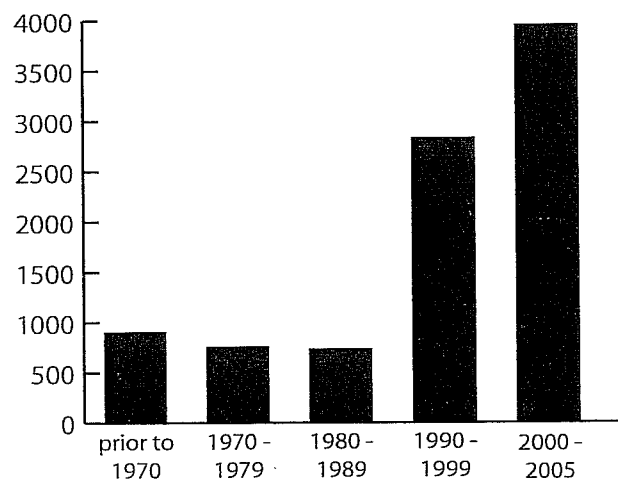


Figure 1
Number of records of Odonata from Turkey per decade.

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 Malatia 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

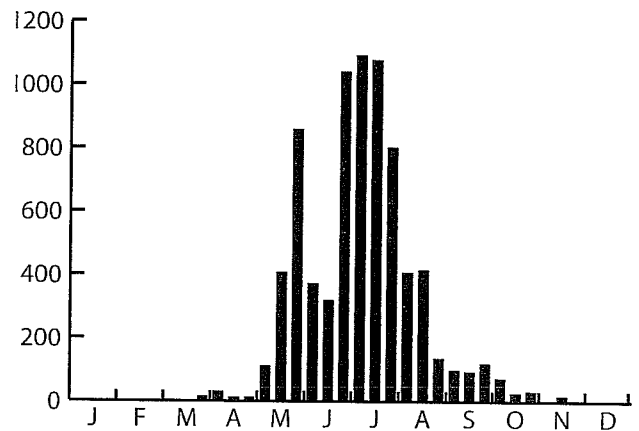
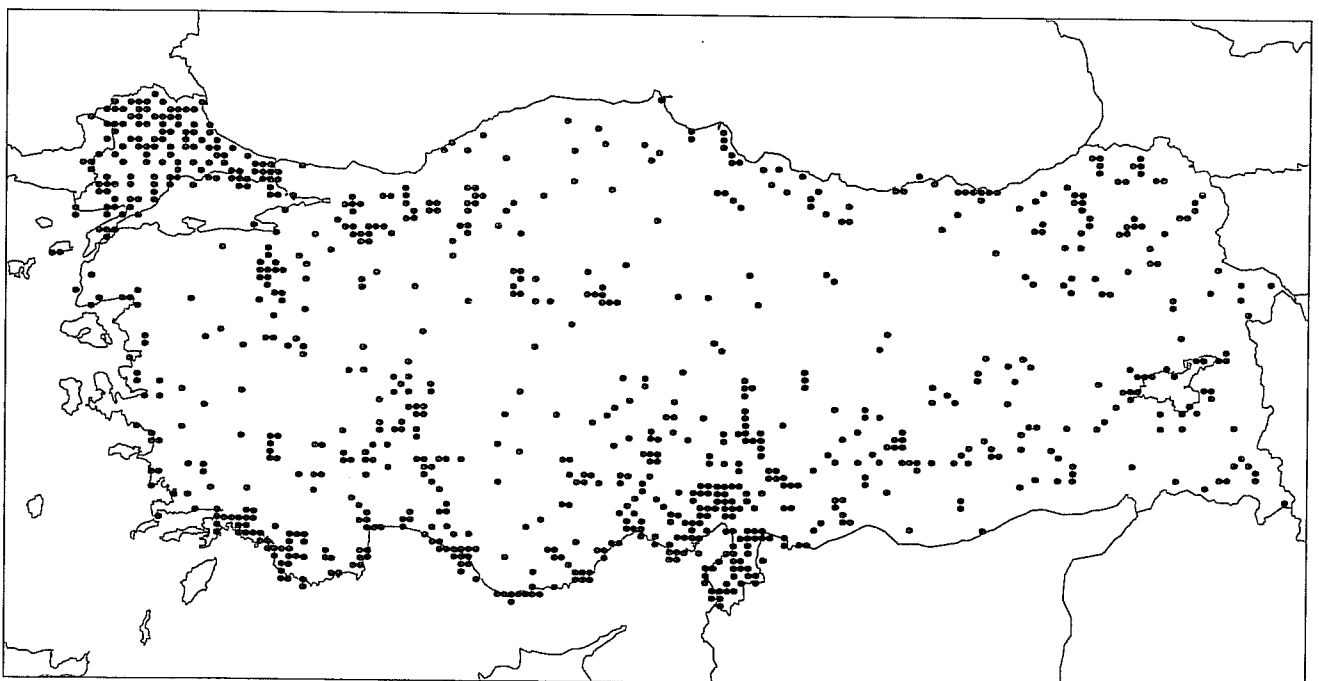


Figure 3. Histogram of the flight period based on all records.

Figure 2. Localities in Turkey from which Odonata records are available.



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

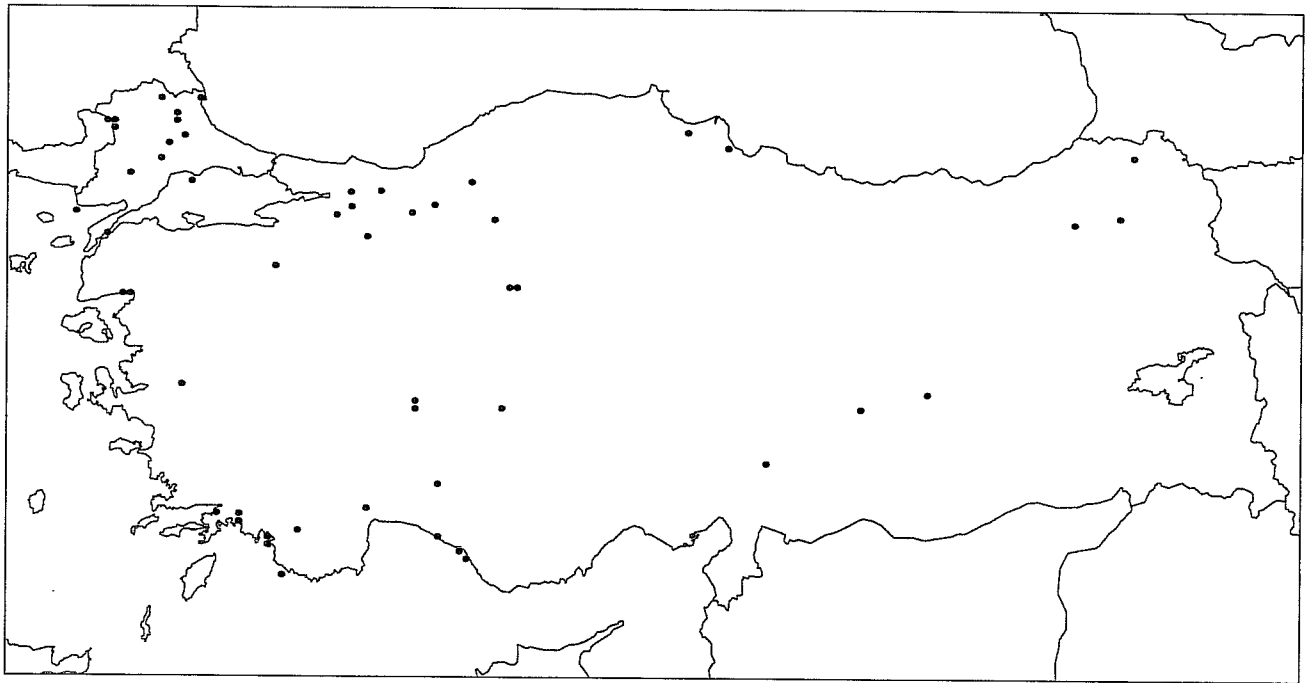
The record from Malatya published by SÉLYS (1887) is still the only Turkish record of this species (see KALKMAN *et al.* 2003 for more information). The nearest locations where this species is found are in Turkestan and Afghanistan. Its close relative, *Ophiogomphus cecilia*, has not seldom small unobtrusive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

Orthetrum trinacria

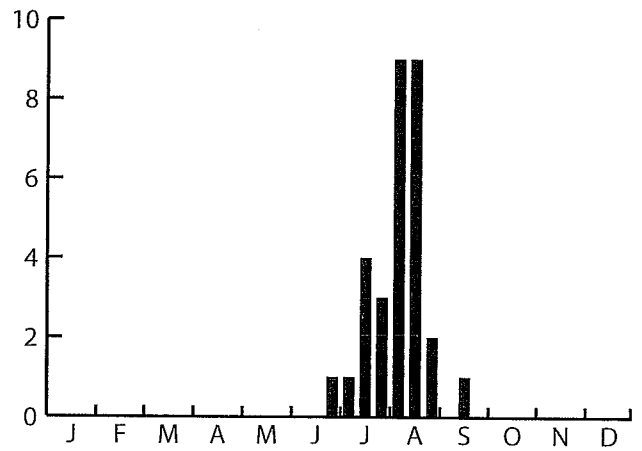
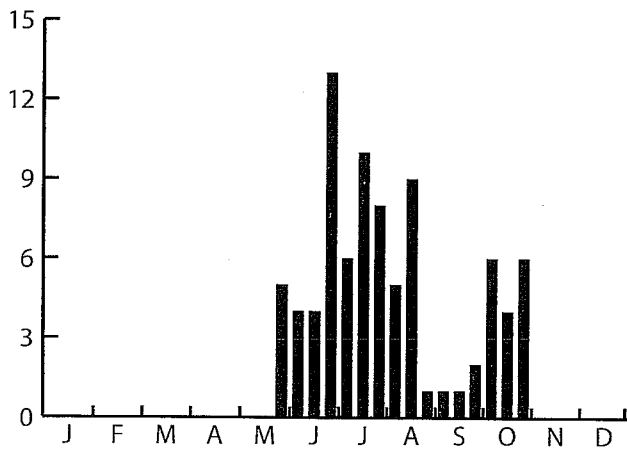
The presence of *Orthetrum trinacria* in Turkey is based on a record from 'Klein-Asien' from which DUMONT (1977) stated that it probably comes from Amik Göl (Antakya province). Other records were published by DEMIRSOY from various parts of Turkey (1982). The identification of these records is doubtful 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

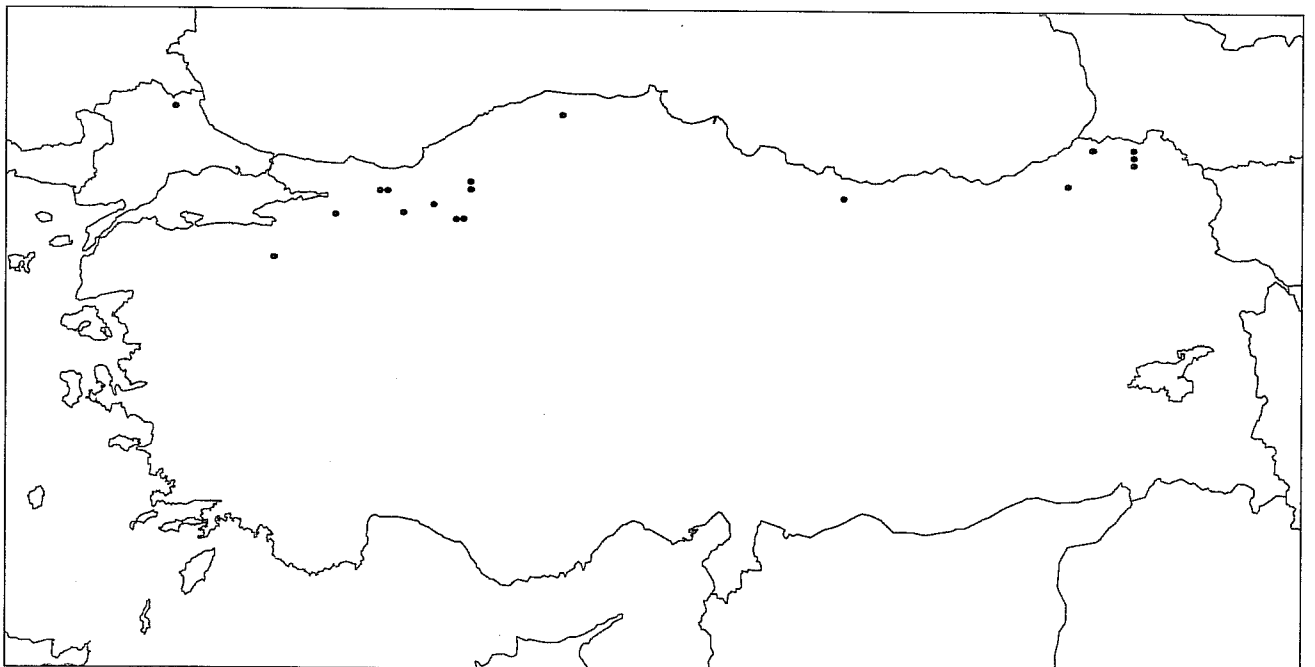
The record from Malatya published by SÉLYS (1887) is still the only Turkish record of this species (see KALKMAN *et al.* 2003 for more information). Especially the males can easily be confused with one of the commoner species of *Orthetrum* and the species might be easily overlooked.

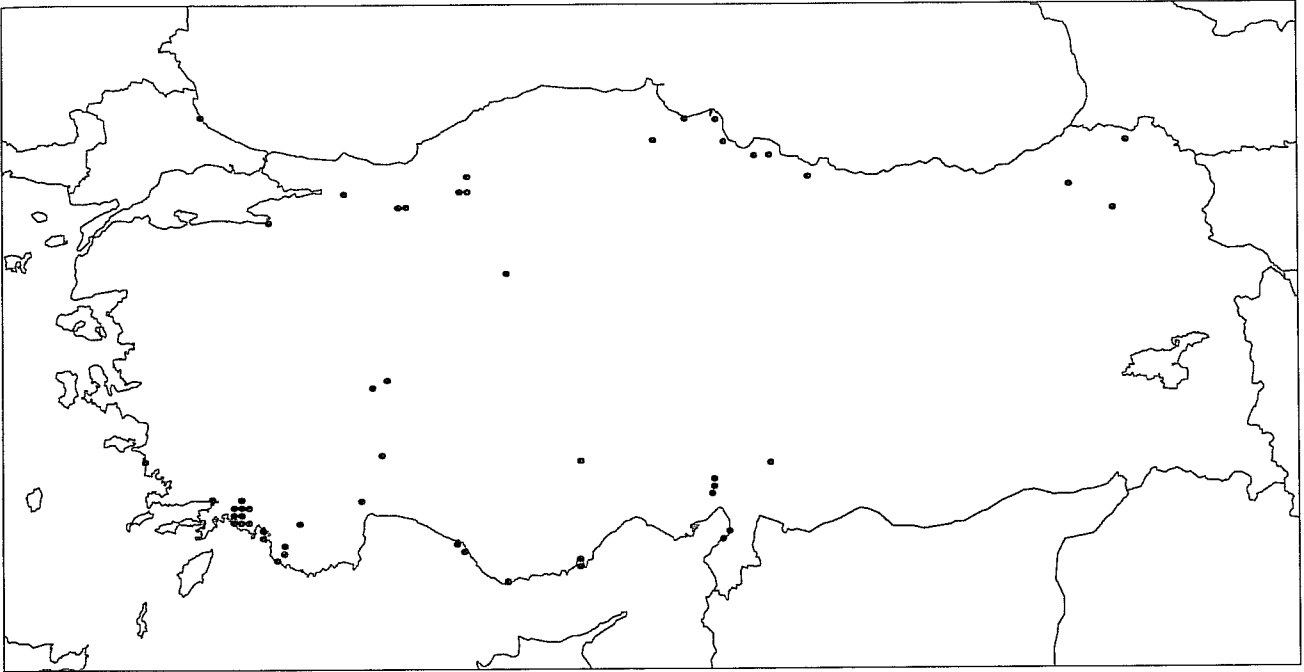


Aeshna affinis

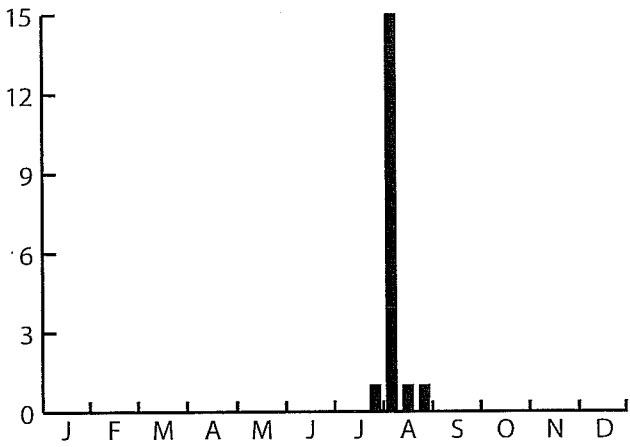
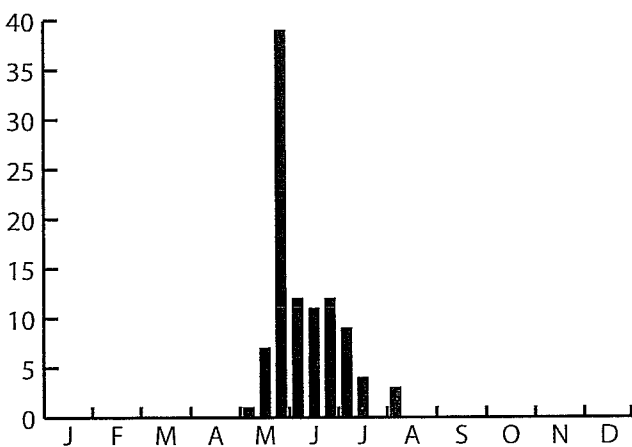


Aeshna cyanea

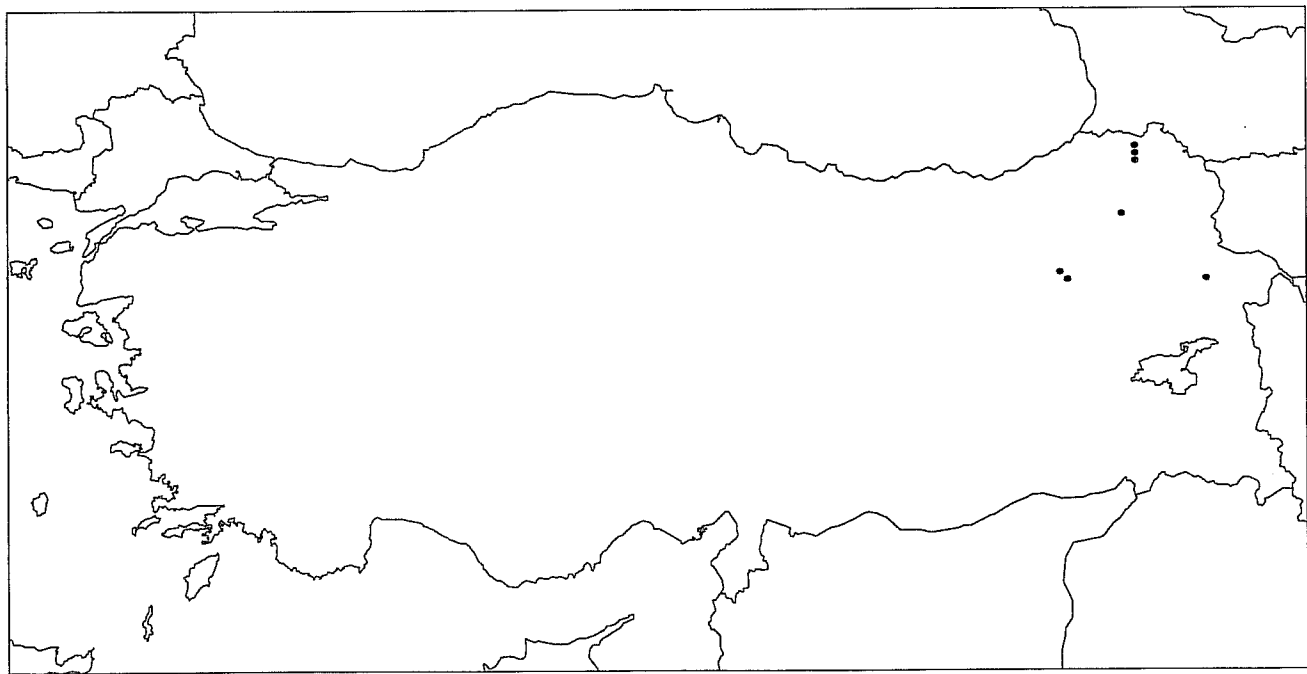


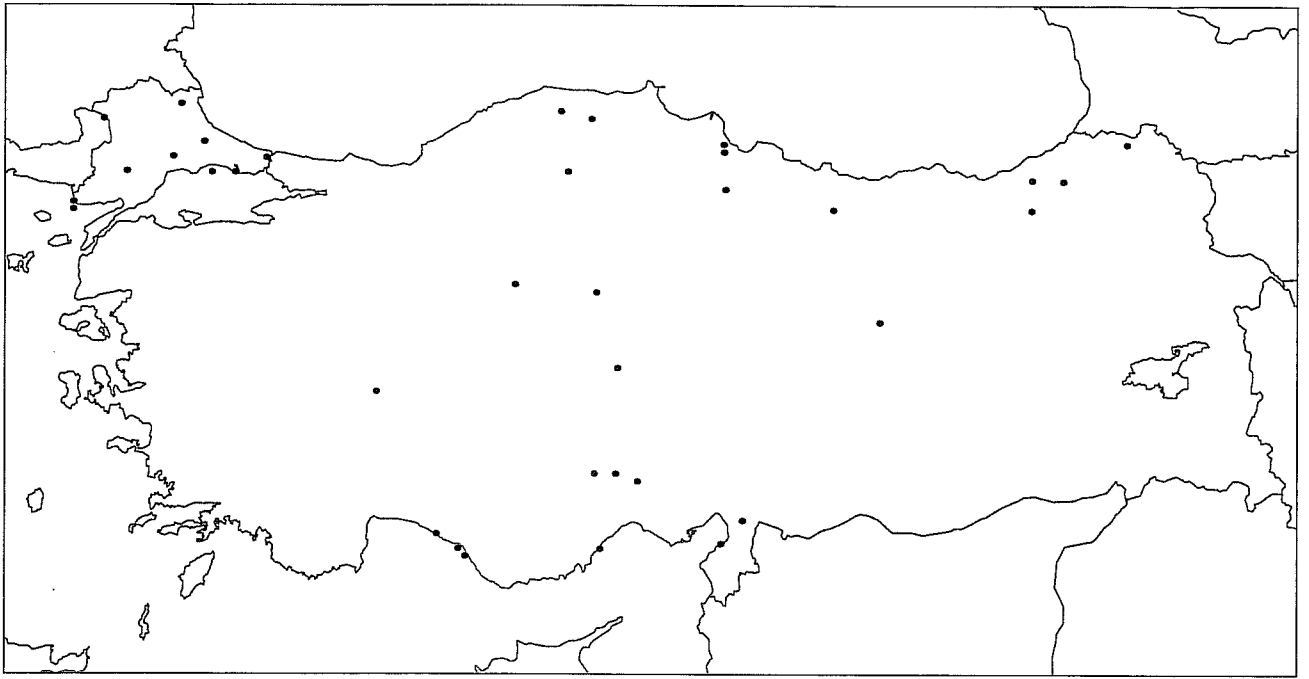


Aeshna isoceles

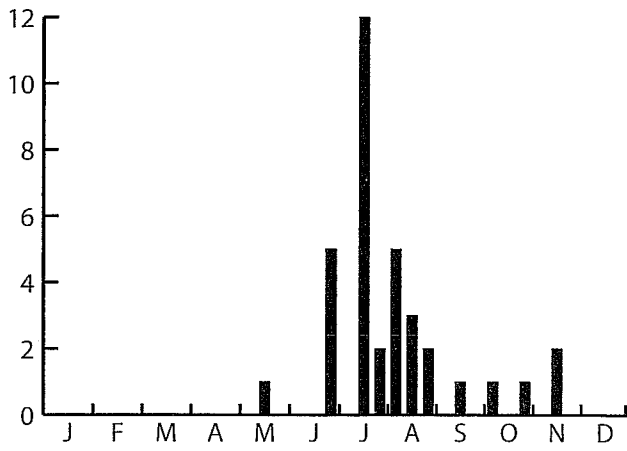


Aeshna juncea



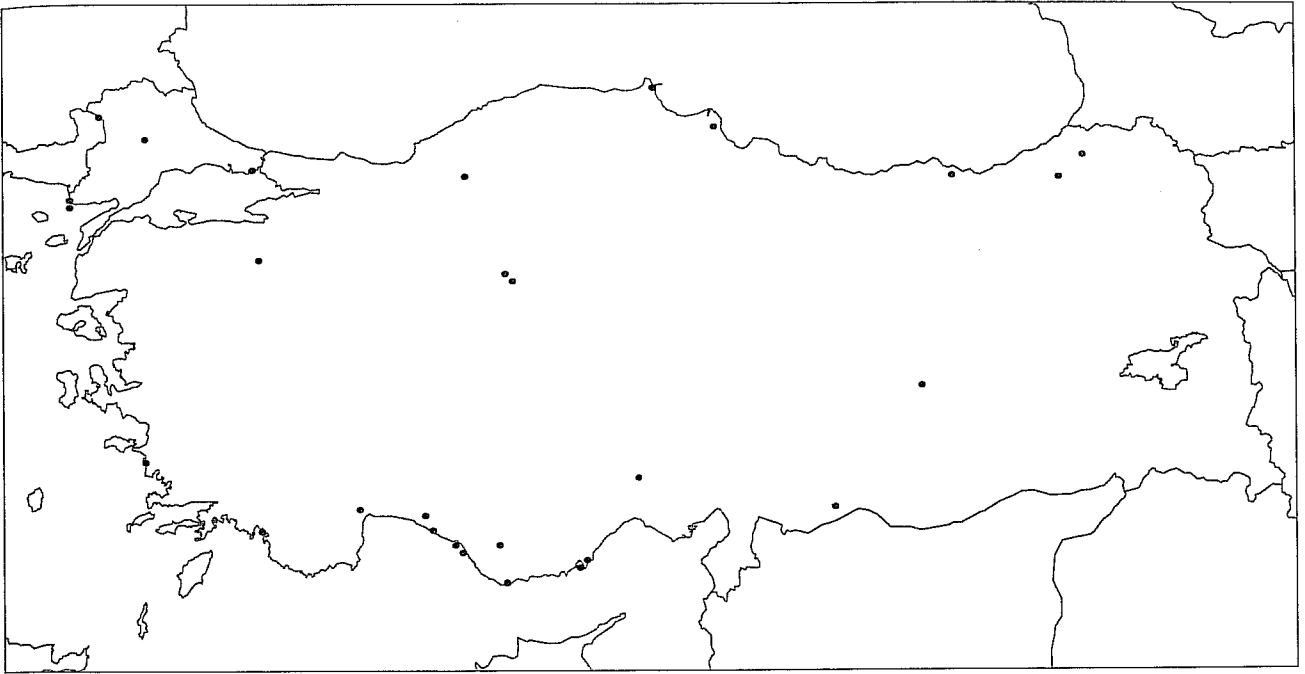


Aeshna mixta

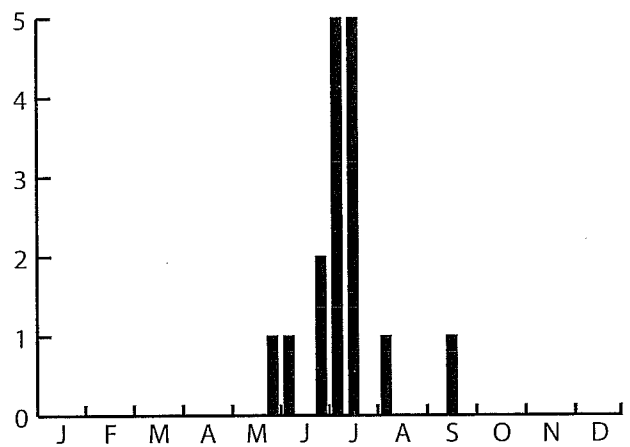
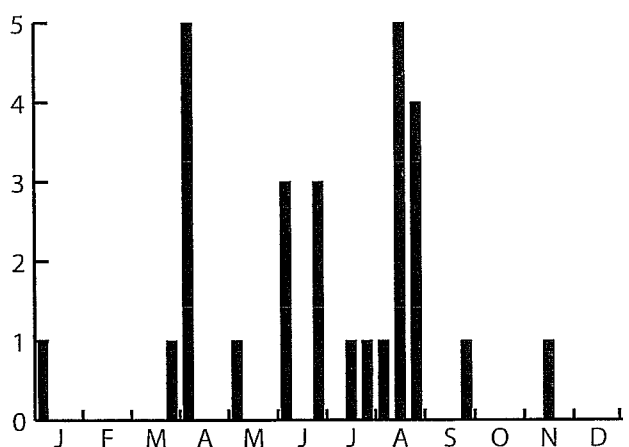


Aeshna serrata

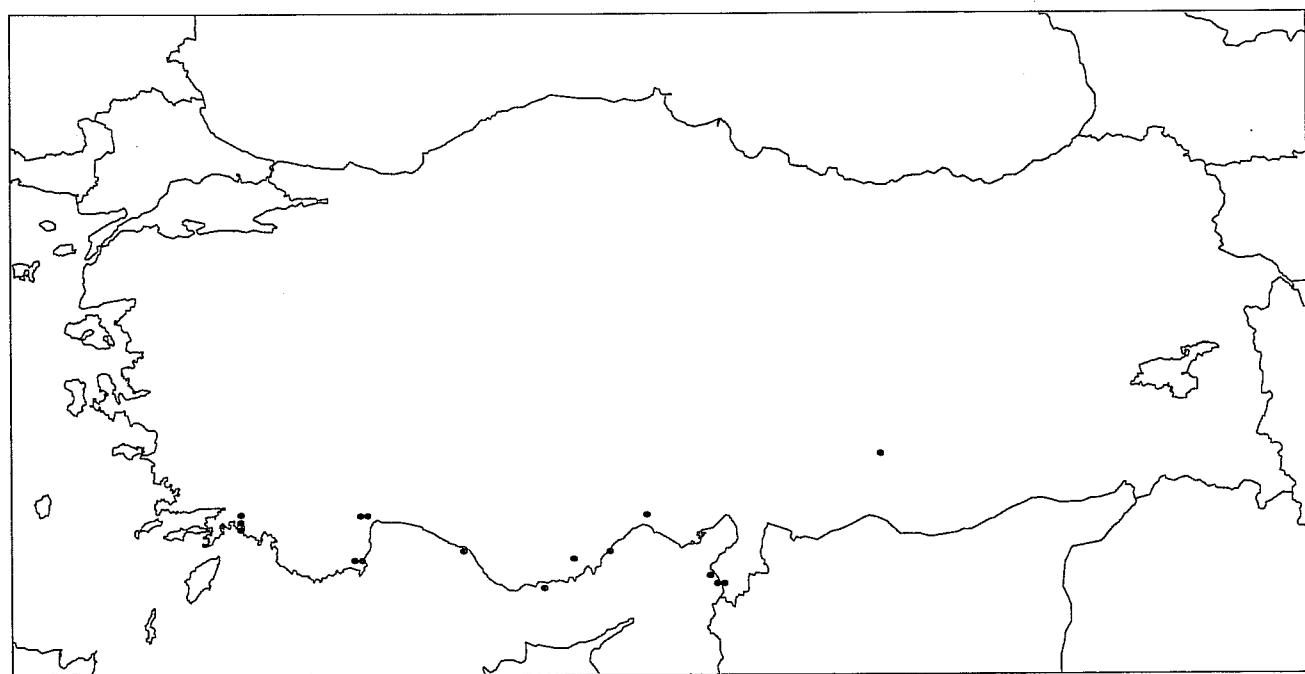


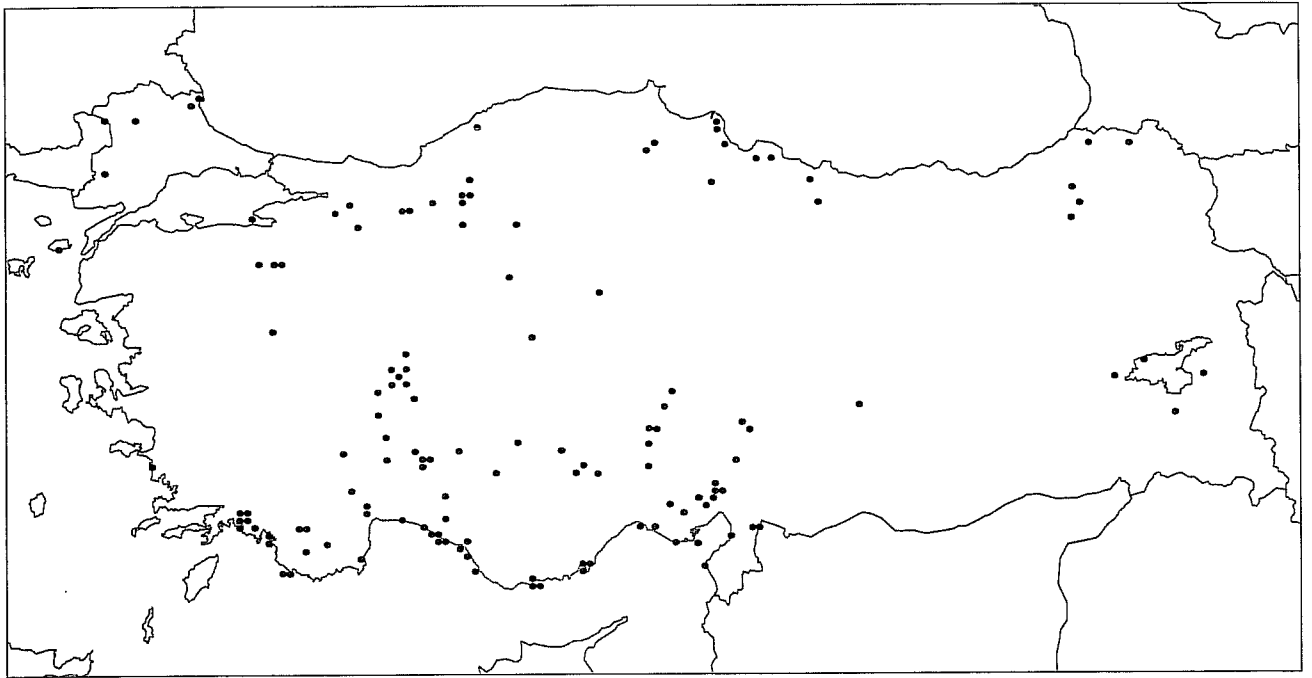


Anax ephippiger

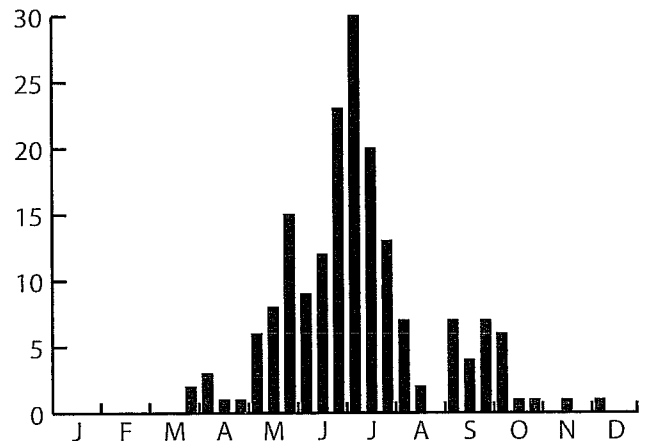
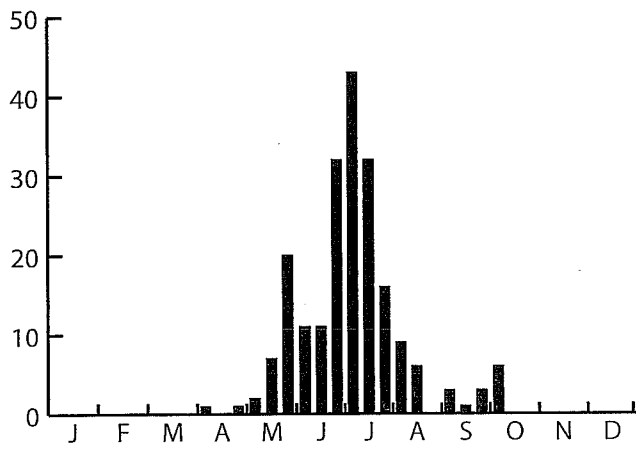


Anax immaculifrons

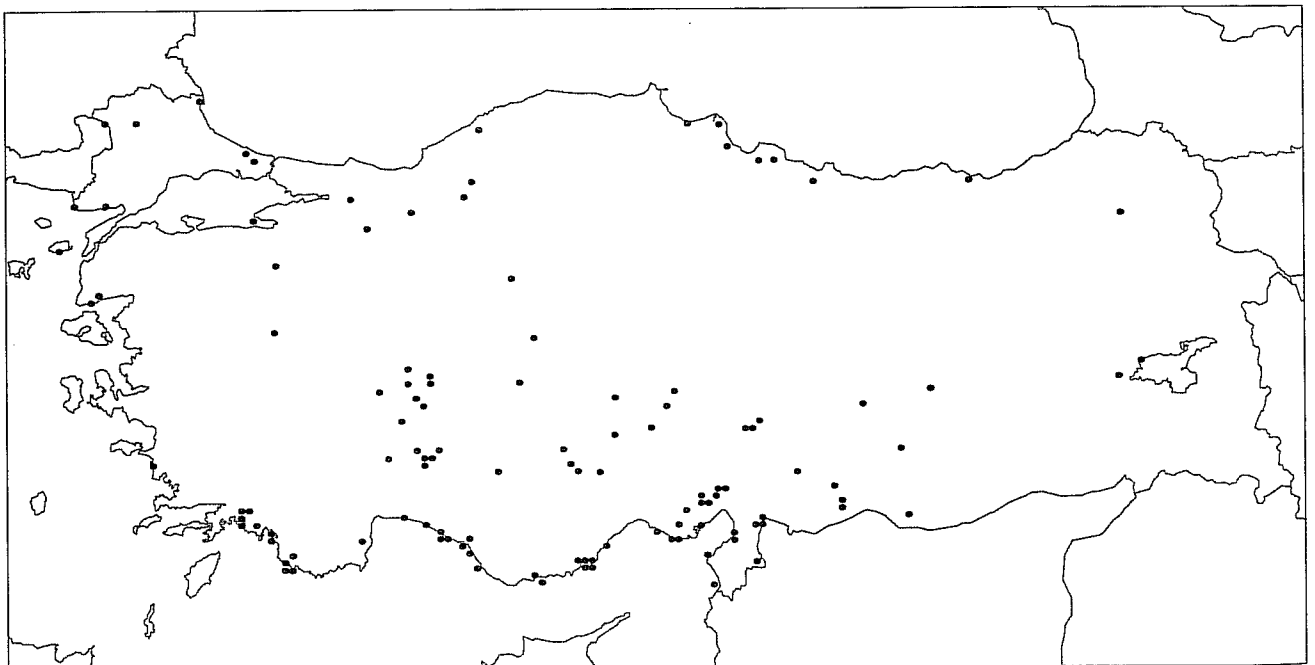


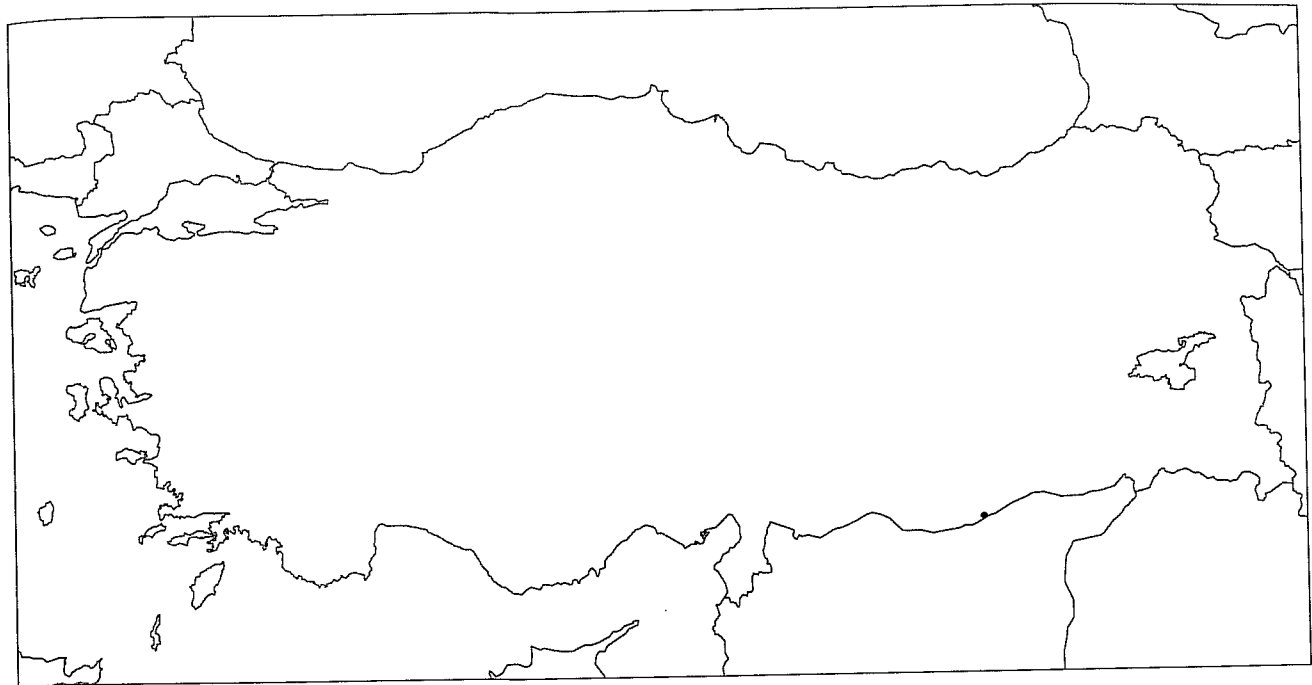


Anax imperator

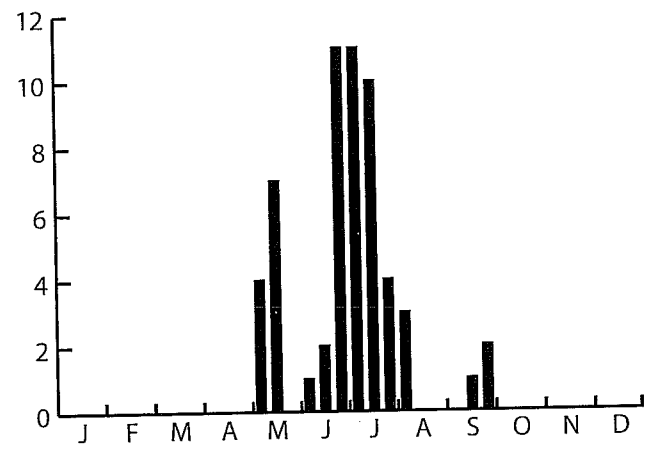
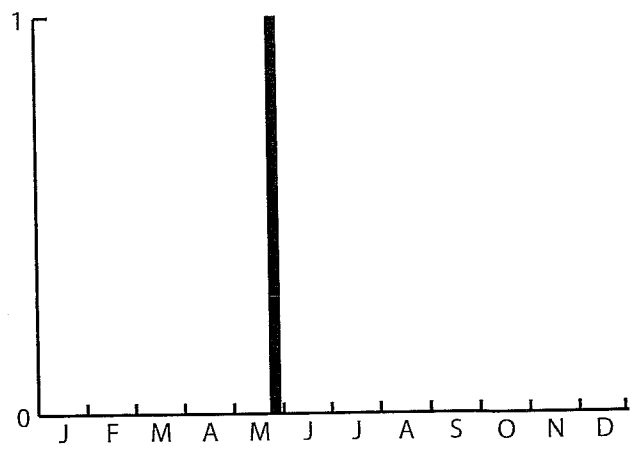


Anax parthenope

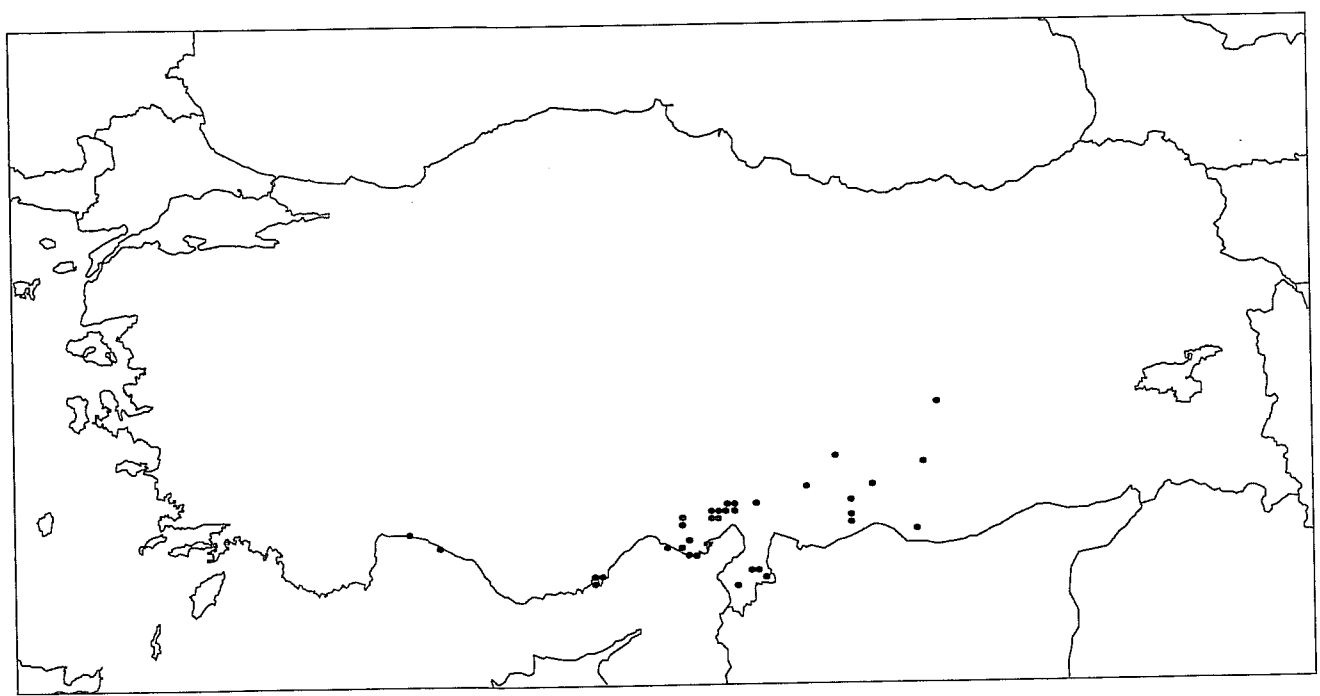


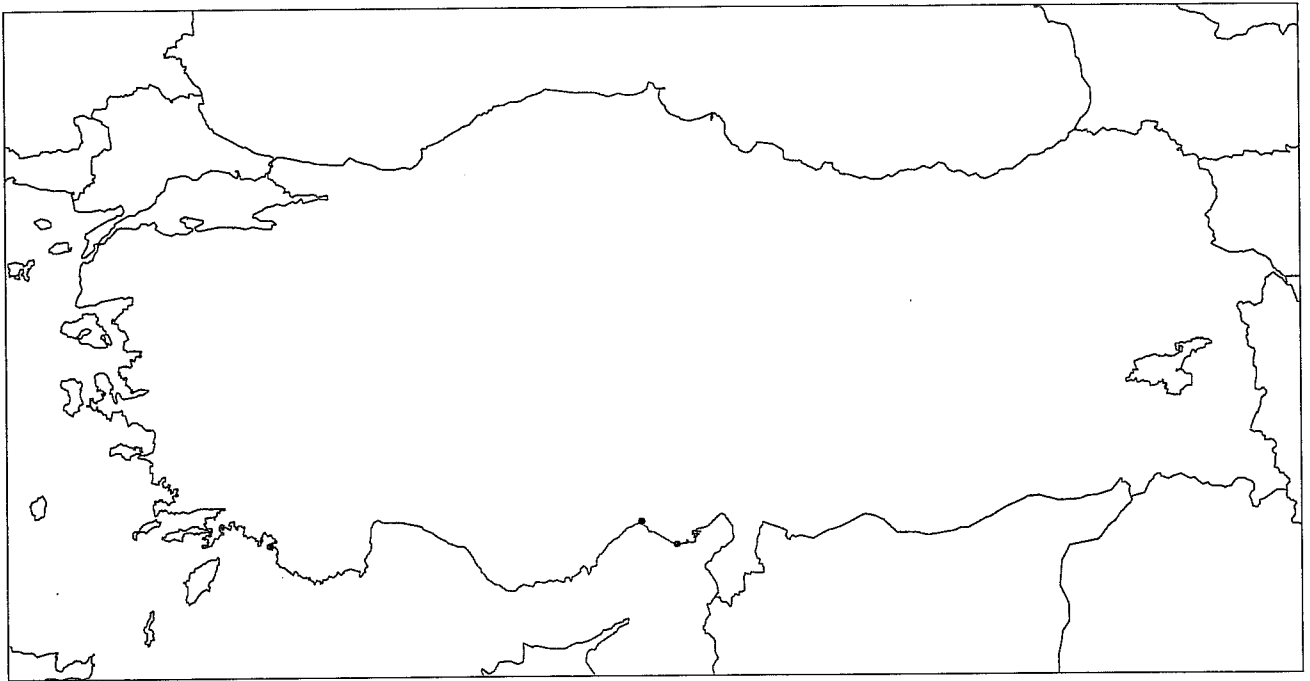


Anormogomphus kiritshenkoi

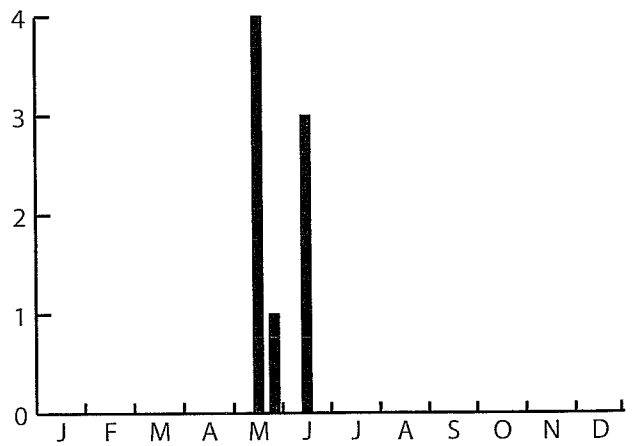
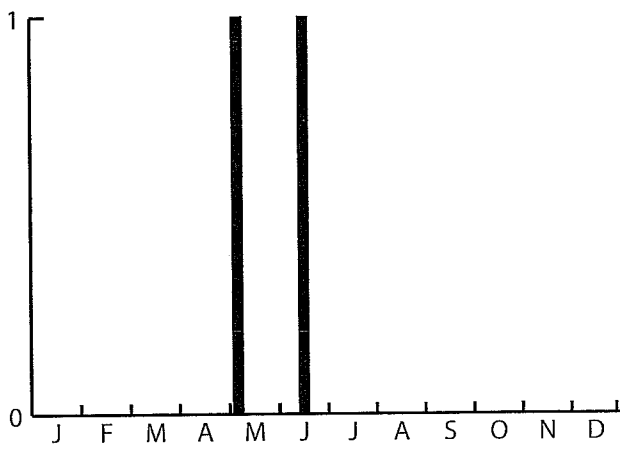


Brachythemis fuscopalliata

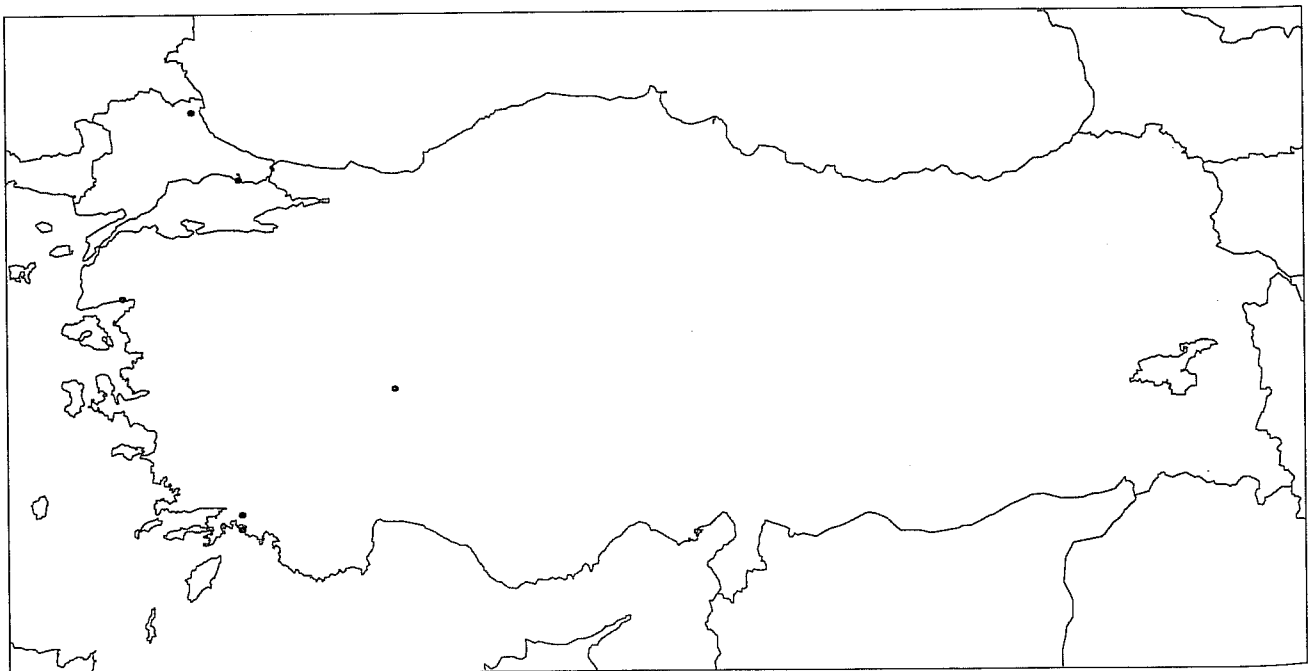


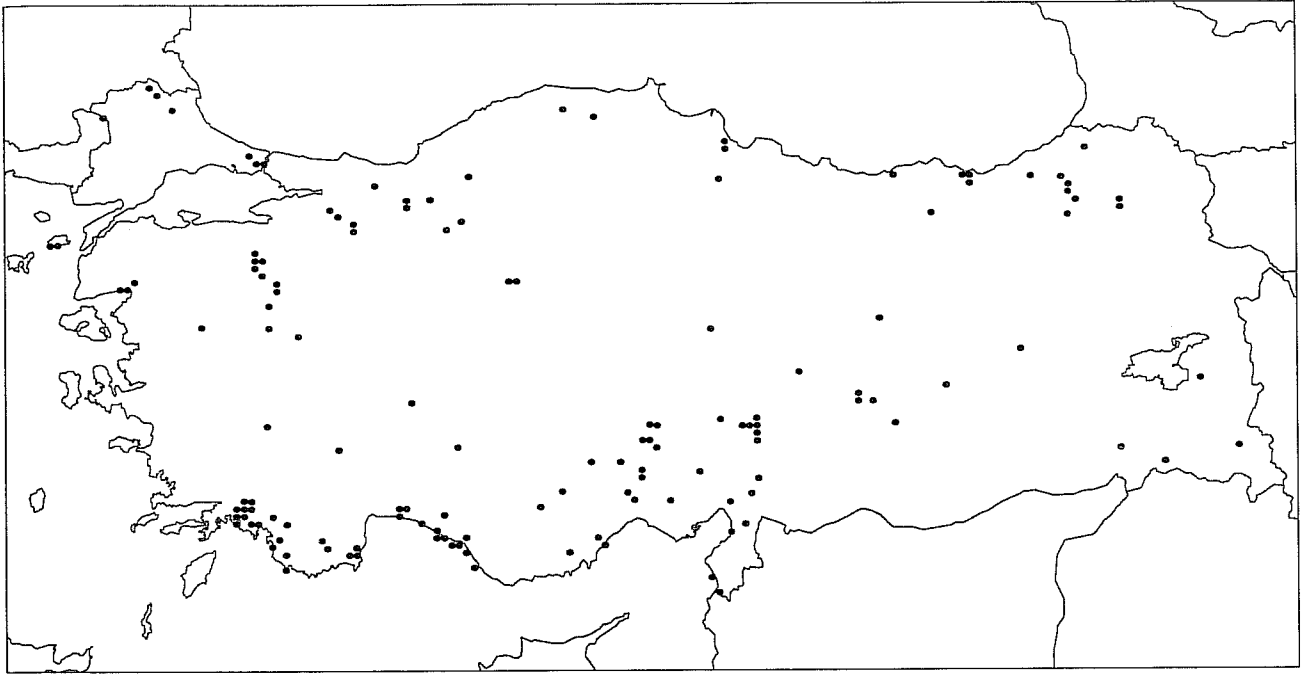


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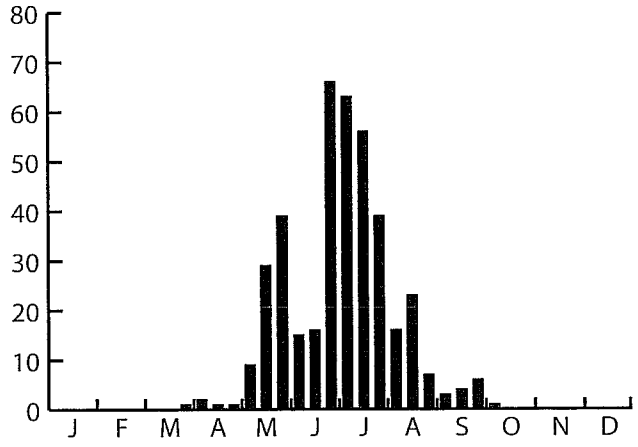
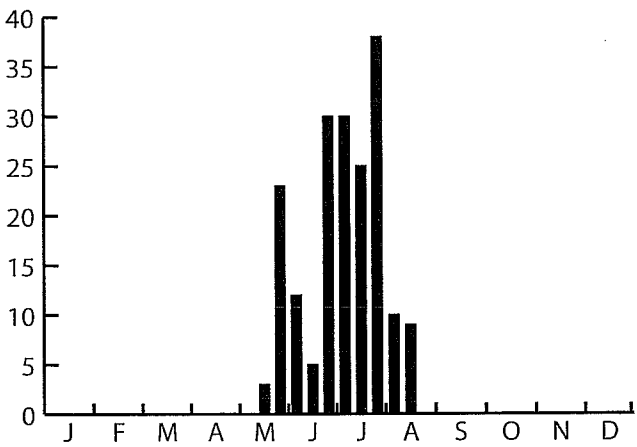


Brachytron pratense

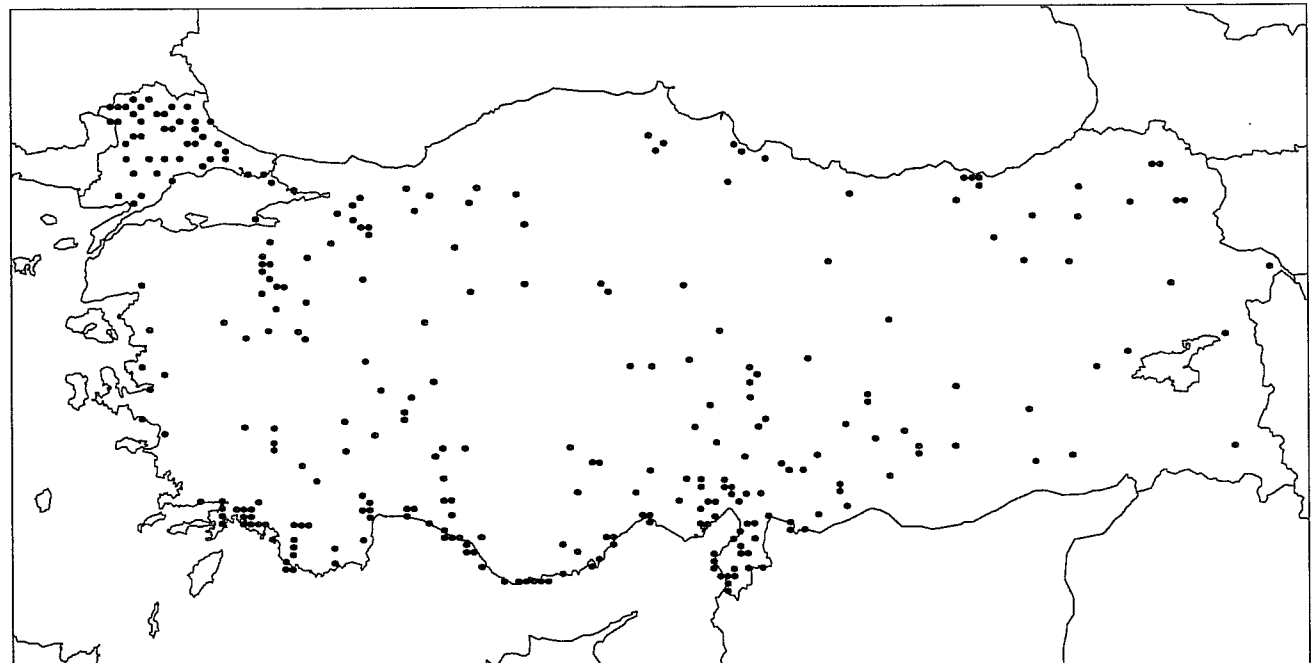


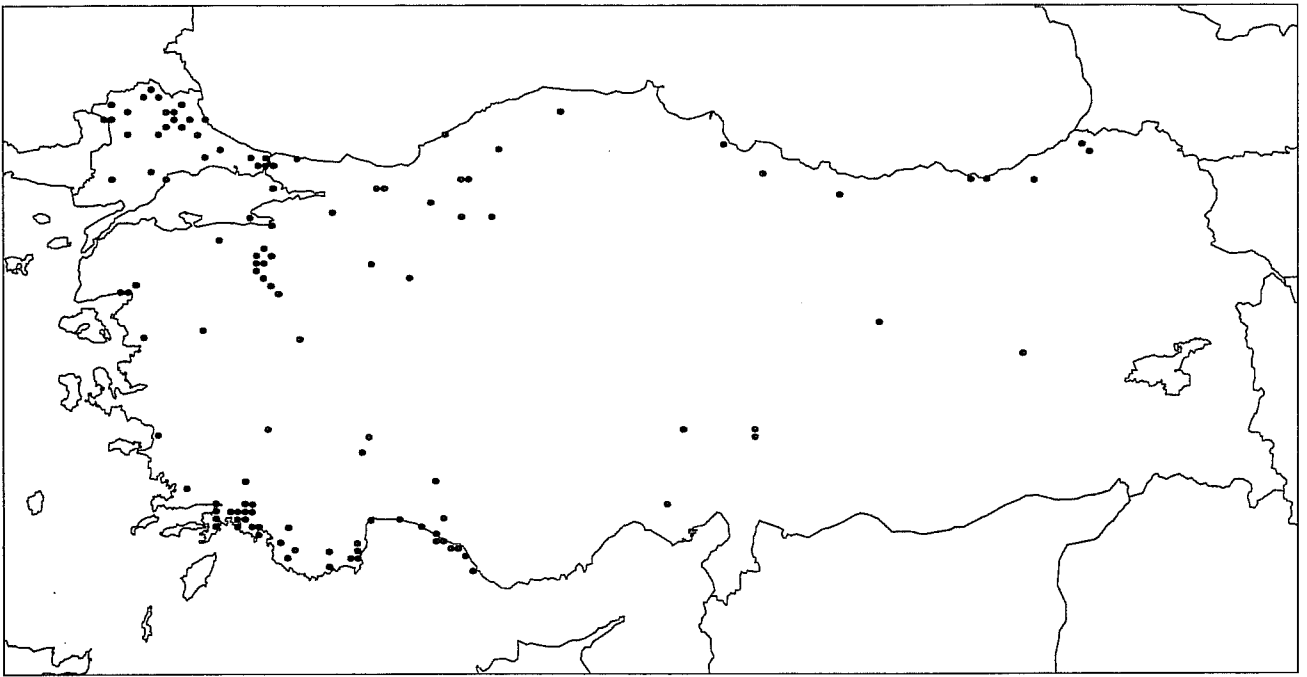


Caliaeschna microstigma

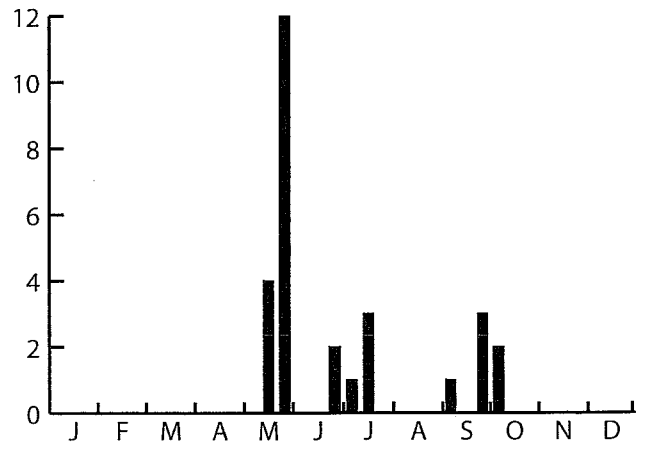
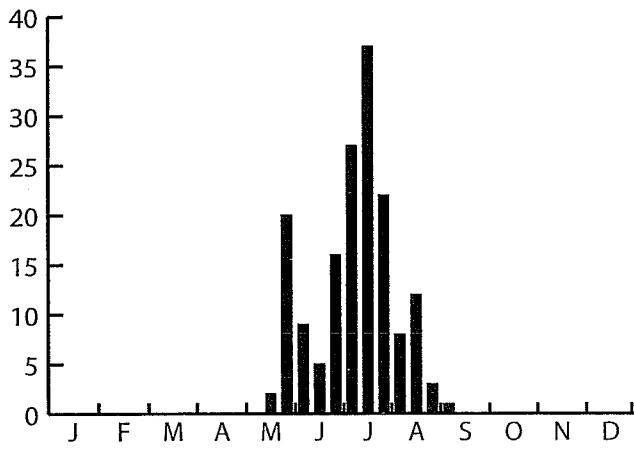


Calopteryx splendens ssp.

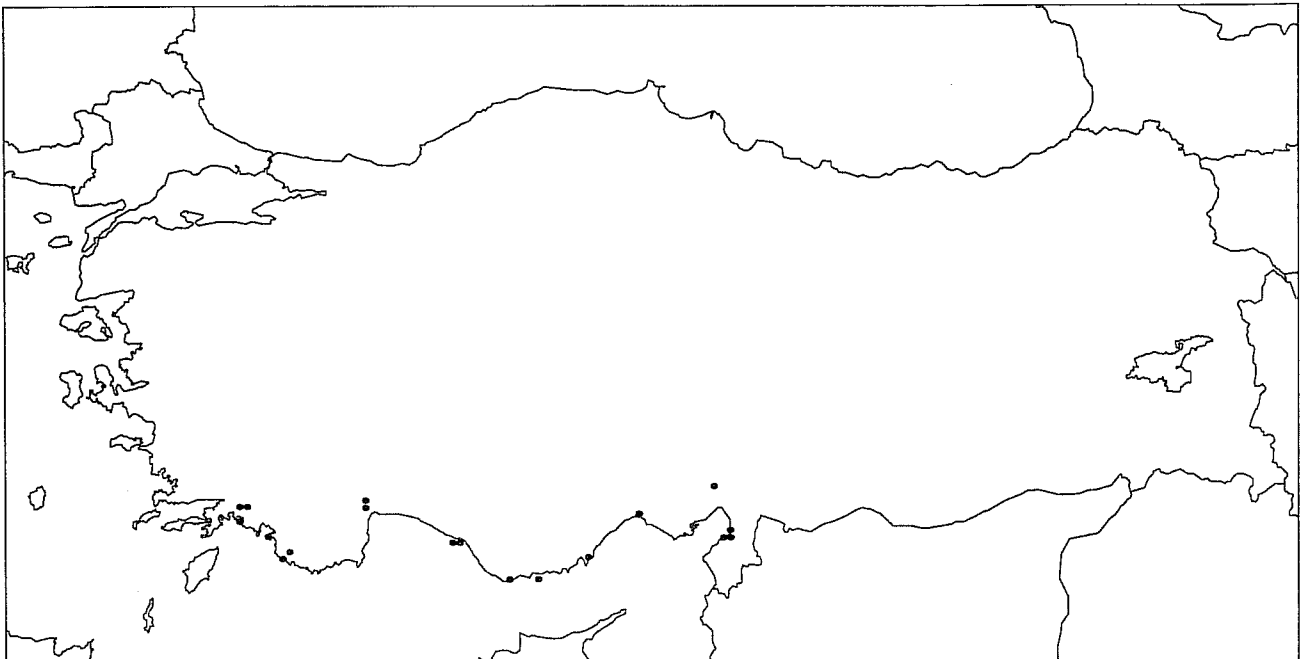


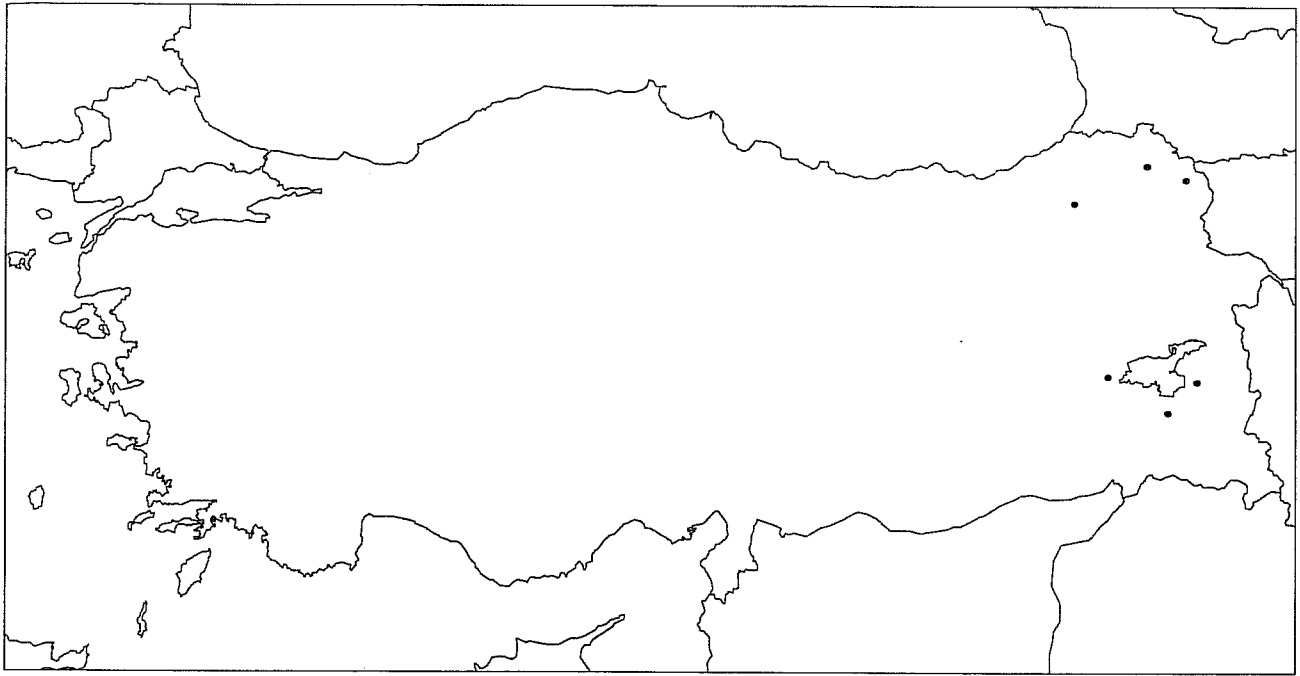


Calopteryx virgo ssp.

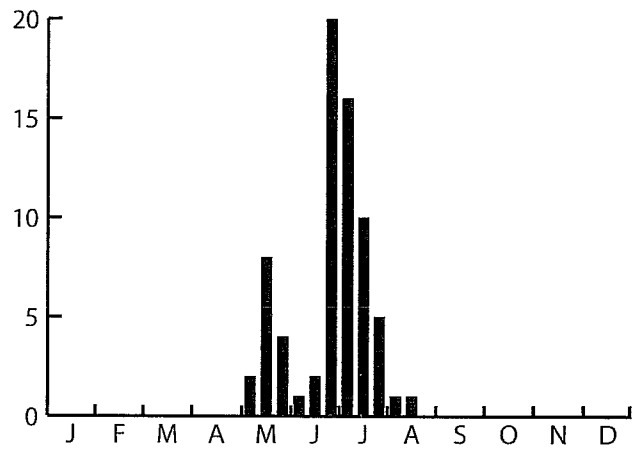
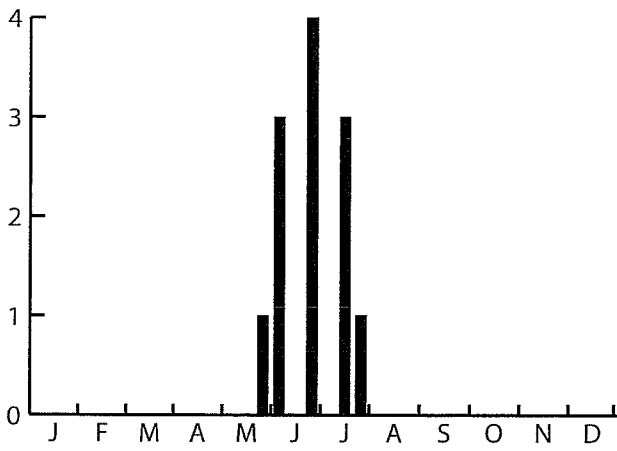


Ceriagrion georgifreyi

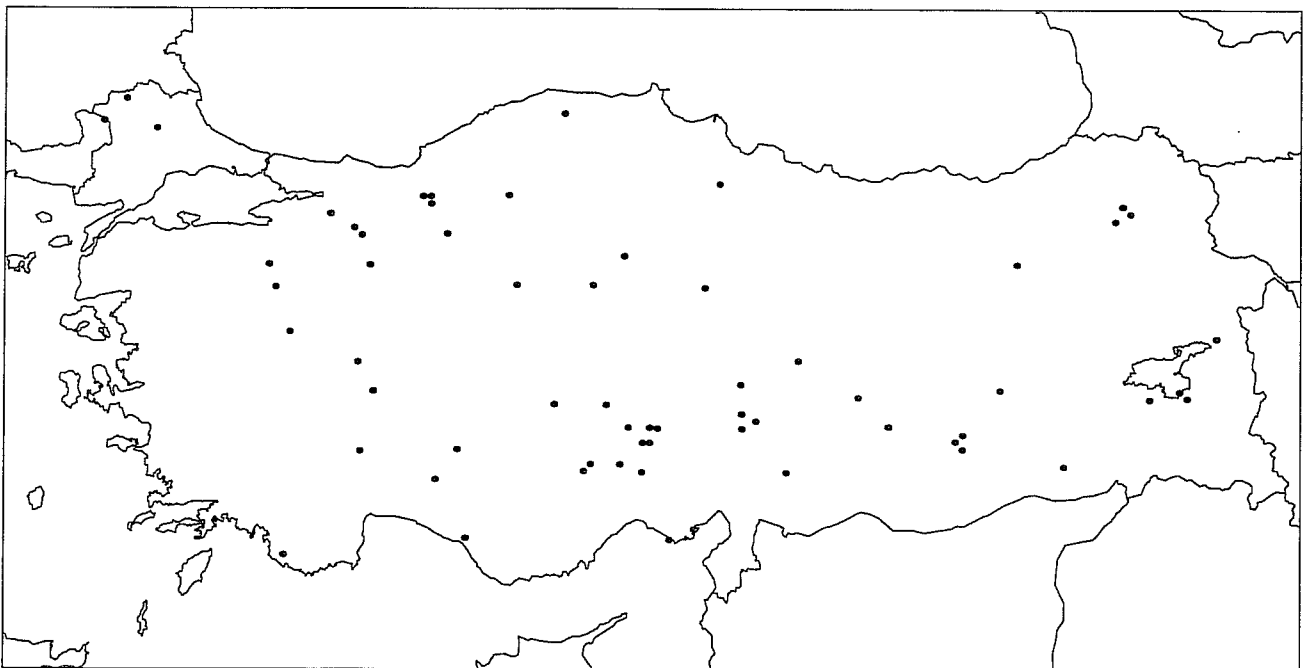


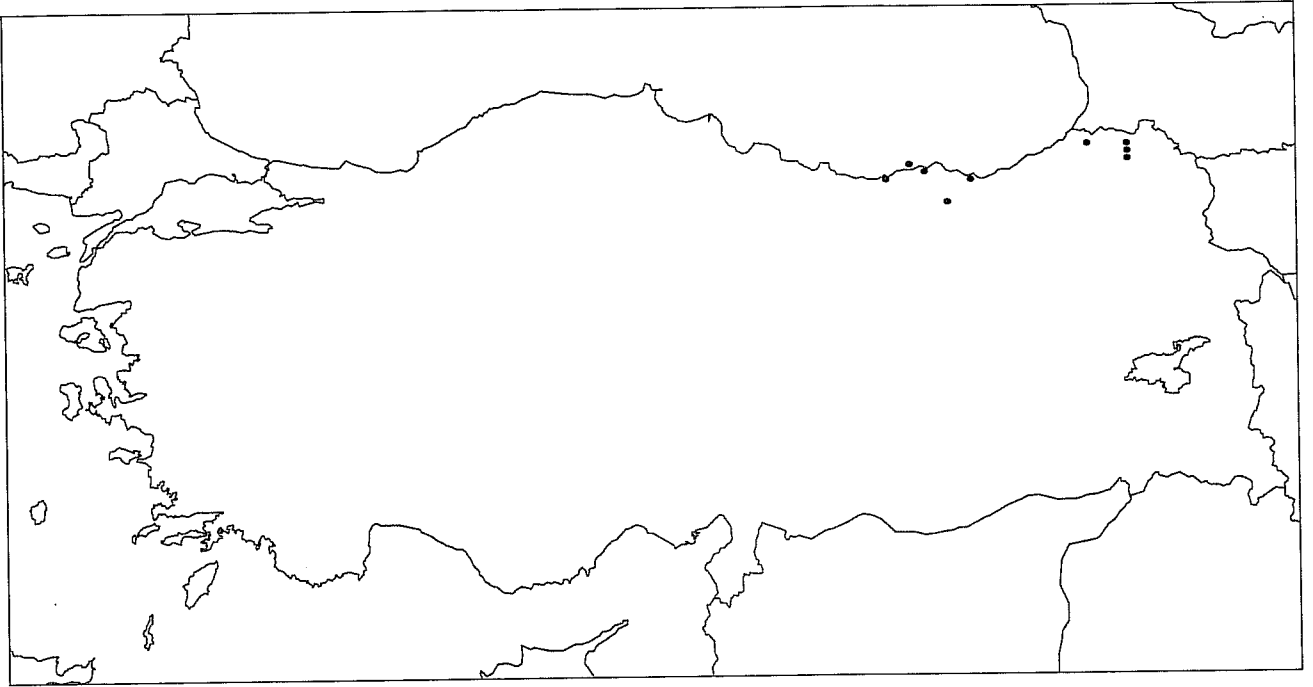


Coenagrion lunulatum

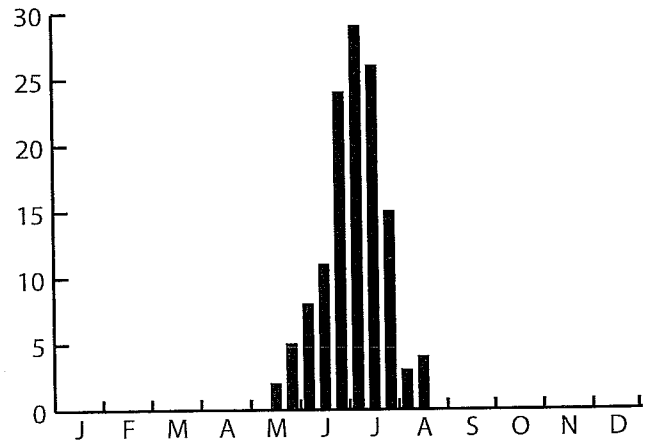
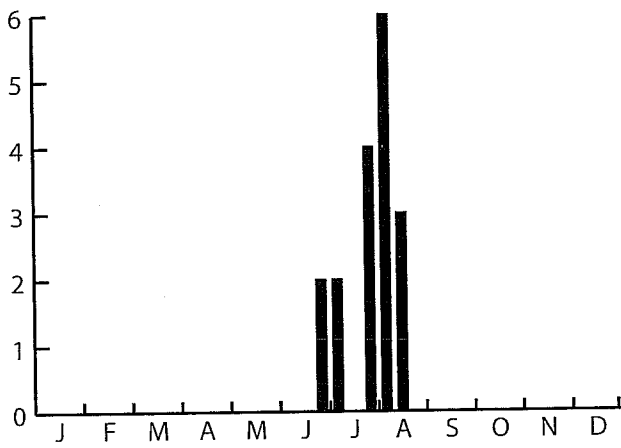


Coenagrion ornatum

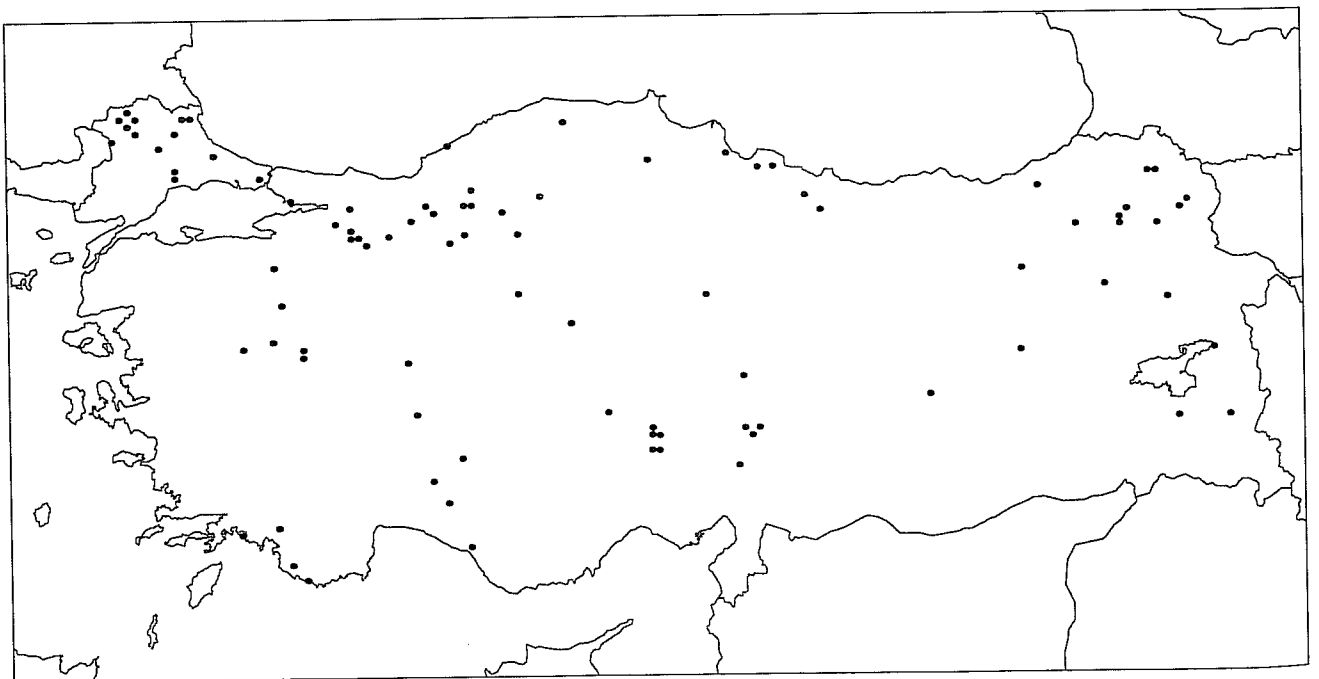


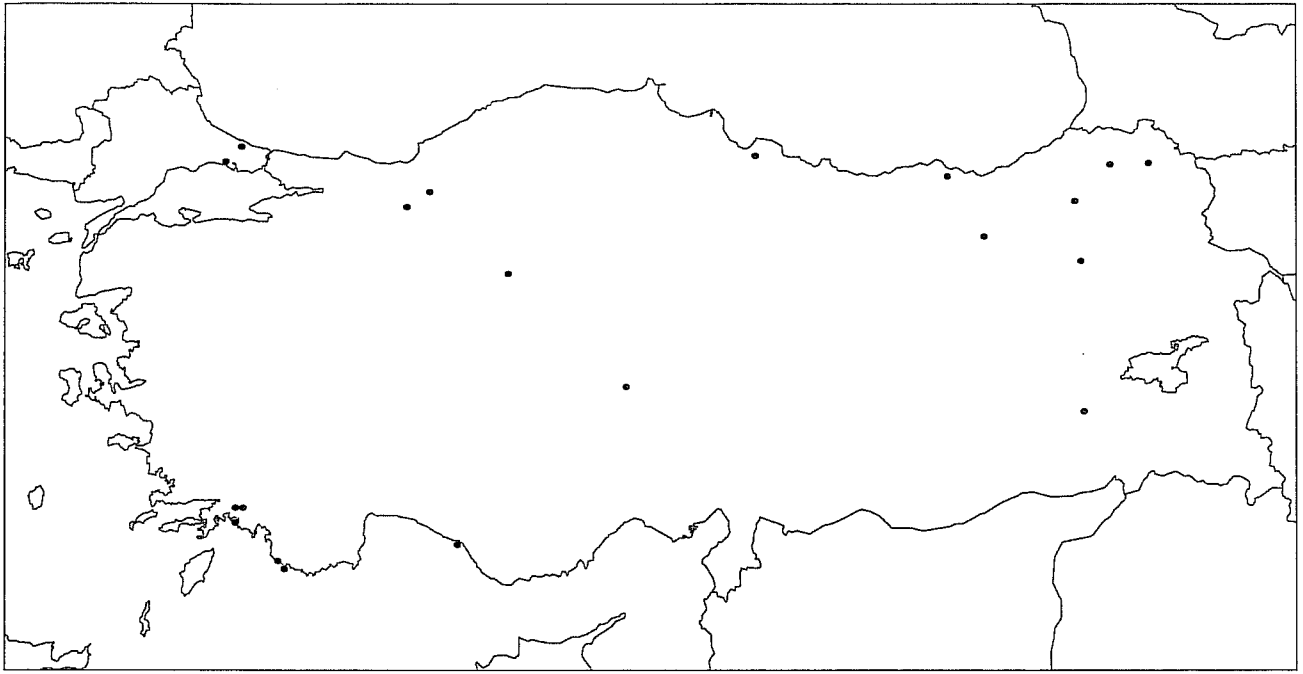


Coenagrion ponticum

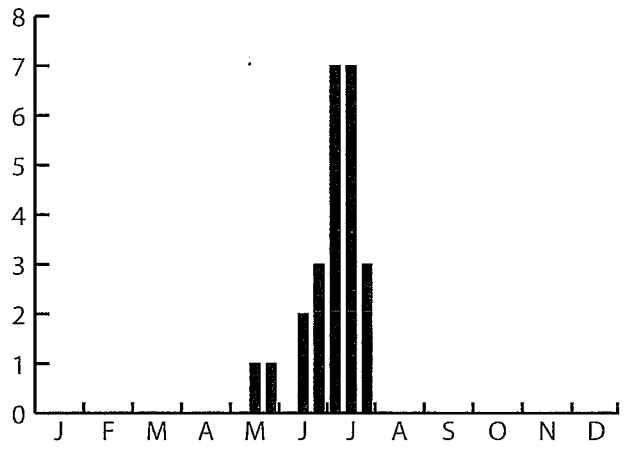
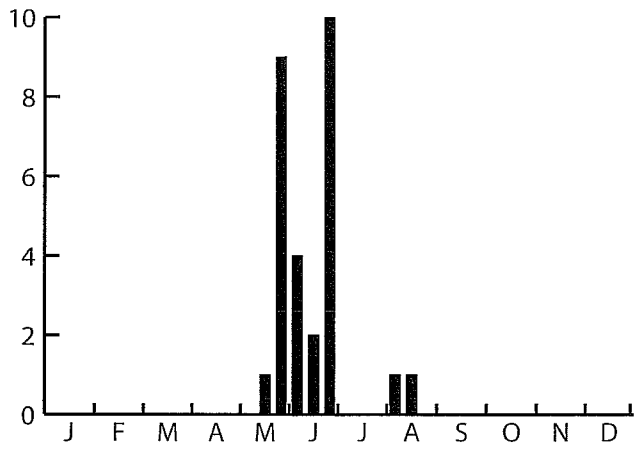


Coenagrion puella



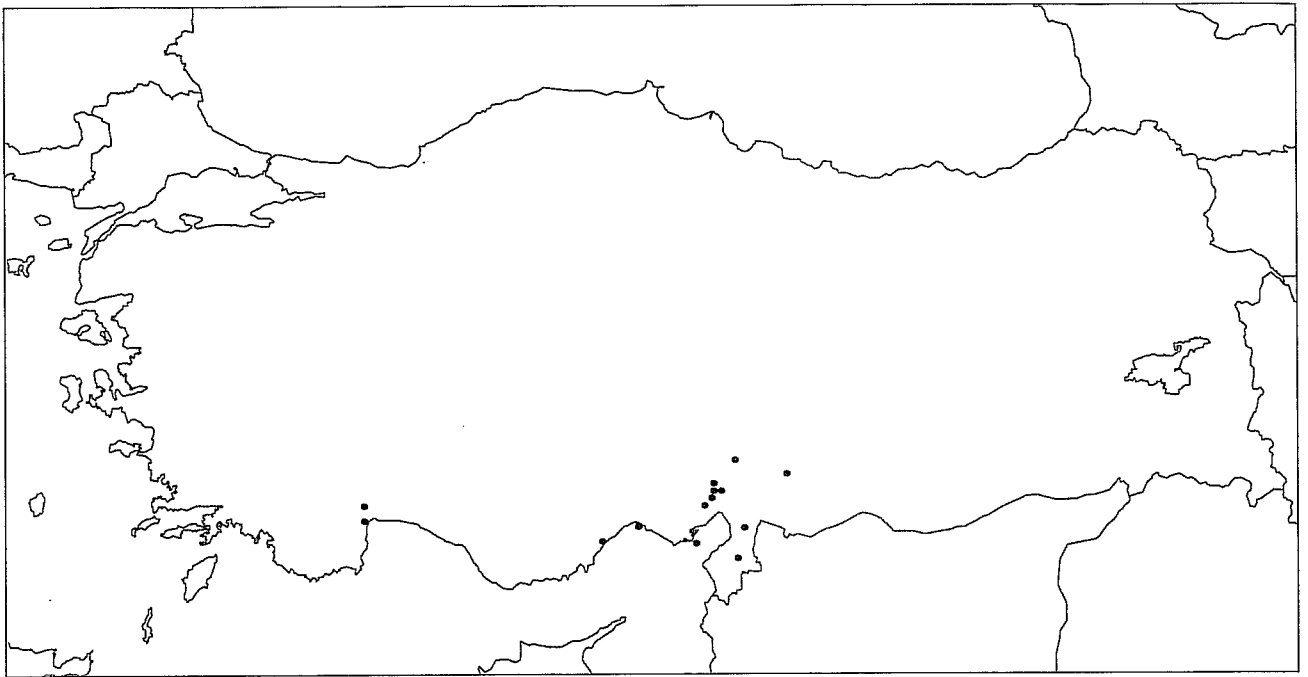


Coenagrion pulchellum ssp.

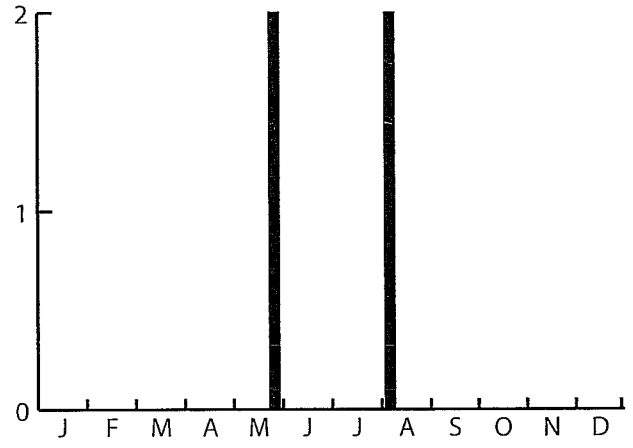
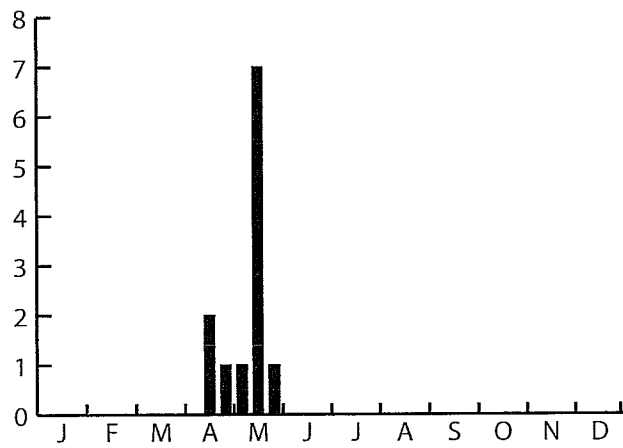


Coenagrion scitulum



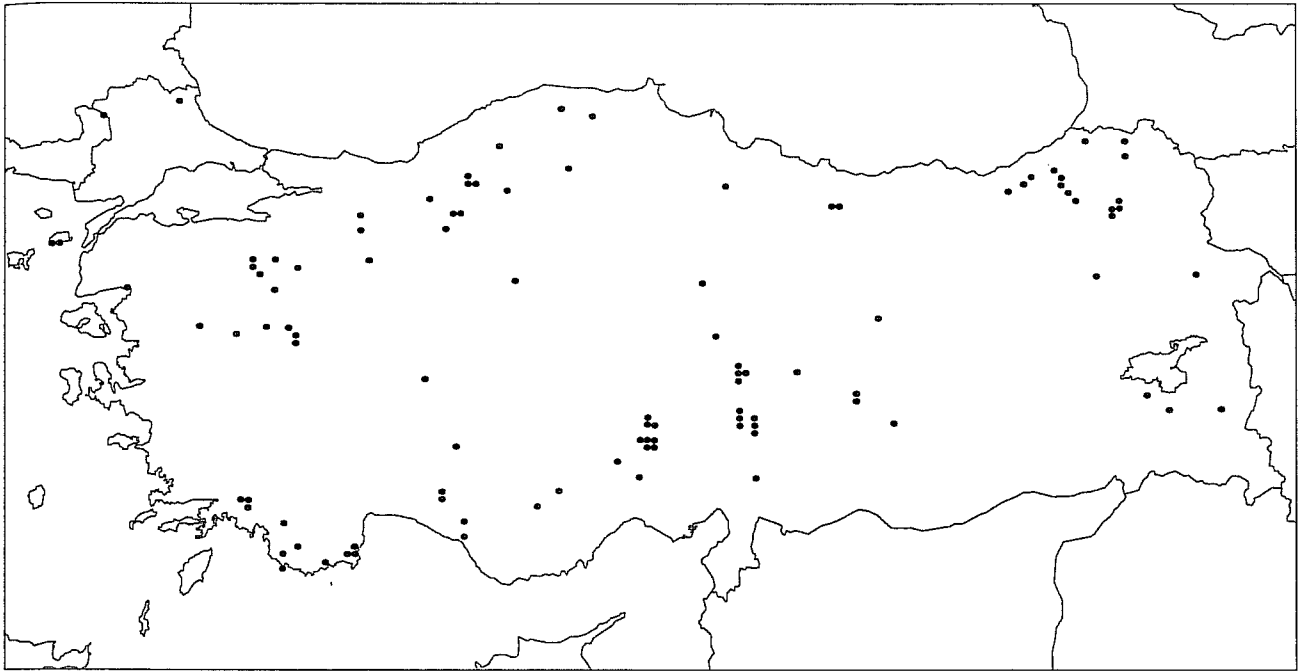


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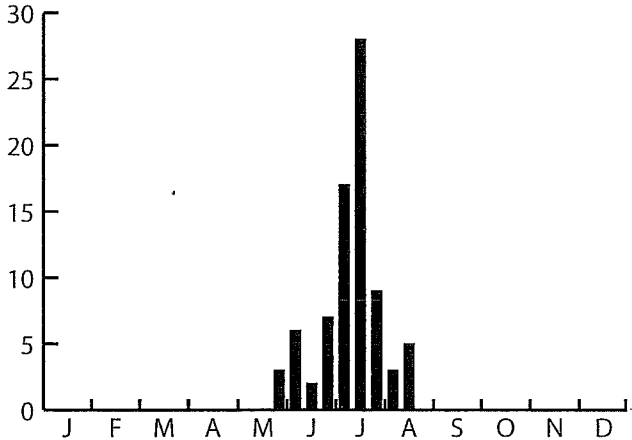
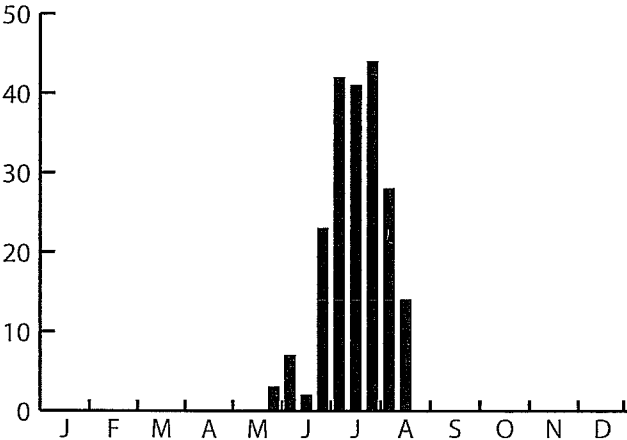


Coenagrion vanbrinkae

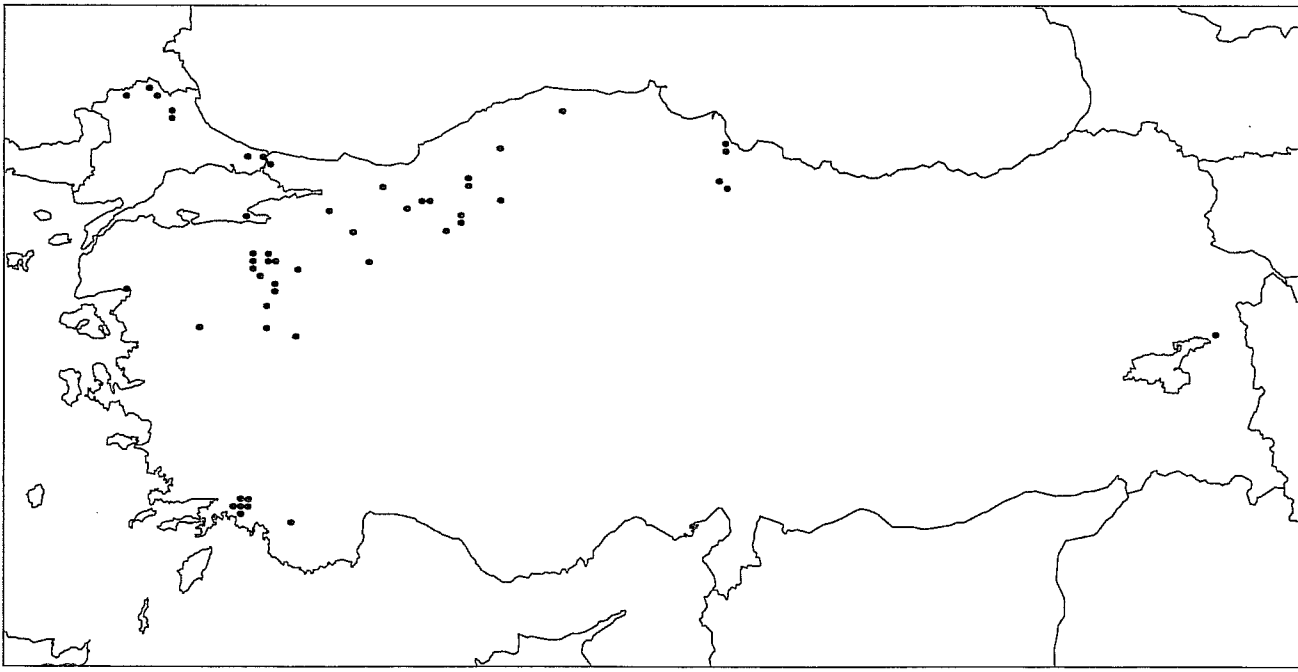


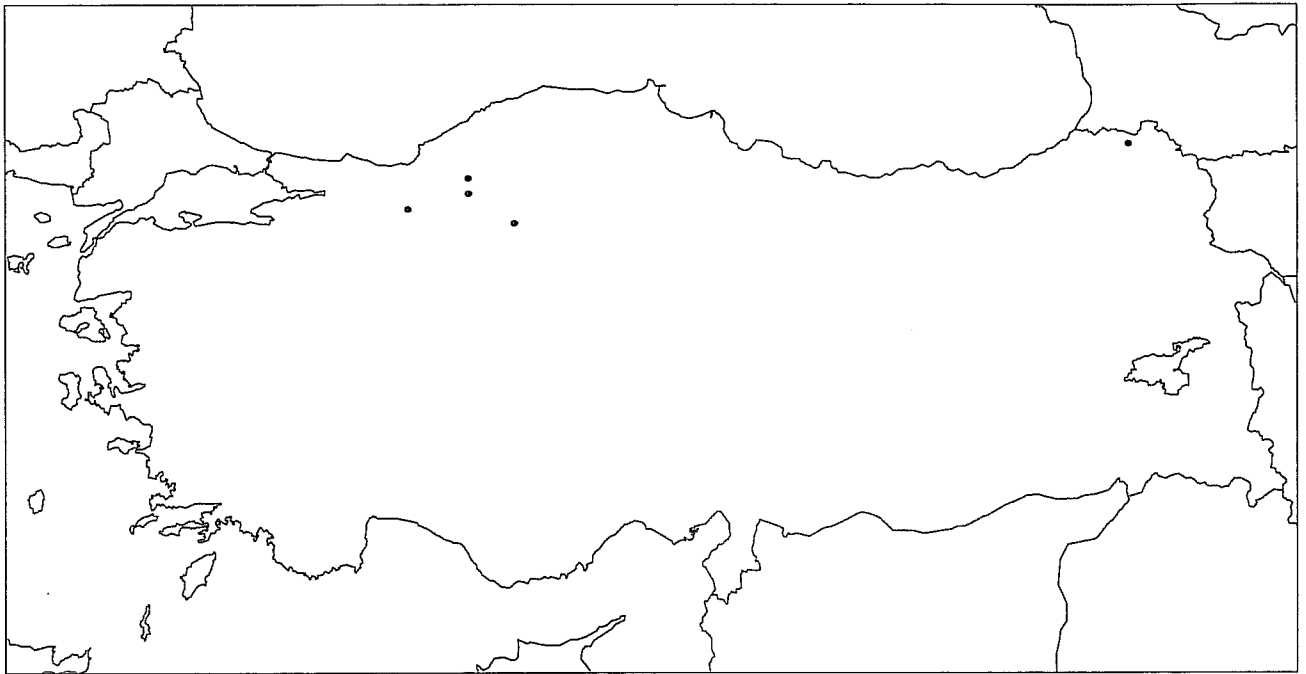


Cordulegaster insignis ssp.

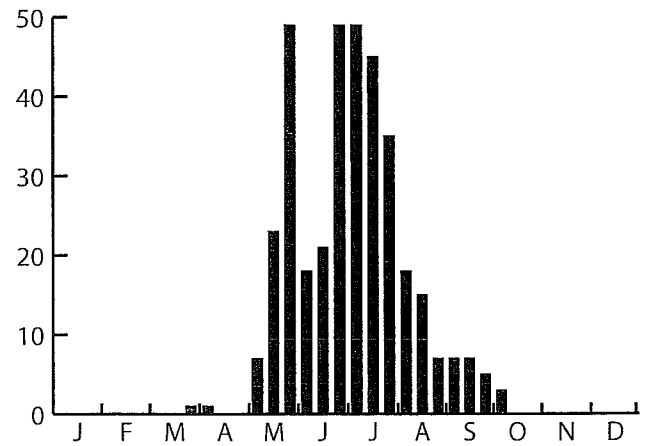
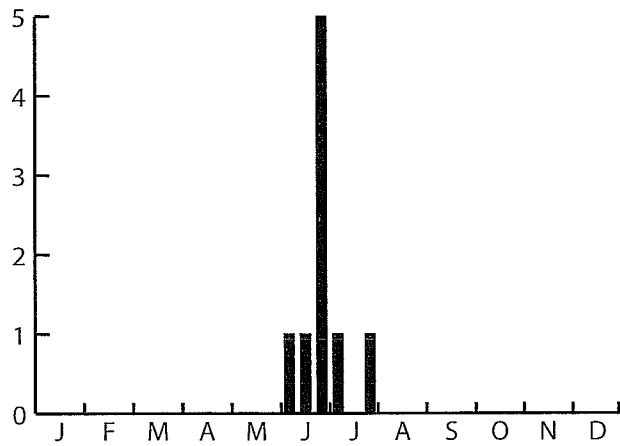


Cordulegaster picta



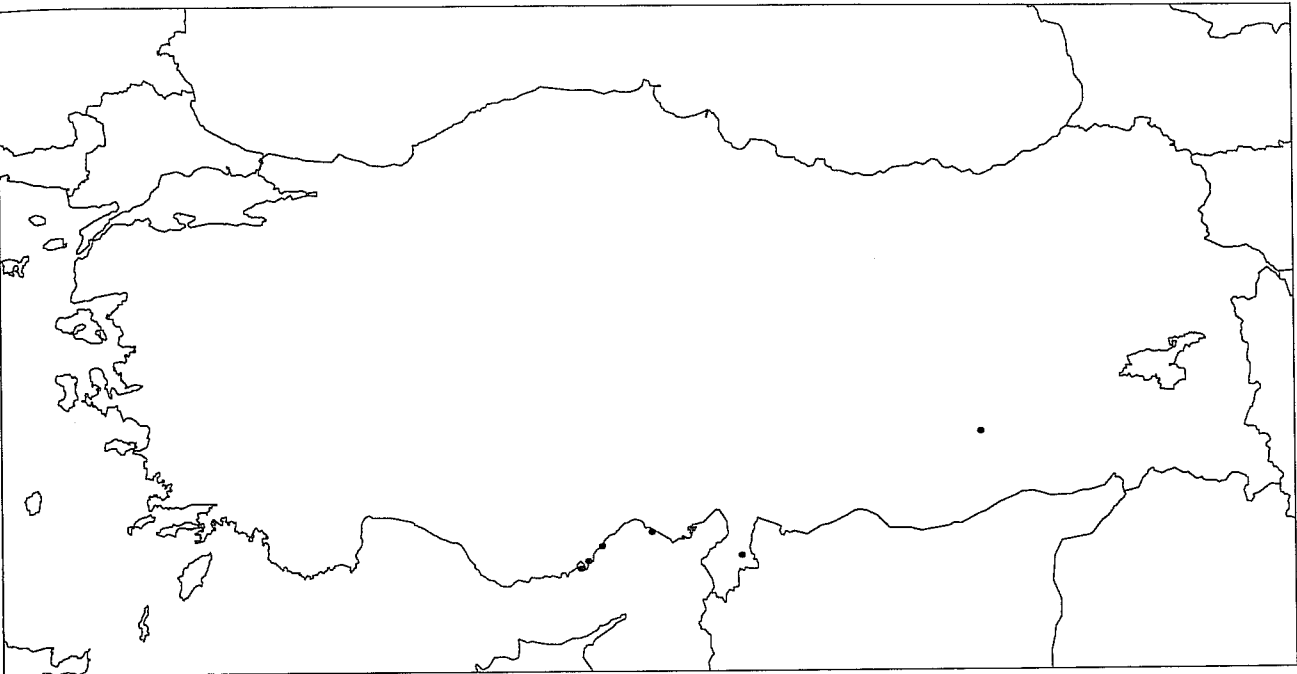


Cordulia aenea

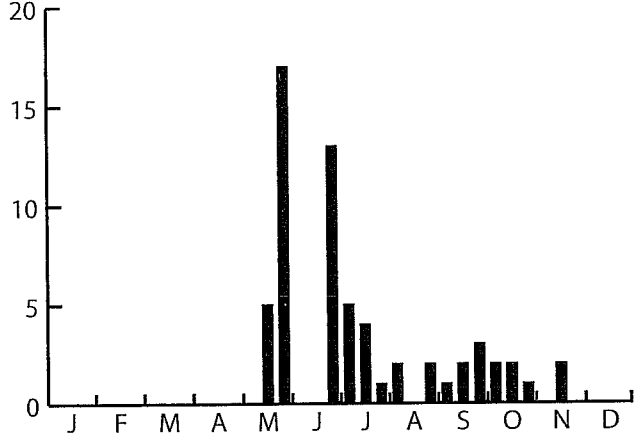
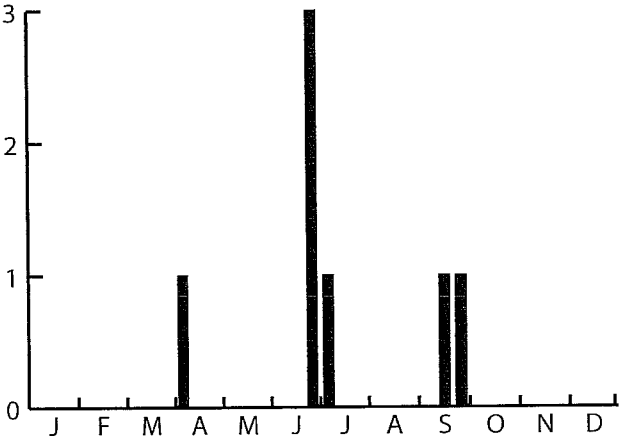


Crocothemis erythraea erythraea

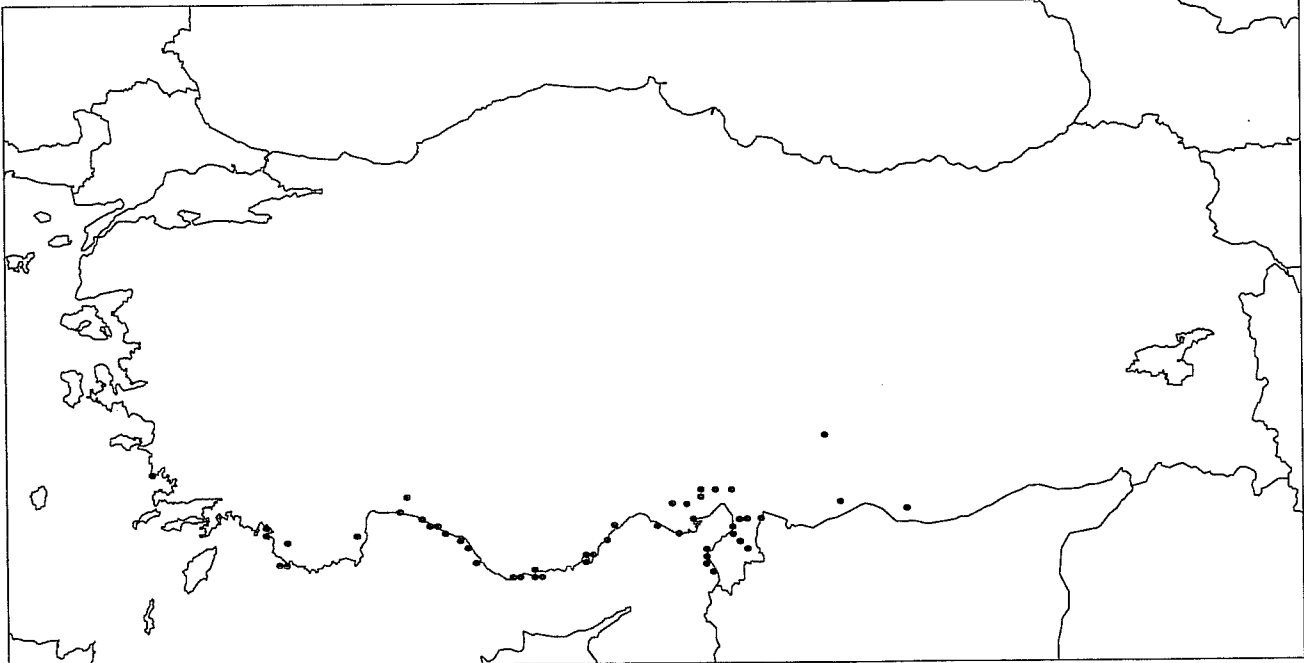


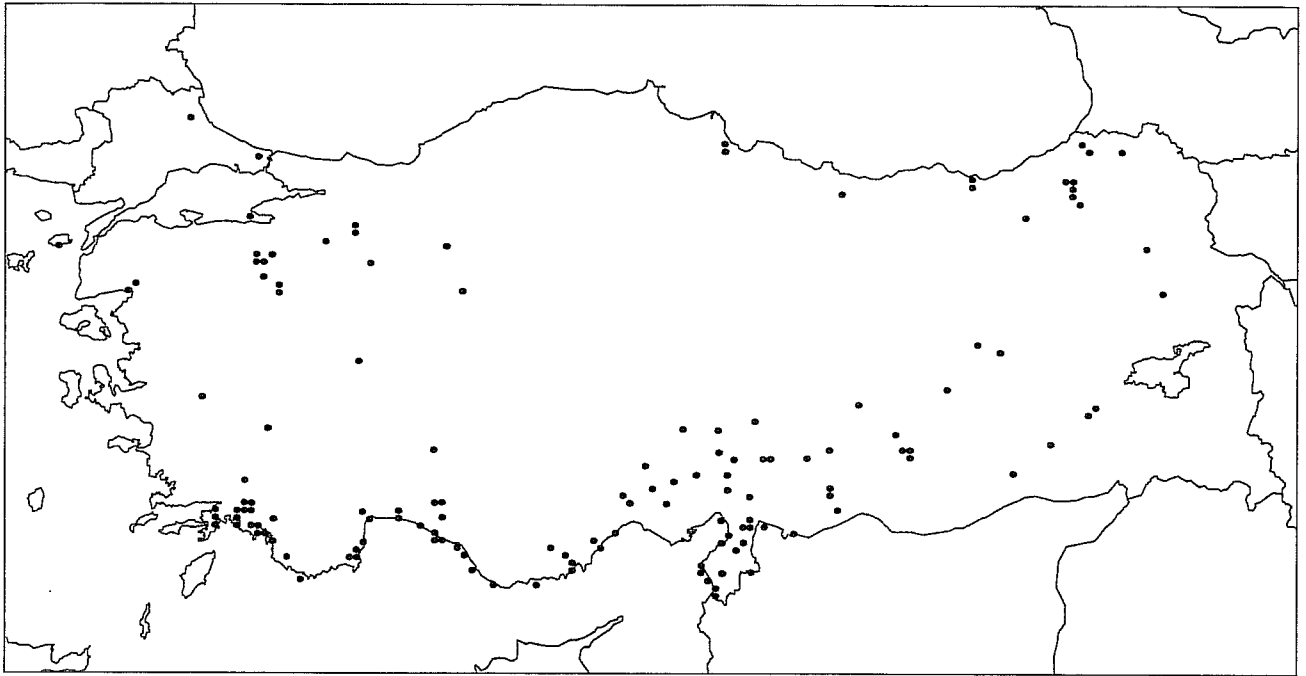


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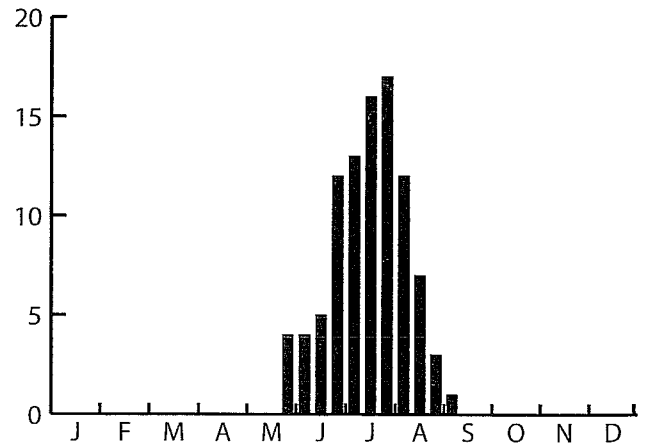
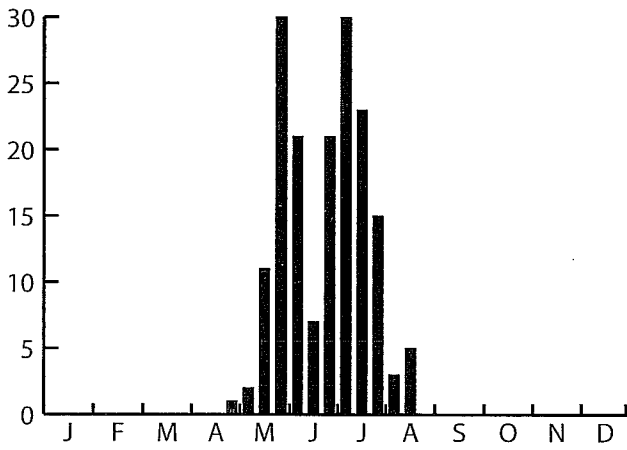


Diplacodes lefebvrii

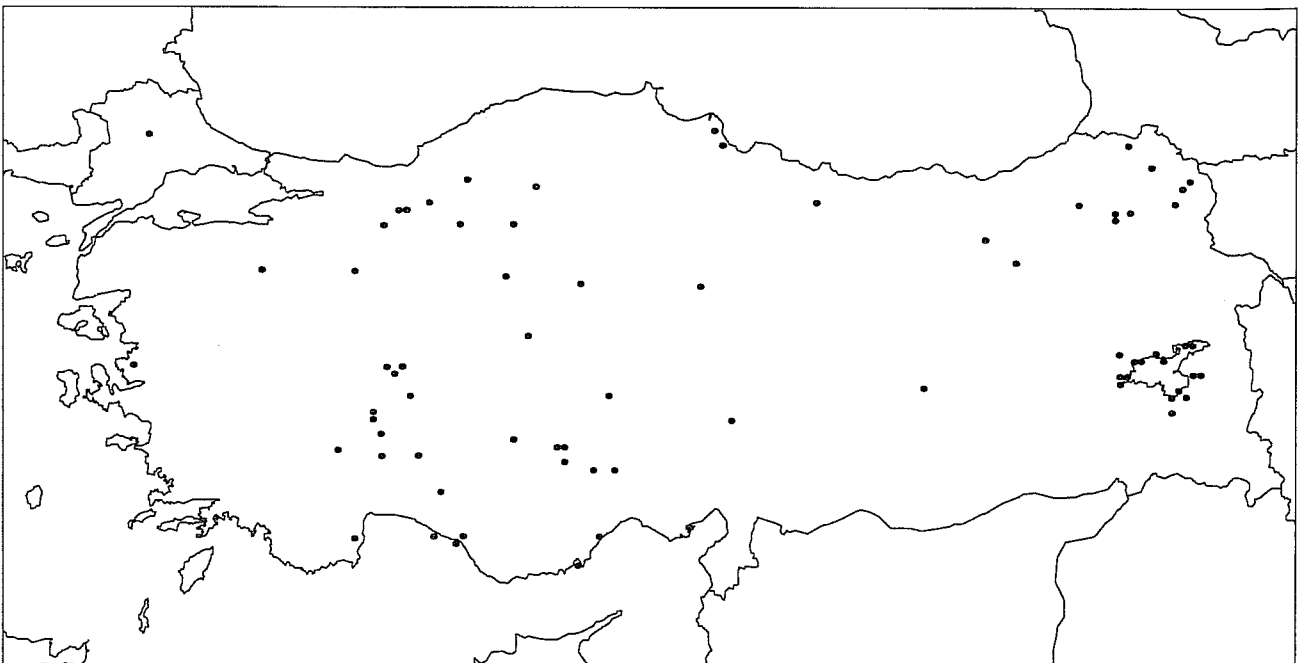


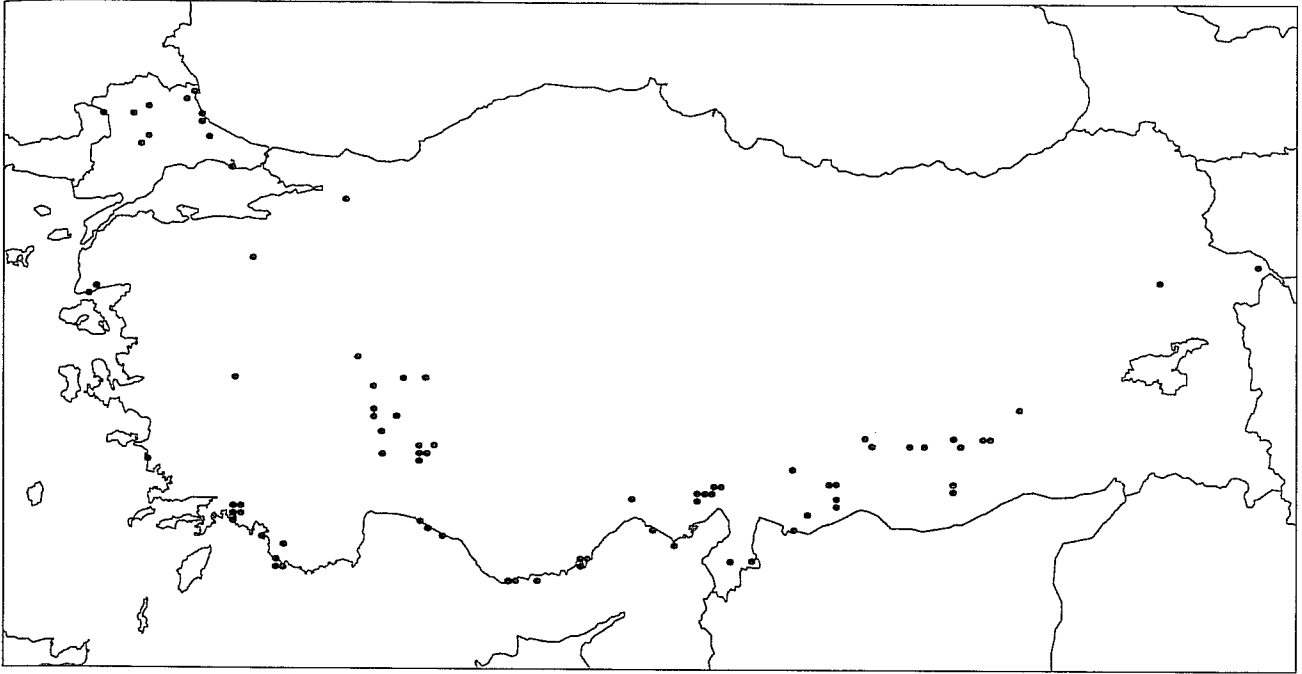


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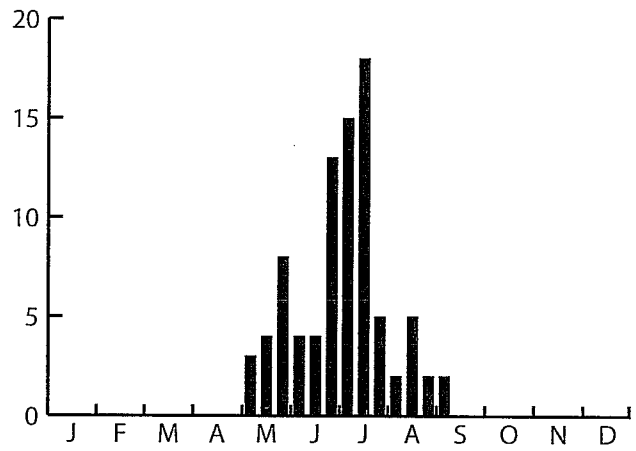
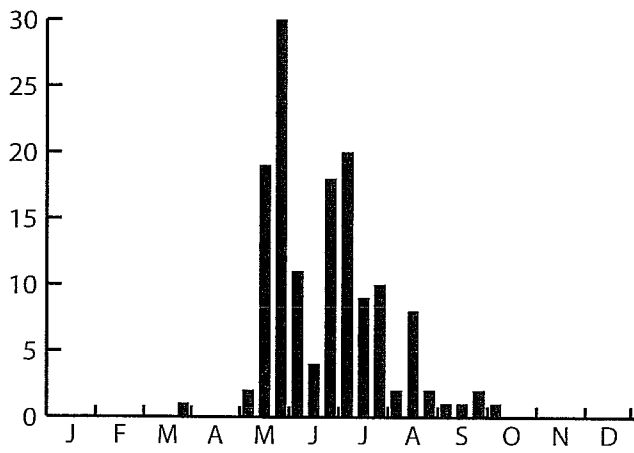


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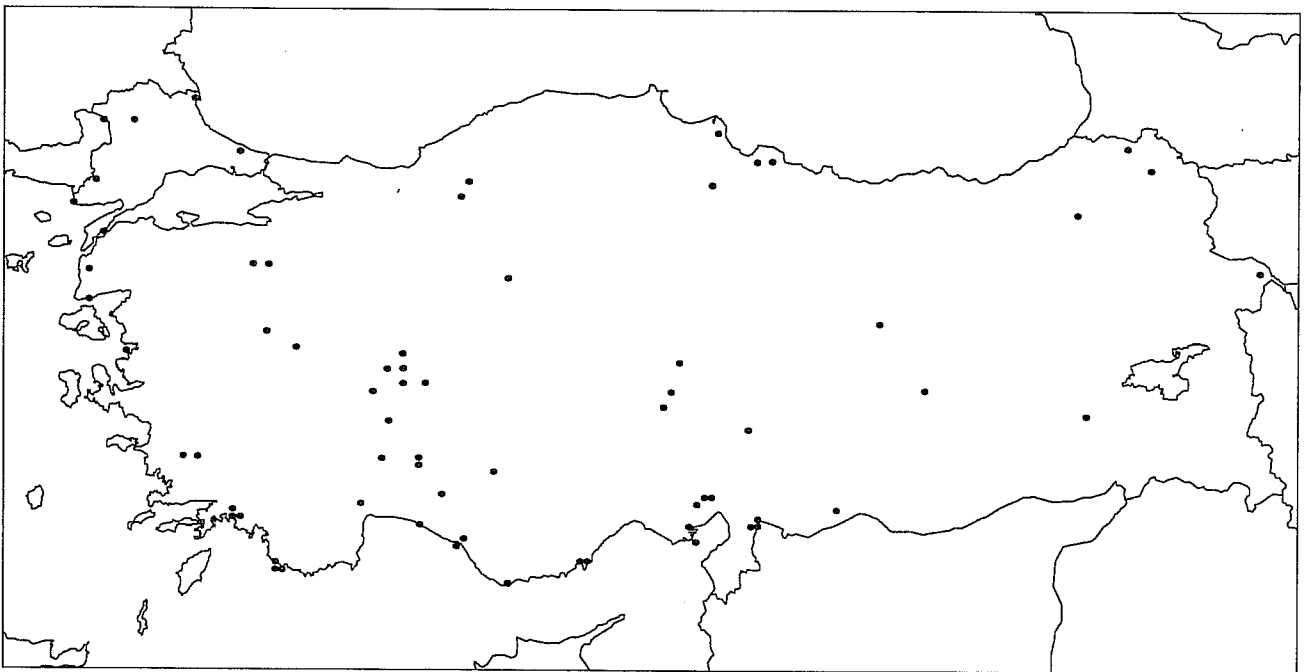


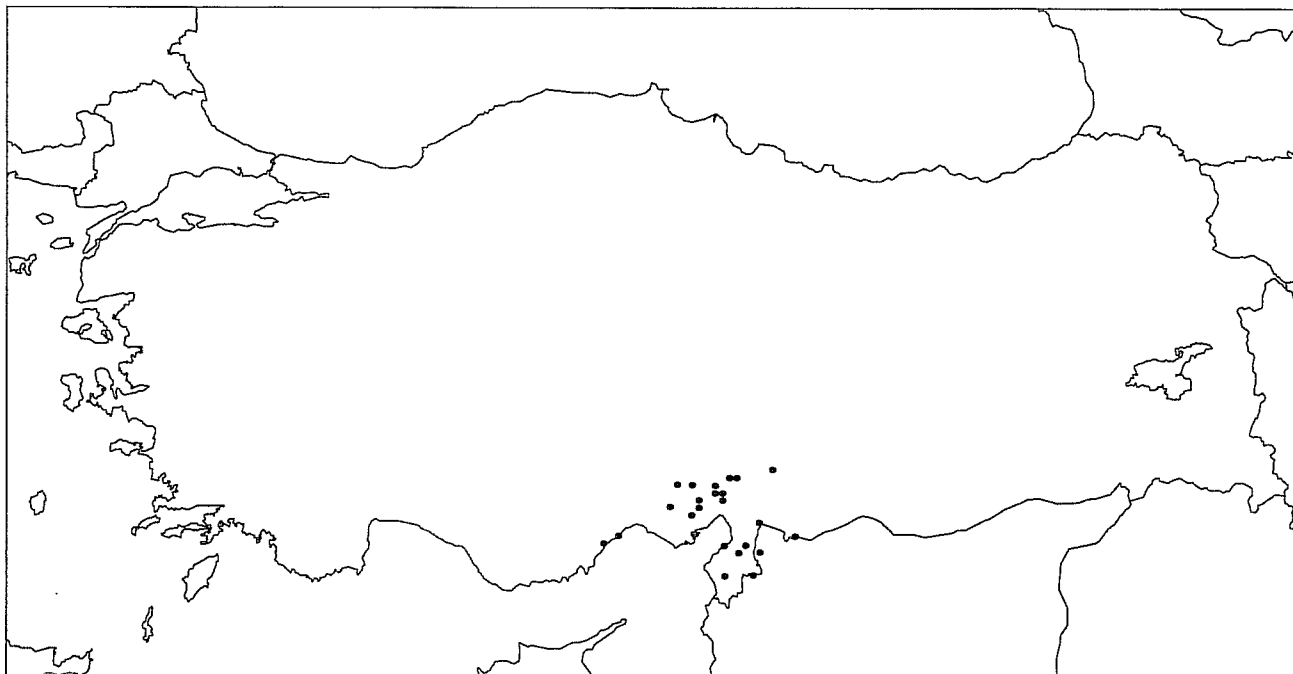


Erythromma lindenii ssp.

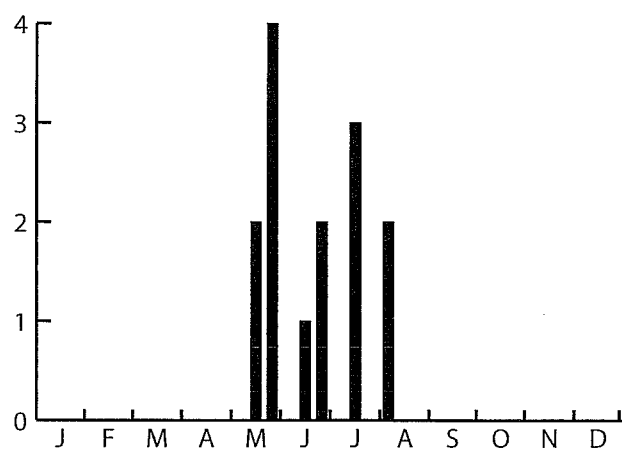
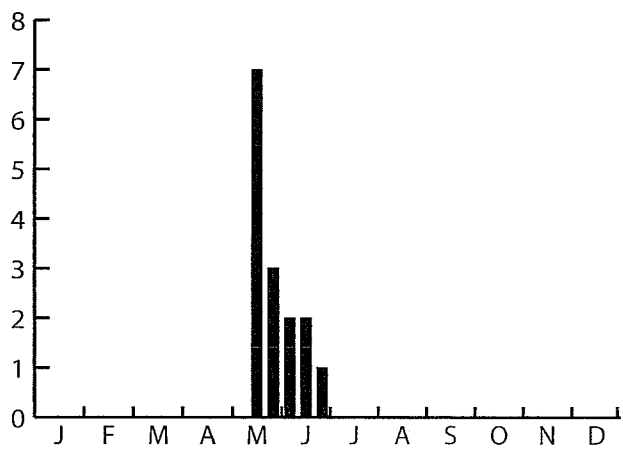


Erythromma viridulum

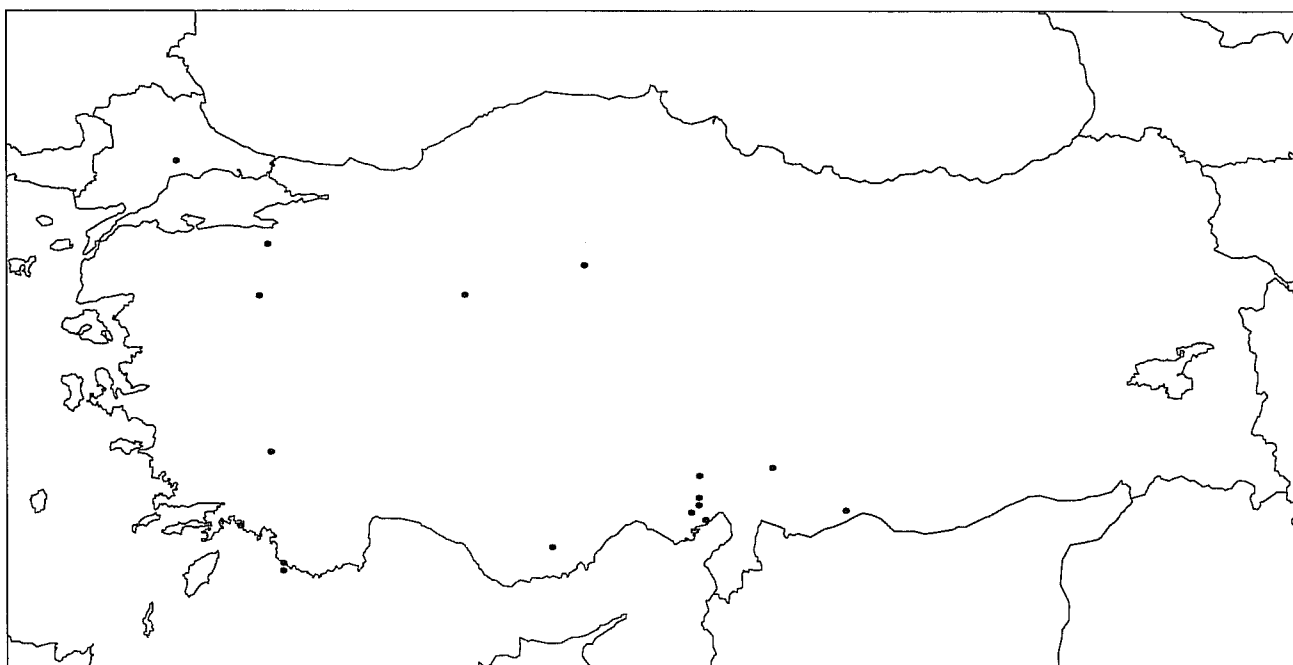


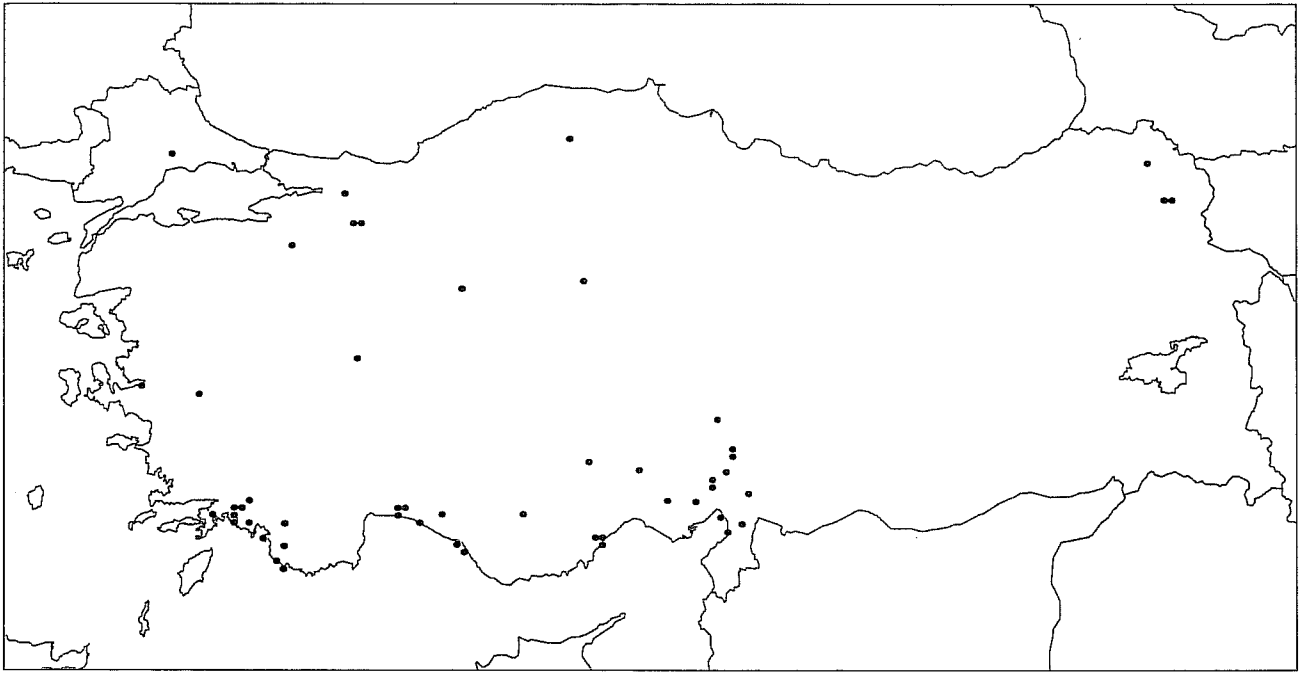


Gomphus davidi

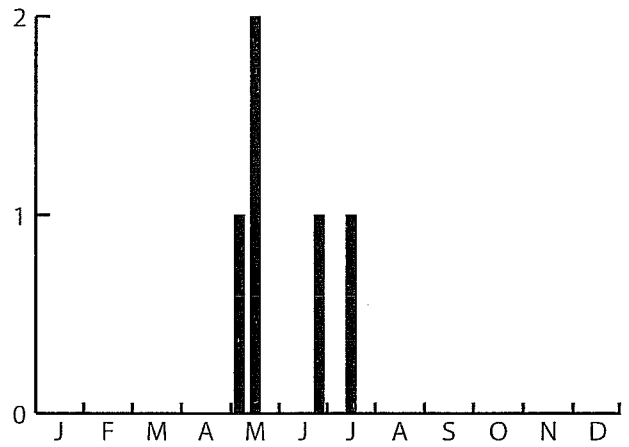
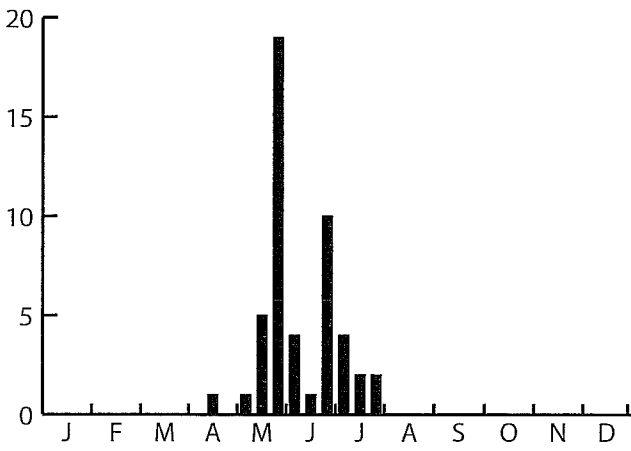


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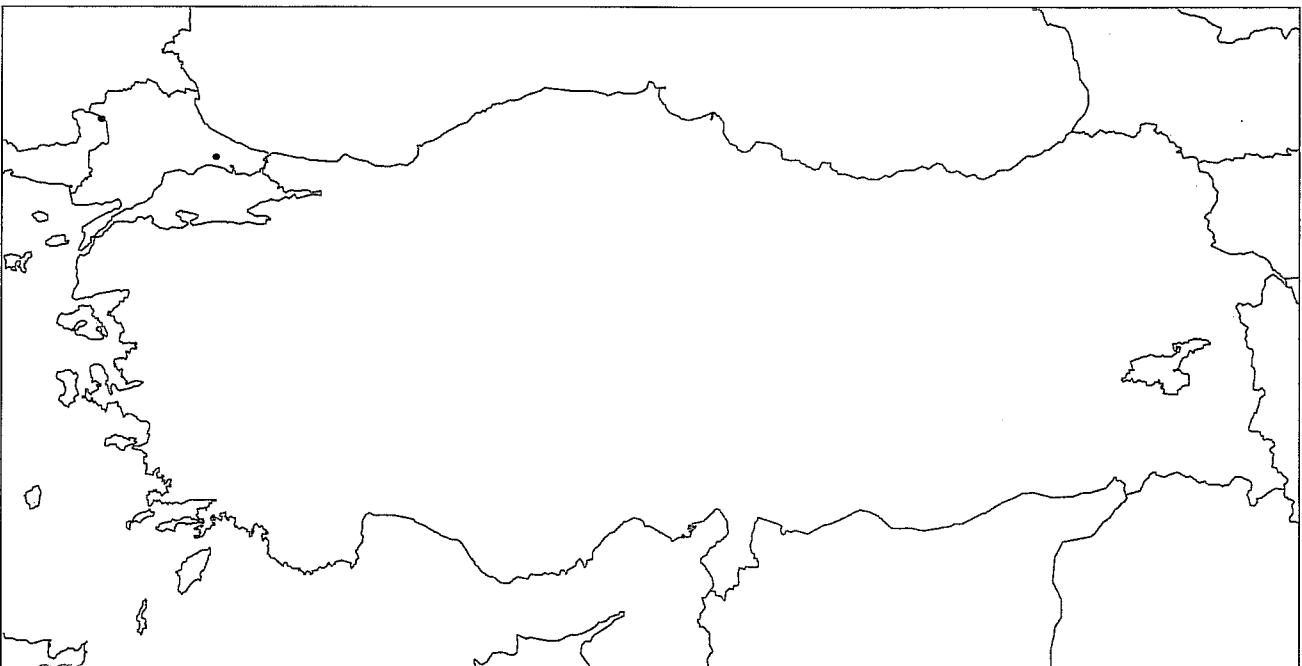


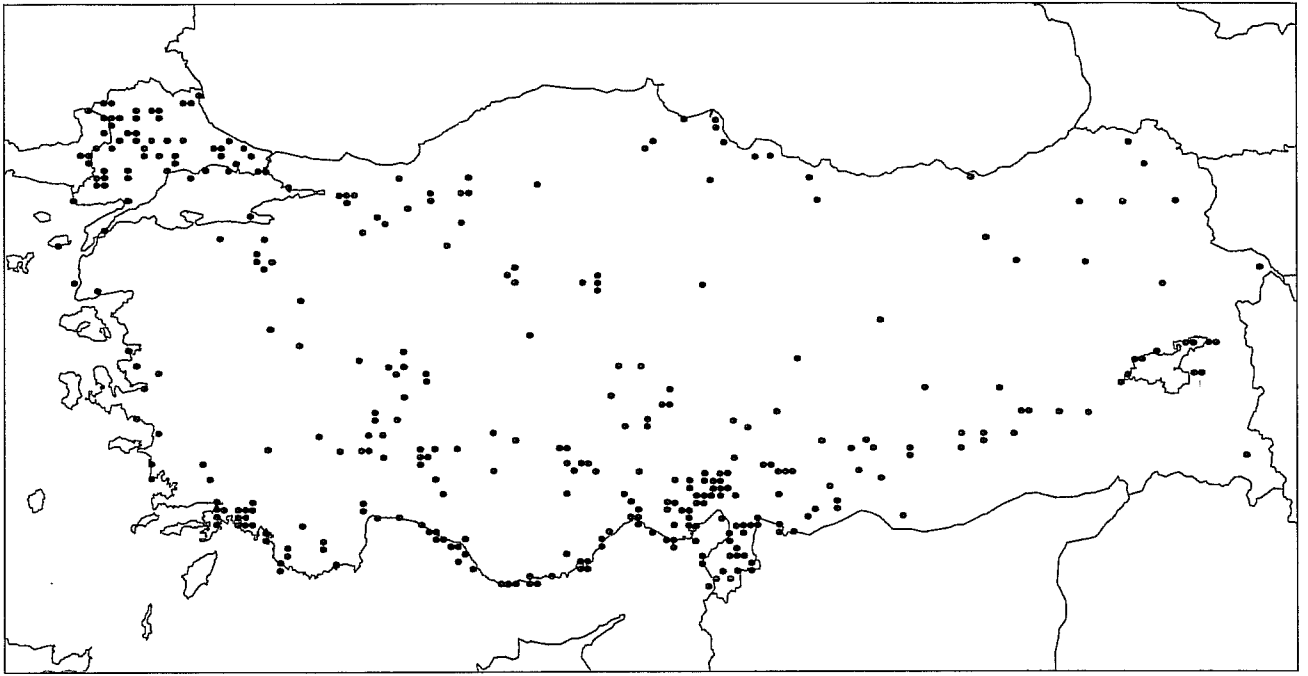


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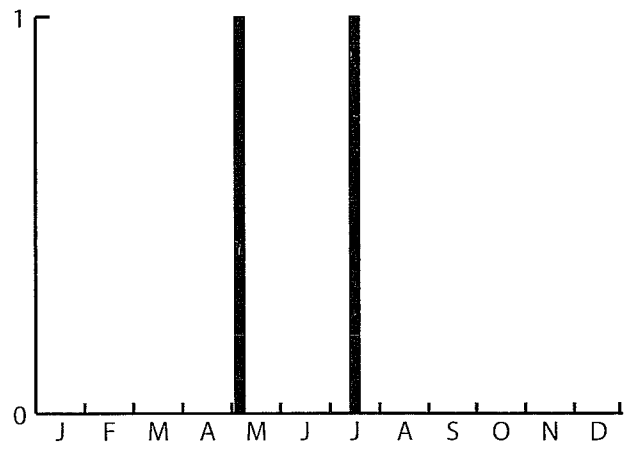
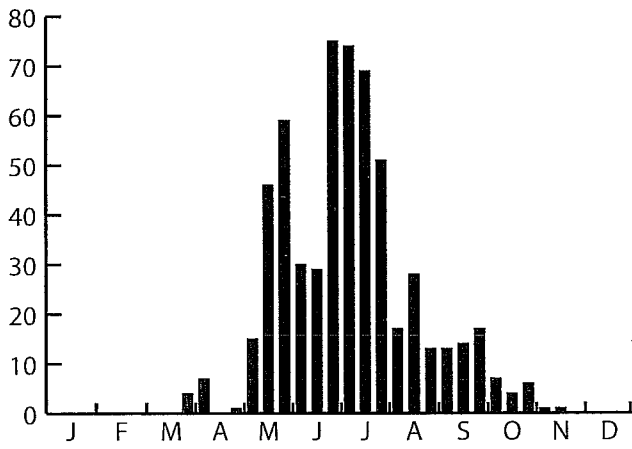


Gomphus vulgatissimus





Ischnura elegans ssp.

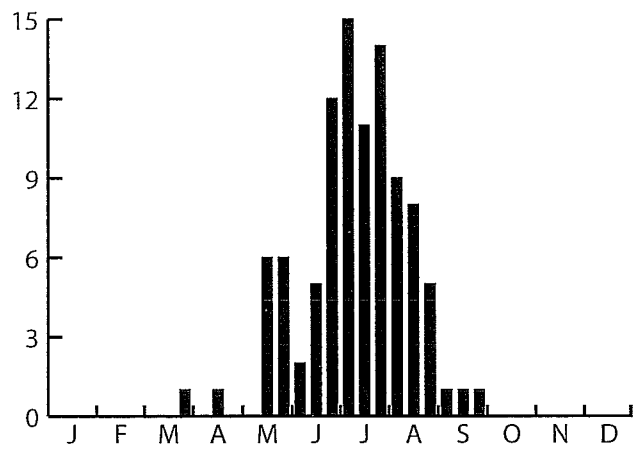
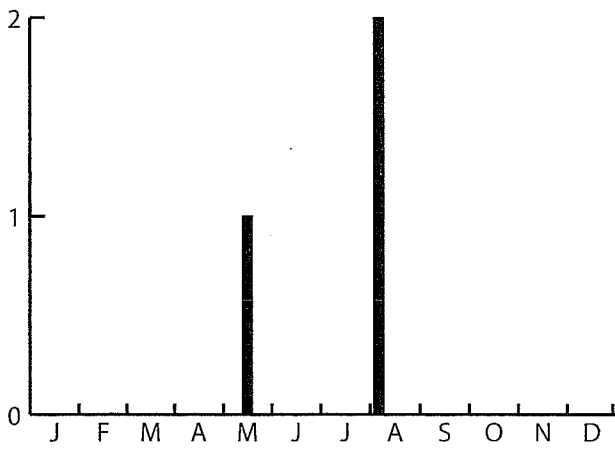


Ischnura fontaineae



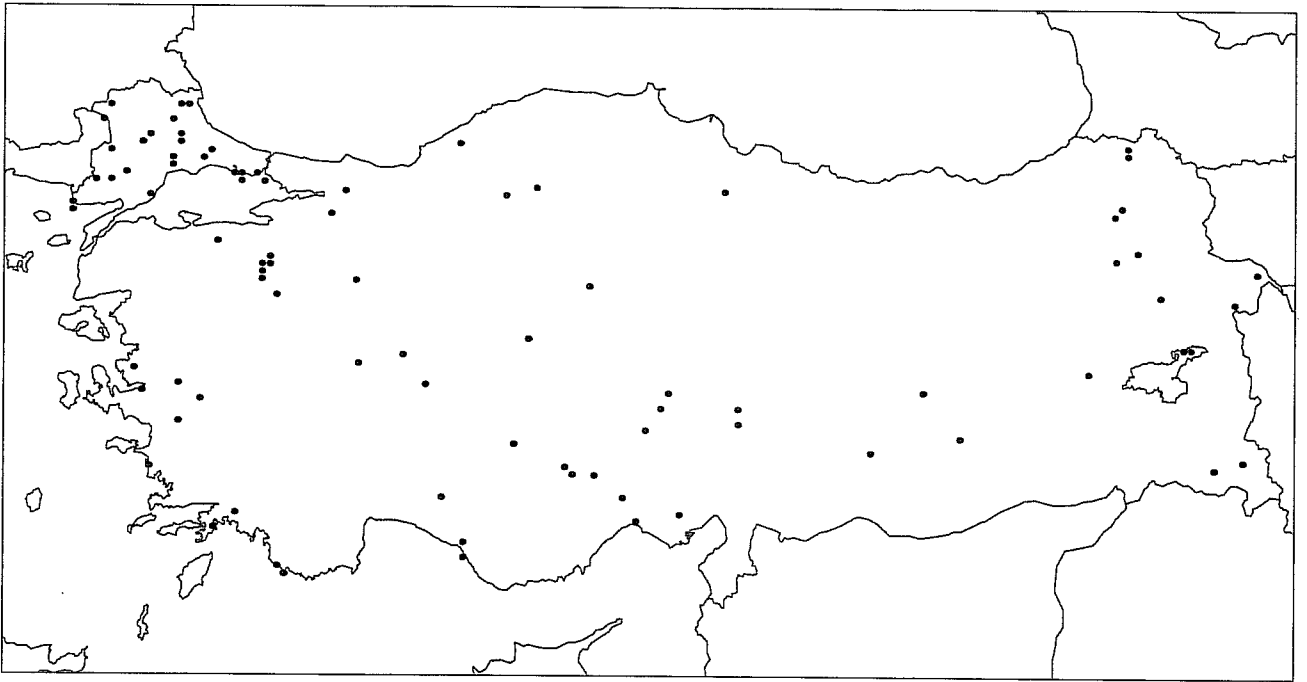


Ischnura intermedia

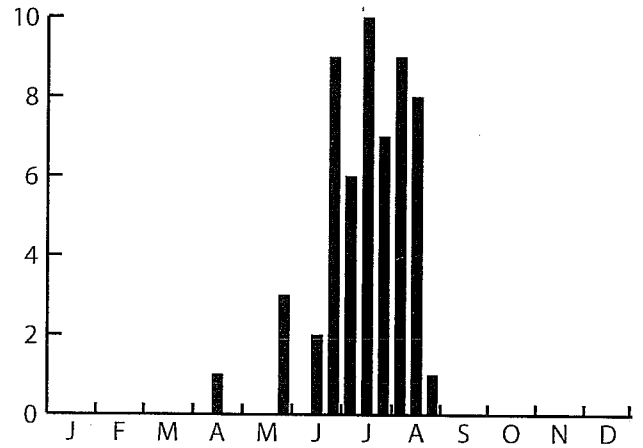
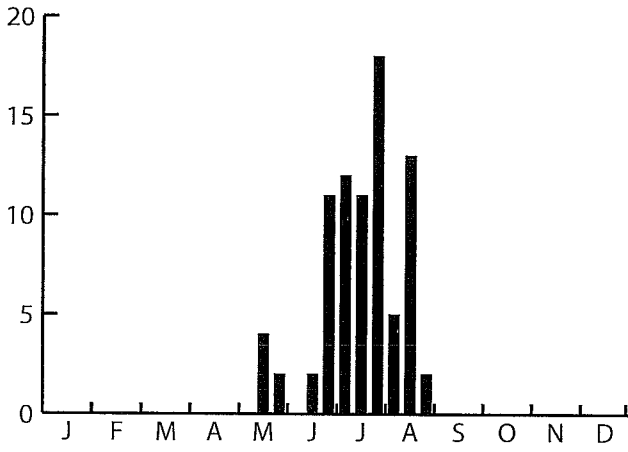


Ischnura pumilio

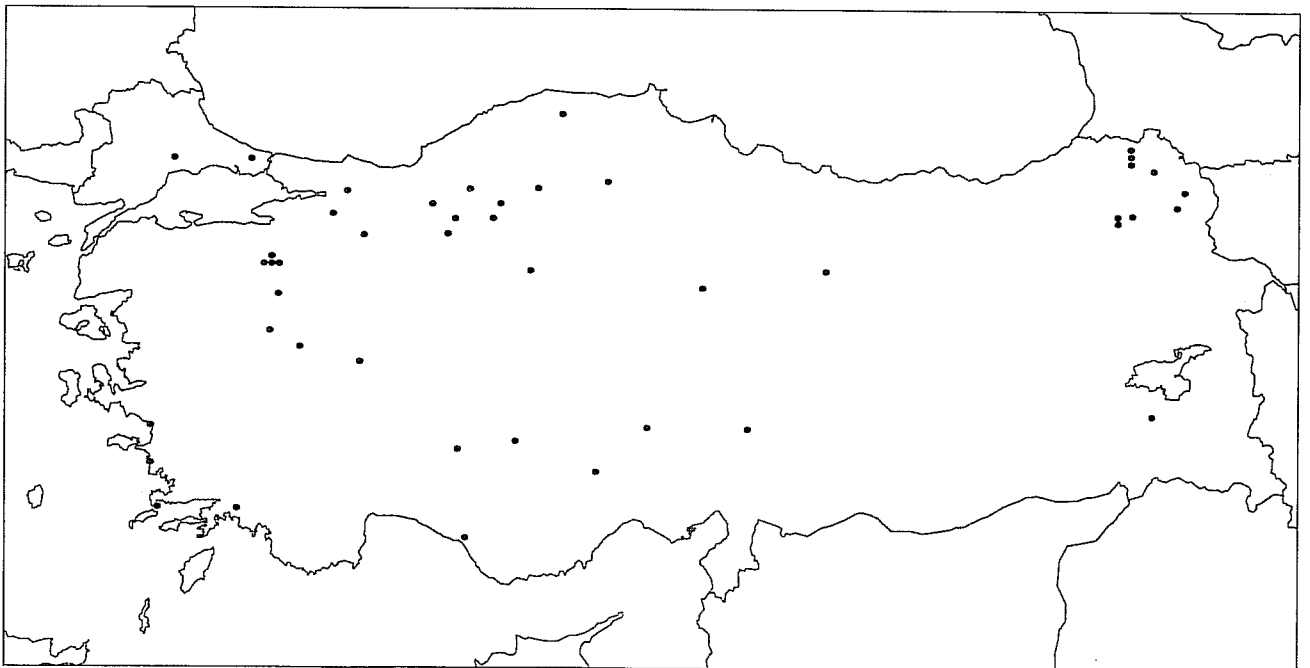




Lestes barbarus

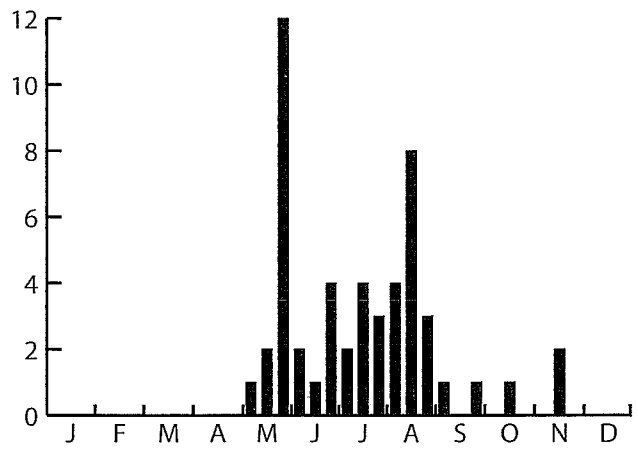
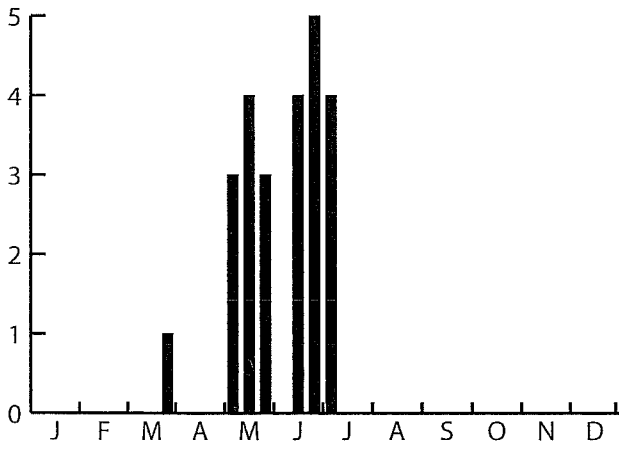


Lestes dryas

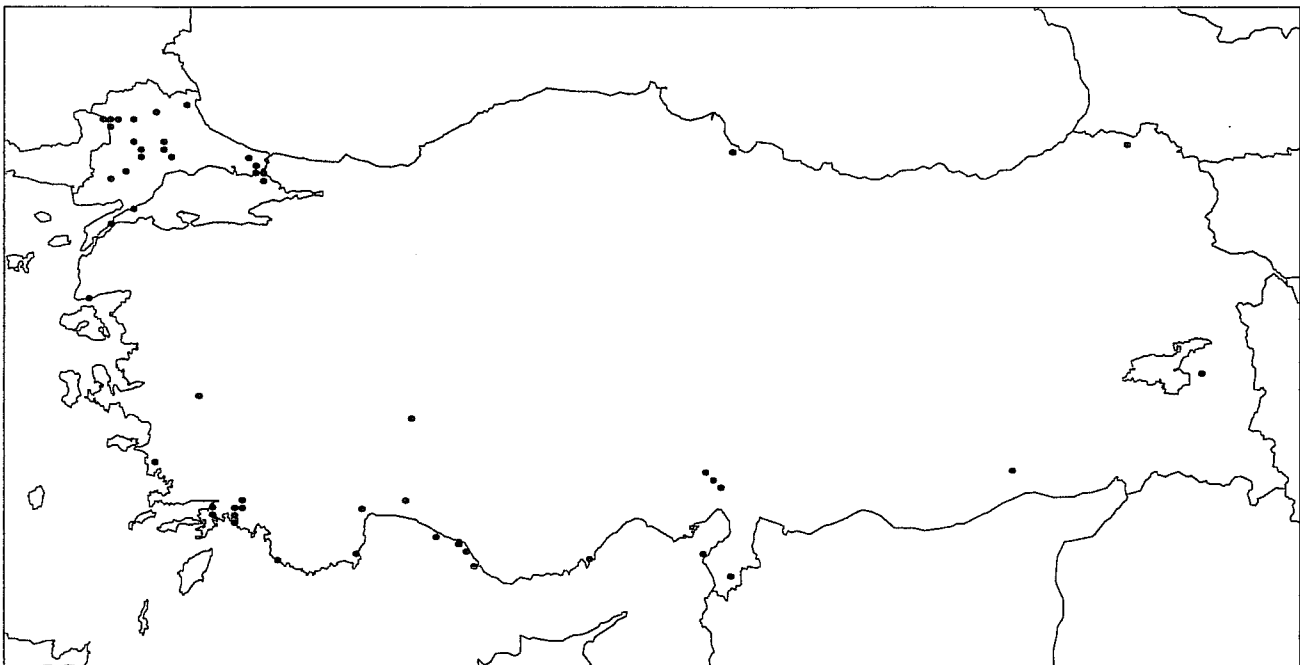


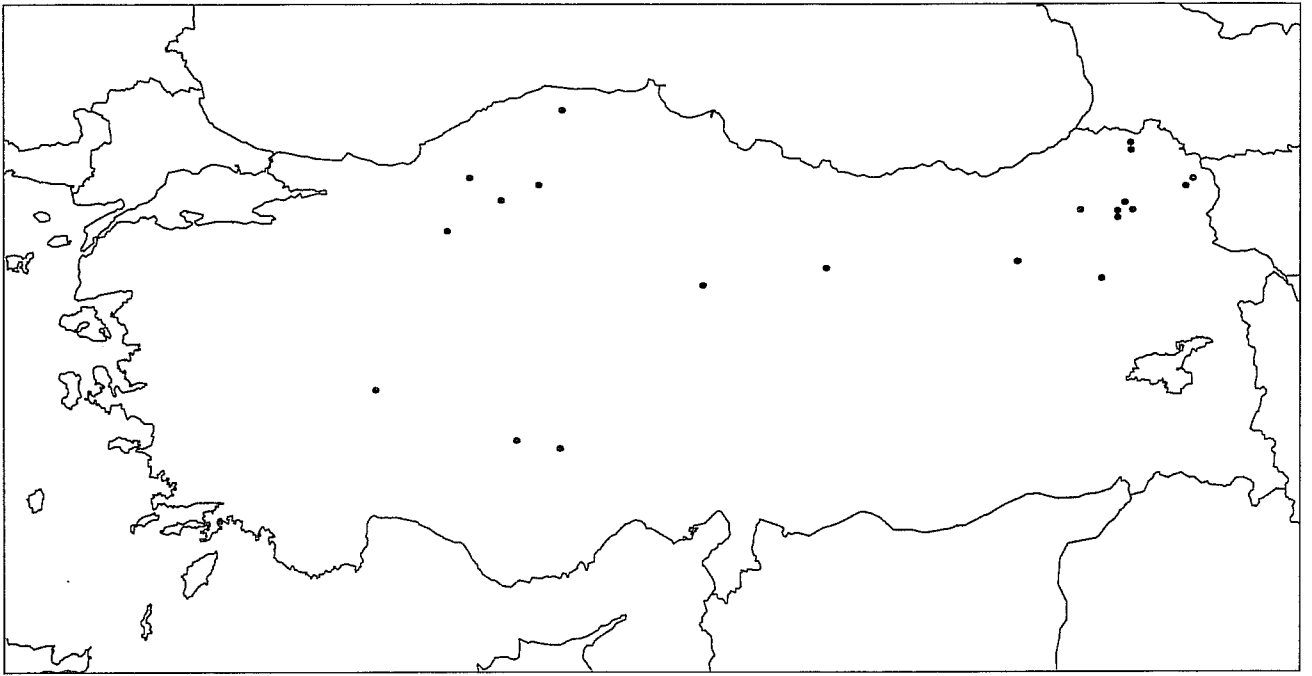


Lestes macrostigma

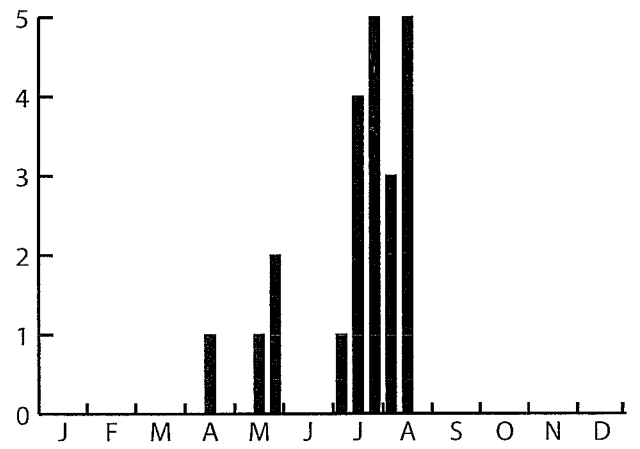
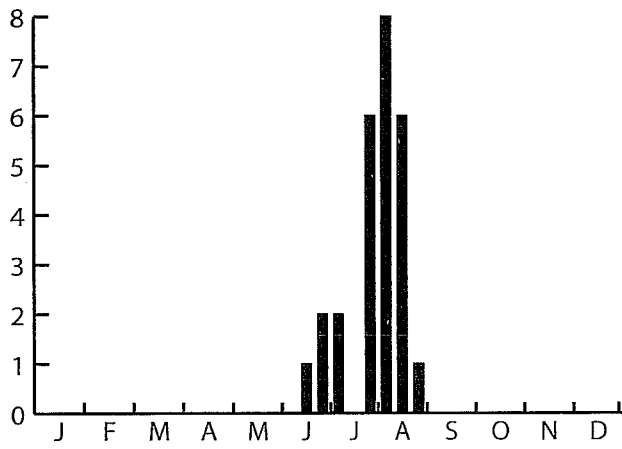


Lestes parvidens

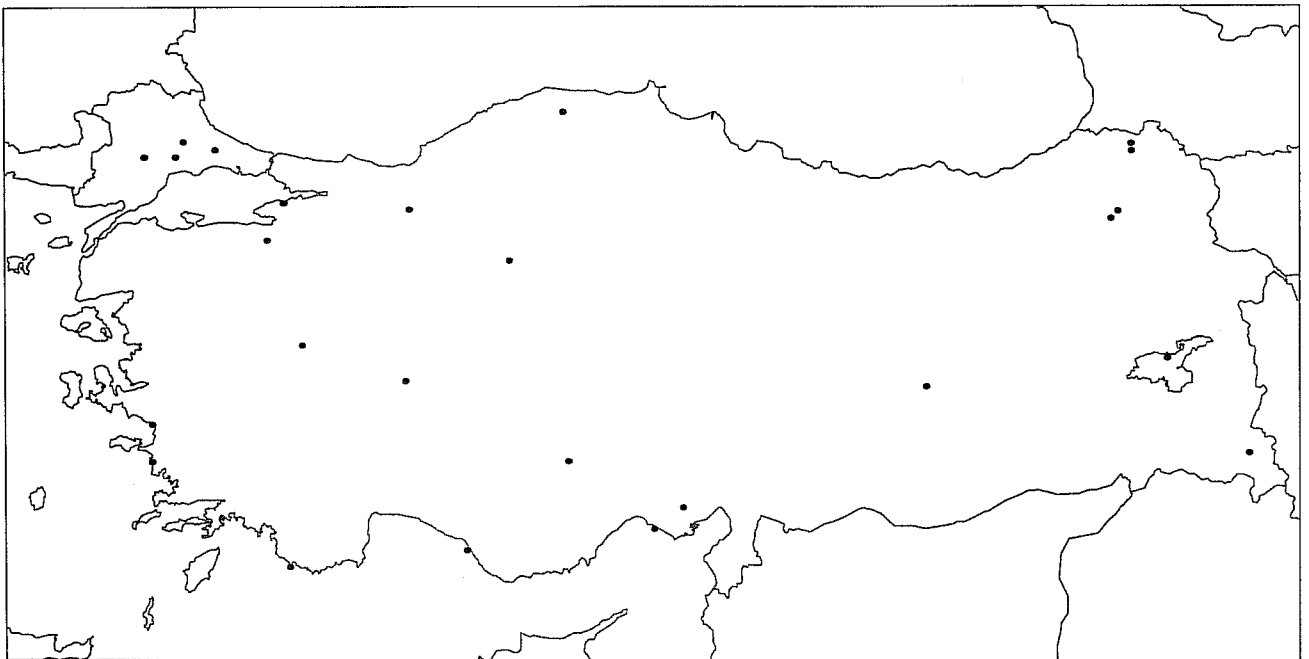


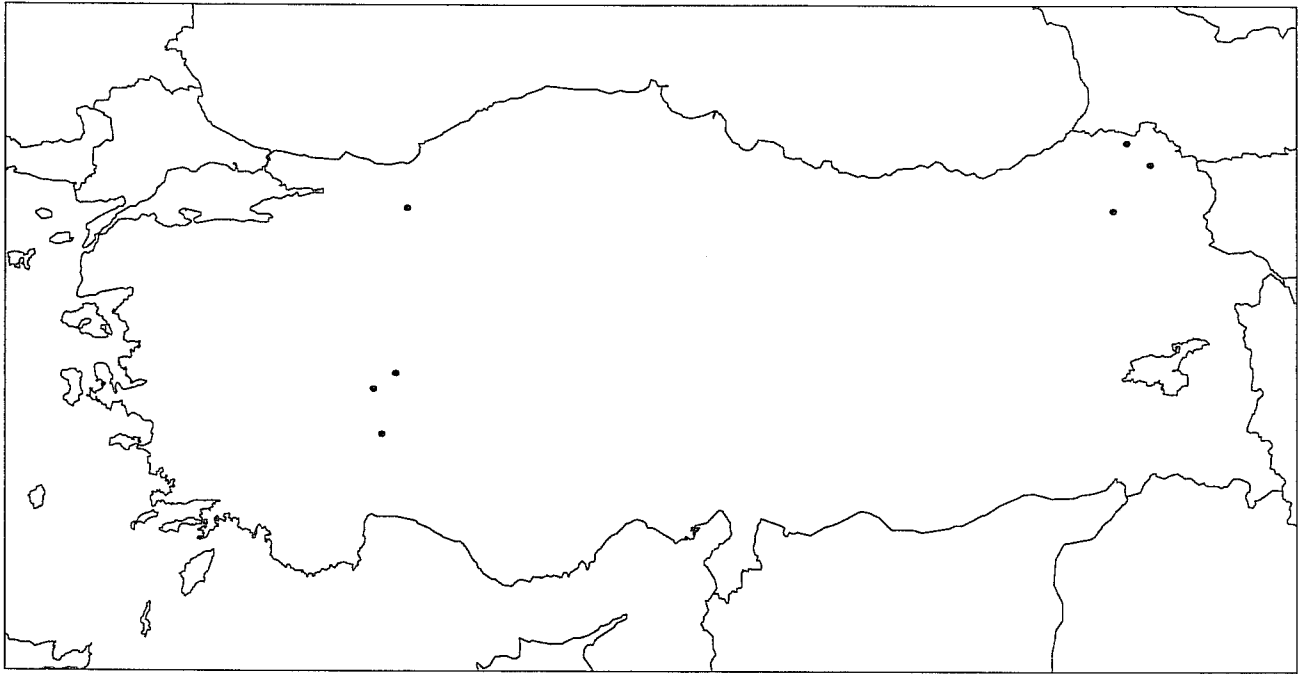


Lestes sponsa

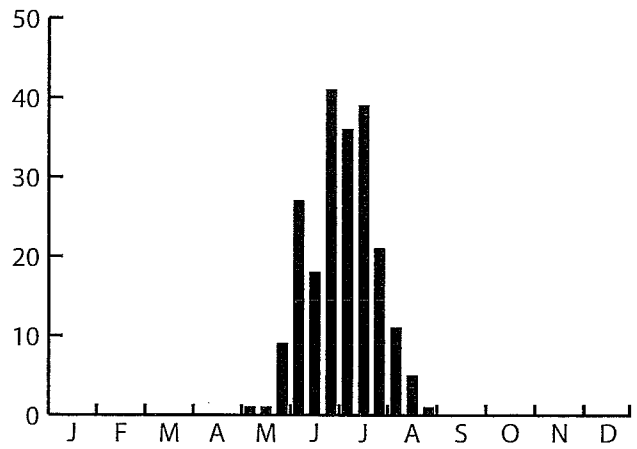
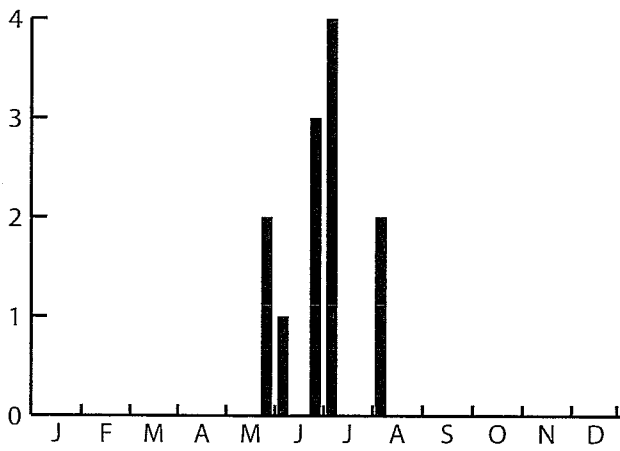


Lestes virens

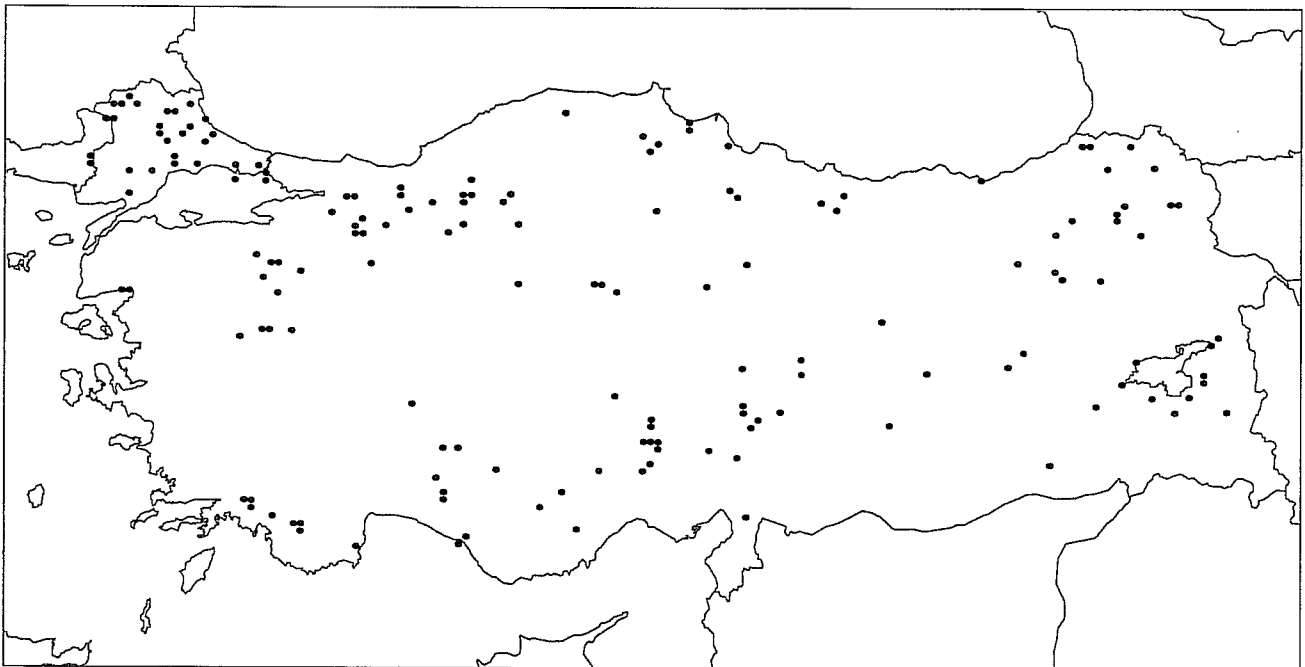


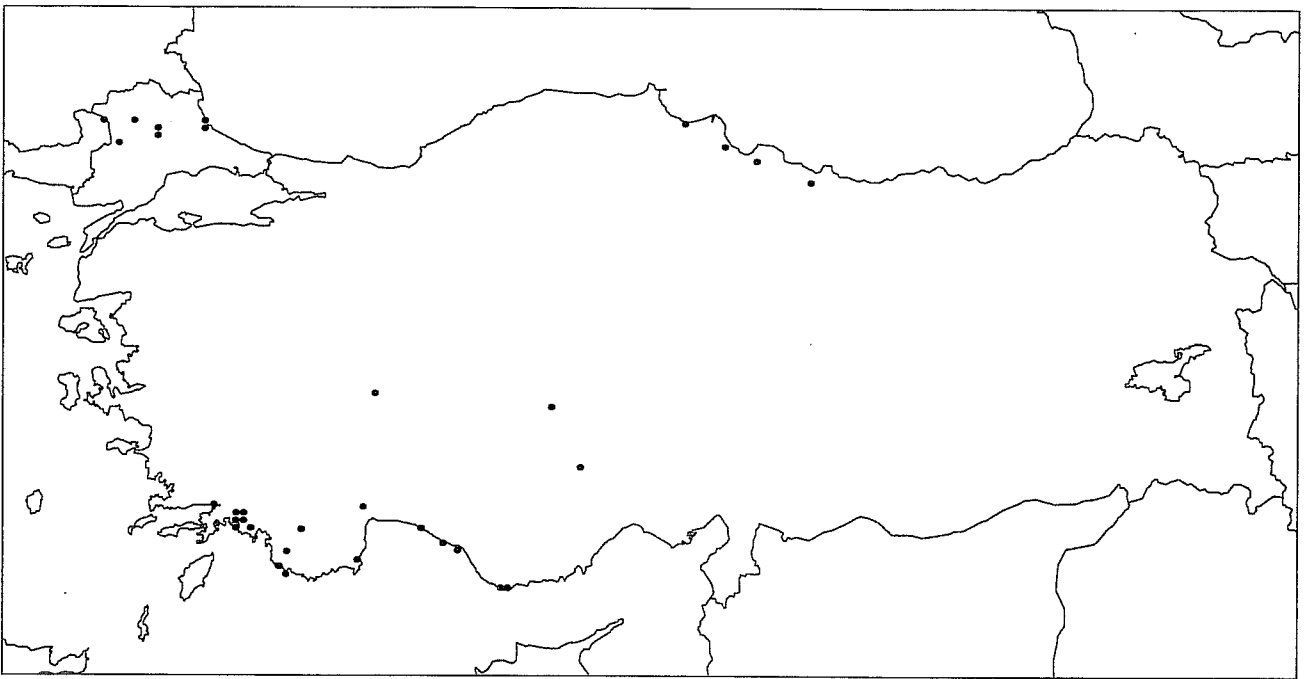


Leucorrhinia pectoralis

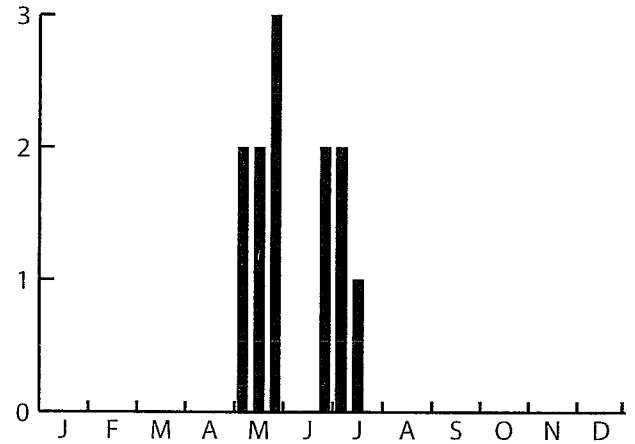
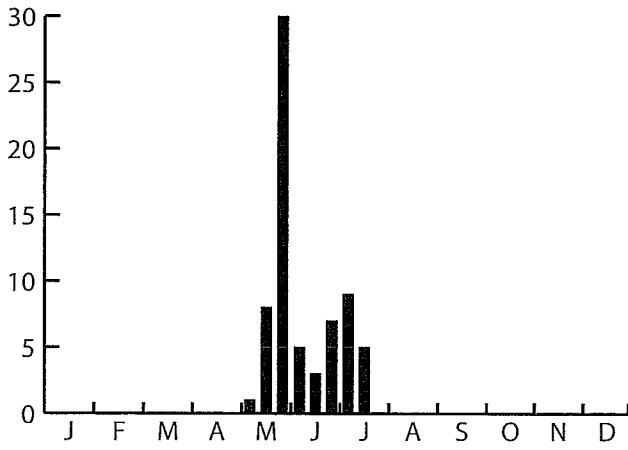


Libellula depressa

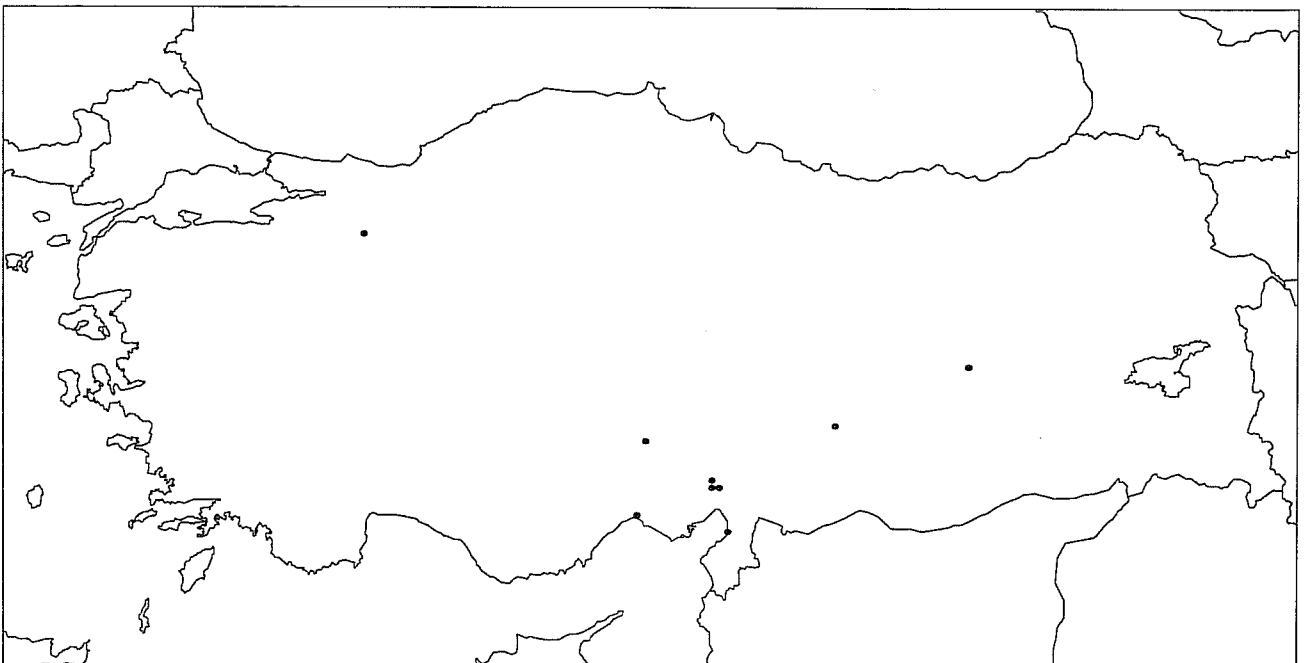


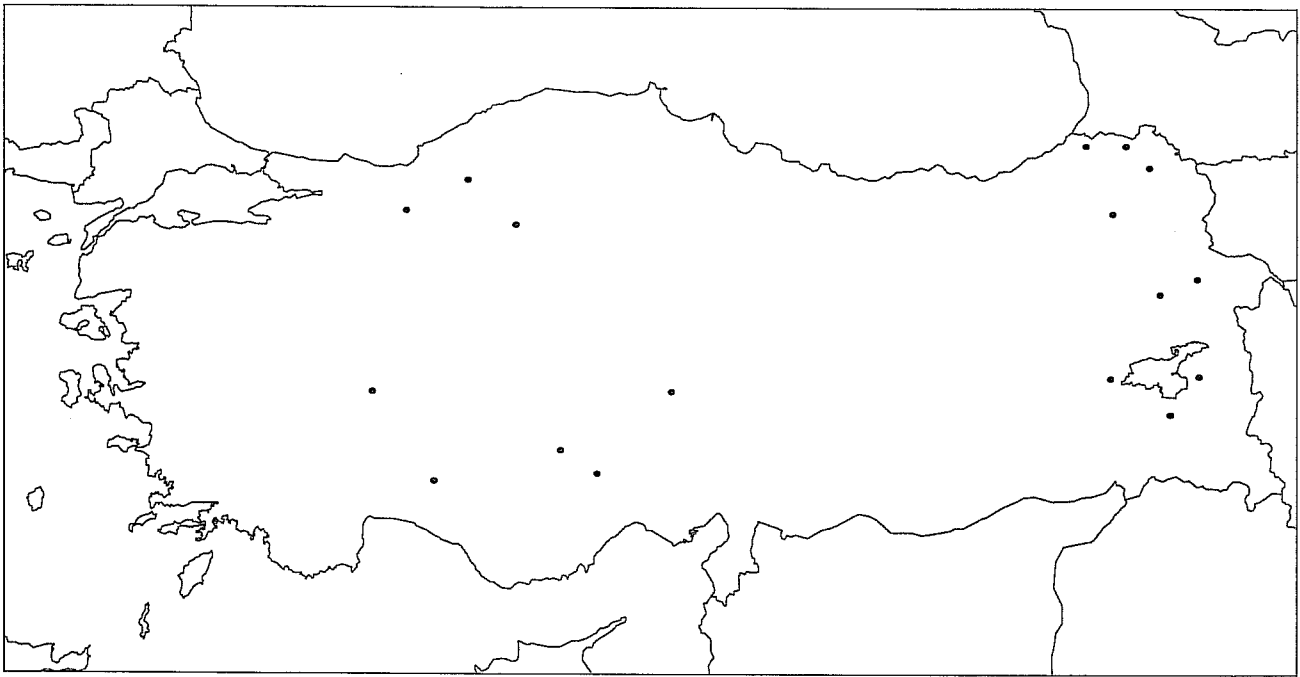


Libellula fulva

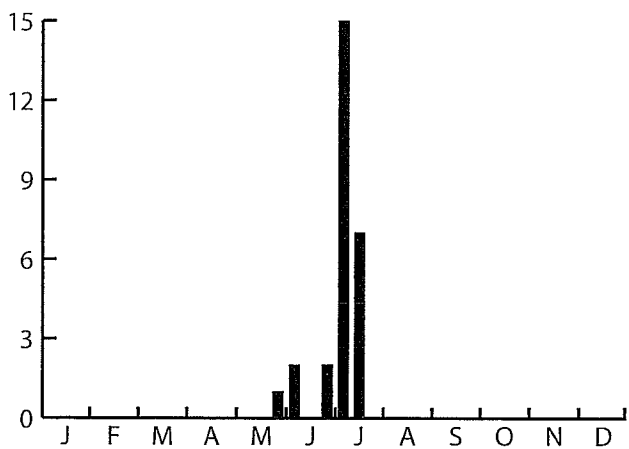
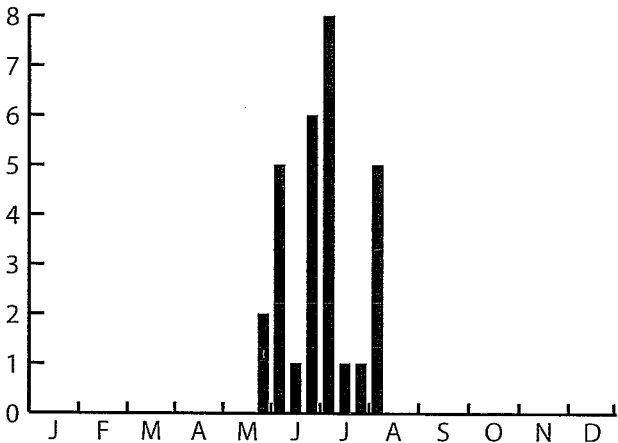


Libellula pontica

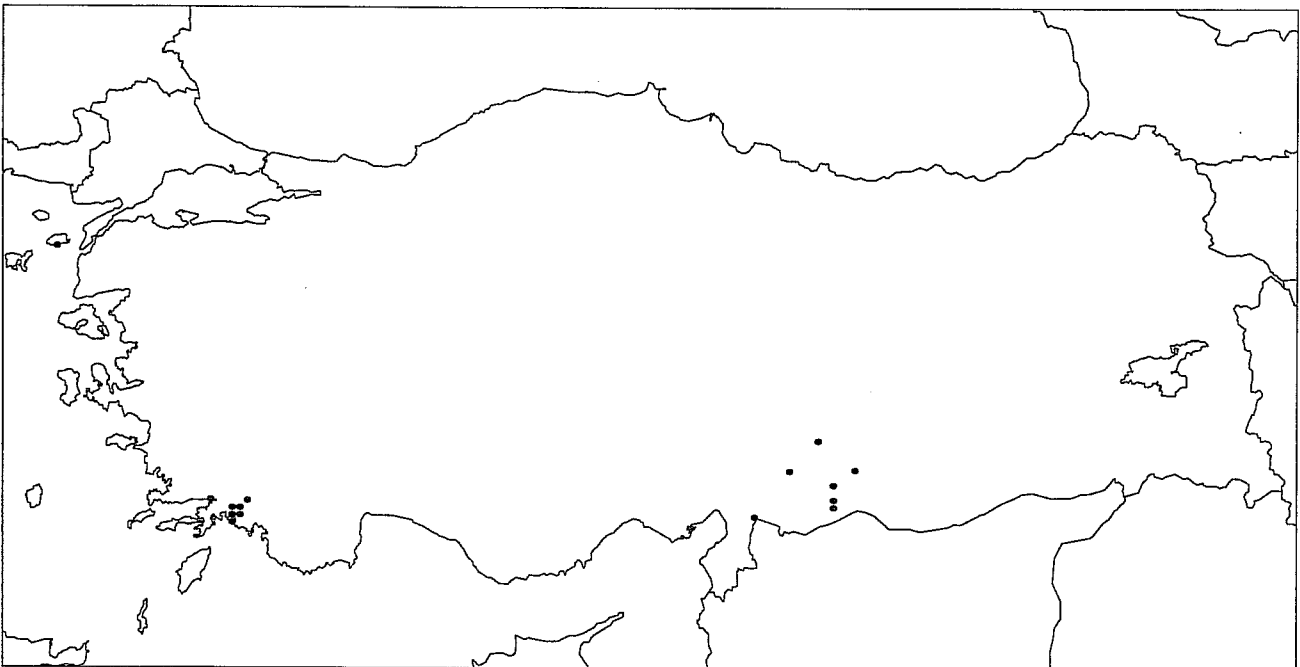


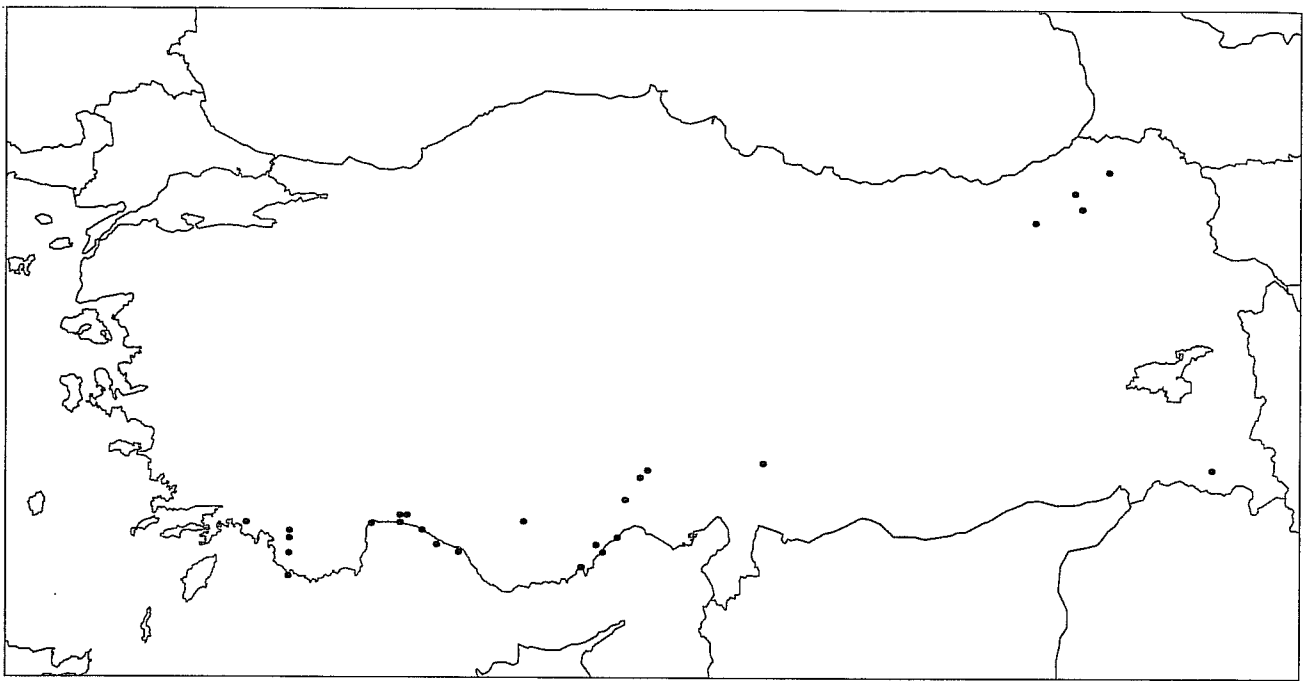


Libellula quadrimaculata

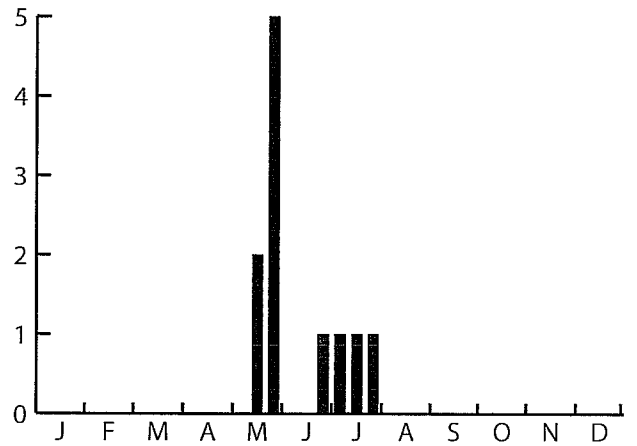
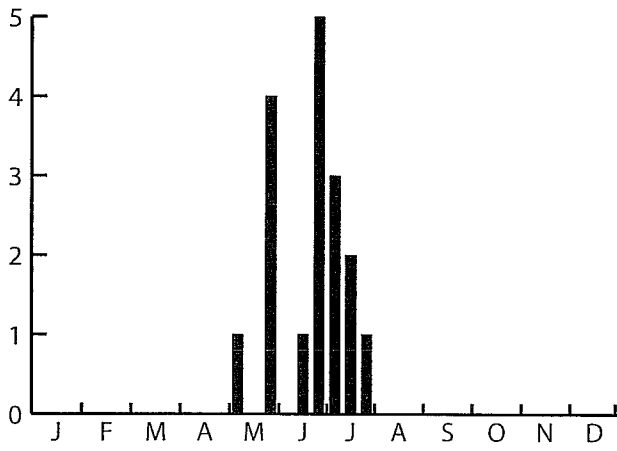


Lindenia tetraphylla

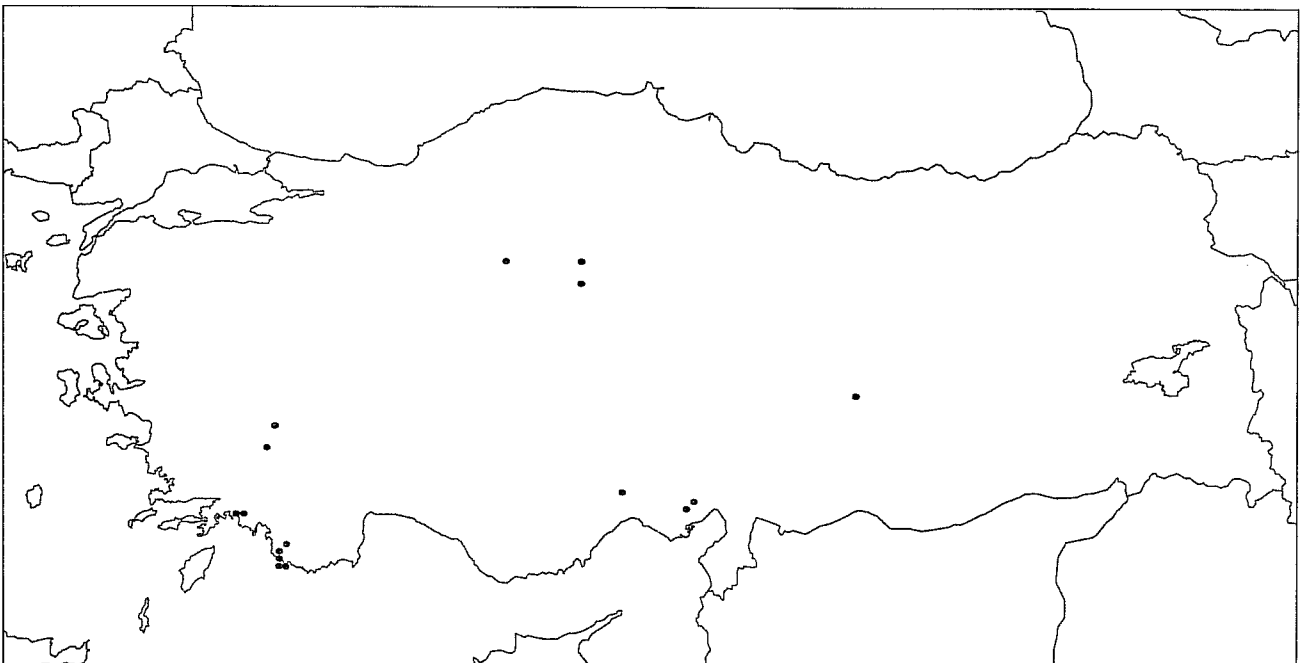


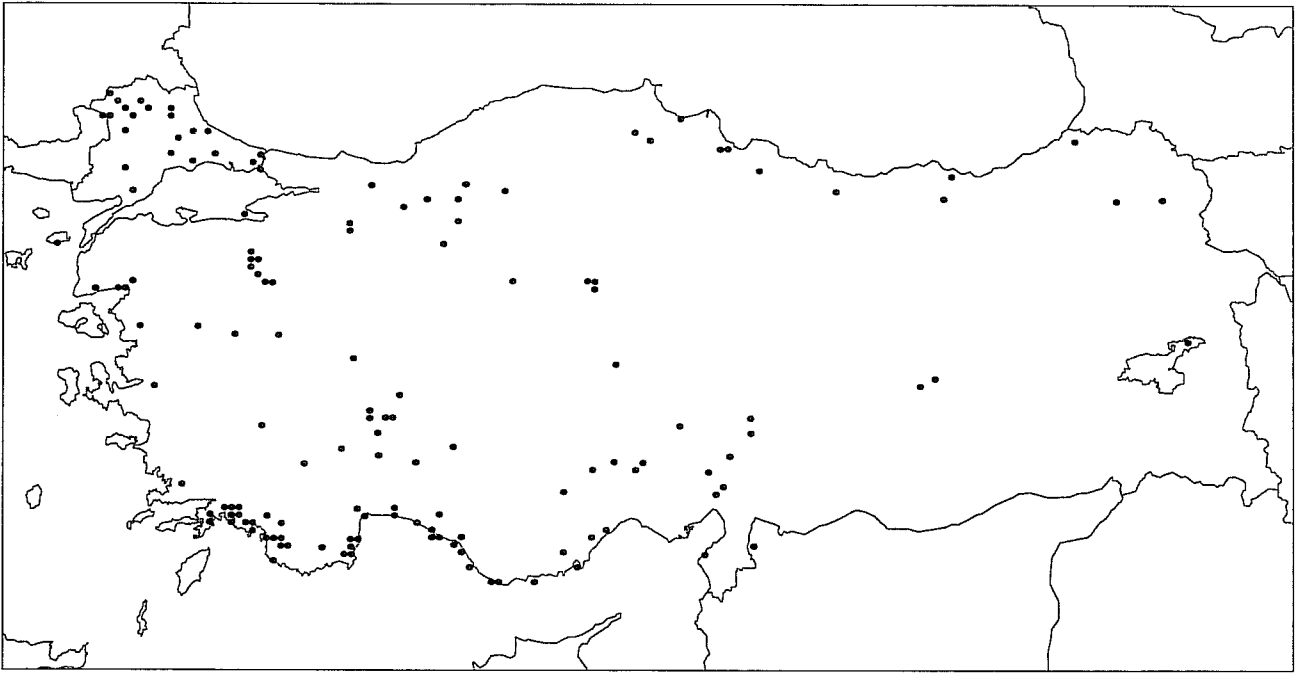


Onychogomphus assimilis

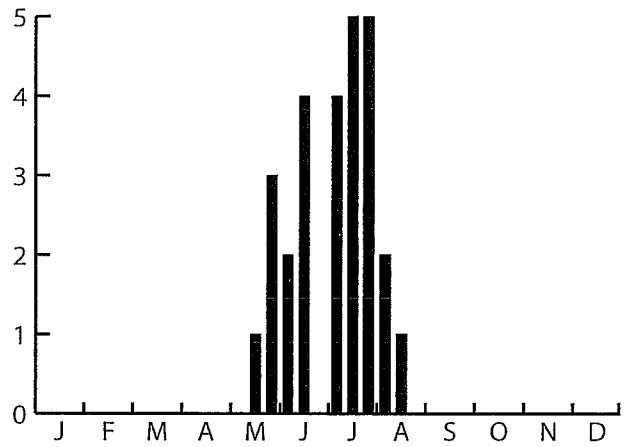
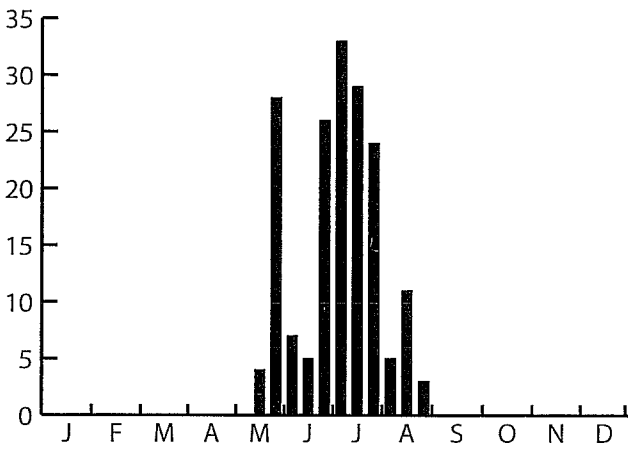


Onychogomphus flexuosus

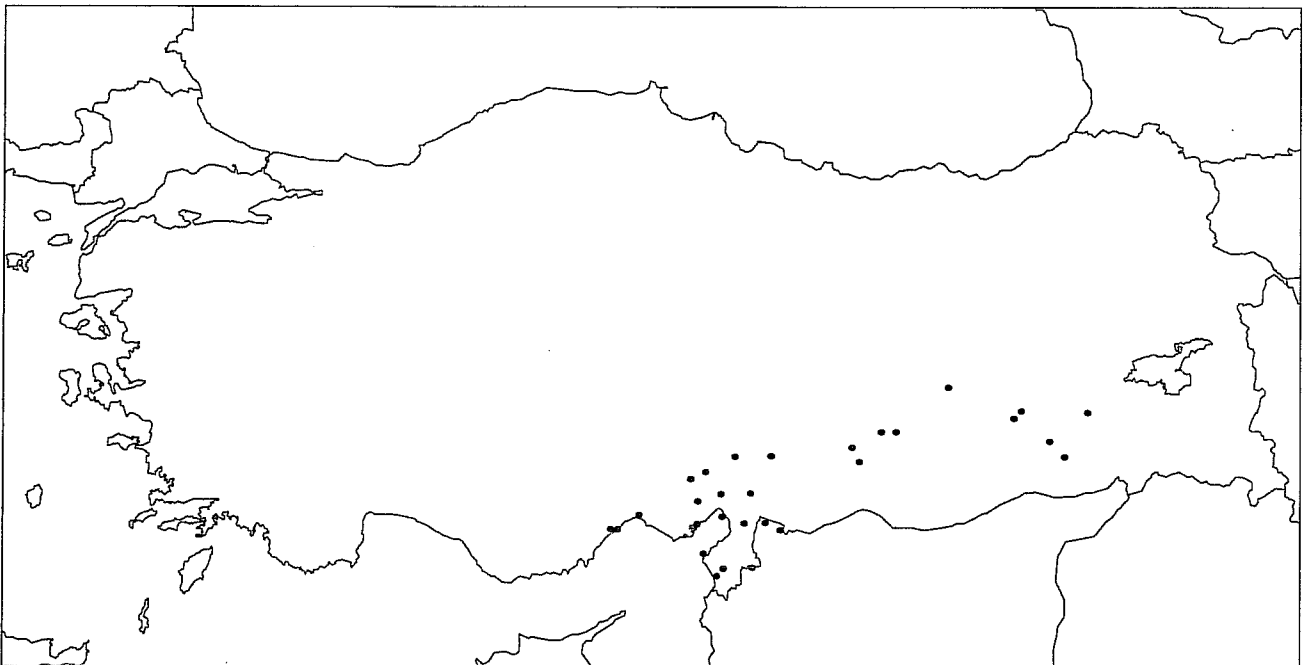


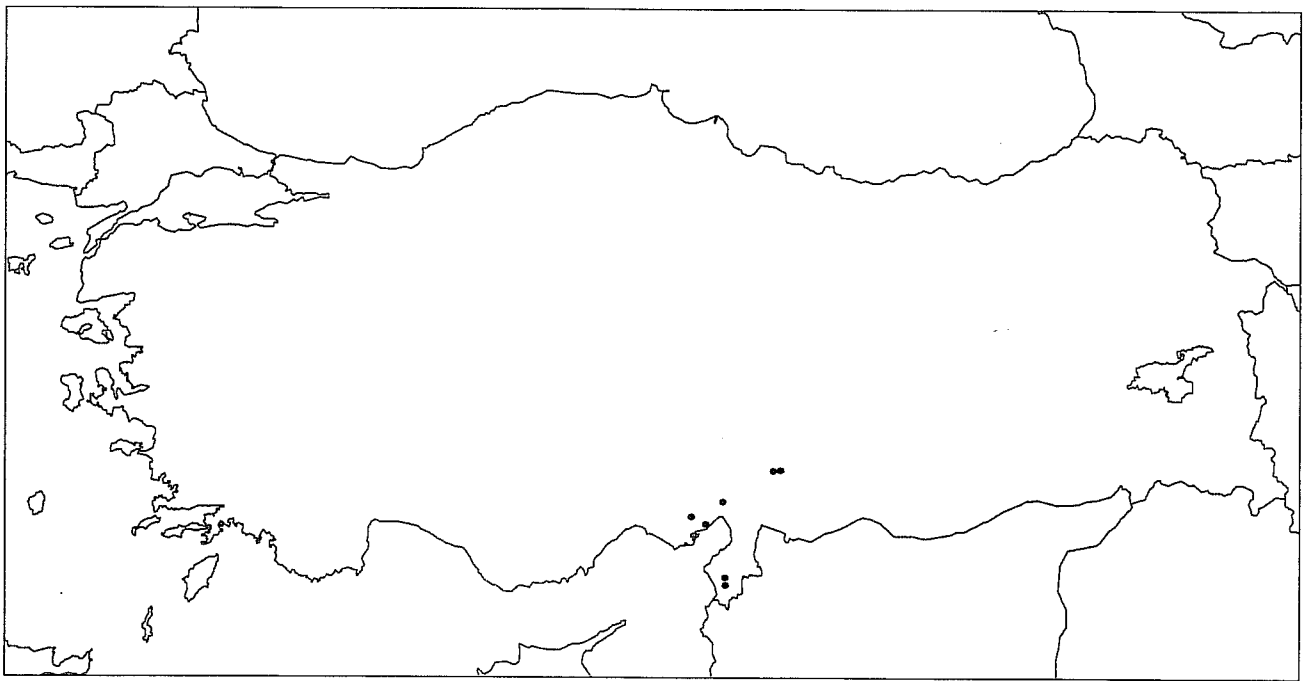


Onychogomphus forcipatus ssp.

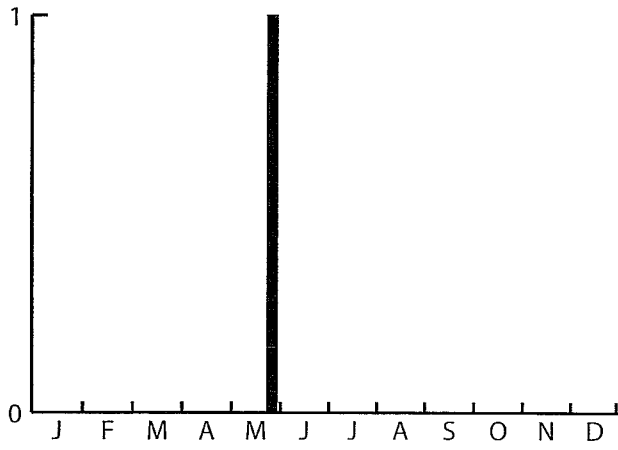


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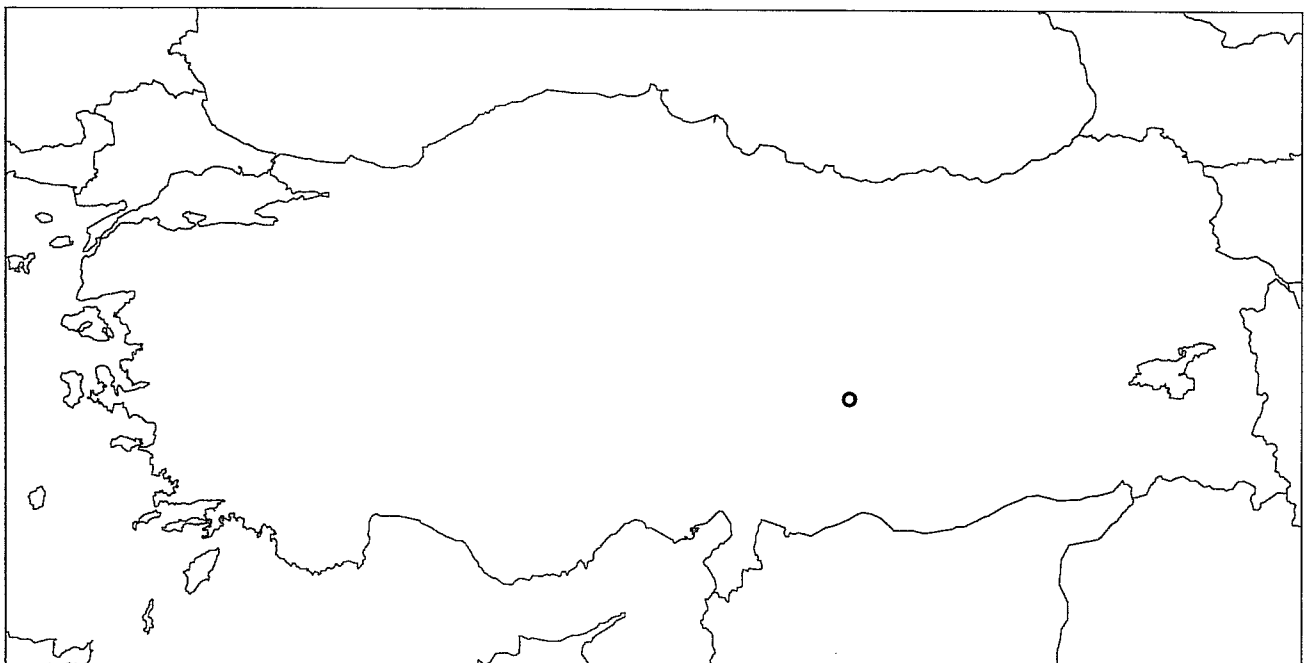


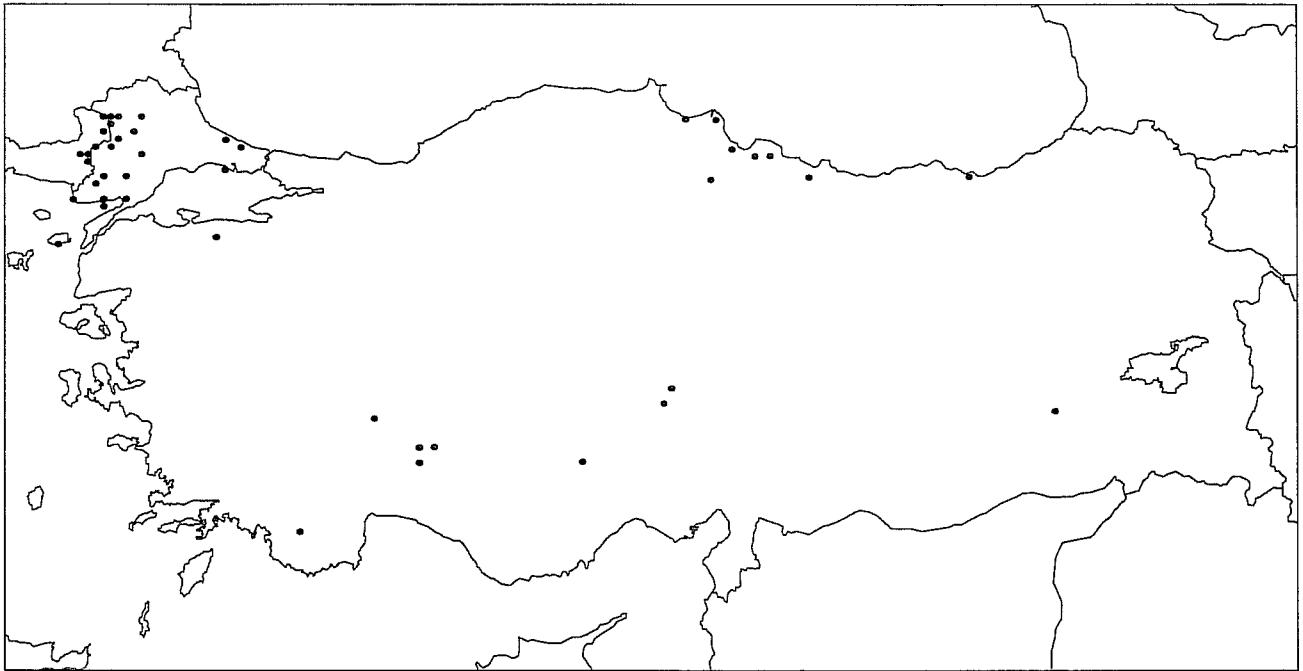


Onychogomphus macrodon

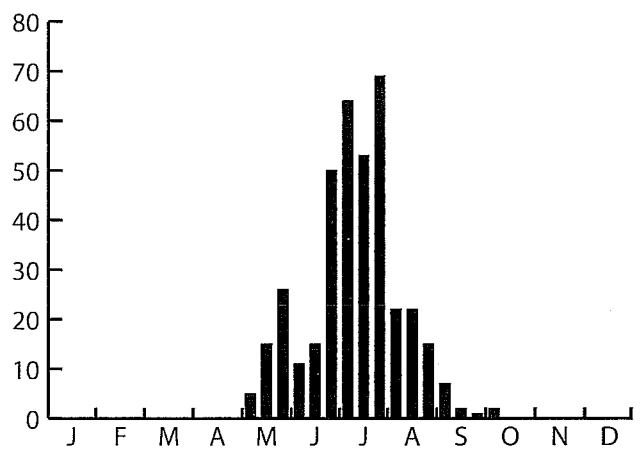
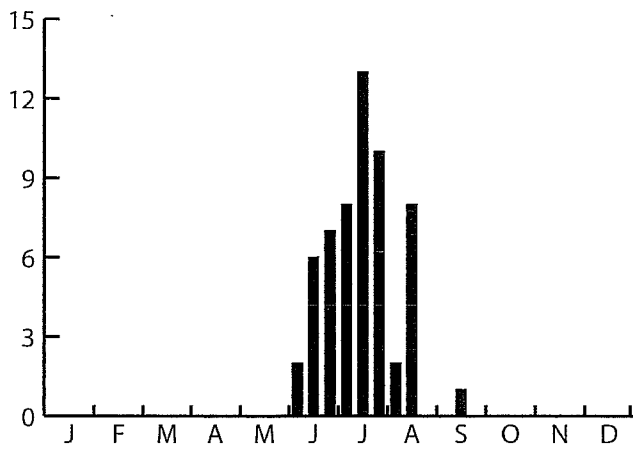


Ophiogomphus reductus



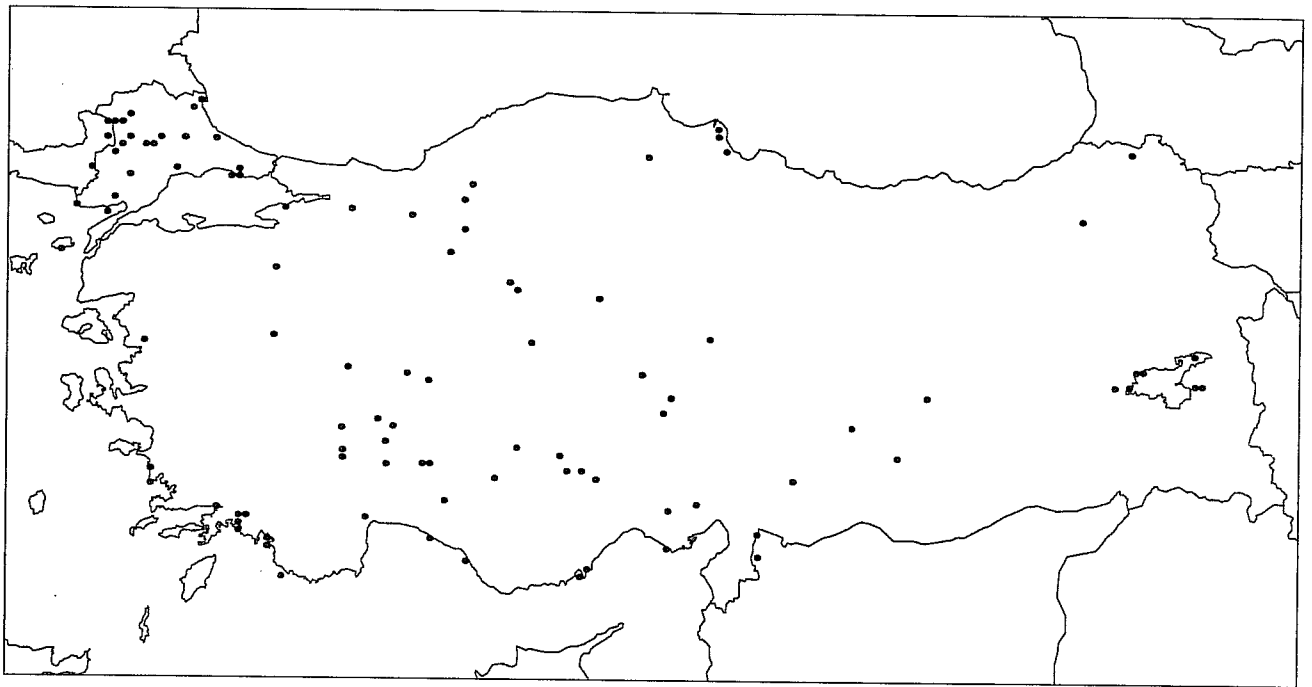


Orthetrum albistylum

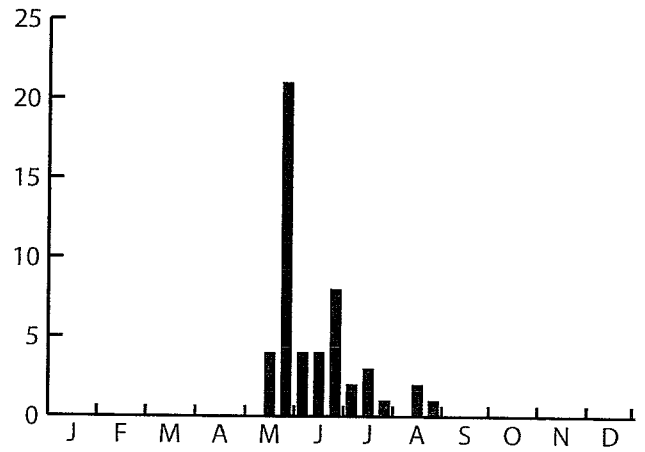
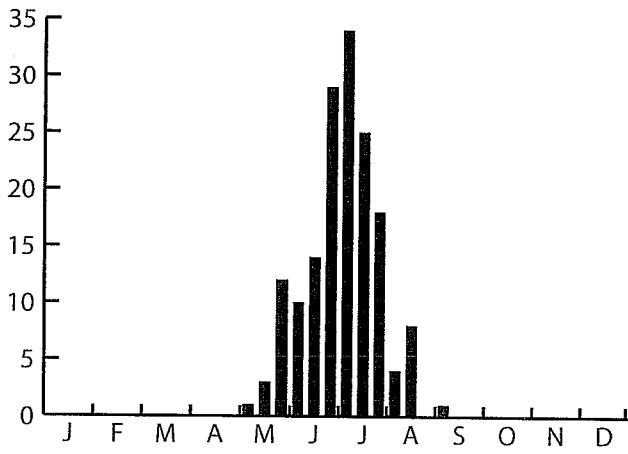


Orthetrum brunneum

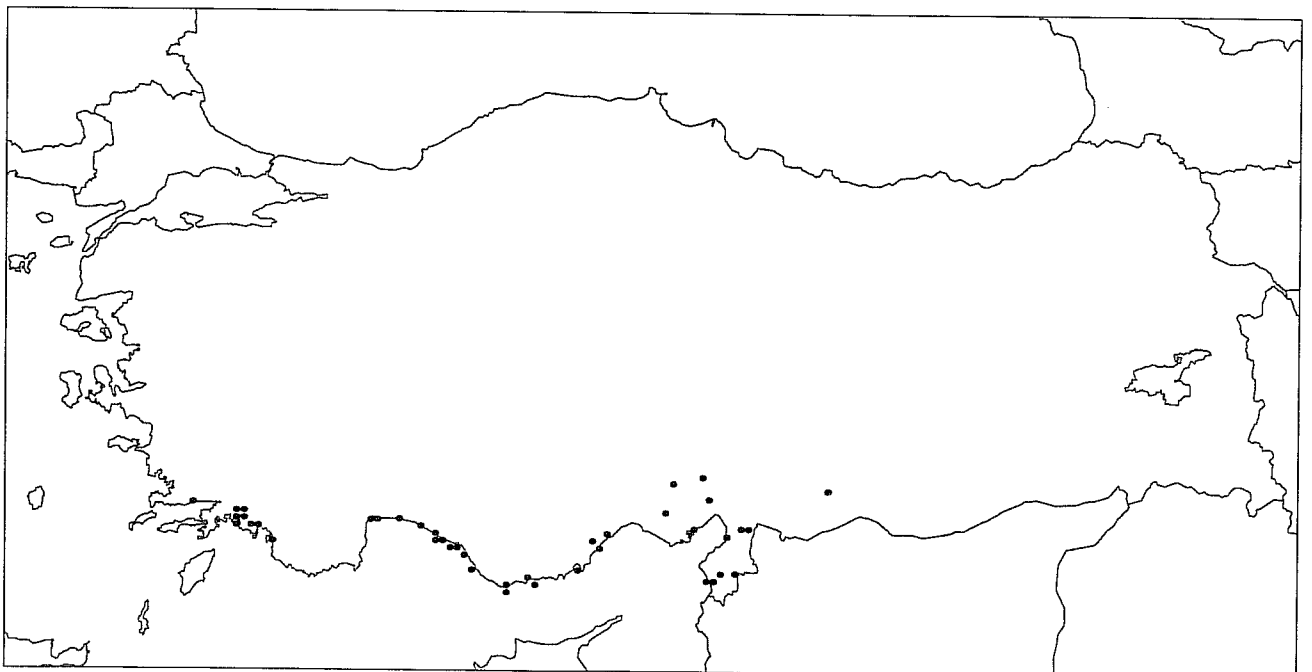




Orthetrum cancellatum

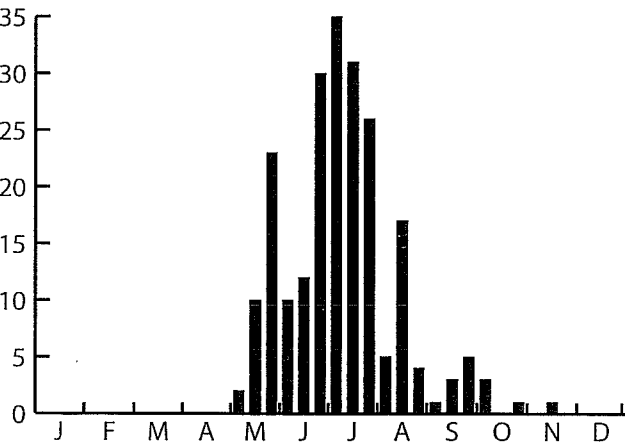


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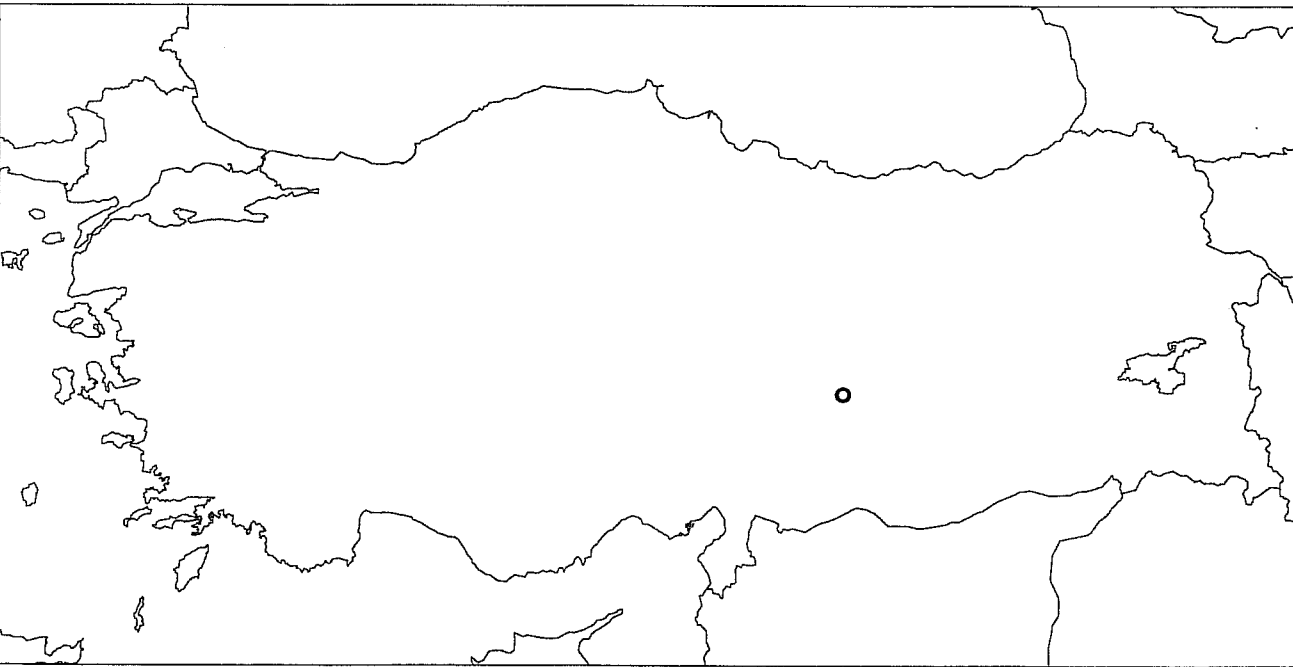


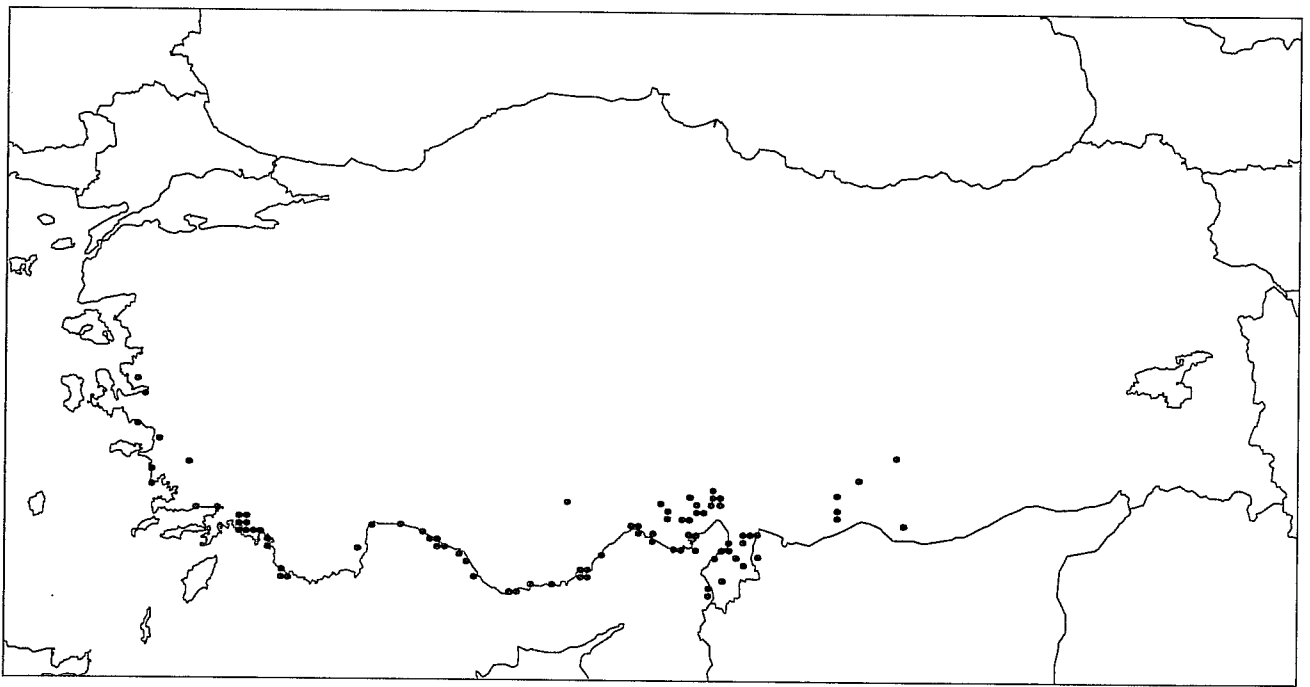


Orthetrum coerulescens

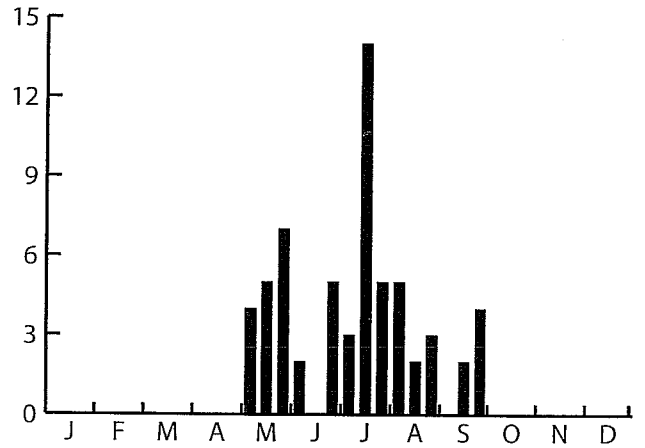
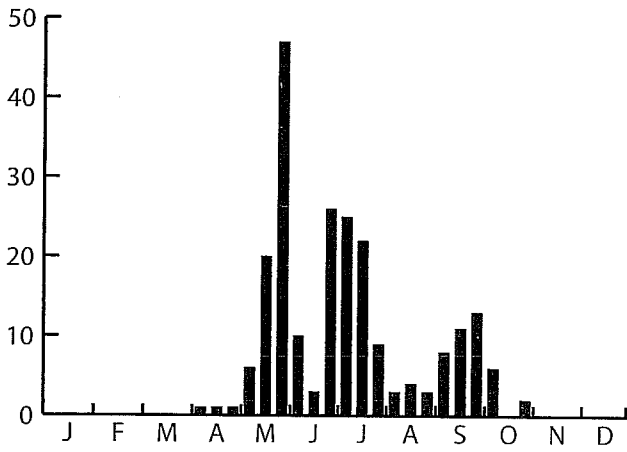


Orthetrum ransonnetii

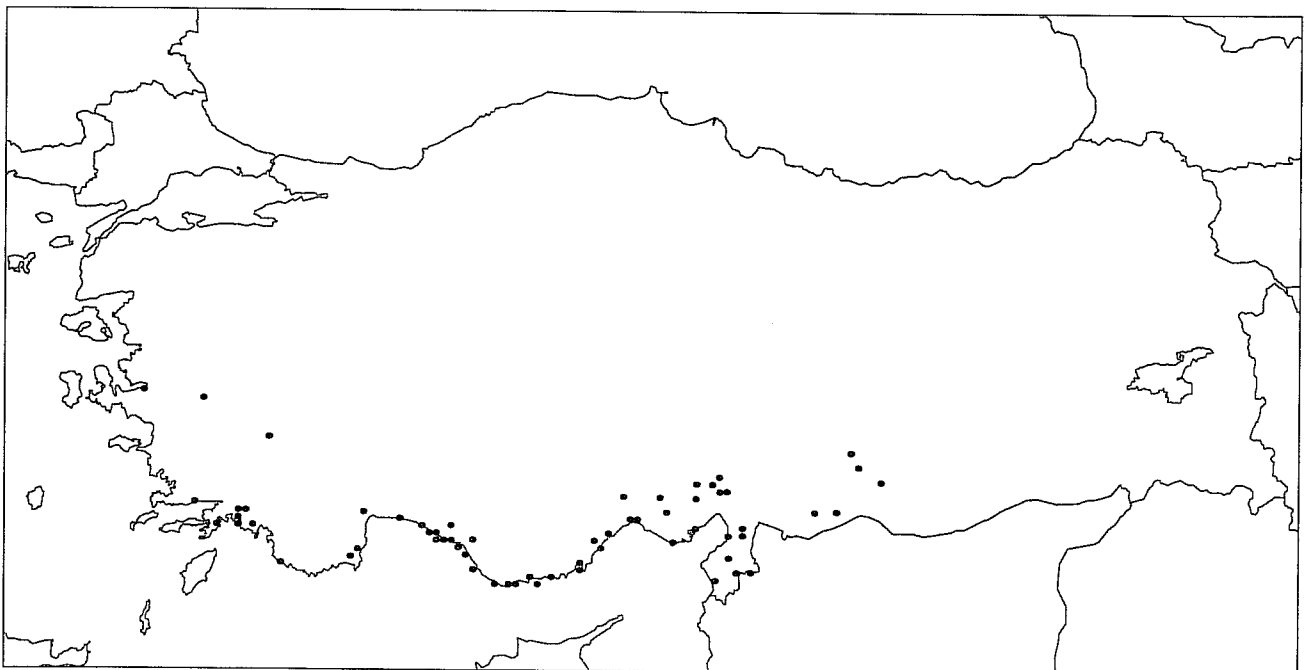


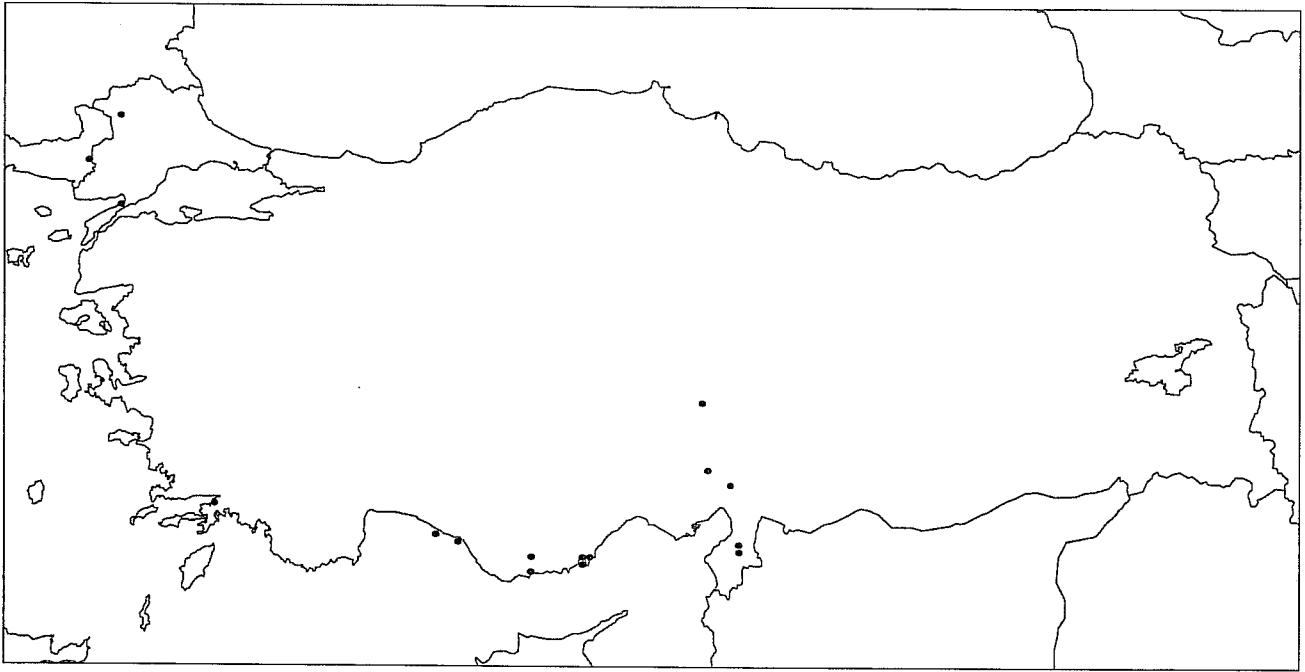


Orthetrum sabina

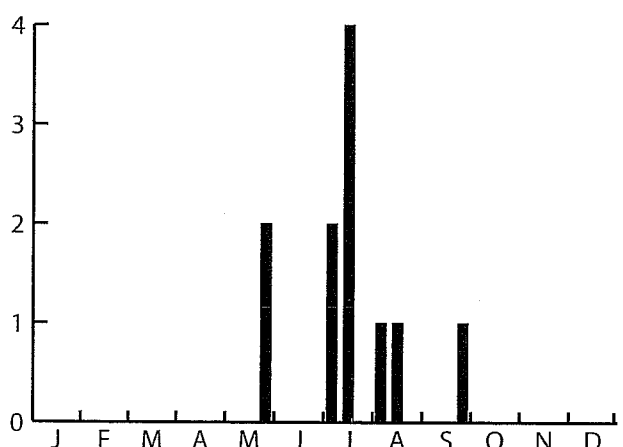
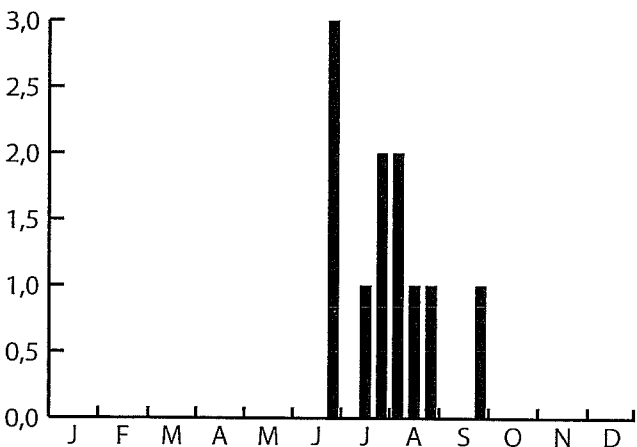


Orthetrum taeniolatum

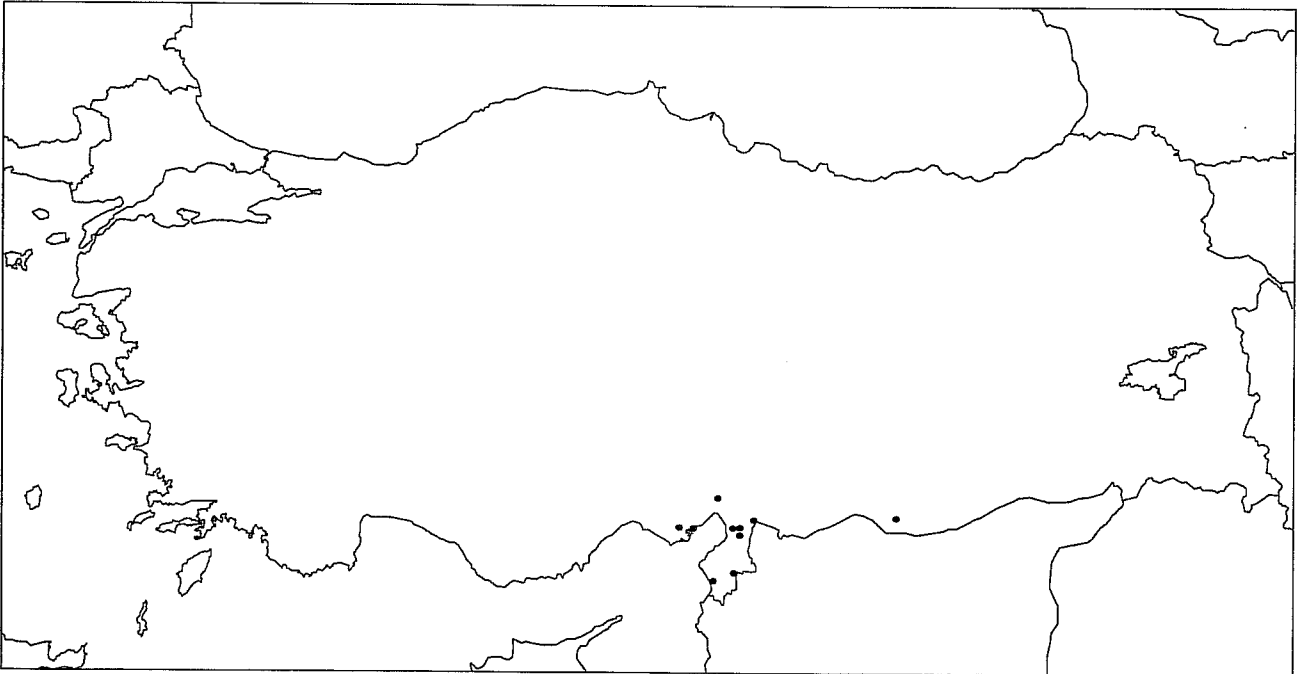


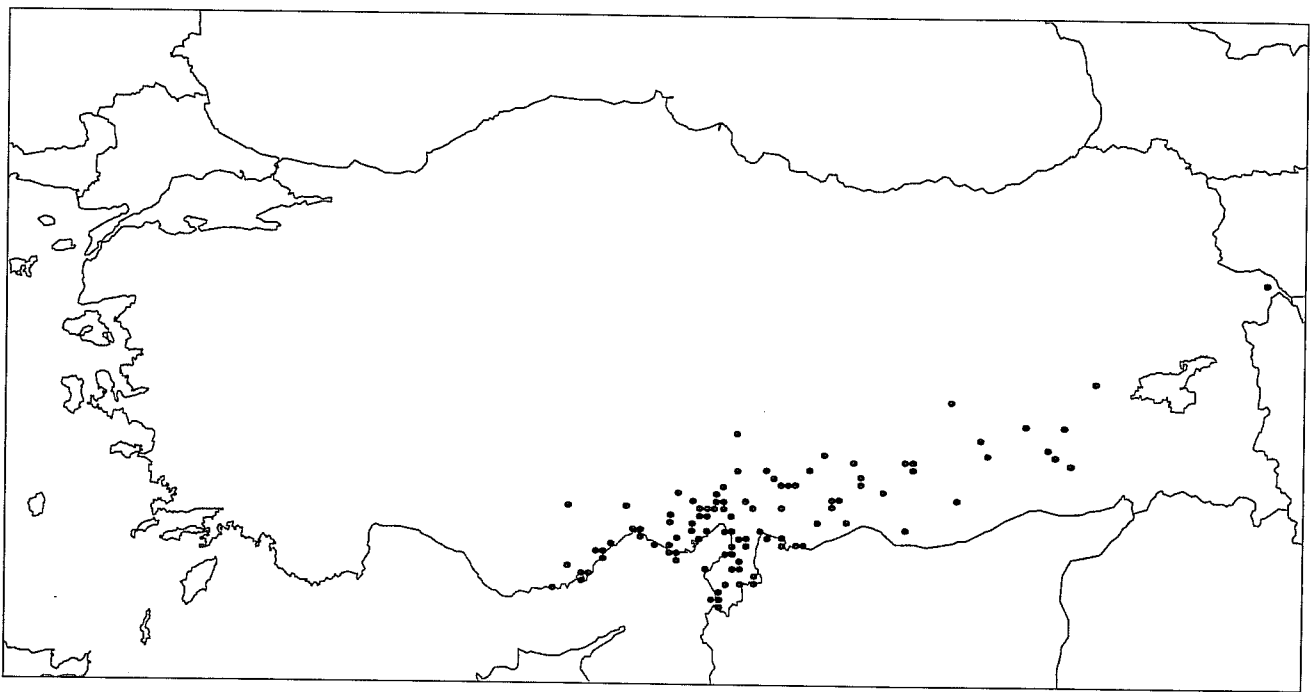


Pantala flavescens

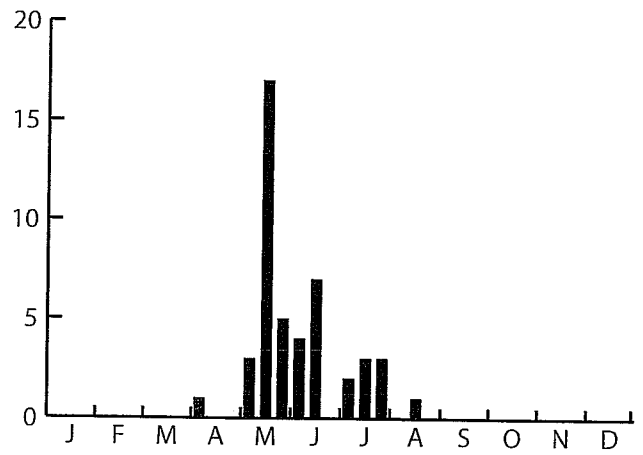
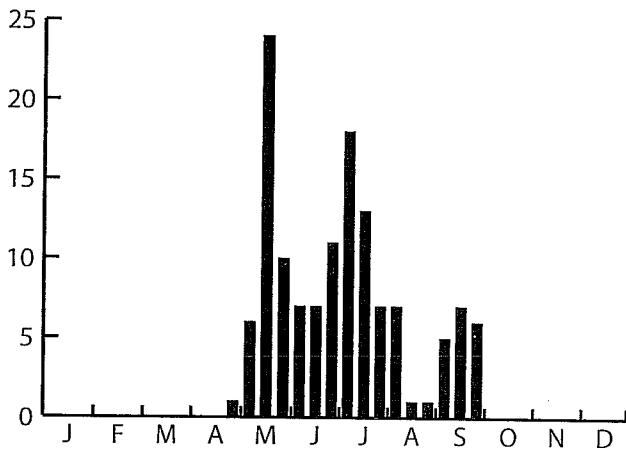


Paragomphus lineatus

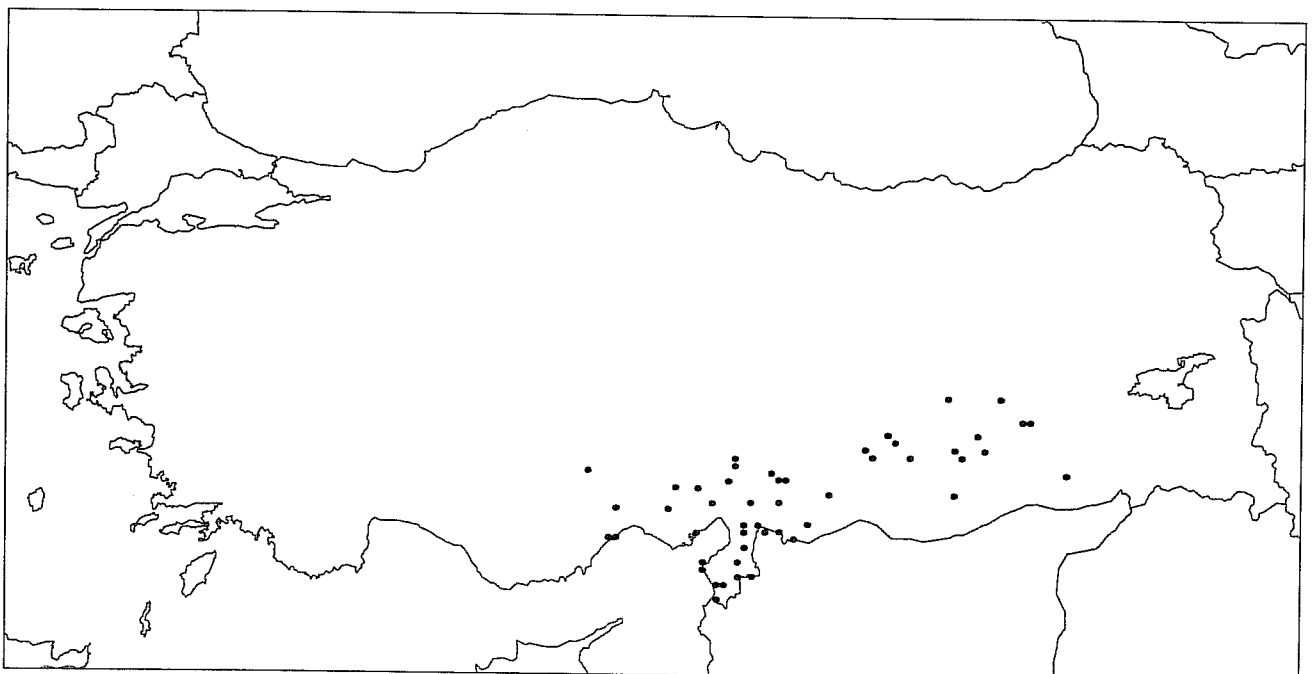


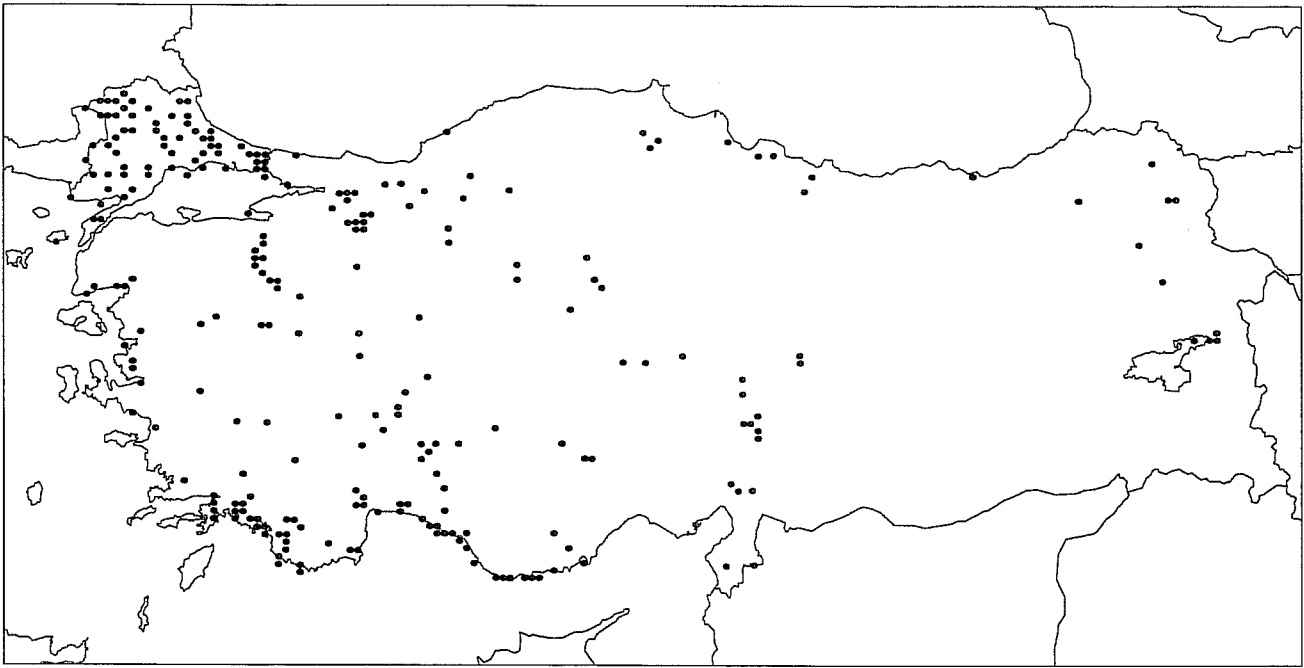


Platycnemis dealbata

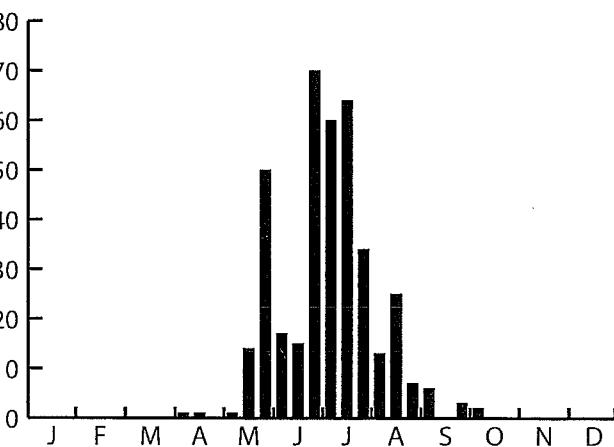


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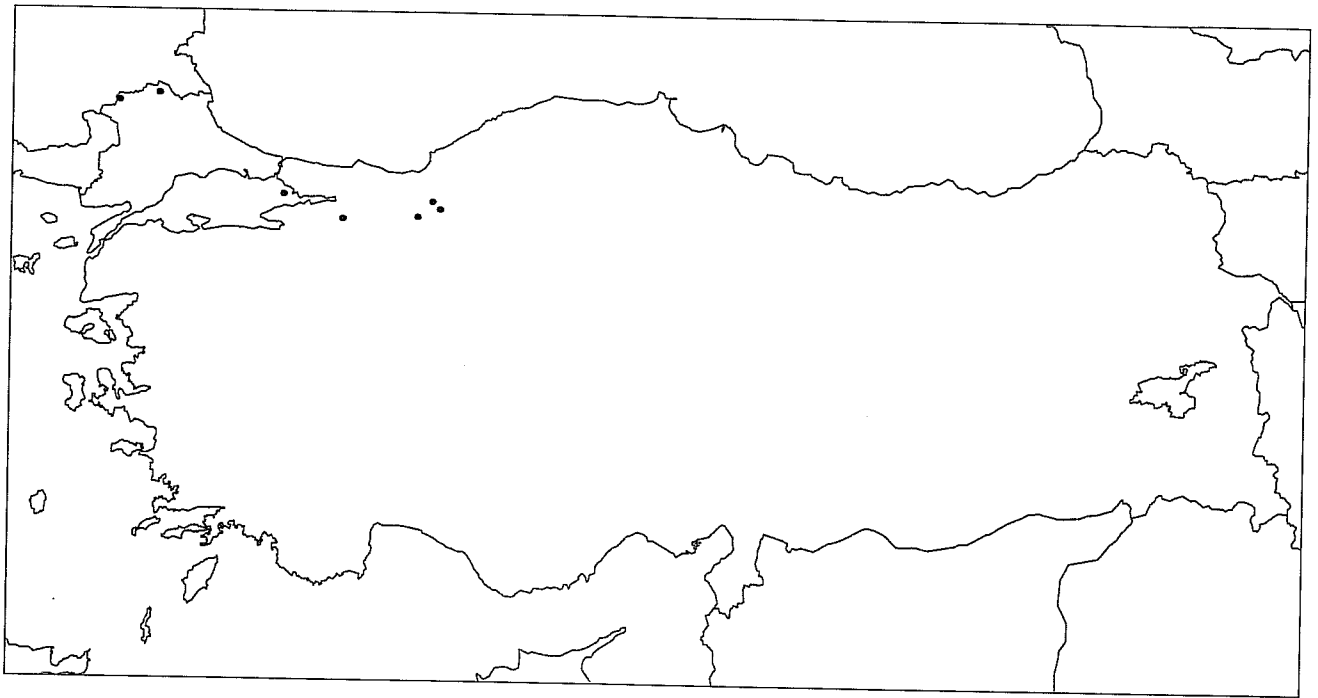


Platycnemis pennipes pennipes

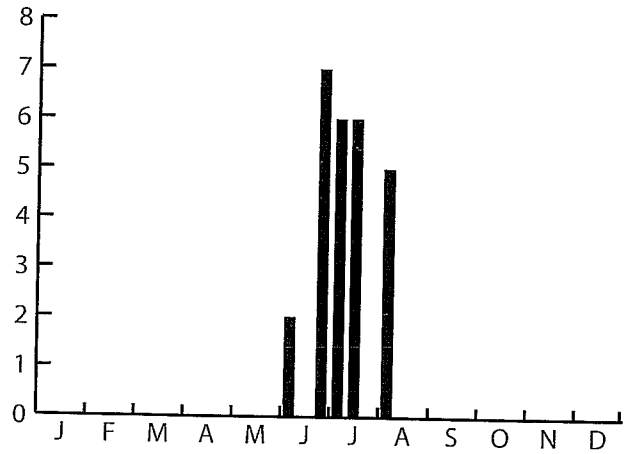
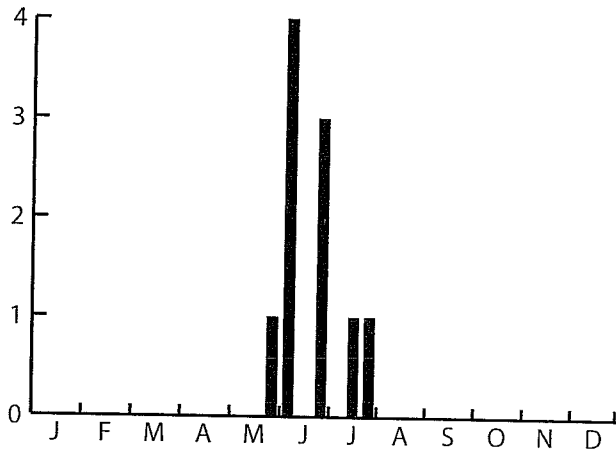


Pseudagrion syriacum

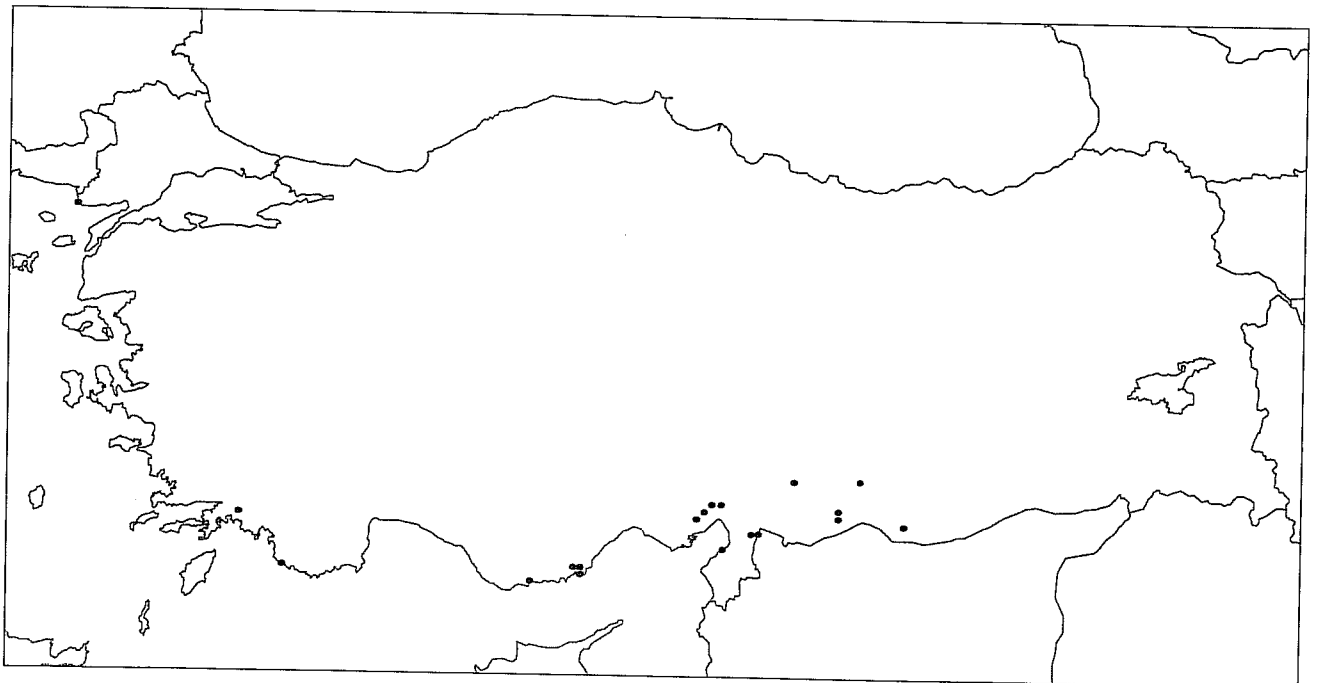


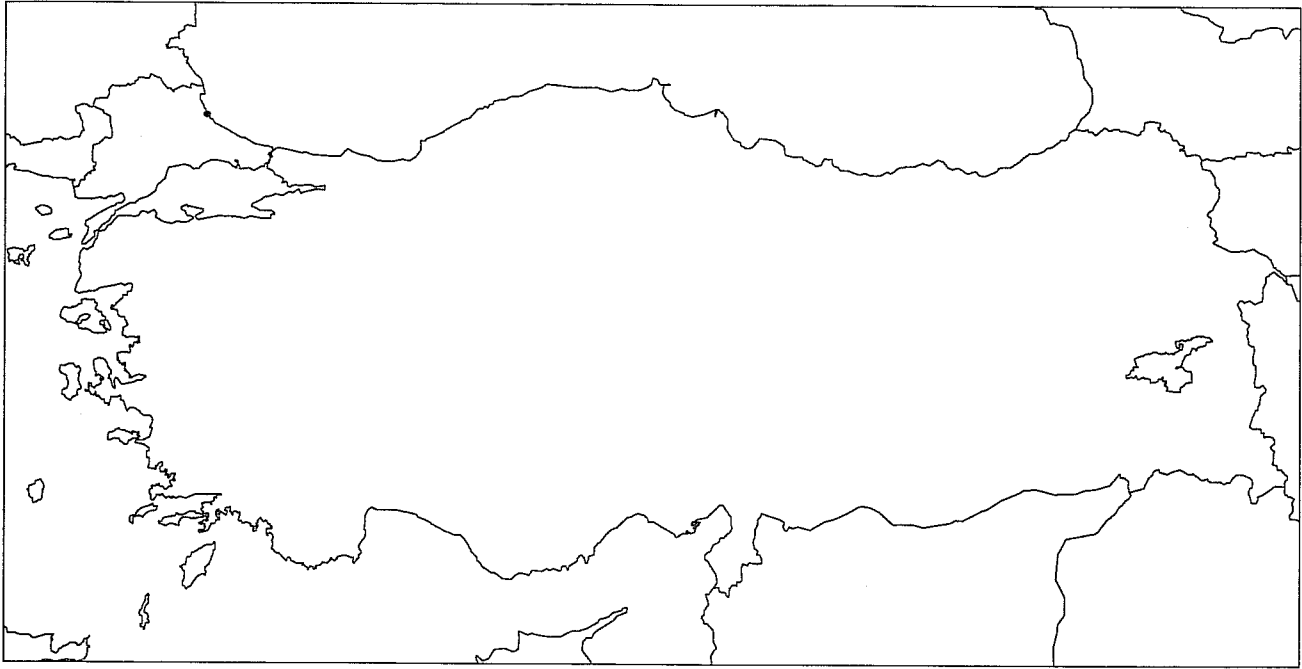


Pyrrhosoma nymphula

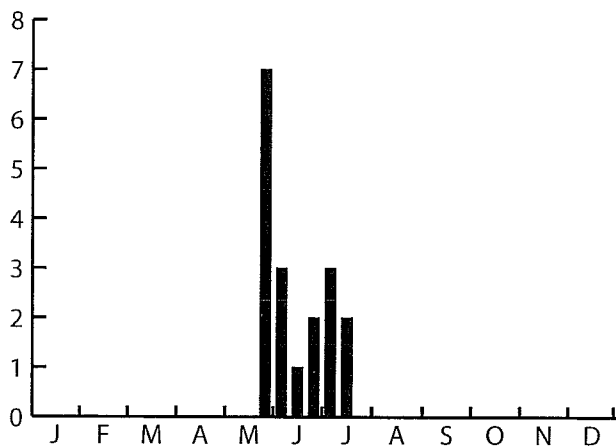
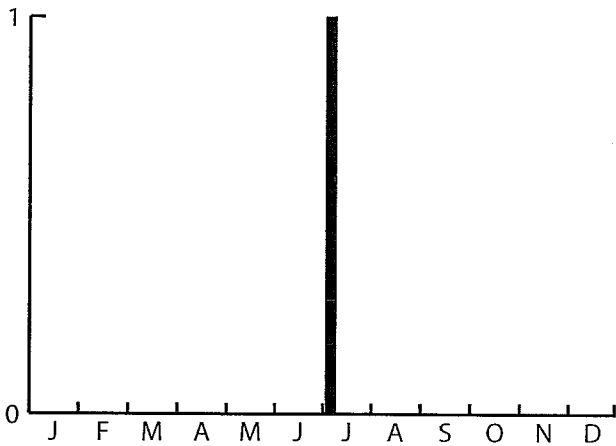


Selysiothemis nigra

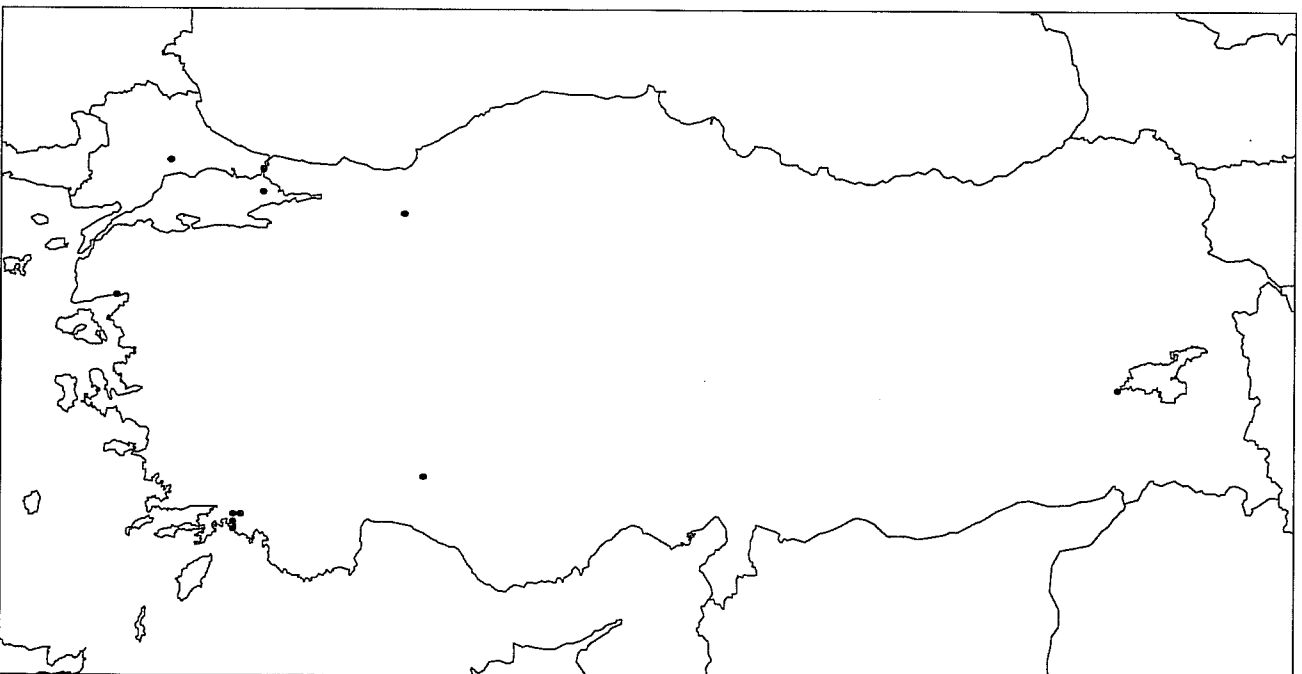


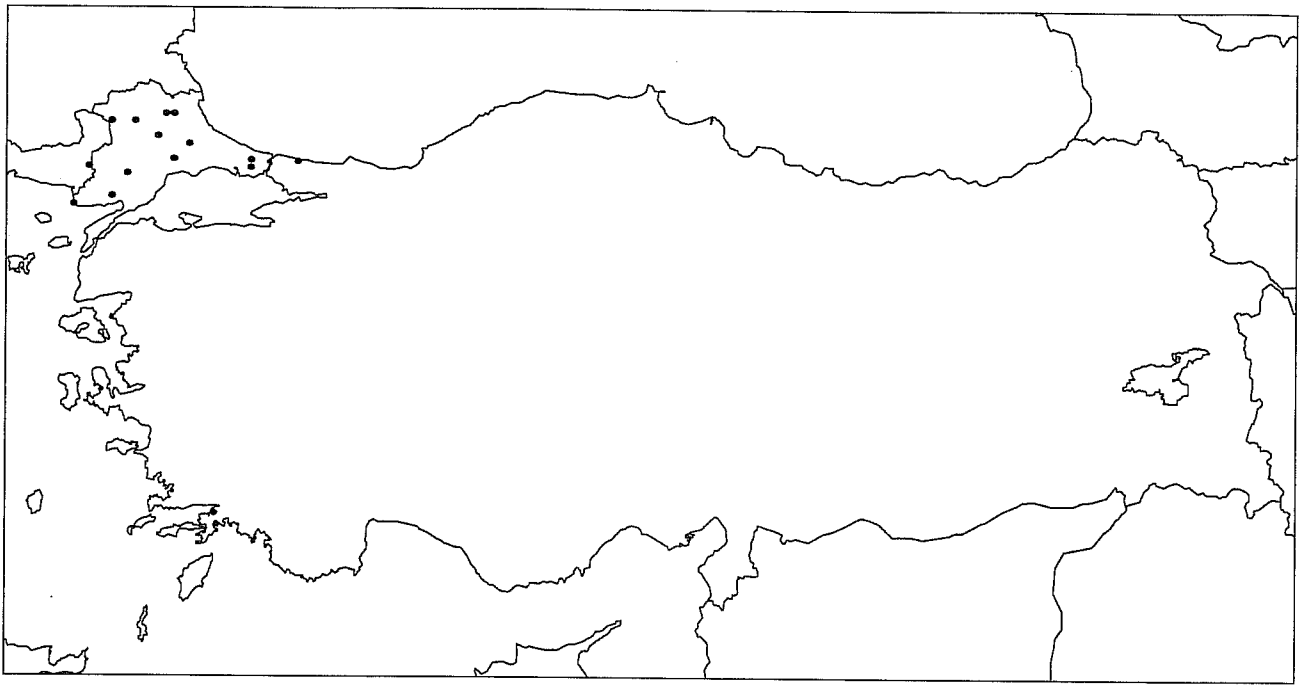


Somatochlora borisi

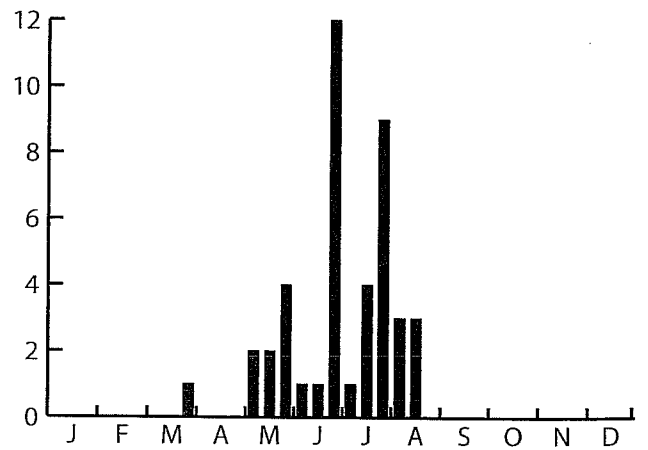
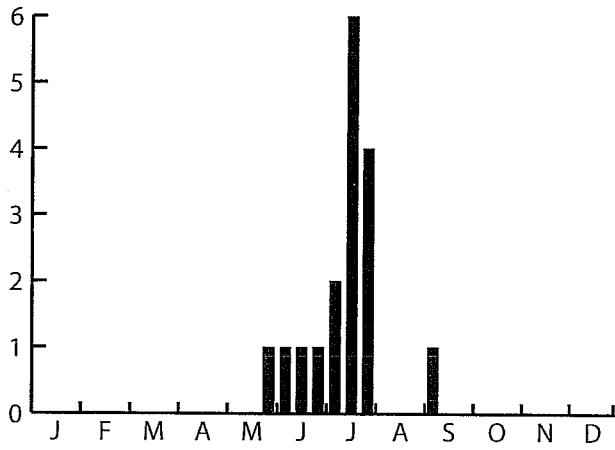


Somatochlora flavomaculata

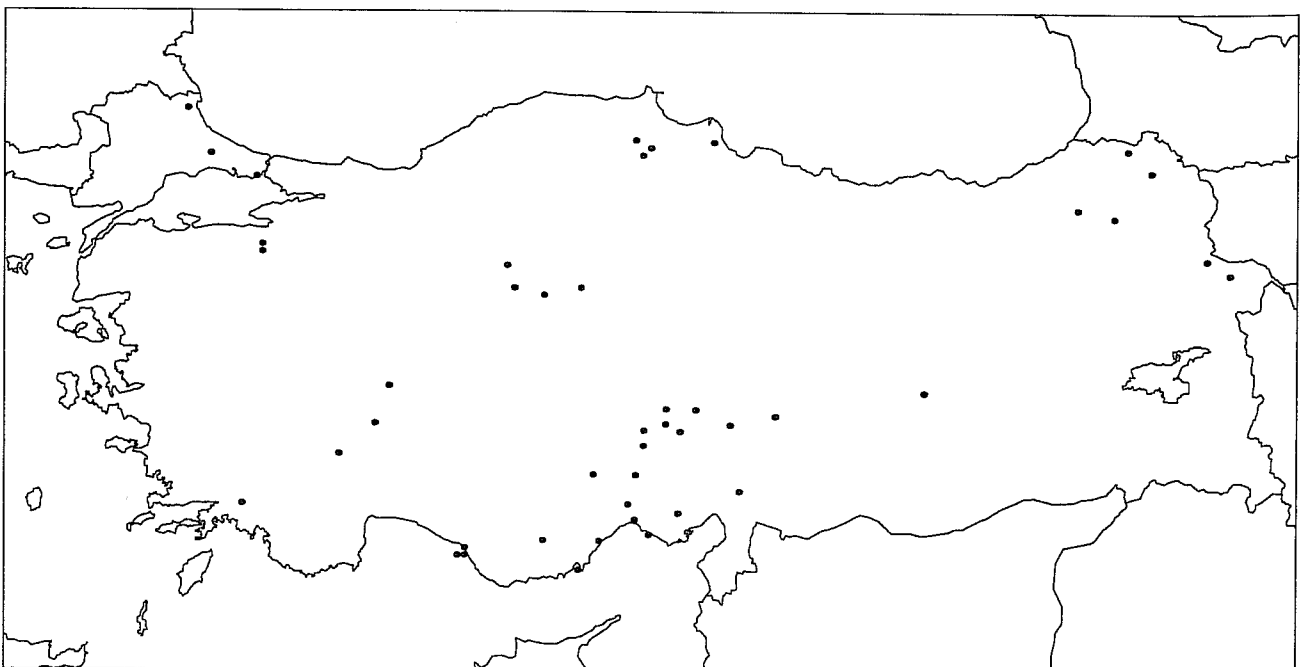


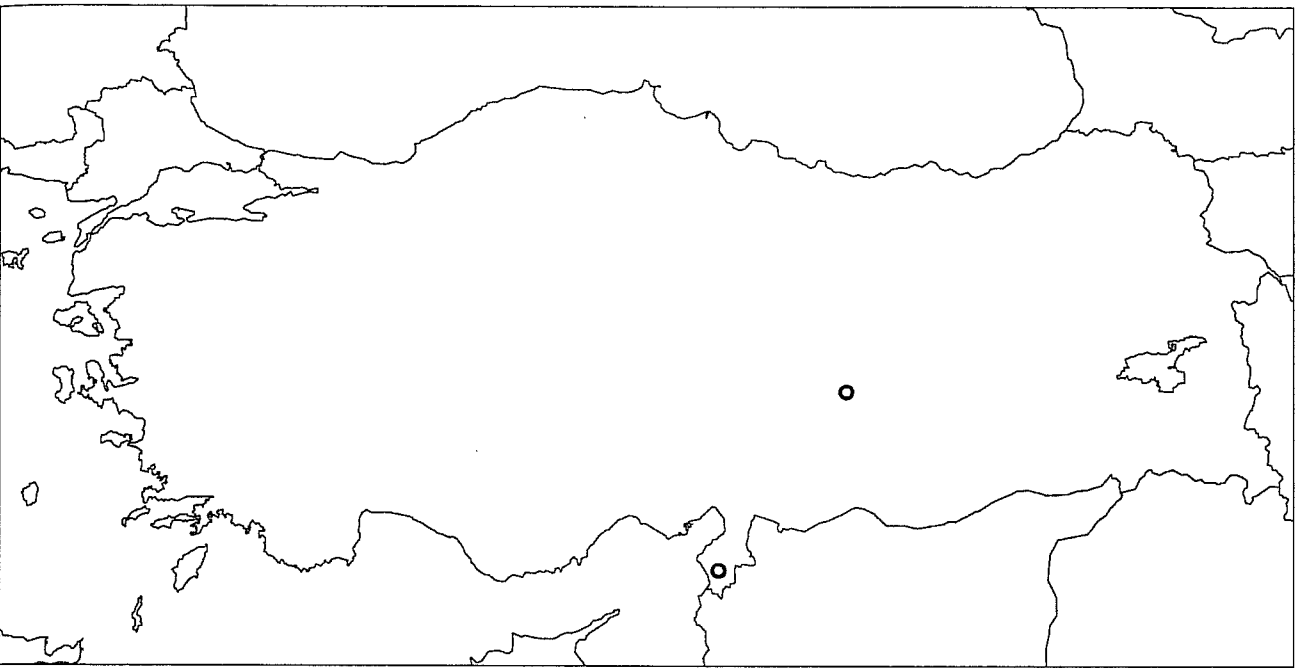


Somatochlora meridionalis

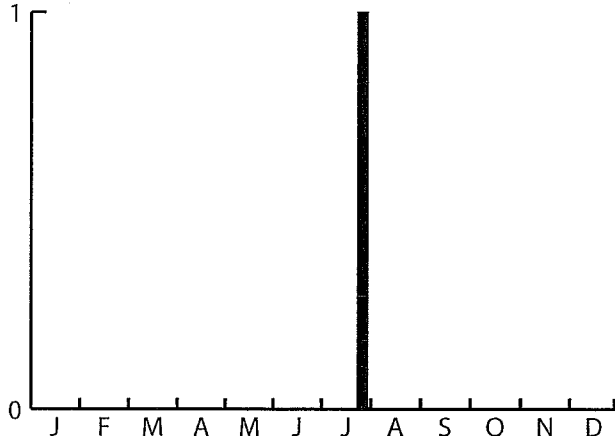


Sympecma fusca

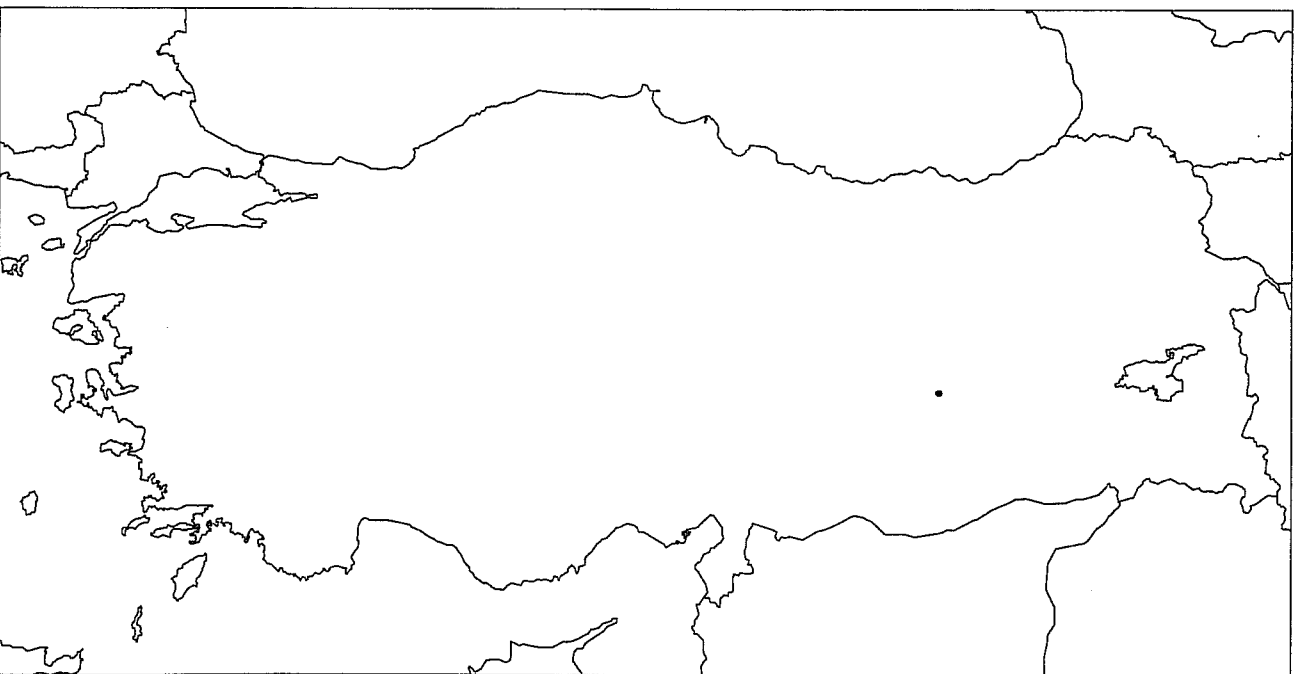


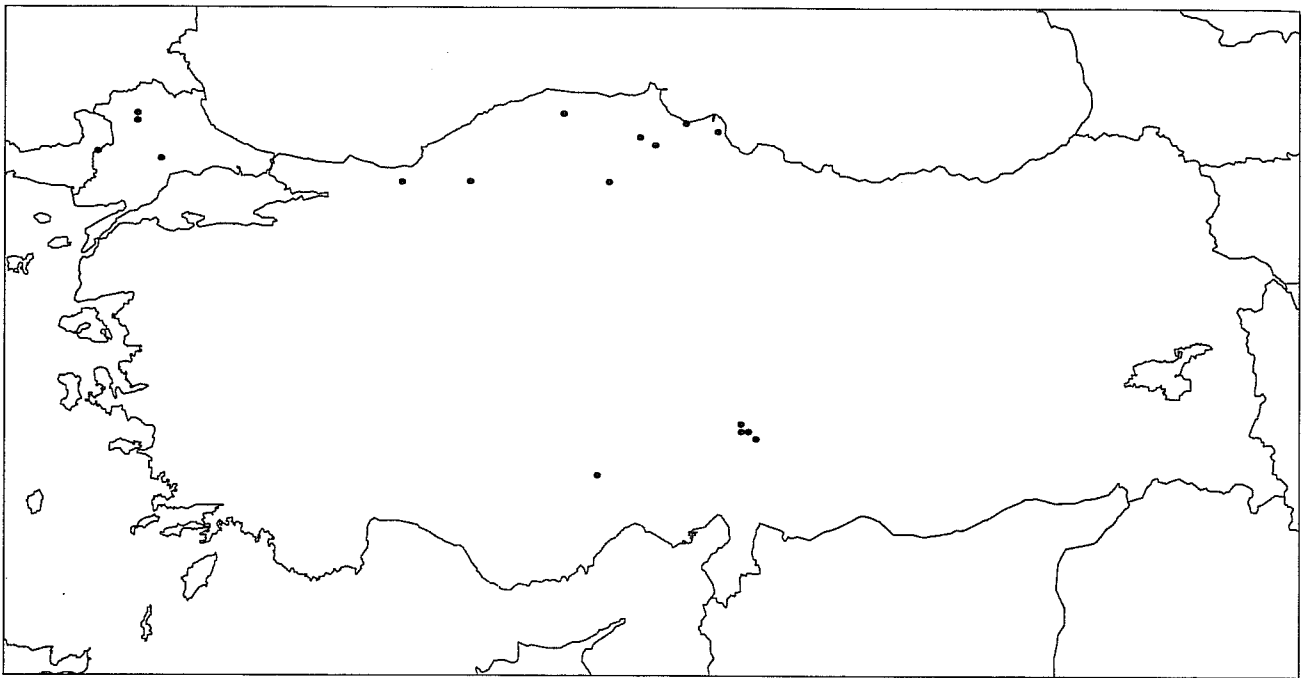


Sympecma paedisca

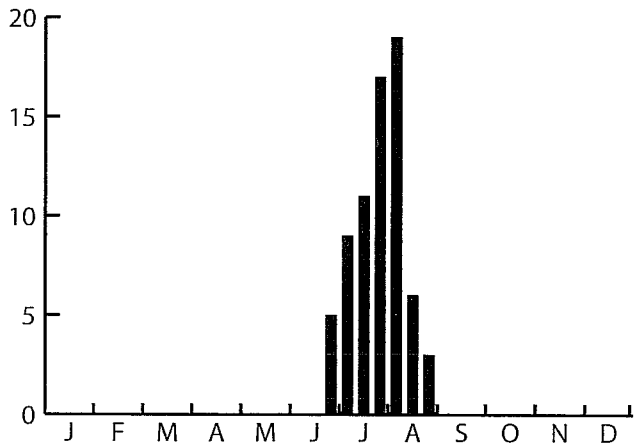
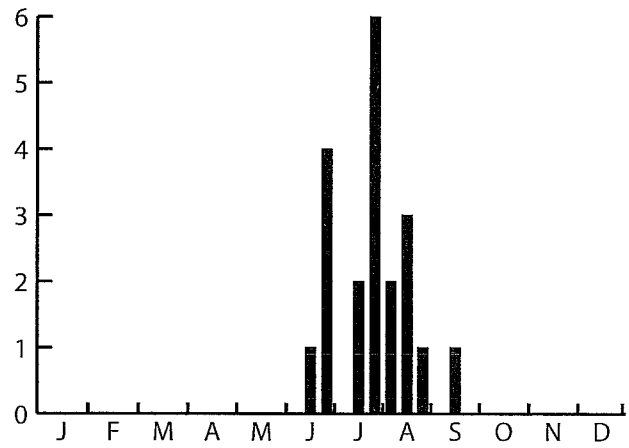


Sympetrum arenicolor

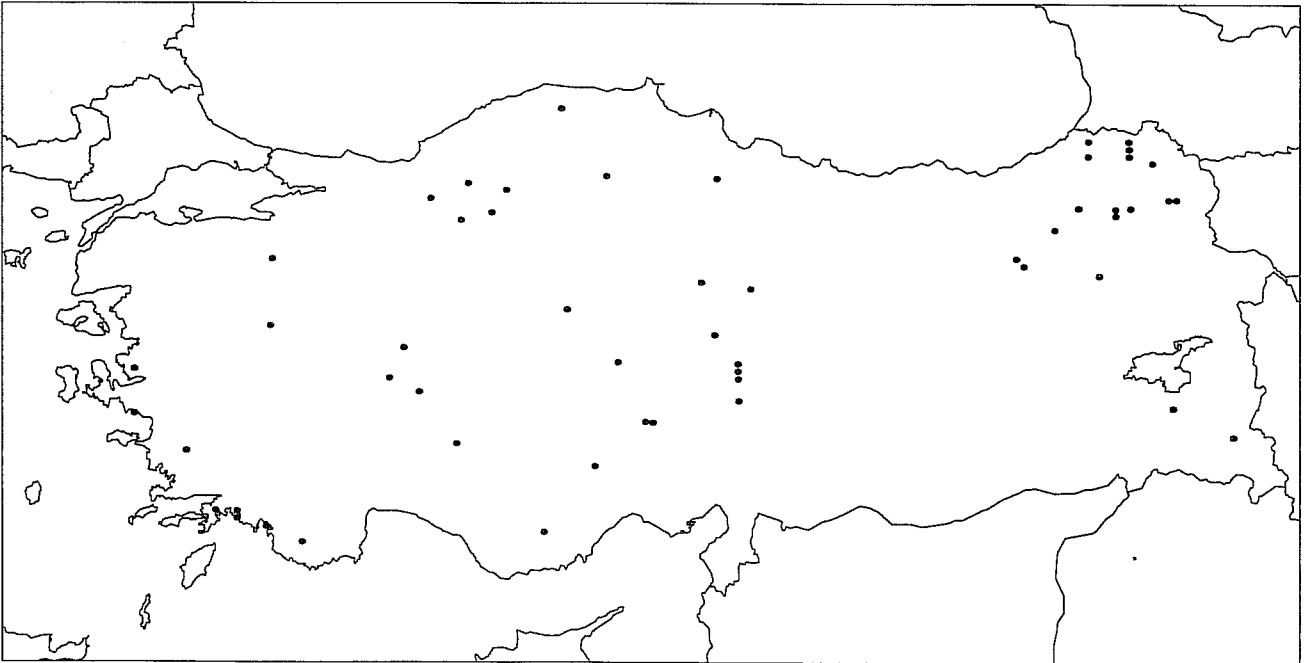


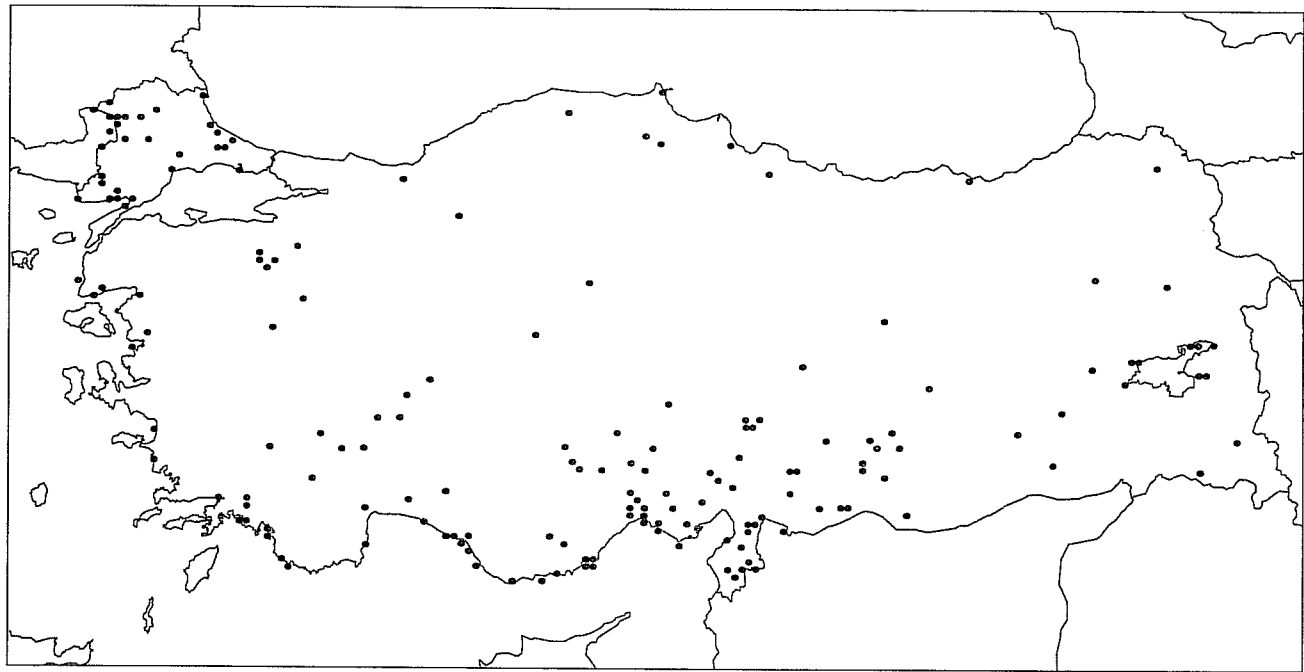


Sympetrum depressiusculum

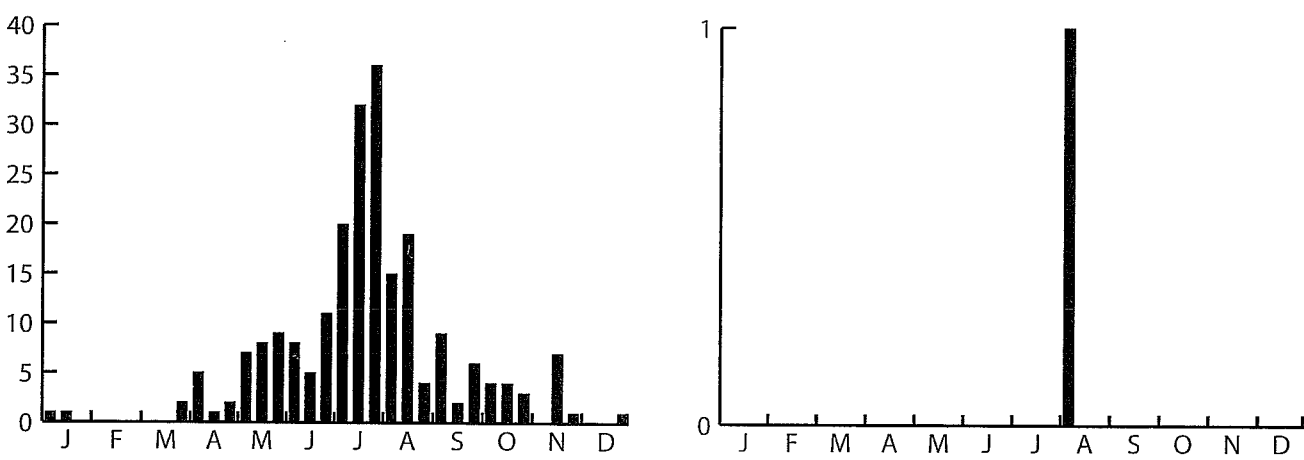


Sympetrum flaveolum



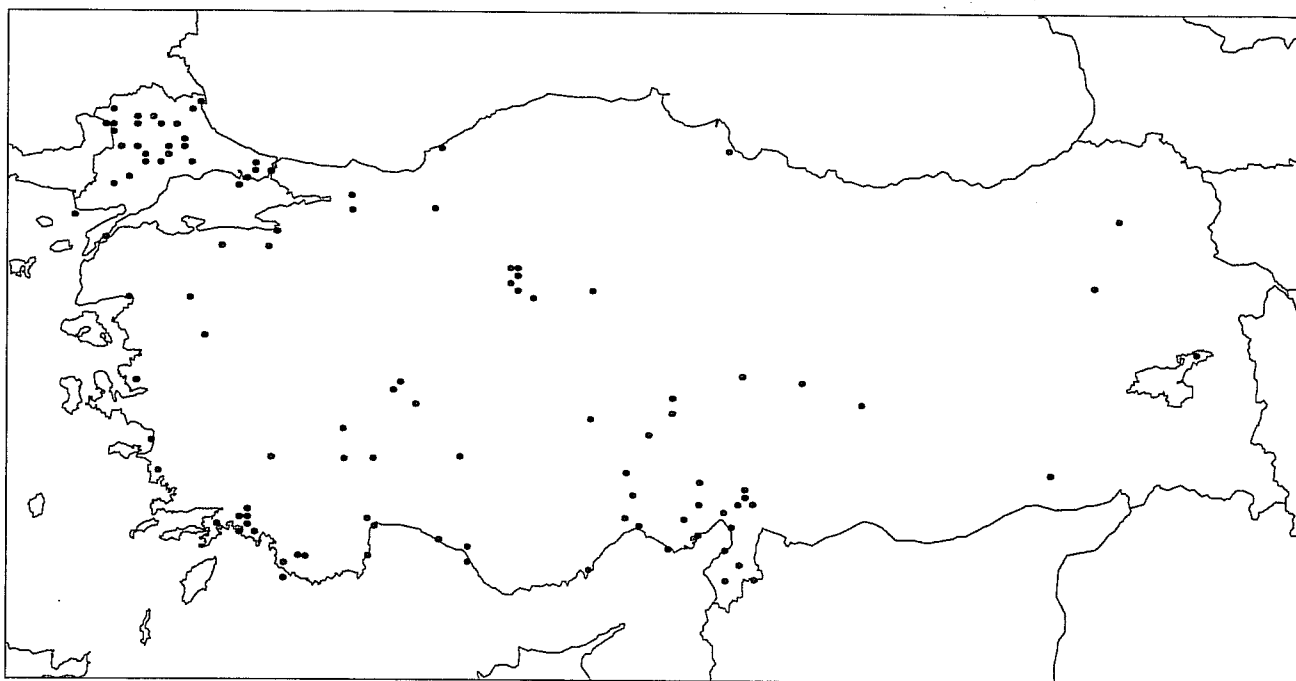


Sympetrum fonscolombii

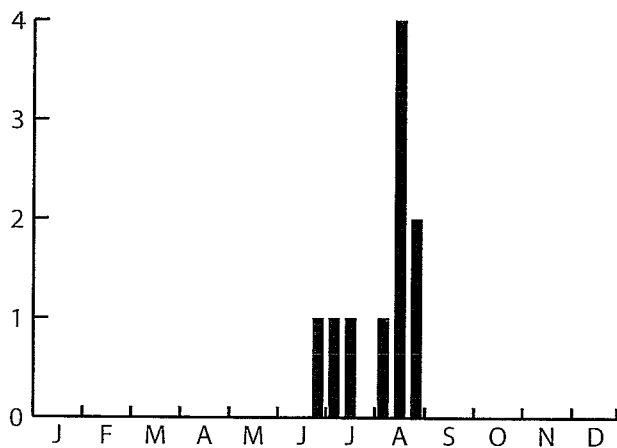
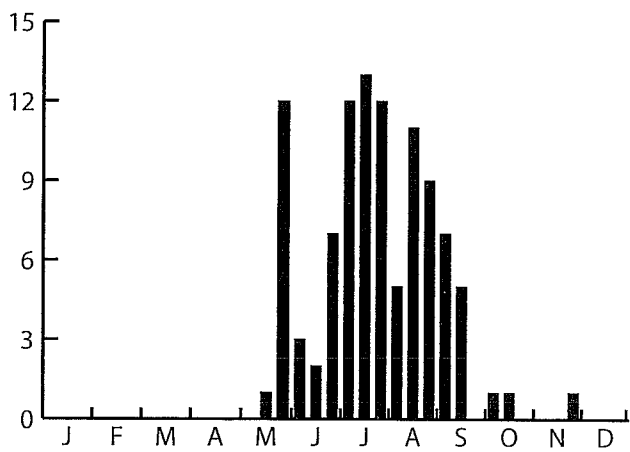


Sympetrum haritonovi

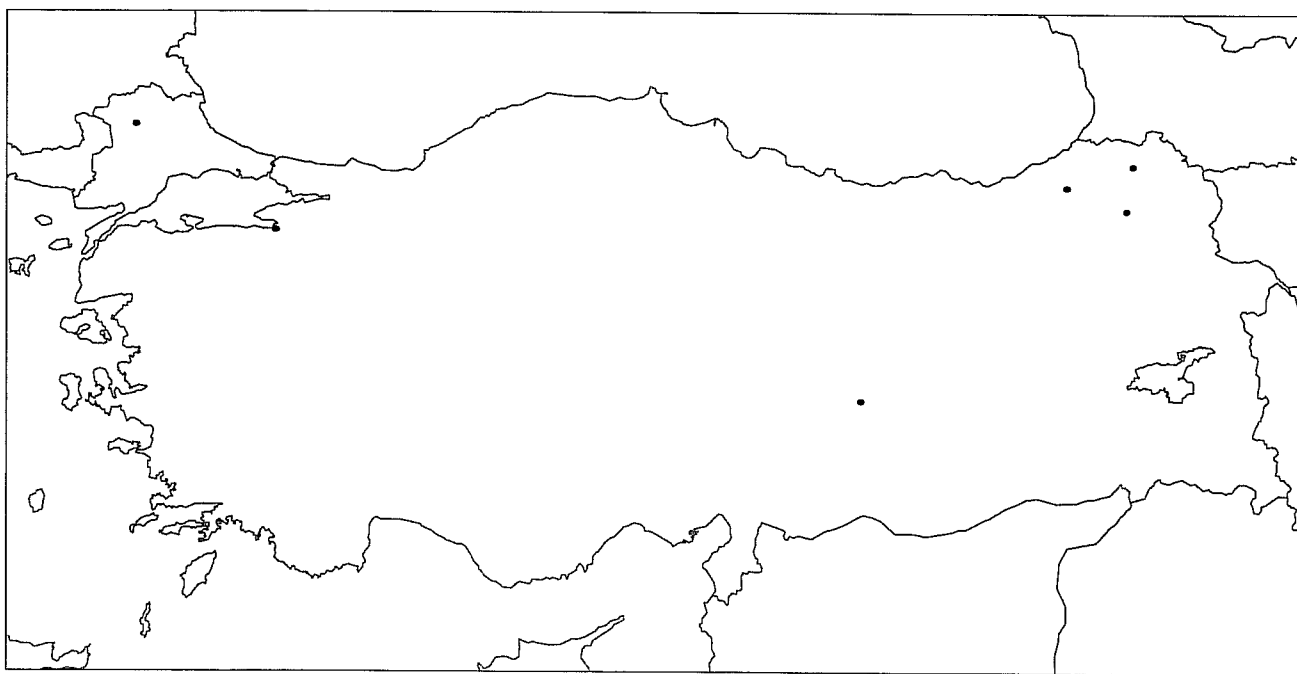


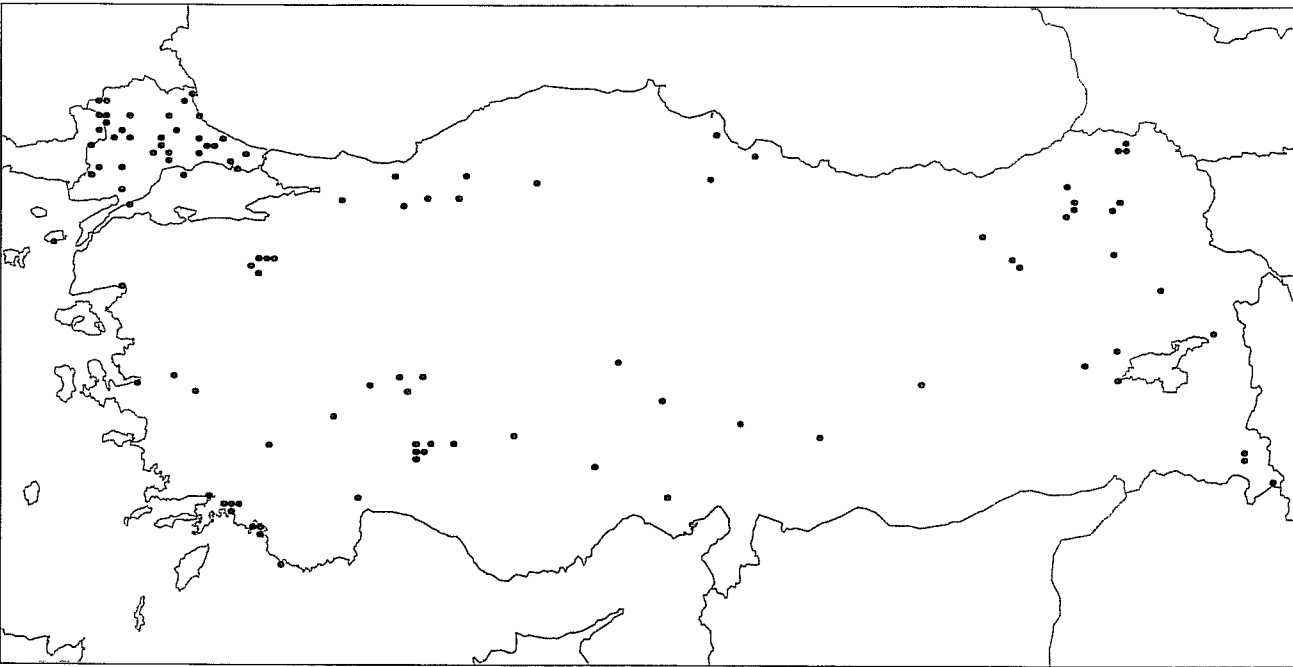


Sympetrum meridionale

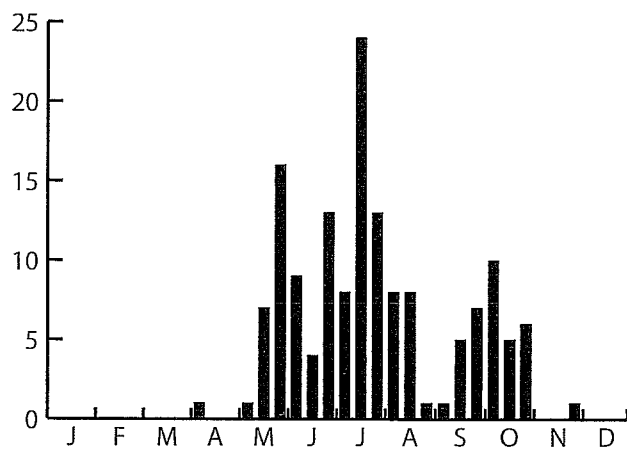
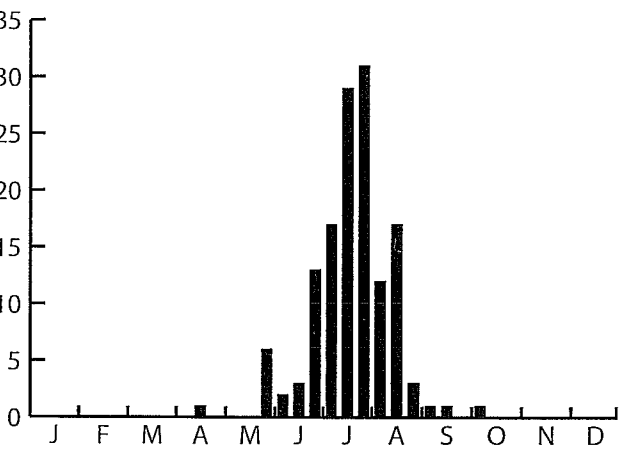


Sympetrum pedemontanum

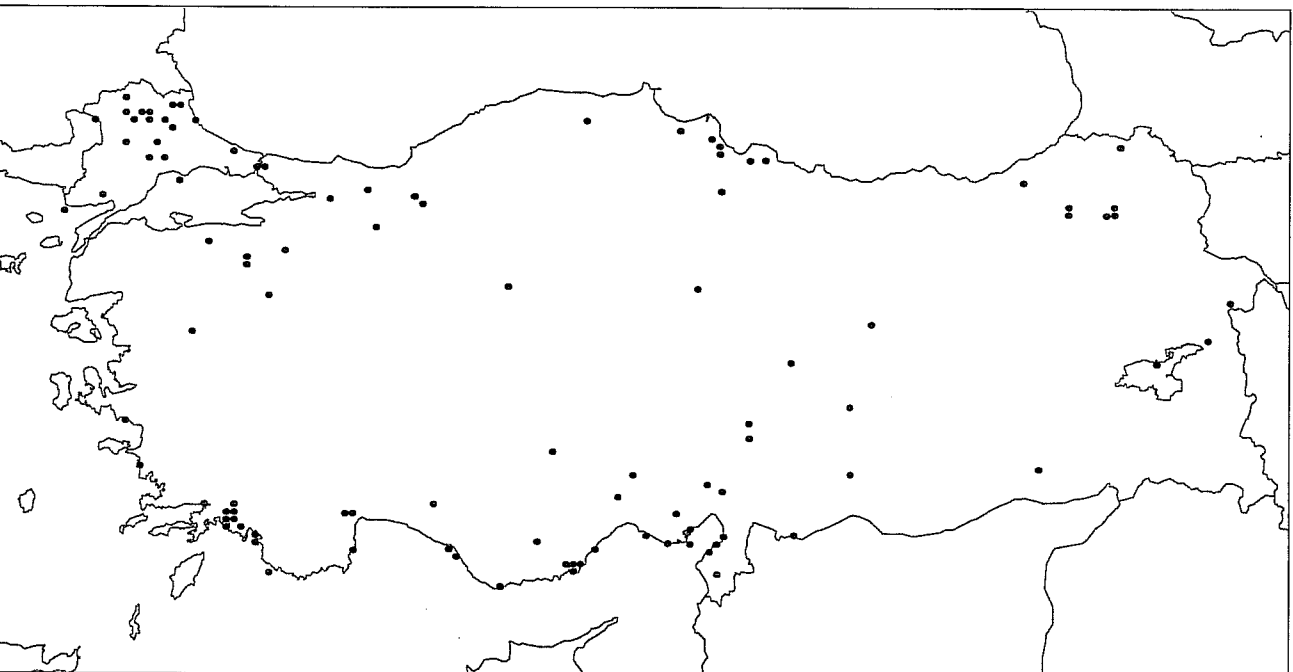


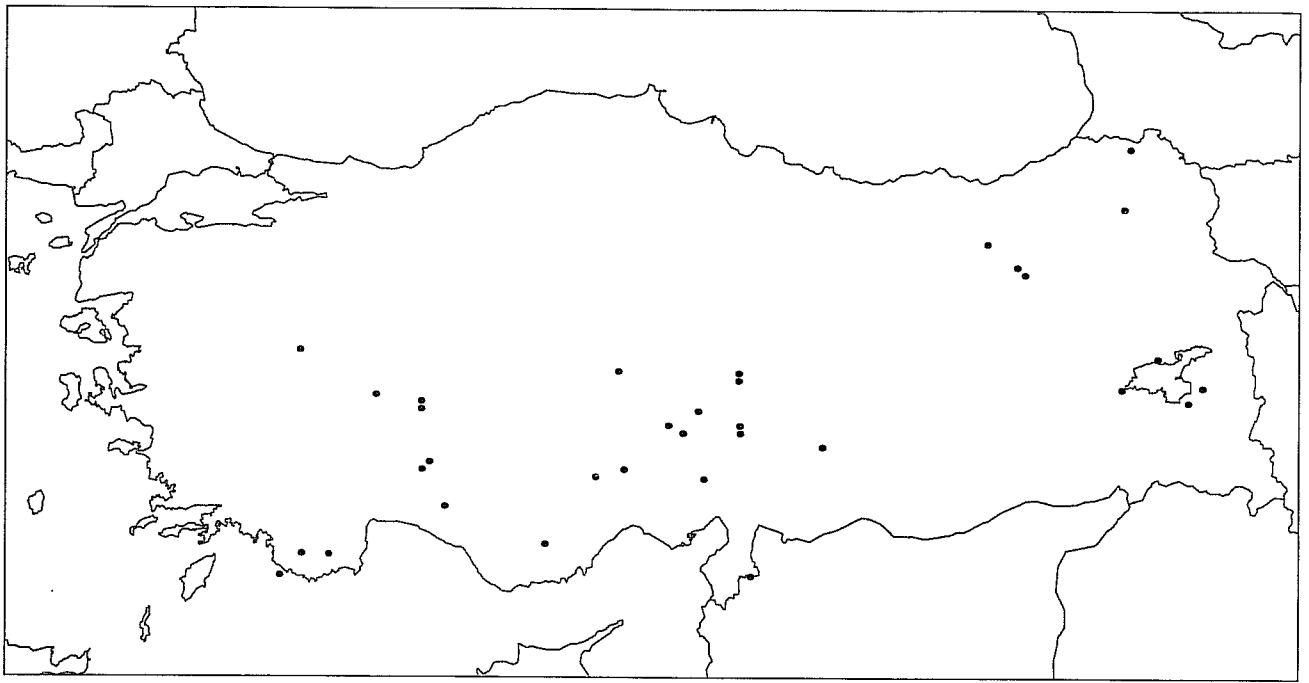


Sympetrum sanguineum

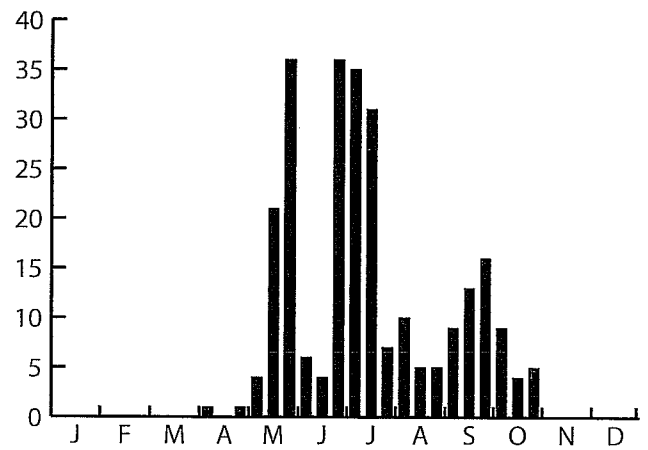
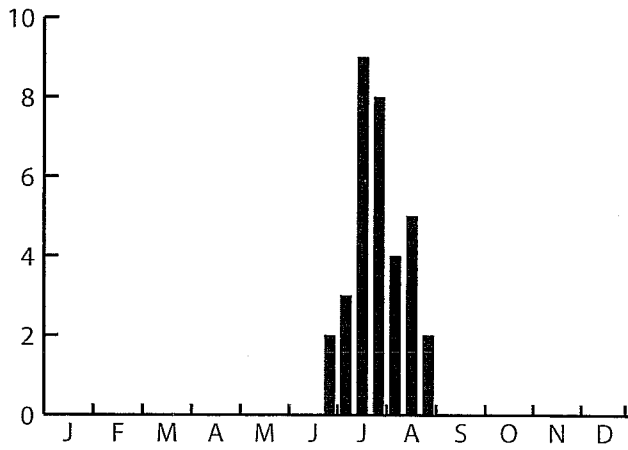


Sympetrum striolatum ssp.

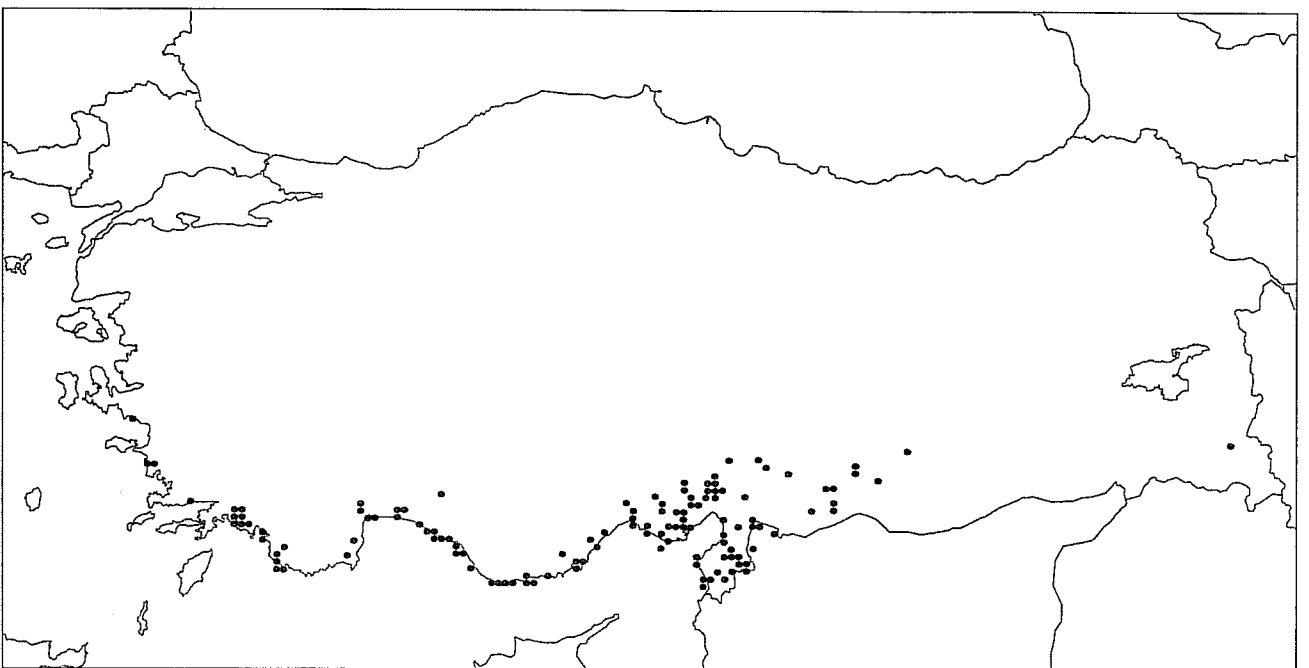


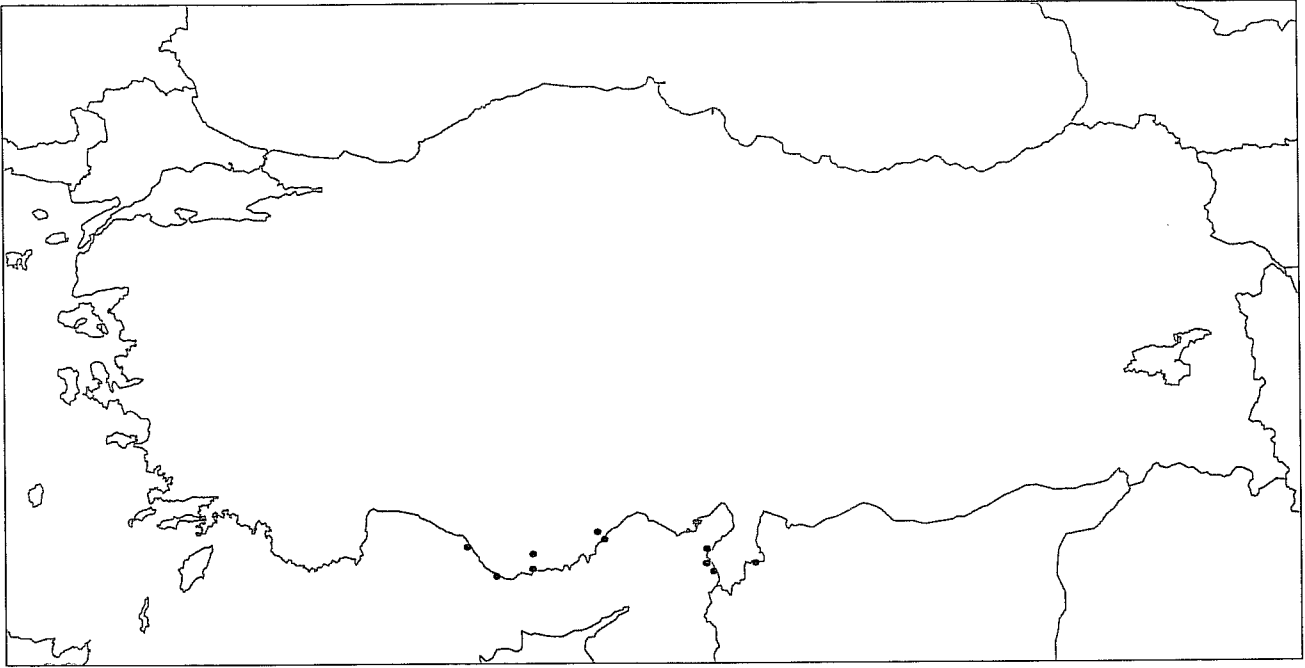


Sympetrum vulgatum decoloratum

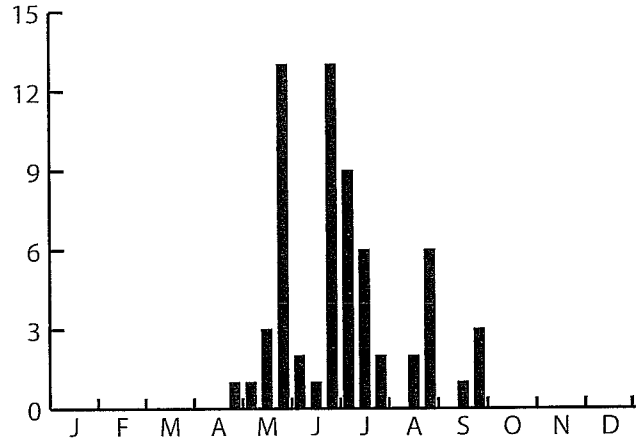
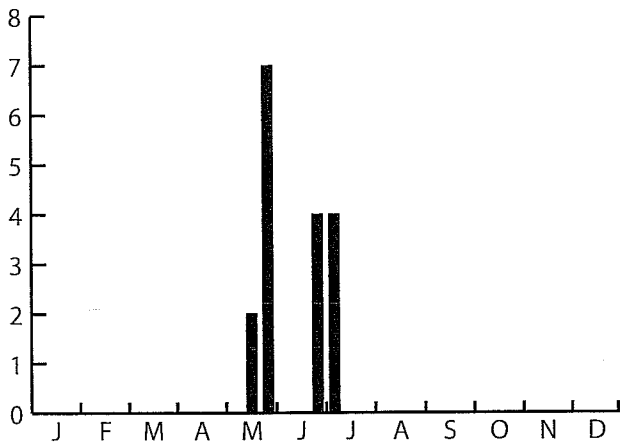


Trithemis annulata





Trithemis arteriosa



Trithemis festiva

