

Contribution to the knowledge of Odonata (Insecta) fauna of Turkey: Eastern and Southeastern Anatolia

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ABSTRACT

1. Investigations on the Odonata fauna were carried out in Eastern and Southeastern Anatolia between 1981 and 1984.
2. Eighteen species, 12 genera, eight families were recorded.
3. *Ischnura senegalensis* (Rambur 1842) is a new record for Turkey.
4. The most represented family was Lestidae from Zygoptera Suborder with five species (27.78 %) and was Libellulidae from Anisoptera with four species (22.22 %).

KEY WORDS: Damselfly, dragonfly, Eastern Anatolia, fauna, new record, Odonata, South Eastern Anatolia, Turkey.

Türkiye Odonata (Insecta) faunasına katkılar: Doğu ve Güneydoğu Anadolu

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ÖZ

1. Doğu ve Güneydoğu Anadolu Odonata faunası üzerine 1981 ve 1984 tarihleri arasında araştırmalar yürütülmüştür.
2. Onsekiz tür, 12 cins ve sekiz familya kaydedilmiştir.
3. *Ischnura senegalensis* (Rambur 1842), Türkiye için yeni kayıttır.
4. Zygoptera Alttakımı'ndan Lestidae Familyası beş tür ile (27.78%) en çok temsil edilen familyadır. Anisoptera Alttakımı'ndan ise Libellulidae Familyası dört tür ile (22.22%) en çok temsil edilen familyadır.

ANAHTAR KELİMELEER: Helikopter böcekleri, Doğu Anadolu, fauna, Güneydoğu Anadolu, kız böcekleri, Türkiye, yeni kayıt.

INTRODUCTION

Odonata is the most ancient winged insect order dating into the Permian Period (Grimaldi and Engel 2005). It is represented with 5680 species on all continents except Antarctica and species richness is highest in tropical forests (Kalkman *et al.* 2008). The most important threat to global diversity of Odonata is destruction of tropical forests (Kalkman *et al.* 2008).

The deteriorations of aquatic habitats caused by various human activities and their impacts on aquatic insect communities have been documented (Allan 2004, Bonada *et al.* 2006). A decline in Odonata diversity was reported in Europe due to habitat destruction during the last century. According to Van Tol and Verdonk (1988) 61 Odonata species were endangered, vulnerable or rare in Europe. Odonata larvae live in lakes, estuaries, wetlands and running waters which are under various threats eg. pollution, physical disturbances and climate changes over the last century.

Lestes macrostigma (Eversmann 1836), *Lestes virens vestalis* Rambur 1842, *Lestes parvidens* Artobolevski 1929, *Coenagrion ornatum* (Selys 1850) *Coenagrion scitulum* (Rambur 1842) *Ischnura pumilio* (Charpentier 1825) and *Sympetrum meridionale* (Selys 1841) were recorded from Temelli Lake near Ankara by Karakoyunlu (Kazancı) (1981). All these species disappeared because of physical loss of Temelli Lake as a result of draining for gaining agricultural and urban areas (Kazancı 2008). *Lestes macrostigma* is known as a rare species in Turkey and Temelli Lake was a certain locality of the species.

The Odonata species inhabiting running waters are at greater risk than those in lentic ecosystems (Clausnitzer *et al.* 2009). Odonata species distributed in lentic ecosystems are less specialised and have a higher dispersal capacity (Corbet 1999, Clausnitzer *et al.* 2009).

Response of Odonata larvae and adults to anthropogenic impacts on aquatic ecosystems and surrounding areas is a useful tool for nature management and conservation.

In this study investigations on the Odonata fauna were carried out between 1981 and 1984 in Eastern and Southeastern Turkey. Eighteen species, 12 genera, eight families were recorded. *Ischnura senegalensis* (Rambur 1842) is a new record for Turkey. Some ecological analysis of recorded species were also given.

MATERIALS AND METHODS

Imagos of Odonata samples were collected from surroundings of lakes, wetlands and running waters by a steel framed net and were preserved in envelopes. The period of collection trips were between 1981 and 1984 in Eastern and Southeastern Turkey. The collecting sites are in Southeastern Turkey except one site (Bayburt) in Eastern Turkey. Nikon SMZ 10 trinocular stereozoom microscope was used for identification. All materials were collected by authoress.

RESULTS AND DISCUSSION

Odonata fauna of Southeastern Turkey are not known (Kalkman and Pelt 2006). Seventeen species from Southeastern Turkey and one species, *Sympecma fusca* (Van Der Linden, 1820) from Eastern Turkey have been recorded in this study. *Ischnura senegalensis* (Rambur, 1842) is a new record for fauna of Turkey. The collecting sites of this species are very close to Iraq Border in Hakkari and Siirt Provinces. *Ischnura senegalensis* distributed in Old World Tropics and temperate Regions and from East Africa to Japan (Steinmann and Fischer 1997). This species was also known from Afrotropical Region and Middle East. It was recorded from Iraq and Iran (Kalkman 2006). The fauna of Taurus Mountains in Southeastern Turkey has similarities with Afrotropical Region because of transitional position (Kosswig 1955). Hakkari and Şırnak Provinces are the eastern extension of the Taurus Mountain Chain which collecting sites of *Ischnura senegalensis* are in this area. Therefore record of *Ischnura senegalensis* can be expected in this region. Ephemeroptera species, *Baetis pseudogemellus* Soldan 1977 was also recorded from Hakkari and Şırnak Provinces (Kazancı 2009). The species is known from Sudan in Afrotropical Region.

Species list

Zygoptera

Euphaeidae

***Epallage* Charpentier, 1840**

Epallage fatime (Charpentier, 1840)

Hakkari-Yüksekova Road, 1800m, 25. 7. 1984, 2 ♂; Hakkari: Yüksekova-Şemdinli Road, Karabey Village, 1900m, 27.7. 1984 , 1 ♂ (Leg. and coll. N. Kazancı).

Epallage fatime is known from numerous localities throughout the Turkey. This is the first record of this species from Hakkari Province.

Calopterygidae

***Calopteryx* Leach, 1815**

Calopteryx splendens intermedia Selys, 1870

Hakkari: Yüksekova, 2000m, 24. 7. 1983, 4 ♂ (Leg. and coll. N. Kazancı).

This subspecies is known from South and Southeastern Turkey (Kalkman 2006).

Lestidae

***Sympecma* Burmeister, 1839**

Sympecma fusca (Van Der Linden, 1820)

Bayburt: Yoncalı, 1900m, 28. 7. 1981, 3 ♀ (Leg. and coll. N. Kazancı).

Sympecma fusca is a widespread species through whole Turkey.

***Lestes* Leach, 1815**

Lestes barbarus (Fabricius 1798)

Hakkari, 1600m, 7. 7. 1983, 1 ♂; Hakkari: Berçelan High Plateau, 2000m, 9. 8. 1983, 3 ♂, 6 ♀; Hakkari, 1600m, 7. 7. 1983, 1 ♂; Hakkari: Merzan District, 1800m, 12. 8. 1983, 5 ♂, 6 ♀; Hakkari: Yüksekova, 1800m, 25. 7. 1984, 2 ♂, 4 ♀ (Leg. and coll. N. Kazancı).

This is a common species known from whole Turkey. But it is reported from Hakkari Province for the first time.

Lestes dryas Kirby 1890

Hakkari: Berçelan High Plateau, 2000m, 9. 8. 1983, 12 ♂, 5 ♀; Hakkari: Merzan District, 1800m, 12. 8. 1983, 15 ♂, 5 ♀ (Leg. and coll. N. Kazancı).

This species is common in north of Turkey and is scarce in the south (Kalkman 2006). This is the first record of this species from Hakkari Province.

Lestes sponsa (Hansemann 1823)

Hakkari, 1600m, 7. 7. 1983, 2 ♂ (Leg. and coll. N. Kazancı).

This species is common in north of Turkey and is scarce in the south (Kalkman 2006). This is the first record of this species from Hakkari Province.

Lestes virens (Charpentier, 1825)

Hakkari: Berçelan High Plateau, Halilan Lake (37° 34' N, 43° 43' E), 1900m, 24. 7. 1983, 6 ♂, 7 ♀; Hakkari-Van Road, Zap River, 1300m, 25. 7. 1984, 3 ♀; Hakkari: Yüksekova-Dağlıca Road, 1800m, 25. 7.1984, 1"♂, 2 ♀; Hakkari: Yüksekova-Şemdinli Road, Karabey Village, 1900m, 27. 7. 1984 , 15"♂, 5 ♀ (Leg. and coll. N. Kazancı).

This species is known from whole Turkey but it is scarce (Kalkman 2006). This is the first record of this species from Hakkari Province.

Platycnemididae

***Platycnemis* Burmeister, 1839**

Platycnemis dealbata Selys, 1863

Hakkari: Hakkari-Van Road, Zap River and Kırıkdağ Stream, 1300m, 25. 7. 1984, 2 ♀ (Leg. and coll. N. Kazancı).

This is common species in South and Southeastern Turkey (Kalkman 2006). This is the first record of this species from Hakkari Province.

Platycnemis pennipes pennipes (Pallas 1771)

Hakkari: 2000m, 7. 7. 1983, 4"♂, 2 ♀ (Leg. and coll. N. Kazancı).

The subspecies is common in west of Turkey and is scarce in the northeast (Kalkman 2006). This is the first record of this species from Hakkari Province.

Coenagrionidae

***Coenagrion* Kirby, 1890**

Coenagrion vanbrinkae Lohmann, 1993

Hakkari, 2000m, 7. 7. 1983, 6 ♂, 4 ♀ (Leg. and coll. N. Kazancı).

The species is known from Iran, Lebanon, Syria, Armenia and East Turkey (Kalkman 2006). This is the first record of this species from Hakkari Province.

***Enallagma* Charpentier, 1840**

Enallagma cyathigerum Charpentier, 1840

Hakkari: Merzan District, 1800m, 12. 8. 1983, 2 ♂ (Leg. and coll. N. Kazancı).

This is common species in Turkey (Kalkman 2006). This is the first record of this species from Hakkari Province.

***Ischnura* Charpentier, 1840**

Ischnura senegalensis (Rambur, 1842)

Hakkari : Yüksekova-Dağlıca Road, 1800m, 25. 7.1984, 4♂, 3 ♀; Siirt-Şirnak-Uludere Road, Siirt-Hakkari Province Border, 800m, 22. 7. 1984, 1♂ (Leg. and coll. N. Kazancı).

New record for Turkey.

This species is known from Asia, Afrotropical Region, Middle East and Iran (Kalkman 2006).

Anisoptera

Aeshnidae

***Aeshna* Fabricius, 1775**

Aeshna juncea (Linneaus, 1758)

Hakkari: Dağgöl District, 1800m, 22. 7. 1982, 1 ♂; Hakkari: Şemdinli, Güzelkonak Village, 1700m, 25. 7. 1984, 1♂; Hakkari: Yüksekova , 1900m, 27.7. 1984, 1♀ (Leg. and coll. N. Kazancı).

According to Kalkman (2006) *Aeshna juncea* is a scarce species and is known from Northeastern Turkey. This is the first record of this species from Hakkari Province.

Gomphidae

***Onychogomphus* Selys, 1854**

Onychogomphus assimilis (Schneider, 1845)

Hakkari: Dağgöl District, 1800m, 22. 7. 1982, 1♂ (Leg. and coll. N. Kazancı). The species is common in Southwestern coast of Turkey and Çoruh Valley. One record known from Hakkari Province (Kalkman 2006). This is the second record of this species from Hakkari Province.

Libellulidae

***Orthetrum* Newman, 1833**

Orthetrum brunneum (Fonscolombe, 1837)

Hakkari: Kırıkdağ Stream, 1300m, 17. 7. 1983, 1♀; Hakkari: Yüksekova, 1900m, 24. 7. 1983, 1♀ (Leg. and coll. N. Kazancı).

The species is common through Turkey.

Sympetrum* Newman, 1833Sympetrum flaveolum* (Linnaeus, 1758)

Hakkari: Berçelan High Plateau, 2000m, 12. 8. 1983, 2 ♀ (Leg. and coll. N. Kazancı).

The species is common through Turkey.

Sympetrum sanguineum sanguineum (Müller, 1764)

Hakkari: Yüksekova, 1900m, 24. 7. 1983, 3"♂, 4 ♀; Hakkari: Şemdinli, Güzelkonak, 1700m, 25. 7. 1984, 1 ♀ (Leg. and coll. N. Kazancı).

The subspecies is common through Turkey.

Sympetrum haritonovi Borisov 1983

Hakkari, 1600m, 7. 7. 1983, 1 ♂; Hakkari: Kırıkdağ Stream, 1300m, 17. 7. 1983, 2"♂ (Leg. and coll. N. Kazancı).

The species is known from Central Asia and is reported from one locality in Antalya Province and two localities in Erzurum Province (Kalkman 2006). This is the third record of Turkey from Hakkari Province.

Ecological notes and data analysis

The recorded species were collected from surroundings of first, second and third order running waters in subalpine (1900-2400m), montane (1000-1900m) and submontane (800-1000m) regions. The collecting sites belonged to Çoruh River (only one site in Bayburt) and Dicle River Basins.

Recorded Odonata species belonged to eight families, 12 genera and 18 species (Table 1). Zygoptera Suborder included 12 species (66,67%), with eight genera (66,67%) and five families (62,5 %) while Anisoptera Suborder included six species (33,33%), with four genera (33,33 %) and three families (37,5 %) (Table. 2, Fig.1).

Table 1. Distribution of species, families and genera in suborders.

Suborder	Nr of species	% of species	Nr of families	% of families	Nr of genera	% of genera
Zygoptera	12	66,67	5	62,5	8	66,67
Anisoptera	6	33,33	3	37,5	4	33,33
TOTAL	18	100 %	8	100 %	12	100 %

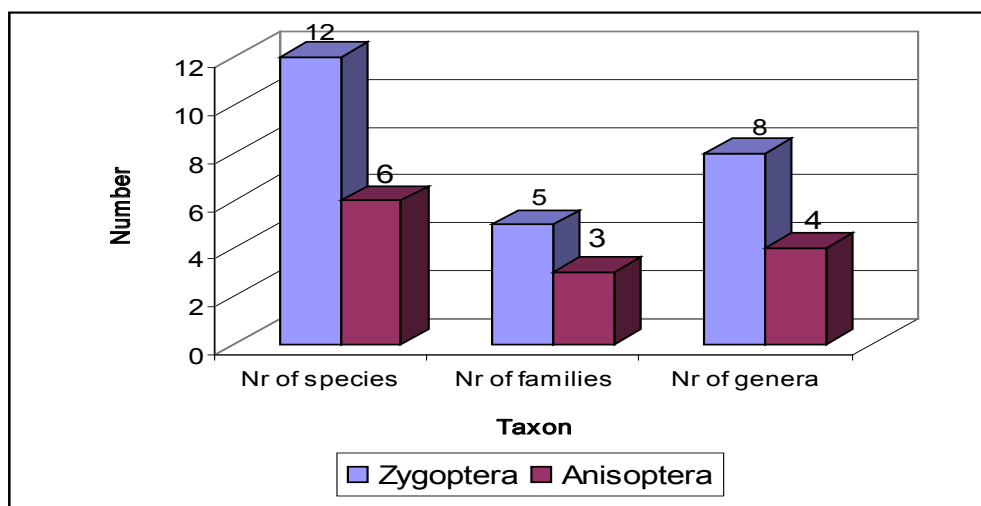


Figure 1. Number of species, families and genera according to suborders.

The most represented family was Lestidae from Zygoptera with five species (27.78 %) and was Libellulidae from Anisoptera with four species (22.22 %). Coenagrionidae was the most represented family with three genera (25.00 %) but Lestidae had highest species percentage (27.78 %) belonged to two genera (Table 2, Fig. 2).

Table 2. Distribution of species and genera in families.

Family	Nr of species	% of species	Nr of genera	% of genera
Euphaeidae	1	5,56	1	8,33
Calopterygidae	1	5,56	1	8,33
Lestidae	5	27,78	2	16,67
Platycnemididae	2	11,11	1	8,33
Coenagrionidae	3	16,67	3	25,00
Aeshnidae	1	5,56	1	8,33
Gomphidae	1	5,56	1	8,33
Libellulidae	4	22,22	2	16,67
TOTAL	18	100 %	12	100 %

Coenagrionidae included five species belonged to two genera while Lestidae included highest species belonged to two genera (Fig. 2).

The results of present research would be a guide for determination of change of taxa richness and of composition in study area in future.

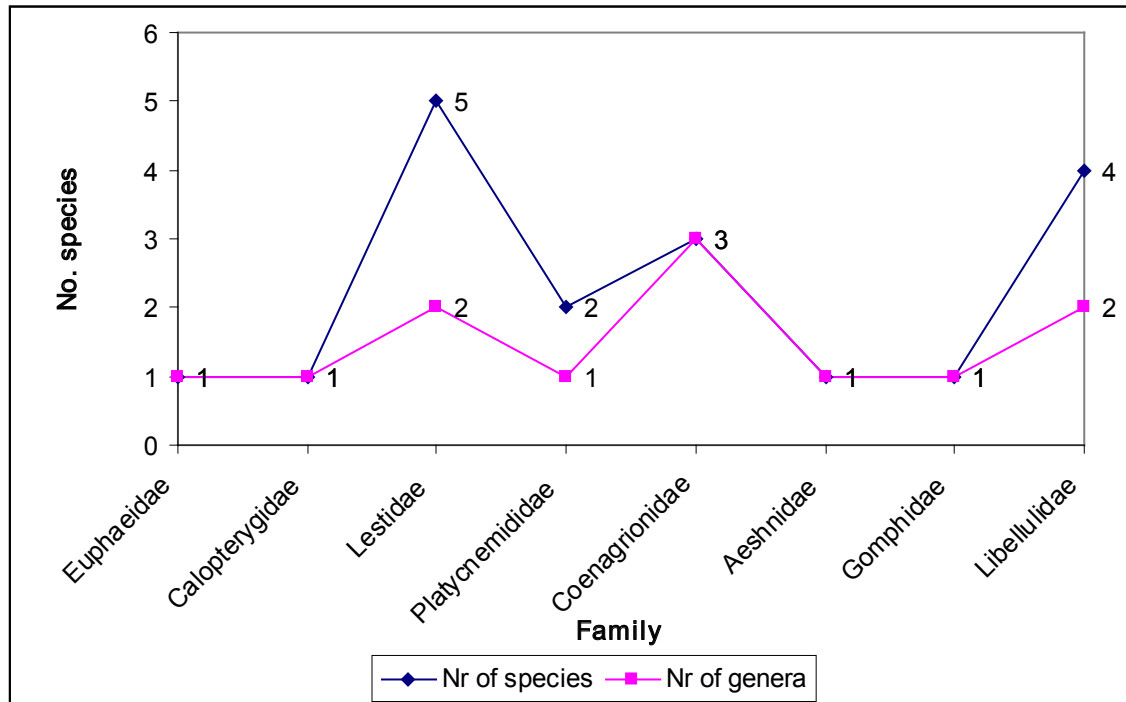


Figure 2. The relationships between the number of species and genera according to families.

CONCLUSION

The quantity and quality of odonate habitats are under threat of various anthropogenic activities. Morphological degradation and physical loss of habitats as a result of draining of wetlands for gaining agricultural and urban areas are important phenomenon in Turkey. Collecting sites of the populations of recorded species were generally isolated areas. Therefore the odonate populations are under greater risk due to heavy fragmentation of aquatic and terrestrial habitats and organic pollution of aquatic habitats.

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