

[Research]

## Dragonflies (Odonata) from South-Eastern Iran

A. Ebrahimi<sup>1\*</sup>, S. M. Madjdzadeh<sup>1</sup> and H. Mohammadian<sup>2</sup>

1. Dept. of Biology, Faculty of Sciences, Shahid Bahonar University, Kerman, Iran

2. Dept. of Environment, Biodiversity Office, Tehran, Iran

\* Corresponding author's E-mail: aebrahimi60@yahoo.com

### ABSTRACT

Twenty-seven species of Odonata were collected in the present survey in the freshwaters of South-Eastern Iran, Kerman province, in contrast to 11 species that were recorded previously from this region. In this study, 528 specimens were collected from more than 30 sites in Kerman province during 2006-2008. It seems that in this region due to its special biogeographic conditions, species diversity of this insect group is relatively high. In this research we collected African-Eurosiberian species, *Anax imperator*, in Kerman province which is the first record for central plateau of Iran. This species had been recorded only from northern part of Iran (Caspian Sea fringe).

**Keywords:** Biodiversity, Dragonflies, Freshwaters, Iran, Kerman province

### INTRODUCTION

Odonata is one of the oldest groups of winged insects found today. With 5680 extant species, dragonflies are a relatively small order of insects (Kalkman *et al.*, 2008). Odonata are well known insects occurring on all continents except Antarctica (Trueman, 2007). The vast majority of this group occur on tropical and subtropical climate zones (Dumont, 1991). Western Palaearctic, wherein Iran is located, has the poorest fauna of this group in the world. Low diversity of Odonata in western Palaearctic in comparison to the other biogeographical regions is largely due to the advance of glaciers during the Pleistocene ice ages (Kalkman *et al.*, 2008). Here the main mountain ranges and seas run east-west (e.g., the Mediterranean Sea, the Pyrenees, Alps and Himalayas) thus forming a barrier for northern species retreating southwards (Kalkman *et al.*, 2008).

Although this order is an important group among the insects, Odonata fauna is poorly known in Iran. However, Heidari and Dumont (2002), presented an annotated check-list of the Odonata of Iran in which 95 reported species were collected during 1945-

1995. This check-list was mostly on the basis of the previous limited studies on Iran dragonfly fauna (Schmidt, 1954; Blom, 1982; Lohmann, 1990, 1992). Despite these studies, South East of the country has not yet been investigated in detail. In fact according to the mentioned check-list, aside from the area of Tehran and the Caspian coastal fringe, the remainder of Iran is poorly known for its dragonfly fauna. Meanwhile, recent studies of Odonata fauna of Iran have been performed locally (Riazi, 1991; Majidi-Shilasar *et al.*, 1998; Ghahari, *et al.*, 2009), therefore many parts of the country have not been well studied yet.

Kerman province is situated on South-eastern Iran and is the largest province of the country (11.15% of whole country). This region is one in which Zagros Mountains, central mountains and lowland deserts, meet. Kerman is located next to the Loot desert which is one of the hottest zones both of Iran and of the world. However, presence of mountains including Kouhbanan (3775m), Jaftan (3975m) and Pelvar (4233m) at the margin of the desert decreases its destroying effects on fauna and flora of the region. Extension of Zagros and central mountains

has divided this place into two distinct sections, dry deserts and temperate valleys which meet together form three zones: desert and marginal desert, tropical zones and temperate mountain zones (Geographic studies of Kerman province, 2007); therefore, it is among the rare regions possessing a variety of climates and different aspects of environmental forms. As a result of this geographic isolation, diversity of animal species and habitats is unique. Unfortunately, from the viewpoint of animal species, this region has been paid less attention and examination.

In this research regarding the distribution zones, and climate conditions and lack of information about Kerman and Iran dragonflies fauna, we carried out our investigation on Odonata fauna of Kerman province.

## MATERIALS AND METHODS

In 2006-2008 (from April to November) we

studied the dragonfly specimens from different habitats of several sampling sites close to freshwater bodies, mainly along canals, pools, streams, ponds and small seasonal rivers. The main collection sites are shown in Fig.1. Odonata specimens (adults) were collected with long-handed aerial net with a net opening of at least 18". White nets make it easier to find the specimen in the net. A wide mesh is preferred because this reduces air resistance and allows a faster swing. Then we placed them, wings folded back, in a glassine (stamp or coin) envelope labeled with locality and date, and transported to the laboratory. All specimens were pinned and the wings were spread and identified according to Dumont (1991), Dijkstra and Lewington (2006) and Kalkman (2006). All specimens were deposited at the insect collection of Zoology Museum, Department of Biology, Shahid Bahonar University, Kerman, Iran.

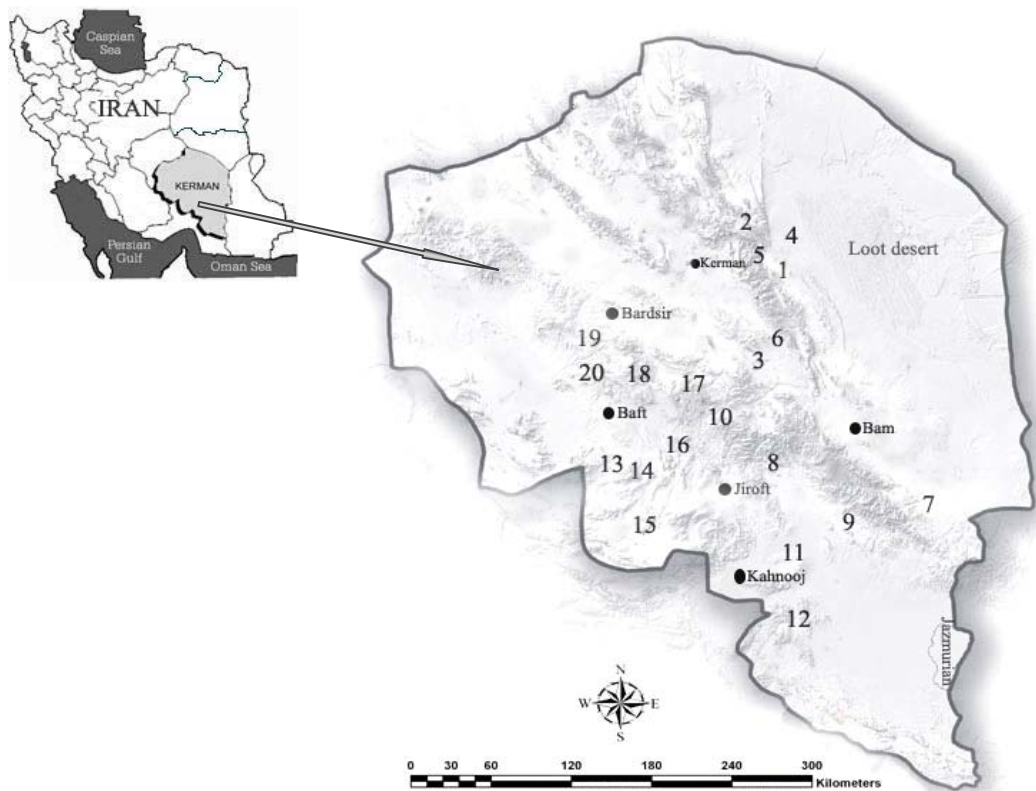


Fig 1. Map of studied area. The main collecting sites are given. The numbers corresponds to the site localities.

**Localities**

- (1) **Sirch**, East of Kerman. 30° 9.4'N, 57° 32.6' E, Elv:1761m.  
 (2) **Koohpayeh**, North Eastern Kerman. 30° 31.7'N, 57° 14.2' E, Elv:2204m.  
 (3) **Rayen**, South of Kerman. 29° 03.2'N, 57° 49.8' E, Elv:2785m.  
 (4) **Shahdad**, East of Kerman. 30° 31.4'N, 57° 21.9' E, Elv:429m.  
 (5) **Sarasiab**, East of Kerman. 30° 31.2'N, 57° 56.8' E, Elv:1864m  
 (6) **Sekonj**, South East of Kerman. 24° 03.3'N, 57° 28.7' E, Elv:2326m  
 (7) **Reygan**, South East of Bam. 28° 39'N, 59° 0' E, Elv: 1060m  
 (8) **Jabalbarez**, North Eastern Jiroft. 28° 08.1'N, 57° 55.2' E, Elv:1764m  
 (9) **Anbarabad**, South Eastern Jiroft. 28° 57.7'N, 57° 58.1' E, Elv:630m.  
 (10) **Sardueyeh**, North of Jiroft. 29° 22.3'N, 57° 27.3' E, Elv:2670m.  
 (11) **Zarchin**, North Eastern Kahnooj. 28° 27.0'N, 57° 39.0' E, Elv:773m.  
 (12) **Rezaabad**, South of Kahnooj. 27° 53.4'N, 57° 04.9' E, Elv:581m.  
 (13) **Khabr** (National park), South Western Baft. 28° 48.7'N, 56° 20.5' E, Elv:2119m.  
 (14) **Ruchoon** (wild life refuge), South Western Baft. 28° 39.8'N, 56° 19.8' E, Elv:1761m.  
 (15) **Orzueyeh**, South of Baft. 28° 31.9'N, 56° 2.1' E, Elv:1208m.  
 (16) **Anjerk**, South Eastern Baft. 29° 14.2'N, 56° 51.4' E, Elv:2463m.  
 (17) **Lalezar**, South Eastern Bardsir. 29° 30.9'N, 56° 48.3' E, Elv:2848m.  
 (18) **Ghale-Asgar**, South of Bardsir. 56° 06.1'N, 29° 55.9' E, Elv:2735m  
 (19) **Bidueyeh**, North Eastern Kerman. 30° 55.5'N, 57° 44.9' E, Elv:2515m  
 (20) **bidkhan**, South Western Bardsir. 56° 25.7'N, 29° 24.3' E, Elv:2456m.

**RESULTS**

Table 1 lists all the species known in this study with an indication of their status in the area.

In the following accounts all localities of the species are represented in detail.

**List of Odonata species**

The Species that are marked with " \* ", are reported as new records of the present study from Kerman province.

**Suborder Zygoptera****Family Calopterygidae****Genus *Calopteryx* Leach, 1815**

**1** *Calopteryx splendens intermedia* Selys, 1887

**Loc(1):** 23.05.2007, 5♂, 2♀; **Loc(2):** 03.06.2008, 28.07.2007, 9♂, 2♀; **Loc(5):** 18.09.2008, 1♂, 1♀; **Loc(16):** 15.05.2007, 5♂, 4♀; **Loc(19):** 29.05.2007, 19♂, 9♀; **Loc(20):** 26.06.2008, 1♂

**Table1. List of Odonata species recorded from Kerman province. For each species the number of records, number of sites and indication of abundance status is given**

Species	Records	Sites	Status
<i>Calopteryx splendens intermedia</i>	58	9	common
<i>Epallage fatime</i>	54	8	common
<i>Ischnura pumilio</i>	27	7	common
<i>Ischnura elegans</i>	24	7	common
<i>Ischnura evansi</i>	4	4	scarce
<i>Coenagrion vanbrinkae</i>	2	2	scarce
<i>Enallagma cyathigerum</i>	11	4	uncommon
<i>Platycnemis dealbata</i>	19	5	uncommon
<i>Corduligaster insignis</i>	33	13	common
<i>Onychogomphus lefeborii</i>	11	6	uncommon
<i>Anax parthenope</i>	2	2	scarce
<i>Anax imperator</i>	3	3	scarce
<i>Crocothemis erythraea</i>	17	10	fairly common
<i>Sympetrum fonscolombeii</i>	7	5	scarce
<i>Zygonyx torridus</i>	1	1	very rare
<i>Orthetrum chryso stigma</i>	26	15	common
<i>Orthetrum brunneum</i>	25	13	common
<i>Orthetrum coerulecence anceps</i>	63	16	very common
<i>Orthetrum taeniolatum</i>	30	18	very common
<i>Orthetrum Sabina</i>	4	1	rare
<i>Orthetrum ransoneti</i>	6	3	scarce
<i>Trithemis festiva</i>	40	25	very common
<i>Trithemis annulata</i>	5	2	scarce
<i>Trithemis kirbyi</i>	23	9	fairly common
<i>Trithemis artriosa</i>	8	6	uncommon
<i>Libellula depressa</i>	4	2	scarce
<i>Pantala flavescens</i>	21	2	scarce

**Family Euphaeidae****Genus *Epallage* Charpentier, 1840**

**2** *Epallage fatime* Charpentier, 1840

**Loc(1):** 14.05.2007, 7♂, 4♀; **Loc(2):** 03.06.2008,

11♂, 5♀; **Loc(13)**: 31.05.2006, 2♂, 2♀; **Loc(19)**: 29.05.2007, 18♂, 6♀

#### Family Platycnemididae

##### Genus *Platycnemis* Burmeister, 1839

\*3 *Platycnemis dealbata* Selys & Hagen, 1850  
**Loc(1)**: 14.05.2007, 2♂, 2♀; **Loc(3)**: 22.06.2008, 3♀; **Loc(13)**: 15.08.2006, 2♂, 1♀; **Loc(16)**: 15.05.2007, 2♂, 3♀; **Loc(20)**: 26.06.2008, 3♂, 1♀

#### Family Coenagrionidae

##### Genus *Ischnura* Charpentier, 1840

\*4 *Ischnura elegans ebneri* Schmidt, 1838  
**Loc(1)**: 14.05.2007, 3♂, 2♀; **Loc(2)**: 20.07.2007, 1♂, 2♀; **Loc(3)**: 22.06.2008, 3♂; **Loc(4)**: 11.11.2008, 2♂, 1♀; **Loc(13)**: 30.05.2006, 2♂, 1♀; **Loc(16)**: 15.05.2007, 2♂; **Loc(17)**: 25.06.2008, 3♂, 2♀

\*5 *Ischnura pumilio* Charpentier, 1825  
**Loc(2)**: 03.06.2008, 4♂, 2♀; **Loc(5)**: 18.09.2008, 3♂, 2♀; **Loc(8)**: 12.04.2007, 1♂, 2♀; **Loc(10)**: 20.05.2008, 1♂; **Loc(11)**: 17.06.2008, 3♂, 1♀; **Loc(13)**: 31.05.2006, 2♂, 2♀; **Loc(17)**: 25.06.2008, 2♂, 2♀

\*6 *Ischnura evansi* Morton, 1919  
**Loc(4)**: 11.11.2008, 1♂; **Loc(10)**: 20.05.2008, 2♂, 1♀

##### Genus *Coenagrion* Kirby, 1890

\*7 *Coenagrion vanbrinkae* Lohmann, 1993  
**Loc(11)**: 17.06.2008, 1♂; **Loc(12)**: 18.06.2008, 1♀

##### Genus *Enallagma* Charpentier, 1840

8 *Enallagma cyathigerum* Charpentier, 1840  
**Loc(2)**: 03.06.2008, 2♂, 1♀; **Loc(11)**: 17.06.2008, 2♂, 1♀; **Loc(12)**: 18.06.2008, 3♂; **Loc(16)**: 23.04.2007, 2♂

#### Suborder Anisoptera

#### Family Aeshnidae

##### Genus *Anax* Leach, 1815

9 *Anax parthenope* Selys, 1839  
**Loc(1)**: 23.05.2007, 1♀; **Loc(19)**: 29.05.2007, 1♂

\*10 *Anax imperator* Leach, 1815  
**Loc(1)**: 20.06.2006, 1♀; **Loc(3)**: 22.06.2008, 1♀; **Loc(13)**: 14.08.2006, 1♂

#### Family Cordulegasteridae

##### Genus *Cordulegaster* Leach, 1815

11 *Cordulegaster insignis nobilis* Morton, 1916  
**Loc(1)**: 20.06.2006, 1♂; **Loc(2)**: 20.07.2007, 1♂; **Loc(3)**: 22.06.2008, 1♂; **Loc(6)**: 20.07.2007, 1♂; 1♀; **Loc(13)**: 31.05.2006, 08.06.2006, 17♂; **Loc(17)**: 25.06.2008, 1♂; **Loc(19)**: 29.05.2007, 8♂; **Loc(20)**: 26.06.2008, 1♂

#### Family Gomphidae

##### Genus *Onychogomphus* Selys, 1854

12 *Onychogomphus lefebvrei* Rambur, 1842  
**Loc(1)**: 20.06.2006, 2♂; **Loc(8)**: 12.04.2007, 1♂, 1♀; **Loc(13)**: 31.05.2006, 2♂, 1♀; **Loc(19)**: 29.05.2007, 1♂, 1♀; **Loc(20)**: 26.06.2008, 2♂

#### Family Libellulidae

##### Genus *Orthetrum* Newman, 1883

\*13 *Orthetrum taeniolatum* Schneider, 1845  
**Loc(1)**: 20.06.2006, 1♂; **Loc(2)**: 20.07.2007, 2♂; **Loc(4)**: 11.11.2008, 1♂; **Loc(9)**: 02.11.2008, 5♂, 4♀; **Loc(10)**: 20.05.2008, 1♂; **Loc(11)**: 17.06.2008, 1♂; **Loc(12)**: 18.06.2008, 1♂, 2♀; **Loc(13)**: 15.08.2006, 4♂, 1♀; **Loc(14)**: 09.06.2006, 1♂; **Loc(15)**: 19.05.2007, 2♂, 1♀; **Loc(16)**: 23.04.2007, 2♂, 1♀

\*14 *Orthetrum coerulescence anceps* Schneider, 1845

**Loc(1)**: 20.06.2006, 18♂, 6♀; **Loc(2)**: 28.07.2007, 03.06.2008, 10♂, 3♀; **Loc(5)**: 18.09.2008, 1♂; **Loc(8)**: 12.04.2007, 1♂; **Loc(9)**: 02.11.2008, 1♂; **Loc(11)**: 17.06.2008, 1♂; **Loc(12)**: 18.06.2008, 2♀; **Loc(13)**: 31.05.2006, 15.08.2006, 8♂, 3♀; **Loc(14)**: 09.05.2006, 7♂; **Loc(15)**: 19.05.2007, 2♂, 1♀; **Loc(19)**: 29.05.2007, 1♀

15 *Orthetrum brunneum* Fonscolombe, 1837

**Loc(1)**: 20.06.2006, 2♂, 2♀; **Loc(3)**: 22.06.2008, 3♂; **Loc(6)**: 20.07.2007, 1♂; **Loc(8)**: 12.04.2007, 1♂; **Loc(13)**: 09.06.2006, 3♂, 1♀; **Loc(15)**: 19.05.2007, 3♂, 2♀; **Loc(18)**: 15.06.2008, 1♂, 1♀; **Loc(19)**: 29.05.2007, 1♂; **Loc(20)**: 26.06.2008, 3♂, 1♀

\*16 *Orthetrum ransoneti* Brauer, 1865

**Loc(8)**: 12.04.2007, 1♀; **Loc(13)**: 31.05.2006, 1♀; **Loc(16)**: 23.04.2007, 4♂

\*17 *Orthetrum chrysostigma* Burmeister, 1839  
**Loc(1)**: 20.06.2006, 1♂; **Loc(4)**: 11.11.2008, 3♂, 1♀; **Loc(8)**: 12.04.2007, 4♂; **Loc(9)**: 03.06.2008, 22.11.2008, 3♂, 1♀; **Loc(13)**: 31.05.2006, 2♂, 2♀; **Loc(14)**: 02.06.2006, 1♂; **Loc(11)**: 17.06.2008, 2♂, 1♀; **Loc(15)**: 26.11.2008, 1♂, 3♀; **Loc(19)**: 29.05.2007, 1♂

\*18 *Orthetrum sabina* Drury, 1773

**Loc(9)**: 22.11.2008, 4♂

##### Genus *Trithemis* Brauer, 1868

\*19 *Trithemis annulata* Palisot de Beauvois, 1807

**Loc(11)**: 17.06.2008, 2♂; **Loc(7)**: 03.11.2008, 3♂

\*20 *Trithemis arteriosa* Burmeister, 1839  
**Loc(7)**: 03.11.2008, 1♂; **Loc(9)**: 22.11.2008, 1♂; **Loc(11)**: 17.06.2008, 2♂, 1♀; **Loc(13)**: 31.05.2006, 1♀; **Loc(14)**: 02.06.2006, 1♂; **Loc(15)**: 13.06.2006, 1♀

21 *Trithemis festiva* Rambur, 1842

**Loc(1):** 20.06.2006, 8♂; **Loc(2):** 03.06.2008, 1♂;  
**Loc(4):** 11.11.2008, 3♂; **Loc(7):** 03.11.2008, 3♂;  
**Loc(8):** 12.04.2007, 5♂, 1♀; **Loc(10):** 20.05.2008,  
 1♂; **Loc(12):** 18.06.2008, 1♂; **Loc(13):**  
 31.05.2006, 8♂, 1♀; **Loc(14):** 02.06.2006, 1♂;  
**Loc(15):** 13.06.2006, 1♂, 2♀; **Loc(16):**  
 23.04.2007, 1♂, 1♀; **Loc(18):** 15.06.2008, 1♂;  
**Loc(20):** 26.06.2008, 1♂

\*22 *Trithemis kirbyi* Selys, 1891

**Loc(1):** 20.06.2006, 3♂, 1♀; **Loc(10):** 20.05.2008,  
 3♂, 1♀; **Loc(13):** 21.08.2006, 3♂, 2♀; **Loc(16):**  
 19.05.2007, 8♂, 1♀; **Loc(19):** 29.05.2007, 1♂

#### Genus *Libellula* Linnaeus, 1758

\*23 *Libellula depressa* Linnaeus, 1758

**Loc(17):** 25.06.2008, 1♂, 2♀; **Loc(19):**  
 01.06.2007, 1♂

#### Genus *Crocothemis* Brauer, 1868

\*24 *Crocothemis erythraea* Brullé, 1832

**Loc(1):** 20.06.2006, 4♂, 1♀; **Loc(8):** 12.04.2007,  
 1♂; **Loc(9):** 22.11.2008, 3♂, 1♀; **Loc(13):**  
 09.06.2006, 3♂; **Loc(15):** 13.06.2006, 2♂, 2♀

#### Genus *Pantala* Hagen, 1861

\*25 *Pantala flavescens* Fabricius, 1798

**Loc(13):** 14.08.2006, 15♂, 6♀

#### Genus *Sympetrum* Newman, 1833

26 *Sympetrum fonscolombi* Selys, 1840

**Loc(2):** 28.07.2007, 1♀; **Loc(3):** 22.06.2008, 1♀;  
**Loc(8):** 12.04.2007, 1♀; **Loc(17):** 25.06.2008, 1♂;  
**Loc(19):** 29.05.2007, 3♂

#### Genus *Zygonyx* Hagen, 1867

\*27 *Zygonyx torridus* Kirby, 1889

**Loc(13):** 10.06.2006, 1♂

## RESULTS AND DISCUSSION

In this survey we reported 27 species of Odonata belonging to eight families in

Kerman province. In previous limited studies which have been done in the region only 11 species have been reported. As a result, due to this study 18 species accounted as new records for this province. Here, we could not find *Sympecma paedisca annulata* and *Ischnura aurora* which had been reported in the previous study (Heidari & Dumont, 2002). We found *Anax imperator* in this region that has been recorded only from Caspian Sea fringe (Heidari & Dumont, 2002; Ghahari *et al.*, 2009), while this species has not been so far reported in any region of the central plateau of Iran.

The family Libellulidae has allocated the majority of dragonflies' genera and species (55%) in the region as shown in Fig.2, and *Trithemis festiva* is a common species in the most of the collecting sites. Khabr National park (Loc.13) is a typical habitat for the species in the province so that 70 percent of all species have been involved there.

It is remarkable that, although a number of suitable habitats for these insects seems to be rare all over this region, the species appears to be abundant. In comparison with North of Iran that has enormous suitable habitats for these insects, Odonates biodiversity and availability in Kerman province is noticeable. In spite of high temperature condition and scarcity of forest habitats as a result of low precipitation and humidity, we can attribute this biodiversity to the existence of mountains in the region. Indeed mountains not only provide a greater contemporary diversity of habitats, but also a greater potential for survival in regional refugia (Kalkman *et al.*, 2008).

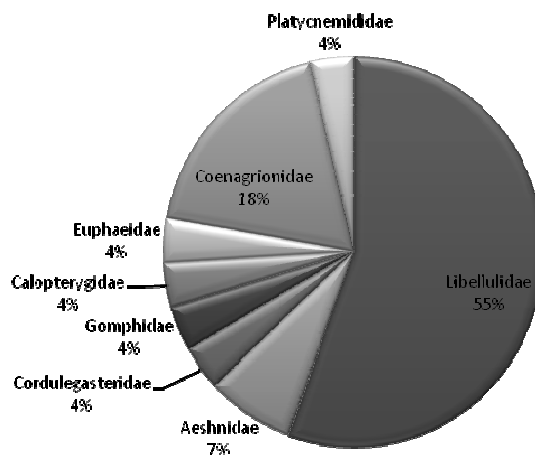


Fig 2. The percentage availability of all family groups caught from Kerman province in the present study.

However; some habitats in north, northwestern and parts of southern province especially Jazmurian basin district have not been studied in detail till now. Probably with more extensive investigations, the number of species in the future checklists will be increased and even new species and/or new records for Kerman province and Iran may be added.

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