

CHECKLIST OF THE HARVESTMEN OF TURKEY (ARACHNIDA: OPILIONES)

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ABSTRACT: Till recent, 50 species plus three subspecies of Opiliones inhabiting Turkey are recorded. These species take place in 25 genera in 6 families in 3 suborders. In this study, the authors present a short historical faunistic review of the harvestmen, and give records and geographical distributions of the species in Turkey.

KEY WORDS: Harvestmen, Opiliones, Turkey, new record, checklist, zoogeography.

Most of harvestmen live in tropical regions of the South Hemisphere. They found in different ecosystems such as forests, fields, steppes, mountains, caves, and prefer moist places (Nosek, 1905; Ljovuschkin & Starobogatov, 1963; Maclede, 1970; Jennings, 1983; Hillyard & Sankey, 1989; Snegovaya & Chemeris, 2004). Harvestmen feed mostly on soft bodied arthropods but they feed also on fruit remnants and mushrooms (Adams, 1984; Philipson, 1960 a,b; Gruber & Martens, 1968; Edgar, 1971). Harvestmen do not prefer polluted places. Therefore ecologists point out their peculiarities being indicator species (Sunderland & Sutton, 1980; Adams, 1984).

About 6300 species are located in Opiliones. Opiliones is divided four suborders: Cyphophthalmi, Laniatores, Dyspnoi and Eupnoi. Cyphophthalmi is a small group and contains primitive species. The members resemble the opiliocarid mites. Laniatores is the largest group. The members are widespread in the tropics and subtropics. The members of Dyspnoi and Eupnoi are mostly found on the North Hemisphere.

As in many groups the first researcher of harvestmen is Linnaeus (1758). After Linnaeus some arachnologists such as Fabricius, Degeer, Herbst, Hermann, Kraepelin, Meade, Koch and Thorell introduced hundreds of species and were established the harvestmen fauna of European countries. In 20th Century, Roewer (1912, 1923, 1950, 1956, 1959) made a lot of works in the Palearctic Region and published many articles on harvestmen. In Europe, taxonomical, faunistic and ecological studies have performed. Gruber himself (1968, 1969, 1976, 1978, 1979, 1984, 1988, 1993, 1996a-b, 1998, 2000, 2001), Gruber & Martens (1968), Stol (1993), Komposch (1999, 2004, 2009), Komposch & Gruber (2004), Starega (2000) have worked on harvestmen fauna of Germany, Belgium, France, Spain, Italy, Austria, Yugoslavia, Greece, Bulgaria, Romania, Poland, Ukraine, Denmark, Ireland, Tunisia and given records of many species from these countries. In addition, Karaman (1990, 1992, 1993, 1995, 1996) has worked on harvestmen fauna of Yugoslavia, Serbia and Balkan Peninsula.

On the other hand, Starega (1966) and Snegovaya (1999) have worked on harvestmen fauna of Caucasus and Azerbaijan. Snegovaya (1999) has raised the

species number from 42 to 52. Then Snegovaya & Chemeris (2004) raised this number to 60 with contributions. Chevrizov (1979) has investigated the harvestmen fauna of the Eastern Europe and Russia. Novak & Gruber (2000) revized the harvestmen fauna of Slovenia. Silhavy worked on the harvestmen of the Caucasian Kuban Mountains (1966) and Southern Slovakia (1968). Martens (1965, 1969, 1978) investigated on the harvestmen fauna of the Karpat Mountains, Greece, the Aegean Islands, Crete, Rhodos and Kos. Martens (1978) and Cokendolpher (1990) collected specimens from Syria, Lebanon, Israel and Egypt and gave many species records from these countries.

Çorak (2004) examined harvest specimens collected from different parts of Turkey and recorded 7 species belong to 6 genera in 2 families in her MSc Thesis. Among the species four are new records for the Turkish harvestmen fauna. Also, Kurt (2004) collected harvestmen of Niğde and environments, and established 13 species belong to 8 genera in 3 families. In this study, 10 species are new records for Turkey. Bayram et al. (2006) investigated the harvestmen fauna of the Soğuksu National Park in Ankara, and established 5 species from the park. Among these species two are new records for Turkey. In addition, *Leiobunum rotundum*, *L. rupeste*, *Mitopus morio* and *Ischyropsalis helwigii* were given as new records for the Turkish harvestmen fauna by Kurt et al. (2008).

In this paper, the species list of the Turkish harvestmen and their geographical distributions are given. The checklist also contains one new record for the Turkish harvestmen fauna with drawings of the taxonomical items. In identification, the keys of Simon (1926), Roewer (1956), Martens (1965), Silhavy (1966), Gruber (1969), Chevrizov (1979) and Hillyard & Sankey (1989) were used. The species number was determined after a critical review of all available records from the literatures concerning the harvestmen in Turkey and a revision of the existing materials in Arachnology Museum of Kırıkkale University (KUAM). The zoogeographical classification of the species was made on basis of literature data reflecting their current distribution (Giribet 2000, Kury 2006, Hillyard & Sankey 1989). The specimens were deposited in KUAM. The species available in KUAM were marked by an asteriks in Table 1.

GEOGRAPHICAL REGIONS OF TURKEY

Turkey is located on crossection of the boreal, Euro-Siberian, Irano-Turan and Mediterranean elements. It binds the elements of Central Asia, Mesopotamia, Caucasus and Balkans (Akman 1993). Turkey is surrounded by seas, has got high mountains and mountain chains, plateaus and wide plains. With these features Turkey is divided into seven geographical regions: Marmara Region, Black Sea Region, East Anatolian Region, Southeast Anatolian Region, Mediterranean Region, Aegean Region, Central Anatolia Region (the Anatolian plateau). In order to show detailed distribution, the Blacksea Region divided into three parts: the West-, the Middle- and the East Black Sea Regions. Like this the Mediterranean Region divided into two parts: the West- and the East Mediterranean Regions.

The Marmara Region includes the European part of Turkey. It has got wide plains. The terrestrial climate is dominant but the Mediterranean climate can be seen too. The Black Sea Region has got long mountain chains. The mountains lay parallel to the sea. The climate is moderate. The nort sides of the mountain chains are covered with dens forests. Especially the East Black Sea Region is the most moisture part. However, the south sides of the mountain chains have got steppes and show the terrestrial climate. The East Anatolian Region is the highest part of Turkey. Many high mountains such as Ağrı, Allahuekber, Tendürek, Süphan,

Nemrut and Cilo Mountains are located in this part. For example, the mean altitude from sea level on the Erzurum-Kars Plateau is 2100 metres. The typical terrestrial climate is dominant in this region. The vegetation type is steppe or oak forest. The Southeast Anatolian Region has got plains and plateau located between Dicle and Fırat Rivers. The mountains are not high. Dominant vegetation is steppe. The Mediterranean Region is located in the south part of Turkey. The West- and Middle Taurus Mountain chains lay parallel to the sea. Osmaniye, Adana and Antalya have got alluvial and productive plains. Citrus trees, cotton and greenhouses are widespread. The vegetation type is maquis, the climate type is the mediterranean. The Aegean Region is located in west part of Turkey. The mountains are not high and parallel to the sea. The plains are wide and productive. On the coast part the mediterranean, in the inside part the terrestrial climate is dominant. In this region, tobacco, olive, cotton, fig and grapes are grown. The Central Anatolia Region is covered with plateaus and unproductive plains. The most grown plant is wheat. The vegetation type is steppe, the climate type is terrestrial (Fig. 1). The abbreviations used for geographical regions in the paper are as follows: MR = Marmara Region, WBSR = West Blacksea Region, MBSR = Middle Blacksea Region, EBSR = East Blacksea Region, EAR = East Anatolian Region, SEAR = Southeast Anatolian Region, EMTR = East Mediterranean Region, WMTR = West Mediterranean Region, AR = Aegean Region, CAR = Central Anatolian Region.

RESULTS AND DISCUSSION

The harvestmen fauna of Turkey is represented by 50 species and 3 subspecies belong to 25 genera in 6 families in 3 suborders: Sironidae 1 species (plus 2 subspecies), Trogulidae 7 species in 4 genera, Nemastomatidae 5 species (plus 1 subspecies) in 4 genera, Dicranolasmatidae 5 species in 1 genus, Ischyropsalididae 2 species in 1 genus, Phalangidae 30 species in 14 genera, (Table 1, Figs. 1-3). The distribution maps of the species in Turkey are shown in the Appendix. The maps are given according to the species order in the Table 1.

As it is subjected above, Turkey has got many different ecosystems and biological diversity is high. Turkey binds the elements of Balkans, Caucasia, Central Asia and Mesopotamia. For this reason a great many species should take place in the checklist but very limited works were performed on harvestmen in Turkey. According to Blick and Komposch (2004) from Belgium 27, Netherlands 27, Denmark 19, Norway 17, Sweden 20, Finland 12, Poland 36, Germany 49, Switzerland 49, Austria 61, Czech Republic 33, Slovakia 32, Hungary 33, Slovenia 58 (in 2006 this number raised to 64, Novak et al. 2006) are known.

In some articles such as Joseph 1868 and Roewer 1914, 1956, the locality of the collected specimen was not clear (e.g. Asia Minor, Anatolia, Klein Asien). So, the exact locality could not be shown on the map. In order to establish the harvestmen fauna of Turkey, more works are needed.

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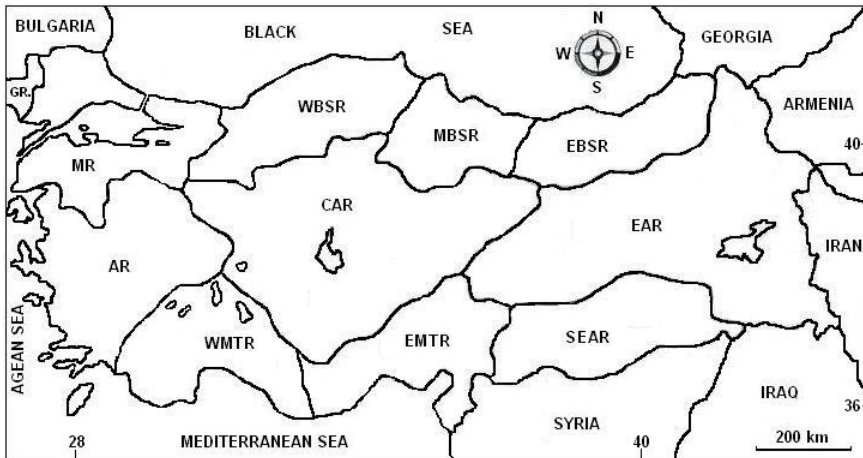


Figure 1. The geographical regions of Turkey.

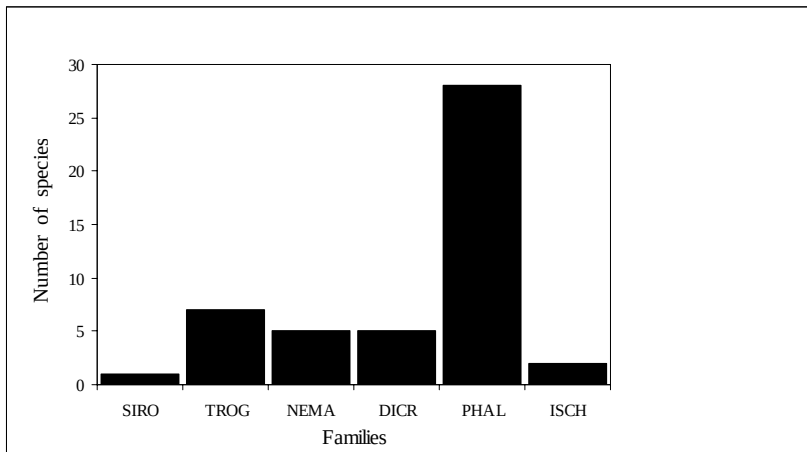


Figure 2. Number of harvestmen species per family in Turkey (SIRO: Sironidae, TROG: Troglidae, NEMA: Nemastomatidae, DICR: Dicranolasmatidae, PHAL: Phalangiidae, ISCH: Ischyropsalididae).

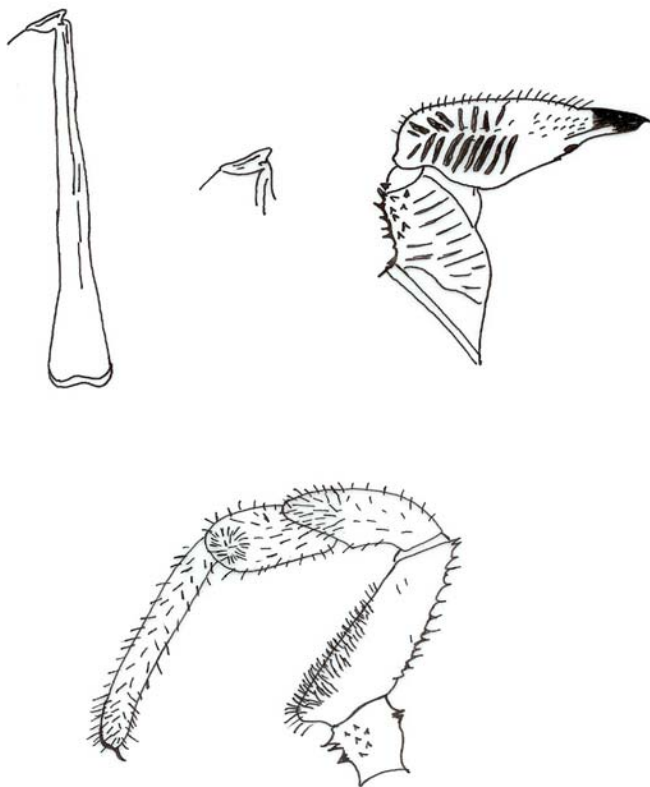


Figure 3. *Metaplatybunus petrophilis*. A- Chelicera; B- Pedipalpus; C- Penis; D- Penis, head.

Table 1. List of the harvestmen species distributed in Turkey.

SPECIES	Distribution in Palearctic	Distribution in Turkey	Reference
CYPHOPHTHALMI			
Sironidae			
1. <i>Cyphophthalmus duricorius duricorius</i> Joseph, 1868	Austria, Croatia, Yugoslavia	—	Joseph, 1868
1a. <i>C. duricorius bithynicus</i> (Gruber, 1969) (*)	Turkey	MR (Bursa) AR (Manisa)	Gruber, 1969 Bayram (Unpubl. data)
1b. <i>C. d. yalouensis</i> (Gruber, 1969)	Turkey	MR (Yalova)	Gruber, 1969
DYSPOI			
Trogulidae			
2. <i>Calathocratus beieri</i> Gruber, 1968	Turkey	EMTR (Mersin)	Gruber, 1968
3. <i>Platybessobius caucasicus</i> Silhavy, 1966	Northern Caucasus, Azerbaijan, Georgia	Anatolia	Snegovaya, 1999
4. <i>Platybessobius singularis</i> Roewer, 1940	Crete, Greece, Turkey	WBSR (Bolu), MR (Bursa, Istanbul)	Gruber, 1969
5. <i>Trogulocratus rhodiensis</i> Gruber, 1963	Rhodos, Karpates, Turkey	AR (Muğla)	Gruber, 1978
6. <i>Trogulus gypseus</i> Simon, 1879	Italy, Crete, Karpates, Syria, Kos, Turkey, Syria, Israel, Egypt	Anatolia	Ökenderoğlu, 1990
7. <i>Trogulus tricarinatus</i> (Linnaeus 1758)	Southeast Europe, Germany, Austria, Eastern Alps, Slovenia, Turkey	MR (Istanbul)	Gruber, 1969
8. <i>Trogulus uncinatus</i> Gruber, 1966	Turkey	MR (Yalova, Bursa, Istanbul), WBSR (Bolu)	Gruber, 1969
Nemastomatidae			
9. <i>Gijiarovia turcica</i> Gruber, 1976	Turkey	MBSR (Amasya, Samsun, Ordu)	Gruber, 1976
10. <i>Mediostoma ceratocephalum</i> Gruber, 1976	Turkey	EMTR (Mersin)	Gruber, 1976
11. <i>Nemastoma bidentatum</i> Roewer, 1914	Austria, Southeast Alps	—	Roewer, 1914
11a. <i>N. b. sparsum</i> Gruber & Martens, 1968	Austria, Eastern Alps, Slovenia, Yugoslavia, Romania, Bulgaria, Turkey	Anatolia	Gruber & Martens, 1968
12. <i>Fyza anatolica</i> (Roewer, 1959) (*)	Turkey	EAR (Van Edremit), SEAR (Mardin, Siirt, Diyarbakir)	Bayram (Unpubl. data) Gruber, 1979
13. <i>Fyza taurica</i> Gruber, 1979	Turkey	WMTR (Antalya, Isparta, Burdur), EMTR (Mersin), CAR (Niğde)	Gruber, 1979
Dicranolasmatidae			
14. <i>Dicranolasma gijiarovi</i> Silhavy, 1966 (*)	Russia, Caucasus, Turkey	CAR (Ankara) EAR (Van)	Qorak, 2004 Bayram (Unpubl. data)
15. <i>Dicranolasma hoberlandti</i> Silhavy, 1956	Rhodos, Turkey, Israel	MR (Bursa), WBSR, MBSR, EMTR (Adana, Hatay)	Gruber, 1978

16. <i>Dicranolasma ponticum</i> Gruber, 1998	Turkey	MESIR (Samsun, Ordu)	Gruber, 1998
17. <i>Dicranolasma resili</i> Gruber, 1998	Turkey	CAR (Konya)	Gruber, 1998
18. <i>Dicranolasma scabrum</i> Herbst, 1798 (*)	Austria, Eastern Alps, Slovenia, Russia, Crete, Rhodes, Kos, Turkey	MIR (İstanbul) CAR (Ankara, Kırıkkale) EAR (Van)	Gruber, 1969 Qorak, 2004 Bayram (Unpubl. data)
Ischyropsalididae			
19. <i>Ischyropsalis turki</i> Roewer, 1930	Turkey	AR (Aegean Islands)	Roewer, 1930
20. <i>Ischyropsalis taunica</i> Nüßler, 1923	Germany, Turkey	CAR (Niğde)	Kurt, 2004
EUPNOI			
Phalangidae			
21. <i>Dasylobus kulczynskii</i> Nosek, 1905	Turkey	CAR	Nosek, 1905
22. <i>Egaenus convexus</i> (C.L. Koch, 1835)	Austria, Eastern Alps, Slovenia, Albania, Lesina, Romania, Russia, Turkey, Afrika	Anatolia	Roewer, 1956
23. <i>Egaenus marenzelleri</i> Nosek, 1905	Asia Minor	CAR	Nosek, 1905
24. <i>Euphalangium nordenskiöldi</i> (L. Koch, 1879)	Mongolei, Kamtschatka, Karakorum, Tibet, Turkey	CAR (Niğde)	Kurt, 2004
25. <i>Lacinius ephippiatus</i> (C.L. Koch, 1835)	Europe, Russia, Turkey, Caucasus, Italy, Turkey	EAR (Van, Bingöl)	Qorak vd., 2008
26. <i>Leiobunum ghigii</i> Di Caporiacco, 1929	Belgium, Austria, Eastern Alps,	AR, WMFR	Gruber, 1978
27. <i>Leiobunum rotundum</i> (Lattelle, 1798)	Slovenia, Russia, Turkey	CAR (Niğde)	Kurt, 2004
28. <i>Leiobunum rupestre</i> (Herbst, 1799)	Slovenia, Russia, Turkey	CAR (Niğde)	Kurt, 2004
29. <i>Metaphalangium cirtaum</i> (C.L. Koch, 1839)	Spain, Italy, Yugoslavia, Albania, Greece, Sicily, Sardinia, Corsica, Levkas, Zante, Crete, Rhodes, Turkey, Syria, Lebanon, Israel, Egypt, Algeria, Tunisia	Anatolia	Cokendolpher, 1990
30. <i>Metaplatybunus petrophilus</i> Martens, 1965	Rodos, Karpathos	CAR (Nevşehir), EAR (Van)	New Record (Qorak 2004)
31. <i>Mitopus mongolicus</i> Roewer, 1942	Mongolia, Turkey	CAR (Niğde)	Kurt, 2004
32. <i>Mitopus morio</i> (Fabricius, 1779)	Germany, Austria, Eastern Alps, Slovenia, Russia, Turkey	CAR (Niğde)	Kurt, 2004
33. <i>Oligopus hanseni</i> (Kraepelin, 1896)	Northern and Central Europe, Lithuania, Germany, Turkey	CAR (Niğde)	Kurt, 2004
34. <i>Oligopus tridens</i> (L. Koch, 1836) (*)	Germany, Austria, Eastern Alps, Slovenia, Turkey	CAR (Niğde) AR (Manisa)	Kurt, 2004 Bayram (Unpubl. data)
35. <i>Opilio insulae</i> Roewer, 1956	Ukrainia, Aegean Islands, Samos Islands, Turkey	AR (Izmir)	Gruber, 1978

36. <i>Opilio lederti</i> Roewer, 1911	England, Germany, Austria, Eastern Alps, Slovenia, Bosnia, Greece, Crete, Holstein, Harz, Runland, Italy, Euboea, Toscana, Turkey, Caucasus, Azerbaijan, Russia, Turkistan, North Africa	EAR (Van Edremit) SEAR (Mardin, Siirt, Diyarbakir)	Gruber, 1979 Bayram (Unpubl. data)
37. <i>Opilio parietinus</i> (Degeer, 1778) (†)	Russia, Georgia, Azerbaijan, Armenia, Turkey	Anatolia, CAR (Konya, Kirsehir, Kizilirmak, Ankara, Nigde) WESR (Kastamonu)	Qorak, 2004 Kurt, 2004 Bayram et. al., 2006 Bayram (Unpubl. data)
38. <i>Opilio saxatilis</i> C.L. Koch, 1839	Germany, Austria, Eastern Alps, Czech Republic, Slovenia, Greece, Aegean Islands, Turkey, Russia	AR (Southern parts), CAR (Nigde)	Gruber, 1978 Kurt, 2004
39. <i>Opilio turcicus</i> Roewer, 1956	Turkey	MR (Bursa), WMTB, EMTR (Taurus Mountains)	Roewer, 1956
40. <i>Paropilio punctatus</i> Roewer, 1956	Turkey	EMTR (Taurus Mountains)	Roewer, 1956
41. <i>Phalangium opilio</i> Linnaeus, 1758 (†)	England, Germany, Austria, Eastern Alps, Italy, Spain, Slovenia, Bosnia, Albania, Yugoslavia, Inseln Thassos, Bulgaria, Turkey, Russia, North America	CAR (Ankara, Kizilirmak, Nigde)	Qorak, 2004; Kurt, 2004; Bayram et. al., 2006; Bayram (Unpubl. data)
42. <i>Phalangium pareissi</i> Roewer, 1956	Turkey	MBSR (Amasya)	Roewer, 1956
43. <i>Phalangium punctipes</i> (L. Koch, 1876)	Russia, Georgia, Azerbaijan, Armenia, Turkey	CAR (Nigde)	Kurt, 2004
44. <i>Phalangium savignyi</i> Audouin, 1825	Russia, Caucasus, Azerbaijan, Turkey, Syria, Lebanon, Israel, Jordan, Egypt, Italy	WMTB, EMTR	Oskendolpber, 1990
45. <i>Phalangium strandi</i> Nosek, 1905	Turkey	CAR	Nosek, 1905
46. <i>Pitybunus anatolicus</i> Roewer, 1956	Cyprus, Rhodes, Turkey (Taurus)	CAR (Ankara), EMTR (Taurus)	Roewer, 1956
47. <i>Zacheus anatolicus</i> (Kulczynski, 1903)	Cyprus, Turkey (Taurus)	EMTR (Taurus, Adana)	Roewer, 1956
48. <i>Zacheus crista</i> (Brulle, 1832) (†)	Greece, Mores, Mytileni, Albania, Rhodes, Karpathos, Kos, Lesbos, Thassos, Crete, Turkey, Azerbaijan	CAR (Ankara, Kizilirmak, Nigde)	Gruber, 1978; Qorak, 2004; Kurt, 2004; Bayram et. al., 2006
49. <i>Zacheus hebraicus</i> (Simon, 1884)	Turkey, Israel	AR (Manisa)	Roewer, 1956
50. <i>Zacheus macrinus</i> Roewer, 1956	Turkey	AR (Aydin)	Roewer, 1956

APPENDIX











