ANADOLU ÜNİVERSİTESİ BİLİM VE TEKNOLOJİ DERGİSİ –C
Yaşam Bilimleri ve Biyoteknoloji

ANADOLU UNIVERSITY JOURNAL OF SCIENCE AND TECHNOLOGY –C
Life Sciences and Biotechnology
Cilt/Vol.: 2-Sayı/No: 2 : 89-99 (2012)

ARAŞTIRMA MAKALESİ /**RESEARCH ARTICLE**

THE RECORDS OF HYDRACARINA (ARACHNIDA, ACARINA) FROM ESKIŞEHIR AND ITS SURROUNDINGS

Sevgi ÜNAL ULUKÜTÜK [1], Yalçın ŞAHİN [2]

ABSTRACT

This work was done between August 1995 and August 1996 to determine the systematic of *Hydracarina* fauna in Eskişehir and in its surroundings where also include the Sakarya River. The other aim of this work is to make a contribution to Turkish water-mites fauna.

In this study, from 9 families, 4 genuses and 14 species which belong to *Hydracarina* fauna was determined; identification keys pertaining to the species were organized and explanations supported with pictures and diagrams were illustrated.

Keywords: *Arachnida, Chelicerata, Acarina, Hydracarina,* Water-mite, Turkey.

ESKİŞEHİR İLİ VE ÇEVRESİNDEKİ HYDRACARINA (ARACHNIDA, ACARINA) FAUNASININ KAYITLARI*

ÖZ

Bu çalışmada Ağustos 1995 ve Ağustos 1996 yılları arasında Sakarya Nehri'ni de içine alan Eskişehir ili ve çevresinde *Hydracarina* faunasının sistematiği yapılmıştır. Bu çalışmanın bir başka amacı da Türkiye su akarları faunasına katkıda bulunmaktır.

Bu çalışmada *Hydracarina* faunasına ait 9 familyadan, 4 genus ve 14 tür tanımlanmıştır. Tür teşhisleri anahtar kullanılarak yapılmış, resim ve diagramlar gösterilerek desteklenmiştir.

Anahtar Kelimeler: *Arachnida, Chelicerata, Acarina, Hydracarina,* Su akarları, Türkiye.

*This Project as Sevgi Ünal Ulukütük's graduate thesis was presented in 1996

[1,] Afyon Kocatepe University, Science and Arts Faculty, Biology Department, Afyonkarahisar.
[2,] Eskişehir Osmangazi University Science and Arts Faculty, Biology Department, Eskişehir.

Recieved: 16 May 2011; **Revised:** 20 May 2011; **Accepted:** 29 February 2012

1. INTRODUCTION

As known, watery areas are being destroyed in a great extend. This is because of the natural events such as drought, biotic factors, precipitation, typhoon, tide, erosion and people's interferences beside agriculture, forest, transportation and accumulation of solid wastes, drilling of petroleum, gas and other minerals and hydrological changes occur in canals and barrages (Özkan et. al., Anonymous according to 1996,1987).

It is known that containing more than 3000 species, for Hydrachnidia. Indeed, this is the best evidence of increased species which take place in world water-mites catalogues that have been caught in particular time and place but have never been seen again (Özkan et.al., Viets, 1956 according to, 1956; 1987).

It is stated that Turkey has one million hectare watery area, and according to its superficies, this country is in the first row within Europe and Middle East countries. It is also stated that Turkey has 60% fresh water, 20% salty water and 20% hard water (Özkan et. al., 1996).

It is thought that the species determination of *Hydracarina* fauna will help to gain important findings for Anatolia Fauna History. Because this is going to put forward the species variety around the city of Eskişehir and the Sakarya River which have been on the way of migration since the glacial period (Erman et. al., 2008).

In the past, the numbers of Acariologs were insufficient. However, in recent years their numbers have increased in a large extend; this is because their roles both in nature and in the general structure of the world have been understood. From the view of universal biology, acaris are very important because they have many features to adapt themselves to different kinds of life conditions.

Symposiums as EURAAC Symposium are being organized to help young researchers and scientists who work on Acariologs to get information about them. Different works are being done (Crowell 1979; Davids; Crowell; Groot, 1985; Gerecke, 1991; Gerecke, 1994; Schaefer, 1982; Smith, 1995), in our country (Boyacı & Özkan, 1994; Demirsoy, 1982; Erman, 1992; Özkan, 1989; Özkan et. al., 1995, 1996; Özkan; Ayyıldız & Soysal, 1988; Özkan; Erman & Boyacı, 1993).

There are various researches about our country's water acariologs. We see that many of these studies are spreading extensively in East and South Anatolian (Boyacı & Özkan, 1994; Erman, 1992; Özkan, 1989; Özkan et. al., 1995; Özkan et. al., 1996; Özkan, Erman & Boyacı, 1993). This studies in which species determination & morphologic information have been presented can be summarized as in below:

The structural features of female *Hygrobates fluviatilis* and *Sperchon (s.str.) squamosus* (Kramer, 1879) which have been defined recently as the new species *d Hydracarina* fauna in North California and their dispersion in the world have been found out in these studies (Crowell, 1952).

Also, the list of *Atractides nodipalpis robustus* (Sokolow), *Limnesia undulata* (Müller) and *Unionicola minör* (Soar), which include their location in Turkey, takes place in it with 11 species which are important for Turkish fauna (Smith, 1995).

Gerecke has dealt with *Hydracarina* fauna in a Palearctic area in a general sense but extensively; and thus has organized genus identification key (Gerecke, 1994).

Davids etal., has put forth the morphological discriminations of *Unionicola crassipes* and *Unionicola minör* that pass the growing phase on sponge (Davids; Crowell & Groot, 1985).

These results of the researches about ecologic circle of *Unionicola minör* North America and Holland have been given (Crowell & Davids, 1979).

General systematic information, which had been gotten from Germany Acari Fauna researches, has been used (Schaefer, 1982).

In the studies which had been done on East Anatolia water acaris, definitions and dispersions of the species *Sperchonopsis verrucosa*

(Protz, 1896), *Sperchon (s.str) squamosus* (Kramer, 1879) and *Sperchon (Hispidosperchon) hispidus* Koenike, 1895 have been put forward and identification keys of *Sperchon* and *Sperchonopsis* genus have been organized (Özkan, 1989).

In the list, which had been prepared for determination of acari fauna in Turkey, the subdistribution species of *Trombidiformes* in Turkey have been presented (Özkan, Ayyıldız & Soysal, 1988).

For Turkish fauna, organ shapes, their measures and dispersion of *Arrenurus (s.str.)* Duges, 1834 species *Arrenurus (s.str.) albator* (Müller, 1776), *Arrenurus (s.str.) furcillatus* (Viets, 1930) have been given with identification key of *Arrenurus (s.str.)* species (Erman, 1992).

New species for Sultan Sazlığı (Kayseri) fauna have been determined. Structural features, measurements of some of the organs, living areas and the dispersions in the world of those newly determined species *Limnesia undulata* (Müller, 1776), *Unionicola minör* (Soar, 1900), *Neumania deltoides* Piersig, 1894 have been given (Özkan et. al., 1996). Beside the species, which were identified for Sultan Sazlığı (Kayseri) fauna, the determination of female *Arrenurus (s.str.) furcillatus,* whose males were known before, has been done. The shapes of those determined species have been given, their organs measurements have been done and their dispersions in the world have been presented (Özkan, Boyacı & Erman, 1993).

Sperchon (Porosperchon) tienemanni (Koenike, 1907) are the new species for Turkish fauna from the city Konya. Their structural features and the dispersions in the world have been presented (Boyacı & Özkan, 1994).

For Sultan Sazlığı *Hydracarina* fauna, 46 species and the names of subspecies of 2 degree, their sample numbers, frequency to be soon, dominancy values and variation indexes have been given (Özkan et. al., 1996).

Recently, according to new research; Three *Hygrobates* Koch, 1837 species, *Hygrobates* (s.str.) *bucharicus* Sokolow, 1928, *H.* (s.str.) *longiporus* Thor, 1898 and *H.* (s.str.) *nigromaculatus* Lebert, 1879 are recorded from Turkey for the first time.The morphological characters, the measurements and drawings of various organs and distributions in Turkey and on the world of all above species and *H.* (s.str.) *fluviatilis* (Ström, 1768) and *H.* (s.str.) *calliger* Piersig 1896 and

H. (s.str.) *longipalpis* (Hermann, 1804) are given. Thus, the numbers of *Hygrobates* species known from Turkey have been reached nine (Erman et. al., 2008).

The water mite species of the *Sperchon denticulatus*-species group (Acari, Hydrachnidia,

Sperchontidae) from Turkey and Iran. *Sperchon akdagensis* Aşçi, Bursali & Özkan, 2010 is synonymized with *S. hibernicus* Halbert, 1944; *S.* cf. *senguni* Özkan, 1982 is reported for the first time for Iran (Pesic, V.& Smit, H., 2011).

In this study, structural properties and an original drawing of males of the water mite *Atractides nodipalpoides n.sp*, from Turkey are described. which is a new discovery in the world of science have been presented and This species was examined for structural features and drawn shapes and various organs was measured (Aşçı, F.; Boyacı, Y.O.; Ozkan, M., 2011).

Lebertia insignis Neuman, 1880 (Acari, Hydrachnidia, Lebertiiade) was collected from Tifi stream with rich aquatic plants in Tokat, Turkey between 2000 and 2005. The structural properties, **zoogeographical** distribution and drawings of male *Lebertia insignis*, which is a new record for the Turkish fauna, are given. Furthermore, An identification key the subgenera of *Lebertia* Neuman, 1880 is provided (Bursalı**,** A.; Aşçı, F.; Özkan, M., 2011).

An other study, the structural characteristics, unique features, various organ measurements of males and females of the water mite *Atractides (Atractides) turcicus sp.* n. from Turkey are described. In addition, the study compares their characteristics with related species (Aşçı, F., 2009).

This paper deals with the water mite species of the family Aturidae Thor, collected from running waters in Bingöl Province,Turkey. *Javalbia (Javalbicula) turcica* sp. nov. and *Barbaxonella bingolensis* sp. nov. are described as new species; *Axonopsis armata* Chaudonneret & Angelier, 1949 is synonymized with *A. romijni* Viets, 1923; *Kongsbergia (Kongsbergia) persica* Pešić, 2005, *Albaxona lundbladi* Motaş & Tanasachi, 1947, *Axonopsis (Hexaxonopsis) romijni* Viets, 1923, *A. (Navinaxonopsis) persica* Pešić, 2004 and *A. (Paraxonopsis) vietsi* Motaş & Tanasachi, 1947 are reported for the first time for Turkey (Esen, Y. ; Pesic, V. & Erman, O., 2011).

Through 10 monthly sampling, a total of 7434 water mites belonging to 24 species and 9 families from Lake Çapalı were caught and identified. Of these, Piona variabilis and *Arrenurus batillifer* are new records for the Turkish fauna. Besides the index of species diversity, frequency analysis and the ecological characters of the study area, constant, associated, euconstant, influent and accidental species were determined (Boyacı, Y. O. & Ozkan, M., 2004).

A new subspecies, *Mixobates brachypalpis ozkani subsp. nov*., is described from a stream in the Rize region (Eastern Black Sea coast, Turkey). The new subspecies can be easily distinguished from the type material of *M. brachypalpis*, a species reported only from the locus typicus in Russia, by the more elongated and slender I-L-5/6. In addition, 3 water mite species (*Torrenticola oraviensis* (L.ska, 1953), *Torrenticola thori* (Halbert, 1944) and Mideopsis roztoczensis Biesiadka and Kovalik, 1979) are reported for the first time from Turkey (Pesic, V.& Turan, D., 2006).

New records of water mites of the genus Monatractides K.Viets (Acari: Hydrachnidia, Torrenticolidae) for the fauna of Turkey are presented in this study. Three species, *Monatractides lusitanicus* (Lundblad, 1941), M. aberratus (Lundblad, 1941), and M. vafaei Peùsic, 2004, are reported for the first time from Turkey (Pesic, V.; Erman, O.; Esen, Y., 2006).

MATERIAL AND THE METHOD

This study was done specimens collected from 21 localities that include creeks streams, rivers, small lakes and transitory waters from the city Eskişehir and its surroundings between August 1995 and August 1996. (Map 1, Diagram 1).

When the samples were being obtained, properties of water were registered and these samples were collected separately according to depth and surface water features. The samples which have been taken from water blocks such as marsh, lake, river, canal have been put to a pot container and then they were put in order from the largest measure to the smallest one and they were sieved from fıve fold sieve system.

These collected samples have been departed from their drifts under the binoculars at the laboratory conditions and they have been taken into "Koenike liquid"(e.g., Gerecke, 1991). When these samples were being converted into preparat from, glycerine was used. With the help of dissection needle and pincer inside the glycerine, segments which are important in identification have been gotten and they have been closed with lamel and they have been converted into a preparat form. The methods described by Gerecke (1994). All measurements are given in micrometers (µm).

RESULTS

In the study area, 4 genus and 14 species belonging to 9 families have been identified.

The ecologic features of the localities were given in diagram 3 and the dispersions of these species to the stations were also in diagram 4.

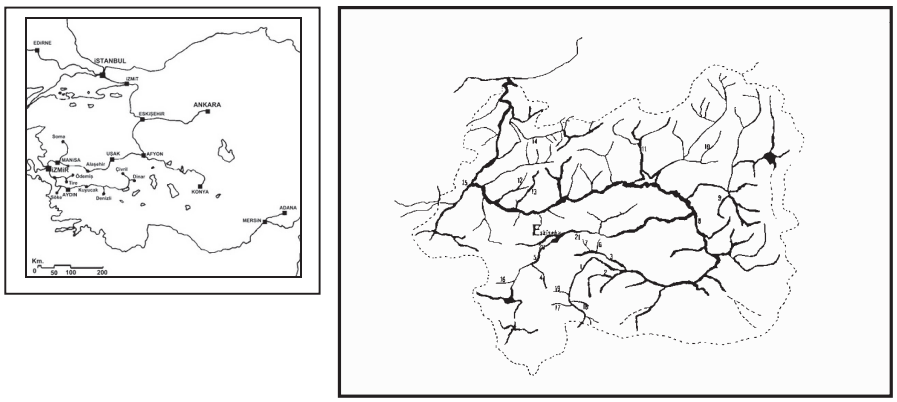
DISCUSSION AND RESULT

In this study, in which covers some part of Sakarya River, 4 genuses and 14 species belonging to 9 families of water mite samples which have been collected from 21 stations in the environs of Eskişehir have been defined and determined. Thus, there's been a progress one step further in determination of Anatolia *Hydracarina* Fauna.

There's a parallelism between *Arrenurus (Micruracarus) sinuator* (Müller, 1776) and the taxonomic information and measures given in Özkan (1993). The amount of Özkan's samples in males is 799.4 µm/ 665 µm, in females 1145.2 µm /950 µm.

Diagram 1. Sample Stations Considering the Date & Location

Nr	Name (water that it runs into)	Geographic Definition	Sampling Date	Longitude	Latitude
1	Seydi Water (Sakarya Source)	Between Seyitgazi-Hamidiye	01.09.1995	31° 06'	39°53'
2	Bardakçı Creek (Seydi Stream)	Çifteler Kör Hasan Village	03.09.1995	31°12'	39°20'
3	Sarısu (Seydi Stream)	Between Çifteler-Kaymaz	03.09.1995	31°07	39°28'
4	Porsuk River. (Sakarya River.)	Porsuk Barage. Regülatör Exit	16.09.1995	30°18'	39°38'
5	Yukarı Çağlan (Porsuk River)	Eskişehir Forest Nursery	16.09.1995	30°28'	39°44'
6	Şerefiye Creek. (Sansu)	Between Alpu-Kaymaz	17.09.1995	31°03'	39°39'
7	Sarısu (Seydi Stream)	Harmandalı (Alpu) Village	17.09.1995	30°50'	39°32'
8	Sakarya River	Yassıhöyük Environs	08.09.1995	31^{0}59"	39°40'
9	Babayakup Creek (Ankara Stream)	Between Temelli-Ankara	09.09.1995	32°25'	39°44'
10	İlhan Stream (Kirmir Stream)	Ayaş İçmeler	11.09.1995	32°23'	40°09'
11	Aladağ Stream (Sanyar Barrage)	Betvveen Beypazan - Nallıhan Dudaş Village	12.09.1995	31°42'	40°17'
12	Akçay Creek (Sakarya)	Vezirhan-Gölpazan	22.09.1995	30°18'	40°17'
13	Çakırlar Creek (Sakarya)	Betvveen AkcapınarVillage Gölpazan-Taraklı	23.09.1995	30°33'	40°18'
14	Ketenli Creek (Mudurnu)	Southeastern Karapürçek	04.10.1995	30°36'	40°37'
15	Göksu Stream. (Sakarya.)	Betvveen Adapazan-Osmaneli 4km	05.10.1995	29°56'	40°22'
16	Sobran Creek. (Porsuk.)	Eski-Kütahya Eceköy Village	19.10.1995	29°57'	39°44'
17	Atkın Creek (Seydi Stream)	Northwestern Kırka- Ikizoluk Village	21.10.1995	30°24'	39°20'
18	Kayır Creek (Seydi Stream)	Southeastern Kırka -Kümbet	22.10.1995	30°37'	39°12'
19	Seydi Water (Seydi Stream)	Seyitgazi at the Eskişehir Exit	22.10.1995	30°45'	39°30'
20	Borabey Lake	Esentepe Exit	07.04.1996	30°30'	39^{0}30'
21	Kelkaya Lake	Between Alpu-Ankara Way	07.10.1995	30°57'	39°43'



Map 1. Stations in Eskişehir and its surroundings

Diagram 2. The Dispersions *oî Hydracarina* Species According to The Families & Genuses

FAMILY	GENUS	SPECİES
Arrenuridae	*Arrenurus*	*Arrenurus (Micruracarus) sinuator*
		Arrenurus (s.str.) furcillatus
		Arrenurus (s.str.) albator
Hydrodromidae	*Hydrodroma*	*Hydrodroma despiciens*
Unionicolidae	*Unionicola*	*Unionicola (s.str.) minör*
	Neumania	*Neumania deltoides*
Hygrobaüdae	*Hygrobates*	*Hygrobates fluviatilis*
	Atractides	*Atractides nodipalpis*
Limnesidae	*Limnesia*	*Limnesia undulata*
Torrenticolidae	*Torrenticola*	*Torrenticola sp.*
Lebertidae	*Lebertia*	*Lebertia sp.*
		Lebertia tuberosa
Aturidae	*Aturus*	*Aturus sp.*
Sperchontidae	*Sperchon*	*Sperchon sp.*
		Sperchon (Hispidosperchon) hispidus
		Sperchon (s.str.) squamosus
		Sperchon (Porosperchon) thienemanni
	Sperhonopsis	*Sperchonopsis verrucosa*

In our findings the body dimensions are 720 µm / 750 µm in males and 1085 µm /930 µm in females. According to this, males' measures are smaller 9% and females' are smaller 3%. It wasn't possible to put fourth the reasons of this different in this study. It can be supposed that the studies that will be done in the future and which will clearify the chemical and physical features of water will support this.

Both males' and females' definition of *Arrenurus (s.str.) furcillatus* (Viets, 1930) have been done through the examples collected from Spain (according to Erman, 1992 from Viets, 1930). Afterwards, it has been told that this specious hasn't been seen anywhere else (Viets, 1956; 1987). However, according to Viets (1956) there is a hyalin addition at the tip of petiol. The length in males is 1125 µm, the distance between tail lateral projections is 780 µm, and petiol is narrow. The body measurements of Erman's examples are 780 µm / 680 µm, the distance between tail lateral projections is 384 µm. However, in our examples, body measurement is 1065 µm / 895 µm and tail width is 600 µm. In this case, our samples are smaller 5.3% than the samples in Europe and they are 26.7% bigger than the ones, which have been determined in Elazığ. They show similarities in size and in tail width with the Europe measurements. While European members were immigrating in the glassial period following the Danube-Sakarya-Middle Anatolia fresh water lake-Africa way to find a chance to live in the studying region can be supposed. Özkan (1993) explane that, according to Viets (1930), the body measurements of females was given as 1140 µm / 995 µm, and the distance between eyes is 375 µm and the sexual species bigness is 265 µm /181 µm. They have been collected from lakes, small lakes, marshes and drifts which are in different depths (0.2-l0 m) in which Elodea, Scirpus, Phragmites, Carex, Typha and Algae were dominant before (Viets, 1930). This places where we have collected have similar qualities as a watery area.

According to Erman (1992) *Arrenurus (s.str.) albator* (Müller, 1776) is wide spread in Europe.

Body measurements of males have been given as 720-750 µm / 560-695 µm (according to Erman, 1992; Bader, 1975; Szalay, 1964). Besides petiolun's shape, carrying 8 hairs of P_2' s inner side is a distinctive feature of this species. Bader (1975) had measured the length of palp as approximately 279 µm. In Erman's samples, the males dimension is 550 µm / 485 µm and the palp length is approximately 216 um and there are 7-8 hairs in the inner side of P_2.

Diagram 3. Ecologic Features of the Stations

Station Numberst asvon No	Current	Depth	Turbidity	Ground
1	Slow	Deep	Less turbid	Much plant
2	Slow	1.5 m.	Turbid	Much plant
3	Slow	40 cm.	Turbid	Stony, sandy, less plant
4	Slow	1 m.	Turbid	Planty
5	Slow	1.5 m.	Turbid	Much plant
6	Slow	30 cm.	Turbid	Mud,reedbed
7	Slow	40 cm.	Less turbid	Mud, sand, reed bed with much plant
8	Very rapid	60 cm.	Turbid	Stony, planty
9	Slow	30 cm.	Very Turbid	No plant
10	Slow	20 cm.	Turbid	Stony, sandy, less plant
11	Slow	1 m.	Turbid	Stony, mud, very lirde plant
12	Fast	30 cm.	Clear	Stony, sandy
13	Very Slow	20 cm.	Clear	Stony, sandy
14	Fast	20 cm.	Clear	Stony
15	Slow	1.5 m.	Turbid	Mud, less plant
16	Fast	10 cm.	Clear	Stony,very little plant
17	Very Slow	30 cm.	Less Turbid	Sandy, less plant
18	Slow	1 m.	Less Turbid	Sandy, less plant
19	Stagnant	1.5 m.	Turbid	Sandy, much moss, less plant
20	Stagnant	1 m.	Clear	Much plant, reed bed
21	Stagnant	1 m.	Clear	Planty

However, in our samples body dimension is 660 µm / 555 µm. Though petiolun shows similarities with its shape, the inner side of P_2 carries 22 hairs and palp is 248 um in length. In this case, our samples are bigger than Erman's samples in 17% and 8,5% smaller than the samples in Europe.

Unionicola (s.str.) minör (Soar, 1900); all kinds of *Unionicola (s.str.)* species, which belong to *Unionicola* genus, live together with fresh water spongies (from Crowell, 1979 Arndt and Viets, 1938). External genitals of this subgenus include 6 couples of sexual cavity and they were encountered in North Hampshire (Crowell, 1988). The length of *U.minor's* P_4 was given nearly as 123 µm in Crowell and Davids (1979). They eat larvas with Chironomids, while ripe and deutonimfs eat Copepod and Cladocers breaking them into pieces by their lonh lakes, which are not in proportion to their bodies (from Özkan, 1993). In German samples of *U. minör* males body dimension is 508 µm / 361µm and females' is 526 µm / 379 µm (Hevers, 1978). However, it is stated that females dimension of the same kind can be 600 µm / 413 µm and the distance between eyes is 213 µm and the length of chelicere is 150 µm (Imamura, 1953; Viets, 1960).

In males P_4 is 114 µm and P_5 is 89 µm. In Özkan's (1993) samples, males dimension is 886 µm / 531µm and the distance between eyes is 230 µm; the length of chelicere is 162 µm. Pro-

jections that take place in half front of P_4 are short. P_4 is 114 µm and P_5 is 86.75 µm. In our samples, the body measurements are smaller than Ozkan's samples in proportion to 5.4%. However, they are 35% bigger than the males in German samples. If we consider the distance between eyes is 217.45 µm and the length of chelicere is 160 µm in our samples, it will be observed that the ratio difference between the body and the members is clearer in our samples.

Neumania (s.str.) deltoides Piersig, 1894 is so common in west palearctic whereas it is known in China, Turkestan and Yakutestan from east palearctic (from Özkan, 1993; Bader, 1975 and Viets, 1956). Besides they that survive stagnant water generally they have been caught from running waters as well(Lundblad, 1956; Viets, 1978). It is emphasized especially the ones in Middle Europe, that the ground they moreover in some places ground is covered with the remains of the plants which are rotting (Lunblade, 1956). Besides showing appropriateness with the Sultan Sazlığı where Özkan's samples have been collected from, this datum is appropriate with the ground that our samples have been taken from as well. In samples of *Neumania deltoides* which have been analyzed till now, the body sizes for males are 725-1090 µm / 575-800 µm, distance between eyes 300 µm, length of palp is 365-513 µm; for females body size 920-1500 µm / 795-1090 µm, distance between eyes 412 µm, length of palp have been given as 520 µm (from Özkan, 1993; Bader, 1975; Lundblad, 1930; Uchida and Imamura, 1951; Viets, 1956; Besseling, 1964; Szalay, 1964). Measurements of our samples equal to the fıxed spaces as Özkan's examples. As body size; males are 7,8%, females are smaller in a rate of 26% than Özkan's samples. Length of palp gives the same measures as well. Two large hollows in sexual plates are the distinctive features of *Neumania deltoides* (from Özkan, 1993-Viets, 1936). But those large hollows don't exist in both Özkan's and our samples. It can be assumed that these species are more similar to European forms because of the possibility they could have found to survive while the European members had been following the Tuna -Sakarya -Middle Anatolia fresh water lakes-Africa ways during the migration in glacial period.

It has been observed that two species, in the city Eskişehir and its surrounding, from *Unionicolidae* familia which has been considered up to here, are smaller than the members of Sultan Sazlığı but takes place in European Standards. It can be assumed that European members could have found possibility to survive in work areas while they had been following the ways; Tuna-Sakarya-Middle Anatolia Fresh Water Lake-Africa during the migrations in ice ages. However it can be thought that they are more similar to European forms.

Hgrobates fluviatilis (Ström, 1768); lengths of females in Özkan's study which has been carried out in Sultan Sazlığı, are smaller in a ratio of 12% than their samples and the lengths of males are smaller 3,5 quantity. It is observed that the length of sexual spaciousness for females is 173 µm, and our organisms are nearly (177 µm). But the measure of male length is surprising. In addition, *Hygrobates fluviatilis* are species that we can see in almost every research station in the area.

Atractides nodipalpis Thor, 1899; Özkan (1993). The body size of female has been pointed out as 1153 µm / 981µm, the lengths of palps on an average are P_1=34µm, P_2=82µm, P_3=98µm, P_4=122µm. Beside the similarities of our samples are as small as the half of Özkan's samples. The depth of the water which samples had been taken from in this study was 60 cm and it was rocky-current with plants, fast flowing and turbid. Here this situation reminds us that quality of the water can influence the size of the body in such degree. But it takes place in the limits of the body size of the members in Europe. In short, it shows the characters close to Europe.

Hydrodroma despiciens (Müller, 1776); The body size of males of the samples, which Özkan (1993) obtained from Kayseri and its surrounding is 1440 µm / 1323 µm, epi-lenght of palps are 55 µm - 89 µm - 55 µm- 182 µm - 103 µm = 484 µm, sub-lengths of palps are 82 µm. - 44 µm - 41 µm - 101 µm - 95 µm. Sexual part is 310 µm / 336 µm. Our samples are 1591 µm / 1350 µm and bigger in a rate of 9%, the epi-lenght of palps are 436 µm. and smaller in a rate of 10 %. The size limitations of samples belong to *Hydrodroma* species are between

1000 µm - 2000 µm (Gerecke 1994). In this case, collected samples in Europe show close relationships with the Özkan's samples in terms of taxonomic features. It can be assumed that this species, which are cosmopolitans can exist in various places.

Limnesia undulata (Müller, 1776); It is comprehended that it had been spread out in Holoarctic (Puthz, 1978), Ethiopia and Neotropic zoogeographic areas (Viets, 1956, 1978; Bader, 1975). It is determined that by finding the species in Turkey an important gap in being spread out in Asia had been completed (Özkan, 1993). The size of Özkan's samples are 1095 µm*I* 1350 µm. Our samples are longer in a rate of %10 but more narrow morphic. Other features are quite similar.

Sperchon squamosus Kramer 1879; It is a common species in Palearctic region (Puthz 1978) The species can expected to be common in Anatolia. According to Özkan (1989) body size of males the 767 µm / 586 µm, the length of sexual plants l60 µm. Our samples, the body size of 525 µm / 450 µm, the length of sexual plants 110 µm. Our samples are smaller 31% than Özkan's samples.

According to the information (Özkan, 1989; Konike, 1895) body dimension of *Hispidus sperchon* females is 905 µm / 809 µm the sexual plate length is 155 µm. It is a wide spread species in palearctic area (Puthz, 1978). It can be expected that this kind is spread in Anatolia.

In contrast to the other *Sperchon* species, *Sperchon thienemanni* (Koenike, 1907) is less spread and it hasn't been seen in the Balkans, Caucasians, Caspieab Sea (Puthz, 1978). This species are found in Middle Anatolia (Özkan, 1994) and does not exist in East Anatolia. It is assumed that they have entered the Anatolia in glacial period only over the rivers Tuna-Sakarya. It is supposed that they didn't migrate by using other immigration ways: Kura -Aras-Murat Rivers and the Black Sea ways. According to Özkan (1994), the male body dimension is 872 µm / 710 µm. The length of P_2 cavity is 59 µm. The distance of *Preanniforma* is 282 µm. And the distance between eyes is 320 µm: However, in our samples, body dimension is 855 µm / 705 µm, the length of P_2 cavity is 75 µm, and the distance betvveen eyes 300 µm. In this case, it can be thought that the fauna of the city Konya and the fauna of city Eskişehir show similarities.

It can be supposed that *Sperchonopsis verrucosa* (Portz, 1896), which is cosmopolitan (Pulthz, 1978), can be found in other parts of Anatolia. According to Özkan (1989) male's body dimension is 645 µm / 458 µm and sexual plate length is 160 µm. Although our samples are different from Özkan's samples because of body dimension, they both share the similar features in general.

The species *Lebertia tuberosa* Thor, 1904; that is spread only in Balkans, Middle Europe, Caucasians and Alps (Puthz, 1978) have an intermittent area. In the samples that Özkan has collected in the environs of the city Kayseri, the body dimension of females is 900 µm / 612 µm and the length of capitulum is 212 µm. Width of epimer is 690 µm; the length of it is 603 µm. The length of sexual plate is 166 µm. In our study, it has been found that the dimension of our samples is 720 µm / 570 µm; the length of capitulum is 172.5 µm. the Width of epimer is 630 µm, and the length of sexual plate is 165 µm.

As a result, *Hydracarina fauna* of the city Eskişehir and its environs have been studied for the first time. It is being thought that with findings which have been gotten as a result of the study, there is an addition to the notions about Turkey Hydracarina fauna.

REFERENCES

Aşçı, F., Boyacı, Y.O. and Ozkan, M. (2011). A new species of water mite family Hygrobatidae (Acari, Hydrachnidia), from Turkey, *Journal of Biology and Life Science* 2(2), 14-16.

Aşçı, F. A (2009). new species of water mite Atractides (Atractides) turcicus sp. n. (Acari: Hydrachnidia: Hygrobatidae) from Turkey, *Biologia* 64/6: 1146—1149, Section Zoology.

Boyacı, Y.Ö. ve Özkan, M. (1994). Konya İlinden Türkiye Faunası İçin Yeni Su Kenesi

(Acari, Hydrachnellae) Türleri-I. XII. Ulusal Biyoloji Kongresi. Edirne.

Boyacı, Y.O. and Ozkan, M. (2004). Water Mite (Acari, Hydrachnellae) Fauna of Lake Çapalı, Afyon, Turkey, *Turkiah Journal of Zoology* 28, 199-203.

Bursalı, A., Aşçı, F. and Özkan, M. (2011). Lebertia insignis Neuman, 1880 (Acari, Hydrachnidia, Lebertiidae), a new record for the water mites of Turkish fauna.

Crowell, R.M. (1952). New Records of Rheophilic Water-Mites form Northwestern. and *U. nearetica,* n.sp., Sponge-Associated *Hydracarina (Parasitengona: Unionicolidae)* from North America. *The Ohio Journal of Science* 79/4: 178.

Crowell, North Carolina. Printed in U.S.A. 68, 2, 191-196.

Crowell, R.M. (1984). Scanning Electron-Microscopic Distinctions Among The Sponge-Associated Water-Mites *(Acarina: Unionicolidae). Acarology* VI 2, 965-970.

Crowell, R.M. (1988). *Two unusual water mite symbiotic associations in New Zeland*. Verh. Internat. Verein. Limnol., 2035-2037, Stuttgart.

Crowell, R.M. and Davids, C. (1979). Systematics of *Unionicola laurentiana,* n.sp R.M. and Davids. C. 1979, The Developmental Cycle of Sponge Associated water mites. *Recent Advances in Acarology* 1, 563-566.

Davids, C., Crowell, R.M. and de Groot, C.J. (1985). The Developmental Cycles of Two Co-Occuring Sponge-Mites *Unionicola crassipes* (Müller) and *Unionicola minör* (Soar) (Acari, Hydrachnellae). *Hydobiologia* 122, 199-205. Nederlands.

Demirsoy, A. (1982). Yaşamın Temel Kuralları (Omurgasızlar) Hacettepe Üniversitesi Yayınlan Cilt II. 213-223.

Erman, 0. (1992). Türkiye Faunası İçin Yeni Arrenurus (s.str.) Duges, 1834 *(Arrenuridae, Hydrachnellae, Acari)* Türleri. *Doğa- Turkish. Journal of Zoology* 16, 193-208 TÜBİTAK.

Erman, O., Tellioğlu, A., Çitil, C. and Ozkan, M. (2008). New Records of Hygrobates Koch, 1837 (Hygrobatidae: Hydrachnidia: Acari) for the Turkish Fauna, *Science and Engineering Journal of Fırat University* 20(1), 1-14.

Esen, Y., Pesic, V. and Erman, O. (2011). Water mites of the family Aturidae Thor, 1900 from Turkey (Acari: Hydrachnidia), with description of two new species, *Zootaxa* 2746, 25–42.

Gerecke, R. (1991). Taxonomische. faunistische und ökologische Untersuchungen an Wassermilben *(Acari, Actinedida)* aus Sizilien unter Berücksichtigung anderer aquatischer Invertebraten. 7, 1-304. D-8901 *Dinkelscherben*.

Gerecke, R. (1994). Lauterbornia. Sübwassermilben Hydrachnellae. Heft 18. s. 1-84. D-86424 Dinkelschherben.

Özkan, M. (1989). Doğu Anadolu Su Akarları (Acari, Hydrachnellae) Üzerine Sistematik Araştırmalar. IV. *Doğa TU. Zooloji* D.C. 13. s.2.

Özkan, M. et al., (1995). Sultan Sazlığından (Kayseri) Türkiye Faunası İçin Yeni Su Kenesi *(Acari, Hydrachnellae)* Türleri - II., *Doğa Turkish Journal of Zoology*, 77-118.

Özkan, M. et. al. (1996). Sultan Sazlığı (Kayseri) Su Akan *(Hydrachnellae, Acari)* Üzerine Bir Araştırma. *Doğa Turkish Journal of Zoology* 20, 95-98.

Özkan, M., Ayyıldız, N. ve Soysal, Z. (1988). Türkiye Akar Faunası, *Doğa TU. Zooloji* D. 12,1.

Özkan, M., Erman, O. ve Boyacı, Ö. (1993). Sultan Sazlığının (Kayseri) Su Akarı *(Hydrachnellae, Acari)* Faunası. TÜBİTAK, TBAG-1064, Ankara, 1-181 (Yayınlanmamış).

Pesic, V. and Smit, H. (2011). Water mites of the *Sperchon denticulatus* species group (Acari, Hydrachnidia, Sperchontidae) from Turkey and Iran, *Systematic & Applied Acarology* 16, 35–39.

Pesic, V. and Turan, D. (2006). New Records and Description of a New Subspecies for the Water Mite Fauna (Acari, Hydrachnidia) of Turkey from the Eastern Black Sea Coast, *Turkish Journal of Zoology* 30 405-411.

Pesic, V., Erman, O. and Esen, Y. (2006). New Records of Water Mites of the Genus Monatractides K.Viets (Acari: Hydrachnidia: Torrenticolidae) from Turkey, *Turkish Journal of Zoology* 30 393-397.

Puthz, V. (1978). *Hydracarina Limnofauna Europaea (Illies J. (edit.))*, Gustav Fischer Verlag. Stuttgard 155-181.

Schaefer, M. (1982). Chelicerata-Acarina in Brohmer, Fauna von Deutschland, *Quelle and Meyer Heidelberg* 131-133.

Smit, H. (1995). *New Records of Water-Mites from Turkey, With 11 Species New for The Turkish Fauna (Acari, Hydrachnellae)*. Storkia 4:10-15, figs. 1-4. Netherlands.