

1-1-2005

New Species of Genera Piona, Koch, 1842 and Arrenurus, Duges, 1833 (Hydrachnidia, Acari) for the Turkish Fauna

YUNUS ÖMER BOYACI

MUHLİS ÖZKAN

Follow this and additional works at: <https://journals.tubitak.gov.tr/zoology>



Part of the [Zooology Commons](#)

Recommended Citation

BOYACI, YUNUS ÖMER and ÖZKAN, MUHLİS (2005) "New Species of Genera Piona, Koch, 1842 and Arrenurus, Duges, 1833 (Hydrachnidia, Acari) for the Turkish Fauna," *Turkish Journal of Zoology*. Vol. 29: No. 1, Article 5. Available at: <https://journals.tubitak.gov.tr/zoology/vol29/iss1/5>

This Article is brought to you for free and open access by TÜBİTAK Academic Journals. It has been accepted for inclusion in Turkish Journal of Zoology by an authorized editor of TÜBİTAK Academic Journals. For more information, please contact academic.publications@tubitak.gov.tr.

New Species of Genera *Piona*, Koch, 1842 and *Arrenurus*, Duges, 1833 (Hydrachnidia, Acari) for the Turkish Fauna

Yunus Ömer BOYACI

Süleyman Demirel University, Fisheries Faculty, Eğirdir, Isparta - TURKEY
E-mail: yboyaci@sdu.edu.tr

Muhlis ÖZKAN

Uludağ University, Education Faculty, Bursa - TURKEY

Received: 12.06.2003

Abstract: The morphological features, the measurements and drawings of various organs and the geographical distributions of *Piona variabilis* (Koch 1836) and *Arrenurus batillifer* Koenike, 1894, which are the first records for the Turkish fauna, are given.

Key Words: *Piona variabilis*, *Arrenurus batillifer*, Hydrachnidia, Acari, Systematics, Turkey.

Türkiye Faunası İçin Yeni *Piona*, Koch, 1842 ve *Arrenurus*, Duges, 1833 (Hydrachnidia, Acari) Türleri

Özet: Türkiye faunası için ilk kez kaydedilen *Piona variabilis* ve *Arrenurus batillifer*' in coğrafik dağılımları, çeşitli organların çizimleri, ölçümleri ve morfolojik özellikleri verilmiştir.

Anahtar Sözcükler: *Piona variabilis*, *Arrenurus batillifer*, Hydrachnidia, Acari, Sistematik, Türkiye.

Introduction

Water mites are sensitive to changes in environmental conditions, as well as to water pollution; they may therefore serve as an indicator of environmental modification. Most *Piona* and *Arrenurus* species are present commonly in standing waters but are occasionally found in sluggish streams or the backwater areas of streams (Sokolow, 1940). Pionid larvae parasitize emerging Chironomidae (Diptera), feed for 1-2 days and then drop off the hosts and molt. The nymph may survive for a long period of dryness in a relatively inactive state, returning to full activity upon becoming wetted. This prolonged nymphal period probably preadapted them to exploiting temporary bodies of water (Smith, 1976). Some species of *Piona* inhabit most available water bodies, their ranges thus overlap with those of their prey, the larvae of aedine mosquitoes. Other species of *Piona* feed on small aquatic arthropods, such as cladocerans (Bottger, 1970).

Nymphae and adults of *Arrenurus* feed on ostracods (Bottger, 1970). Parasitism appears to depend on temporal and spatial co-occurrence of the mites and their hosts (Cook, 1974; Gerson and Smiley, 1990).

The genera *Arrenurus* and *Piona* have nearly 1100 species and 200 species, respectively, widely distributed globally (Viets, 1936). To date, 8 species of *Piona* and 45 of *Arrenurus* have been recorded from Turkey (Özkan, 1982; Özkan et al. 1993; Özkan and Boyacı, 1996)

Consequently, this study contributes to the knowledge on Turkish fauna as well as presenting useful data on faunal distribution.

Materials and Methods

Mosses and mud collected from the lake were washed under pressurized tap water; then the water mite specimens were collected in a container and fixed in Koenike liquid (10 parts glacial acetic acid, 45 parts water, 45 parts glycerin) (Özkan, 1982).

Results

Pionidae Thor, 1900

Piona Koch, 1842

Piona variabilis, (Koch, 1836) (Figure 1 A-G)

Female: Integument typically weak and smooth; body 1150 (1280-1020)/ 950 (880-990) μm in size; the distance between the lateral eyes 180 μm ; chelicerae 400 μm in length; claw 150 μm in length. Palpae with a lot of setae; thickened setae are usually found on P2 and P3.

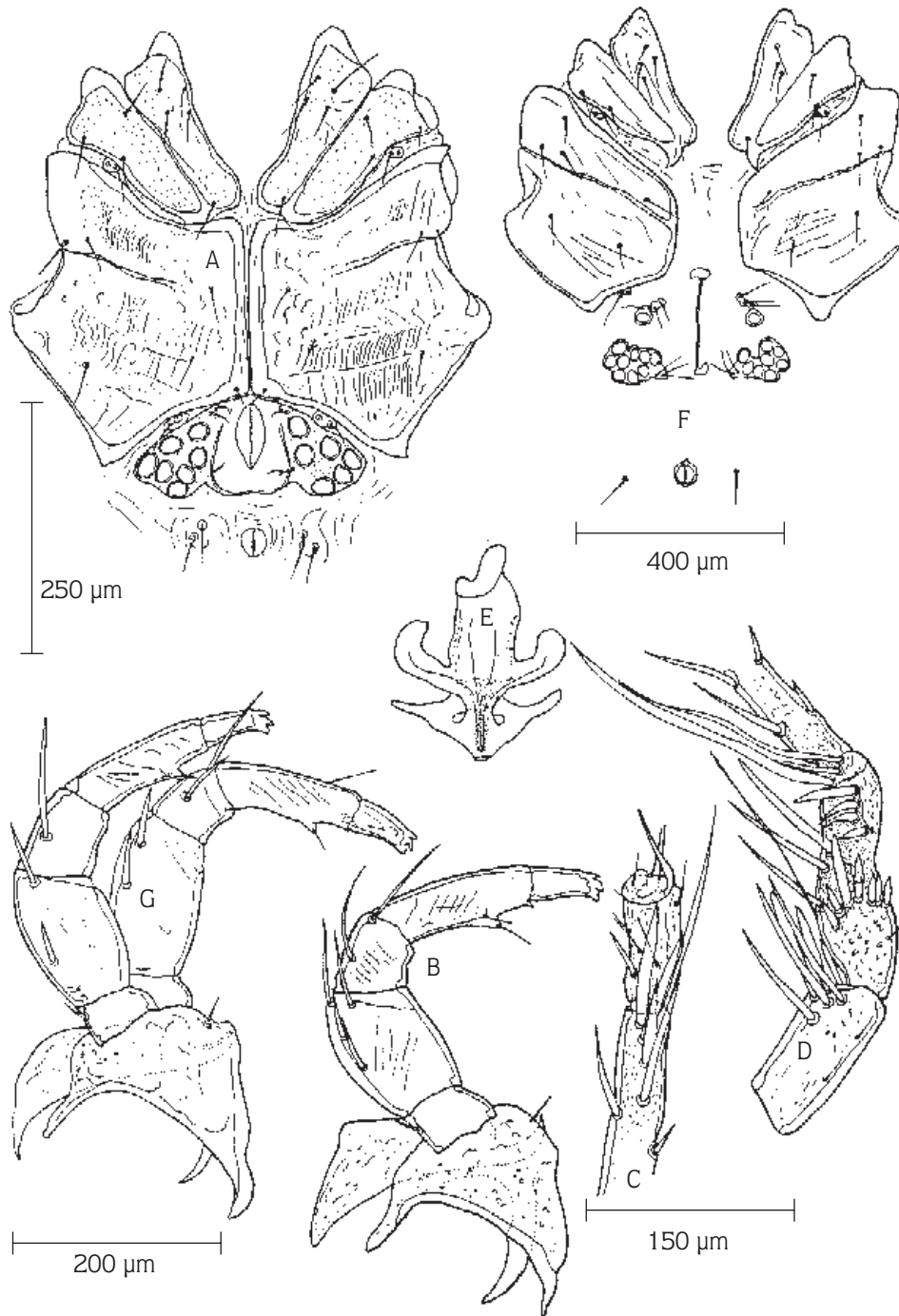


Figure 1. *Piona variabilis*: Male; A) Body ventral, B) Gnathosoma, C) III. Leg-6, D) Fourth Leg-4, E) Penis Skeleton. Female; F) Body ventral, G) Gnathosoma.

The dorsal portion of palpa convex, ventral portion smooth; P2 more stocky than other parts; 2 peg-like setae on P4 located at proximal, equal in length and inclined toward front; lengths of dorsal and ventral with heights of palpa segments: 70 (81-63)- 235 (225-248)- 145 (130-152)-250 (228-263)-110 (102-118) = 810 (780-843) μm , 55 (49-63)- 190 (181-203)- 90 (83-101)-210 (201-224)-100 (93-108) = 645 (621-660) μm , 105 (98-118)- 175 (163-183)- 110 (98-123)-90 (81-103)- 50 (42-55) μm , respectively.

Genital acetabula of female lying on 2 pairs of acetabular plates; genital area 175 μm and acetabular plate 90 (85-96)/ 120 (115-128) μm in size. There are genital acetabula on each acetabular plate. Upper acetabular plate, 2 setae; under acetabular plate bears 2-4 setae.

Coxae in 2 groups; 4th coxae abruptly angled posteromedially; epimergandularia 1 lying free, anterior coxal groups 384 μm and posterior coxal groups 452 μm in length. Distribution on the leg segments of swimming hairs: 1st leg-4: 6, 1st leg-5: 8, 2nd leg-4: 6, 2nd leg-5: 10, 3rd leg-4: 6, 3rd leg-5: 10. Lengths of leg segments as follows; 60 (53-71)- 100 (92-113)- 150 (126-163)- 210 (184-223)- 230 (210-248)-250 (233-265) = 965 (950-983) μm , 60 (51-72)- 110 (102-121)- 150 (128-163)- 210 (184-223)- 230 (218-248)- 250 (233-265) = 1000 (980-1105) μm , 75 (70-81)-135 (128-145)- 150 (128-164)- 210 (188-224)-250 (232-270) -225 (217-37) = 1045 (1021-1105) μm , 115 (110-122)- 125 (120-129)- 175 (163-183)- 260 (238-274)- 280 (270-292)- 280 (271-292) = 1253 (1213-1254) μm .

Male: Body 820 (800-850)/530 (510-551) μm in length and oval. Infracapitulum 320 μm ; chelicerae 365 μm in length; at distal end of P5 present moderately developed 3 parts; palpa with small number of setae; 2 peg-like setae of P4 equal in length and inclined toward front. Lengths of dorsal and ventral with heights of palp segments: 60 (54-63)- 225 (216-233)- 125 (118-132)- 225 (214-234)- 100 (93-110) = 735 (711-753) μm , 55 (50-59)-150 (138-162)-50 (43-57)- 155 (143-168)- 90 (85-93) = 500 (482-520) μm , 110 (102-115)- 150 (135-161)- 100 (96-105)- 75 (70-86)- 45 (41-51) μm , respectively.

Fourth coxae separated in the middle from each other; genital field not fused with 4th coxae; anterior coxal groups 250 μm , posterior coxal groups 212 μm in length. Genital area 100 μm and acetabular plate 230 μm

in length, short toward the sides and bears 6-8 genital acetabula on each side; acetabular plate smooth on upper side and oval on under side. Upper position of acetabular plate is adjacent to 4th coxae and formed a projecting part in the middle of 4th coxae. Distribution on the leg segments of swimming hairs: 2nd leg/4:2, 3rd leg/4:6, 3rd leg/5:6, 4th leg/5:6; 4th Leg-6 bears a lot of peg-like setae on concave side. Lengths of leg segments are as follows: 50 (47-54)- 100 (88-110)- 115 (110-121)- 165 (158-173)- 175 (170-181)- 225 (218-230) = 830 (800-848) μm , 2nd leg: 50 (48-54)- 110 (96-112)- 120 (112-126)- 165 (157-172)- 190 (181-200)- 235 (218-250) = 870 (835-882) μm , 3rd leg: 55 (50-62)- 110 (98-115)- 118 (108-128)- 180 (170-191)- 225 (218-230)- 100 (93-111) = 788 (762-800) μm , 4th leg: 75 (68-82)- 110 (92-108)- 108 (96-112)- 170 (163-180)- 210 (200-223)- 225 (216-233) = 888 (867-892) μm . 3rd leg-6 modified for transfer of spermatophore and the tip of its long claw not forked.

The examined samples and the living areas: The lakeshore is covered with water plants and rushes. 21.3.1999, 8 ♀♀, 42 ♂♂; 21.4.1999, 10 ♀♀, 40 ♂♂; 23.5.1999, 8 ♀♀, 14 ♂♂; 26.6.1998, 15 ♀♀, 8 ♂♂; 22.7.1999, 18 ♀♀, 3 ♂♂; 23.8.1999, 2 ♀♀; 30.9.1999, 3 ♀♀, 28.10.1999, 2 ♂♂. Çapalı Lake, Afyon.

Distribution: Widely distributed in Europe. It is known from Russia in Asia (Viets, 1987). It is new to the Turkish fauna.

Arrenuridae Duges, 1833

***Arrenurus* Duges, 1833**

***Arrenurus batillifer* Koenike, 1894 (Figure 2-A-D)**

Male: Length of body 1230-910 μm , (not petiole) slightly narrowed in front and concave. Distances between the lateral eyes and preantenniformae setae are 340 μm and 352 μm , respectively. Dorsal plate 590/622 μm in size. There are 2 mounds not joining at the tips, inclined toward sides. Pygal lobes narrowed and smooth, distance between 550 μm and 100 μm in size; hyaline appendages surrounded petiole, concave in the tip section. Petiole has an oval structure, wide toward tips and 175 μm in size.

Capitulum has a pointed rostrum, disto-ventral projecting and 225 μm in length; P4 equal in width at anterior and posterior. Distribution to the palp segments of setae is 1-6-4-5-1. Lengths of dorsal and ventral with heights of palp segments: 25-88-63-100-55 = 331 μm ,

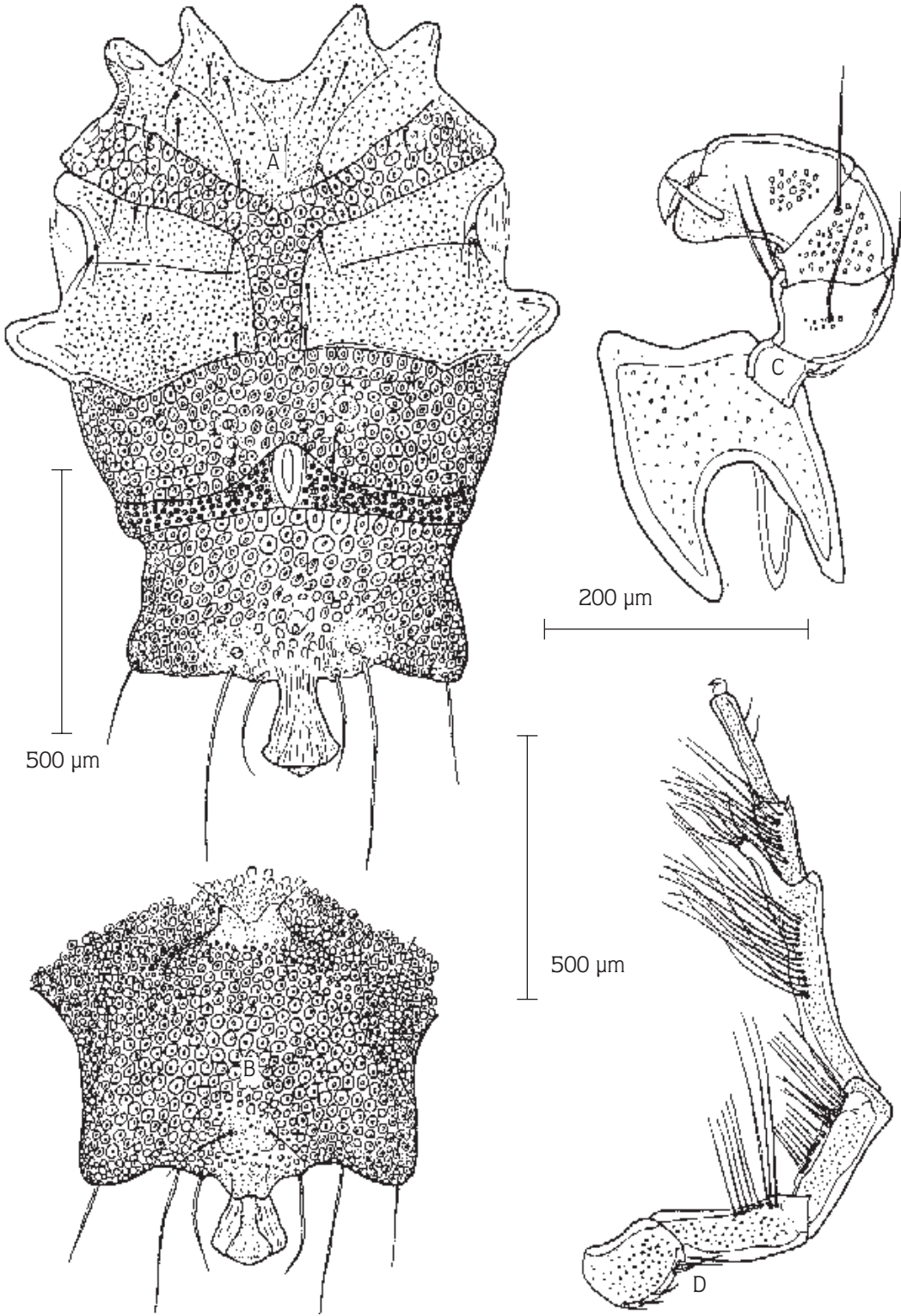


Figure 2. *Arrenurus batillifer*: Male: A) Body ventral, B) Pygial lobes and petiole, C) Gnathosoma, D) Fourth Leg.

23-50-25-75-45 = 218 µm, 30-78-75-18 µm, respectively.

First coxal group 390 µm, second coxal group 420 µm in size; distribution on coxae of setae is 1-2-4-3. There are body pores in 3-4 rows between 2nd and 3rd coxae, and body integument with weak chitin; acetabular plate 580 µm in size.

Lengths of leg segments are as follows; 1st leg 65-86-127-154-162-201 = 795 µm, 2nd leg: 74-100-138-190-184-219 = 905 µm, 3rd leg: 116-122-151-220-212-223 = 1044 µm, 4th leg: 145-210-203-346-110-172 = 1186 µm. Extension of 4th B/4 100 µm in length and bears 5 long hairs. Distribution on the leg segments of swimming hairs: 2nd B/3:2, 2nd B/4:6, 2nd B/5:6, 3rd B/3:8, 3rd B/4:10, 3rd B/5:8, 4th B/2:4, 4th B/3:8, 4th B/4:10, 4th B/5:12 and 2nd leg/6, 2nd leg/6, 3rd leg/6 bear a number of long setae.

The examined samples and their living areas: The lake area is covered with rushes, 22.7.1995, 1 ♂. Çapalı Lake, Afyon.

Distribution: Denmark, Belgium, Poland, Finland, Hungary, Romania, Yugoslavia, France and Italia (Viets, 1987). It is new to the Turkish fauna.

Discussion

It is known that *Piona variabilis*, widely distributed in Europe, prefers stagnant waters (Viets, 1956). The

measurements and descriptions of our specimens are in agreement with those given for this species before (Besseling, 1964; Szalay, 1964). Viets (1936) and Szalay (1964) have given 8-12 acetabulum on the acetabular plates and body length ratios of males and females 600:480µm, 1300:900µm, respectively. However, the acetabulum numbers of our specimens were 8-13.

While the males of this species are different from those of the other species of the genus *Piona* in terms of their common characteristics and not joining with the 4th coxae of the genital acetabulae, the females are separated by the structures of the palpa and the positions of peg-like setae on P4.

Arrenurus batillifer is distributed widely in Europe (Viets, 1936). However, it is stated that *A. batillifer* is a species with low frequency in different environments.

Furthermore, over a 10 month period, only 1 male individual was caught in our research area. Although this has made impossible a more detailed evaluation, this species is easily separated from close species with typical petiol characteristics: the position of the hyaline appendages and the forward curved 2 small mounds with long sharp tips at the dorsal (Besseling, 1964; Szalay, 1964). Because petiole features are an important character for distinguishing *Arrenurus* species, species identification in males is easier than in females. Body shape and the measurements of various organs of *A. batillifer* males are similar to those of our specimens (Viets, 1936).

References

- Besseling, A.J. 1964. de Nederlandse Watermijten (Hydrachnellae, Latreille, 1802) Monograph Nederland Entomologie, Vereniging.
- Böttger, K. 1970. Die Ernährungs weise der Wassermilben (Hydrachnellae, Acari) Int. Rev. Ges. Hydrobiol. 55: 895-912.
- Cook, D.R. 1974. Water mites: Genera and Subgenera. Mem. American Entomological Inst., Michigan.
- Gerson, U. and Smiley, R. 1990. Acarine Biocontrol Agents. Chapman and Hall. Great Britain.
- Özkan, M. 1982. Doğu Anadolu Su Akarları (Acari, Hydrachnellae) Üzerine Sistemantik Araştırmalar. Assist. Prof. thesis, Atatürk Univ. Science Faculty, Erzurum. 237pp.
- Özkan, M., Erman, O. and Boyacı, Y.Ö. 1993. Sultan Sazlığının (Kayseri) su keneleri (Acari, Hydrachnellae) faunası üzerine bir araştırma. Doğa-Tr. J. of Zoology, 20: 95-98.
- Özkan, M. and Boyacı, Y.Ö. 1994. Türkiye Faunası İçin Yeni Üç *Arrenurus* Duges, 1834 (Arrenuridae, Hydrachnellae, Acari) Türü. Tr. J. of Zoology, 18: 185-191.
- Smith, I.M. 1976. Study of the systematics of the water mite family Pionidae (Prostigmata: Parasitengona). Mem. Entomol. Soc., Canada.
- Sokolow, I. 1940. Hydracarina. Fauna SSCB. Zool. Inst Academia Sic. Moscow.
- Szalay, L. 1964. Viziattkak Hydracarina, Fauna Hungarian, AC. Kiado.
- Viets, K. 1936. Wassermilben oder Hydracarina (Hydrachnellae und Halacaridae) Dahls Tierwelt Deutschl. Jena, Gustav Fisch Verlag, Hamburg.
- Viets, K. 1956. Die Milben des Süsswassers und des Meeres (Hydrachnellae und Halacaridae) Jena, Gustav Fisch. Verlag, Hamburg.
- Viets, K.O. 1987. Die milben des Süßwassers (Hydrachnellae und Halacaridae, Acari) 2: Katalog. Gustav Fisch. Verlag, Hamburg.