NEW HALACARID RECORDS FROM ANTALYA, TURKEY (ACARI: HALACARIDAE)

Furkan Durucan*

* Işıklar Caddesi No 16, 17 TR-07100 Antalya, TURKEY. E-mail: f_durucan@hotmail.com

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ABSTRACT: In this study, halacarid mites were found from the western Turkish Mediterranean Sea Coast at 6 sampling stations. As a result, 8 species belonging to 6 different genera were identified. The following species are recorded: *Agaue chevreuxi* (Trouessart, 1889), *Agaue panopae* (Lohmann, 1893), *Halacaropsis hirsuta* (Trouessart, 1889), *Halacarus bisulcus* (Viets, 1927), *Maracarus gracilipes* (Trouessart, 1889), *Rhombognathus magnirostris* Trouessart, 1889, *Rhombognathus paratonops* Bartsch, 1986 and *Thalassarachna affinis* (Trouessart, 1896). All are new records for the Mediterranean Sea Coast of Turkey (Levantine Sea), whereas *A. panopae*, *H. bisulcus* and *M. gracilipes* are recorded for the first time for Turkish coast. Of the identified species, *R. paratonops* is the highest number of the specimens (54 species, 29%), whereas *H. hirsuta* is the lowest number of the specimens (6 species, 3%). Each species is illustrated, briefly described in the present study with their data to habitat and worldwide geographical distributions.

KEY WORDS: Acari, Halacaridae, new records, Mediterranean Sea, Levantine Sea, Antalya, Turkey

Halacaridae Murray, 1877 constitutes a taxon of worldwide distribution. The family has 64 genera and more than 1000 species in the world (Durucan, 2018). The author presented here the specimens belonging to the six different genera (*Agaue*, *Halacaropsis*, *Halacarus*, *Maracarus*, *Rhombognathus* and *Thalassarachna*) with eight species (*A. chevreuxi*, *A. panopae*, *H. hirsuta*, *H. bisulcus*, *M. gracilipes*, *R. magnirostris*, *R. paratonops* and *T. affinis*) with their habitat informations, geographical distributions, morphological features with original illustrations. All are new records for the Mediterranean Sea Coast of Turkey (Levantine Sea), whereas *A. panopae*, *H. bisulcus* and *M. gracilipes* are recorded for the first time for Turkish coast. The present work aims to explore halacarid fauna of Turkey. The present records bring the total number of known species in the family 34 to 37 in Turkey, of which 34 species found on the west coast of Antalya, Turkey (Durucan, 2018).

MATERIAL AND METHODS

Samples of various macroalgae (*Cystoseira crinita*, *Corallina elongata*, *Corallina officinalis*, *Jania rubens*, *Mesophyllum expansum* and *Padina pavonica*) and sandy habitats (1,5-12 m) were collected by hand intertidally using snorkelling and usually using SCUBA at localities, qualitatively from Antalya in 2016 (Fig. 1). Immediately after collection, mites were extracted by washing the substrates. The meiofauna retained in the set of sieves (63 μm, 500 μm, 1 mm) was sorted under binocular microscope (Nikon SMZ10). In the laboratory, mite specimens were cleared in lactic acid and mounted in glycerine jelly. Figures were drawn with the aid of a camera lucida (Nikon Eclipse E400). The study was supported by the Süleyman Demirel University SDÜ-BAP3973-D2-14 project and

is a part of the author's PhD thesis. All measurements are given as micrometers. The specimens were kept in the author's personal collection in Antalya, Turkey.

List of abbreviations			
AD	anterior dorsal plate	gs	genital sclerite
AE	anterior epimeral plate	L	larva
ce	cerotegument	mc	middle claw
che	chelicera	n	number of specimens
co	corneae	OC	ocular plate (s)
cos	costae	ovo	ovopositor
		P-1 to P-	first to fourth segments of
DN	deutonymph	4	palp
	dorsal setae, from anterior to		
ds-1 to ds-6	posterior	PD	posterior dorsal plate
ep	epimeral pores	PE	posterior epimeral plate (s)
gac	genital acetabula	pgs	perigenital seta
GA	genitoanal plate	PN	protonymph
	gland pore/s, from anterior to		
glp-1 to glp-5	posterior	sgs	subgenital seta
GO	genital opening	spr	spermatopositor

RESULTS

Table 1 shows a list of the species recorded in this study. In the present study, 8 halacarid species and 189 specimens have been identified along the western coast of Antalya, Turkey: *A. chevreouxi*, *A. panopae*, *H. hirsuta*, *H. bisulcus*, *M. gracilipes*, *R. magnirostris*, *R. paranotops* and *T. affinis*. From these records, 3 species (*A. panopae*, *H. bisulcus* and *M. gracilipes*) are new to Turkish halacarid fauna and 5 species are new to the Mediterranean Sea of Turkey (summarized in Table 2). The diagnosis of the species that will be presented as follows.

SYSTEMATICS

Family Halacaridae Murray, 1877

Genus *Agaue* Lohmann, 1889
Agaue chevreuxi (Trouessart, 1889)

(Fig. 2)

Material examined. Yakamoz Beach, 2 m, *C. elongata*, 1 ♀, 1 ♂, 2 DN, 1 L; Phaselis, 3 m, *Jania rubens*, 7 ♀♀, 3 ♂♂ and 7 m, *Cystoseira crinita*, 2 ♀♀, 3 ♂♂; Finike, 5 m, *J. rubens*, 2 ♀♀, Kalkan, 3 m, *Padina pavonica*, 2 ♀♀.

Morphology and notes. Idiosoma of female 450-550 µm long, 350 µm wide, that of male 600-625 µm long, 380-400 µm wide, that of deutonymphs 400 and 410 µm long, 300 µm wide. AD 85-87 µm long, 61-63 µm wide. OC 60-62 µm long, 48-50 µm wide with two corneae. Female PD 320-325 µm long, 173-175 µm wide. Setae ds-1 on AD, ds-2 to ds-4 (striated in integument) and legs covered by cerotegumental lamellae (Figs. 2A,B). AE 200 µm long, 300 µm wide. PE 250 µm long, 100 µm wide. Male GO surrounded by 90 pgs and 5 pairs of sgs (Fig. 2C). Female GA with 8-10 pairs of pgs (Fig. 2D). Gnathosoma 210-213 µm long and slender. Palps are slender and 4 segmented. Total palp length 135 µm long (Fig. 2C). Leg I 462 µm long. Legs are tibiae club-shaped. The chaetotaxy of leg I as follows from trochanter to tarsus (solenidia included) 1, 2, 5, 5, 11, 20-23 (Fig. 2E). A single larva is 350 µm long (gnathosoma included) (Fig. 2F). The species is closely related to *Agaue panopae*. It can be easily be distinguished from the related species by the following features: (1) idiosoma of *A. chevreuxi* is larger than *A. panopae* (2) *A. chevreuxi* has larger cerotegumental lamellae than *A. panopae*. (3) in *A. chevreuxi* setae from ds-2 to ds-4 with

cerotegumental lamella, *A. panopae* has no such lamella (Bartsch, 2016a). The morphological characteristics of the our specimens reported here accord with the previously given records by Bartsch (2016a). The present finding constitutes the third record of this species from Turkey and stand as the first report from Antalya.

Distribution. Azores, Bulgaria, Canary Islands, Crimea, Croatia (Rovinj), France (North Atlantic and Mediterranean France-Marseille), Italy (Adriatic and Ligurian Sea), Monaco, Morocco, Romania, Spain (Cadiz), Turkey (Istanbul) (Bartsch, 2016a) (Fig. 10a).

Agaue panopae (Lohmann, 1893)

(Fig. 3)

Material examined. Yakamoz Beach, 2 m, *C. elongata*, 5 ♀♀, 4 ♂♂, 4 DN, 2 PN; Phaselis, 7 m, *C. crinita*, 4 ♂♂, 3 DN; Finike, 5 m, *J. rubens*, 2 ♀♀, Kaş, 10 m, *Mesophyllum expansum*, 3 ♀♀, 5 ♂♂; Kalkan, 3 m, *P. pavonica*, 6 ♂♂.

Morphology and notes. Idiosoma of female 500-530 µm long, 320 µm wide, that of male 468-475 µm long, 310-312 µm wide, of deutonymph 330-480 µm long, of protonymph 350, 380 µm long. AD 125 µm long,112 µm wide. OC 75 µm long, 60 µm wide; with two corneae. PD 275 µm long, 160 µm wide; anteriorly truncate. Setae ds-1 on AD, ds-2 to ds-4 (striated in integument). Dorsal plates of idiosoma and setae from ds-2 to ds-4 have normal setae (without ceratogumental lamellae) (Fig. 3A). AE 137 µm long, 225 µm wide; with three pairs of ventral setae. PE 187 µm long, 75 µm wide; with 1 dorsal 3 ventral setae. GO surrounded by 62-64 pgs (Fig. 3B). Female ovopositor 200 µm long (Fig. 3C). Gnathosoma 187 µm long and 75 µm wide. Palps are slender and 4 segmented. Total palp lenght 137 µm (Fig. 3D). Leg I 425 µm long (Fig. 3E). Our specimens fit the previously recorded of the species (Table 2). The differences between *A. chevreuxi* and *A. panopae* have already discussed in remarks of *A. chevreuxi* above. The species was recorded for the first time for Turkish halacarid fauna (Table 2).

Distribution. Cape Verde Islands, Croatia (Rovinj and Split), France (Perpignan and off Marseille), Italy (Tyrrhenian Sea), Monaco, Spain (Galicia) (Bartsch, 2016a) (Fig. 10b).

Genus *Halacaropsis* Bartsch, 1996

Halacaropsis hirsuta (Trouessart, 1889)

(Fig. 4)

Material examined. Yakamoz Beach, 1 m, *J. rubens*, 3 ♀♀; Finike, 5 m, *J. rubens*, 3 ♀♀.

Morphology and notes. Idiosoma of females 700 µm long, 270 µm wide. Dorsal and ventral plates large. Idiosoma have 5 pairs of idiosomotic setae. ds-1 on AD. Enlarged setae from ds-2, ds-3 and ds-4 situated in striated integument (length of pairs of setae 100, 110 and 110 µm respectively). ds-5 on PD. AD and OC with pair of gland pores. AD 240 µm long, 170 µm wide. The plate has a frontal spine anteriorly. OC distinctly longer than wide (135/50 µm) and anterolaterally with 2 corneae. PD 225 µm long, 175 µm wide (Fig. 4A). AE 100 µm long, 225 µm wide with 3 pairs ventral setae and a pair of epimeral pores. Epimeral pores 15-17 µm wide. GA 100 µm long, 110 µm wide with 12 pgs setae and 5 pair of sgs (Fig. 4B). Gnathosoma 215 µm long, quadrangular. Palps 4 segmented. Total palp lenght is 140 µm. Chelicera 237 µm long (Figs. 4C,D). Leg I wider than following legs. Length of legs I, II, III, IV = 700, 650, 675, 725 µm, respectively. Leg I thickened and armoured with heavy spiniform setae. The chaetotaxy of leg I as follows (from basifemur to tarsus) (spiniform setae with Roman numerals); 3, 4+III, 5+II, 6+III, 7+I (Figs. 4E-H). The morphological characteristics, habitat preferences and body sizes of the specimens reported here accord with the previously given records by Viets (1940). The present finding constitutes the second record of this species from Turkey and stand as the first report from Antalya (Table 2).

Distribution: Croatia, Egypt, France, Italy, Spain and Turkey (Antalya) (Bartsch, 2009) (Fig. 10c).

Genus *Halacarus* Gosse, 1885

Halacarus bisulcus (Viets, 1927)

(Fig. 5)

Material examined. Bilem Beach, 10 m, fine sand, 7 ♀♀; Kaş, 12 m, fine sand, 4 ♀♀, 2 DN, 1 PN.

Morphology and notes. Idiosoma of females 380-405 µm long, 145-150 µm wide. The body dorsally smooth. Dorsal plates smooth or faintly reticulated. AD 150-160 µm long, 90-100 µm wide. AD quadrangular. OC 40-50 µm long, 20-24 µm wide, with cornea, gland pore. ds-1 on AD between pair of glp-1. ds-2, ds-3 and ds-4 in striated in integument. Pair of ds-5 and ds-6 on PD. PD 100-112 µm long, 75-78 µm wide (Fig. 5A). AE 140-150 µm long, 70-75 µm long wide; with three pairs of ventral setae. PE with 1 dorsal 3 ventral setae. Female GA 110-115 µm long, 87-90 µm wide, heavily sclerotized (Fig. 5B). Gnathosoma 110-112 µm long, 60-63 µm wide. P-2 with two setea. P-3 short with a spine medially. P-4 with 3 setae and 2 spurs at the tip. Total palp lenght is 100 µm. P-1-4; 15/50/10/25 (Fig. 5C). Leg I 400 µm long and wider than following legs. Telofemura I covered with striated epicuticular. The chaetotaxy of leg I as follows (from basifemur to tarsus); 2, 5, 10, 11, 7 (Fig. 5D). Two female specimens have observed as a everted ovipositor (Fig. 4E). *H. bisulcus* is similar to *H. subtilis* in characters: (1) epicuticula on legs with delicate parallel striated. (2) All tibiae with four spiniform ventral setae. (3) Pair of ds-1 posterior to glp-1. However, *H. bisulcus* is distinguished from the *H. subtilis* by the following characters: (1) PD without reticulate in *H. bisulcus* whereas reticulated in *H. subtilis*. (2) OC lacking cornea in *H. bisulcus*, with cornea in *H. subtilis* (Viets, 1927; Bartsch, 1980; Green & MacQuitty, 1987; Bartsch, 2007). In this study, the genus and species are recorded for the first time from Turkey (Table 2).
Distribution. England, France, Germany, Iceland, Italy and Norway (Bartsch, 2009) (Fig. 10d).

Genus *Maracarus* Bartsch, 2016
Maracarus gracilipes (Trouessart, 1889)
(Fig. 6)

Material examined. Phaselis, 5 m, medium coarse sand, 10 ♀♀, 6 ♂♂.
Morphology and notes. Idiosoma of female 345-350 µm long, that of male 350-360 µm long. Dorsal plates reticulated. AD 95-100/85-88 µm with 3 raised areola. ds-1 on AD between pair of glp-1. ds-2 and ds-3 in striated integument. PD 228-235 µm long with two longitudinal costae. Pair of ds-4 to ds-6 on PD. OC 200 µm long, tail-like extended with wide gland pore and big corneae. Male GA 155/125 µm. Male GA with 30 pgs and 4 pairs of sgs. AE with three pairs of ventral setae. PE with 2 dorsal 3 ventral setae. Female GA 162/112 µm with 3 pairs of pgs (Figs. 6A-E). Gnathosoma 112/25 µm. P-2 with one distal seta. No seta on P-3. P-4 with 3 setae in basal whorl. Total palp lenght is 100 µm (Fig. 6F). Legs very slender. Tibia I with 4 ventral setae (Fig. 6G). *M. gracilipes* resembles to *M. minor*. Two species differs from each other in that GA with areolae both female and male in *M. gracilipes*, while ventral plates with reduced areolae in M. minor (Green & MacQuitty, 1987). This is the first record of this species from Turkey.
Distribution. English Channel, North Sea, Skagerrak, Öresund, Norwegian Basin, Azores, Senegal (Dakar), Spain, France, Ireland, United Kingdom, Germany, Denmark, Sweden, Norway (Bergen, Tromsö); Mediterranean and Black Sea: France, Italy, Croatia, Bulgaria, Crimea, Russia (Bartsch, 2016b) (Fig. 10e).

Genus *Rhombognathus* Trouessart, 1888
Rhombognathus magnirostris Trouessart, 1889
(Fig. 7)

Material examined. Yakamoz Beach, 2 m, *Corallina officinalis*, 4 ♀♀, 1 ♂; Phaselis, 7 m, *C. officinalis*, 1 ♀, 1 ♂.
Morphology and notes. Idiosoma of female 320-390 µm long, 250-260 µm wide, that of male 240 and 330 µm long. Idiosoma is smooth. Female AD as long as wide (123 µm). Setae ds-1 50 µm. OC 90 µm long, 60 µm wide with 2 corneae. PD 213 µm long, 150 µm wide; both female and male with AE, PE and GA fused (Fig. 7). Our specimens accord with the previously given if the species recorded from the Black Sea by Bartsch (1996). The present finding constitutes the second record of this species from Turkey and stand as the first report from Antalya (Table 2).
Distribution. Mediterranean and Black Sea (Bartsch, 2009) (Fig. 10f).

Rhombognathus paranotops Bartsch, 1986
(Fig. 8)

Material examined. Yakamoz Beach, 2 m, *Corallina officinalis*, 10 ♀♀, 6 ♂♂; Bilem, 6 m, *Cystoseira barbata*, 2 PN, Phaselis, 2 m, *C. officinalis*, 1 ♀; Finike, 3 m, *Cystoseira crinita*, 30 ♀♀, 5 ♂♂.

Morphology and notes. Idiosoma of female 295-300 µm long, 214-218 µm wide that of male 240-250 µm long. AD is longer than wide; 100 µm long, 88 µm µm wide. OC 75 µm long, 50 µm wide Both female and male with AE, PE and GA fused. Female GO surrounded (Figs. 8A-C). Gnathosoma 60-65 µm long (Fig. 8D). The morphological characteristics of the specimens from Turkey accord with the original descriptions of the species. *R. paratonops* can be distinguished among other Mediterranean species of the genus by having reticulated PD and the size of the first pair of dorsal setae. ds-1 is not apparently larger than the other dorsal setae of the specimens (Bartsch, 1986). Our specimens accord with the previously given if the species recorded from the Black Sea by Bartsch (1996). The present finding constitutes the second record of this species from Turkey and stand as the first report from Antalya (Table 2).

Distribution: Mediterranean and Black Sea (Bartsch, 2009) (Fig. 10g).

Genus *Thalassarachna* Packard, 1871
Thalassarachna affinis (Trouessart, 1896)
(Fig. 9)

Material examined. Yakamoz Beach, 2 m, *C. officinalis*, 30 DN

Morphology and notes. Idiosoma 570-580 µm long, 250 µm wide. Dorsal plates uniformly punctate. Major parts of AD, OC, and PD uniformly reticulated. AD 135-138 µm long, 100-110 µm wide. OC 95 µm long, 55 µm wide; slender with three corneae. PD 187 µm long, 150 µm wide, anteriorly ovate. Pairs of ds-1 on AD, ds-2 to ds-4 in striated integument, ds-5 on PD and ds-6 on anal plate (Fig. 9A). AE with three pairs of ventral setae. PE with 1 dorsal 3 ventral setae. GA longer than wide; 63 µm long, 50 µm wide (Fig. 9B). Gnathosoma 175 µm long, 100 µm wide. P-2 with one distodorsal seta. P-3 with medial spine. P-4 with 3 setae in basal whorl. Total palp lenght is 137 µm (Figs. 9C,D). Leg I 462 µm long. The chaetotaxy of leg I as follows (from basifemur to tarsus); 2, 5, 4, 8, 11 (Figs. 9E-H). *T. affinis* is similar to *T. basteri* in characters: (1) while the frontal spine process is wide in *T. basteri*, that spine is short process in *T. affinis*. (2) while the PD is slightly longer than wide in *T. basteri*, in *T. affinis* about 1.3 times longer than wide. (3) while deutonymphs of *T. basteri* have four (rarely three) ventral spines on tibia I, deutonymphs of *T. affinis* one (rarely two) and one (rarely zero) spurs (Bartsch, 2015). The present finding constitutes the second record of this species from Turkey and stand as the first report from Antalya (Table 2).

Distribution: North Atlantic, Mediterranean, Black Sea and Marmara Sea (Bartsch, 2015) (Fig. 10h).

The author also characterised the mite fauna associated with the habitats qualitatively. The highest number of the species sampled were *Rhombognathus paratonops* (54 specimens, 29%), *Agaue panopae* (38 specimens, 20%), *Thalassarachna affinis* (30 specimens, 16%), *Agaue chevreuxi* (24 specimens, 13%), respectively. All of the rest species occurred less than 15 specimens (10%) (Fig. 11).

The highest abundances of specimens were observed for *Corallina officinalis* (54 specimens, 29%), whereas *Cystoseria barbata* (2 specimens, 1%) was characterized by the lowest number of specimens in the habitats (Fig. 12). Six species, *Agaue chevreouxi*, *Agaue panopae*, *Halacaropsis hirsuta*, *Rhombognathus magnirostris*, *R. paranotops* and *Thalassarachna affinis* were only found in macroalgae habitats. whereas *Halacarus bisulcus* and *Maracarus gracilipes* were found only in sandy habitats.

Of the stations selected, the highest diversity was found at Yakamoz Beach (74 specimens, 39%), whereas the lowest diversity at Kalkan (8 specimens, 4%) (Fig. 13).

Table 2 presents idiosoma size, worldwide distribution and habitat notes based on published data from Mediterranean Sea.

DISCUSSION

In this study, a total of 8 halacarid species were obtained from various habitats of the western coast of Antalya, Turkey: *A. chevreuxi*, *A. panopae*, *H. hirsuta*, *H. bisulcus*, *M. gracilipes*, *R. magnirostris*, *R. paratonops* and *T. affinis*. All of them are new records from Mediterranean Sea of Turkey, Antalya. The genera *Halacarus* and *Maracarus* and the species of *Agaue panopae* have not previously been recorded from Turkey. Regarding the species, to date, *A. chevreuxi*, *R. magnirostris, R. paratonops* and *T. affinis* have only been reported from Black Sea of Turkey (Sinop) by Bartsch (2004) and the species *A. chevreuxi*, *H. hirsuta* and *T. affinis* have only been reported from Sea of Marmara (Istanbul) by Boyaci & Durucan (2013), Durucan and Boyaci (2014 and 2016). The author has added these species in Turkish halacarid fauna with this study. The summary of my findings are contributed to an increase in the number and better knowledge of halacarid diversity. This study increases the number of marine halacarid known species from 34 to 37 in Turkey (Durucan, 2018). Regarding the halacarid fauna, the Mediterranean Coast of Turkey (Levantine Sea) is the richest coast of Turkey as shown in figure 14.

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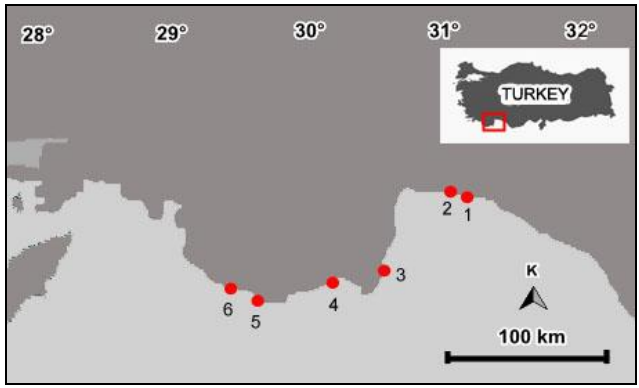

Figure 1. Map of sampling locations and coordinates along the western coast of Antalya, Turkey. **1.** Yakamoz 36.845556°N-30.799167°E; **2.** Bilem 36.854722°N-30.743889°E; **3.** Phaselis 36.525°N-30.552222°E; **4.** Finike 36.278889°N-30.140278°E; **5.** Kaş 36.156944°N-29.628333°E; **6.** Kalkan 36.261944°N-29.411389°E.

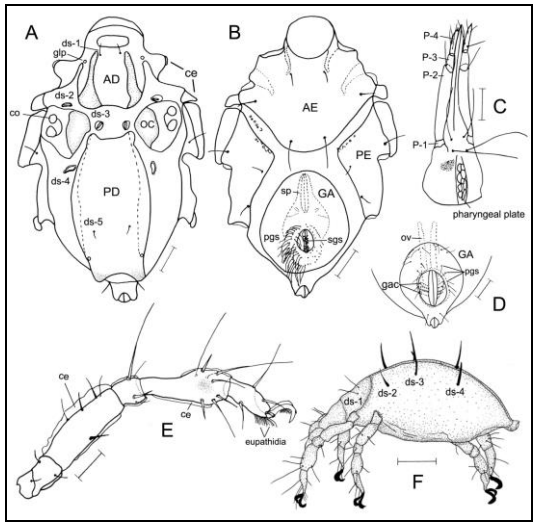

Figure 2. *Agaue chevreuxi* Trouessart, 1889: **A.** idiosoma, dorsal, male **B.** idiosoma, ventral, male **C.** gnathosoma, male **D.** GA, female **E.** leg I, lateral, male. **F.** Lateral view of larva. **AD**. anterior dorsal plate **OC**. ocular plate **PD**. posterior dorsal plate **PE**. posterior epimeral plate **AE**. anterior epimeral plate **GA**. genitoanal plate **ce**. cerotegument **co**. cornea **ds-1 to ds-5**. first to fifth dorsal setae **gac.** genital acetabula **glp.** gland pore **P-1 to P-4.** first to fourth palpal segments **pa.** pharyngeal plate **pgs**. perigenital setae **sgs**. subgenital setae **sp.** spermatopositor **ov.** ovipositor. Scale bars: 50 µm.

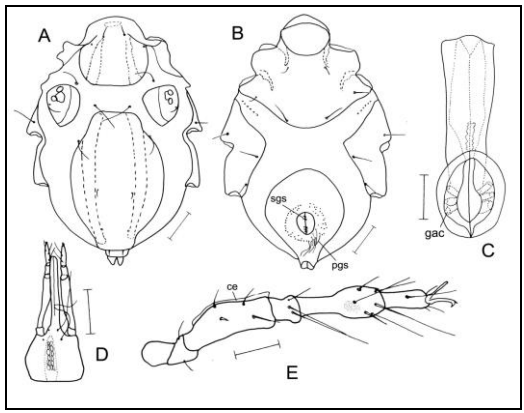

Figure 3. *Agaue panopae* Trouessart, 1889 **A.** idiosoma, dorsal, male **B.** idiosoma, ventral, male **C.** ovopositor, female **D.** gnathosoma, ventral, male **E.** leg I, lateral, male **ce.** cerotegument **gac.** genital acetabula **pgs.** perigenital setae **sgs.** subgenital setae. Scale bars: 50 μm.

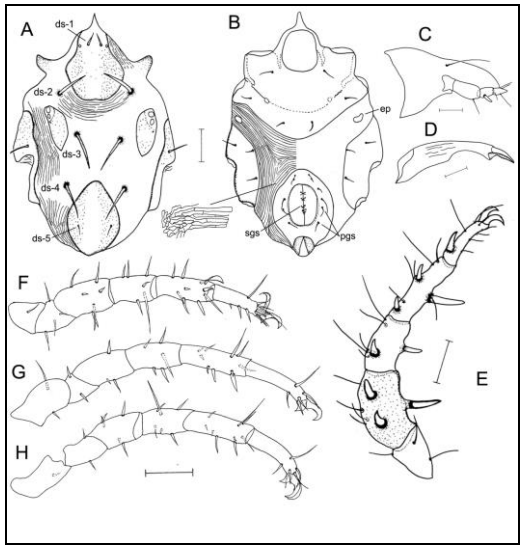

Figure 4. *Halacaropsis hirsuta* (Trouessart, 1889) (female): **A.** idiosoma, dorsal **B.** idiosoma,ventral **C.** gnathosoma, lateral **D.** chelicera, lateral; **E.** leg I, lateral **F.** leg II, lateral **G.** leg III, lateral **H.** leg IV, lateral **ds-1 to ds-5**. first to fifth dorsal setae **ep.** epimeral pore **pgs**. perigenital setae **sgs**. subgenital setae. Scale bars: 50 μm.

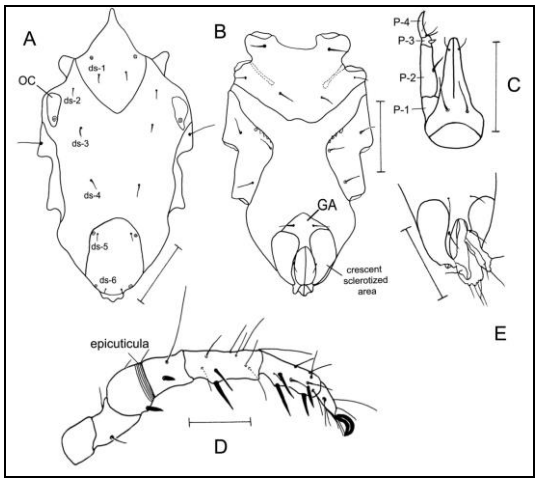

Figure 5. *Halacarus bisulcus* Viets, 1927: **A.** idiosoma, dorsal, female **B.** idiosoma, ventral, female, **C.** gnathosoma, ventral, female, **D.** leg I, lateral, female, **E.** everted ovopositor. **OC**. ocular plate **GA**. genitoanal plate **P-1 to P-4.** first to fourth palpal segments **ds-1 to ds-6**. first to sixth dorsal setae **glp-1 to glp-5.** first to fifth gland pores. Scale bars: 50 μm.

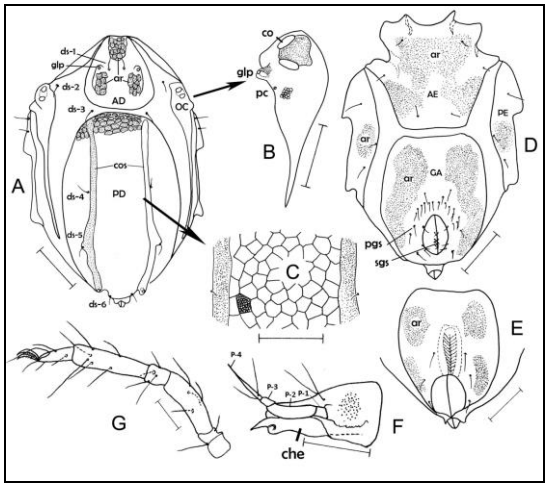

Figure 6. *Maracarus gracilipes* (Trouessart, 1889): **A.** Idiosoma, dorsal, male **B.** OC, enlarged, male **C.** PD, enlarged, male **D.** Idiosoma, ventral, male **E.** GA, female **F.** gnathosoma, medial, male **G.** Leg-I, medial, male. **AD**. anterior dorsal plate **OC**. ocular plate **PD.** posterior dorsal plate **PE.** posterior epimeral plate **AE.** anterior epimeral plate **GA.** genitoanal plate **P-1 to P-4.** first to fourth palpal segments **ds-1 to ds-6.** first to sixth dorsal setae **ar.** areolae **che.** chelicera **co.** cornea **cos.** costae **glp.** gland pore **pc.** pore canaliculus **pgs.** perigenital setae. **sgs.** subgenital setae. Scale bars: 50 μm.

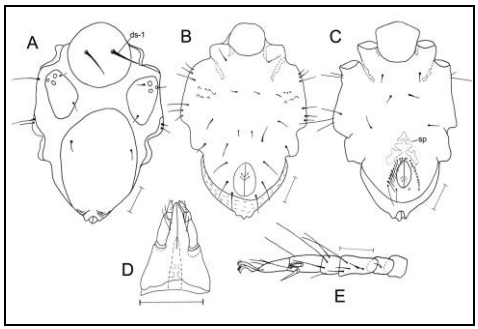

Figure 7. *Rhombognathus magnirostris* Trouessart, 1889: **A.** idiosoma, dorsal, female **B.** idiosoma, ventral, female **C.** idiosoma, ventral, male **D.** gnathosoma, ventral, female **E.** leg I, lateral, female. **ds-1.** first dorsal setae **sp.** spermatopositor. Scale bars: 50 μm.

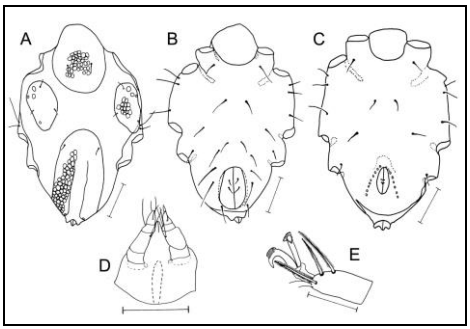

Figure 8. *Rhombognathus paranotops* Bartsch, 1986: **A.** idiosoma, dorsal, female **B.** idiosoma, ventral, female **C.** idiosoma, ventral, male **D.** gnathosoma, ventral, female **E.** tarsus I, lateral, female. Scale bars: 50 μm.

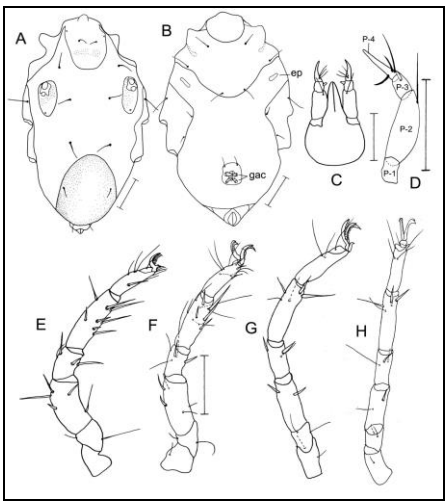

Figure 9. *Thalassarachna affinis* Trouessart, 1896 (DN): **A.** idiosoma, dorsal; **B.** idiosoma, ventral; **C.** gnathosoma, ventral; **D.** palp, lateral; **E.** leg I, lateral; **F.** leg II, lateral; **G.** leg III, lateral; **H.** leg IV, lateral. **ep.** epimeral pore, **gac.** genital acetabula, **P-1 to P-4.** first to fourth palpal segments. Scale bars: 50 μm.

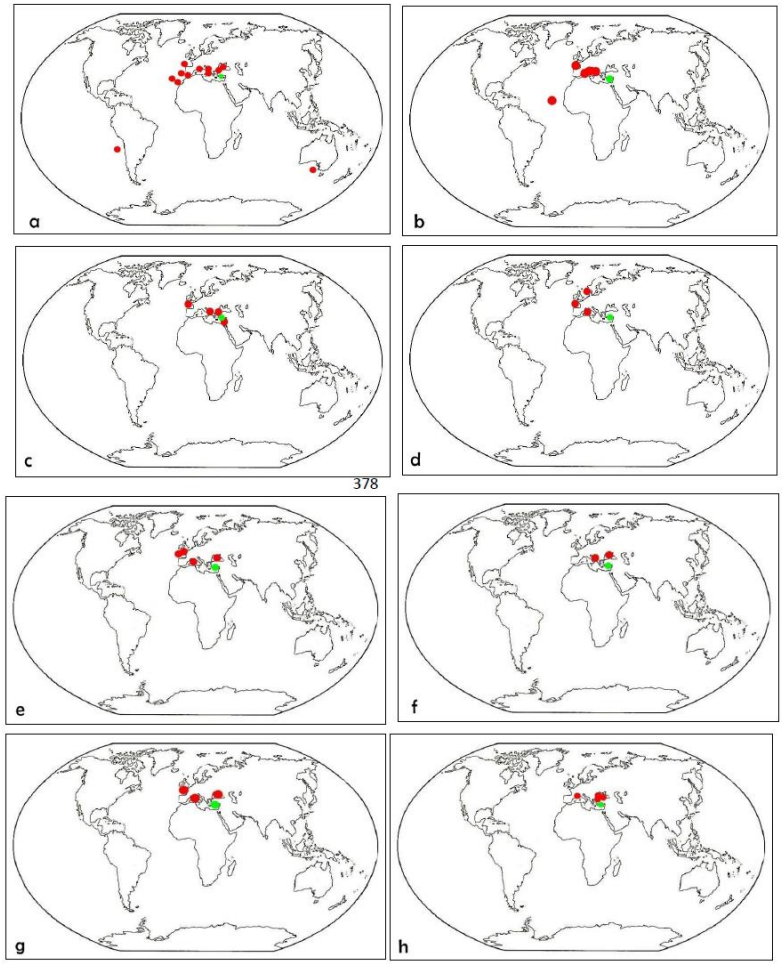

Figure 10. Worldwide distributions of the species **a.** *A. chevreuxi* **b.** *A. panopae* **c.** *H. bisulcus* **d.** *H. hirsuta* **e.** *M. gracilipes* **f.** *R. magnirostris* **g.** *R. paranotops* **h.** *T. affinis* (red circles indicate that previously records, green circles indicate that present records).

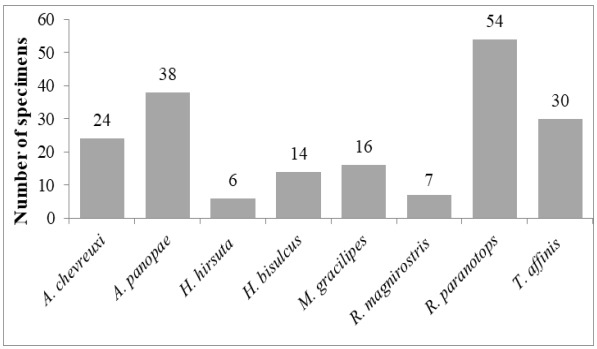

Figure 11. The number of specimens to the species.

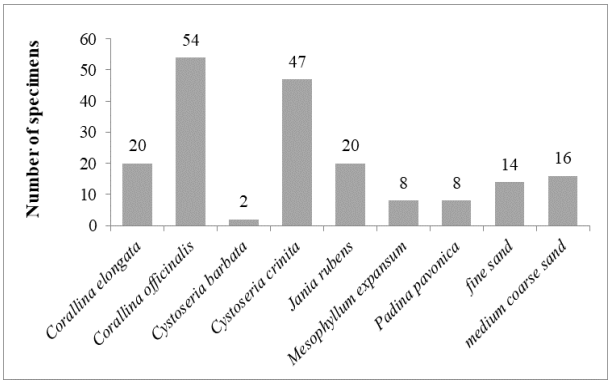

Figure 12. The number of specimens to the habitats.

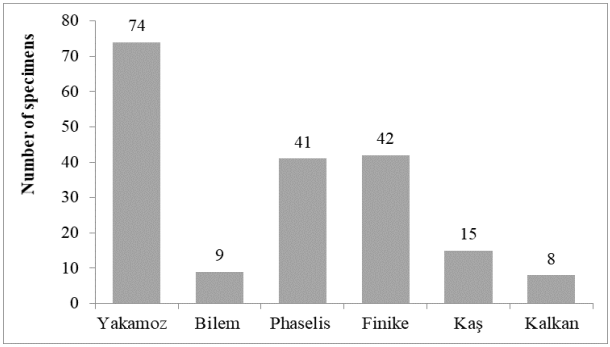

Figure 13. The number of specimens to the stations.

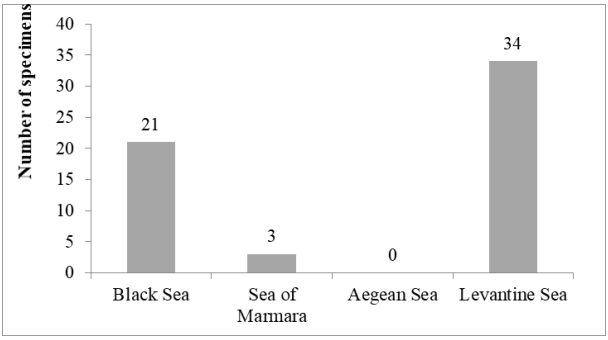

Figure 14. The total number of specimens along to the Turkish coast.

Table 1. List of recorded halacarid species in this study. 1: New records for Antalya; 2: New records for Turkey.

No	Species	1	2
1	*Agaue chevreuxi* (Trouessart, 1889)	x	
2	*Agaue panopae* (Lohmann, 1893)	x	x
3	*Halacaropsis hirsuta* (Trouessart, 1889)	x	
4	*Halacarus bisulcus* (Viets, 1927)	x	x
5	*Maracarus gracilipes* (Trouessart, 1889)	x	x
6	*Rhombognathus magnirostris* Trouessart, 1889	x	
7	*Rhombognathus paranotops* Bartsch, 1986	x	
8	*Thalassarachna affinis* (Trouessart, 1896)	x	

Table 2. List of all recorded species that given in this study with additional informations. *:New records for Antalya; **: New records for Turkey; DN: Deutonymph, PN: Protonymph, L: Larva. Site Numbers; 1. Yakamoz Beach, 2. Bilem Beach, 3. Phaselis, 4. Finike, 5. Kaş, 6. Kalkan.

Species	Idiosoma length (µm)	Locality	Habitats	References
A. chevreuxi	♀: 550; ♂: 660	Rovinj, Croatia	various macroalgae, sponge, sediment, *Zostera* sp., on sea cucumber (0,5-20 m)	Viets, 1940
	♀: 655; ♂: 628; DN: 435	Isle of Ishia, Italy	*P. oceanica* (1, 6 m)	Mari and Morselli, 1990
	♀: 570-755; ♂: 567-620; DN: 489-638; PN: 493	Crimea, Odessa, Ukraine	macroalgae, vascular plants, colonies mussels, sediments (10 m)	Bartsch, 1998
	♂: 675	Istanbul, Turkey	*Ulva lactuca* (3-4 m)	Boyaci and Durucan, 2013
	♀: 450-550; ♂: 600-625; DN: 400,410	Antalya[1,3,4,6] Turkey	various macroalgae (2-7 m)	present study*
A. panopae	♀: 554-563; ♂: 493	Piambino area, Italy	sandy bottoms	Morselli and Mari, 1985
	♀: 555-655; ♂: 528-555	Ischia Island, Italy	meadows of *Posidonia oceanica* (1-6 m)	Mari and Morselli, 1990
	♂: 518, 562; DN: 533	Latium Coast, Italy	coralligenous formations (6-12 m)	Morselli and Mari, 1993
	♀: 500-530; ♂: 468-475; DN: 330-480; PN: 350,380	Antalya[1,3-6] Turkey	various macroalgae (2-10 m)	present study**
H. hirsuta	-	Alexandria, Egypt	stones, *Caulerpa-Halimeda* ground on *Cystoseira* (9-11 m)	Viets, 1935
	♀: 743; ♂: 677	Rovinj and Split, Croatia	various macroalgae, seagrass (*Zostera* sp.); porifera (*Aplysina aerophoba*); sea urchin (*Strongylocentratus* sp.) (0-4 m), sand (6-7 m)	Viets, 1940
	L: 354	Livorno, Italy	coarse sand with quartz calcareous (8 m)	Morselli and Mari, 1985
	DN: 550	Istanbul, Turkey	*Ulva lactuca* (3-4 m)	Durucan and Boyaci, 2016
	♀: 700	Antalya[1,4] Turkey	*J. rubens* (1,5 m)	present study*
H. bisulcus	♀: 435-537; ♂: 450	Roscoff, France	maerl beds, sediment with macroalgae, bryozoan, balanus	Bartsch, 1980
	♀: 590	Livorno, Italy	fine sand (8 m)	Morselli and Mari, 1985
	♀: 380-495; DN: 260, 270	Antalya[2,6] Turkey	fine sand (10-12 m)	present study**
M. gracilipes	♀: 310-384; ♂: 304-360	Roscoff, France	midlittoral and sublittoral	Bartsch, 1977
	♀: 458-510; ♂: 458-528	Livorno, Italy	fine sand (8 m)	Morselli ve Mari, 1985
	♀: 316-334; ♂: 343	Crimea, Sevastopol and Laspi (Ukraine)	corallines (10 cm-0.5 m)	Bartsch, 1998
	♀: 345-350; ♂: 350, 360	Antalya[3](Turkey)	medium-coarse sand (5 m)	present study**
R. magnirostris	♀: 432	Marsillee (France)	macroalgae	Newell and Andre, 1959
	♀: 390-470; ♂: 360-422; TN:310-397	Crimea (Ukraine)	various macroalgae (0-3 m), *Mytilus* sp., coarse sediment (6-7 m)	Bartsch, 1996
	♀: 320-390; ♂: 240, 330	Antalya[1,3] Turkey	*C. officinalis* (2, 7 m)	present study*
R. paranotops	♀: 292-353; ♂: 269-322; TN: 198-251	Marsillee (France)	sand (11-45 m)	Bartsch, 1986
	♀: 271-303; ♂: 251-300; TN: 261-264	Latium Coast (Italy)	coralligenous formations (6-12 m)	Morselli and Mari, 1993
	♀: 375-421 ; ♂: 353-385; TN: 314-335	Crimea (Ukraine)	*Laurencia* sp., *Zostera* sp. (2-3 m)	Bartsch, 1996
	♀: 295-300; ♂: 240-250	Antalya[1,4]Turkey	various macroalgae (2-6 m)	present study*
T. affinis	♂: 575	Marsillee (France)	macroalgae (0-1 m)	Bartsch, 1986
	♀: 570-755; ♂: 567-620	Crimea (Black Sea)	*Ectocarpus* sp., *Phyllophora* sp., *Mytilus* sp., sediment (6-12 m)	Bartsch, 1998
	DN: 500	Istanbul (Turkey)	among macroalgae of the sublittoral sandy (2-3 m)	Durucan and Boyaci, 2014
	DN: 570-580	Antalya[1](Turkey)	*C. officinalis* (2 m)	present study*