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## ***Typhlodromus (Anthoseius) caudiglans* (Schuster) (Acari: Phytoseiidae), The New Record for the Predatory Mite Fauna of Turkey in Erzurum**

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### ABSTRACT

*Typhlodromus (Anthoseius) caudiglans* (Schuster) (Acari: Phytoseiidae) was collected from *Hippophae salicifolia* L. (Elaeagnaceae) leaves in Erzurum during the years 2015-2016. *T. (A.) caudiglans* is a predatory mite lives on ornamental plants. The samples were extracted by Berlese funnel and cleared in Lacto-phenol solution after that mounted in Hoyer solution. The

samples were deposited in the mite collection at Ankara University and Atatürk University Plant Protection Department of Turkey.

This is the first record of *T. (A.) caudiglans* for Phytoseiidae fauna of Turkey. Re-description and illustration of the new record is given.

Keywords: Elaeagnaceae; Mesostigmata; Turkey; Taxonomy; *Typhlodromus (Anthoseius) caudiglans*

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## 1. Introduction

Phytoseiidae (Acari) fauna is pretty well known in Turkey, comparison to the other European countries. 103 Phytoseiid species were designated which were presented by *Amblyseius* Berlese (12), *Aristadromips* Chant & McMurtry (1), *Chelaseius* Muma & Denmark (1), *Eharius* Tuttle & Muma (3), *Euseius* Wainstein (4), *Galendromus* Muma (1), *Graminaseius* Chant & McMurtry (1), *Iphiseius* Berlese (1), *Kampimodromus* Nesbitt (4), *Typhlodromus (Typhlodromus)* Scheuten (13), *Typhlodromus (Anthoseius)* De Leon (14), *Metaseiulus (Metaseiulus)* Muma (1), *Neoseiulus* Hughes (18), *Neoseiulella* Muma (3), *Paragigagnathus* Amitai & Grinberg (1), *Paraseiulus* Muma (4), *Phytoseiulus* Evans (2), *Phytoseius* Ribaga (6), *Transeius* Chant & McMurtry (4). *Proprioseiopsis* Muma (3), *Typhloseiella* Muma (2), *Typhloseiulus* Chant & McMurtry (3). France (90), Germany (78) while Belgium has (18) species. (Demite et al 2015; Döker et al 2016). Some phytoseiid species were reported in Erzincan and Erzurum; *T. (A.) kazachstanicus* Wainstein (Ecevit 1981); *Euseius finlandicus* (Oudemans), *Kampimodromus aberrans* Oudemans, *Paraeiulus soleiger* (Ribaga), *Parasiulus talbii* (Athias-Henriot), *Phytoseius echinus* Wainstein and Arutunjan, *Neoseiulella tiliarum* (Oudemans), *Typhlodromus (Anthoseius) rhenanus* (Oudemans) (Alaoğlu 1996 a, b), *Neoseiulus zwölfleri* (Dosse) and *Proprioseiopsis okanagensis* (Chant) were reported from Erzurum (Çobanoğlu 1989a, b; Kasap & Çobanoğlu 2007; 2009; Faraji et al 2011).

Survey studies can provide detection of a predatory mite; *Typhlodromus (Anthoseius) caudiglans* (Schuster) (Acari: Phytoseiidae) species on ornamental plants.

The aim of this study was re-description of *T. (A.) caudiglans* determined from ornamental plants in Erzurum 2015-2016.

## 2. Material and Methods

The samples were collected from ornamental plants in Erzurum which are located Eastern part of Turkey, during 2015 and 2016 (Figure 1).



**Figure 1- Sampling localities: Erzurum (Eastern Part of Turkey) (★)**

The mite samples were extracted by Berlese funnel. They were cleared in Lacto-phenol solution and mounted in Hoyer's medium, afterwards they dried for 2-3 weeks at 50 °C (Henderson 2001).

The identification and drawing of the mites were done by using Leica DM 2500 microscopes.

The idiosoma was measured from the base of the gnathosoma to end of opisthosoma. The length of setae were measured from their bases to their apex. The setae measurements are given in micrometres and average followed by the range in parentheses. The plant samples collections were made by K. Akçakoyunluoğlu (Atatürk University).

All the identification of the samples were made by Sultan Çobanoğlu, according to; Kolodochka (1978), Chant (1957), Chant et al (1974; 1978). Measurements and World distribution, of the species, is provided.

## 3. Results and Discussion

Phytoseiidae  
Typhlodrominae  
Typhlodromini

*Typhlodromus (Anthoseius)* De Leon 1959  
*Typhlodromus (Anthoseius) caudiglans* (Schuster 1959)  
*Anthoseius timidus* Wainstein et Arutunjan (1968).  
*Typhlodromus (Anthoseius) nodosus* (De Leon 1962) - Lehman (1982)  
*Typhlodromus (Anthoseius) caudiglans* (Schuster) Chant et al (1978)  
*Typhlodromus (Typhlodromus) caudiglans* (Schuster) - Chant et al (1974)

Female (n= 5)  
(Figures 2-6, 7-15)  
*Dorsal idiosoma* (Figures 2, 7, 10)  
Idiosomal setal pattern: 12A: 8A (included r3 and R1).

Dorsal shield: 343 (330-350) long, 237 (200-290), width at j6 level, elongate, oval and ornamented and imbricated all the dorsal shield, with distinct lateral notches. with 20 pairs of dorsal setae. The dorsal setae mostly smooth, except Z<sub>4</sub> and Z<sub>5</sub>, slightly serrated, and Z<sub>5</sub> knobbed apically lengths j<sub>1</sub> 18 (15-20), j<sub>3</sub> 17 (15-18), j<sub>4</sub> 14 (13-15), j<sub>5</sub>

14 (13-15), j<sub>6</sub> 16 (15-18), J<sub>2</sub> 19 (18-20), J<sub>5</sub> 10 (8-13), z<sub>2</sub> 17 (15-20), z<sub>3</sub> 21 (18-25), z<sub>4</sub> 18 (18-20), z<sub>5</sub> 16 (15-18), Z<sub>4</sub> 32 (30-35), Z<sub>5</sub> 53 (50-55), s<sub>4</sub> 24 (23-28), s<sub>6</sub> 25 (23-28), S<sub>2</sub> 29 (28-33), S<sub>4</sub> 34 (33-35), S<sub>5</sub> 29 (25-33), setae r<sub>3</sub> 20 (15-23), R<sub>1</sub> 20 (18-23), placed on lateral integument. Five pairs of large visible soleostome (gd<sub>2</sub>, gd<sub>4</sub>, gd<sub>6</sub>, gd<sub>8</sub> and gd<sub>9</sub>), and 4 pairs of relatively large and conspicuous poroids exist on the dorsal shield. Z<sub>5</sub> is the longest seta among the other dorsal setae with a very weak clava.

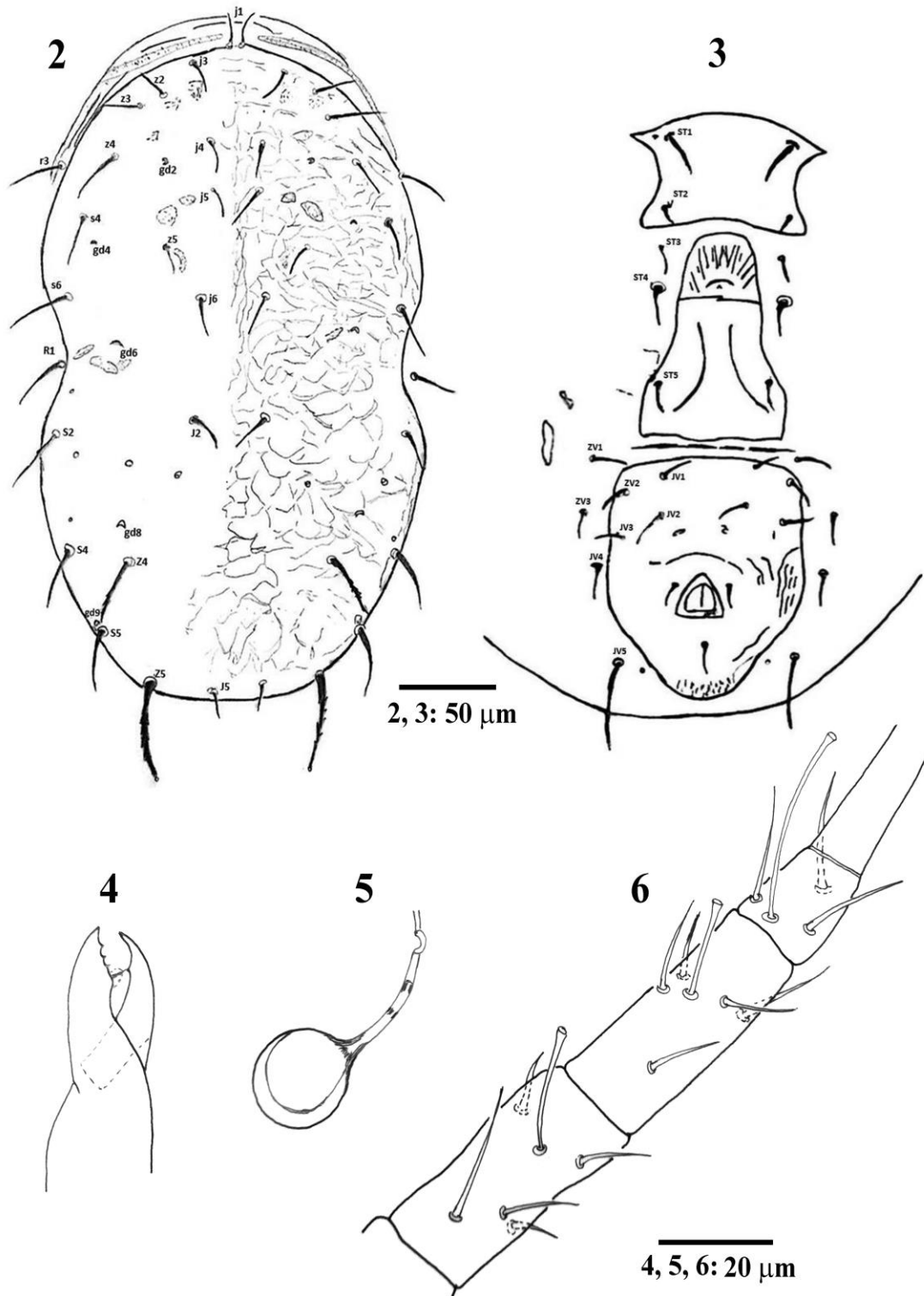
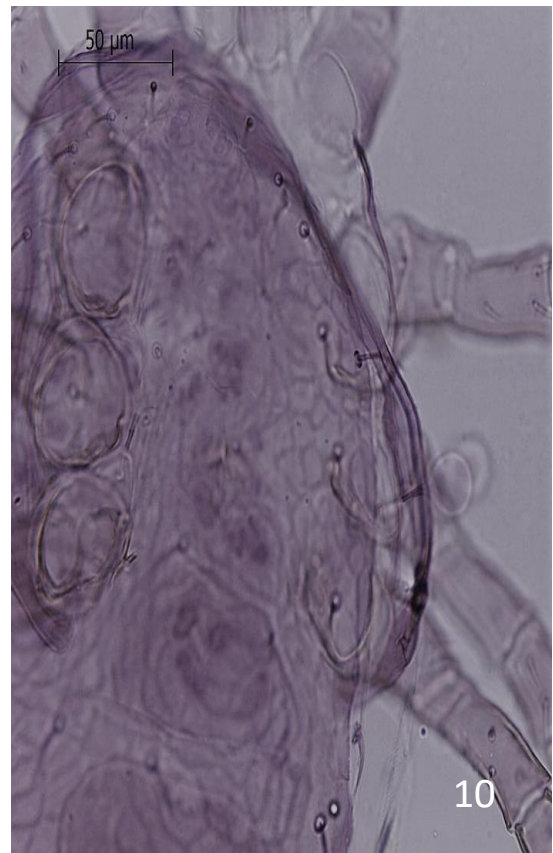
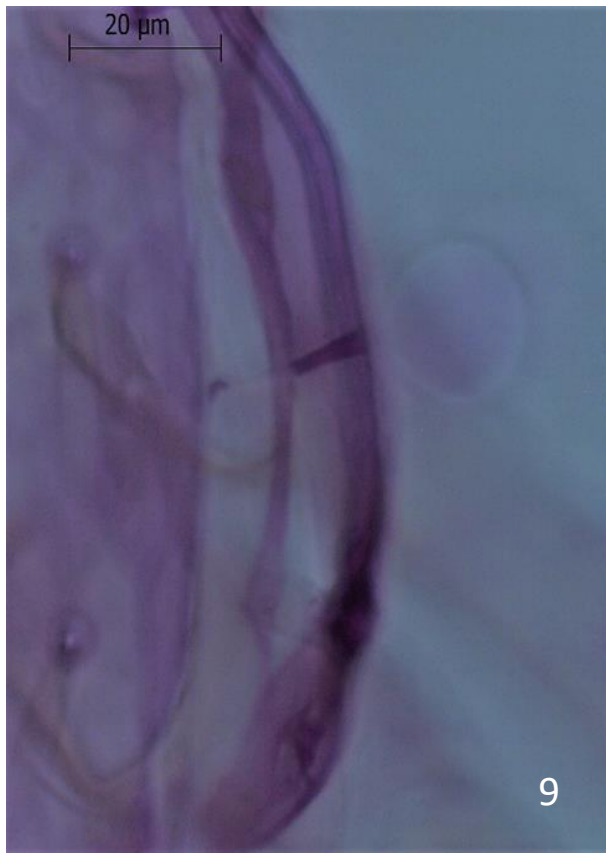
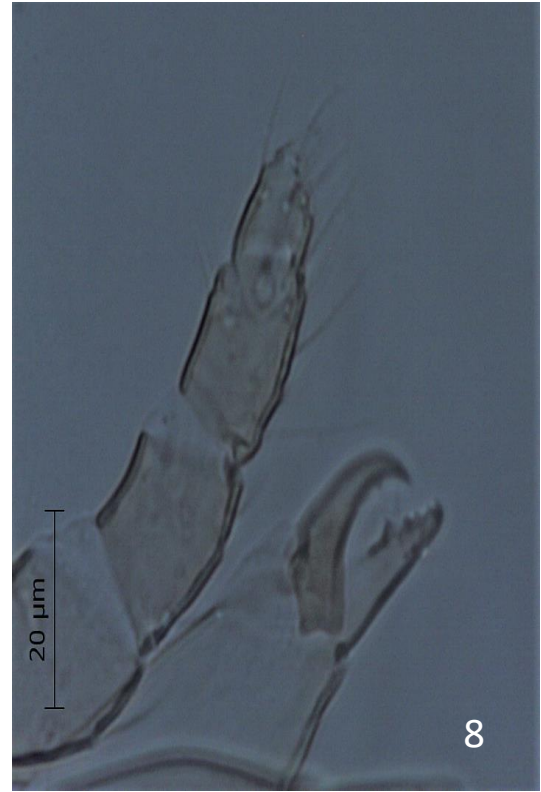
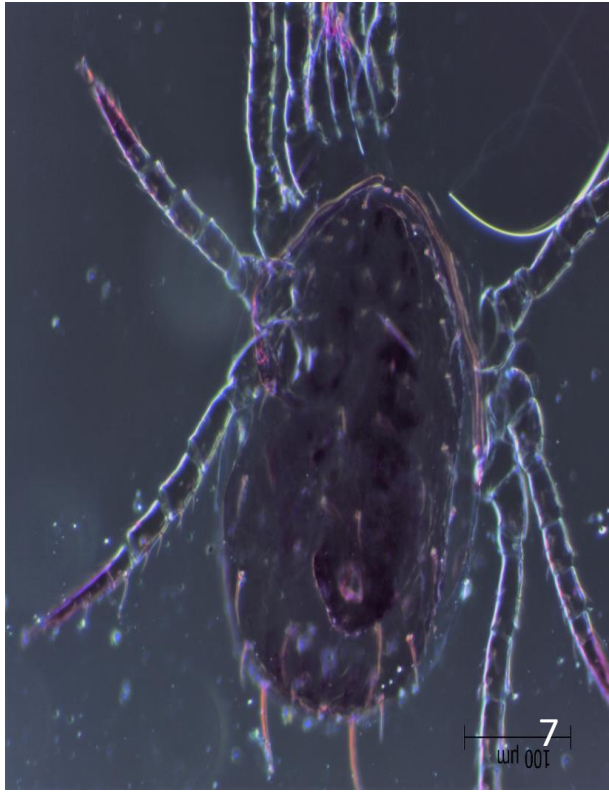
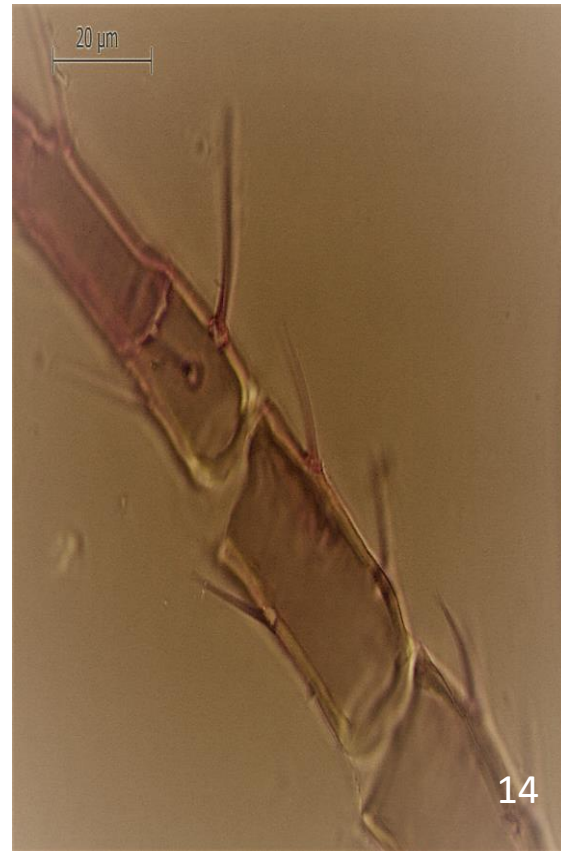
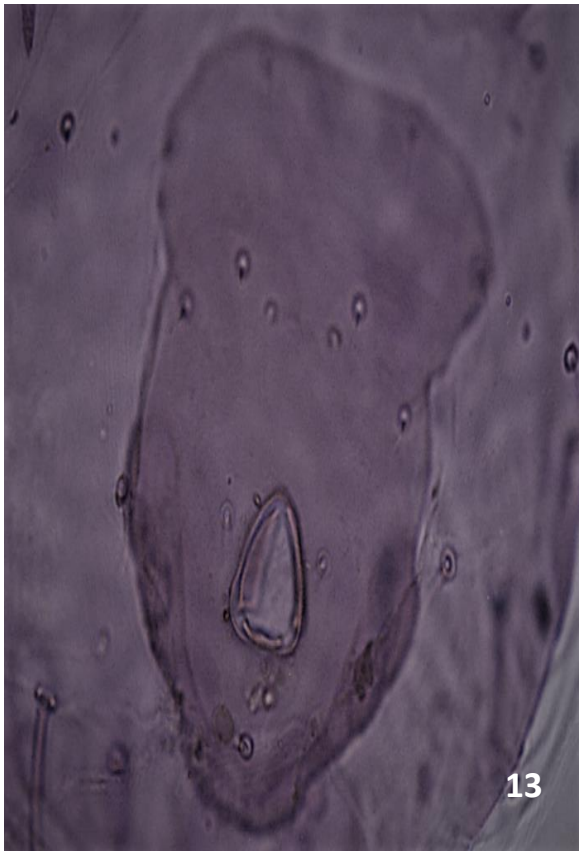


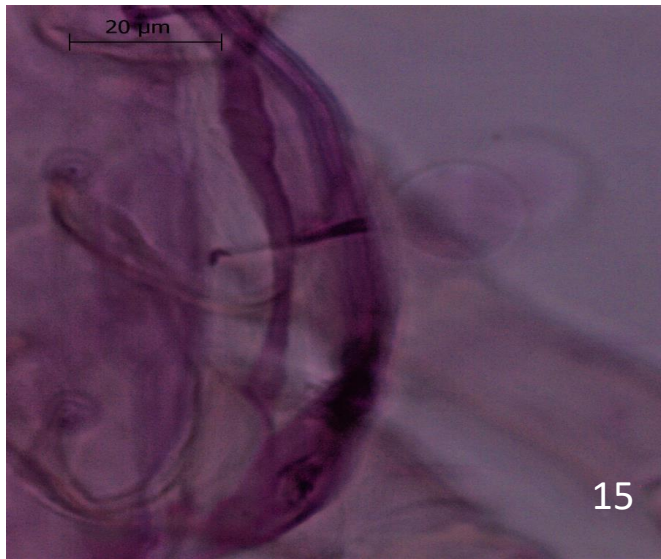
Figure 2-6. *Typhlodromus (Anthoseius) caudiglans* (Schuster), female 2. Dorsal view 3. Ventral view 4. Chelicera 5. Spermathecae 6. Genu, tibia and basitarsus IV



**Figures 7-10- *Typhlodromus (Anthoseius) caudiglans* (Schuster), female; 7, Dorsal view; 8, Chelicera; 9, Peritrem; 10, Dorsal reticulation, peritrem**



**Figures 11-14- *Typhlodromus (Anthoseius) caudiglans* (Schuster), female; 11, Ventral view; 12, Ventral opisthosoma; 13, Ventrianal plate; 14, Genu, tibia and basitarsus IV**



**Figure 15- *Typhlodromus (Anthoseius) caudiglans* (Schuster), female; 15, Spermatheca**

Peritreme - Extends to the insertions of setae  $j_1$  (Figure 2, 9, 10).

Ventral idiosoma - (Figure 3, 11-13) - Sternal plate smooth with, 63 (55-68) long and 63 (55-68) width at level of setae  $ST_2$ , with two pair pores ( $iv_1$  and  $iv_2$  at tip of the shield) and 2 pairs setae,  $ST_1$  19 (18-20) and  $ST_2$  19 (15-23) and  $ST_3$  15 (13-18) on interscutal membrane,  $ST_4$  15 (13-18) on small plates with a pair of pores, genital plate smooth at middle, 64 (58-73) wide at widest point,  $ST_5$  20 (15-25); with 2 pairs of metapodal plates, the primary 28 (25-30) long-ovoid and accessory 9 (8-13) long; ventrianal plate sub pentagonal shaped and well sclerotized with some striae between  $JV_2$  and paranals, with clearly defined waist in some specimen while there is not very clear in some others, and round shape preanal pores set close together each other; length 113, and 93 (90-95) width at setae  $ZV_2$ ; and level pranals 83 (78-88) width; with 4 pairs of preanal setae  $JV_1$  8 (8-10),  $JV_2$  8 (5-10),  $JV_3$  7 (5-8),  $ZV_2$  12 (8-18); with a pair of muscle marks lateral of anal opening; distance between these pores 22 (20-23), 4 pairs of setae surrounding ventrianal shield on integument,  $JV_4$  15 (13-15),  $JV_5$  38 (35-43),  $ZV_1$  13 (13-15),  $ZV_3$  15 (10-18); with five pairs of small pores and poroids surrounding integument. There is a sclerotized line and folds between genital and ventrianal shield. Some species show substantial variation in ventrianal shield, regularly intended, subrectangular with a pair of pore (Figure 3, 11-13).

Spermatheca - Calyx long and tube-shaped, tubular and well sclerotised 11 (8-15) length, width 14 (13-15) (Figure 5, 15).

Chelicera-Fixed digit 26 (25-28) length with 3 small teeth, with pilus dentilis; movable digit 24 (23-28) length have a tooth (Figure 4, 8).

Legs-Leg IV (Figure 6, 14) basitarsus with small knobbed macrosetae, clavate at the tip,  $St IV$  30 (28-30); the measurement from the base of macrosetae to slit-like organ 42 (40-43), usually genu, tibia and basitarsus IV with one macrosetae; the chaetotactic formulae of genua and tibiae, I-II-III-IV with 10-7-7-6 and 10-7-7-6 setae respectively.

Material examined - Aşkale-Çayköy, 11.VII.2015 (5 ♀♀); 06.VI.2015, (6 ♀♀) (*Hippophae salicifolia* L. (*Elaeagnaceae*), (39°56'03.1" N, 40° 43' 32. 8" E, 1662 m).

Distribution: Austria, Azerbaijan, Canada China, Czechia, England, Iran, Latvia, Lithuania, Moldova, New Zealand, Norway, Russian Federation, Slovakia, Ukraine and USA (Chant et al 1978; Demite et al 2015; Moraes et al 2004); and Turkey (new record).

Host Plants: alder, apple, ash, birch, blubbery, cherry, cedar trees, elm, hawthorn, hazel, *Malus* sp., mulberry, maple, oak, peach, plum, poplar berry, pine poplar, *Prunus* sp., *Tamarix* sp., willow (Chant et al 1974; Kolodochka 1974; 1978).

Remarks: *T. (A.) caudiglans*, is a new report for the predatory mite fauna of Turkey. This species is very close to *Typhlodromus (Anthoseius) kimbasi* Papadoulis & Emmanuel, with a bulbous tip of setae Z<sub>5</sub> and similar shape of spermatheca. *T. (A.) caudiglans* has been separated from latter by the length of dorsal setae and most of them smooth except Z<sub>4</sub> and Z<sub>5</sub>, one tooth on movable digit of chelicera; ventrianal shield with rounded small pores. *T. (A.) kimbasi*, with 3 teeth on a movable digit and crescent shape solenostomes on the ventrianal shield. *T. (A.) caudiglans*, is separated from *T. (A.) rapidus* Wainstein & Arutunjan, by the movable digit of chelicera with three teeth in latter. The measurements of dorsal setae and the ventral features of Turkish specimens have concurred with Canadian specimen (Chant et al 1974; 1978). In our specimen, fixed digit has 3 teeth and pilus dentilis. Kolodochka (1978) mentioned that fixed digit with four teeth and *Pilus dentilis* for Ukraine specimen (Table 1).

**Table 1- Some taxonomical characteristics and setae lengths *Typhlodromus (Anthoseius) caudiglans* (depends on different countries) and *Typhlodromus (Anthoseius) kimbasi***

Characteristics	<i>Typhlodromus (A.) caudiglans</i> (Turkey)	<i>Typhlodromus (A.) caudiglans</i> (Ukraine) (Kolodochka 1978)	<i>Typhlodromus (A.) caudiglans</i> (Canada) (Chant et al 1974)	<i>Typhlodromus (A.) kimbasi</i> (Greece) (Papadoulis & Emmanuel 1997)
J <sub>3</sub>	17	14	24	26
J <sub>2</sub>	19	19	-	36
Z <sub>4</sub>	18	19	25	37
Z <sub>4</sub>	32	28	28	49
Z <sub>5</sub>	53	45	48	62
S <sub>4</sub>	24	22	25	39
S <sub>6</sub>	25	24	31	43
S <sub>2</sub>	29	25	30	47
S <sub>4</sub>	34	22	32	48
S <sub>5</sub>	29	22	28	42
Number of solenostome on dorsal shield	5	5	1	5
Teeth/Fixed digit	3	4	2-3	4
Teeth/movable digit	1	1	1	3
Macroseta on tarsi IV.	30	25		29
Ventrianal pores	A pair rounded pore	A pair rounded pore	A pair of distinct pore	A pair crescent shape pore

As a conclusion, *T. (A.) caudiglans* was identified as a new record for the mite fauna of Turkey. The biodiversity of Phytoseiidae family is very rich in Turkey, especially it is very important to further detailed studies on ornamental plants in Erzurum. It is a great advance to take into account Phytoseiidae species for controlling of the plant-parasitic mites especially depending on with native predatory mite species for protecting the environment and controlling the pesticide resistance problem.

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