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**A NEW SPECIES OF CARABOACARUS  
(ACARI: CARABOACARIDAE) FROM CALOSOMA  
DENTICOLLE (CARABIDAE) FROM RUSSIA**

**НОВЫЙ ВИД CARABOACARUS (ACARI: CARABOACARIDAE)  
С CALOSOMA DENTICOLLE (CARABIDAE) ИЗ РОССИИ**

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**ABSTRACT**

*Caraboacarus krczali* sp.n. (Acari: Caraboacaridae) is described from *Calosoma denticolle* Gebl. (Carabidae) from Rostov Region, Russia, and noted from *Calosoma auropunctatum* Hrbst. and *C.denticolle* from Crimea, Ukraine. It differs from the other five known species of the genus in having thin and long ventral setae 3c and lancetiform pointed setae 4c.

**РЕЗЮМЕ**

Приведено описание *Caraboacarus krczali* sp.n. (Acari: Caraboacaridae), собранного под надкрыльями *Calosoma denticolle* Gebl. (Carabidae) в Ростовской области и обнаруженного на *Calosoma auropunctatum* Hrbst. и *C.denticolle* в Крыму. *C.krczali* отличается от пяти известных видов рода наличием тонких и длинных вентральных щетинок 3с и ланцетовидных заостренных щетинок 4с.

## INTRODUCTION

The genus *Caraboacarus* was erected by Krczal [1959] for *Caraboacarus stammeri*, collected from carabid beetles in Germany. Cross [1965] redescribed the genus and placed it in a new subfamily, Acarofenacinae, and Mahunka [1970] elevated the taxon to family rank. Later on, *C.stammeri* was recorded from Japan [Kurosa, 1980], Hungary, China [Husband, Husband, 1984], Ukraine, Moldova, Russia, Kazakhstan, Siria [Eidelberg, 1993]; four new species were described: *C.karenae* Nickel et Elzinga, 1969 from USA, *C.towsleyi* Husband et Husband, 1984 from Solomon Islands, *C.calosomae* Husband, 1986 from Chile and *C.bernardi* Haitlinger, 1990 from the Far East of Russia. In the process of examining beetles of the genus *Calosoma*, a new species of *Caraboacarus* was found under the elytra of *Calosoma denticolle* Gebl. from Russia (our earlier identification of these specimens as *C.calosomae* [Eidelberg, 1993] was a mistake), and of *C.auropunctatum* Hrbst. and *C.denticolle* from Crimea, Ukraine. It is a purpose of this paper.

## MATERIALS AND METHODS

During 1989-1992 we examined 70 specimens of 9 species of the genus *Calosoma* (Carabidae) from Moldova, Ukraine, Russia and Kazakhstan. It was collected more than 100 specimens of mites under their elytra, on wings, on membranous cuticle and external covers of beetles. 21 females of new species of *Caraboacarus* were among them.

Measurements were taken using a MBI-15 microscope with the ocular-micrometer. Terminology is based on that of Lindquist [1986]. All measurements are in micrometers (n=10).

*Caraboacarus krczali* Eidelberg, sp.n.

Fig. 1a,b.

## DESCRIPTION OF FEMALE

Gnathosoma. Length 32.9 (30-38), width 64.5 (63-67). Length of dorsal setae 21.6 (18-24), of antero-ventral setae 4, of postero-ventral setae 7. Midventral gnathosomal setae pointed, length 6. Palps inconspic-

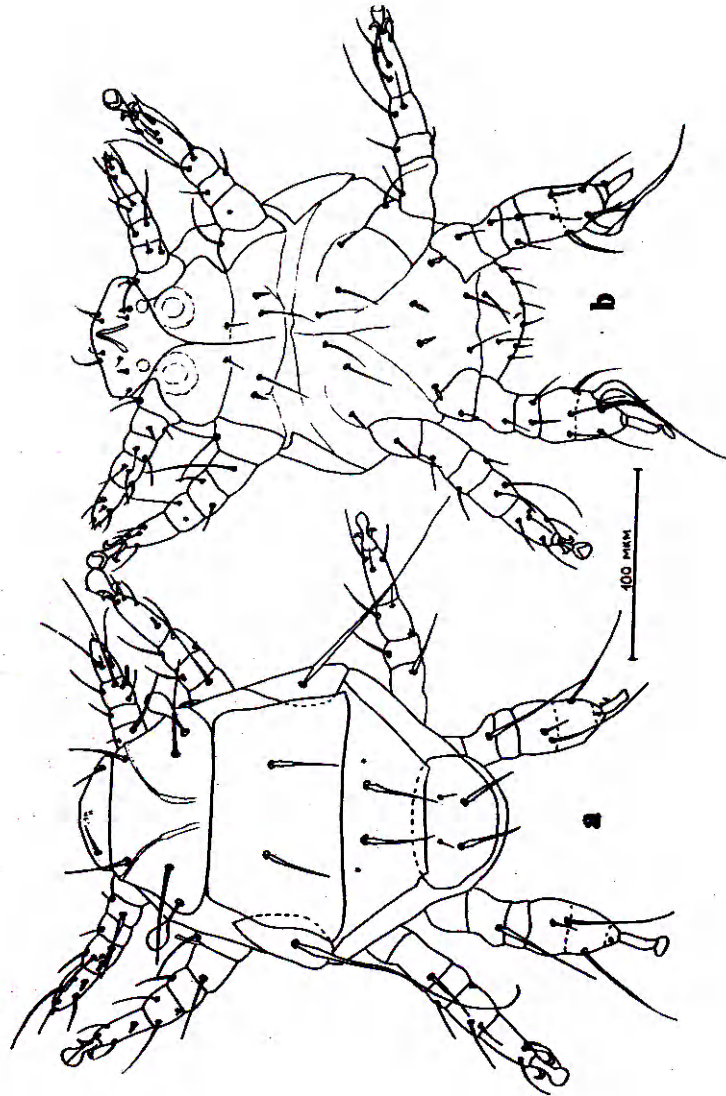


Fig. 1. *Carabocarus krczali* sp.n., female: a — dorsal view, b — ventral view.

uous, length of setae on the basal segment about 21, on the distal segment 15. Length of cheliceral stylets 19 (17-22).

Idiosoma. Length 221.1 (202-242), width 165.9 (158-170).

Dorsum. Length of prodorsal plate 59, width 124, length of setae **v1** 32.3 (30-34), **sc2** 56.5 (50-67). Bothridial setae club-like and almost smooth, length 27. Stigmata lateral and ventral to seta **v1**. Plate **C** divided, trapezoid, length 69, width at base 145. Length of setae **c1** 40.4 (36-48), **c2** 140.2 (130-150), on separate lateral plates. Plate **D** inversely trapezoid, its length 55, length of setae **d** 40.2 (30-45). Plates **E** and **F** fused, length of setae **e** 15, of setae **f** 35 (35-38). Plate **H** with two pairs of setae, length of setae **h1** 15, **h2** 17.

Venter with apodemes well developed. Coxa I with large indistinct circular concavities, length of setae **1a** 13.1 (13-14). Coxal setae **2a** pointed, 10.9 (9-14) in length, **2b** 29.9 (27-34). Length of setae **3a** 26.7 (23-32), **3b** 30.9 (27-34), **3c** 20.0 (17-23). Setae **4a** and **4c** pointed and stout, lancetiformes, their length, respectively, 10.4 (8-12) and 9.9 (9-11). Setae **4b** thin, 29 in length. Length of adgenital setae 14. Opisthosoma extending well beyond base of tibiotarsus IV.

Legs. Number of setae on leg segments as in Table 1. Leg I slightly shorter and thinner than legs II-IV, without ambulacrum or claws. Femur I setae **v''** slightly thickened and pointed. Length of tibial solenidion 12, of adjacent seta **k** 5. Tarsus solenidion **ω** 8. Leg II with a thick blunt **l'** seta of femur, solenidion **φ** shorter and more slender than solenidion **ω**. Claws and ambulacrum well developed. Leg III with trochanter seta 40 in length, solenidion 3, claws and ambulacrum well developed. Leg IV with tibia and tarsus fused, with no solenidion but with a broad blade-like seta 88 in length. Ambulacrum developed but claws not developed.

Type material. Holotype, non-gravid female: Russia, Rostov Region, settlement Nedvigovka, 5 July 1990, from *Calosoma denticolle* Gebl. (Carabidae), collector V. Grebennikov (slide N 870/3). Paratypes, 18 non-gravid females, the same host data as holotype (slides N 870/1-3). Deposited in the collection of Nikitsky Botanic Garden, Yalta.

Two specimens of *C.krczali* were collected under the elytra of *Calosoma auropunctatum* Hrbst., 2 August 1988, and one from *C.denticolle* Gebl., 29 July 1979, Crimea, Ukraine.

## DIAGNOSIS

*C.krczali* has pointed setae **2a**, **4a** and midventral gnathosomal setae, whereas these setae are blunt and rounded in *C.stammeri*, *C.karenae*, *C.towsleyi* and *C.bernardi*. It differs from all known species of *Caraboacarus* in having thin and long setae **3c** (setae **3c** in *C.calosomae* are stout and pointed, in the rest of the species stout and blunt), lancetiform pointed setae **4c** (these setae in other species are blunt) and weakly stout femur I setae **v''** (it is considerably stout in other species).

## DISCUSSION

Species of the genus *Caraboacarus* can be clearly distinguished by the shape of ventral setae (Table 2). The plesiomorphic shape of seta of Caraboacaridae is long, tapered, setiform. It transforms at the expense of shortening into short, tapered, setiform or spinelike one, and then it can thicken entirely or only in its apical part and have pointed or blunt top.

It is not hard to establish the homology of setae in the species of *Caraboacarus*, because their arrangement is relatively constant. And the additional material for the revealing of the origin of thick setae is provided by the finding of anomalous specimens: in the population of typical *C.stammeri* in South-West Crimea. I collected two specimens, having one seta **4a** short, tapered and setiform and the other thick and blunt, and one specimen, having both setae **4a** setiform. Proceeding from the above, *C.krczali* is the most primitive among known species of *Caraboacarus*, because of having thin and long setae **3c**, short setiform setae **2a**, midventral gnathosomal setae and femur I setae **v''**, lancetiform setae **4a** and **4c**. The setae of *C.calosomae* are somewhat modified: **2a**, **3c** and **4a** are short setiform. And in *C.towsleyi* 6 pairs of ventral setae are capitulum-shaped.

Of 9 examined beetles species of the genus *Calosoma*, only on three mites were found. They are: 6 females of *Antennoseius masoviae* Sellnick, 1943 (Antennosiidae) under the elytra of *C.auropunctatum* Hrbst. (Ukraine, Moldova); one deutonymph of *Iphidosoma fimetarius* (Muller, 1959; Eviphididae) under the elytra of *C.inquisitor* L. (Ukraine); one female *Imparipes* sp. (Scutacaridae) on the membranous cuticle of prothorax of *C.auropunctatum* (Ukraine); 14 hypopi of Acaridae on the external covers of *C.inquisitor* (Moldova); nearly 60 specimens of all

Table 1.  
Total setae and solenidia on leg segments of *Caraboacarus*  
*krczali* sp.n.





























	Coxa	Troch.	Femur	Genu	Tibia	Tarsus
Leg I: setae	1	1	4	3	7	11
solenidia					1	1
Leg II: setae	2	1	3	3	4	7
solenidia					1	1
Leg III: setae	3	1	2	3	4	7
solenidia					1	0
Leg IV: setae	3	1	2	2	2	11
solenidia						0

stages of Canestriniidae under the elytra of *C.auropunctatum* (Ukraine); 6 females of *Caraboacarus stammeri* and 21 of *C.krczali* on the wings of *C.auropunctatum* and *C.denticolle* (Russia, Ukraine). Earlier P.A.Nickel and R.J.Elzinga [1969] noted *C.karenae* on *C.externum* from USA, R.W.Husband [1986] — *C.calosomae* on *C.argentinense* from Chile, R.Haltlinger [1990] — *C.bernardi* on *Calosoma* sp. from Far East, Russia. One can see from the cited material that 5 out of the 6 known species of *Caraboacarus* were found on *Calosoma*, and 3 of them (*C.calosomae*, *C.bernardi* and *C.krczali*) only on *Calosoma*. So findings of new species of this mite genus are most probable also on the beetles of this genus, and they may have different sets of ventral setae, not as mentioned above, especially with larger number of plesiomorphic or slightly transformed setae.

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Table 2.  
Share of some setae of *Caraboacarus* species.

Setae	<i>C. kreza- li</i>	<i>C. calo- somae</i>	<i>C. stam- meri + C. kare- nae</i>	<i>C. tows- leyi</i>	<i>C. ber- nardi</i>
2a					
3c					
4a					
4c					
midvent- ral gnatho- somal					?
Femur I v''					?

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