

ON THE IDENTITY OF TWO NEW SPECIES OF THE GENUS *COLEOSCIRUS* (ACARI: CUNAXIDAE) WITH ANNOTATIONS ON THE GENUS FROM PAKISTAN

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Adult females of two new Cunaxid mites, *Coleoscirus raviensis* n.sp. and *Coleoscirus tobaensis* n.sp. were collected during the taxonomic exploration of the mite fauna of the family Cunaxidae from Punjab- Pakistan. The new species were compared with 9 already describes species of the same genus from Pakistan. A Comprehensive key of all the known species of this genus from Pakistan has been prepared to incorporate the new species. A ceremonial description and illustration of main body characteristics, geographical distribution, host range and distinguishing remarks are also given.

Keywords: *Coleoscirus*, Acari, Cunaxidae, Pakistan

INTRODUCTION

Mites belonging to the family Cunaxidae are well known predators of other harmful mites and small soft bodied insects (Smiley, 1992). Schruft (1971) reported that *Cunaxoides oliveri* is a predator of grape wine mite *Clepitrimerus vitus*. Walter and Kaplan (1991) found *Coleoscirus simplex* colonizes green house pot cultures of root knot nematodes (*Meloidogyne* spp.) in Florida where it feeds on vermiform nematodes and other soil arthropods. They also studied the feeding behaviour of Cunaxidae. Arbabi *et al.* (2002) reported the family Cunaxidae as an important predatory family of mites from Sistan Baluchestan and Hormozgan provinces of Iran. Tagore and Putatunda (2003) reported that cunaxid mites were important predators in the ornamental plants in Haryana. De-Oliveira and Daemon (2003) found that cunaxid mites are important component of fauna in the dust samples from the rural dwellings of Zona da Mata region of Brazil.

Berlese (1916) erected new genus *Coleoscirus* and included two species *C. halacaroides* and *C. corniculatus* in it. den Heyer (1979) examined *Coleoscirus corniculatus* and compared with the specimens of *Scirus curtispalpis* and they proved conspecific. *Coleoscirus corniculatus* is a synonym of *Scirus* (= *Coleoscirus*) *curtispalpis*. Berlese (1916) designated *Coleoscirus halacaroides* as type species of genus *Coleoscirus*, in spite of an earlier described species *Coleoscirus curtispalpis*. Ewing (1917) described a new species *Scirus* (= *Coleoscirus*) *simplex* from U.S.A.

Thor and Willmann (1941) redescribed and provided drawings of *Coleoscirus simplex*, *C. brevicornis*, *C. curtispalpis*, *C. halacaroides*, and the synonym of *C. curtispalpis* (*C. corniculatus*). Baker and Hoffmann (1948) redescribed and provided the drawings of *C. curtispalpus*, *C. brevicornis* and *C. simplex*. They also described and gave drawings of a new species *Cunaxa*

mexicana (= *Coleoscirus mexicanus* Baker and Hoffmann, 1948, comb. nov.) from Mexico and U.S.A. Simley (1975) provided a new genus name for species related to and including *Coleoscirus simplex*, viz. *Pseudocunaxa*. This new genus name is a junior synonym of *Coleoscirus* Berlese, 1916. den Heyer (1979) described two new species *C. tuberculatus* and *C. magdalenae* from Africa and gave key for these two species. den Heyer (1980) described three new species *Coleoscirus coatesi*, *C. buartus* and *C. breslauensis* and prepared a comprehensive key. Sepasgosarian (1984) included the genus *Coleoscirus* in subfamily Coleoscirinae, tribe (new) Coleoscirini along with genus *Scutascirus*. He mentioned genus *Pseudocunaxa* Smiley, 1975 as synonym of genus *Coleoscirus*. In 1992 Smiley gave the new classification system for Cunaxidae family and he synonymized *Pseudocunaxa* with *Coleoscirus* and described 11 species of this genus world wide.

From Pakistan Chaudhri (1977) described *Pseudocunaxa baptois* while Inayatullah and Shahid (1993) described 3 species viz., *Pseudocunaxa carex*, *P. mardi* and *P. kayfayati*. Present authors agree with Smiley (1992) and treat all the above mentioned species under genus *Coleoscirus*. Muhammad and Chaudhri (1992, a, b) described 4 new and one old species in this genus. In the present manuscript the authors have reported 2 new species with illustrations, thus making a total of 11 species of this genus from Pakistan.

MATERIALS AND METHODS

Various localities in different climatic regions of Punjab were surveyed extensively for the collection of cunaxid mites. On the spot, collection was done by shaking the plant parts on a white paper. The cunaxid mites were sorted out with the help of a field lens and preserved in small glass vials having 70% alcohol and few drops of

glycerin. The samples of leaf debris and soil were brought to the laboratory and processed through Berlese's funnel for at least 24 hours. From the bulk collection received in the beakers having 70% alcohol and few drops of glycerin, the cunaxid mites were sorted out by using binocular microscope and preserved in small glass vials. Permanent slides were prepared by using Hoyer's medium prepared in the laboratory for this purpose. The mounted specimens were identified using a phase contrast microscope and sketches were prepared by using an ocular grid. The identification of the species was done with the help of the existing keys and literature. The setal nomenclature of Smiley (1992) has been followed. All the measurements (in μm) and ranges are given in the description. Following abbreviations are used in this manuscript.

asl attenuate solenidion
bsl blunt ended solenidion
sts simple tactile setae
T trichobothrium

RESULTS

Key to species of genus *Coleoscirus* from Pakistan

- 1) Dorsal shield with 4 pairs setae in hysterosomal region-----2
Dorsal shield with more than 4 pairs setae in hysterosomal region -----3
- 2) Genu IV with 5 setae; tibia I with 7 setae-----
-----*C. carex* (Inayatullah and Shahid)
Genu IV with 6 setae; tibia I with 6 setae-----
-----*C. mardi* (Inayatullah and Shahid)
- 3) Dorsal shield with 6 pairs simple setae in hysterosomal region -----4
Dorsal shield with 5 pairs simple setae in hysterosomal region -----6
- 4) Venter with 6 pairs simple setae between lateral plates and distal part of body in addition to setae of anal and genital region ----- *C. raviensis*, n. sp.
Venter with less than 6 pairs simple setae between lateral plates and distal part of body in addition to setae of anal and genital region-----5
- 5) Leg genu IV with 6 setae; Venter with 4 pairs simple setae between lateral plates and distal part of the body in addition to setae of anal and genital-----
-----*C. tobaensis*, n. sp.
Leg genu IV with 7 setae; Venter with 5 pairs simple setae between lateral plates and distal part of the body in addition to setae of anal and genital-----
----- *C. carmus* (Muhammad and Chaudhri)
- 6) Coxa II with 3 setae-----7
Coxa II with 2-setae-----
-----*C. bapto*s (Chaudhri and Akbar)

- 7) Basifemur III with 5 setae-----8
Basifemur III with 4 setae----- 10
- 8) Para anal seta present-----
----- *C. comis* (Muhammad & Chaudhri)
Para anal seta absent-----9
- 9) Genu I-IV with 8-7-6-6 setae-----
----- *C. kayfayati* (Inayatullah and Shahid)
Genu I-IV with 9-8-6-7 setae----- *C. disparis* (Muhammad and Chaudhri)
- 10) Genu I with 8 setae; telofemur I with 4 setae-----
-----*C. simplex* Ewing
Genu I with 9 setae; telofemur I with 5 setae-----
----- *C. irroratus* (Muhammad and Chaudhri)

1. *Coleoscirus raviensis*, new species (Fig. 1A-F)

Female

Gnathosoma

Gnathosoma 250 (240-250) long and 90 (90-120) wide. Hypostome subrectangular in shape and cone shaped distally, with 4 pairs simple hypognathal setae (hg₁-hg₄) (Fig. 1 E).

Palp 5 segmented, measuring 192 (182-192), terminating in a short strong claw. Chaetotaxy of palp as follows; trochanter none; basifemur with one simple seta; telofemur with one simple seta; genu with 4 simple setae; tibiotarsus with 5 simple setae and one small stout triangular tubercle (Fig. 1 C).

Chelicerae 187 (175-187) long, terminating in a claw, dorsal and ventral sides with lobes, with one dorsolateral simple seta (Fig. 1 D).

Dorsum

Body 550 (460-550) long (without gnathosoma) and 350 (270-350) wide. Propodosoma with subrectangular shield originating behind the base of gnathosoma and extending into or beyond the region of metapodosoma with anterior and posterior sensillae PS₁, PS₂ measuring 182 (150-182), 175 (150-175) respectively and propodosomal setae P₁ measuring 30 (27-30) and P₂ 25 (25-28) in propodosomal region. Dorsal shield contiguous, extending into hysterosomal region, with randomly distributed papillae, shield complimented with seta D₁ measuring 15 (13-16), D₂ 17 (15-17), D₃ 17 (17-20), D₄ 25 (25-27), L₁ 15 (15-16) and L₄ 15 (15-17). Setae D₅ measuring 30 (30-37) and L₅ 15 (15-17), located off the shield. One pair pores located off shield, lateral to setae D₄ on hysterosomal integument (Fig. 1 A).

Venter

Anterior portion coalesced with coxae I-II, forming strong pentagonal shaped sternal plate. Sternal plate with random dots, coxae III- IV coalesced, forming

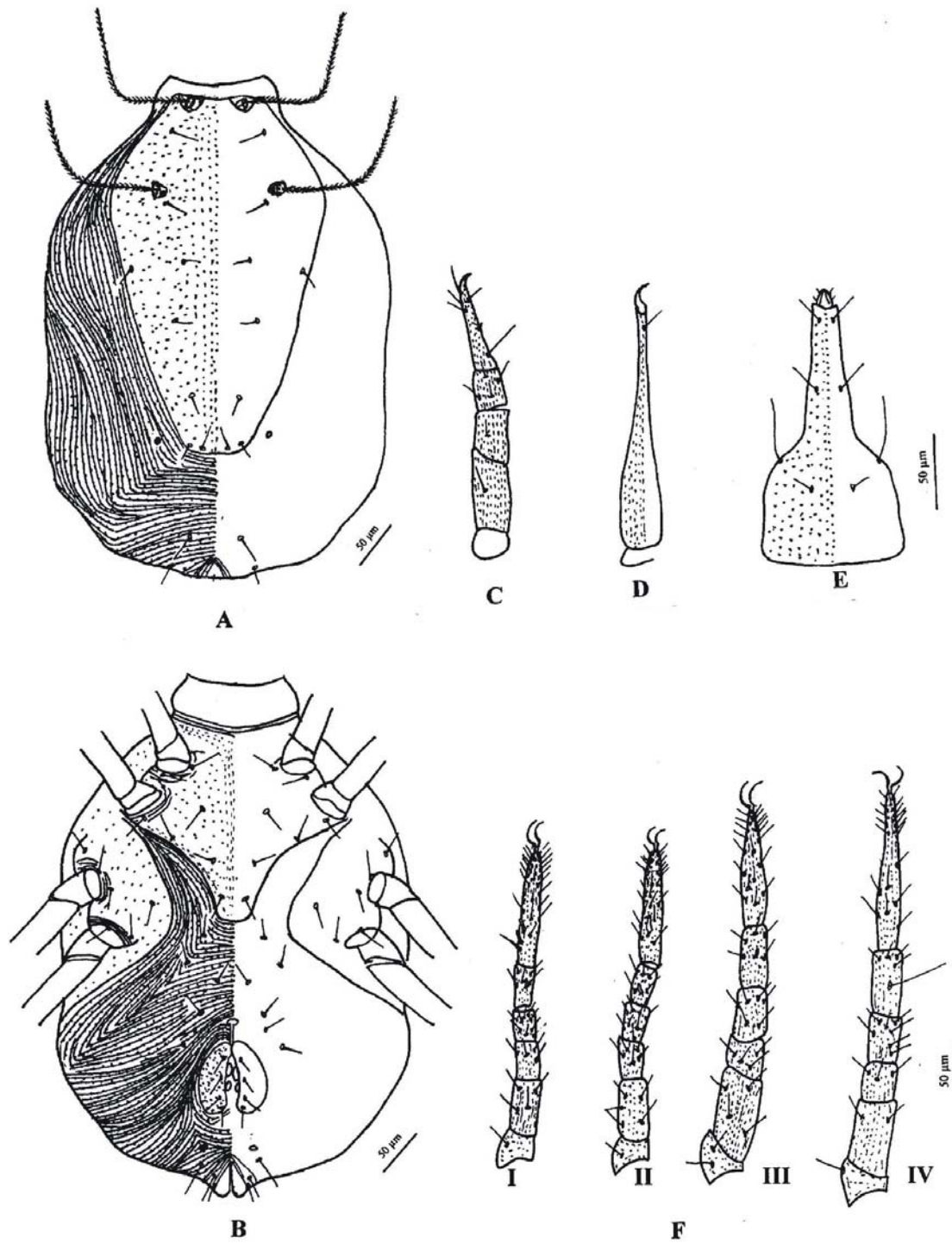


Fig. 1. *Coleoscirus raviensis*, n.sp.

A-Dorsal Side; B-Ventral Side; C-Palp; D-Chelicera; E-Hypostome; F-legs I-IV

separate elongate dotted lateral plates on each side. Each lateral plate with 6 simple setae; sternal plate with 14 simple setae. Hysterosoma with 6 pairs of simple setae between lateral plates and distal part of the body in addition to setae of anal and genital region. Hysterosoma with dotted striations. Genital shield with two valves having random dot like lobes, each valve with 4 simple genital setae (g_1 - g_4) in a row and two genital suckers. Anal setae (a) 2 pairs, paranal setae (pa) 1 pairs; one pair minute pores near anal shield (Fig. 1 B).

Legs

Legs I-IV measuring (from trochanter base to the tip of tarsus) 290 (280-290), 290 (260-290), 320 (300-320) and 350 (330-350) respectively. Chaetotaxy of legs I-IV as follows: Coxae 3-3-3-3; trochanters 1-1-2-1; basifemora 4-5-4-2; telofemora 4-5-4-3; genua 9-8-6-7; tibiae 6-(1 bsl + 5 sts)-6(1 bsl + 5 sts)-6(1 bsl + 5 sts)-5(1 T + 4 sts) and tarsi 23(2 bsl + 21 sts)-24(1 bsl + 23 sts)-19-20 (Fig. 1 F).

Male

Not known

Type

Holotype female, collected Lahore (Gulshan-e-Ravi) from leaf debris on 28-08-2004 (Hamid). Eight female paratypes were collected from the following localities.

Locality	No. of Paratypes	Date	Source
Lahore	3	28-08-2004	Leaf debris
Kasoor	3	05-05-2004	Leaf debris
Sialkot	1	11-07-2004	Leaf debris
Bahawalpur	1	12-08-2004	Leaf debris

All deposited in Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture Faisalabad - Pakistan.

Etymology

This species is named for locality from where the type was collected.

Remarks

This new species, *Coleoscirus raviensis* comes closer to *Coleoscirus carnus* Muhammad and Chaudhri, but can be separated from it on the basis of following characters:

1. Venter with 5 pairs simple setae between lateral and genital shield in *Coleoscirus carnus* as against 6 pairs in this new species.
2. Chaetotaxy of legs I-IV in this new species is: basifemora 5-6-5-2; telofemora 5-5-4-3; tibiae 7-6-6-5 and tarsi 29-25-22-21 whereas in *Coleoscirus carnus* it is: basifemora 4-5-4-2, telofemora 4-5-4-3, tibiae 4-5-4-2 and tarsi 23-24-19-20.

This new species can be separated from *C. buartus* Den Heyer due to following characters:

1. Dorsal shield with 4 pairs of simple setae in hysterosomal region in *C. buartus* while with 5 pairs of simple setae in this new species.
2. Venter with 4 pairs of simple setae adjacent to lateral plates and distal part of the body in addition to setae of anal and genital region in *C. buartus* as against 7 pairs in this new species.
3. Setal counts of legs I-IV differs in both species.

This new species comes closer to *C. curtialpis* (Berlese) but can be separated from it on account of following points.

1. Dorsal shield with 5 pairs of setae in hysterosomal region in *C. curtialpis* while with 6 pairs in this new species.
2. Palp tibiotarsus with a small tubercle in this new species while a thick spine like seta in *C. curtialpis*.
3. Venter with 3 simple setae adjacent to lateral plates and distal part of the body in addition to setae and anal and genital region in *C. curtialpis* as against 14 in this new species.
4. Both species differ in setal counts on legs I-IV.

2. *Coleoscirus tobaensis*, new species (Fig. 2A-F)

Female

Gnathosoma

Gnathosoma 150 (150-170) long and 70 (70-80) wide. Hypostome subrectangular in shape and cone shaped distally, with 4 pairs simple hypognathal setae (hg_1 - hg_4) (Fig. 2E).

Palp 5 segmented, measuring 135 (117-135). Chaetotaxy of palp as follows: trochanter none; basifemur with one simple seta; telofemur with one simple seta; genu with 4 simple setae; tibiotarsus terminating in short strong claw, with 5 simple setae and one stout small triangular tubercle (Fig. 2 C).

Chelicerae 112 (112-117) long, terminating in a claw, dorsal and ventral sides with lobes, with one dorsolateral simple seta (Fig. 2 D).

Dorsum

Body 250 (250-290) long (without gnathosoma) and 160 (160-190) wide.

Propodosoma with subrectangular shield, originating behind the base of gnathosoma and extending into or beyond the region of metapodosoma. Shield with anterior and posterior sensillae PS_1 , PS_2 measuring 117 (117-137), 112 (112-137) respectively and propodosomal setae P_1 measuring 17 (15-17), P_2 17 (17-20) in the propodosomal region. Shield contiguous, extending into hysterosomal region, with randomly

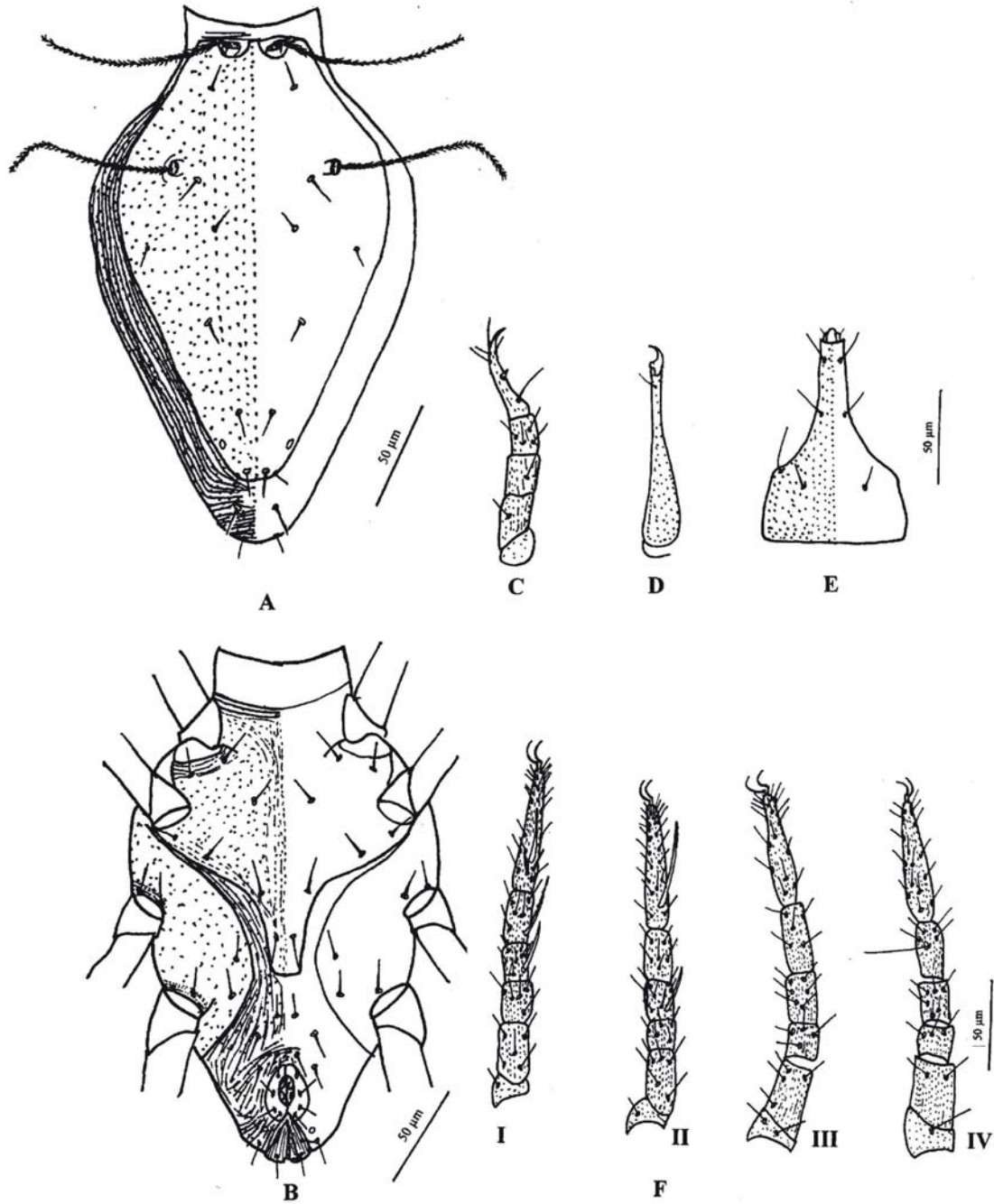


Fig. 2. *Coleoscirus tobaensis*, *n.sp.*

A-Dorsal Side; B-Ventral Side; C-Palp; D-Chelicera; E-Hypostome; F-legs I-IV

distributed papillae, shield complimented with seta D_1 measuring 11 (11-12), D_2 11 (11-12), D_3 12 (11-12), D_4 13 (13-15), L_1 11 (11-12) and L_4 7 (7-8). Seta D_5 measuring 15 (15-16) and L_5 10 (8-10) located off the shield on the integument. One pair pore between seta D_3 and D_4 lateral in position, on the shield (Fig. 2 A).

Venter

Anterior portion coalesced with coxae I-II, forming strong pentagonal shaped sternal plate; coxae III- IV coalesced, forming separate elongate lateral plates on each side. Each lateral plate with 5 simple setae; sternal plate with 14 simple setae. Hysterosoma with 4 pairs of simple setae between lateral plates and distal part of the body in addition to setae of anal and genital region. Hysterosoma with dotted striations. Genital shield with two smooth valves, each valve with 4 simple genital setae (g_1 - g_4) in a row and two genital suckers. Anal setae (a) 2 pairs; paranal setae (pa) 1 pair (Fig. 2 B).

Legs

Legs I-IV measuring (from trochanter base to the tip of tarsus) 200 (200-230); 190 (190-200); 200 (200-230) and 210 (210-230) respectively. Chaetotaxy of legs I-IV as follows: Coxae 3-3-2-3; trochanters 1-1-2-1; basifemora 5-6-4-2; telofemora 5-5-4-3; genua 9(1 asl + 8 sts)-8(1 asl + 7 sts)-6-6; tibiae 6(1 asl + 5 sts)-6-5-5(1 T + 4 sts) and tarsi 23(2 asl + 1 bsl + 20 sts)- 21(1 bsl + 20 sts)-17-16 (Fig. 2 F).

Male

Not known

Type

Holotype female, collected T.T. Singh from leaf debris on 06-08-2004 (Hamid). Eight female paratypes were collected from the following localities.

Locality	No. of Paratypes	Date	Source
T.T. Singh	1	06-08-2004	Leaf debris
Faisalabad	2	12-08-2004	Leaf debris
Chakwal	2	19-05-2004	Leaf debris
Sialkot	3	11-07-2004	Leaf debris

All deposited in Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture Faisalabad - Pakistan.

Etymology

This species epithet is in reference to place of type collection.

Remarks

This new species *Coleoscirus tobaensis* comes closer to *Coleoscirus carnus* Muhammad and Chaudhri due

to majority of body characters, but can be separated from it due to.

1. In *Coleoscirus carnus* chaetotaxy of legs I-IV is: coxae 3-3-3-3; basifemora 5-6-5-2; genua 9-8-6-7; tibiae 7-6-6-5 and tarsi 29-25-22-31 where as in this new species it is: coxae 3-3-2-3; basifemora 5-6-4-2; telofemora 5-5-4-3; genua 9-9-6-6; tibiae 6-6-5-5 and tarsi 23-21-17-16.

Coleoscirus tobaensis n.sp. can also be separated from *Coleoscirus breslauensis* Den Heyer on account of following characters.

1. Venter with 6 pairs simple setae adjacent to lateral and genital shields in addition to setae of anal and genital region in *Coleoscirus breslauensis* as against 4 pairs in this new species.
2. Leg segments I-IV basifemora; telofemora; genua; tibiae and tarsi with 5-6-5-2; 5-5-4-3; 9-8-6-7; 7-6-6-5 and 27-25-22-21 setae in *Coleoscirus breslauensis* as against 5-6-4-2; 5-5-4-3; 9-9-6-6; 6-6-5-5 and 23-21-17-16 setae in this new species.

This new species can be compared with *C. curtispalpis* (Berlese) due to following characters:

1. Palp tibiotarsus with a thick spine like in *C. Curtispalpis* while with a small tubercle in this new species.
2. Venter with 3 simple setae adjacent to lateral plates and distal part of the body in addition to setae of anal and genital region in *C. curtispalpis* as against 14 in this new species.
3. Dorsal shield with 5 pairs of simple setae in hysterosomal region in *C. curtispalpis* while with 6 pairs in this new species.
4. Setal counts of legs I-IV differ in both species.

This new species also comes closer to *C. monospinosus* (Tseng) but can be separated from it on account of following characters:

1. Dorsal shield with 5 pairs simple setae in hysterosomal region in *C. monospinosus* as against 6 pairs in this new species.
2. Both species differ in setal counts of legs I-IV.

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