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A new species of the genus *Acaropsella* (Acari: Trombidiformes: Cheyletidae) from Kerala, India

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Abstract

A new species, *Acaropsella strioreticulata* sp. nov. is described and illustrated herein from wheat semolina of Kerala state, South India. Additionally, this is first record of genus *Acaropsella* from India. Descriptions are based on the morphology of adult females.

Keywords: Acari, *Acaropsella*, new species, Kerala, India

Introduction

Cheyletidae is a large family which presently includes 75 genera and over 440 species (Zhang *et al.* 2011; Beron 2021; Bochkov and Abramov2016). Genus Acaropsella comprises relatively large cheylitids and was created by Volgin (1969) for those species of the genus Acaropsis Moquin-Tandon 1863 in which acicular humeral setae is absent. Genus Acaropsella can be characterized by having a single palp comb, two dorsal shields, a pair of propodosomal eyes, all legs with paired claws, elongate and narrowly expanded or spatulate dorsal setae (L.A Corpuz-Razos, 1998). According to Gerson *et al.* (1999), Acaropsella included nine species. Later Fain and Bochkov, (2001) synonymized Acaropsella aegyptiaca Wafa et Soliman, 1968 with A. volgini Gerson, 1967; A. filippina Corpuz-Raros and A. konoi Tseng, 1977 with *A. kinshasensis* Fain, 1972. Consequently the species number of *Acaropsella* reduced to six. In 2007, Akbar *et al.* added two new species to this genus which resulted in the total of eight species of mite in the *Acaropsella*. This genus is been reported from India so far. Thus, the present work describes a new species *Acaropsella strioreticulata* sp. nov from India, which is also a new record to India.

Materials and Methods

Samples of wheat semolina infested with mites were collected from Kozhikode district of Kerala state, South India (11° 22' 3.54" N, 75° 47' 35.74" E) and extracted using Berlese-Tullgren funnels equipped with 60 watt bulbs. and picked out under a stereo microscope. Extracted mites were kept temporarily in lactic acid for clearing. Hoyer's medium was used for making permanent slides. Illustrations and measurements were made using Olympus CX31 bright field microscope equipped with a drawing tube. Illustrations were scanned and redrawn using Adobe Illustrator® program (vector-based graphics software, Adobe Systems Incorporated, San Jose). Measurements were done with Lynx Biolux (Lawrence and Mayo) image analysis software. All body measurements presented as ranges (minimum to maximum), in micrometers (µm). The type materials are preserved as permanent slides and deposited in the Western Ghat Field Research Centre- Zoological Survey of India, Kozhikode, Kerala, India.

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Systematic Accounts

***Acaropsella strioreticulata* sp. nov.**

Female (Figures.1-4)
urn:lsid:zoobank.org:pub:574A2901-D890-489A-B320-FEF39ABC5EB8

Material Examined: Holotype, Female, India, Kerala, Kozhikode. 23 September 2021. Paratype: four, four females. 11° 22' 3.54" N, 75° 47' 35.74" E, Altitude 13 m, 23-ix-2021, coll. Neeraj Martin (deposited at the Western Ghat Field Research Centre- Zoological Survey of India, Kozhikode, Kerala, India)

Gnathosoma: (Figure 3). Length 125 (122-127) and width 81 (79-82). Rostral shield has coarse robust pentagonal or hexagonal reticulation pattern. Rostrum tappers to blunt end. Tegmen is broader than protegmen. Palp femur have one spatulate dorsal setae of length 26 (25-26), two ventral setae and one dorsolateral seta. Transverse striations seen on palp femur. Palp tibia with one comb like seta with 13 teeth, two sickle like setae, palp claw with four teeth. Horse- shoe shaped periteme with six links on each side.

Idiosoma: (Figure 1) Body ovoid, length 360 (352-366) and width 250 (244-254). Two dorsal shields are separated by transverse striation membrane of 34 (33-35) width. Both shields have prominent coarse pentagonal or hexagonal reticulation pattern. All dorsal setae are broadly spatulate and barbed. Propodosomal shield length 149 (146-151), width 166(162-169) and is trapezoidal. One pair of eyes are present which is placed off propodosomal shield. Propodosomal shield has four pairs of lateral setae Vi (25, 24-25), Ve (31, 30-32), Sci (29, 28-29) and Sce (31, 30-32) and three pairs of median setae d1(26, 25-26), d2 (26, 25-26) and d3 (25, 24-25) within the shield. Humeral setae of length 35(34-36) is similar to dorsal setae and is seen laterally on the membrane off the propodosomal shield. Hysterosomal shield of length 149(146-151) and width 166(162-169) bears four pairs oflateral setae L1 (31, 30-32), L2 (31, 30-32), L3 (31, 30-32), L4 (32, 31-33) and four pairs of median setae d4 (26, 25-26), d5 (26, 25-26), d6 (26, 25-26) and d7 (32, 31-33). Lateral setaL5 (34, 33-35) is placed caudally on membrane off the shield. Membranous area around the shield with striations seen.

Venter: (Figure 2) All setae in the genital region are acicular. Genital setae g1 14(14), g2 16(16) and g3 16(16). Anal setae a1: 16(16) , a2: 26(25-26) and a3: 20(20) . Striations can be seen in the genito-anal region (Figure 2)

Legs: (Figure4) Length of leg I (from coxae to tip of tarsi): 228 (223-232) , leg II: 195 (191-198) , leg III: 206 (201-209) and IV: 275 (269-280) . Ratio of leg I/ idiosoma= 0.63 (0.63-0.65), leg II/ idiosoma =0.54 (0.52-0.54), leg III/ idiosoma = 0.57 (0.56-0.58) and leg IV / idiosoma= 0.76 (0.73-0.76). Length of solenidion ω1 on tarsus I is 30 (29-30) µm and is supported by a small guard seta. Setae and solenidion in leg segments I-IV: coxae 2-1-2-2, trochanter 1-2-2-1, femur 2-2-2-1, genu 2-2-2-2, tibia 6-4-4-4 and tarsi 11-8-7-5. All leg segments except tarsi I- IV have transverse striation whereas tarsi I-IV have longitudinal striation. Tarsal claws have a terminal fork-like eupathidia.

Male: Not came in collection.

Diagnosis: *Acaropsella strioreticulata* **sp. nov.** is closely similar to *Acaropsella kinshasensis* Fain, 1972 and *A. filipina* Corpuz-Raros, 1998. The species *A. filipina* Corpuz- Raros, 1988 and *A. konoi* Tseng, 1977 are not different from *A. kinshasensis* Fain, 1972. All morphological the characters of these species, described by Corpuz-Raros (1988) and Tseng (1977) as "unique", i.e. the reticulate pattern on the stylophore and on the dorsal shields and also the fan-like dorsal seta of the palpal femur, are also present in *A. kinshasensis*. Hence, Fain and Bochkov (2001) considered *A. filipina* and *A. konoi* as junior synonyms of *A. kinshasensis*. A. strioreticulata sp. nov is similar to A. kinshasensis by having reticulation on rostrum and idiosoma, membranous separation between propodosomal and idiosomal shields, a total of 16 dorsal setae, L5 placed off the shield, comb seta with 13 processes and all anal setae simple acicular. *Acaropsella strioreticulata* sp.nov. clearly differs from *A. kinshasensis* by the presence of 4 palp teeth and by having propodosomal and hysterosomal shield of same length (ratio between the lengths of propodosomal shield and hysteriosomal shield is 1 in *A. strioreticulata* sp.nov and 0.78 in *A. kinshasensis*). Whereas, in *A. kinshasensis* 5-6 palp teeth present and hysterosomal shield is longer than propodosomal shield. All setae of tibia I is hair-like in *A. kinshasensis* whereas, in *A. strioreticulata* sp.nov all setae on tibia I is simple except one thickened setae (immature form of fan-like setae). *A. kinshasensis* possesses one fan-like seta on tibia III, while, *A. strioreticulata* sp.nov does not have such fan-like setae on tibia III. Three sickle setae are found in *A. filipina* whereas only 2 sickle setae is observed in *A. strioreticulata* sp. nov. Chaetotaxy of femur I-IV is 2-2-2-1 in *A. strioreticulata* sp.nov but it is 2-2-1-1 in *A. filipina.* In *A. strioreticulata* sp.nov, eyes are placed off propodosomal shield whereas in *A. filipina*, eyes are located within the antero-lateral margins of propodosomal shield.

Chaetotaxy of tarsi I-IV (including solenidion) is 11-8-7-5 in *A. strioreticulata* whereas it is 6-5-4-4 in *A. filipina.* All leg segments are transversely striated except tarsi which is longitudinally striated in *A. strioreticulata* **sp. nov**. and *A. shaziai.* This morphological feature is absent in other *Acaropsella* species. *A. strioreticulata* sp.nov. can be separated from *A. schmidtmanni, A.rohdendorfi* and *A.volgini* by the presence of coarse robust pentagonal or hexagonal reticulation on rostral and idiosomal shield , whereas it is absent in *A. schmidtmanni , A.rohdendorfi* and *A.volgini*. This specimen can be separated from *A.nobilis* and *A.kulagini* by the presence of four palp teeth whereas *A.nobilis* and *A.kulagini* have six palp teeth. *Acaropsella strioreticulata* sp.nov. differ from *A.shazai and A. walli* by the presence of 13 processes on comb seta and dorsal seta L5 out of theshield. In *A. shazai and A. walli* 16 processes present on comb seta and dorsal setae L5 is out of the shield along with L1 and L4.

Etymology: The specimen has been named after their morphological features.

Key to females species of the genus *Acaropsella*

1. Total number of dorsal setae equal or more than 17 ---------- *A. nobilis* Rasool, Chaudhri &Akbar, 1980
   -total number of dorsal setae less than 17 ----------2

2. Setae d2 situated off from propodosomal shield ---------- *A. schmidtmanni* Price, 1972
   -setae d2 situated on propodosomal shield ----------3

3. Peritreme with more than 6 links ----------4
   -Peritreme with less than 6 links ----------5

4. Peritreme with 7 links ---------- *A. rohdendorfi* Volgin,1962
   -Peritreme with 8 links ---------- *A. shaziai* Akbar, Jahan & Mughal, 2008

5. Hysteriosomal shield longer than propodosomal shield, palpal teeth equal or more than 5 in number ----------6
   -Hysterisomal shield and propodosomal shields almost similar in length, Palpal teeth less than 5 in number.----------8

6. Propodosomal and hysteriosomal shields are separated by membranous area Dorsal setae on genu I-II fan like ----------7
   - Propodosomal and hysteriosomal shields are not separated by membranous area Dorsal setae on genu I-II hair like--*A . kulagini* Rohdendorf, 1940

7. Rostral and idiosomal shield with network pattern ---------- *A. kinshasensis* Fain, 1972
   -Rostral and idiosomal shield without network pattern ----------*A. volgini* Gerson,1967

8. Comb setae with 13 process, setae L1 and L2 situated on hysteriosomal shield, striation pattern present on membranous area around propodosomal and hysteriosomal shield, femur IV with one setae……..…….***A. strioreticulata* sp.nov**

   -Comb setae with 16 process, setae L1 and L2 situated off hysteriosomal shield,striation pattern absent on membranous area around propodosomal and hysteriosomal shield, femur IV without setae……..*A. walii* Akbar, Jahan & Mughal, 2008

FIGURES

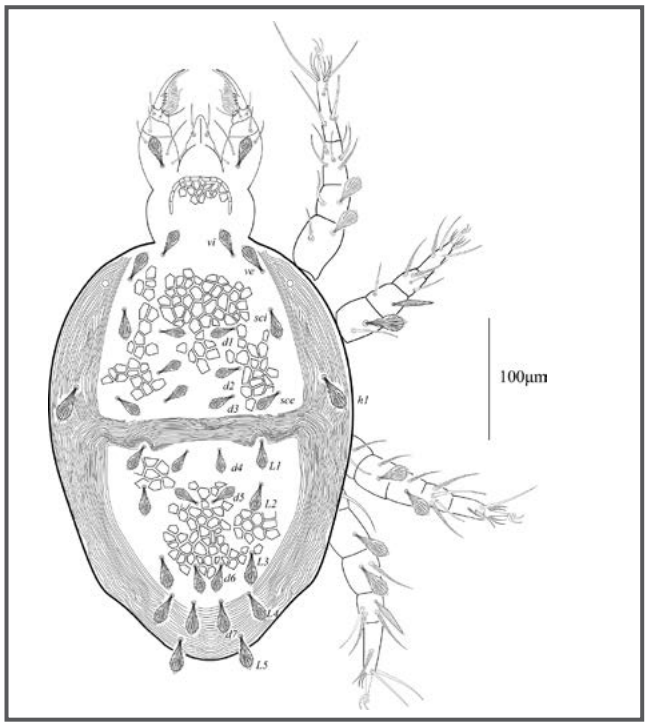

Figure 1: *Acaropsella strioreticulata* sp.nov. holotype female. Dorsal idiosoma

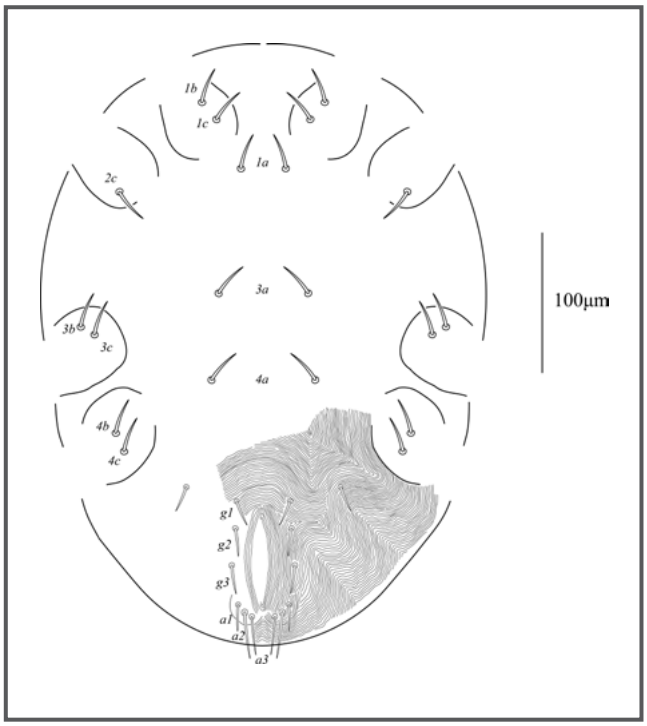

Figure 2: *Acaropsella strioreticulata* sp.nov. holotype female. Ventral idiosoma.

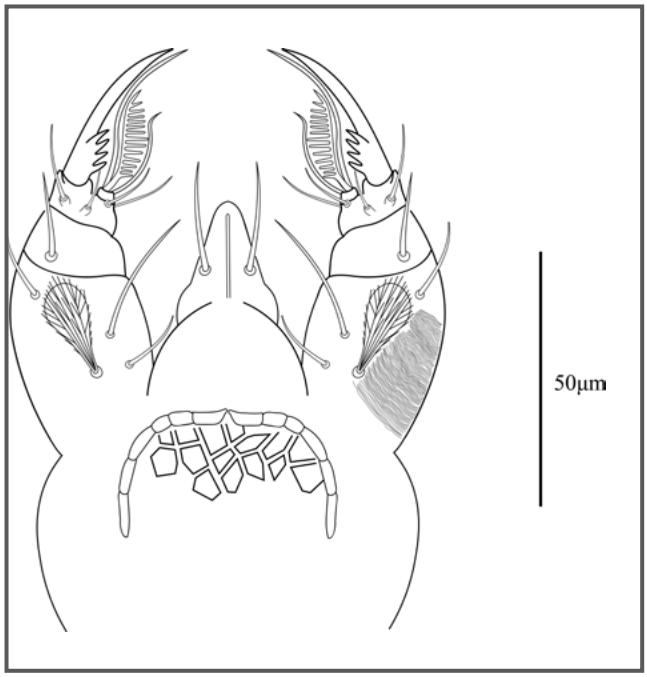

Figure 3: *Acaropsella strioreticulata* sp.nov. holotype female. Gnathosoma

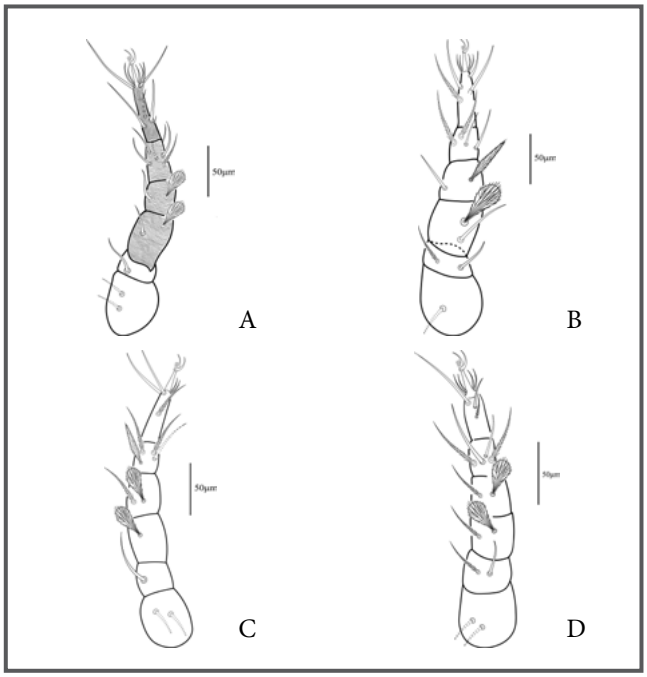

Figure 4: *Acaropsella strioreticulata* sp.nov. holotype female. A. leg I, B. leg II, C. legIII, D. leg IV.

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