Zootaxa 5652 (1): 162–168
https://www.mapress.com/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5652.1.17
http://zoobank.org/urn:lsid:zoobank.org:pub:3851177E-798E-46C7-B89D-E602392C1557

A new species of *Rhodacaroides* (Mesostigmata: Ologamasidae) from Yintiaoling Nature Reserve, with a key to *Rhodacaroides*

GUI-MING MU[1,2], ZE-PENG HOU[1,3], DAO-CHAO JIN[1,4] & TIAN-CI YI[1,5*]
[1]*Institute of Entomology, Guizhou University, Guizhou Provincial Key Laboratory for Agricultural Pest Management of the Mountainous Region, Scientific Observing and Experimental Station of Crop Pest in Guiyang, Ministry of Agricultural and Rural Affairs, P. R. China, Guiyang 550025, P. R. China.*
[2] *13048587741@163.com; https://orcid.org/0009-0002-7487-9698*
[3] *kcshzp@126.com; https://orcid.org/0009-0002-9767-939X*
[4] *daochaojin@126.com; https://orcid.org/0000-0003-2727-5621*
[5] *tcyi@gzu.edu.cn; https://orcid.org/0000-0002-9953-3709*
[*]*Corresponding author*

Abstract

A new species, *Rhodcaroides multithornus* Mu, Jin & Yi **sp. nov.** is described from litters of Yintiaoling National Nature Reserve, Chongqing, China. It can be distinguished from the other congeners by digit with 10–11 teeth fixed, two pairs of small and slender metapodal plates, and 11 pairs of dorsum setae slightly thorn. Additionally, a key to all species of *Rhodcaroides* is provided, based on characteristics of females.

Key words: soil mites, new species, Chongqing

Introduction

The soil mite genus *Rhodacaroides* Willmann, 1959 (Mesostigmata: Ologamasidae) prefers to stay in the soil, plant litter or fallen leaves. Presently, the genus includes ten species worldwide, four of them recorded from Chile (*R. levis* Karg, 1977, *R. coniunctus* Karg, 1977, *R. calidus* Karg, 1977 and *R. brevispiritus* Karg, 1977), three of them from Argentina (*R. costai* (Sheals, 1962), *R. crinitus* Karg, 1979 and *R. unguellus* Karg, 1979). The other three were recorded from Egypt (*R. aegyptiacus* Willmann, 1959), Australia (*R. minyaspis* Lee, 1973) and China (*R. leptinochaetus* (Ma, 2005)). It seems the diversity of this genus be far away from clear.

The Chinese species, *R. leptinochaetus* was found from fallen leaves in Shandong Province and originally described as member of *Gamasellus* Berlese, 1892. Castilho *et al.* (2016) reclassified the species in the genus *Rhodacaroides*.

During a field survey in the Yintiaoling National Nature Reserve, Chongqing, China, a new species of *Rhodacaroides* was found. This is the second Chinese species of the genus. In order to facilitate the taxonomy, besides the description of the new species, a key to all species of *Rhodacaroides* is provided.

Materials and methods

Mites were extracted from decomposing leaves by Berlese-Tullgren funnels for 12 hours and stored in 75% alcohol, and cleared in Nesbitt's solution and then mounted on slides in Hoyer's medium. Terminology for the leg chaetotaxy follows Evans (1963a) and Lee (1970). Palp chaetotaxy follows Evans (1963b). Idiosomal setal nomenclature is based on Lindquist & Evans (1965). Specimens were observed and illustrated under a Nikon DS-Ri2 microscope, and figures were edited with Nikon NIS-Elements AR 4.50 and Adobe Photoshop CC2019.

All measurements are given in micrometres (*μm*), the range is written (min–max). All types are deposited in the Institute of Entomology, Guizhou University, Guiyang, P.R. China (GUGC).

 Accepted by Z.-S. Zhang: 2 Jun. 2025; published: 24 Jun. 2025

Taxonomy

Ologamasidae Ryke, 1962
土革螨科

Rhodacaroides Willmann, 1959
拟胭螨属

Rhodacaroides Willmann, 1959: 97; Castilho *et al.*, 2016: 22.
Rhodacaroides (*Tenacaroides*).—Karg, 1977: 328.
Rhodacaroides (*Nodacaroides*).—Karg, 1979: 198.

Type species: *Rhodacaroides aegyptiacus* Willmann, 1959

Diagnosis. Fixed digit with 4–16 teeth in addition to apical tooth and a distinct pilus dentilis, movable digit with 3–7 teeth in addition to apical tooth, epistome with an anteromedian extension, both sides have extensions of varying lengths. Podonotal and opisthonotal shields separated. Podonotal region of dorsum with 17–23 pairs of setae, 0–5 pairs on cuticle. Opisthonotal region with 11–21 pairs of setae, 0–7 pairs on cuticle. Opisthonotal and ventrianal shields separated. With a pair of presternal platelets (two pairs in *R. aegyptiacus*). Sternal shield not fused to endopodal shield near coxa IV. Ventrianal shield with 5–7 pairs of setae, 0–2 pairs on cuticle. With 0–2 pair of metapodal platelets. (Castilho *et al.* 2016; Karg, 1977, 1979; Willmann, 1959).

Rhodcaroides multithornus Mu, Jin & Yi sp. nov.
多刺拟胭螨
Figures 1–5

Specimens examined. Holotype female (slide No. 20220820m12) from litter of Hongqi, Yintiaoling Nature Reserve, Wuxi County, Chongqing Municipality China, 109°49′23.2788″E, 31°30′49.8384″N, altitude 1187m, coll. Gui-Ming Mu, on 20 August 2022. **Paratypes**: two females (slides No. 20220820m12), the same date as holotype.

Diagnosis. Fixed digit with 10–11 teeth and movable digit with 6 teeth in addition to apical tooth. Podosoma with 20 pairs of setae, *j4*, *z5*, *s2*, *z6*, *s5* and *r3* slightly thorn. Opisthosoma with 18 pairs of setae, *J2*, *J4*, *Z4*, *Z4* and *Z5* slightly thorn. Ventri-anal with five pairs of setae. Two pairs of small and slender metapodal plates.

Description

Females (n=3)

Idiosoma. Oval, length along mid-line 365–372, width at level of *r3* 252–254.

Gnathosoma (Figs 1, 5 A–D). Fixed digit with 10–11 teeth in addition to apical tooth and a distinct pilus dentilis, movable digit with six teeth in addition to apical tooth, with lyrifissures and cheliceral base seta visible, arthrodial process with a short coronet-like fringe (Fig 1A). Palpus 161–169 long, palptarsal apotele three-tined, genua with one arborescent seta and one clavate seta (Fig 1B). Epistome with one anteromedian extension of distal slightly enlarged and bifurcated, both sides have 4–6 extensions of varying lengths (Fig 1C). Internal malae lateral margins fimbriate. Corniculi horn-like. Deutosternal groove with eight rows of denticles, first row smooth (Fig 1D). Hypostome with four pairs of simple and smooth setae. Length of setae:*h1* 40–43, *h2* 34–35, *h3* 21–26, *sc* 26–27.

Dorsum (Figs 2A, 3A, 5E). Podonotal shield slightly reticulate, 208–217 long and 238–241 wide at widest level, with 19 pairs of setae, one pair of setae on cuticle, *j4*, *z5*, *s2*, *z6*, *s5* and *r3* setae slightly thorn, other setae smooth, one pair of distinguishable lyrifissures and four pairs of pores. Opisthonotal shield reticulate, 141–149 long and 182–183 wide at widest level, with 13 pairs of setae, five pairs of setae on cuticle, *J2*, *J4*, *Z4*, *Z4* and *Z5* setae slightly thorn, one pair of distinguishable lyrifissures and five pairs of pores. Length of setae: *j1* 30–34, *j2* 17–21, *j3* 19–26, *j4* 34–37, *j5* 16–21, *j6* 16–17, *z1* 32–40, *z2* 16–18, *z3* 19–22, *z5* 36–40, *z6* 39–41, *s2* 32–33, *s3* 31–33, *s4* 18–23, *s5* 38–40, *s6* 17–20, *r2* 18–22, *r3* 33–37, *r4* 12–16, *r5* 16–20, *J1* 16–17, *J2* 35–37, *J3* 20–22, *J4* 38–39, *J5* 15–17, *Z1* 16–19, *Z2* 29–31, *Z3* 17–18, *Z4* 32–34, *Z5* 46–47, *S1* 18–22, *S2* 22–23, *S3* 18–19, *S4* 19–21, *S5* 17–19, *R1* 17–21, *R2* 21–24, *R3* 18.

Venter (Figs 2B, 3B, 5 F). Base of tritosternum 37–38 long, with one pair of slightly pilose laciniae, 78–85 long. One pair of presternal plates wedges. Sternal shield smooth, 104–107 long and 77–80 wide at widest level,

with four pairs of setae (*st1-st4*) and two pairs of distinguishable lyrifissures and one pair of pores. Genital shield anteromedian extension, 69–74 long and 53–60 wide at *st5* level, one pair of pores on unsclerotized integument. A wedge plate between coxa I and coxa II, exopodal shields not fused. Peritreme extending anteriorly to level of coxa I. Ventrianal shield striate, 127–132 long and 120–121 wide at widest level, with five pairs of setae (*JV1–JV3*, *ZV1–ZV2*) in addition to circum-anal setae, *JV3*, *JV5* and *ZV2* setae slightly thorn. Two pairs of small and slender metapodal plates. Length of setae: *st1* 24–27, *st2* 23–28, *st3* 21–25, *st4* 22–26, *st5* 19–21, *JV1* 20–23, *JV2* 21–26, *JV3* 29–36, *JV5* 28–30, *ZV1* 24–26, *ZV2* 23–25, para-anal 18–19, post-anal 38–39.

Spermatheca. Not distinguishable.

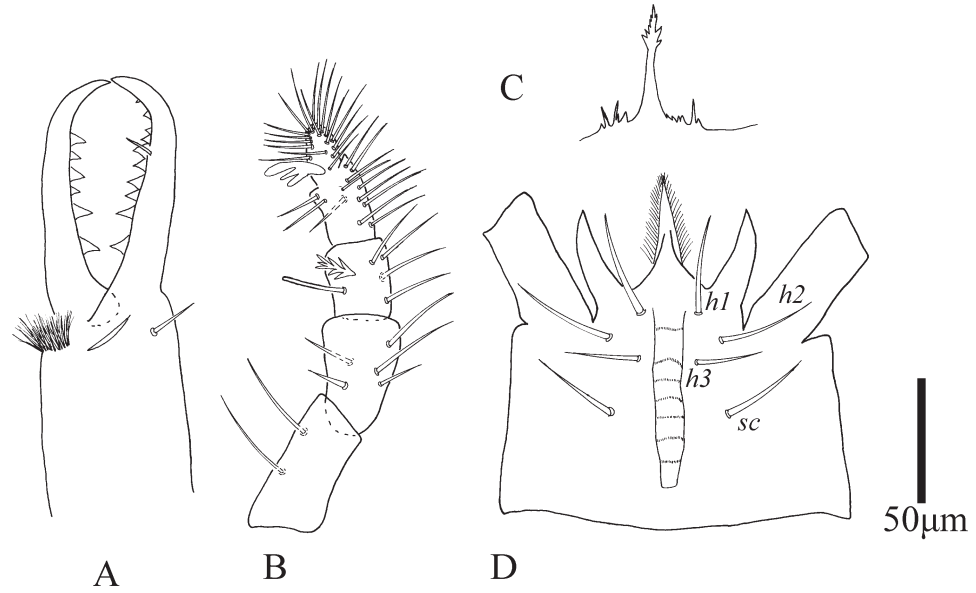

FIGURE 1. *Rhodcaroides multithornus* **sp. nov.**, Holotype female, A. Chelicera; B. Palp; C. Epistome; D. Hypostome.

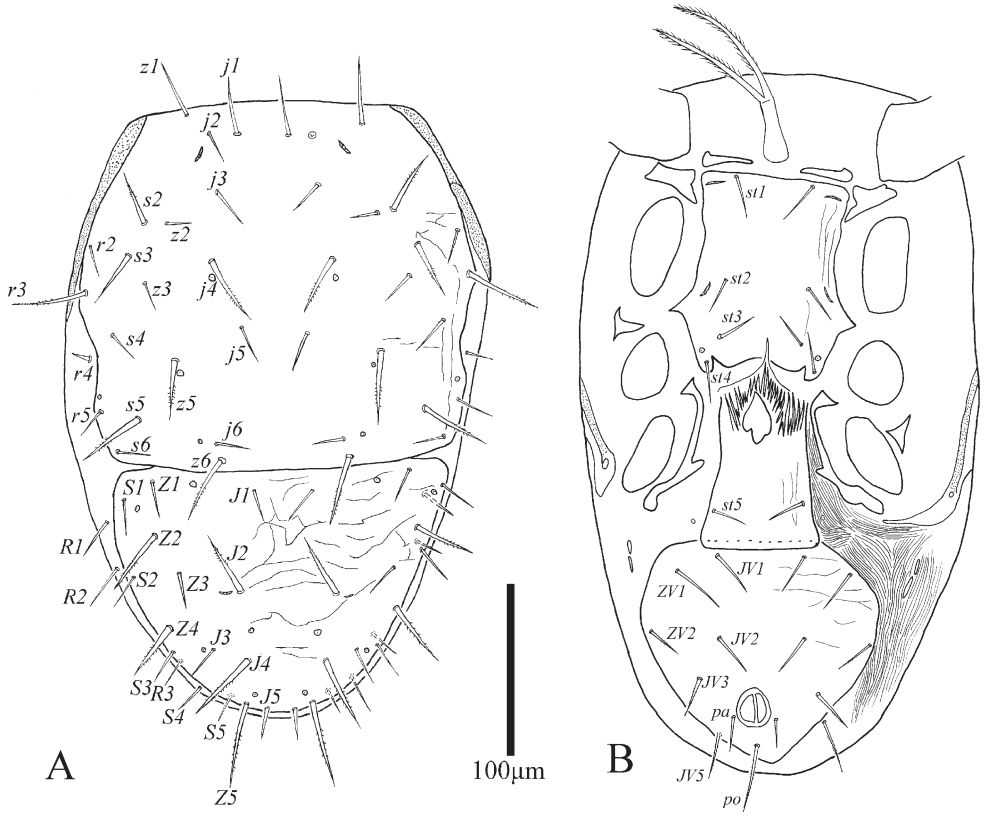

FIGURE 2. *Rhodcaroides multithornus* **sp. nov.**, Holotype female, A. Dorsal view; B. Ventral view.

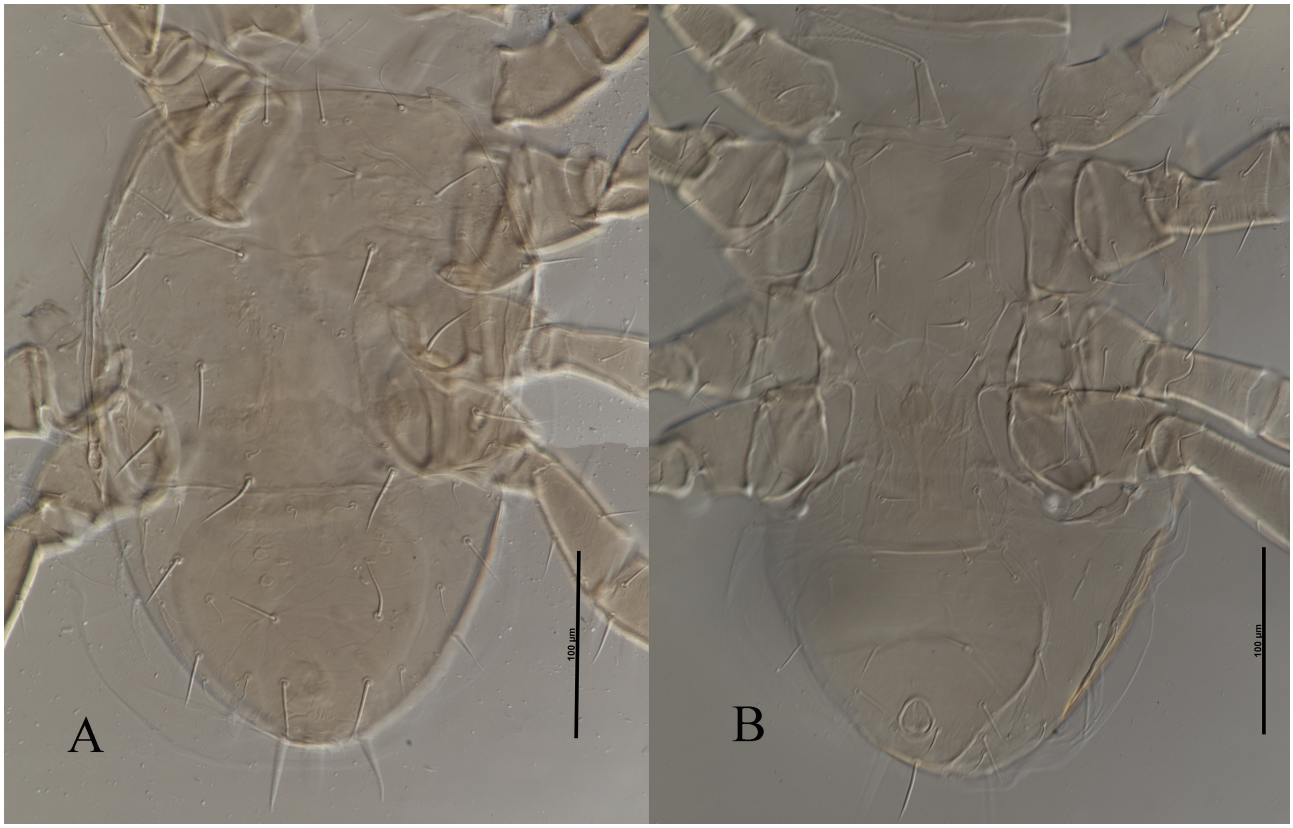

FIGURE 3. *Rhodcaroides multithornus* **sp. nov.**, Holotype female, A. Dorsal view; B. Ventral view.

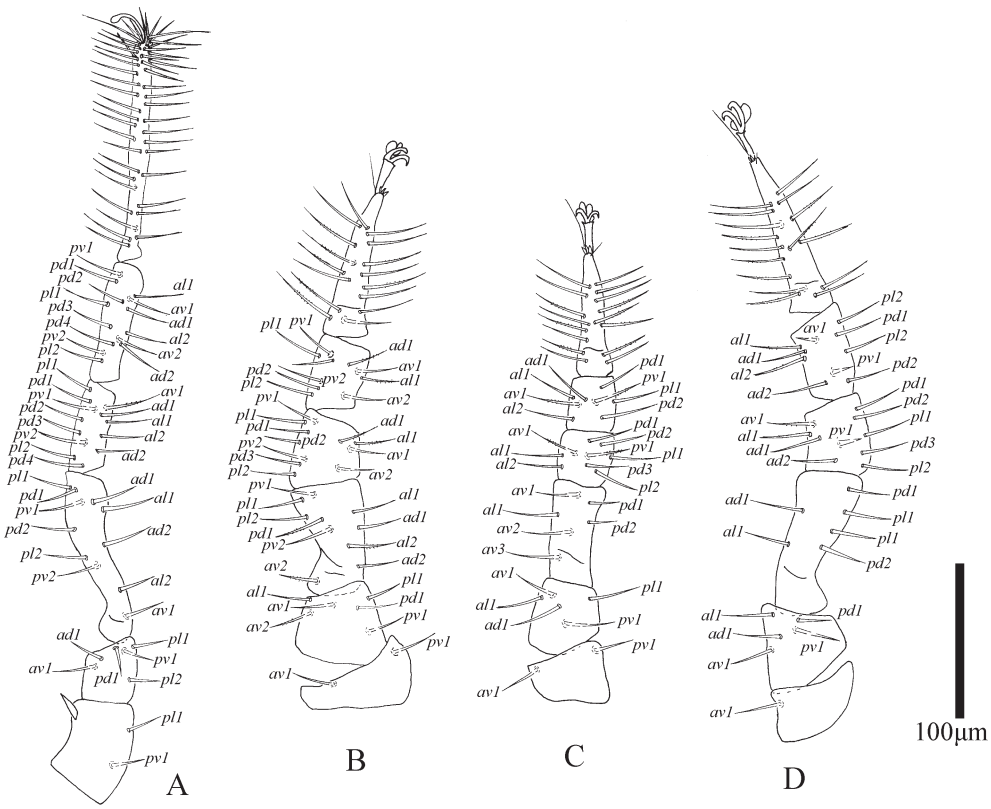

FIGURE 4. *Rhodcaroides multithornus* **sp. nov.**, Holotype female, A. Leg I; B. Leg II; C. Leg III; D. Leg IV.

Legs (Fig 4). Lengths: I 471–475, II 315–323, III 285–298, IV 362–368. Pretarsi II–IV each with a pair of claws. Chaetotaxy of each segment in legs I–IV: coxae 2 (0 0/1 0/1 0), 2 (0 0/1 0/1 0), 2 (0 0/1 0/1 0), 1 (0 0/1 0/0 0); trochanters 6(0 1/1 2 1/1), 5(1 0/2 1/1 1), 5(1 1/1 0/1 1), 5(1 1/1 1/1 0); femora 11 (2 2/1 2/2 2), 10 (2 2/1 1/2 2), 6 (1 0/3 0/2 0), 6 (1 1/0 2/0 2); genua 13 (2 2/1 4/2 2), 11 (1 1/2 3/2 2), 9 (2 0/1 4/1 1), 10 (1 2/1 3/1 2); tibiae 14 (2 2/2 4/2 2), 10 (1 1/2 2/2 2), 8 (2 1/1 1/1 2), 10 (2 2/1 2/1 2).

Male Not collected.

Etymology. The term *multithornus* refers to many dorsum setae with slightly thorn.

Remarks. *Rhodcaroides multithornus* **sp. nov.** resembles *R. leptinochaetus* (Ma 2005). The similarities are as follows: opisthonotal shield with 13 pairs of setae, one pair of presternal plates wedges, ventrianal shield with five pairs of setae except para-anal and post-anal. The difference are: (1) 17 pairs of setae on podonotal shield, two pairs of setae on cuticle around podonotal shield, and four pairs of setae on cuticle in *R. leptinochaetus*, while 19 pairs of setae on podonotal shield and one pair of setae on cuticle, five pairs of setae on cuticle around opisthonotal shield in *Rhodcaroides multithornus* **sp. nov.**; (2) 7–8 teeth on fixed digit, epistome with one anteromedian extension and one pair of denticle in *R. leptinochaetus*, while fixed digit with 10–11 teeth, epistome with one anteromedian extension of distal slightly enlarged and bifurcated, both sides have 4–6 extensions of varying lengths in *Rhodcaroides multithornus* **sp. nov.**; (3) metapodal plates absent in *R. leptinochaetus*, while two pairs of small and slender metapodal plates present in *Rhodcaroides multithornus* **sp. nov.**

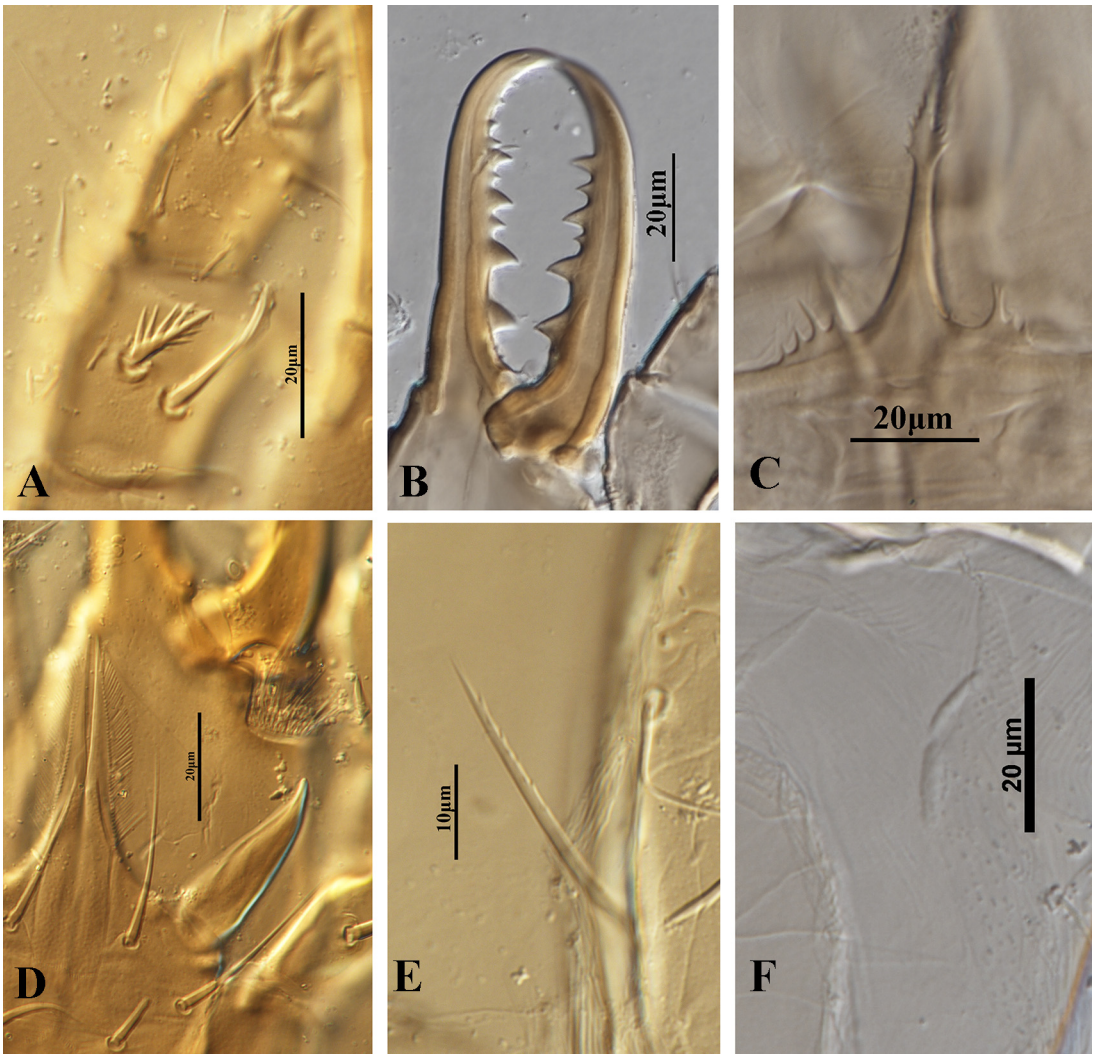

FIGURE 5. *Rhodcaroides multithornus* **sp. nov.**, Holotype female, A. Palptarsal genua arborescent seta and clavate seta; B. Fixed digit and movable digit; C. Epistome; D. Internal malae; E. *r3* slightly thorn; F. Two pair of small and slender metapodal plates.

Key to species of *Rhodacaroides* (based on female) from the world

1. Length of idiosoma over 400 *μm* 2
   Length of idiosoma not exceed or approach 400 *μm* 5
2. Opisthonotal shield with 13–14 pairs of setae 3
   Opisthonotal shield with 18–20 pairs of setae 4
3. Opisthonotal shield with 13 pairs of setae, movable digit with three teeth in addition to apical tooth . . . . . *Rhodacaroides unguellus* Karg, 1979
   Opisthonotal shield with 14 pairs of setae, movable digit with six teeth in addition to apical tooth . . . . . *Rhodacaroides brevispiritus* Karg, 1977
4. Opisthonotal shield with 18 pairs of setae, epistome with one anteromedian extension dense denticle . . . . . *Rhodacaroides calidus* Karg, 1977
   Opisthonotal shield with 20 pairs of setae, epistome with one anteromedian extension and one pair of denticle . . . . . *Rhodacaroides aegyptiacus* Willmann, 1959
5. Opisthonotal shield with 5 pairs of setae . . . . . *Rhodacaroides minyaspis* Lee, 1973
   Opisthonotal shield with over 10 pairs of setae 6
6. Opisthonotal shield with 15–17 pairs of setae 7
   Opisthonotal shield with 11–13 pairs of setae 8
7. Opisthonotal shield with 15 pairs of setae, Podonotal shield without scleronoduli . . . . . *Rhodacaroides costai* (Sheals, 1962)
   Opisthonotal shield with 17 pairs of setae, Podonotal shield with four scleronoduli . . . . . *Rhodacaroides crinitus* Karg, 1977
8. Opisthonotal shield with 11 pairs of setae . . . . . *Rhodacaroides coniunctus* Karg, 1977
   Opisthonotal shield with 13 pairs of setae 9
9. Two pairs of metapodal plates . . . . . *Rhodcaroides multithornus* **sp. nov.**
   Without metapodal plates 10
10. Ventrianal shield with six pairs of setae, epistome with one anteromedian extension dense denticle . . . . . *Rhodacaroides levis* Karg, 1977
    Ventrianal shield with five pairs of setae, epistome with one anteromedian extension and one pair of denticle . . . . . *Rhodacaroides leptinochaetus* (Ma, 2005)

Acknowledgments

We are grateful to Prof. Zhi-Sheng Zhang and his team (Southwest University, China) for organizing the expedition, also as subject editor, giving some helpful comments. We cordially thank the reviewer, Dr. Irina Marchenko for her suggestions. This study was supported by the Fund for survey of Invertebrates from Yintiaoling National Nature Reserve (CQS21C00739, CQS24C00333) and the National Natural Science Foundation (32160118).

References

Berlese, A. (1892) *Acari, Myriopoda et Scorpiones hucusque in Italia reperta. Ordo Mesostigmata (Gamasidae)*. Tipografia del Seminario, Padua, 143 pp.

Castilho, R.C., Moraes, G.J. de., Silva, E.S. & Halliday, B. (2016) Catalogue of the family Ologamasidae Ryke (Acari: Mesostigmata). *Zootaxa*, 4197 (1), 1–147. http://doi.org/10.11646/zootaxa.4197.1.1.

Evans, G.O. (1963a) Observations on the chaetotaxy of the legs in the free–living Gamasina (Acari: Mesostigmata). *Bulletin of the Natural History Museum Zoology*, 10, 277–303. https://doi.org/10.5962/bhl.part.20528

Evans, G.O. (1963b) Some observations on the chaetotaxy of the pedipalps in the Mesostigmata (Acari). *Annals and Magazine of Natural History*. 6, 513–527. https://doi.org/10.1080/00222936308651393

Karg, W. (1977) Zur Kenntnis einiger Milbengattungen der Rhodacaridae Oudemans, 1902 (Acarina, Parasitiformes) Teil 1. *Zoologische Jahrbücher, Abteilung fur Systematik, Oekologie und Geographie der Tiere*, 104, 327–351.

Karg, W. (1979) Zur Kenntnis einiger Milbengattungen der Rhodacaridae Oudemans, 1902 (Acarina, Parasitiformes) Teil 2. *Zoologische Jahrbücher, Abteilung fur Systematik, Oekologie und Geographie der Tiere*, 106, 197–213.

Lee, D.C. (1970) Rhodacaridae (Acari: Mesostigmata): classification, external morphology and distribution of genera. *Records of the South Australian Museum*, 16 (3), 1–219.

Lee, D.C. (1973) Rhodacaridae (Acari: Mesostigmata) from near Adelaide, Australia. I. Systematics. *Records of the South Australian Museum*, 16 (14), 1–36.

Lindquist, E.E. & Evans, G.O. (1965) Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma

of the Gamasina (Acarina, Mesostigmata). *Memoirs of the Entomological Society of Canada*, 47, 1–64. https://doi.org/10.4039/entm9747fv
Ma, L.M. (2005) New species of the genus *Gamasellus* and Asca, with supplemental Description of know species of the Asca (Acari: Mesostigmata: Rhodacaridae). *Acta Zootaxonomica Sinica*, 33 (3), 538–544.
Sheals, J.G. (1962) Mesostigmata: Gamasina (Acari). *In*: Delamare Deboutteville, C. & Rapoport, E. (Eds.), *Biologie de l'Amerique Australe. Vol. 1.* Centre National de la Recherche Scientifique, Paris, pp. 83–110.
Willmann, C. (1959) Zwei neue Milben aus dem Küstengrundwasser des Roten Meeres. *Kieler Meeresforschungen*, 15 (1), 97–104.