

A NEW SPECIES OF THE GENUS *MACHADOBELBA* (ACARINA: ORIBATIDA: MACHADOBELBIDAE) FROM TRIPURA, INDIA

Asok K. Sanyal ¹, Susmita Saha ² and Samiran Chakraborty ³

¹ Zoological Survey of India, M-Block, New Alipore, Kolkata, West Bengal 700053, India

² 236, G.T. Road, Mahesh, Hooghly, West Bengal 712202, India

³ Dept. of Zoology, University of Kalyani, West Bengal 741235, India

Email: ¹ coordinator@enviszsi.org

ABSTRACT

The paper contains the description along with illustrations of a new species of oribatid mite, *Machadobelba barbata*, from Tripura, India.

KEYWORDS

Acarina, *Oribatid mite*, *Machadobelba barbata* sp. nov., *New species*, *India*.

Balogh (1958) established the genus with *Machadobelba symmetrica* as the type species from Belgian Congo. Later the same author described another new species, *M. dispar* from the same place (Balogh, 1959). Balogh initially placed the genus *Machadobelba* under the family Eremaeidae (Sellnick, 1928) and later transferred the genus from Eremaeidae to the newly erected family Machadobelbidae (Balogh, 1972). Balogh (1959) and Perez-Inigo (1968) also reported the type-species from East Africa and Gulf of Guinea respectively.

In addition to above, Csiszar (1961) described two more new species, *simplex* and *tuberculata* under this genus from Java. Balogh (1970) reported *M. ceylonica* from the soil of Sri Lanka. Hammer (1979) added one more new species, *M. serrata* from Java. Hammer (1982) further reported another new species, *M. foliata* from Bali. Mahunka (1987, 1988a, 1988b) described 4 more new species i.e. *spatulifer*, *descombesi*, *similis* and *tanzica* under this genus. He described the first three species from Sabah, East Malaysia and last one from Tanzania. Balogh (1988) described *M. neotropica* from the soil of Ecuador. The genus was first reported with description of a new species *M. baloghi* from India by Mondal and Kundu (1999).

Until now, 13 species of *Machadobelba* are known from the world. The genus *Machadobelba* is being recorded here for the second time from India.

General diagnosis

Prodorsum with one pair of distinct costulae; sensillus simple and directed forward or bifurcate; basal part of lamellae converging, apical part subparallel; pedotecta I well developed; ten pairs of notogastral setae; six pairs of genital setae; one pair of aggenital setae; two pairs of anal setae; three pairs of adanal setae; legs monodactylous.

Distribution

India: Tripura, West Bengal. Elsewhere: Annobon Is. (Gulf of Guinea), Belgian Congo, East Africa, Ecuador, Indonesia (Java, Bali), Russia, Sri Lanka, Sabah (E. Malaysia), Tanzania.

METHODOLOGY

Soil, litter and humus samples from all possible habitats in South district of Tripura were collected from upper 5-10cm of soil profile. The extraction of mites was carried out by using a battery of Tullgren's Dry funnel extraction apparatus and the mites were collected in glass vials containing a mixture of 70% alcohol and 5% glycerol. Prior to identification the mites were desclerotized in lactic acid.

The measurements of the specimens are given in micron (μm). The type specimens are deposited in the National Zoological Collection, Zoological Survey of India, Kolkata.

Machadobelba barbata sp. nov.

(Figs. 1-3)

Material Examined

Holotype: Female, 2.i.1992, from humus beside Gomti river Jatanbari (Amarpur), Tripura, India, coll. S. Saha (ZSI, Kolkata).
Paratypes: 2 females, data same as for holotype.

Diagnosis

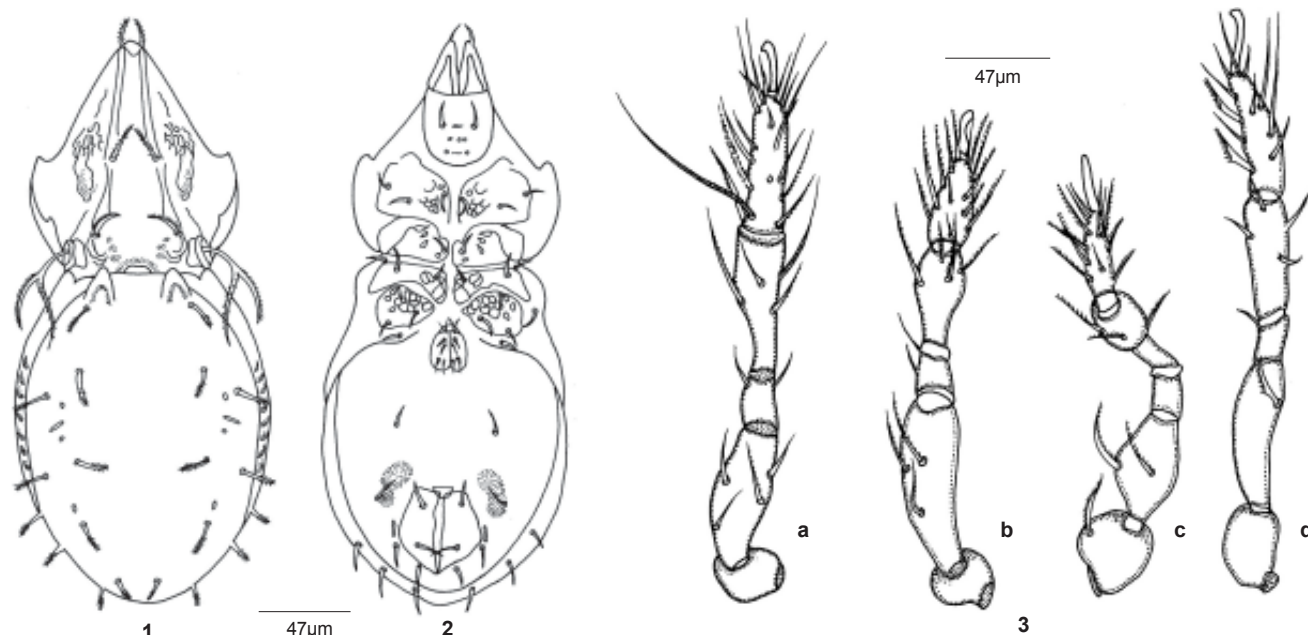
Colour: Light brown.

Measurements: Body length 259 μm ; body width 117 μm .

Prodorsum: Rostrum rounded; rostral setae moderately long (9 μm), arise from tip of prolamella, anterior 2/3 part barbed on both sides; line of lamella continued forward to rostrum as prolamella, basally ending in large tubercles, which oppose inner notogastral tubercles; lamellar setae more close to interlamellar setae than to rostral setae; both lamellar setae (14) and interlamellar setae (14) longer than rostral setae; lamellar setae curved inwards and bilaterally barbed; interlamellar setae unilaterally barbed; sensillus deeply bifurcated, inner ramus rough in appearance, outer ramus finely pilose on outer side only; prodorsum smooth, interlamellar region with markings.

Notogaster: Notogaster oval, with two pairs of prominent lateral condyles situated anteriorly along margin of dorsosejugal suture, median condyles continued in long keel, larger and wider than lateral notogastral ones; 10 pairs of notogastral setae; moderately long (9-19 μm), stiff, distally barbed, with blunt tip distance $r_1-r_1 < ta-ta < r_2-r_2 < ms-ms < ti-ti < r_3-r_3 < te-te$.

Epimeral Region: Sternal plate well developed, strongly chitinised, all epimeres well separated from each other; epimeral



Figures 1-3. *Machadobelba barbata* sp. nov.
1 - Dorsal view; 2 - Ventral view; 3 - Legs (a-d)

region foveolated; epimeral seta short (9-10µm), simple, epimeral setal formula 3-1-3-4.

Ano-genital region: Genital plates more or less squarish in shape (length: 21µm, width: 23µm) with six pairs of simple, short (7-8µm) setae, anterior four setae placed closely in longitudinal row, two others in oblique row in front of posterior margin of genital plates; one pair of smooth aggenital, three pairs of adanal setae; ventral side smooth except two punctuated patches on both sides of anal plates; anal plates rectangular in shape (length: 35µm, width: 45µm) with two pairs of short (8-9µm), simple setae; distance between genital and anal apertures more than twice the length of anal apertures.

Legs: Legs monodactylous. Leg chaetotaxy: Leg I: 0-4-2-3+1-19+1-1; Leg II: 0-3-2-4-13--1; Leg III: 1-2-0-3-14-1; Leg IV: 0-1-1-4-11-1.

Remarks

All the known *Machadobelba* species can be broadly divided into two groups viz., one with deeply bifurcate sensillus and the other with simple filiform, long, pointed sensillus. The former includes species like *M. symmetrica* Balogh, 1958, *M. dispar* Balogh, 1959, *M. cylonica* Balogh, 1970 and *M. neotropica*

Balogh, 1988 and the latter group includes species like *M. simplex* Csiszar, 1961, *M. tuberculata* Csiszar, 1961 and *M. serrata* Hammer, 1979. The present species falls in the former group and is comparable to *M. dispar* due to the presence of prominent prolamellae reaching up to rostral tip and structure of sensillus. But in this specimen the inner ramus of sensillus is little longer than the outer one whereas in *M. dispar* the inner ramus is only half as long as the outer. In *M. dispar* notogastral setae smooth but in the present specimen distal half of the notogastral seta is barbed and the tip is blunt. Further, presence of foveolated epimeral region and two punctuated patches on both sides of anal plates separate the new species from *M. dispar*.

The new species shows similarity with Indian species *M. baloghi* Mondal and Kundu, 1999 only in presence of bifurcate sensillus. It strongly differs from *baloghi* in length and width of body and length and shape of prodorsal setae. Further in the new species the epimeral region is foveolated and punctuated patches are present near anal plates.

REFERENCES

Balogh, J. (1958). Oribatides nouvelles de l'Afrique tropicale. *Review of Zoology and Botany of Africa* 58: 1-34.

Key to the Indian species of *Machadobelba*

- 2(1). Average body length 328, average width 175; *ro* smooth; *la* and *in* long, feathered; two rami of sensillus very long, equal in length; notogastral setae long (8-32), feathered; epimeral region not foveolated; no punctuated patches on the sides of anal plates *baloghi* Mondal & Kundu, 1999
- 1(2). Average body length 259, average width 117; anterior 2/3 part of *ro* barbed; *la* and *in* moderately long, barbed; two rami of sensillus moderately long, inner ramus is longer than outer one; notogastral setae, small, stiff, distally barbed; epimeral region foveolated; two light punctuated patches on the sides of anal plates ***barbata* sp. nov.**

Balogh, J. (1959). Some oribatid mites from eastern Africa (Acari; Oribatidae). *Acta Zoologica Hungary* 5: 13-32.

Balogh, J. (1970). New oribatids (Acari) from Ceylon. The scientific results of the Hungarian Soil Zoological Expedition. *Opusc. zool., Bpst.* 10: 33-67.

Balogh, J. (1972). *The oribatid genera of the world*, 1st edition, Akademiai Kiado, Budapest, 188p+71pl.

Balogh, P. (1988). Oribatid mites from Ecuador (Acari). *Acta Zoologica Hungary* 34(4): 321-336.

Csiszar, J. (1961). New oribatids from Indonesian soils (Acari). *Acta Zoologica Hungary* 7: 345-366.

Hammer, M. (1979). Investigations on the oribatid fauna of Java. *Biol. Skr. Dan. Vid. Selsk.* 22(9): 1-79.

Hammer, M. (1982). On a collection of oribatid mite from Bali, Indonesia (Acari: Cryptostigmata). *Ent. Scand.* 13(4): 445-465.

Mahunka, S. (1987). Neue und interessante Milben aus dem Genfer Museum, 60. Oribatids from Sabah (East Malaysia) II. (Acari: Oribatei). *Rev. suisse Zool.* 94(4): 765-817.

Mahunka, S. (1988a). New and interesting mites from Geneva Museum, 61. Oribatid from Sabah (East Malaysia). 3. (Acari: Oribatida). *Rev. suisse Zool.* 95(3): 817-888.

Mahunka, S. (1988b). The oribatid fauna of Tanzania (Acari), II. *Annls.Hist. Nat. Mus. Natl. Hung.* 80: 189-213.

Mondal, B.K. and B.G. Kundu (1999). A new species of the genus *Machadobelba* (Acari: Oribatei) from Jalpaiguri, West Bengal, India. *Acarologia* XL(1): 85-87.

Perez-Inigo, C. (1968). Resultados de la expedicion Paris Alvarez a la isla de Annobon (13) Oribatid mites (1st series) (Acari, Oribatei). *Eos. Madr.* 44: 405-423.

Sellnick, M. (1928). Formenkreis: Hornmilben, Oribatei. In: *P. Brohmer, Ehrmann and Ulmer's Die Tierw. Mittl. Leipzig*, 3(4/9): 1-42.

ACKNOWLEDGEMENT

The authors thankfully acknowledge the help in terms of providing laboratory facilities by Dr. J.R.B. Alfred, Director, Zoological Survey of India, Kolkata.



Advt. No. WII/RES/A.3.6(2)-2005 RECRUITMENT OF RESEARCH PERSONNEL

The Wildlife Institute of India (WII), Dehra Dun, is a premier national autonomous Institute of the Ministry of Environment and Forests (MoE&F), Government of India in the field of teaching, training and research. The Institute wishes to recruit Research Associate(s), Senior Research Fellow(s) & Junior Research Fellow(s) for its various research projects/cells/disciplines. The details of the available positions along with their essential and desirable qualifications, terms and conditions and how to apply are hosted on the Institute website <http://www.wii.gov.in>.

Director, Wildlife Institute of India

MACROMORPHOLOGY OF HARD PALATE OF ADULT WHITE BENGAL TIGER (*PANTHERA TIGERS TIGRIS*)

M. Sarma ¹, S.N. Kalita ², K.B. Dev Choudhury ³,
A. Chakraborty ⁴ and K.K. Sarma ⁵

¹ Assistant Professor, ² Professor and Head, ³ Research Associate, Department of Anatomy and Histology, ⁴ Professor, Department of Pathology, ⁵ Associate Professor, Department of Surgery and Radiology, College of Veterinary Science, Khanapara, Guwahati, Assam 781022, India

web supplement

A male adult white Bengal Tiger *Panthera tigris tigris* "Kashyab" aged 18 years died due to old age at the Assam State Zoo, Guwahati on 22 June 2003. Following postmortem examination, the hard palate was studied *in situ*.

Hard palate, the mucosal covering of the osseous palate, the roof of the oral cavity of the tiger was nearly flat, nonpigmented and was bounded laterally and rostrally by the upper dental arch. It was continuous laterally with the mucous membrane with the gums and caudally with the soft palate. Median palatine raphae was absent in the tiger unlike dog (Nickel *et al.*, 1979) who possesses indistinct palatine crest.

Palatine ridges numbering eight pairs are transversally oriented in the hard palate of the tiger, 6-10 pairs in dog and seven pairs in cat (Nickel *et al.*, 1979). The ridges were cornified. The first four pairs of palatine ridges in the tiger were semicircular. Caudally, 5th, 6th and 7th pairs (Image 1^w) of ridges were distinctly concave caudally while the last or 8th pair was transversely placed being 1.73cm in length. There were rows of papillae on either side being rostral and caudal to the palatine ridges as in cats (Nickel *et al.*, 1979). Elleport (1975) suggested that there were 7-9 curved ridges in cats and papillae were present in the grooves between the ridges. The incisive papilla was present just caudal to the central incisors which was rhomboid in shape with an average width of 0.8cm. Incisive ducts opened on either side of the incisive papilla in tiger similar to dog and cat (Nickel *et al.*, 1979). Close examination of the palatine ridges revealed presence of small blunt eminences caudally directed as in dog (Evans & Christensen, 1979).

REFERENCES

- Elleport, C.R. (1975). Carnivore Digestive System. In: Getty, R. (ED.). Sission and Grossman's *Anatomy of the Domestic Animals*, Vol. 2. 5th edition. W.B. Saunders & Company, Philadelphia.
- Evans, H.E. and C.G. Christensen (1979). The Digestive Apparatus and Abdomen, p. 413. In: *Miller's Anatomy of the Dog*. 2nd edition. W.B. Saunders & Company, Philadelphia.
- Nickel, R., A. Schummer and E. Seiferle (1979). Digestive System, p. 57. In: Schummer A and Nickel R. (Eds.). *The Viscera of the Domestic Mammals* Vol. 2. 2nd edition. Verlag Paul Parey, Hamburg.

ACKNOWLEDGEMENTS

The authors are grateful to the Dean, Faculty to Veterinary Science for providing necessary facilities in condition of this research. They also thank Mr. Narayan Mahanta, D.F.O., Dr. H.C. Deka and Dr. Bijoy Gogoi, Assam State Zoo, for their help in providing the specimen for conducting the research work.

^w see image 1 in the web supplement at www.zoosprint.org



©Zoo Outreach Organisation; www.zoosprint.org; Manuscript 1103; Received 22 Oct. 2003; Finally accepted 2 Jan. 2005; Date of publication 21 Apr. 2005