



*Rec. zool. Surv. India* : 106(Part 4) : 61-71, 2006

## **ON A COLLECTION OF SOIL PROSTIGMATID MITES (ACARI) FROM SOUTHERN PARTS OF WEST BENGAL, INDIA**

ARUN GUPTA, M. CHATTERJEE, A. K. SANYAL AND S. K. GUPTA\*

*Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053, India*

### **INTRODUCTION**

Mites form very important biotic component in soil, litter, mosses and lichens. Any sample from these environs will reveal the occurrence of a large number of species. These are important not only because of the fact that they help in biodegradation of soil organic matter and enrich fertility but also help in recycling of soil nutrients and help in dispersal of soil fungi which, in turn, help in biodegradation process. Many of the soil prostigmatid mites are useful predators of soil insects and nematodes. Among the soil mites, the prostigmatid mite fauna of India has not been properly explored as evident from the fact that only 26 spp. under 16 genera and 7 families are so far known from soil, of those 11 spp. under 4 genera and 2 families are known from West Bengal (in Prasad, 1974; Gupta, 1991).

This indicates that there is a vast scope to explore prostigmatid mite fauna from soil and indepth taxonomic study will reveal many interesting and hitherto unrecorded species. While in other orders like Cryptostigmata over 500 spp. (Sanyal, 1991) and Mesostigmata 156 spp. (Bhattacharya *et al.*, 1996) are known from India.

Because of being highly fragile, soft bodied, and colourless bodies of these mites, these mites are often ignored during the process of sorting of soil extracted mite specimens considering these as immature stages, although it is a fact that this habitat is highly rich with the prostigmatid mite fauna.

Cosidering the inadequacy of knowledge in this group of mites, the authors carried out survey of these mites in West Bengal during 2003-2005 and results thereof are presented in this paper.

---

\*1C/10 Anandam Housing Complex, 7, K. B. Sarani, Kolkata-700 080, India

## MATERIAL AND METHODS

The mite specimens studied in this paper were collected from soil samples taken from Howrah, Hooghly, 24-Parganas (N), 24-Parganas (S), East Medinipur and West Medinipur districts of West Bengal. The samples were extracted by using the standard method of extraction with the Tullgren funnel apparatus. The identified specimens are deposited in the National Zoological Collection, Zoological Survey of India, Kolkata.

## SYSTEMATIC ACCOUNT

### Order PROSTIGMATA

### Family 1. TYDEIDAE Kramer

#### 1. *Pronematus tenuisetosus* Meyer & Rodrigues

1966. *Pronematus tenuisetosus* Meyer & Rodrigues, *Garcia Orta*, **13**(2) : 1-33.

1968. *Pronematus tenuisetosus*, Baker, *Annals Ent. Soc. Amer.* **61**(5) : 1096.

*Collection Records* : One female; vegetable field, Janglepara, Uday Narayanpur, Howrah, West Bengal; from soil rich with leaf litter; 20.ix.2003.

*Remarks* : This was described basing on collection made on *Gossypium* sp. in Mozambique and therefore its record on leaf litter is a new habitat record.

#### 2. *Pronematus* sp.

*Collection Records* : One male; village area, Bargachia, Howrah, West Bengal; from soil; 22.ix.2003.

*Remarks* : The specimen was in badly damaged condition and hence specific determination could not be done.

#### 3. *Parapronematus* sp.

*Collection Records* : One male, one female; mango and banana garden, Maheshpur, Simlapole, Chinsura, Hooghly, West Bengal; from soil; 25.ix.2003.

*Remarks* : The specimen was damaged during the process of extraction of soil litter sample and therefore further identification was not possible.

#### 4. *Paralorryia* sp.

*Collection Records* : Two males collected from organic manure dumping ground, Basirhat, 24-Parganas (North), West Bengal; from soil; 27.ix.2003.

### 5. *Triophtydeus* sp.

*Collection Records* : One male, one female; vegetable field, Narna, Bhaskur, Howrah, West Bengal; from soil; 22.ix.2003; one male, one female; fruit garden, Gayeshpur, Howrah, West Bengal, from soil; 8.iv.2004; one male; flower garden, Bagur, Deulia Bazar, East Medinipur, West Bengal; from soil; 20.iii.2005; three females; Kamal nursery, Minitikiri, East Medinipur, West Bengal; from soil; 20.iii.2005; one male; Shilamon, Mohalishoi, West Medinipur, West Bengal; from soil; 22.iii.2005; one male; Khapramari, Mohalishoi, West Medinipur, West Bengal; from soil; 22.iii.2005.

*Remarks* : Baker (1965) described a species *Triophtydeus alaskansis* collected on *Salex* sp, in quarantine. The occurrence of this species in soil is therefore a record of new habitat.

### 6. *Microtydeus* sp.

*Collection Records* : One male; vermicompost ground, Babubazar, Babughat, Bhaddreshwar, Hooghly, West Bengal; from soil; 4.iv.2004.

*Remarks* : Normally, the specimens of this genus are inhabitants of moss. However, in the present case it was collected from soil and therefore it is a new habitat record.

### 7. *Tydeus* sp.

*Collection Records* : One male, one female; orchard, Gazipur, Amta, Howrah, West Bengal; from soil; 7.iv.2004; one female; Social Forestry area of Dakshinsole, Arabari, West Medinipur, West Bengal; from soil; 25.ix.2004.

*Remarks* : It was damaged while mounting.

### 8. *Paratriophtydeus* sp.

*Collection Records* : One male; Chowkisolet forest of Ramgarh, Goaltore, West Medinipur, West Bengal; from soil; 23.iii.2005.

*Remarks* : The specimen of this genus are habitants of mosses and lichens and soil therefore is a new habitat record.

## Family 2. CUNAXIDAE Thor

### 9. *Cunaxa* sp. nr. *setirostris* (Hermann)

*Collection Records* : Two males; Agricultural field, Buroshibtola, North Kalyanpur, 24-Parganas (South), West Bengal; from soil; 21.ix.2004; one female; vegetable field, Nasibpur, Hooghly, West Bengal; from soil; 24.ix.2004.

*Remarks* : The present specimen is very close to *C. setirostris* in having almost similar palpal chaetotaxy but the spines on genu and tibiotarsus are relatively smaller. Inadequate material did not allow further identification.

#### 10. *Cunaxa* sp. nr. *carina* Den Heyer

*Collection Records* : One male; vermicompost ground, Babubazar, Babughat, Bhaddreshwar, Hooghly, West Bengal; from soil; 4.iv.2004.

*Remarks* : Den Heyer (1979) collected *Cunaxa carina* from litter in South Africa. The present specimen also collected from litter is close to *C. carina* but final decision regarding identity could not be taken pending study of further material.

#### 11. *Dactyloscirus* sp.

*Collection Records* : One female; vegetable ground, Jamtola, 24-Parganas (South), West Bengal; from soil; 16.iii.2005.

*Remarks* : The members of this genus occur in bark, litter, leaf etc. From India three species are known (Gupta, 2002) but the present one differs from all the known species in dorsal chaetotactic pattern. Final decision regarding identification will be taken after studying further material.

#### 12. *Colosscirus* sp.

*Collection Records* : One female; mango garden, Gazipur, Amta, Howrah, West Bengal; from soil; 7.iv.2004.

*Remarks* : The members of this genus are inhabitants of soil, litter, pine cone, leaves, etc. The present specimen collected from soil is being recorded here for the first time in India and no member of this genus was earlier reported from India.

#### 13. *Parabonzia* sp.

*Collection Records* : One male, one female; vermicompost ground, Babubazar, Babughat, Bhaddreshwar, Hooghly, West Bengal; from soil; 2.iv.2004.

*Remarks* : The members of this genus occur in soil rich, in organic matter, tree hole, litter, etc. (Smiley, 1992) and earlier this genus was not recorded from India. Final decision regarding identity will be taken after further study and collection of additional material.

#### 14. *Neocunaxoides* sp.

*Collection Records* : One female; Chowkiso forest, Ramgarh, Goaltore, West Medinipur, West Bengal; from soil; 23.iii.2005.

*Remarks* : So far only four species of this genus are known from India (Gupta, 2002). The specimen collected in the present case did not tally with any of those. Further examination is on with the collection of additional material and the result thereof will be published elsewhere.

15. *Scirula* sp. nr. *impressa* Berlese

*Collection Records* : One male; paddy field, Haripur Hattala, Taki, 24-Parganas (North), West Bengal; 2.iv.2004.

*Remarks* : This genus was so far not reported from India. The present species appears to be a new one which will be described elsewhere.

Family 3. CHEYLETIDAE Leach

16. *Cheyletus fortis* Oudemans

*Collection Records* : One male; village area, Bargachhia, Howrah, West Bengal; from soil; 22.ix.2003.

*Remarks* : This mite species is more common in storage habitats and has also has been recorded on tree trunk, leaf (Gupta, 2002). Therefore its occurrence in soil is interesting.

17. *Cheyletus malaccensis* Oudemans

*Collection Records* : One female; vegetable field, Bargachhia, Howrah, West Bengal; from soil; 22.ix.2003.

*Remarks* : This mite is known from habitats like paddy, guava, magnolia, debris, leg horn, skin of bird (Gupta, 2002) and is not known from habitat like soil.

18. *Chelacaropsis moorei* Baker

*Collection Records* : One male; Khapramari, Mohalishoi, West Medinipur, West Bengal; from soil; 22.iii.2005.

*Remarks* : Earlier records of this species in India are from garlic, in association with *Aceria tulipae* and paddy in association with paddy. Therefore, soil is the new habitat of this species.

Family 4. ERYTHRAEIDAE Robineau-Desvoidy

19. *Paraerythraeus indicus* Khot

1963. *Paraerythraeus indicus* Khot, *Acarologia*, 5 : 236-238.

*Collection Records* : One male; guava garden, Bamungachi, Baruipur, 24-Parganas (South), West Bengal; from soil; 20.ix.2004.

*Remarks* : The earlier record of this species is from debris in Madhya Pradesh and hence soil is the new habitat of this species and is reported here for the first time from West Bengal.

Family 5. TARSONEMIDAE Kramer

20. *Tarsonemus* sp.

*Collection Records* : One male; Maheshpur, Chinsura, Hooghly, West Bengal; from soil; 25.ix.2003.

*Remarks* : The specimen was damaged during extraction and mounting.

Family 6. BDELLIDAE Duges

21. *Bdellodes* sp.

*Collection Records* : One male; vermicompost ground, Babubazar, Babughat, Bhaddresswar, Hooghly, West Bengal; from soil; 4.iv.2004.

*Remarks* : The specimen was damaged during extraction and mounting.

Family 7. TROMBIDIIDAE Leach

22. *Trombidium gigas* Trouessart

1894. *Trombidium gigas* Trouessart, *Ann. Soc. Ent. Fr.*, **63** : 92.

1931. *Trombidium gigas*, Cherian, *J. Asiat Soc. Beng.*, **27** : 141-147.

*Collection Records* : One male; flower garden, Bagur, Deulia Bazar, East Medinipur, West Bengal; from soil; 20.iii.2005.

*Remarks* : Earlier it was recorded from soil in Tamil Nadu.

Family 8. RAPHIGNATHIDAE

23. *Undetermined* sp.

*Collection Records* : One male; Maheshpur, Chuchura, Hooghly, West Bengal; from soil; 25.ix.2003.

Family 9. SCUTACARIDAE Oudemans

24. *Diversipes simplex* Mahunka

1971. *Diversipes simplex* Mahunka, *Acta Zool. Acad. Sci. Hungaricae*, **17** : 26-27.

*Collection Records* : One male; vegetable garden, Sripur, Khukurdah, East Medinipur, West Bengal, from soil; 19.iii.2005.

*Remarks* : Earlier record of this species was from mossy fern from Orissa and this is the first record from West Bengal and soil is the new habitat.

Family 10. PYGMEPHORIDAE

25. *Bakerdania spinifera* Mahunka

1971. *Bakerdania spinifera* Mahunka, *Acta zool. Acad. Sci. Hung.*, 17(1-2) : 21-22.

*Collection Records* : One male; kitchen garden of C.I.S.F. House, Haldia, East Midnapur, West Bengal; from soil; 22.ix.2004.

*Remarks* : Mahunka (1971) recorded it from soil of West Bengal.

Family 11. OEHSERCHESITIDAE

26. *Oehserchestes* sp.

*Collection Records* : One male; central nursery, Arabari, near Chandrakona road, West Medinipur, West Bengal; from soil; 26.ix.2004.

*Remarks* : A very interesting species of this genus was collected from soil which does not tally with any of the known species of this genus. The family and the genus were previously unknown from India. The material is under study and final decision regarding its identity will be taken with the availability of further material.

**Key to the families and genera of soil Prostigmatid mites  
collected from Southern West Bengal**

1. Females (rarely males) with a pair of anterolateral stigmata and associated trachea; peritreme absent. Opisthosoma generally showing indication of segmentation; palpi often 2 segmented, greatly reduced and closely appressed to a small capsulate gnathosoma ..... Cohort Eleutherengonina  
..... sub-cohort Heterostigmae, 7
- Females and males with stigmata between cheliceral bases or on posterodorsal margin of gnathosoma, or stigmata absent; peritreme often present in stigmatiform forms, extending along anterior propodosomal margins. Opisthosoma without indications of segmentation. Gnathosoma variously shaped, generally conspicuous with articulated palpi ..... 2
2. Palpal thumb claw process in all stages, primarily terrestrial form ..... 7
- Palpi simple, chelate or produced distidorsally in postlateral instars, rarely flange-like, occasionally absent; larvae of aquatic species may have a palpal thumb-claw process ..... 3
3. Prodorsal sensilla present, hair-like or variously produced but differing in form from other prodorsal setae, inserted in bothridia ..... 4
- Prodorsal sensilla absent, prodorsal setae paired, similar in size and form, or absent ..... 9

4. Chelicerae free, broad basally, narrowed apically, often chelate or hooked terminally, inserted on elongated rostral snout in such a way that lateral motion possible with trichobothria on various leg segments ..... Bdelloidea, 5
- Chelicera free or fused without lateral motion, inserted on or fused with short rostrum, leg trichobothria absent ..... 6
5. Palpi long, antenniform, often elbowed typically with strong distal setae, with 3 pairs of genital acetabula ..... Bdellidae
- Palpi extending beyond gnathosoma or equal to chelae in length terminating in tarsal claw (exception *Parabongia*) with 2-3 pairs of acetabula ..... Cunaxidae, 18
6. Cheliceral digits opposed, cheliceral bases free ..... \*
- \*Claws present on tarsi II-IV, present or absent on tarsus I ..... \*\*
- \*\*With one pair of prodorsal sensilla, tarsus I without true claws, with or without empodi ..  
..... Oehserchestidae
- Fixed cheliceral digits, cheliceral bases fused or contiguous along their mesal edges of movable digits short, needle-like ..... Tydeidae, 12
7. Leg IV of female with separate femora and genua, often with claws and membranous empodia, leg IV of female 5 segmented ..... Pygmephoroidae, 8
- Legs IV of female, when present, with fused femora and genua and without claws or empodia; legs IV of male, when present usually 4 segmented with a single sessile claw....Tarsonemoidea\*
- \*Female always with 4 pairs of legs, leg IV attenuate, 3 segmented, male with leg IV ventrally inserted, 3 or 4 segments ..... Tarsonemidae
8. Podonotal shield large, covering propodorsoma completely, free margin of shield striated, forming roof over gnathosoma, distance between insertions of legs II-III equal to that between legs III-IV ..... Scutacaridae
- Podonotal shield generally smaller and not covering entire propodosoma or absent, distance between insertions of legs II-III at least twice that of distance between legs III-IV .....  
..... Pygmephoridae
9. Adults and nymphs often strongly hypertrichous, idiosomal setae not arranged in orderly rows, often forming thick peltage, with one or two pairs of prodorsal sensilla usually inserted into median crista metopica, larvae heteromorphic, adults parasitic, nymphs freeliving ..... 11
- Body setae of adults and nymphs relatively few, generally arranged in transverse rows, rarely with hypertrichous patches, prodorsal sensilla usually absent, larvae homomorphic, similar to nymphs and adults ..... 10
10. Cheliceral bases forming a stylophore which is fused with the rostrum ..... Cheyletidae
- Cheliceral bases closely contiguous or fused with each other, rarely integrated with other gnathosomal elements ..... Raphignathidae

- 11. Movable digit – of nymphs and adults short, curved, sometimes toothed distally; chelicerae and associated gnathosomal entities fixed, not retractable into idiosoma; with or without empodia. Larvae heteromorphic, with urstigma and an anal opening with one pair of bothridial sensilla on the prodorsal shield. Coxae I – II usually contiguous, parasites of vertebrate and invertebrates ..... Trombidioidea\*
  - \*Terrestrial species, sometimes found in damp habitats, sensilla variously inserted, often median in position, empodia present or absent, larvae parasitic on variety of arthropods ..... Trombidiidae
  - Movable chelae of nymph and adults, long, straight, either independently retractile or integrated with a wholly retractile gnathosoma, empodia absent. Larvae homomorphic or heteromorphic, larval morphology variable, but; usually with 2 pairs of bothridial sensilla on the prodorsal shield ..... Erythraeoidea\*
    - \*Gnathosoma normally developed, chelicerae independently retractile; propodosoma not narrowed anteriorly, generally with ossiform crista. Body setae simple or pectinate, often somewhat broadened. Larvae parasitic on insects and arachnids or predators .... Erythraeidae
- 12. With hysterosomal setae  $L_2$  in normal lateral position ..... 13
  - With hysterosomal  $L_2$  in dorsal position ..... 15
- 13. Striae transverse or reticulate between second pair of hysterosomal dorsocentral setae ..... 14
  - Striae longitudinal between second pair of hysterosomal dorsocentral setae ..... *Paralorryia*
- 14. Dorsal striae not forming reticulate pattern ..... *Tydeus*
  - Dorsal striae forming reticulate pattern in whole or in part ..... *Lorryia*
- 15. Tarsus I without empodium or claws ..... 16
  - Tarsus I with empodium or claws ..... 17
- 16. Without anal setae, femur II and IV each with prominent forked seta ..... *Parapronematus*
  - With a single pair of anal setae, setae normal on femora III and IV ..... *Pronematus*
- 17. Femur IV not divided ..... *Microtydeus*
  - Femur IV divided ..... *Triophtydeus*
- 18. Palpal tibiotarsus with an apical solenidia, ventral hypostome usually with geniculate setae ..  
..... Bonziinae\*
  - \*Dorsal palpal segment without a claw, palpal tibiotarsus without tubercle ..... *Parabonzia*
  - Palpal tibiotarsus without a solenidion, ventral hypostome never with geniculate setae ..... 19
- 19. Palpus with fewer than 5 segments ..... 20
  - Palpus with 5 segments ..... 21

20. Palpus with 4 segments ..... Seirulinae\*  
 \*Body strongly sclerotized, dorsum with strong furrow, femur with 2 dorsal spine like setae  
 ..... *Scirula*  
 — Palpus with 3 segments ..... Cunaxoidenae\*  
 \*Setae  $L_4$  absent, venter with or without coxae I-II forming a pentagonal-shaped sternal plate  
 ..... *Neocunaxoides*
21. Dorsum either with a single shield on the propodosoma or a single shield originating on  
 anterior edge of propodosoma and extending beyond metapodosoma ..... Coleoscirinae\*  
 \*Female with sternal and ventrolateral plates. Dorsum with a single Shield extending from  
 propodosoma into hysterosomal region ..... *Coleoscirus*  
 — Dorsum of propodosoma with or without shield ..... Cunaxiinae, 22
22. Without conspicuous lateral bilobed flanges terminally ..... *Cunaxa*  
 — With lateral bilobed fanges, with one sensory setae having a stout elongate base .....  
 ..... *Dactyloscirus*
23. All tarsi with paired claws ..... *Cheyletus*, 24  
 — One or more tarsi without paired claws ..... *Cheletogenes*
24. Palp claw with one large basal tooth ..... *fortis*  
 — Palp claw with 2 or more basal teeth ..... *malaccensis*

### SUMMARY

The present paper is a record of collection of soil inhabiting mites of the order Prostigmata belonging to 22 genera and 26 species from Howrah, 24 Parganas (N & S), Hooghly, East Medinipur and West Medinipur districts of West Bengal, India.

### ACKNOWLEDGEMENTS

The authors are thankful to the Director, Zoological Survey of India, Kolkata for providing laboratory facilities.

### REFERENCES

- Baker, E.W. 1965. A review of the genera of the family Tydeidae (Acarina). In : *Advances in Acarology*, Vol. 2, Cornell University Press, New York, 95-133.
- Bhattacharyya, A.K., Sanyal, A.K. and Sengupta, D. 1996. Present state of knowledge of taxonomy of soil mesostigmata (Acari) in India. *Environment & Ecology*, **14**(4) : 850-857.

- Den Heyer, J. 1979. Description of seven African species of *Cunaxa* von Heyden, 1826 (Actinedida : Acarida), with remarks on the genus. *Phytophylactica*, **11**(1) : 24-42.
- Gupta, S.K. 1991. Acari : Prostigmata, Astigmata and Mesostigmata. In : *Animal Resources of India* (Ed. Director, ZSI), Zoological Survey of India, 483-499.
- Gupta, S.K. 2002. A monograph on plant inhabiting predatory mites of India. Part I. Order Prostigmata, Astigmata and Cryptostigmata. *Mem. zool. Surv. India*, **19**(2) : 1-183.
- Mahunka, S. 1971. Tarsonemina (Acari) species from India. *Acta zool. Acad. Sci. Hungaricae*, **17**(1-2) : 11-49.
- Prasad, N. 1974. *A catalogue of mites of India*. Indira Acarology Publishing House, Ludhiana, 320 pp.
- Sanyal, A.K. 1991. Acari : Cryptostigmata. In : *Animal Resources of India* (Ed. Director, ZSI), Zoological Survey of India, 505-511.
- Smiley, R.L. 1992. The predatory mite family Cunaxidae (Acari) of the world with a new classification. Indira Publishing House, Michigan, 356 pp.