



*Rec. zool. Surv. India* : 103 (Part 3–4) : 33-45, 2004

## PHYTOPHAGOUS AND PREDATORY MITE FAUNA OF SUNDARBANS BIOSPHERE RESERVE : II. SOME PREDATORY MITES OCCURRING ON MANGROVE VEGETATION AND AGRI-HORTICULTURAL CROPS

S. K. GUPTA, S. GHOSHAL, A. CHOUDHURY AND B. MUKHERJEE\*

*S. D. Marine Biological Research Institute, 8/8, B. B. Mukherjee Road, Sodepure, India*

### INTRODUCTION

This paper is based upon collection made during 1.8.2000 to 31.3.2002 in connection with the study of phytophagous and predatory mite fauna occurring on mangrove and agri-horticultural crops of Sundarban Biosphere Reserve (SBR). This forms Part-II of this study while Part-I dealing with phytophagous mites belonging to 21 species under 10 genera and 4 families has been published separately (Gupta *et al.*, 2003).

### MATERIALS AND METHODS

The Materials and Methods adopted for this study are same as described earlier in Part-I of this study dealing with phytophagous mites (Gupta *et al.*, 2003).

#### Family I. PHYTOSEIIDAE Berlese

1952. Phytoseiidae Baker & Wharton, *An introduction to Acarology*, McMillan Company, New York, p. 87.  
1959. Phytoseiidae, Chant, *Can. Ent.*, 91(Suppl-12) : 48.  
1986. Phytoseiidae, Gupta, *Fauna of India (Acari Mesostigmata) Family Phytoseiidae*, p. 31.

#### Key to the Subfamilies, Genera and Subgenera known to occur in Sundarbans Biosphere Reserve (SBR)

1. Prolateral setae 4 pairs, in all 6–9 pairs of lateral setae; preanal setae 3 pairs .....  
..... Subfamily AMBLYSEIINAE, 2
- Prolateral setae 5 or more pairs, in all 9–12 pairs of setae, preanal setae 3–4 pairs .....  
..... Subfamily PHYTOSEIINAE, 7

---

\* Department of Pharmaceutical Technology, Jadavpur University, Kolkata-700 032, India

2. Ventrianal shield absent or indistinctly demarcated; only preanal setae distinctly present ....  
..... Genus *Indoseiulus*  
– Ventrianal shield distinctly present ..... 3
3. Lateral integument sclerotized so that  $r_3$  and  $R_1$  though on usual lateral position appear to be  
on lateroventral extension of dorsal shield ..... Genus *Iphiseius*  
– Lateral integument not sclerotized as above ..... Genus *Amblyseius*, 4
4. Dorsal shield with 5 pairs of post lateral setae ..... 5  
– Dorsal shield with less than 5 pairs of post lateral setae ..... Subgenus *Paraphytoseius*
5. Setae  $Z_5$ ,  $s_4$  long and whip like, longer than distance between their bases. Leg IV with macro  
setae on genu & erect seta on tarsus-I ..... Subgenus *Amblyseius*  
– Setae  $Z_5$  shorter, almost as long as distance between their bases; leg I with no macro setae or  
only one on genu, no erect setae on tarsus-I ..... 6
6. Sternal shield distinct and straight or concave posteriorly, ventrianal shield approximately  
shield shaped or pentagonal..... Subgenus *Neoseiulus*  
– Sternal shield indistinct may be trilobate posteriorly, ventrianal shield elongate, vase shaped  
or concave laterally ..... Subgenus *Euseius*
7. Seta  $r_3$  on dorsal shield, genu II with 7 setae, genu III with 6 setae ..... Genus *Phytoseius*, 8  
– Seta  $r_3$  on lateral integument, genu II with 6 setae, genu III with 6 or 7 setae .....  
..... Genus *Typhlodromus*, 9
8. Seta  $R_1$  present ..... Subgenus *Pennaseius*  
– Seta  $R_1$  absent ..... Subgenus *Phytoseius*
9.  $Z_5$  and  $Z_4$  normally serrate and the former usually knobbed ..... Subgenus *Amblydromella*  
–  $Z_5$  and  $Z_4$  never serrate,  $Z_5$  always smooth ..... Subgenus *Typhlodromus*

#### Subfamily AMBLYSEIINAE Muma

1961. Amblyseiinae Muma, *Bull. Fla. St. Mus.*, 5(7) : 273.

1986. Amblyseiinae, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*. p. 32.

#### Genus I. *Amblyseius* Berlese

1914. *Amblyseius* Berlese, *Redia.*, 10 : 43.

1986. *Amblyseius*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*. p. 32.

#### 1. *Amblyseius (Amblyseius) largoensis* (Muma)

1955. *Amblyseiopsis largoensis* Muma, *Ann. Ent. Soc. Amer.*, 48 : 266

1986. *Amblyseius (Amblyseius) largoensis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*.  
p. 51-55.

*Collection records* : 10 (F), 5 (M), Bamankhali, ex. several plants like *Hibiscus rosa-sinensis*, *Nayantara*, *Heritiera fomes*, *Psidium guajava*, *Avicennia alba*, 5.8.2000; 5 (F), 2 (M), *Heritiera fomes*, *Psidium guajava*, *A. alba.*, 15.9.2000; 4 (M), 10 (F), Chemaguri, ex. betel vine, *Rhizophora*, neem, 25.9.2000; 3 (F), Bhagabatpur, ex. *Rhizophora* sp., *Avicennia* sp., 17.10.2000.

*Distribution* : INDIA : Arunachal Pradesh, Assam, Nagaland, Manipur, Meghalaya, Tripura, Himachal Pradesh, Bihar, West Bengal, Orissa, Punjab, Gujarat, Uttar Pradesh, Andhra Pradesh, Karnataka, Kerala,, Pondicherry, Tamil Nadu, Andaman-Nicobar Isls. *Elsewhere* : Philippines, Taiwan, Thailand, Hong Kong, Israel, Iran, Japan, New Zealand, South Africa, Kenya, U. S. A, Brazil, Costa Rica, Guatemala, Honduras, Jamaica, Puerto Rico, Trinidad.

*Remarks* : This predatory mite was found to be most abundant in various places of Sundarbans Biosphere Reserve (SBR) occurring on both mangrove plants and agri-horticultural crops. The Phytophagous mites on which this was found to feed upon were eggs and nymphal stages of *Tetranychus urticae*, *Tetranychus neocaledonicus*, *Schizotetranychus* sp. Since this is widely distributed and was found to be voracious feeder, it may turn out to be a good bio-controlling agent.

#### Subgenus *Euseius* Wainstein

1962. *Amblyseius (Amblyseius)* section *Euseius* Wainstein, *Acarologia*, 4 : 14.

1986. *Euseius*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 73.

#### Key to the species of *Euseius* known to occur in SBR

1. All setae on dorsal shield minute excepting j<sub>1</sub> and Z<sub>5</sub> ..... *ovalis*  
 – Besides j<sub>1</sub>, Z<sub>5</sub> some other setae also long ..... 2
2. Setae j<sub>3</sub> longer than j<sub>1</sub> ..... *alstoniae*  
 – Setae j<sub>3</sub> and j<sub>1</sub> equal ..... 3
3. Spermatheca bell shaped ..... *coccineae*  
 – Spermatheca elongated ..... *pruni*

#### 2. *Amblyseius (Euseius) alstoniae* Gupta

1975. *Amblyseius alstoniae* Gupta, *Internat. J. Acarol.* 1(2) : 31-32.

1986. *Amblyseius (Euseius) alstoniae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 74-76.

*Collection records* : 2 (F) Bhagabatpur island, ex. *Terminalia arjuna*, 18.10.2000.

*Distribution* : INDIA : Arunachal Pradesh, Assam, Nagaland, Manipur, Meghalaya, Tripura, Himachal Pradesh, Bihar, West Bengal, Orissa, Punjab, Gujarat, Uttar Pradesh, Andhra Pradesh, Karnataka, Kerala,, Pondicherry, Tamil Nadu, Andaman-Nicobar Isls.

### 3. *Amblyseius (Euseius) ovalis* (Evans)

1953. *Typhlodromus ovalis* Evans, *Ann. Mag. nat. Hist.*, 6 : 458-461.

1986. *Amblyseius (Euseius) ovalis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 92-94.

1987. *Amblyseius (Euseius) ovalis*, Gupta, *Rec. zool. Surv. India, Occ. Pap No. 95*, p. 27-28.

*Collection records* : 3 (F), 7 (M), Namkhana, ex. china rose, 25.9.2000; 3 (F), Bhagabatpur island, ex. betel vine, 18.10.2000; 7 (F), 1 (M), Chandanpiri, ex. chili, 20.10.2000.

*Distribution* : INDIA : Arunachal Pradesh, Assam, Nagaland, Manipur, Meghalaya, Tripura, Bihar, West Bengal, Orissa, Himachal Pradesh, Punjab, Gujarat, Uttar Pradesh, Karnataka, Kerala, Pondicherry, Andhra Pradesh Tamil Nadu, Andaman-Nicobar Isls.

### 4. *Amblyseius (Euseius) coccineae* Gupta

1975. *Amblyseius coccineae* Gupta, *Internat. J. Acarol.*, 1(2) : 33.

1986. *Amblyseius (Euseius) coccineae*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 78-80.

*Collection records* : 4 (F), 1 (M) Namkhana, ex. *Mangifera indica*, 25.9.2000.

*Distribution* : INDIA : Meghalaya, West Bengal, Bihar, Orissa, Madhya Pradesh, Gujarat, Uttar Pradesh, Punjab, Himachal Pradesh, Jammu & Kashmir, Andhra Pradesh, Pondicherry, Tamil Nadu.

*Remarks* : This is another very important predatory species and a voracious feeder of *Tetranychid* mite. In the present study, it was found to feed on all stages of *Oligonychus mangiferus* infesting mango tree.

### 5. *Amblyseius (Euseius) pruni* Gupta

1986. *Amblyseius (Euseius) pruni*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 94-96.

*Collection records* : 3 (F), 2 (M), Bamankhali, Sagar Island, ex. Chalta, 15.11.2000.

*Distribution* : INDIA : Assam, Meghalaya, Tripura, West Bengal, Himachal Pradesh, Jammu & Kashmir.

*Remarks* : This was found feeding upon *Eotetranychus* sp. infesting Chalta tree. It mostly attacked nymphs and adults.

### Subgenus *Neoseiulus* Hughes

1948. *Neoseiulus* Hughes, *The mites associated with stored food products. Minst. Fish. Food. London. H.M. Stationary Office*, p. 141.

1986. *Neoseiulus* Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 100.

### 6. *Amblyseius (Neoseiulus) fallacis* (Garman)

1948. *Iphidulus fallacis* Garman, *Bull. Conn. Agr. Exp. Sta.*, **520** : 13.  
 1958. *Amblyseius fallacis*, Athias-Henriot, *Bull. Soc. Hist. nat. Afr. Nord.*, **49** : 34.  
 1986. *Amblyseius (Neoseiulus) fallacis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 109-111.

*Collection records* : 7 (F), 1 (M), Bhagabatpur Island, ex. *Oryza sativa*, 18.10.2000; 3 (F), Chandanpiri, ex. *Tarminalia arjuna*, Mehagini, 20.10.2000; 5 (F), Gosaba, ex. *Oryza sativa*, 8.11.2000.

*Distribution* : INDIA : Assam, Meghalaya, Tripura, West Bengal, Bihar, Himachal Pradesh, Jammu & Kashmir, Punjab, Tamil Nadu, *Elsewhere* : Algeria, Australia, North and Central America, Canada, Caribbean Isls.

*Remarks* : This mite was found to feed effectively on all the stages of *Schizotetranychus andropogoni* and an undetermined species of *Steneotarsonemus* sp. infesting paddy. This appears to be a good biocontrolling agent of paddy mites. The earlier reports also confirm this observation.

### Subgenus *Paraphytoseius* Swirski & Shechter

1961. *Paraphytoseius* Swirski & Shechter, *Israel J. agric. Res.*, **11** : 113.  
 1986. *Paraphytoseius*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 122.

### 7. *Amblyseius (Paraphytoseius) multidentatus* (Swirski & Shechter)

1960. *Typhlodromus (Amblyseius) orientalis* Narayanan, Kaur & Ghai, *Proc. Nat. Inst. Sci.*, **26B(6)** : 394.  
 1986. *Amblyseius (Paraphytoseius) multidentatus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 123-126.

*Collection records* : 2 (F), 1 (M), Sajnakhali, ex. Sundari (*Heritiera fomes*), Garjan (*Rhizophora* sp.), 8.11.2001; 1 (F), Gosaba, ex. papaya, 8.11.2001.

*Distribution* : Arunachal Pradesh, Assam, Manipur, Nagaland, West Bengal, Orissa, Bihar, Gujarat, Himachal Pradesh, Punjab, Andaman Nicobar Isls.

*Remarks* : Though it is a very important predatory species and occurs on mostly vegetables (Brinjal) but in the present study this species appeared to be scarce.

### Genus 2. *Indoseiulus* Ehara

1969. *Indoseius* Ghai & Menon, *Oriental Ins.*, **3** : 348.  
 1982. *Indoseiulus* Ehara, *Appl. ent. Zool.*, **17** : 42-43.

### 8. *Indoseiulus ricini* (Ghai & Menon)

1969. *Indoseiulus ricini*, Ghai & Menon, *Oriental Ins.*, **3** : 348.

1986. *Indoseiulus ricini*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 195-196.

*Collection records* : 3(F), Sajnakhali, ex. *Avicennia alba*, 8.11.2001.

*Distribution* : INDIA : Arunachal Pradesh, West Bengal, Bihar, Himachal Pradesh, Delhi, Gujarat, Uttar Pradesh, Tamil Nadu.

*Remarks* : This is a very voracious feeder of Tetranychid mites but in the present study such behaviour of this species was not recorded as because the host was free of Tetranychid mites.

### Genus 3. *Iphiseius* Berlese

1916. *Iphiseius* Berlese, *Redia*, **12** : 33.

1921. *Iphiseius*, Berlese, *Redia*, **14** : 95.

### 9. *Iphiseius andamanicus* Gupta

1980. *Iphiseius andamanicus* Gupta, *Entomologists' mon. Mag.*, **115** : 213-214.

1986. *Iphiseius (Iphiseius) andamanicus*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 198-200.

*Collection records* : 1(F), Sajnakhali, ex. Banana, 8.11.2001; 2(F), Lothian Island, ex. *Acanthus* sp. and *Avicennia alba*, 26.1.2002.

*Distribution* : INDIA : West Bengal, Karnataka, Andaman and Nicobar Isls.

### Subfamily PHYTOSEIINAE Berlese

1916. Phytoseiinae Berlese, *Redia*, **112** : 11.

1961. Phytoseiinae, Muma, *Bull. Fla. St. Mus.*, **5(7)** : 292.

### Genus 4. *Phytoseius* Ribaga

1904. *Phytoseius* Ribaga, *Riv. Path. Veg.*, **10** : 177.

1951. *Phytoseius* Nesbitt, *Zool. Verh.*, **12** : 16.

### Subgenus *Pennaseius* Pritchard & Baker

1962. *Pennaseius* Pritchard & Baker, *Hilgardia*, **33** : 223.

### 10. *Phytoseius (Pennaseius) kapuri* Gupta

1969. *Phytoseius (Pennaseius) kapuri* Gupta, *Israel J. agric. Res.*, **19** : 115-117.

1986. *Phytoseius (Pennaseius) kapuri*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 221-223.

*Collection records* : 3 (F), Chemaguri, ex. brinjal, 15.9.2000; 7 (F), Chandanpiri, ex. *Terminalia arjuna*, 20.10.2000.

*Distribution* : INDIA : Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, West Bengal, Bihar, Orissa, Himachal Pradesh, Punjab, Gujarat, Uttar Pradesh, Andhra Pradesh, Pondicherry, Tamil Nadu, Karnataka, Kerala, Andaman and Nicobar Isls.

### *Phytoseius* Ribaga

1904. *Phytoseius* Ribaga, *Riv. Path. Veg.*, **10** : 177.

#### 11. *Phytoseius (Phytoseius) corniger* Wainstein

1959. *Phytoseius (Dubininellus) corniger* Wainstein, *Zool. Zh. Ukr.*, **38** : 1362-1364.

1986. *Phytoseius (Phytoseius) corniger*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 230-232.

*Collection records* : 2 (F), Sagar Island, Bamankhali, ex. *Tabernaemontana coronaria*, brinjal, 5.8.2000.

*Distribution* : INDIA : West Bengal. *Elsewhere* : Pakistan, U.S.S.R.

#### 12. *Phytoseius (Phytoseius) macropilis* (Banks)

1909. *Sejus macropilis* Banks, *Proc. Ent. Soc. Wash.*, **11** : 135.

1986. *Phytoseius (Phytoseius) macropilis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 240-242.

*Collection records* : 2 (F), 1 (M) Bamankhali, Sagar Island, ex. brinjal, *Avicennia* sp., 5.8.2000.

*Distribution* : INDIA : Arunachal Pradesh, Orissa, West Bengal, Delhi. *Elsewhere* : Caribbean Isls., Mexico, British West Indis, Panama canal zone, U.S.A., U.S.S.R., U.K., Australia, Canary Isls., New Burnswick.

#### 13. *Phytoseius (Phytoseius) indicus* Bhattacharyya

1969. *Phytoseius (Phytoseius) indicus* Bhattacharyya, *J. Bom. Nat. Hist. Soc.*, **65**(3) : 679-680.

*Collection records* : 1 (F), Bhagabatpur Isls., ex. banana, 17.10.2000.

*Distribution* : INDIA : West Bengal.

#### 14. *Phytoseius (Phytoseius)* sp.

*Collection records* : 6 (F), Chandanpiri, ex. guava, 17.10.2000.

Genus 5. *Typhlodromus* Scheuten

1857. *Typhlodromus* Scheuten, *Arch. Naturges*, **23** : 111.

15. *Typhlodromus (Amblydromella) homalii* Gupta

1970. *Typhlodromus homalii* Gupta, *Oriental Ins.*, **4** : 188-189.

1986. *Typhlodromus (Amblydromella) homalii*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 278-280.

*Collection records* : 2 (F), 1 (M), Sajnakhali, ex. *Xylocarpus* sp., 8.11.2001.

*Distribution* : INDIA : West Bengal, Himachal Pradesh, Punjab, Rajasthan.

16. *Typhlodromus (Typhlodromus) communis* Gupta

1980. *Typhlodromus communis* Gupta, *Entomologists' mon. Mag.*, **115** : 209.

1986. *Typhlodromus (Typhlodromus) communis*, Gupta, *Fauna of India (Acari : Mesostigmata) Family Phytoseiidae*, p. 316-318.

*Collection records* : 1 (F), Bhagabatpur, ex. brinjal, 17.10.2000.

*Distribution* : INDIA : West Bengal, Arunachal Pradesh, Karnataka, Tamil Nadu.

## Family II ASCIDAE Voigts &amp; Oudemans

1979. Ascidae Voights & Oudemans, In : *Evans & Till, Trans. Zool. Soc. Lond.*, **135** : 196.

Key to the Genera of *Ascidae* known to occur in SBR

1. Corniculi slender, approximating, rows of hypognathal denticles narrow, each with few denticles, female with humeral setae ( $r_3$ ), lying off holodorsal shield ..... *Blattisocius*
- Corniculi of normal length, well separated, parallel rows of hypognathal denticles wider, multidenticulate, females with humeral setae ( $r_3$ ) situated on dorsal shield\*

\* Adult with 3–9 pairs of R setae on membrane lateral to holodorsal shield, male with sternogenital and ventroanal shields, genu II with 8 or 9 setae ..... *Lasioseius*

Genus 6. *Lasioseius* Berlese

1916. *Lasioseius* Berlese, *Redia*, **12** : 34.

1963. *Lasioseius*, Chant, *Can. J. Zool.*, **41** : 272.

17. *Lasioseius mcgregori* Chant

1963. *Lasioseius mcgregori* Chant, *Can. J. Zool.*, **41** : 276.

1999. *Lasioseius mcgregori*, Dhooria, *J. Acarol.*, **14** : 88-89.



*Collection records* : 2 (F), West Bengal, Gosaba, Tagore Society Agricultural Farm, ex. coconut and *Hibiscus rosa-sinensis*, 8.11.2001.

*Distribution* : INDIA : West Bengal, Punjab. *Elsewhere* : U.S.A.

Genus 7. *Blattisocius* Keegan

1944. *Blattisocius* Keegan, *J. Parasitol.*, 30 : 181.

18. *Blattisocius keegani* Fox

1961. *Blattisocius keegani* Fox, 1947, Hughes, *The mites of stored food and houses*, London, p. 328-329.

*Collection records* : 3 (F), Sajnekhali, ex. *Rhizophora* sp., *Heritiera* sp., 8.11.2001.

*Distribution* : INDIA : West Bengal. *Elsewhere* : Poland, Mexico, South America, U.S.A. Hawaii, Malayasia, West Africa, Isreal.

Family III TYDEIDAE Karmer

1877. Tydeidae Karmer, *Naturg.*, 43 : 232, 246.

Key to the Genera of Tydeidae known to occur in SBR

1. Femora III & IV each with a prominent forked setae ..... *Parapronematus*  
– Setae normal on femora III & IV ..... *Pronematus*

Genus 8. *Parapronematus* Baker

1965. *Parapronematus* Baker, *Advances in Acarology*, 2 : 115-116.

19. *Parapronematus* sp.

*Collection records* : 6 (F), Chandanpiri, ex. *Citrus*, Ladys' finger, 17.10.2000.

Genus 9. *Pronematus* Canestrini

1886. *Pronematus* Canestrini, *Att. 1<sup>a</sup> Veneto, Sev.*, 6, 4 : 698.

1965. *Pronematus*, Baker, In : *Advances in Acarology*, 2 : 114.

20. *Pronematus fleschneri* Baker

1962. *Pronematus fleschneri* Baker, *Ann. Ent. Soc. Amer.* 61 : 1092-1093.

1974. *Pronematus fleschneri*, Gupta & Dhooori, *Proc. Ind. Sci. Congr.*, 16 : 69.

*Collection records* : 1 (F), Bamankhali, ex. *Avicennia alba*, 5.8.2000.

*Distribution* : INDIA : Tripura, Sikkim, West Bengal, Bihar, Delhi, Punjab, Uttar Pradesh, Andaman Nicobar Isls.

21. *Pronematus* sp.

*Collection records* : 1 (F), Bamankhali, ex. papaya, 5.8.2000; 6 (F), Chandanpiri, ex. brinjal, papaya, 17.10.2000.

## Family IV BDELLIDAE Duges

1834. Bdellei Duges, *Ann. Sci. nat.* 8(2) : 1(Zool) : 21.

1959. Bdellidae, Meyer & Ryke, *Ann. Mag. nat. Hist.*, (13)2 : 372.

Genus 10. *Bdella* Latreille

1765. *Bdella* Latreille, *Magasin encyclopedique on journal des lettres et des Arts. Paris*, Vol. 4 : 18.

22. *Bdella maldahensis* Gupta

1992. *Bdella maldahensis* Gupta, In : *State Fauna Series 3, Fauna of West Bengal, Part-3*, p. 12.

1999. *Bdella maldahensis*, Gupta & Chatterjee, *Sci. & Cult.*, 65 : 161.

*Collection records* : 1 (F), Bamankhali, ex. Cashew nut, 5.8.2000; 2 (F), Chemaguri, ex. papaya, 25.9.2000; 1 (M), Lothian Isls., ex. banana, 17.10.2000.

*Distribution* : INDIA : West Bengal.

## Family V CUNAXIDAE Thor

1902. Cunaxidae Thor, *Verh. Zool. Bot. Ges. Wien.*, 159-164.

1992. Cunaxidae, Smiley, In : *Cunaxidae of the World*. p. 21.

Genus 11. *Cunaxa* Von Heyden

1826. *Cunaxa* Von Heyden, *ISIS of Oken*, 18(6) : 609.

1992. *Cunaxa* Smiley, In : *Cunaxidae of the World*, p. 153.

**Key to the species of *Cunaxa* known to occur in SBR**

1. Propodosomal shield smooth\*

\* Spine like setae on palp tibiotarsus long and slender ..... *cynodonae*

– Propodosomal shield reticulate/striate\*\*

\*\* Telofemur inner surface with elongate apophysis and dorso median simple setae. *setirostris*

23. *Cunaxa cynodonae* Gupta & Ghose

1980. *Cunaxa cynodonae* Gupta & Ghose, *Rec. zool. Surv. India*, 77 : 196-198.

1992. *Cunaxa cynodonae*, Smiley, In : *Cunaxidae of the World*, p. 166-167.

*Collection records* : 2 (F), 1 (M), Sajnakhali, ex. coconut, cashwe nut, 8.11.2001.

*Distribution* : INDIA : West Bengal, Andaman and Nicobar Islands.

#### 24. *Cunaxa setirostris* Hermann

1804. *Scirus setirostris* Hermann, *Apterologique*, p. 60-62.

1826. *Cunaxa setirostris*, Von Heyden, In : *ISIS of Oken*, 18(6) : 608.

1999. *Cunaxa setirostris*, Gupta & Chatterjee, *Sci. & Cult.*, 65(5-6) : 161.

*Collection records* : 1 (F), Bamankhali, ex. brinjal, 18.8.2000; 1 (M), Lothian Isls., ex. *Avicennia alba*, 17.10.2000.

*Distribution* : INDIA : Arunachal Pradesh, West Bengal, Tripura, Sikkim, Punjab, Andaman Isls., Lakshadwip Isls. *Elsewhere* : Cosmopolitan.

#### Family VI. STIGMAEIDAE Oudemans

1931. Stigmaeidae Oudemans, *Ent. Ber.*, 7(158) : 252.

1992. Stigmaeidae Gupta, In : *State Fauna Series 3, Fauna of West Bengal, Part-3*, p. 117.

#### Genus 12. *Agistemus* Summers

1960. *Agistemus* Summers, *Proc. Ent. Soc. Wash.*, 62 : 234.

#### 25. *Agistemus industani* Gonzalez-Rodriguez

1965. *Agistemus industani* Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, 41 : 40.

1991. *Agistemus industani*, Gupta, *Rec. zool. Surv. India*, 81 : 215.

*Collection records* : 1 (F), Sagar Island, Bamankhali, ex. chilli, 8.8.2000.

*Distribution* : INDIA : Arunachal Pradesh, Mizoram, Nagaland, U. P., Punjab, Tamil Nadu, Karnataka.

*Remarks* : Rai & Singh (1999) reported this as an important predator feeding voraciously on eggs of *Tetranychus ludeni* and they also studied its biology. In the present study, the predatory behaviour of this species was not noticed in the field.

#### Family VII. EUPODIDAE Koch

1842. Eupodidae Koch, *Hept.*, 1-40.

1991. Eupodidae Gupta, *Rec. zool. Surv. India*, 88 : 237.

#### Genus 13. *Eupodes* Koch

1842. *Eupodes* Koch, *Hept.*, 1-40.

1934. *Eupodes*, Thor, *Das. Tierreich.*, 71 : 541.

1992. *Eupodes*, Gupta, In : *State Fauna Series 3, Fauna of West Bengal, Part-3*, p. 144.

### 26. *Eupodes sigmoidensis* Strandtmann & Goff

1978. *Eupodes sigmoidensis* Strandtmann & Goff, *Pacific insects*, **19** : 123-124.

1992. *Eupodes sigmoidensis*, Gupta, In : *State Fauna Series 3, Fauna of West Bengal, Part-3*, p. 144.

*Collection records* : 1 (F), 1 (M), Bamankhali, Sagar Island, ex. chili, betel vine, 14.12.2000.

*Distribution* : INDIA : Sikkim, Mizoram, West Bengal, Lakshadwip Isls.

### Family VIII. CHEYLETIDAE Leach

1815. Cheyletidae Leach, *Trans. Linn. Soc. Lond.*, **11** : 399.

1970. Cheyletidae, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 1-153.

1997. Cheyletidae, Gupta & Chatterjee, In : *State Fauna Series 6, Fauna of Delhi*, p. 516-517.

### Genus 14. *Cheletogenes* Oudemans

1905. *Cheletogenes* Oudemans, *Ent. Ber. Nad. Ver.*, **1(21)** : 208.

1970. *Cheletogenes*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 53.

### 27. *Cheletogenes ornatus* (Canestrini & Fanzago)

1878. *Cheyletus ornatus* Canestrini & Fanzago, *Atti. Soc. Vent. Trentene.*, p. 106.

1941. *Cheletogenes ornatus*, Womersley, *Rec. S. Aust. Mus.*, **7(1)** : 85.

1985. *Cheletogenes ornatus*, Gupta, *Handbk. Plant mites of India*, p. 300.

1997. *Cheletogenes ornatus*, Gupta & Chatterjee, In : *State Fauna Series 6, Fauna of Delhi*, p. 516-517.

*Collection records* : 4 (F), Sajnakhali, ex. mango, banana, 8.11.2001.

*Distribution* : INDIA : West Bengal, Uttar Pradesh, Delhi, Rajasthan, Cosmopolitan.

*Remarks* : Narayanan *et al.*, 1960 and Sharma & Kushwaha, 1983 reported this mite feeding upon mango bud mite, ber gall mite, respectively, and the latter workers studied the bioecology of this species. In the present study no predatory behavior of this species was noticed in the field.

### Family IX. ERYTHRAEIDAE Robineau-Desvoidy

1828. Erythraeidae Robineau-Desvoidy, *K.H.O.A.*, **IIID** : 144.

1970. Erythraeidae, Meyer, *Koedoe*, **13** : 32.

### Genus 15. *Sphaerolophus* Berlese

1885. *Rhyncholophus* Berlese, *AMS.*, **18** : 7.

1914. *Sphaerolophus*, Oudemans, *ARC. Naturgesch.*, **79A** : 1.

### 28. *Sphaerolophus gigas* Khot

1965. *Sphaerolophus (Cavannae) gigas* Khot, *Acarologia*, 7 : 64.

1997. *Sphaerolophus gigas*, Gupta & Chatterjee, In : *State Fauna Series 6, Fauna of Delhi*, p. 520.

*Collection records* : 2 (F), 1 (M), Sajnakhali, Sundarban, ex. *Rhizophora* sp. and *Heritiera* sp., 8.11.2001.

*Distribution* : INDIA : Delhi, West Bengal.

### SUMMARY

This paper provides for the first time a detailed taxonomic account of 28 species under 15 genera and 9 families of predatory mites occurring on mangrove and agri-horticultural crops of Sundarbans Biosphere Reserve (SBR), among these the occurrence of 18 species are reported for the first time in SBR. This includes 6 species found to be voracious feeders of phytophagous mites and were abundantly available indicating that their conservation and proper utilisation may prove to be profitable in biological control.

### ACKNOWLEDGEMENTS

The authors are thankful to the Ministry of Environment & Forests, Govt. of India for financing this project. Thanks are also due to Sri Yogindra Chourasia, former research fellow of this project as well as to Sri Amal Kumar Patra, Asish Jana and Nitish Jana of the SDMBRI, Sagar Islands, for assisting in collection of mites.

### REFERENCES

- Gupta, S. K., Ghoshal, S. & Choudhury, A. 2003. Phytophagous and predatory mite fauna of Sundarban Biosphere Reserve : I. some Phytophagous mites occurring on mangrove vegetation and agri-horticultural crops : *Rec. zool. Surv. India*, 101(3-4) : 69-79.
- Narayanan, E. S., Kaur, R. B. & Ghai, S. 1960. Importance of some taxonomic characters in the family Phytoseiidae Berl., 1916 (Predatory mites) with new records and descriptions of species. *Proc. Natn. Inst. Sci. India*, 26(B) : 384-394.
- Rai, S. N. & Singh, J. 1999. Biology of *Agistemus industani* (Acari : Stigmaeidae), an efficient predator of *Tetranychus ludeni* on mulberry. *J. Acarol.* 14(1-2) : 4-7.
- Sharma, A. & Kushwaha, K. S. 1983. Some plant mites of agricultural importance in Rajasthan, Abst. II<sup>nd</sup> All India Symp. Acarology. Puna. p. 19.