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RECORDS OF SOIL INHABITING ORIBATID MITES (ACARI : ORIBATEI) IN THE SUNDARBAN DELTA OF WEST BENGAL, INDIA

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INTRODUCTION

Oribatid or Cryptostigmatial mites commonly called as 'beetle' or 'moss' mites appear to be predominant among the commonly soil inhabiting arthropods. These mites occur in soil, litter, humus and compost heaps. They are also found to inhabit other habitats like tree trunks, moss, lichens, etc. Oribatids are known to take active part in decomposition of organic matter promoting soil fertility. They also disseminate plant diseases mainly root rots and fungal diseases and also act as intermediate hosts of tapeworms of domestic ruminants.

Inspite of the richness and variety of soils in India, the studies so far done on this group of mites are not sufficient. However, the status of oribatid mite in West Bengal has been studied by a number of workers, but the deltaic region of the state has not yet been explored thoroughly. The present author collected soil dwelling oribatid mites from different parts of deltaic area of South 24-Parganas, West Bengal during 1977-1978. A part of collections were then studied and 8 new species were described. In order to make a comprehensive idea about this tiny economically important soil fauna in an unique habit like deltaic areas dominated by mangroves, the present author wants to publish a consolidated report on oribatid fauna of the area with the idea that it would be a useful source of base-line data of nearly 30 years old to the present and future workers.

REVIEW OF THE STUDIES ON ORIBATED MITES OF SUNDARBAN DELTA OF WEST BENGAL

The study of oribatid mites of Gangetic delta of South 24-Parganas was started by the present author during 1977-'78. Sanyal & Bhaduri (1981) first described one new species *Atropacarus* (*Hoplophorella*) *sundarbanensis* from the area. Later 5 species *viz*., *Brachioppia ananthakrishni, Multioppia simplitricha, Oppia orientalis and Oppia remisetosa* were describe as new to science by Sanyal & Bhaduri (1985). Sanyal (1992) again described 3 new species under the genus

Schcloribates namely *bhadurii, indicus* and *rakhali*. The same publication also recorded few known species from the area.

MATERIAL AND METHODS

Oribatid mites were extracted from samples mainly litter, soil and humus collected from all possible habitats in different localities in the deltaic region of South 24-Parganas, West Bengal during 1977-1978. For defails about collection and extraction of samples, preparation of specimens prior to identification and identification of specimens Sanyal (1992, 2000) may be consulted.

LOCALITIES SURVEVED

The present study included oribatid fauna from the litter, soil and humus samples collected from different plots in six localities namely Sagar Island, Kakdwip, Diamond Harbour, Bakkhali, Frazerganj and Namkhana at Sundarban delta, West Bengal [Fig. 1].

The dominant vegetation in the six localities were, *Acanthus illicifolius* Linn., *Hemigraphis hirta* Linn., *Nelsonia campestris* R. Br. (Acanthaceae); *Tylophora indica* Merr. (Asclepiadaceae); *Croton sparciflorus* Morung., *Excoecaria agallocha* Linn., *Jatropha* sp. (Euphorbiaceae); *Brachiaria* sp., *Cynodon dactylon* Pers., *Echinochloa colona* Link., *Paspalidium punctatum* Staff. (Gramineae); *Azadirachta indica* A. Juss. (Meliaceae); *Phoenix sylvestris* Roxb. (Palmae); *Cayrotia carnosa* Gegnep., *Cayrotia pedata* (Wall) Gegnep. (Vitaceae); *Acacia arabica* Willd. (Mimosae); *Clerodendron* inerme (L.) Gaertn. (Verbenaceae), etc.

LIST OF TAXA KNOWN FROM SUNDARBAN DELTA OF WEST BENGAL

*1. Family HYPOCHTHONIIDAE Berlese, 1910

*1. Genus ***Hypochthonius*** Koch, 1835

*1. *Hypochthonius* sp.

*2. Family MESOPLOPHORIDAE Ewing, 1917

*2. Genus ***Mesoplophora*** Berlese, 1904

*2. *M. pectinata* Mahuska, 1979

*3. Family COSMOCHTHONIIDAE Grandjean, 1947

*3. Genus ***Cosmochthonius*** Berlese, 1910

*3. *C. bengalensis* Chakraborty, Bhaduri and Raychaudhuri, 1972

4. Genus ***Phyllozetes*** Gordeeva, 1978

4. *P. heterotrichus* Sanyal & Bhaduri, 1983

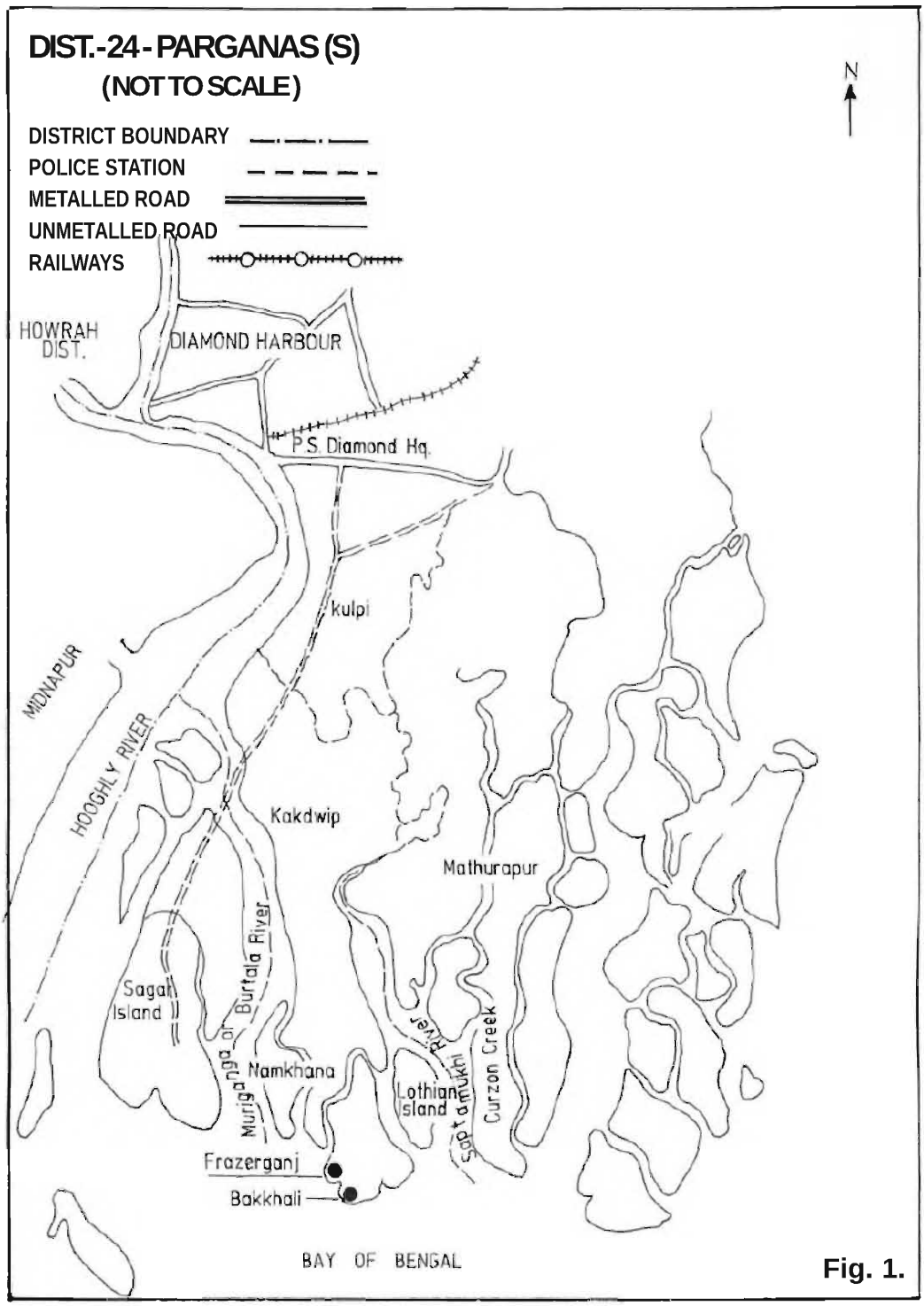
DIST.-24-PARGANAS (S)
(NOT TO SCALE)
N
DISTRICT BOUNDARY
POLICE STATION
METALLED ROAD
UNMETALLED ROAD
RAILWAYS
HOWRAH DIST.
DIAMOND HARBOUR
P.S. Diamond Hq.
kulpi
MIDNAPUR
HOOGHLY RIVER
Kakdwip
Mathurapur
Sagar Island
Muriganga or Burtala River
Namkhana
Lothian Island
Saptamukhi River
Curzon Creek
Frazerganj
Bakkhali
BAY OF BENGAL

Fig. 1.

4. Family HAPLOCHTHONIIDAE Hammer, 1959

5. Genus ***Haplochthonius*** Willmann, 1930

5. *H. intermedius* Chakraborty, Bhaduri & Raychaudhuri, 1977

5. Family PHTHIRACARIDAE Perty, 1841

6. Genus ***Atropacarus* (*Hoplophorella*)** Niedbala, 1986

6. *A.* (*Hoplophorella*) *scapellatus* (Aoki, 1965)

7. *A.* (*Hoplophorella*) *sundarbanensis* Sanyal & Bhaduri, 1981

6. Family EUPHTHIRACARIDAE Jacot, 1930

7. Genus ***Rhysotritia*** Markel and Meyer, 1959

8. *R. ardua* var. *otaheitensis* Hammer, 1972

7. Family LOHMANIIDAE Berlese, 1916

8. Genus ***Cryptacarus*** Grandjean, 1950

9. *C. tuberculatus* Csiszar, 1961

*9. Genus ***Haplacarus*** Wallwork, 1962

*10. *Haplacarus foliatus bengalensis* Bhattacharya *et al*., 1974

*8. Family EPILOHMANNIIDAE Oudemans, 1923

*10. Genus ***Epilohmannia*** Berlese, 1916

*11. *E. pallida pacifica* Aoki, 1965

*9. Family TRHYPOCHTHONIIDAE Willmann, 1931

*11. Genus ***Allonothrus*** Hammer, 1953

*12. *A. indicus* Bhaduri & Raychaudhuri, 1968

*10. Family MALACONOTHRIDAE Berlese, 1916

*12. Genus ***Malaconothrus*** Berlese, 1906

*13. *M. geminus* Hammer, 1972

*11. Family BASILOBELBIDAE Balogh, 1961

*13. Genus ***Basilobelba*** Balogh, 1958

*14. *B. indica* Bhaduri, Chakraborti & Raychaudhuri, 1974

*12. Family CARABODIDAE Koch, 1837

*14. Genus ***Carabodes*** Koch, 1836

*15. *C. peniculatus* Aoki, 1970

*13. Family TECTOCEPHEIDAE Grandjean, 1954

*15. Genus ***Tectocepheus*** Berlese, 1913

*16. *T. velatus velatus* (Michael, 1888)

*14. Family OTOCEPHEIDAE Balogh, 1961

*16. Genus ***Dolicheremaeus*** Jacot, 1938

*17. *D. bengalensis* Sanyal, 1992

*18. *D. coronarius* Chakraborti, Bhadhuri & Kundu, 1981

15. Family OPPIIDAE Grandjean, 1954

17. Genus ***Brachioppia*** Hammer, 1961

19. *B. ananthakrishni* Sanyal & Bhaduri, 1985

18. Genus ***Multioppia*** Hammer, 1961

20. *M. simplitricha* Sanyal & Bhaduri, 1985

19. Genus ***Oppia*** Koch, 1836

21. *O. orientalis* Sanyal & Bhaduri, 1985

22. *O. ramisetosa* Sanyal & Bhaduri, 1985

23. *O. yodai* Aoki, 1965

*16. Family CHAUNOPROCTIDAE Balogh, 1961

*20. Genus ***Chaunoproctus*** Pearce, 1906

24. *C. abalai* Bhaduri, Bhattacharya & Raychaudhuri, 1975

*17. Family XYLOBATIDAE Balogh & Balogh, 1984

*21. Genus ***Xylobates*** Jacot, 1929

*25. *X. seminudus* Hammer, 1971

18. Family HAPLOZETIDAE Grandjean, 1936

22. Genus ***Haplozetes*** Willmann, 1935

26. *Haplozetes* sp.

23. Genus ***Lauritzenia*** Hammer, 1958

27. *L. longipluma* Hammer, 1958

19. Family SCHELORIBATIDAE Grandjean, 1953

24. Genus ***Euscheloribates*** Kunst, 1958

*28. *E. samsinaki* Kunst, 1958

25. Genus ***Scheloribates*** Berlese, 1908

29. *S. bhaduri* Sanyal, 1992
30. *S. natalensis* Pletzen, 1963
31. *S. indicus* Sanyal, 1992
32. *S. rakhali* Sanyal, 1992

20. Family AUSTRACHIPTERIIDAE Luxton, 1985

26. Genus ***Lamellobates*** Hammer, 1958

33. *L. palustris* Hammer, 1958

*27. Genus ***Paralamellobates*** Bhadhri & Raychoudhuri, 1968

*34. *P. bengalensis* Bhaduri & Raychoudhuri, 1968

21. Family GALUMNIDAE Jacot, 1925

28. Genus ***Galumna*** von Heyden, 1826

35. *G. crenata* Deb & Raychoudhuri, 1975
*36. *G. flabellifera orientalis* Aoki, 1965

*(Taxa with asterik mark is first record from Sundarban delta)

SYSTEMATIC ACCOUNT

Key to the families and genera of oribatid mites from Sundarban delta of West Bengal

1. Ptychoid body, propodosoma can be shut back against hysterosoma and ventral region like blade of penknife, generally laterally compressed body 2

— Body not ptychoid, propodosoma can not be shut back like blade of penknife; body not laterally compressed 4

2. Notogaster with 1–3 transverse sutures; anogenital region brachypylic i.e. genital and anal plates round and well developed ..... Mesoplophoridae Ewing — (i)

(i) Anal plates with two pairs of setae; genital setae arranged as 1 + 6 .... *Mesoplophora* Berlese

— Notogaster without transverse suture; anogenital region macropylic i.e. genital and anal plates meeting each other 3

3. Anogenital region narrow, ‘v’-shaped; body considerably compressed laterally .... Euphthiracaridae Jacot — (ii)

(ii) One interlocking triangle present in middle of anogenital region; notogaster not sculptured ..... *Rhysotritia* Markel and Meyer

— Anogenital region wide, almost 'v'-shaped; body only slightly compressed laterally ..... Phthiracaridae Perty — (iii)

(iii) Genital setae forming a row or almost a row, located near the paraxial margin, distance between g_6 and g_5 greater than that between g_5 and g_4 *Atropacarus* (*Hoplophorella*) Niedbala

4. Anogenital region of macropyline type; no ventral plate; tibia and genu of similar length and shape 5

— Anogenital region of brachypyline type; ventral plate present; tibia and genu of different length and shape 11

5. Notogaster with 1 or 3 transverse sutures 6

— Notogaster without transverse sutures 8

6. Notogaster with only one transverse suture ..... Hypochthoniidae Berlese — (iv)

(iv) Shoulder without tubercle; notogastral setae simple ..... *Hypochthonius* Koch

— Notogaster with 3–4 transverse sutures 7

7. Notogastral setal e_1, e_2, f_1, f_2 long and rigid, arising on the transverse sutures ..... Cosmochthoniidae Grandjean — (v)

(v) Notogaster subdivided by 3 transverse sutures into 4 shields; tarsal claw formula 2–3–3–3 ..... *Cosmochthonius* Berlese

— Notogaster subdivided by 4 transverse sutures into 5 shields; tarsal claw formula 2–2–2–3. ..... *Phyllozetes* Gordeeva

— All notogastral setae almost similar in length, not rigid, arising on the shields ..... Haplochthoniidae Hammen — (vi)

(vi) Notogaster with 3 sutures, with 4 shields; no preanal plate; rostral setae present ..... *Haplochthonius* Willmann

8. Body dichoid *i.e.*, articulation between legs II and III; preanal plate present ..... Lohmanniidae Berlese*

— Body holoid *i.e.* the body regions rigidhy coalesced; preanal plate absent 9

* Genital plates with transverse suture ..... (vii)

— Genital plates without transverse suture ..... (viii)

(vii) Anal and adanal plates separated; no long branched setae ..... *Cryptacarus* Grandjean

(viii) 5 pairs of setae in the ano-adanal plates ..... *Haplacarus* Wallwork

9. Three pairs of setae on epimere 3 10

10. Genital setae 4–14 pairs; adanal setae two pairs ..... Trhypochthoniidae Willmann — (ix)

(ix) Pentagonal notogaster; notogastral setae spatulate; 7–14 pairs of genital setae; legs tridactylous ..... *Allonothrus* Hammen

— Genital setae 4–6 pairs; adanal setae three pairs ..... Malaconothridae Berlese — (x)

(x) Notogaster largely parallel sided; legs monodactylous ..... *Malaconothrus* Berlese

11. Notogaster pycnonotic i.e. ototaxic organs absent; usually pteromorphae absent 12

— Notogaster poronotic *i.e.*, areae porosae, sacculi or pori absent; pteromorphae usually present 20

12. Anogenital plate schizogastric type; 14 pairs of notogartral setae ..... Epilohmanniidae Oudemans — (xi)

(xi) Transverse line between genital and anal plates; genital plates usually with more than 7 pairs of setae ..... *Epilohmannia* Berlese

— Ventral plate hologastric type 13

13. Prodorsum having lamellae 14

— Prodorsum without true lamellae; either thin crest-shaped lamellae or thin costulae present or both lamellae and costulae absent 16

14. Translamella present, dorsosejugal suture absent or incomplete 15

Ttanslamella often absent; dorsosejugal suture complete; lamellae with short cuspides ..... Carabodidae Koch — (xiv)

15. Dorrosejugal suture absent; lamellae with relatively long cuspides; lamellar—interlamellar complex 'N'-shaped ..... Tectocepheidae Grandjean — (xii)

(xii) Lamellae wide; notogaster with 10 pairs of setae; genital setae 6 pairs; humeral appendages horizontal; legs monodactyle ..... *Tectocepheus* Berlese

— Dorsosejugul suture incomplete in the middle; lamellae with short cuspides; no 'N'-shaped complex ..... Chaunoproctidae Pearce — (xiii)

(xiii) Lamellae and translamella present; notoguster with 10 pairs of setae; genital setae 6 pairs; legs tridactylous ..... *Chaunoproctus* Pearce

(xiv) 10 pairs of notogastral setae; notogaster without tubercle ..... *Carabodes* Koch

16. Ventral neotrichy present, more than 4 pairs of aggenital + adanal setae 17

— Ventral neotrichy absent 18

17. Exuvia or atleast tritonymphal exuvia affixed to one tubercle on notogaster ..... Basilobelbidae Balogh — (xv)

(xv) Mandibles normal; rostrum not pointed; aggenital setae 5 pairs; adanal setae 5 pairs ... *Basilobelba* Balogh

18. Body elongate, mostly at least twice longer than wide; prodorsal and notogastral condyles present; notogastral setae 10–14 pairs ..... Otocepheidae Balogh — (xvi)

(xvi) Pedotecta 2 + 3 distinct but not so conspicuously developed; genital plates with 4 pairs of setae; anal plates with 2 pairs of setae ..... *Dolicheremaeus* Jacot

— Body not elongate, mostly never twice as long as wide 19

19. Chelicera normal; prodorsum without tectopodial fields and lamellar knob .... Oppiidae Grandjean — (xvii)

(xvii) Sensillus unbranched, club-shaped or faintly globular, head may be terminated in pointed tip sometimes with 1–2 long seta-like processes; rostral setae smooth or may be minutely ciliated ..... *Oppia* Koch

— Sensillus branched, branches radiating from the posterior border of the compressed clavate head; rostral setae feathered ..... (xviii)

(xviii) 10 pairs of nongastral setae; pore *iad* usually placed obliquely to the anal field .... *Brachioppia* Hammer

— 13 pairs of notogastral setae; pore *iad* usually placed parallel to the anal field .... *Multioppia* Hammer

20. Pteromorphae movable, articulate or semicircular; prodorsum without true projecting lamellae; some chitinous lines on the prodorsum ..... Galumnidae Jacot — (xix)

(xix) Lamellar setae placed between lines *L* and *S* ..... *Galumna* Heyden

— Pteromorphae immovable but not articulate, sometimes absent 21

21. Prodorsum with tulorium; lamellae broad, sometimes synlamella type .... Austrachipteriidae Luxton — (xx)

(xx) Interlamellar area small; lamellae without free tips ..... *Lamellobates* Hammer

— Interlamellar area large; lamellae with free tips .... *Paralamellobates* Bhaduri and Raychoudhuri

Prodorsum without tutorium; usually 3–5 pairs of genital setae (exceptionally 6 pairs) 22

22. Notogaster with true areae porosae 23

— True areae porosae absent, notogaster with secculi or pori 24

23. Sensillus long, reclinate, setiform, often slightly lanceolate at its tip .... Xylobatidae Balogh and Balogh — (xxi)

(xxi) Notogaster with 10–11 pairs of setae or alveoli; 4–6 pairs of genital setae; sensillus not pilose; legs monodactylous ..... *Xylobates* Jacot

24. Pteromorphae movable, hinged ..... Haplozetidae Grandjean — (xxii)

(xxii) Interlamellur setae not originating on dorsosejugal suture; notogastral setae distinct .. .. *Lauritzenia* Hammer

— Interlamellar setue originating on dorsosejugal suture; notogastral setae hardly discernible . ..... *Haplozetes* Willmann

— Pteromorphae immovable or absent ..... Scheloribatidae Grandjean — (xxiii)

(xxiii) 3 pairs of genital setae ..... *Euscheloribates* Kunst

— 4 pairs of genital setae ..... *Scheloribates* Berlese

1. Family HYPOCHTHONIIDAE Berlese, 1910

1. Genus ***Hypochthonius*** Koch

1836. *Hypochthonius* Koch, Deutschlands Crustaceen, Myriapoden und Arachniden, 1-9.

1. ***Hypochthonius*** sp.

Material examined : 5♂♂, Bakkhali, 26.i.1977, from soil, coll. A. K. Sanyal; 7♂♂, Frazergunj, 15.ii.1977, from litter, call. A. K. Sanyal; 2♂♂, Namkhana, 30.vi.1978.

Remarks : The specimens seem to be new species but could not be identified upto species level due to non availibility of sufficient literature.

2. Family MESOPLOPHORIDAE Ewing, 1917

2. Genus ***Mesoplophora*** Berlese

1904. *Mesoplophora* Berlese, *Redia*, **2** : 23.

1979. *Mesoplophora pectinata* Mahunka, *Revue Suisse Zool.*, **86**(2) : 551.

Material examined : 3♂♂, Namkhana, 22.ii.1977, from soil, coll. A. K. Sanyal; 2♂♂, Sagar Island, 10.i.1977, from litter and soil, coll. A. K. Sanyal; 5♂♂, Bakkali, 10.viii.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : Tripura.

3. Family COSMOCHTHONIIDAE Grandjean, 1947

3. Genus ***Cosmochthonius*** Berlese

1910. *Cosmochthonius* Berlese, *Redia*, **6**(2) : 218.

3. ***Cosmochthonius bengalensis*** Chakrabarti, Bhaduri and Raychoudhuri

1972. *Cosmochthonius bengalensis* Chakrabarti, Bhaduri and Raychaudhuri, *Acta Arachnol.*, **24**(2) : 86.

Material examined : 2♂♂, Frazergunj, 17.i.1977, from litter and soil, coll. A. K. Sanyal; 4♂♂, Kakdwip, 12.iv.1977, 1♂, Namkhana, 10.viii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

4. Genus ***Phyllozetes*** Gordeeva

1978. *Phyllozetes* Gordeeva, *Zool. Zh.*, **57** : 1099.

4. ***Phyllozetes heterotrichus*** Sanyal and Bhaduri

1983. *Trichthonius heterotrichus* Sanyal and Bhaduri, *Acarologia*, **24**(2) : 219.

Material examined : 3♂♂, Sagar Island, 8.ii.1977, from humus, coll. A. K. Sanyal; 2♂♂, Frazergunj, 10.viii.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

4. Family HAPLOCHTHONIIDAE Hammen, 1959

5. Genus ***Haplochthonius*** Willmann

1930. *Haplochthonius* Willmann, *Abh. naturw. ver. Bremen.*, **28**(1) : 2.

5. ***Haplochthonius intermedius*** Chakraborti, Bhaduri and Raychaudhuri

1977. *Haplochthonius intermedius* Chakraborti, Bhaduri and Raychoudhuri, *Sci. & Cult.*, **43**(4) : 178.

Material examined : 4♂♂, Kakdwip, 12.iv.1977, from humus, coll. A. K. Sanyal; 2♂♂, Diamond Harbour, 22.ix.1977, from soil, coll. A. K. Sanyal; 2♂♂, Bakhali, 24.xii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

5. Family PHTHIRACARIDAE Perty, 1841

5. Genus ***Atropacarus*** Ewing

1917. *Atropacarus* Ewing, *J. Economic Ent. Concord*, **10** : 131.

***Atropacarus* (*Hoplophorella*)** Niedbala

1986. *Atropacurus* (*Hoplophorella*), Niedbala, *Acarologia*, **27**(1) : 80.

6. ***Atropacarus* (*Hoplophorella*) *scapellatus*** (Aoki)

1965. *Hoplophorella scapellata*, Aoki, *Nat. Life Southeast Asia*, **4** : 131.

1992. *Atropacarus* (*Hoplophorella*) *scapellatus*, Niedbala, In : *Phthiracaroidea* (*Acari*, *Oribatida*). *Systematic studies*, *Amsterdam*, 226.

Material examined : 4♂♂, Sagar Island, 8.ii.1977, from decomposed dung and soil, coll. A. K. Sanyal; 2♂♂, Frazergunj, 15.x.1977, from humus, coll. A. K. Sanyal; 3♂♂, Kakdwip, 20.ii.1978.

Distribution : INDIA : Assam, Bihar, Manipur, Orissa, Tripura, West Bengal.

Remarks : The species was reported earlier from Frazergunj by Sanyal and Bhaduri (1982).

7. ***Atropacarus* (*Hoplophorella*) *sundarbanensis*** Sanyal and Bhaduri, 1981

1992. *Atropacarus* (*Hoplophorella*) *sundarbanensis*, Sanyal and Bhaduri, *Indian J. Acar.*, **6**(1&2) : 35.

Remarks : Sanyal and Bhaduri (1981) described the species from Sagar Island, Bakkhali and Namkhana.

6. Family EUPHTHIRACARIDAE Jacot, 1930

6. Genus ***Rhysotritia*** Markel and Meyer

1959. *Rhysotritia* Markel and Meyer, *Zool. Anz.*, **163** : 329.

8. ***Rhysotritia ardua*** var. ***otaheitensis*** Hammer

1972. *Rhysotritia ardua* var. *otaheitensis* Hammer, *Biol, Skr. Dan. Vid. Selsk.*, **19**(3) : 12.

Material examined : 3♂♂, Kakdwip, 12.iv.1977, from humus, coll. A. K. Sanyal; 2♂♂, Sagar Island, 10.xii.1977, from soil, coll. A. K. Sanyal; 1♂, Bakkhali, 24.xii.1977, from soil, call. A. K. Sanyal.

Distribution : INDIA : Tripura, West Bengal.

7. Family LOHMANIIDAE Berlese, 1916

7. Genus ***Cryptacarus*** Grandjean

1950. *Cryptacarus* Grandjean, *Arch. Zool. exp. gen. Paris*, **87** : 138.

9. ***Cryptacarus tuberculatus*** Csiszar

1961. *Cryptacarus tuberculatus* Csiszer, *Acta. Zool. Acad. Sci. Hung.*, **7** : 346.

Material examined : 3♂♂, Sagar Island, 20.viii.1977, from litter and soil, coll. A. K. Sanyal; 3♂♂, Frazergunj, 15.x.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

8. Genus ***Haplacarus*** Wallwork

1962. *Haplacarus* Wallwork, *Acaralogia*, **4** : 465.

10. ***Haplacarus foliatus bengalensis*** Bhattacharya *et al.*

1974. *Haplacarus faliatus bengalensis* Bhattacharya, Bhaduri and Raychaudhuri, *Oriental Ins.*, **8**(2) : 281.

Material examined : 5♂♂, Bakkhali, 10.viii.1977, from litter and soil, coll. A. K. Sanyal; 2♂♂, Kakdwip, 10.xii.1977, from humus, coll. A. K. Sanyal.

Distribution : INDIA : Tripura, West Bengal.

8. Family EPILOHMANNIIDAE Oudemans, 1923

9. Genus ***Epilohmannia*** Berlese

1916. *Epilohmannia* Berlese, *Redia*, **12** : 176.

11. ***Epilohmannia pullida pacifica*** Aoki

1965. *Epilohmannia pallida pacifica* Aoki, *Pacific Insects*, **7**(2) : 321.

Material examined : 4♂♂, Sagar Island, 22.ix.1977, from litter and soil, coll. A. K. Sanyal; 3♂♂, Frazergunj, 15.x.1977, from humus, col. A. K. Sanyal; 2♂♂, Namkhana, 24.xii.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : Kerala, Orissa, Tripura, West Bengal.

9. Family TRHYPOCHTHONIIDAE Willmann, 1931

10. Genus ***Allonothrus*** Hammen

1953. *Allonothrus* Hammen, *Proc. Acad. Sci. Amst.*, **56C** : 244.

12. ***Allonothrus indicus*** Bhaduri and Raychaudhuri

1968. *Allonothrus indicus* Bhaduri and Roychaudhuri, *Oriental Ins.*, **2**(2) : 195.

Material examined : 4♂♂, Namkhana, 17.i.1977, from soil, coll. A. K. Sanyal; 3♂♂, Diamond Harbour, 8.ii.1977, from litter and soil, coll. A. K. Sanyal; 2♂♂, Frazergunj, 15.x.1977, from humus, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

10. Family MALACONOTHRIDAE Berlese, 1916

11. Genus ***Malaconothrus*** Berlese

1904. *Malaconothrus* Berlese, *Redia*, **2** : 24.

13. ***Malaconothrus geminus*** Hammer

1972. *Malaconothrus geminus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **19**(3) : 20.

Material examined : 2♂♂, Diamond Harbour, 8.ii.1977, from soil, coll. A. K. Sanyal; 2♂♂, Namkhana, 24.xii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

11. Family BASILOBELBIDAE Balogh, 1961

12. Genus ***Basilobelba*** Balogh

1958. *Basilobelba* Balogh, *Rev. Zool. Bot. Afr.*, **58** : 9.

14. ***Basilobelba indica*** Bhaduri, Chakraborti and Raychaudhuri

1974. *Basilobelba indica* Bhaduri, Chakraborti and Raychaudhuri, *Acta Arachnol.*, **25**(2) : 86.

Material examined : 5♂♂, Frazergunj, 22.ii.1977, from litter and soil, coll. A. K. Sanyal; 2♂♂, Kakdwip, 18.iv.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : Orissa, Tripura, West Bengal.

12. Family CARABODIDAE Koch, 1837

13. Genus ***Carabodes*** Koch

1836. *Carabodes* Koch, Deutschlands Crustaccen, Myriapoden und Arachnidean, 3.

15. ***Carabodes peniculatus*** Aoki

1970. *Carabodes peniculatus* Aoki, *Bull. Nat. Sci. Mus. Tokyo*, **13**(3) : 417.

Material examined : 4♂♂, Sagar Island, 12.iv.1977, from litter and soil, coll. A. K. Sanyal; 3♂♂, Kakdwip, 20.ii.1978, from soil, coll. A. K. Sanyal; 1♀, Frazergunj, 10.viii.1977, from humus, coll. A. K. Sanyal.

Distribution : INDIA : Tripura, West Bengal.

13. Family TECTOCEPHEIDAE Grandjean, 1954

14. Genus ***Tectocepheus*** Berlese

1913. *Tectocepheus* Berlese, *Redia*, **9** : 91.

16. ***Tectocepheus velatus velatus*** (Michael)

1888. *Tectocepheus velatus velatus* (Michael), *Ray. Soc.*, 65.

Material examined : 7♂♂, Frazergunj, 8.ii.1977 and 10.xii.1977, from litter and soil, coll. A. K. Sanyal; 2♂♂, Sagar Island, 12.iv.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : Bihar, Himachal Pradesh, Orissa, Sikkim, Tripura, West Bengal.

14. Family OTOCEPHEIDAE Balogh, 1961

15. Genus ***Dolicheremaeus*** Jacot

1938. *Dolicheremaeus* Jacot, *Florida Ent.*, **21**(4) : 51.

17. ***Dolicheremaeus bengalensis*** Sanyal

1992. *Dolicheremaeus bengalensis* Sanyal, *Zoological Survey of India, Fauna of West Bengal*, Part 3 : 292.

Material examined : 3♂♂, Diamond Harbour, 12.iv.1977, from humus, coll. A. K. Sanyal; 2♂♂, Namkhana, 15.x.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

18. ***Dolicheremaeus coronarius*** Chakraborti, Bhaduri and Kundu

1981. *Dolicheremaeus coronarius* Chakraborty, Bhaduri and Kundu, *Mitt. Zool. Mus. Berlin*, **57**(1) : 15.

Material examined : 3♂♂, Kakdwip, 8.ii.1977, from litter and soil, coll. A. K. Sanyal; 3♂♂, Sagar Island, 20.viii.1977, from humus, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

15. Family OPPIIDAE Grandjean, 1954

16. Genus ***Brachioppia*** Hammer, 1961

1961. *Brachioppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13**(1) : 51.

19. ***Brachioppia ananthakrishni*** Sanyal and Bhaduri

1985. *Brachioppia ananthakrishni* Sanyal and Bhaduri, *Indian J. Acar.*, **10**(1 & 2) : 15.

Remarks : The species was first described by Sanyal and Bhaduri (1985) from Diamond Harbour.

Distribution : INDIA : West Bengal.

17. Genus ***Multioppia*** Hammer

1972. *Multioppia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **13**(1) : 61.

20. ***Multioppia simplitricha*** Sanyal and Bhaduri

1985. *Multioppia simplitricha* Sanyal and Bhaduri, *Indian J. Acar.*, **10**(1 & 2) : 15.

Remarks : Sanyal and Bhaduri (1985) described the species from Kakdwip, Frazergunj, Namkhana and Diamond Harbour.

Distribution : INDIA : West Bengal.

18. Genus ***Oppia*** Koch

1836. *Oppia* Koch, *Deutschlands Crustaceen, Myriapoden and Arachniden*, 1-9.

21. ***Oppia orientalis*** Sanyal and Bhaduri

1985. *Oppia orientalis* Sanyal and Bhaduri, *Indian J. Acar.*, **10**(1 & 2) : 15.

Remarks : Sanyal and Bhaduri (1985) described *Oppia orientalis* as new species from Bakkhali.

Distribution : INDIA : West Bengal.

22. ***Oppia ramisetosa*** Sanyal and Bhaduri

1985. *Oppia ramisetosa* Sanyal and Bhaduri, *Indian J. Acar.*, **10**(1 & 2) : 15.

Remarks : The species was described as new to science by Sanyal and Bhaduri (1985) from Kakdwip and Diamond Harbour.

Distribution : INDIA : West Bengal.

23. ***Oppia yodai*** Aoki

1965. *Oppia yodai* Aoki, *Nat. Life Southeast. Asia*, **4** : 169.

Material examined : 7♂♂, Diamond Harbour, 12.iv.1977, from litter and soil, coll. A. K. Sanyal; 4♂♂, Bakkhali, 10.viii.1977, from humus, coll. A. K. Sanyal; 2♂♂, Namkhana, 24.xii.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : Tripura and West Bengal.

16. Family CHAUNOPROCTIDAE Balogh, 1961

19. Genus ***Chaunoproctus*** Pearce

1906. *Chaunoproctus* Pearce, *Journ. Roy. Micr. Soc.*, 271.

24. ***Chaunoproctus abalai*** Bhaduri, Bhattacharya and Chakraborti

1975. *Chaunoproctus abalai* Bhaduri, Bhattacharya and Chakrabarti, *Mitt. Zool. Mus. Berlin*, **5**(1) : 59.

Material examined : 3♂♂, Kakdwip, 10.i.1977, from litter and soil, coll. A. K. Sanyal; 4♂♂, Frazergunj, 15.x.1977, from soil, coll. A. K. Sanyal.

Distribution : INDIA : Tripura and West Bengal.

17. Family XYLOBATIDAE Balogh and Balogh, 1984

20. Genus ***Xylobates*** Jacot

1929. *Xylobates* Jacot, *Trans. Amer. Micr. Soc. Menasha*, **48** : 429.

25. ***Xylobates seminudus*** Hammer

1971. *Xylobates seminudus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16** : 38.

Material examined : 3♂♂, Diamond Harbour, 8.ii.1977, from soil, coll. A. K. Sanyal; 7♂♂, Sagar Island, 22.ix.1977, from humus, coll. A. K. Sanyal; 2♂♂, Bakkhali, 15.x.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : Tripura and West Bengal.

18. Family HAPLOZETIDAE Grandjean, 1936

21. Genus ***Haplozetes*** Willmann

1935. *Haplozetes* Willmann, *Zool. Jahrb. Syst.*, **66** : 333.

26. ***Haplozetes*** sp.

Material examined : 4♂♂, Kakdwip, 12.iv.1977, from soil, coll. A. K. Sanyal; 2♂♂, Frazergunj, 18.v.1977, from soil, coll. A. K. Sanyal; 3♂♂, Sagar Island, 20.vii.1977, from soil, coll. A. K. Sanyal.

Remarks : Due to nonavailability of pertinant literature the specimens could not be identified upto species level.

22. Genus ***Lauritzenia*** Hammer

1958. *Lauritzenia* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 83.

27. ***Lauritzenia longipluma*** Hammer

1958. *Lauritzenia longipluma* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 83.

Material examined : 7♂♂, Frazergunj, 18.iv.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

19. Family SCHELORIBATIDAE Grandjean, 1977

23. Genus ***Euscheloribates*** Kunst

1958. *Euscheloribates* Kunst, *Acta Soc. Ent. Cech.*, **55** : 67.

28. ***Euscheloribates samsinaki*** Kunst

1958. *Euscheloribates samsinaki* Kunst, *Acta. Soc. Ent. Cech.*, **55** : 68.

Material examined : 5ÆÆ, Namkhana, 15.x.1977 and 24.xii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : Tripura, West Bengal.

24. Genus ***Scheloribates*** Berlese

1908. *Scheloribates* Berlese, *Redia.*, **5** : 2.

29. ***Scheloribates bhadurii*** Sanyal

1992. *Scheloribates bhadurii* Sanyal, *Zoological Survey of India, Fauna of West Bengal*, Part 3 : 313.

Remarks : Sanyal (1992) described *S. bhadurii* as new species from Namkhana and Sagar Island.

Distribution : INDIA : West Bengal.

30. ***Scheloribates indicus*** Sanyal

1992. *Scheloribates indicus* Sanyal, *Zoological Survey of India, Fauna of West Bengal*, Part 3 : 315.

Remarks : *S. indicus* was described as new to science by Sanyal (1992) from Namkhana.

Distribution : INDIA : West Bengal.

31. ***Scheloribates natalensis*** Pletzen

1963. *Scheloribates natalensis* Pletzen, *Acarologia*, **5**(4) : 700.

Material examined : 10ÆÆ, Sagar Island, 8.ii.1977, from soil, coll. A. K. Sanyal; 5ÆÆ, Frazergunj, 18.iv.1977, from decomposed litter, coll. A. K. Sanyal; 3ÆÆ, Bakkhali, 24.xii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

32. ***Scheloribates rakhali*** Sanyal

1992. *Scheloribates rakhali* Sanyal, *Zoological Survey of India, Fauna of West Bengal*, Part 3 : 317.

Remarks : Sanyal (1992) described *S. rakhali* as new species from Frazergunj, Sagar Island and Kakdwip.

Distribution : INDIA : West Bengal.

20. Family AUSTRACHIPTERIIDAE Luxton, 1985

25. Genus ***Lamellobates*** Hammer

1958. *Lamellobates* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 100.

33. ***Lamellobates palustris*** Hammer

1958. *Lamellobates palustris* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 100.

Material examined : 4ÆÆ, Sagar Island, 12.iv.1977, from litter and soil, coll. A. K. Sanyal; 3ÆÆ, Kakdwip, 20.viii.1977, from soil, coll. A. K. Sanyal; 4ÆÆ, Diamond Harbour, 20.ii.1978, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : Bihar, Meghalaya, Tripura, West Bengal.

26. Genus ***Paralamellobates*** Bhaduri and Raychaudhuri

1968. *Paralamellobates* Bhaduri and Raychaudhuri, *Oriental Ins.*, **2**(2) : 197.

34. ***Paralamellobates bengalensis*** Bhaduri and Raychaudhuri

1968. *Paralamellobates bengalensis* Bhaduri and Raychaudhuri, *Oriental Ins.*, **2**(2) : 197.

Material examined : 4ÆÆ, Sagar Island, 20.vii.1977, from litter and soil, coll. A. K. Sanyal; 2ÆÆ, Namkhana, 15.x.1977, from humus, coll. A. K. Sanyal.

Distribution : INDIA : Kerala, Sikkim, Tripura, West Bengal.

21. Family GALUMNIDAE Jacot, 1925

27. Genus ***Galumna*** von Heyden

1826. *Galumna* von Heyden, *Isis Oken*, **18** : 611.

35. ***Galumna crenata*** Deb and Raychaudhuri

1975. *Galumna crenata* Deb and Raychaudhuri, *Annot. Zool. Japan*, **48**(3) : 167.

Material examined : 5ÆÆ, Diamond Harbour, 8.ii.1977, from litter and soil, coll. A. K. Sanyal; 4ÆÆ, Namkhana, 18.iv.1977, from decomposed dung, coll. A. K. Sanyal; 4ÆÆ, Bakkhali, 15.x.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

36. ***Galumna flabellifera orientalis*** Aoki

1965. *Galumna flabellifera orientalis* Aoki, *Nat. Life Southeast Asia*, **4** : 187.

Material examined : 3ÆÆ, Kakdwip, 10.i.1977, from litter and soil, coll. A. K. Sanyal; 4ÆÆ, Namkhana, 18.iv.1977, from decomposed dung, coll. A. K. Sanyal; 3ÆÆ, Frazergunj, 10.viii.1977, from litter and soil, coll. A. K. Sanyal.

Distribution : INDIA : West Bengal.

DISCUSSION

The analysis of the present study indicates that before the study of the collection of oribatid mites made during 1977-78, a total of 19 species under 14 genera and 10 families were known from Sundarban delta of West Bengal. The present work includes 17 species under 14 genera and 11 families to the list of earlier known taxa. Thus at present a total of 36 species under 28 genera and 21 families are known from the study area. Table 1 shows that maximum number (17) of oribatid species was recorded from Sagar Island and Frazergunj and minimum number (11) of species was reported from Diamond Harbour and Bakkhali.

Table 1. : Distribution of oribatid genus/species in different localities in Sundarban of South 24-Parganas, West Bengal.

Name of the genus / species	Sagar Island	Kakdwip	Diamond Harbour	Bakkhali	Frazergunj	Namkhana
	1	2	3	4	5	6
Hypochthonius sp.				+	+	+
M. pectinata	+			+		+
C. bengalensis		+			+	+
P. heterotrichus	+				+	
H. intermedius		+	+	+		
A. (H.) scapellatus	+	+			+	
A. (H.) sundarbanensis	+			+		+
R. ardua var. *otaheitensis*	+	+		+		
C. tuberculatus	+				+	
H. foliatus bengalensis		+		+		
E. pallida pacifica	+				+	+
A. indicus			+		+	+
M. geminus			+			+
B. indica		+			+	
C. peniculatus	+	+			+	
I. velatus velatus	+				+	
D. bengalensis			+			+
D. coronarius	+	+				
B. ananthakrishni			+			

Table 1. : *(Cont'd.)*

Name of the genus / species	Sagar Island	Kakdwip	Diamond Harbour	Bakkhali	Frazergunj	Namkhana
	1	2	3	4	5	6
M. simplitricha		+	+		+	+
O. orientalis				+		
O. ramisetosa		+	+			
O. yodai			+	+		+
C. abalai		+			+	
X. seminudus	+		+	+		
Haplozetes sp.	+	+			+	
L. longipluma					+	
E. samsinaki						+
S. bhadurii	+					+
S. natalensis	+			+	+	
S. indicus						+
S. rakhali	+	+			+	
L. palustris	+	+	+			
P. bengalensis	+					+
G. crenata			+	+		+
G. flabellifera orientalis		+			+	+

SUMMARY

The paper deals with the oribatid mite fauna collected from six different localities like Sagar Island, Kakdwip, Diamond Harbour, Bakkhali, Frazerganj and Namkhana in Sundarban delta of West Bengal during 1977-1978. Altogether 36 soil inhabiting oribatid species pertaining to 28 genera and 21 families have been recorded. The work recorded 11 families 14 genera and 17 species for the first time from Sundarban delta. Key to identification of families and genera dealt in the paper has also been incorporated.

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REFERENCES

Sanyal, A. K. 1992. Oribatid mites (Acari). In : *Fauna of West Bengal, State Fauna Series*, **3** (Part 3) : 213-356. *Zoological Survey of India.*

Sanyal, A. K. 2000. Oribatid mites (Acari : Oribatei). In : *Fauna of Tripura, State Fauna Series*, **7** (Part 2) : 33-112. *Zoological Survey of India.*

Sanyal, A. K. and Bhaduri, A. K. 1981. A new species of the genus *Hoplophorella* (Acari : Oribatei) from West Bengal, India. *Indian J. Acar.*, **6**(1 & 2) : 35-38.

Sanyal, A. K. and Bhaduri, A. K. 1985. Four new species of the family Oppiidae (Acari : Oribatei) from West Bengal, India. *Indian J. Acar.*, **10**(1 & 2) : 15-21.