

AN ACCOUNT OF THE GENUS *DIPTILOMIOPUS* NALEPA (ACARINA : ERIOPHYOIDEA) FROM INDIA WITH DESCRIPTIONS OF THREE NEW SPECIES AND KEY TO INDIAN SPECIES

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INDIAN
ERIOPHYIDAE

ABSTRACT : An account of the so far known *Diptilomiopus* species from India and abroad has been provided. Three new species, viz. *D. ficusis* infesting *Ficus hispida* Lf., *D. holoptelus* infesting *Holoptelea integrifolia* Planch and *D. trewier* infesting *Trewia nudiflora* Lin. have been described from West Bengal. *D. assamica* Keifer is reported for the first time from the State of West Bengal, India. A key for separating the Indian species has also been provided.

ERIOPHYIDAE
DE L'INDE

RÉSUMÉ : Un compte rendu des espèces de *Diptilomiopus* de l'Inde et d'ailleurs, connues jusqu'à présent, est établi. Trois nouvelles espèces du Bengale Occidental sont décrites, *D. ficusis* infestant *Ficus hispida* Lf., *D. holoptelus* infestant *Holoptelea integrifolia* Planch et *D. trewier* infestant *Trewia nudiflora* Ln. *D. assamica* Keifer est rapporté pour la première fois de l'État du Bengale Occidental, Inde. Une clé d'identification des espèces indiennes est aussi établie.

INTRODUCTION

The genus *Diptilomiopus* Nalepa (1917) is one of the distinct genera under subfamily Diptilomiopinae, family Rhyncaphyoptidae. This genus at present embodies at least 13 species infesting different host plants of the families Campanulatae, Euphorbiaceae, Moraceae, Rubiaceae and Rutaceae and known from countries like India, Africa across Southern Asia to Australia.

The family Rhyncaphyoptidae consists of 2 subfamilies viz. Rhyncaphyoptinae and Diptilomiopinae. In India, so far 12 species under 4 genera viz. *Diptilomiopus* Nalepa (1916), *Dipti-*

lorhynacus Mondal *et al.* (1981), *Neorhynacus* Mohanasundaram (1981) and *Rhyncaphyoptus* Keifer (1939) are known.

The genus *Diptilomiopus* among the other Diptilomiopine genera can be separated in having deeply bifurcated featherclaw, fused patella with femur, absence of first coxal setiferous tubercles and setae, lateral setae and all the leg setae except tarsal setae. Detail characters of this genus have been provided by NALEPA (1917) and KEIFER (1938).

Here, 3 new species viz. *D. ficusis* infesting *Ficus hispida* Lf., *D. holoptelus* infesting *Holoptelea integrifolia* Planch and *D. trewier* infesting *Trewia nudiflora* Lin. are described from West

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Bengal, North East India. This addition brings the total number of species under *Diptilomiopus* from world to 16 and from India to 11. *Diptilomiopus assamica* Keifer so far known from the State of Assam, is reported for the first time also from the State of West Bengal, India. A key for separating these Indian species have been provided.

All the type materials of the new species are deposited in the collection of Biosystematics Research Unit, Department of Zoology, University of Kalyani.

India) but could not be examined. However, from the diagram and description it appears that this species has a distinct patella with seta present and may not be a member of the genus *Diptilomiopus*. Therefore, a definitive decision regarding its identification can only be taken when authentic material of this species will be available for examination.

Distribution : India : Tamil Nadu.

Relation to the host plant : This species infests the ventral surface of leaves of *Artocarpus integrifolia* Linn. (Moraceae) and causes drying of twigs.

SYSTEMATIC ACCOUNT

1. *Diptilomiopus assamica* Keifer

Diptilomiopus assamica KEIFER, 1959 : *Bull. Ent., Calif. Dept. Agri., Occ. Papers*, 2 : 14.

Materials examined : ♀♀, India : West Bengal : 24 Parganas, Kanchrapara, 3.IV.78 from *Citrus* sp., coll. S. MONDAL.

This species was first described by KEIFER (1959) from Assam (India) infesting different species of *Citrus*. It has been found along with *Phyllocoptruta oleivora* (Ashmead) infesting the same host plant in West Bengal.

Distribution : India : Assam, West Bengal.

Relation to the host plant : The mites were collected from under surface of leaves. No apparent damage to the host plant was noticed.

Remark : This species is reported for the first time from the state of West Bengal.

2. *Diptilomiopus artocarpae* Mohanasundaram

Diptilomiopus artocarpae MOHANASUNDARAM, 1981. *Orient. Insects*, 15 (1) : 45.

This species originally was described by MOHANASUNDARAM (1981) from Tamil Nadu (Southern

3. *Diptilomiopus bengalensis* Chakrabarti and Mondal

Diptilomiopus bengalensis CHAKRABARTI and MONDAL, 1979 : *Orient. Insect*, 13 (1-2) : 47

Materials examined : ♀♀, India : West Bengal : Nadia, Kalyani, 15.XI.78 from *Gardenia jasminoides* Ellis., coll. S. MONDAL (Type material) and subsequent collections.

Distribution : India : West Bengal.

Relation to the host plant : This species was collected from the ventral surface of leaves. Due to infestation leaves turn yellow to brown and in heavy infestation normal growth of leaves was prevented.

4. *Diptilomiopus camerae* Mohanasundaram

Diptilomiopus camerae MOHANASUNDARAM, 1981 : *Orient. Insects*, 15 (1) : 47

This species described By MOHANASUNDARAM (1981) from Tamil Nadu (Southern India) could not be examined.

Distribution : India : Tamil Nadu.

Relation to the host plant : This species inhabit the ventral surface of leaves of *Lantana camera* Linn. (Verbenaceae) as leaf vagrants without causing any injury to the host plant.

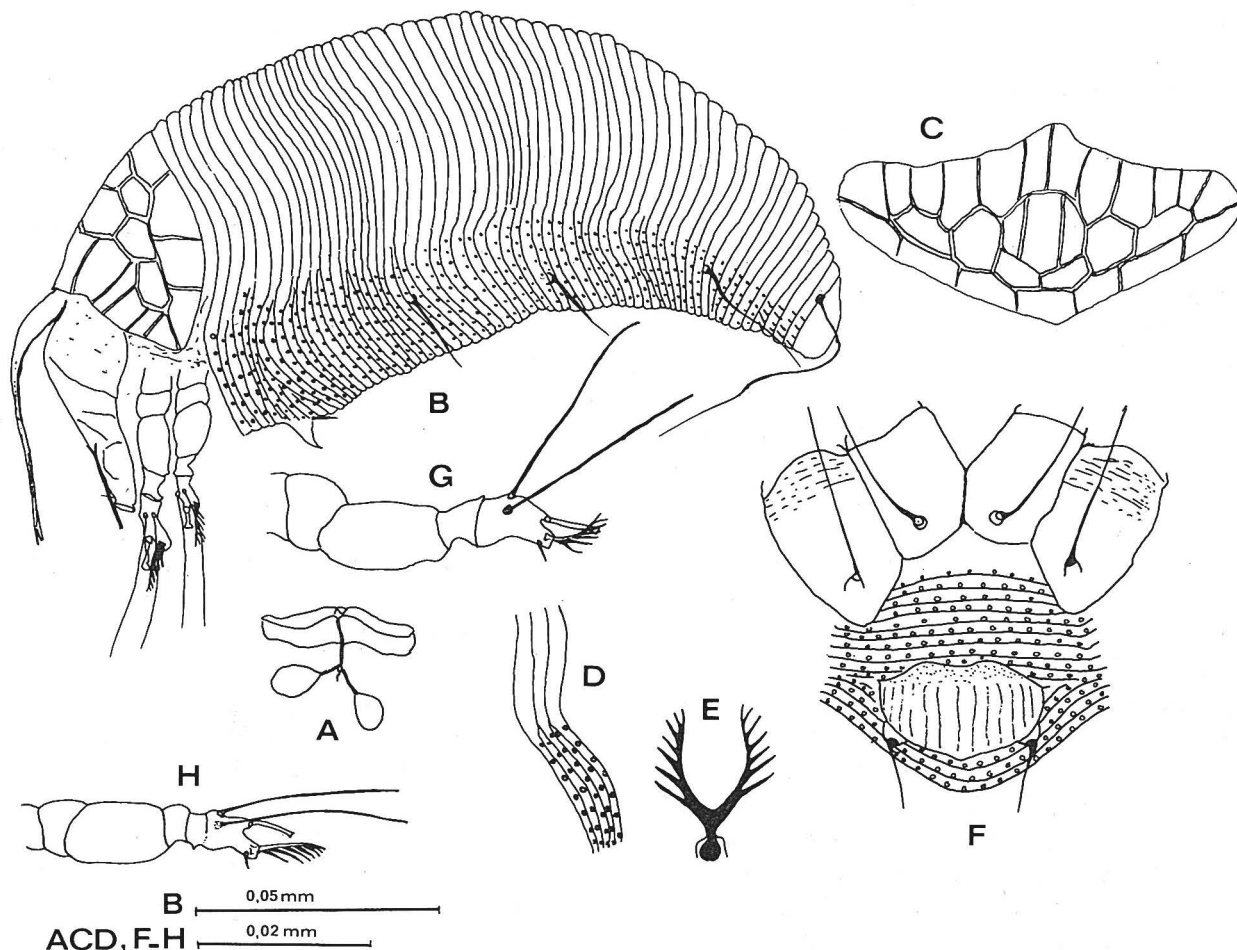


FIG. 1 A-H: *Diptilomiopus ficus* sp. nov., female.

A) internal female genitalia; B) lateral view of mite; C) anterior dorsum of mite; D) side view of the skin structure; E) feather-claw (empodium); F) coxae and female genitalia; G) foreleg; H) second leg.

5. *Diptilomiopus cocculae* Mohanasundaram

Diptilomiopus cocculae MOHANASUNDARAM, 1981 :
Orient. Insects, 15 (1) : 49.

This species described by MOHANASUNDARAM from Southern India could not be examined.

Distribution : India : Tamil Nadu.

Relation to the host plant : This species also inhabits the ventral surface of leaves of *Cocculus hirsutus* (Linn.) Diels as simple leaf vagrants.

6. *Diptilomiopus ficus* sp. nov.

(Fig. 1 A-H)

FEMALE : Body 157-209 μm long, 63-83 μm wide; robust, fusiform and brown in colour. Rostrum curved down just perpendicular to the body, 39-42 μm long; subapical seta 7-8 μm long. Shield about 21-38 μm long, 42-49 μm wide, convex dorsally. Shield design represents a network of cells; median line present on anterior 0.25 and posterior 0.25; admedian lines present only within the central cell; anteriorly a row of 6 cells

extending along lower lateral shield margin and posteriorly three cells are present on either side ; dorsal tubercles and setae absent. Forelegs 29-32 μm long from coxal base ; femur 9-13 μm long, without seta ; tibia 5-6 μm long, without fore tibial seta ; tarsus 7 μm long, with two upper tarsal setae each 25-31 μm long and a lower tarsal seta of 4 μm long ; claw 5-6 μm long with knobbed apex ; featherclaw divided and 7-rayed. Hindlegs 24-26 μm long from coxal base ; tibia 3-4 μm long without seta ; tarsus 6-7 μm long with two upper tarsal setae, each 21-27 μm long and a lower tarsal seta 4 μm long ; other characters as in foreleg. Anterior coxae contiguous and with a median suture ; both the coxae almost without any ornamentation except a few lines ; first coxal tubercles absent ; second coxal tubercles much ahead of the level of third coxal tubercles.

Abdomen with 58 tergites and 65 sternites ; an indistinct dorsal ridge extends from rear shield margin upto 3/4 of the thanosome posteriorly ; microtubercles present only on sternites and within the ring. First ventral seta 18-25 μm long, on about sternite 26 ; second ventral seta 11-19 μm long, on about sternite 40 ; third ventral seta 26-29 μm long, on about sternite 57 ; caudal seta 35-47 μm long ; accessory seta missing. Genitalia 16-21 μm wide, 8-10 μm long ; genital coverflap with fine granules on upper margin and with faint longitudinal lines on lower margin ; genital seta 7 μm long.

MALE : Unknown.

Holotype : ♀, India : West Bengal : Nadia, Kalyani, 5.IV.79 from *Ficus hispida* Lf. (Moraceae), on slide (No. 178/63/79), coll. S. MONDAL.

Paratypes : Many ♀♀, on holotypic slide and on 2 slides (Nos. 179/63/79 to 180/63/79), collected from the same plant and locality.

Distribution : India : West Bengal.

Relation to the host plant : The mites were found in association with a new species of *Calepitrimerus* within heavy hairy outgrowths on the ventral of leaves. But the population of the present species was found to be dominant over *Calepitrimerus* species throughout the year. Due to infestation of these mites, colour of the leaves

turn yellowish and show some symptoms of stunted growth.

Remarks : The Indian *Diptilomiopus* species fall under two groups, as regards the shield designs are concerned. The first group embodies *D. bengalensis* Chakrabarti and Mondal (1979) and *D. knorii* Keifer (1974) having a central cell with radiating lines and the second group embodies other 9 species having a reticulated net-like shield design. In the second group 3 more species viz. *D. davisi* Keifer (1969), *D. holmesi* Keifer (1962), *D. javremovici* Keifer (1960) are also known from other countries. *D. ficusis* can be distinguished from the species of second group by the nature of coxal ornamentation, genital coverflap structure and absence of dorsal tubercles and dorsal setae in addition to 7-rayed featherclaw. The differentiating characters of the Indian species including new species described here have been provided under the key to the species.

7. *Diptilomiopus holoptelus* sp. nov. (Fig. 2 A-H)

FEMALE : Body 149-183 μm long, 65-89 μm wide, robust fusiform, brownish in colour. Rostrum 42-50 μm long, curved down ; subapical seta 4-6 μm long. Shield subtriangular, 31-35 μm long, 52-62 μm wide ; shield design presents a network with almost complete median line, except in the central shield region where it is faint and discontinuous ; admedian lines extend back divergently upto anterior 1/2 of the shield, then straight upto 1/6 where each bifurcates ; the outer fork meets the median line at its rear end and the inner fork meets the median line slightly ahead of rear shield margin and forming 2 cells in between ; lateral shield with cells in 2 tiers, anteriorly 6 such cells present along the anterior shield margin ; while posteriorly 2 such cells present ahead of the rear shield margin on each side ; a small dorsal tubercles without seta is present on each side of shield slightly ahead of rear end. Forelegs 42-46 μm long from the coxal base ; femur 12-14 μm long without seta ; patella fused with femur ; tibia 5-7 μm long ; tarsus 7-10 μm long ;

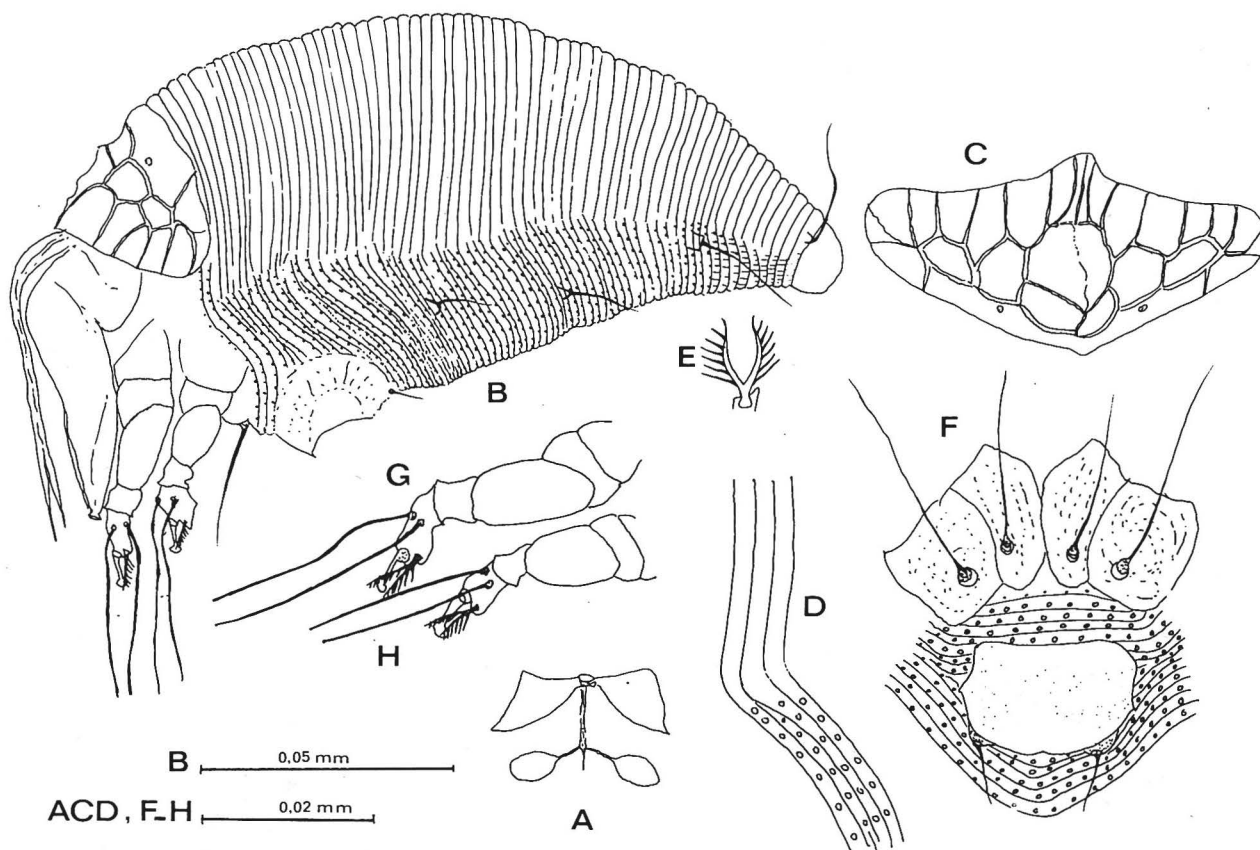


FIG. 2 A-H : *Diptilomiopus holoptelus* sp. nov., female.

A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) featherclaw (empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg.

claw 6-7 μm long ; featherclaw 7-rayed. Hindlegs 35-40 μm long from coxal base ; femur fused with patella, 10-12 μm long ; tibia 4-6 μm long ; tarsus 7-9 μm long ; claw 5-6 μm long. Anterior coxae contiguous with median suture ; both the coxae with fine dotted lines. First coxal seta absent ; second coxal seta slightly ahead of the level of third coxal setae.

Abdomen with 62-65 smooth tergites and 69-71 microtuberculous sternites ; microtubercles round, and located within ring margin. First ventral seta 9-12 μm long, on about sternite 26 ; second ventral seta 13-16 μm long, on about sternite 41 ; third ventral seta 28-32 μm long, on about sternite 62 ; caudal seta 33-43 μm long ; accessory seta absent. Genitalia 11-15 μm long, 16-21 μm wide ;

coverflap smooth or with fine granules ; genital seta 5-8 μm long.

MALE : Unknown.

Holotype : ♀, on slide (No. 228/89/80) India : West Bengal : Birbhum, Sriniketan, 6.vii.80 from *Holoptelea integrifolia* Planch (Ulmaceae), coll. A. K. DAS.

Paratypes : Many ♀♀, on holotypic slide and 3 slides (Nos. 229/89/80 to 231/89/80) collection data as in the holotype ; many ♀♀, on 4 slides (Nos. 232/90/80 to 235/90/80) Birbhum, Sriniketan, 14.vi.80 from *Streblus asper* Lour. (Urticaceae), coll. A. K. DAS ; many ♀♀, on 2 slides (Nos. 236/92/80 to 237/91/80), Bankura, 20.vi.80, from *Streblus asper* Lour. (Urticaceae), coll. B.

GHOSH ; many ♀♀, on 8 slides (Nos. 238/92/80 to 245/92/80), Bankura, 26.X.80 from *Buchanania latifolia* Roxb. (Anacardiaceae), coll. B. GHOSH ; many ♀♀, on 4 slides (Nos. 246/93/80 to 249/93/80), Bankura, 19.XI.80 from *Anthocephalus cadamba* Miq., (Rubiaceae), coll. B. GHOSH ; many ♀♀, on 1 slide (No. 250/94/80), Hooghly, 28.VI.80 from *Streblus asper* Lour. (Urticaceae), coll. B. GHOSH.

Distribution : India : West Bengal.

Relation to the host plant : This species has been collected from several hosts of different localities. Mites are leaf vagrants on ventral surfaces and cause no remarkable injury to the host plants.

Remarks : *Diptilomiopus holoptelus* sp. nov. falls in the same group as the *D. ficusis* sp. nov. However, this species differs from *D. davisi* Keifer (1969), *D. holmesii* (Keifer, 1962) and *D. javremovici* Keifer (1960) by the nature of genital coverflap and 7-rayed featherclaw and from the Indian species by the characters mentioned in the key to species. Recently MOHANASUNDARAM (1981) described *D. integrifoliae* from the same host plant from Tamil Nadu (Southern India) but the present new species differs from *integrifoliae* by its 7-rayed featherclaw and incomplete median line on shield. This species is a very good example of polyphagous eriophyid species in West Bengal.

8. *Diptilomiopus integrifoliae* Mohanasundaram

Diptilomiopus integrifoliae MOHANASUNDARAM, 1981 : *Orient. Insects*, 15 (1) : 49.

Materials examined : ♀♀, India : Tamil Nadu : Coimbatore, 25.I.1974 from *Holoptelea integrifoliae* Planch, coll. M. MOHANASUNDARAM.

Distribution : India : Tamil Nadu.

Relation to the host plant : These mites are vagrants on the under surface of leaves without causing any injury to the host plant.

9. *Diptilomiopus jevremovici* Keifer

Diptilomiopus jevremovici KEIFER, 1960. Eriophyid studies B-1. *Bur. Ent. Calif. Dept. Agri.* ; MOHANASUNDARAM, 1981 : *Orient Insects*, 15 (1) : 51.

Materials examined : ♀♀, India : Tamil Nadu : Coimbatore, 20.X.75 from unidentified host, coll. M. MOHANASUNDARAM.

Distribution : India : Tamil Nadu.

Relation to the host plant : These mites are known to infest ventral surface of leaves and causing no injury to the host plant.

10. *Diptilomiopus knorri* Keifer

Diptilomiopus knorri KEIFER, 1974. Eriophyid studies C-9. *Ent. Res. Div., Agri. Res. Serv., U.S. Dept. Agri.* ; MOHANASUNDARAM, 1981 : *Orient. Insects*, 15 (1) : 51

Materials examined : ♀♀, India : Tamil Nadu : Coimbatore, 25.VII.76 from *Gardenia* sp. (Rubiaceae), coll. M. MOHANASUNDARAM.

Distribution : India : Tamil Nadu.

Relation to the host plant : This species inhabits the ventral surface of leaves as simple leaf vagrants.

11. *Diptilomiopus trewier* sp. nov. (Fig. 3 A-H)

FEMALE : Body 150-211 µm long, 60-75 µm wide, fusiform, brownish in colour. Rostrum 37-42 µm long projecting down perpendicularly to body axis ; subapical seta 8 µm long. Shield subtriangular, almost without anterior lobe, 30-35 µm long, 61-67 µm wide ; shield design represents a network of raised lines ; median line present only on 0.33 of anterior and posterior region of shield ; admedian lines complete, strongly angled at cross line connections and joined to median line anteriorly by one cross line and posteriorly by two cross lines ; lower front and sides of shield present a pattern of vertically elongate cells ; dorsal tubercles and setae totally absent. Forelegs

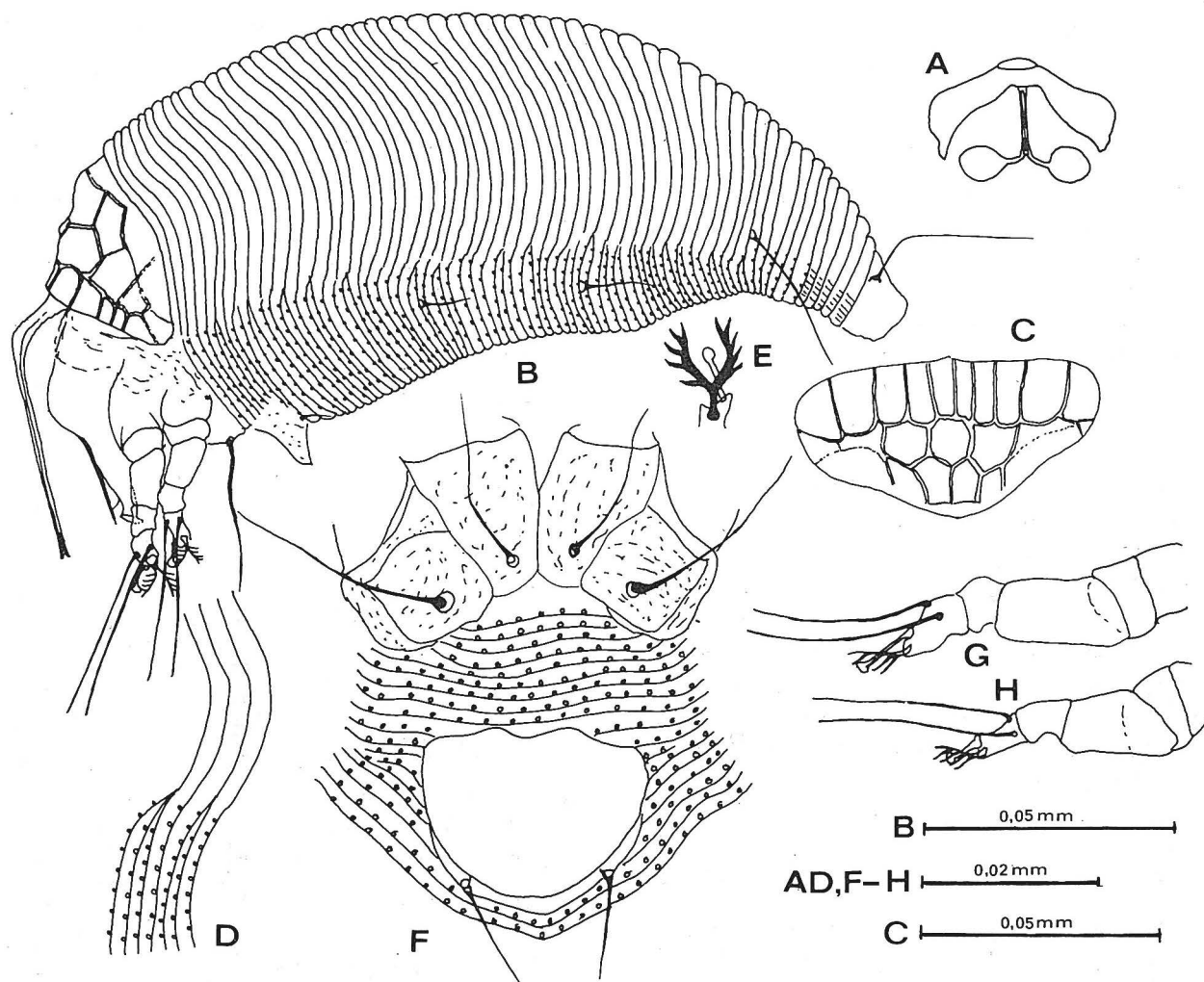


FIG. 3 A-H : *Diptiomipus trewier* sp. nov., female.

A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) featherclaw (empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg.

32-34 μm long from trochanter base ; femur fused with patella, 11-15 μm long, without femoral and patellar setae ; tibia 5-7 μm long, without seta ; tarsus 7-11 μm long, with two strong seta, each 35-42 μm long ; claw 6-7 μm long, knobbed ; featherclaw 5-rayed. Hindlegs 26-28 μm long from trochanter base ; femur fused with patella 11-13 μm long ; tarsus 6-8 μm long with two strong setae, each 28-32 μm long ; claw 5-6 μm long ; other characters as in foreleg. Anterior coxae connate basally ; both the coxae ornamented with

irregular faint lines ; first coxal tubercles and setae absent ; second coxal tubercles a little ahead of transverse line through third coxal tubercles.

Abdomen with about 61 tergites and 75-78 sternites ; a shallow longitudinal furrow extend on each side of the middorsum and fades caudally ; microtubercles small, present only on sternites, touching rear ring margins ; dorsum non microtuberculous. First ventral seta 13-14 μm long, on about sternite 28 ; second ventral seta 13 μm long, on about sternite 46 ; third ventral seta 26-27 μm

long, on about sternites 68 ; caudal seta 37-45 μ m long ; accessory seta absent. Female genitalia 11-12 μ m wide, 11-12 μ m long ; coverflap smooth ; genital seta 5-7 μ m long.

MALE : Unknown.

Holotype : ♀, India : West Bengal : Nadia, Kalyani, 5.II.80, from *Trewia nudiflora* L. (Euphorbiaceae) on slide (No. 198/71/80), coll. S. MONDAL.

Paratypes : Many ♀♀, on holotypic slide and 4 slides (Nos. 199/71/80 to 202/71/80), collected from the same plant and locality.

Distribution : India : West Bengal.

Relation to the host plant : The mites were found in large numbers on the ventral surface of young leaves only. Due to infestation of this mites no injury to the host plant was noticed.

Remarks : This species also falls in the same group as the *D. ficusis* and differs from *D. davis* Keifer (1969), *D. holmesi* (Keifer, 1962) and *D. jevremovici* Keifer (1968) by its 5-rayed featerclaw in addition to other characters in details and from the other Indian species by the characters mentioned in the key to the species.

KEY TO THE INDIAN SPECIES OF *Diptilomiopus* NALEPA

1. Shield design represents a central cell with radiating lines ; patella and femur less completely fused..... 2
Shield design represents a reticulated net-like structure instead of a central cell with radiating lines ; patella and femur completely fused..... 3
2. Featherclaw 6-rayed ; dorsal tubercles absent ; genital coverflap with longitudinal scorrings in one rank..... *bengalensis* Chakrabarti and Mondal
Featherclaw 5-rayed ; dorsal tubercles present ; genital coverflap with longitudinal scorrings basally in two ranks..... *knorri* Keifer
3. Dorsal tubercles without seta present..... 4
Dorsal tubercles and seta absent..... 10
4. Featherclaw 5-rayed..... 5
Featherclaw 6 or 7-rayed..... 7
5. Distinct patella with seta present ; median line on shield totally absent ; first ventral seta very long (55 μ m)..... *artocarpa* Mohanasundaram
Distinct patella and patellar seta absent ; median

line. on shield present but may be complete or incomplete ; first ventral seta small (11-20 μ m). 6

6. Genital converflap with granules at the base ; anterior coxae granulated ; long rays on divided featherclaw..... *integrifoliae* Mohanasundaram
Both genital coverflap and anterior coxae smooth ; short rays on divided featherclaw..... *assamica* Keifer

7. Both tergites and sternites microtuberculous ; first and second ventral seta very long (75-77 μ m) ; anterior coxae smooth ; featherclaw 7-rayed..... *cocculae* Mohanasundaram

Microtubercles present only on sternites ; first and second ventral seta short (9-16 μ m) ; coxae with fine dotted lines or granulation..... 8

8. Featherclaw 7-rayed ; median line on shield complete ; accessory seta absent... *holoptelus* sp. nov.
Featherclaw 6-rayed ; median line on shield present but may be complete or incomplete ; accessory seta present or absent..... 9

9. Median line on shield incomplete ; genital coverflap only with granules ; accessory seta absent..... *camerae* Mohanasundaram

Median line on shield complete ; genital coverflap with granules and lines at the base in addition to a semicircular line on main coverflap ; accessory seta, though minute, present..... *jevremovici* Keifer

10. Featherclaw 5-rayed ; coxae ornamented with irregular faint lines ; tarsus without lower tarsal setae ; genital coverflap smooth ; on *Trewia nudiflora* Lin. *trewier* sp. nov.

Featherclaw 7-rayed ; coxae almost smooth ; tarsus with lower tarsal seta ; genital coverflap with fine granules on upper margin and with longitudinal lines on lower margin ; on *Ficus hispida* Lf..... *ficusis* sp. nov.

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