

STUDIES ON THE ERIOPHYID MITES
(ACARINA : ERIOPHYOIDEA) OF INDIA — III :
DESCRIPTION OF FIVE NEW SPECIES OF *CALACARUS*
FROM WEST BENGAL WITH KEY TO INDIAN SPECIES

BY

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ABSTRACT

Five new species of eriophyid mites under the genus *Calacarus* Keifer, viz. *C. araliae* infesting *Aralia* sp., *C. capsica* infesting *Capsicum frutescens* L., *C. keiferi* infesting *Clerodendrum viscosum* Vent., *C. swietenensis* infesting *Swietenia mahagoni* L. and *C. quisqualis* infesting *Quisqualis indica* L. are described. Relationship of new species with the other known species of the genus have been discussed. A key for separating the Indian species has also been provided.

RÉSUMÉ

Description de cinq nouvelles espèces d'Eriophyidae du genre *Calacarus* Keifer : *C. araliae* sur *Aralia* sp., *C. capsica* sur *Capsicum frutescens* L., *C. keiferi* sur *Clerodendrum viscosum* Vent., *C. swietenensis* sur *Swietenia mahagoni* L. et *C. quisqualis* sur *Quisqualis indica* L. Les relations de ces nouvelles espèces avec les autres espèces du genre sont étudiées et une clé des espèces indiennes est donnée.

INTRODUCTION

During the survey of Eriophyid mites from north east India a number of representative belonging to the genus *Calacarus* Keifer (1940) have been collected. The mites are known to be leaf vagrant. So far 11 species of *Calacarus* are known from different parts of World and out of these 3 species are known from India. Thus in India *Calacarus channabasavannae* Lakundi (1974) infesting *Phyllanthum acidus* at Karnataka state (South India), *Calacarus carinatus* (Green, 1890) infesting *Thea sinensis* at Assam (North East India) and *Calacarus jasmini* Chakrabarti and Mondal (1978) infesting *Jasminum sambac* at West Bengal (North East India) are known.

In this paper, 5 new species have been described from West Bengal. So the genus *Calacarus* now embodies 16 species of which 8 species are found in India. Besides the detailed account of these new species, a key for separating the Indian *Calacarus* species has also been provided here.

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The type slides of the new species have been deposited in the department of Zoology, University of Kalyani, West Bengal except 2 slides of *Calacarus quisqualis* sp. nov. which are with Mr. H. H. Keifer, California, U.S.A.

SYSTEMATIC ACCOUNT

Calacarus araliae sp. nov. (Figs. 1 A-I)

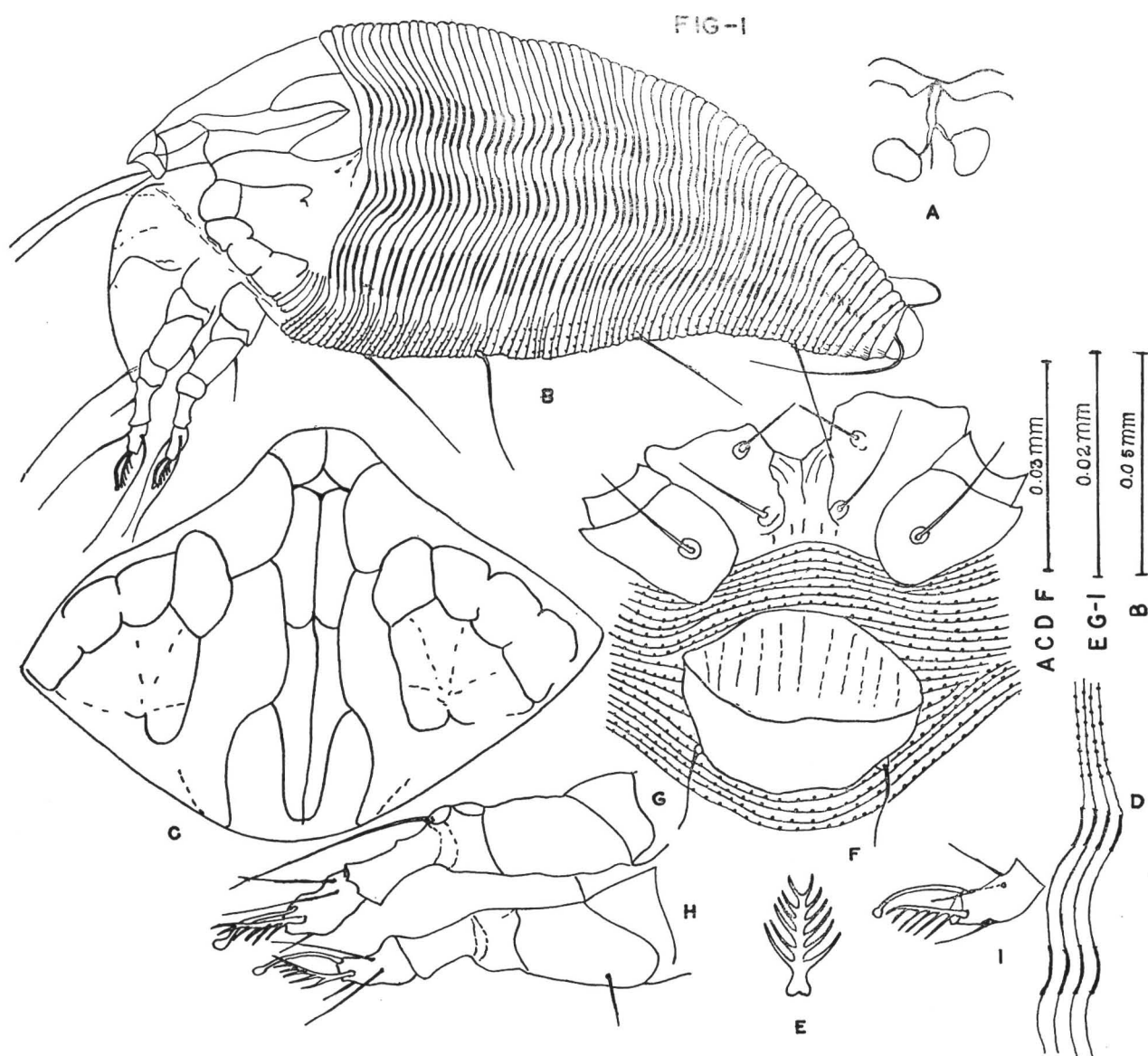
Female : Body 176.88-195.64 μ long, 72.36-80.40 μ wide, robust, fusiform in dorsal view. Colour purple brown with whitish longitudinal waxy ridges. Rostrum 26.50-28.62 μ long, projecting down, subapical seta 7.42 μ long. Shield subtriangular, 29.68-32.86 μ long, 44.52 μ wide, with a small blunt anterior lobe, lacking dorsal tubercles and dorsal setae, represents a net work with characteristic pattern of cells laterally. Anterior cells nearly rectangular, a cell present below the junction of anterior cells; median line distinct and present throughout the shield length; admedian and submedian lines sinuate; admedian connected with the median through a crossline at about 0.5 portion of the shield; submedians originate from 0.3 part of admedian on anterior margin; portion of the shield below lateral cells represents inconspicuous shield design. Forelegs from coxal base 32.40-59.40 μ long; femur 10.80-12.96 μ long, with a seta 16.20 μ long; patella 5.40 μ long, with a patellar seta 33.48-37.80 μ long; tibia 8.64-11.88 μ long, with the tibial seta 6.48-7.56 μ long; tarsus 7.56-12.96 μ long, with two upper tarsal setae, each 27.0 μ long and one lower tarsal seta about 7.56 μ long; claw 8.64 μ long, with knobbed apex; feather claw 6-rayed. Hindlegs 28.08-48.60 μ long; femur 8.64-14.05 μ long, with seta 12.96-16.20 μ long; patella 3.24-4.32 μ long, without patellar seta; tibia 6.48-8.64 μ long, without tibial seta; tarsus 6.48-8.64 μ long, with two upper tarsal setae, each 23.76-27.0 μ long and a lower tarsal seta of 6.48 μ long; claw 7.56-8.64 μ long. Anterior coxae contiguous upto the level of second coxal setae; sternal line present; coxae more or less smooth; first and second setiferous coxal tubercles further apart laterally than the third setiferous coxal tubercles; second coxal tubercles well ahead of transverse line through third coxal tubercles; first coxal setae convergent each 10.60 μ long; second and third coxal setae divergent each 12.72 μ and 28.62 μ long respectively. Abdomen with five longitudinal wax bearing ridges of which the middle one longest; indistinct furrow present in between the two ridges; sternites with microtubercles resting either on or very close to rear sternal ring margin; tergites nonmicrotuberculated; with 63 tergites and 74-80 sternites; lateral seta 44.52-49.82 μ long, on about sternite 14; first ventral seta 49.82-53.0 μ long, on about sternite 30; second ventral seta 31.80-37.20 μ long, on about sternite 54; third ventral seta 21.20-23.32 μ long, on about sternite 74; caudal seta 55.12-58.30 μ long; accessory seta missing. Genitalia 13.78 μ wide and 13.78 μ long; coverflap with about 11 faint longitudinal lines; genital seta 15.90 μ long.

Male : Unknown.

Holotype : ♀, on slide (No. 55/34/78), INDIA : WEST BENGAL, Nadia, Kalyani, 3.IV.1978 from *Aralia* sp. (Araliaceae), coll. S. Mondal.

Paratypes : Many ♀♀, on slide (No. 56/34/78) and on dry leaves, collection data as in the holotype.

Remarks : *Calacarus araliae* sp. nov. is distinct from the other known species of the genus by its prominent median line present throughout the shield length. In having 6-rayed feather claw, the species comes close to *Calacarus quisqualis* sp. nov. and *Calacarus swietensis* sp. nov. From

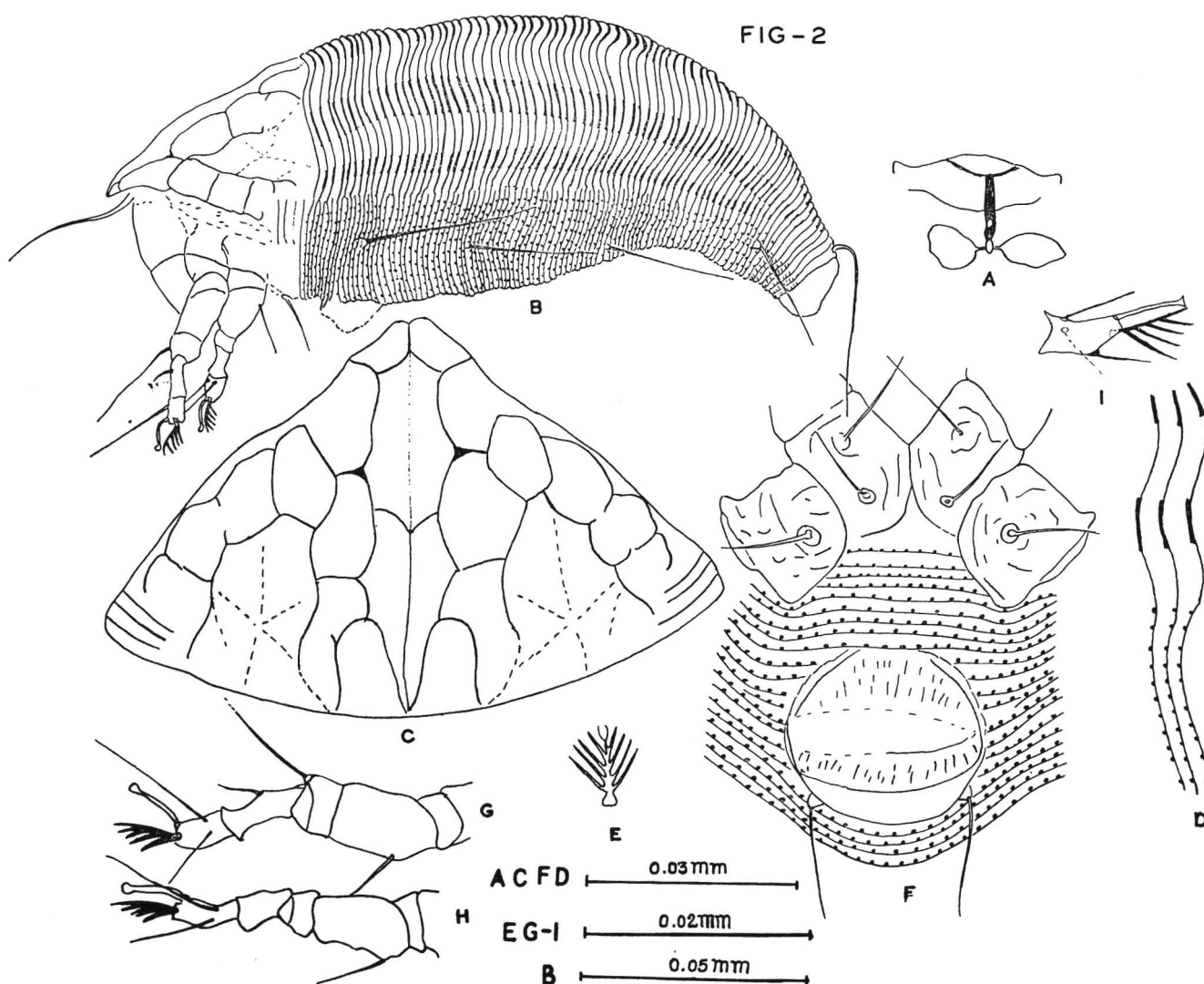


FIGS. 1 A-I. — *Calacarus arallae*. sp. nov., Female : A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) feather claw (Empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg ; I) fore tarsus with lower tarsal seta.

quisqualis, this species differs by the details of shield design, nature of genital coverflap and anterior coxal approximation; from *swietensis* in the nature of genital coverflap and by the nature of shield design.

***Calacarus capsica* sp. nov.** (Figs. 2 A-I)

Female : Body 190.28-225.12 μ long, 67.0-80.40 μ wide, robust, fusiform in dorsal view; colour purple to dark black with 5 whitish longitudinal waxy ridges; body gradually tapering from 0.33 part of abdomen. Rostrum 30.74 μ long, projecting down; subapical seta 8.48 μ long. Shield 30.74-39.22 μ long, 42.40-53.0 μ wide, subtriangular, with a distinct anterior lobe, lacking dorsal tubercles and dorsal setae, representing a network with characteristic pattern of cells



FIGS. 2 A-I. — ***Calacarus capsica* sp. nov.**, Female : A) internal female genitalia; B) lateral view of mite; C) anterior dorsum of mite; D) side view of skin structure; E) feather claw (Empodium); F) coxae and female genitalia; G) foreleg; H) second leg; I) fore tarsus with lower tarsal seta.

laterally ; anterior cells blunt apically ; median line present throughout the shield length, though it is not distinct on anterior half except on anterior lobe ; admedian and submedian lines sinuate ; admedian connected with the median by a cross line at about 0.5 part of shield, bifurcates on 0.6 part of shield from anterior margin, the inner branch of the fork ultimately meets with the median at rear margin of shield, the outer branch meets the rear margin ; posterior part of submedian faint, centrad and meet with the outer branch of the admedian at the rear margin ; three cross lines present between the admedian and submedian ; lateral cells 4 ; a few faint lines present on posterior region of the shield in between submedian and lateral cells. Forelegs from coxal base 57.24-60.48 μ long ; femur 12.56-15.12 μ long, with seta 16.20 μ long ; patella 5.40-6.48 μ long, with seta 37.80 μ long ; tibia 8.64-11.88 μ long, with a tibial seta 10.80 μ long ; tarsus 7.56-8.64 μ long, with two upper tarsal setae, each 25.92-32.42 μ long and one lower tarsal seta 7.56 μ long ; claw knobbed, 9.72 μ long ; feather claw 5-rayed. Hindlegs 49.68-51.84 μ long ; femur 11.58-15.12 μ long, with a femoral seta 10.80-14.04 μ long ; patella 4.32-5.40 μ long, without any seta ; tibia 6.48-8.64 μ long, tibial seta absent ; tarsus 7.56-8.64 μ long with two upper tarsal setae, each 27.0-32.40 μ long and one lower tarsal seta 6.48 μ long ; claw 7.56-9.72 μ long. Anterior coxae connate with distinct median suture, almost without any ornamentation except two or three lines ; posterior coxae ornamented with short dashes ; first setiferous coxal tubercles are at the level of anterior coxal approximation and further apart than second coxal tubercles ; second coxal tubercles somewhat ahead of transverse line between third coxal tubercles ; first coxal seta 8.48 μ long ; second coxal seta 15.90 μ long ; third coxal seta 31.80-37.10 μ long. Abdomen with five longitudinal ridges which gradually becoming narrower caudad ; microtubercles small, distinct, rounded on posterior ring margin and present only on sternites except 6 or 7 thanosomal sternites which are microstriated ; thanosoma with about 75 tergites and 79-87 sternites ; lateral seta 27.56-37.10 μ long, on about sternite 14 ; first ventral seta 37.10-47.72 μ long, on about sternite 36 ; second ventral seta 16.96-23.32 μ long, on about sternite 62 ; third ventral seta 21.20-22.26 μ long, on about sternite 81 ; caudal seta 58.30 μ long. Genitalia 16.98-18.02 μ wide and 10.60-12.72 μ long ; coverflap with many fine but distinct longitudinal lines in two ranks ; genital seta 9.54-10.60 μ long.

Male : Unknown.

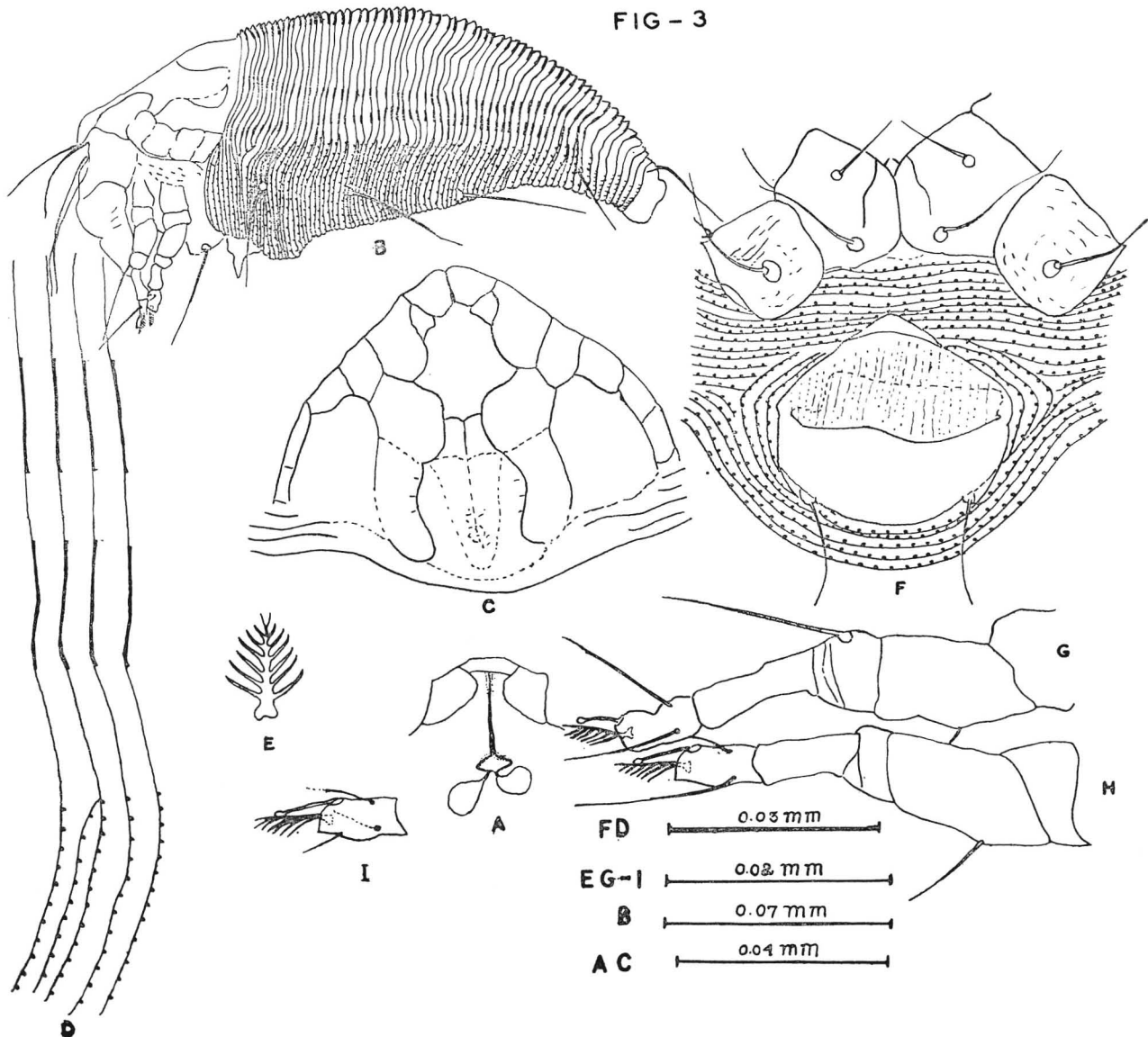
Holotype : ♀, on slide (No. 50/37/78), India : West Bengal, Nadia, Kalyani, 5.v.1978 from *Capsicum frutescens* L. (Solanaceae), coll. S. Mondal.

Paratypes : Many ♀♀, on 2 slides (Nos. 51/37/78 to 52/37/78), collection data as in the holotype ; many ♀♀, on 2 slides (Nos. 53/12/75 to 54/12/75), West Bengal, Nadia, Kalyani, 16.viii.1975 from *Capsicum frutescens*, coll. S. Mondal.

Remarks : This species is very close to *Calacarus carinatus* (Green, 1890) but differs from the latter by its nature of median line and other details of shield characters. From the nature of shield design, *Calacarus capsica* sp. nov. shows some similarities with *C. channabasavannae* Lakkundi (1974) and *C. citrifolii* Keifer (1955). From *channabasavannae* this new species differs in having 5-rayed feather claw and by the nature of scoring on genital coverflap and from *citrifolii*, by the absence of microtubercles on tergites and some details of shield design. Moutia (1958) recorded *Calacarus carinatus* on *Capsicum annum* L. in Mauritius but from the region of the present study only *Calacarus capsica* sp. nov. has been collected on *Capsicum frutescens*.

Calacarus keiferi sp. nov. (Figs. 3 A-I)

Female : Body 214.40-249.24 μ long from anterior shield lobe, 174.20-107.20 μ wide, robust, colour dark black with five longitudinal lines of white wax. Rostrum 31.80-37.10 μ long, down curved ; antapical seta 8.48-10.60 μ long. Shield 40.28-42.40 μ long, 53.0-63.60 μ wide, with a short anterior lobe and lacking dorsal tubercles and dorsal setae, with some curved lines and representing a network ; median line present very distinctly on anterior lobe and on the posterior half of shield and absent on the rest middle part of shield ; admedian lines sinuate, arising from sides of anterior lobe, run posteriorly and outwardly upto 0.3 part of shield, then converge towards the centre where they meet each other by a cross line, then arch backwardly and posteriorly and



FIGS. 3 A-I. — **Calacarus keiferi**, sp. nov., Female : A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) feather claw (Empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg ; I) fore tarsus with lower tarsal seta.

connected by another cross line at about 0.53 part of the shield where the admedians fork, the inner fork is faint while the outer fork is distinct and arch first outwardly, the inwardly and finally outwardly and upwardly to meet rear shield margin and the submedian; submedian posteriorly connected with the admedian; lateral cells 4; faint lines arising from a centre present between submedian and lateral cells. Forelegs from coxal base 59.40-69.12 μ long; femur 11.88-14.04 μ long, with a femoral seta 16.20 μ long; patella 4.32-5.40 μ long, with seta 32.40-53.08 μ long; tibia 9.72-11.88 μ long, without a tibial seta; tarsus 8.64-9.72 μ long, with two upper tarsal setae, each 19.44-27.0 μ long and a lower tarsal seta 8.64 μ long; claw 7.56-8.64 μ long, moderately knobbed; feather claw 7-rayed. Hindlegs 52.90-57.24 μ long; femur 11.88 μ long, with a seta 12.90-14.04 μ long; patella 4.32 μ long without patellar seta; tibia 7.56-9.72 μ long, without tibial seta; tarsus 7.56-8.64 μ long, with two upper tarsal setae, each 23.76 μ long and a lower one which is 5.48-7.56 μ long; claw 7.56 μ long. Anterior coxae connate with a distinct median suture and ornamented with some indistinct lines; hind coxae with some irregular curve lines; first coxal tubercles below the anterior coxal approximatition and 12.72 μ apart from each other; second coxal tubercles at the level of first and second coxal junction and 10.60 μ apart from each other; third coxal tubercles 27.56 μ apart; longitudinal distance among the tubercles are almost same; first coxal seta 8.48 μ long; second coxal seta 12.72 μ long and third coxal seta 26.50 μ long. Abdomen with five longitudinal waxy ridges which are quite prominent and the middle one longest; abdomen with 62 tergites and 87 sternites; tergites nonmicrotuberculated, sternites with fine microtubercles on posterior sternal ring margin except last 4 or 5 sternites which are microstriated; all the thanosomal setae are present except subdorsal one, but they are comparatively smaller; lateral seta 19.08-21.20 μ long, on about sternite 17; first ventral seta 23.32-31.80 μ long, on about sternite 34; second ventral seta 21.20-24.38 μ long, on about sternite 60; third ventral seta 18.02-21.20 μ long, on about sternite 79; caudal seta 26.50-37.10 μ long; accessory seta absent. Genitalia 15.90-21.20 μ wide and 13.78-19.08 μ long; coverflap with many (nearly 24-26) indistinct longitudinal scoring; genital seta 9.54-14.84 μ long.

Male : Unknown.

Holotype : ♀, on slide (No. 55/36/78), India : West Bengal, Nadia, Kalyani, 5.v.1978 from *Clerodendrum viscosum* Vent. (Verbenaceae), coll. S. Mondal.

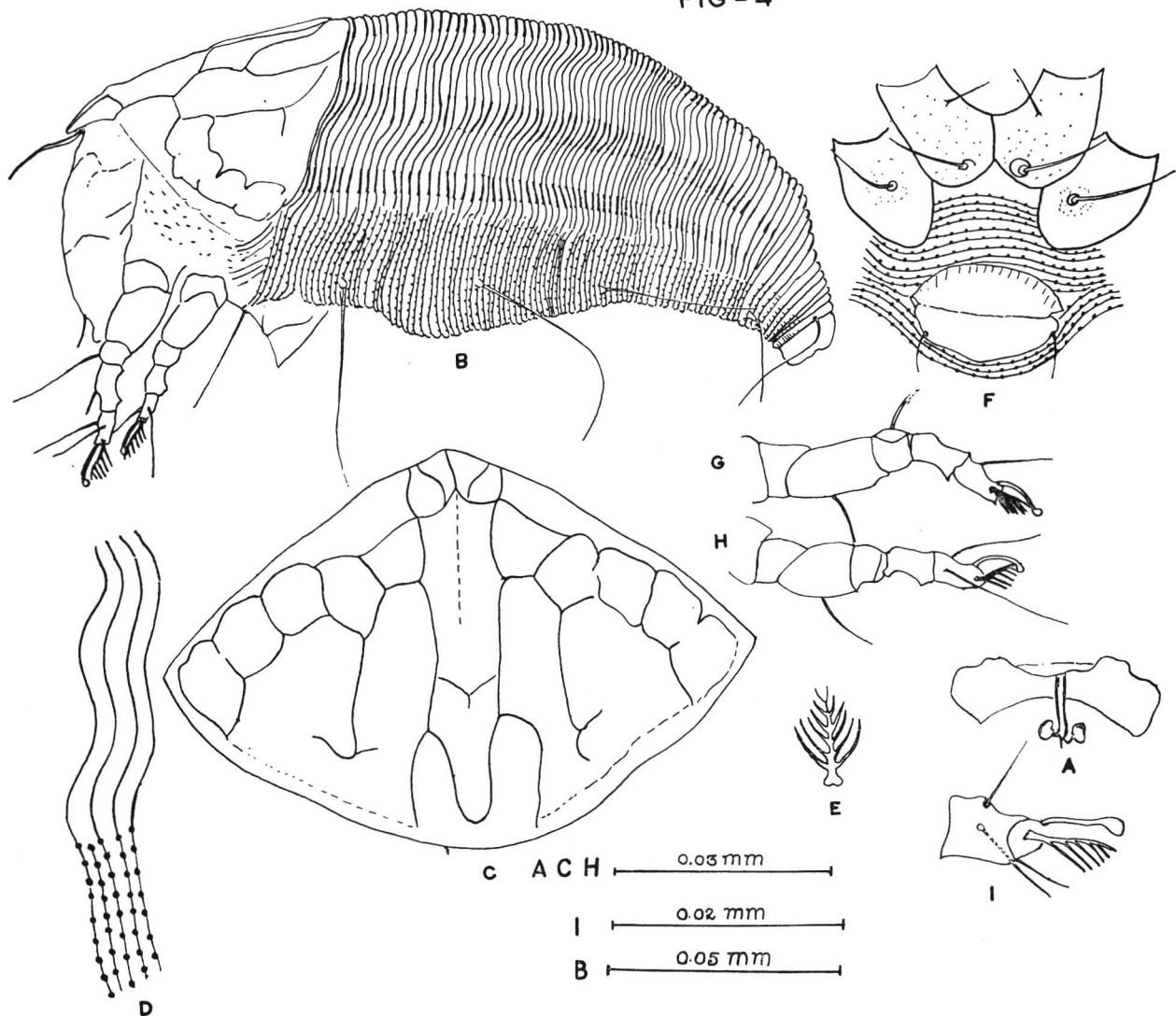
Paratypes : Many ♀♀, on 3 slides (Nos. 56/32/77 to 58/32/77), West Bengal, Nadia, Kalyani, 18.xii.1977 from *Clerodendrum viscosum*, coll. S. Mondal.

Remarks : By the absence of foretibial seta and having 7-rayed feather claw, *Calacarus keiferi* sp. nov. can easily be distinguished from all other known species of the genus except *Calacarus tejonis* Keifer (1952) and *Calacarus mussaendae* Keifer (1977). But from both these species, this new species differs by the nature of shield design. This species also comes rather close to *Calacarus alocasiae* Keifer (1978) but can be distinguished from the latter in having median line on posterior half of shield, scoring on genital coverflap in single row and with 7-rayed feather claw besides other characters.

***Calacarus quisqualis* sp. nov. (Figs. 4 A-I)**

Female : Body 165.44-192.96 μ long, 53.60-67.00 μ wide, robust and gradually tapering from nearly middle part of abdomen; body colour purplish, but young ones are quite white with whitish longitudinal waxy ridges. Rostrum 24.38-28.62 μ long, moderately large and projecting down;

FIG - 4



FIGS. 4 A-I. — *Calacarus quisqualis* sp. nov., Female : A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) feather claw (Empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg ; I) fore tarsus with lower tarsal seta.

subapical seta 6.36-8.48 μ long. Shield 27.56-34.98 μ long and 33.92-46.64 μ wide ; subtriangular, lacking dorsal tubercles and dorsal setae, represent a network with characteristic pattern of cells laterally ; anterior cells by division forming four cells ; median line indistinct and present only on 0.4-0.5 part of the shield anteriorly ; admedian and submedian lines sinuate and connected with each other by crosslines ; admedian bifurcates on 0.6 part of shield from rear margin, the inner part unites with its component part of other side just anterior to rear margin ; lateral cells 4. Forelegs from coxal base 38.88-43.20 μ long ; femur 11.88-14.04 μ long, with a seta 11.88-12.96 μ long ; patella 4.32-5.40 μ long, with a seta 28.08 μ long ; tibia 7.56-9.72 μ long, with a tibial seta 5.40-9.72 μ long ; tarsus 7.56-8.64 μ long with two upper tarsal setae of equal length, each 23.42-25.92 μ long and one lower tarsal seta, 6.48-7.56 μ long ; claw 7.56 μ long and knobbed ; feather claw 6-rayed. Hindlegs 35.64-42.40 μ long, femur 11.88-14.04 μ long, with a femoral

seta 15.12 μ long ; patella 3.24-4.32 μ long, without patellar seta ; tibia 6.48-7.56 μ long, without tibial seta ; tarsus 6.48-7.56 μ long, with two upper tarsal setae, each 21.60-27.0 μ long and one lower tarsal seta 6.48 μ long. Anterior coxae divergent, central connation short ; first setiferous coxal tubercles further apart than second ones and at the level of anterior coxal approximation ; second setiferous coxal tubercles ahead of the transverse line across the third coxal tubercles ; both the coxae with a few curved lines ; first coxal seta 7.42 μ long ; second coxal seta 19.08 μ long and third coxal seta 24.38 μ long. Abdomen with 5 longitudinal white waxy ridges which gradually become narrower and ended simultaneously ; microtubercles small, distinct, rounded and present only on anterior ring margin of sternites except a few last sternites which are microstriated ; thanosoma with about 85-92 sternites and 66-77 tergites ; telosoma shortly bilobed terminally. Abdominal setae very long, lateral seta 23.32-38.16 μ long on about sternite 12 ; first ventral seta 37.10-49.82 μ long, on about sternite 34 ; second ventral seta 21.20-33.90 μ long, on about sternite 59 ; third ventral seta 15.90-21.20 μ long, on about sternite 85 ; caudal seta 31.80-48.76 μ long ; accessory seta absent. Genitalia 8.48-9.54 μ long and 10.60-13.78 μ wide ; coverflap with a number of very short longitudinal scoring near the anterior coverflap margin ; genital seta 7.42-10.60 μ long.

Male : Unknown.

Holotype : ♀, on slide (No. 72/55/78), India : West Bengal, Nadia, Kalyani from *Quisqualis indica* L. (Combretaceae), coll. S. Mondal.

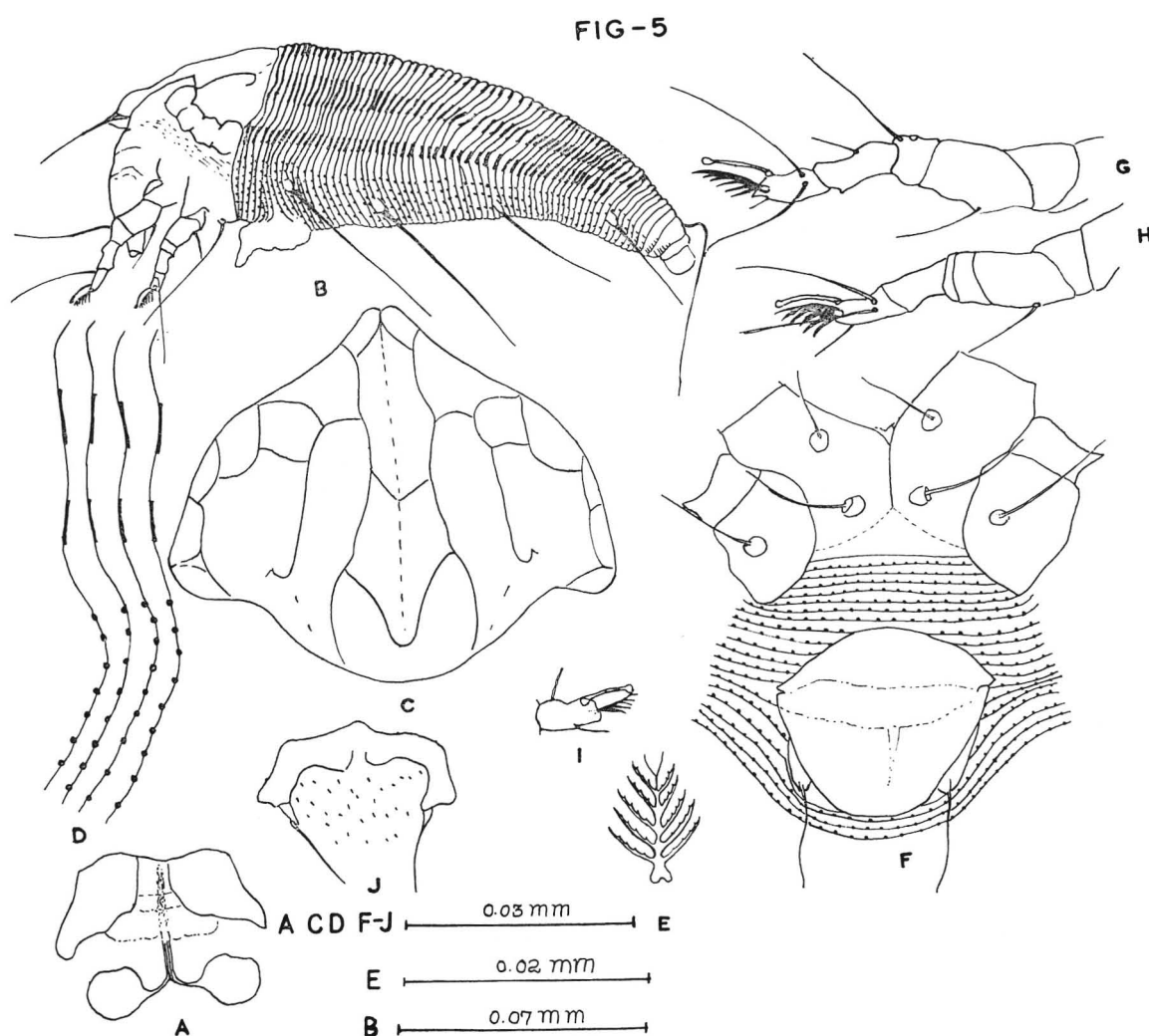
Paratypes : Many ♀♀, India : West Bengal, Nadia, Kalyani, 5.v.1975 on 5 slides Nos. 59/1/75 to 63/1/75 ; many ♀♀, on 5 slides (Nos. 64/16/76 to 68/16/76), West Bengal, Nadia, Kalyani, 4.viii.1976 ; many ♀♀, on 3 slides (Nos. 69/27/77 to 71/27/77), West Bengal, Nadia, Kalyani, 5.vii.1975 from *Quisqualis indica*, coll. S. Mondal.

Remarks : So far no *Calacarus* sp. is known with 6-rayed feather claw and longer thanosomal hairs except *Calacarus quisqualis* sp. nov. and the *Calacarus swietensis* sp. nov. The former species can be distinguished from latter by the nature of genital coverflap and shield design particularly the median line.

***Calacarus swietensis* sp. nov. (Figs. 5 A-I)**

Female : Body 155.04-175.44 μ long, 61.20-69.36 μ wide, robust, fusiform in dorsal view ; colour purple with whitish, shiny longitudinal waxy ridges ; body tapering from rear shield margin to posterior margin. Rostrum 18.02 μ long, projecting down ; subapical seta 6.36 μ long. Shield 28.62-34.98 μ long, 38.16-42.40 μ wide ; lacking dorsal tubercles and dorsal setae ; represents a network with characteristic pattern of cells laterally ; anterior cells blunt apically ; median line very faint ; admedian and submedian lines sinuate and connected with each other by cross lines ; admedians bifurcate at 0.35 part of shield from rear margin ; the inner fork meet with the complement part of other side just anterior to the rear shield margin ; lateral cells 4. Forelegs from coxal base 31.80-32.80 μ long ; femur 6.36-7.42 μ long, with a femoral seta 7.42 μ long ; patella 2.12-3.18 μ long, with a patellar seta 18.02 μ long ; tibia 4.24-5.30 μ long, with a seta 15.90 μ long originating from 0.4 part of the tibia ; tarsus 3.18-5.30 μ long, with two upper tarsal setae, each 13.78-15.90 μ long and a lower tarsal seta 3.18 μ long ; claw 4.24-5.30 μ long, knobbed ; feather claw 6-rayed. Hindlegs 25.44-26.50 μ long ; femur 6.36-7.42 μ long, with a femoral seta

7.42 μ long ; patella 2.12-3.18 μ long, without any patellar seta ; tibia 3.18-4.24 μ long, without tibial seta ; tarsus 3.18-4.24 μ long, with two upper tarsal setae, each 12.72-14.84 μ long and a lower tarsal seta 2.12 μ long ; claw 4.24-5.30 μ long. Anterior coxae contiguous with a distinct median suture and with a few curve lines basally ; hind coxae with a few curve lines particularly around the third coxal tubercles ; first setiferous coxal tubercles 7.42 μ apart and situated above the level of anterior coxal approximation ; second setiferous coxal tubercles 5.30 μ apart and well ahead of transverse line through third coxal tubercles ; third setiferous coxal tubercles 16.96 μ apart ; first coxal seta 6.36 μ long ; second coxal seta 12.72 μ long and third coxal seta 28.62 μ long. Abdomen with five waxy ridges of which middle one is longest ; abdomen widest at 0.2 part of thanosoma, gradually tapering posteriorly upto 0.66 part and less so on rest of the thanosoma ; microtubercles small, distinct, rounded, present on the ring margin only on sternites except last five or six sternites which are microstriated ; microtubercles absent on tergites ; thanosoma with 65 tergites and 73 sternites ; ventral thanosomal setae quite longer ; lateral



FIGS. 5 A-I. — *Calacarus swietensis* sp. nov., Female : A) internal female genitalia ; B) lateral view of mite ; C) anterior dorsum of mite ; D) side view of skin structure ; E) feather claw (Empodium) ; F) coxae and female genitalia ; G) foreleg ; H) second leg ; I) fore tarsus with lower tarsal seta ; J) male genitalia.

seta 31.80 μ long, on about sternite 15 ; first ventral seta 29.68-31.80 μ long, on about sternite 27 ; second ventral seta 24.38-26.50 μ long, on about sternite 46 ; third ventral seta 15.90-21.20 μ long, on about sternite 67 ; caudal seta 34.98 μ long ; accessory seta absent. Genitalia 11.66-13.78 μ wide and 11.66 μ long ; coverflap smooth ; genital seta 9-54.11.66 μ long.

Male : Body 150.96-155.04 μ long, 53.04-65.28 μ wide ; shield 30.74 μ long, 38.16 μ wide ; rostrum 14.84 μ long with the subapical seta 7.42 μ long ; foreleg 28.62-31.80 μ long and hind leg 26.50-29.68 μ long ; genitalia 13.78 μ wide ; genital seta 8.48-10.60 μ long.

Holotype : ♀, on slide (No. 79/35/78), India : West Bengal, Nadia, Kalyani, 24.iv.1978 from *Swietenia mahogoni* L. (Meliaceae), coll. S. Mondal.

Paratypes : Many ♀♀, and a few ♂♂, on 2 slides (Nos. 77/35/78 to 78/35/78), collection data as in the holotype ; many ♀♀ on 4 slides (Nos. 73/31/77 to 76/31/77), West Bengal, Nadia, Kalyani, 5.xi.1977 from *Swietenia mahogoni*, coll. S. Mondal.

Remarks : This species is very close to *C. quisqualis* sp. nov., the differences have been mentioned under *quisqualis* sp. nov.

KEY TO THE INDIAN SPECIES OF *Calacarus* KEIFER

1. Feather claw 5-rayed..... 2
Feather claw more than 5-rayed..... 4
2. Coverflap with 15-17 scorings arranged in a single row ; median line present only on posterior half of the shield ; granules present at the junction of tergites and sternites ; first coxae connate apically ; on *Jasminum sambac*..... *jasmini* Chakrabarti and Mondal
Coverflap with discontinuous lines in two ranks..... 3
3. Median line and submedian lines apparently absent ; claws with large knob ; rudiments of dorsal tubercles present ; on *Thea sinensis*..... *carinatus* (Green)
Median line present distinctly on anterior lobe and posterior half and faintly present on rest of middle part of shield ; only posterior coxae ornamented ; numbers of tergites greater than sternites ; on *Capsicum frutescens*..... *capsica* sp. nov.
4. Lower tarsal setae absent ; feather claw 8-rayed ; median line confined to a short distance at the anterior end of shield ; on *Phyllanthus acidus* *channabasavannae* Lakkundi
Lower tarsal seta present ; feather claw 6 or 7-rayed..... 5
5. Genital coverflap smooth ; median line faint throughout the shield length except on anterior lobe ; on *Swietenia mahogoni*..... *swietensis* sp. nov.
Genital coverflap with some distinct and indistinct lines..... 6
6. Median line distinctly present throughout the shield length ; a cell present just behind the anterior lobe ; on *Aralia* sp..... *araliae* sp. nov.
Median line absent or partly present on shield..... 7
7. Foretibial seta absent ; only two cells present behind the anterior lobe ; on *Clerodendrum viscosum*.
keiferi sp. nov.
Foretibial seta present ; each apical cells by division form four cells ; on *Quisqualis indica*.....
quisqualis sp. nov.

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