

THE FIRST REPORT OF THE ACARINE SUBORDER OPILIOACARIDA  
FROM INDIA, WITH DESCRIPTION OF NEW GENUS, *INDIACARUS*,  
AND A NEW SPECIES, *INDIACARUS PRATYUSHI*.

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(Accepted January 2007)

OPILIOACARIDA,  
*INDIACARUS*,  
WESTERN GHATS, INDIA.

**SUMMARY:** A recent collection of Opilioacarids from Lohgarh (Western Ghats), Lonavala, District Pune, India, is the first report of the suborder Opilioacarida from the Indian subcontinent. Based on a comparative study of these specimens we propose a new genus *Indiacarus* gen. nov. with type species *I. pratyushi* sp. nov.. The presence of two setae on the basal segment of chelicerae, four denticulations on the movable finger of chelicerae, and setae on the ovipositor, as well as legs I that are twice as long as the idiosoma give the genus its characteristic features. This reporting of opilioacarids from India raised the scope of further study of opilioacarid diversity from Indian subcontinent.

INTRODUCTION

The suborder Opilioacarida (Notostigmata) of Acari is an interesting subject of study, both for its status as a group of primitive mites, and its superficial resemblance with the order Opiliones, which has given it the characteristic name. The first report of the group was made by the Danish zoologist D. J. WITH from Algeria (WITH, 1904). The suborder is characterized by the presence of four pairs of dorsal spiracular openings just behind the fourth coxa. The suborder is represented by only one family, Opilioacaridae. The family is widely distributed throughout the tropical and warm temperate zones of the world. In spite of this, the group is often neglected during field collection mostly due to its small size and obs-

cure habits. Specimens are often mistaken for immature Opiliones.

So far only 19 species in 9 different genera have been described (VÁZQUEZ GONZÁLEZ & KLOMPEN, 2002). Eight genera, *Adenacarus* Van der Hammen 1977, *Opilioacarus* With 1902, *Panchaetus* Naudo 1963, *Paracarus* Chamberlin and Mulaik 1942, *Phalangiacarus* Coineau and Van der Hammen 1977, *Salfacarus* Van der Hammen 1977, *Siamacarus* Leclerc 1989, and *Vanderhammenacarus* Leclerc 1989, have been reported from Old World, while only one genus, *Neocarus* Chamberlin and Mulaik 1942, has been reported from the New World. None of the Old World genera has been reported from the Indian subcontinent. The nearest records of the group are for *Paracarus* from Kazakhstan (VAN DER HAMMEN,

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1968) and *Siamacarus* and *Vanderhammenacarus* from Thailand (LECLERC, 1989).

In a recent survey of Lohgarh (Western Ghat), 18°42'N, 73°29'E, Altitude 1035 MSL, near Malawali, Lonavala, Pune, Maharashtra, India, we were able to collect some Opilioacarid specimens from near the base of the Lohgarh fort. These specimens constitute the first report of the group from India. The specimens do not fit any of the existing generic concepts. The goal of this paper is to describe a new genus, *Indiacarus* gen. nov., and species *Indiacarus pratyushi* sp. nov., based on this new material.

#### MATERIAL AND METHODS

The majority of the specimens were collected between December, 2005 to July, 2006 in different survey trips to Lohgarh. The specimens were collected from under stones with a brush and placed in 70% alcohol. The specimens were studied in cold diluted lactic acid (one part lactic acid and one part distilled water). They were mounted in temporary cavity slides and studied under compound microscopes. Measurements are based on slide mounted specimens using an optical micrometer.

#### *Indiacarus* gen. nov.

*Diagnosis:* Adults with unique combination of two pairs of eyes, two setae on the basal segment of the chelicerae, a row of four denticles on the outer margin of the movable digit, five leaf-like setae on the palp tarsus, an ovipositor with five setae near the tip, and legs I twice as long as the idiosoma.

*Type species:* *Indiacarus pratyushi* by original designation.

*Etymology:* The generic epithet is based on the name of the country, India, in which these specimens were discovered first.

#### *Indiacarus pratyushi* sp. nov.

*Diagnosis:* as for genus

*Description:* Body small in size ranging from 1.5-2.4 mm in size (N=5M, 2F, most of these specimens were damaged and disfigured because of treatment of lactic acid for preparation of temporary slides). The

studied male specimen was about 1.6 mm in length (podosoma 0.6mm + hysterosoma 1.0 mm); highest width being 0.87 mm at middle abdominal region (FIG. 1A). Body usually dark violet in colour, which seems black, with few pale yellow or whitish patches. Cuticle unsclerotized and leathery in texture.

*Idiosoma.* The anterior portion of the propodosomal shield bears 15-16 minute blunt setae at its tip (FIG. 1B) and also few setae in rows on lateral border and on the dorsal surface of the podosomal shield. Of these the pair of setae on the anterior tip of propodosoma comparatively larger. The idiosomal region behind gnathosoma divided into two parts by transverse grooves (FIG. 1A): an anterior dorsal shield and an unsclerotized region that might be equivalent to either the hysterosoma (KLOMPEN, 2000) or opisthosoma (VAN DER HAMMEN, 1966). The shield region bears two pairs of ocelli latero-posterior on a pair of slightly elevated regions placed about 0.4 mm apart from each other (FIG. 1A). Four pairs of stigmata (FIG. 1C) present latero-dorsally on the opisthosoma, slightly posterior to the coxae IV. The opisthosoma is characterized by the presence of rows of lyrifissures and weak transverse sutures. The pre-anal segment (segment XVIII sensu VAN DER HAMMEN (1966)), with about 4 dorsal setae (FIGS. 1D, 2A). Few small projections also seem to be present on the lateral side of the segments XVII. Anal operculum with a row of 9-10 setae on each valve in a row running towards ventral side (FIGS. 1, D. and fig. 2, A.).

*Venter.* Sternapophysis (FIG. 1E) flattened and pointed with two pairs of setae, one pair at the tip and one pair little below. Sternum and abdomen whitish gray in colour. Sternal region (FIG. 5A) of male shows, sternal capsules elliptical in shape with 2-3 pointed setae each. Sternal region between sternal capsule and pregenital region with two types of setae: 4-5 blunt and broad setae arranged laterally on each side of 2 pairs of median pointed setae.

Male genital region (FIG. 5A): Pregenital capsules each with elevated borders along internal margin and 5 blunt setae and one seta with pointed tip. Pregenital region with minute setae of both types (blunt and pointed). Genital region much wider than long, provided with about 6-7 minute pointed setae. Female genital region (FIG. 5B): Female pregenital capsules with six setae each, one of which with a pointed tip,

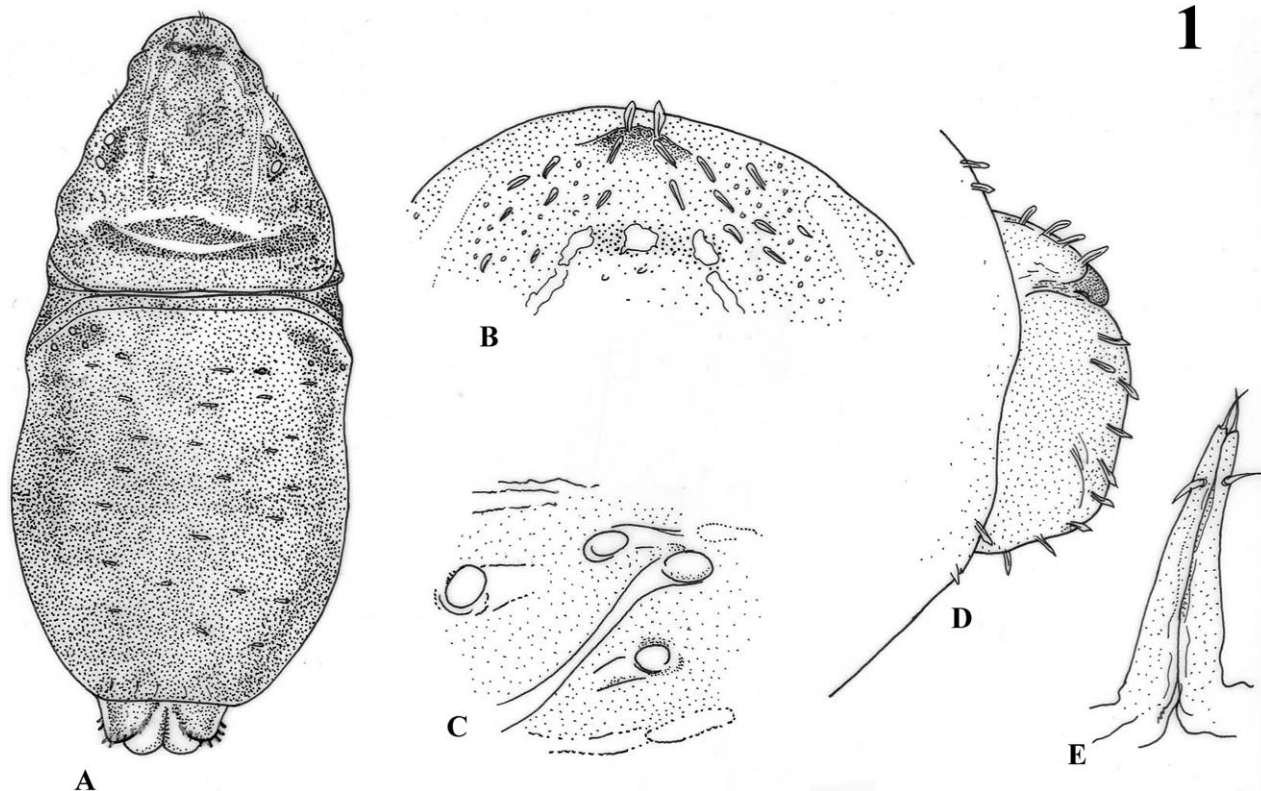


FIG. 1: *Indiacarus pratyushi*. A. — Idiosoma, dorsal view; B. — Tip of propodosomal shield, dorsal view; C. — Stigmata position; D. — Anal valves, lateral view; E. — Sternapophysis, ventral view.

remainder broad with a blunt tip. Pregenital region between capsules, with single blunt and broad type seta. Genital region with two pairs of minute pointed setae and one or two small blunt and broad type setae. Ovipositor (FIG. 5C, D.) cylindrical in structure. Tip with middle suture. Below the tip the distal rim with five small setae arranged in a row.

*Gnathosoma*. The subcapitulum (FIG. 2B) with well-developed rutella and WITH's organ. Rutellum with five teeth, the basal tooth being placed little apart from the top four contiguous ones and of same size. WITH's organ appears membranous and discoidal in shape. A single paralabial setae (horn like structure) present on both sides towards the base of WITH's organ below the row of circum buccal setae. Four pairs of circum-buccal type setae arranged on both sides extending from the base of lateral lips of labrum to the base of rutellum; 8-9 sub-capitular setae.

*Chelicera* (FIG. 2C) three segmented, basal segment with two setae at distal region. Middle segment with a dorsal hump towards distal part and with three setae. The movable and immovable digits each with a single large tooth. Movable digit ventrally with four distinct denticles (FIGS. 2D, E.). Pedipalp (FIG. 2F): Trochanter short, with small ventral spines. Femur laterally compressed with few of dorsal blunt setae and few ventral setae towards distal part. Two to three trifoliate setae with minute pointed spinule at the middle tip, present at the dorsal surface towards the distal part. Genu little shorter than the femur, with row of dorsal blunt setae bending towards front, extends from proximal to distal region and few ventral setae. Few (1-3) trifoliate setae present at dorsal surface on the proximal region. Tibia shorter than genu, with row of dorsal pointed setae and few ventral blunt setae and pointed setae. Tarsus (FIGS. 3A, B) short, beset with rows of slender pointed setae on

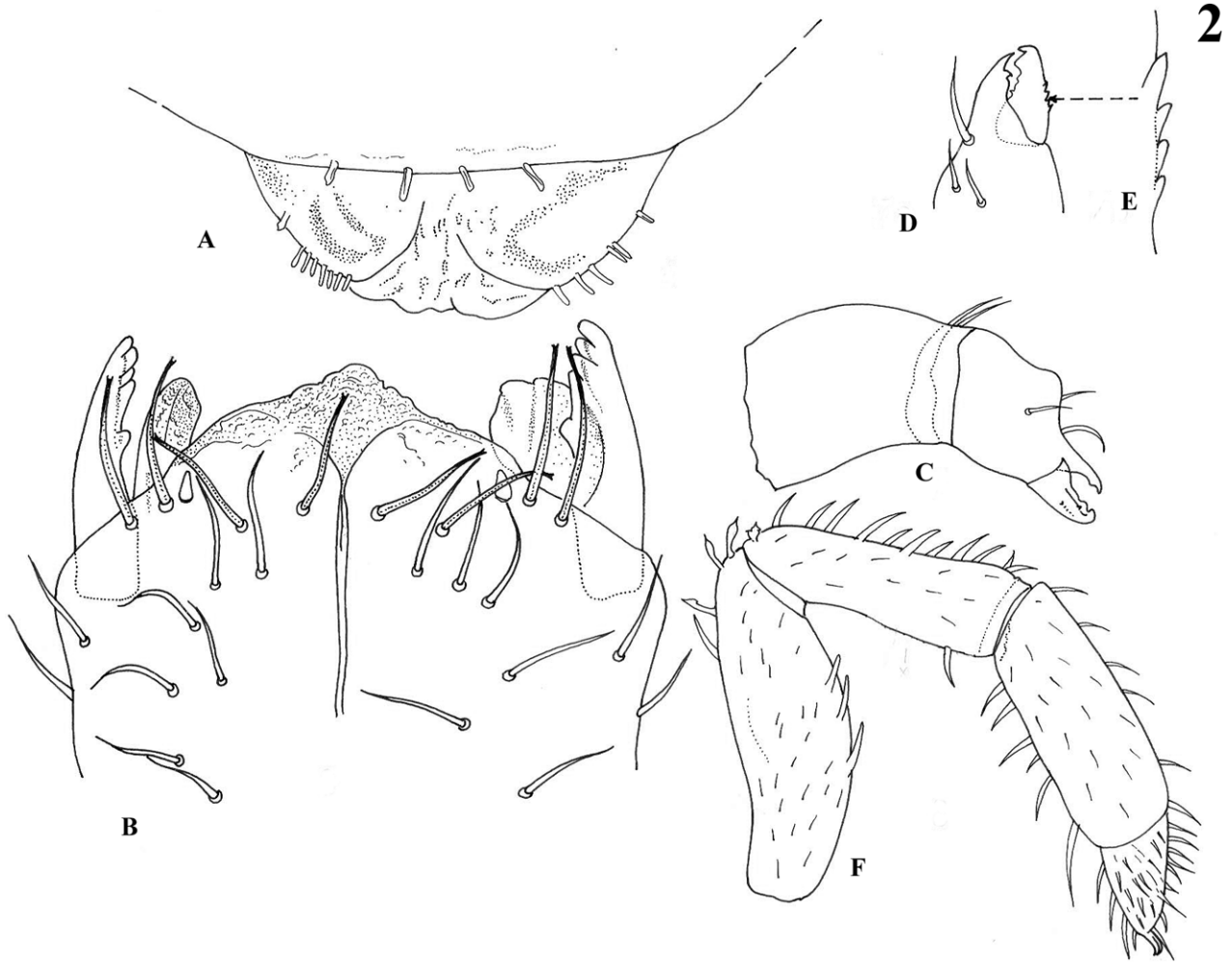


FIG. 2: *Indiacarus pratyushi*. A. — posterior portion of idiosoma showing anal cone and segment XVIII, dorsal view; B. — Subcapitulum, ventral view; C. — Chelicera, lateral view; D. — Chela of chelicera (enlarged), lateral view; E. — Dentition on the outer lateral border of movable finger of chelicera (enlarged); F. — Pedipalp, lateral view.

dorsal and ventral side and latero-ventrally with five leaf-like setae (FIG. 3A). Pretarsus with two well developed, curved claws at its tip.

**Legs.** Leg I very long (more than double the length of idiosoma). Trochanter I long and broad; femur long, narrow and tubular, divided into a short basifemur and long (almost ten times as long) telofemur; genu, tibia and tarsus long, narrow and tubular. Sensory region of tarsus I with a complicated setal arrangement, including morphologically diverse setal morphologies (FIG. 3C). Pretarsus with pair of sessile claws. Leg II (FIG. 4A) -IV normal in size; each

pretarsus with a pair of plain claws and an arolium or apotele (sucker like structure) at its tip (FIG. 4B). The legs from trochanter to basitarsus armed with small trifoliate setae, arranged in two to three rows, each with a minute spinule at the middle tip (FIG. 4A). In between those setae, rows of slender, pointed, dorsal setae.

**Type data:** *Holotype* male and 3 *paratypes* (2 males, 1 female) deposited at National Collection, Zoological Survey of India, Kolkata. Additional *paratypes* (4 males, 1 female and 3 nymphs) deposited in authors collection.

Legs: length (mm)	Trochanter		Femur		Genu	Tibia		Tarsus				Total
	Basi	Telo	Basi	Telo		Basi	Telo	Basi	Telo	Acro	Pre-tarsus + apotele	
<b>Leg 1</b>	0.37		0.1	1.0	0.77	0.73	0.67	0.4	0.45		—	4.49
<b>Leg 2</b>	0.18		0.63		0.3	0.37		0.42	0.37	0.08	0.025	2.375
<b>Leg 3</b>	0.23	0.18	0.45		0.27	0.35		0.4	0.4	0.1	0.025	2.405
<b>Leg 4</b>	0.23	0.23	0.67		0.45	0.5		0.5	0.5	0.1	0.025	3.205

TABLE 1. *Indiacarus pratyushi*: length of leg articles (mm).

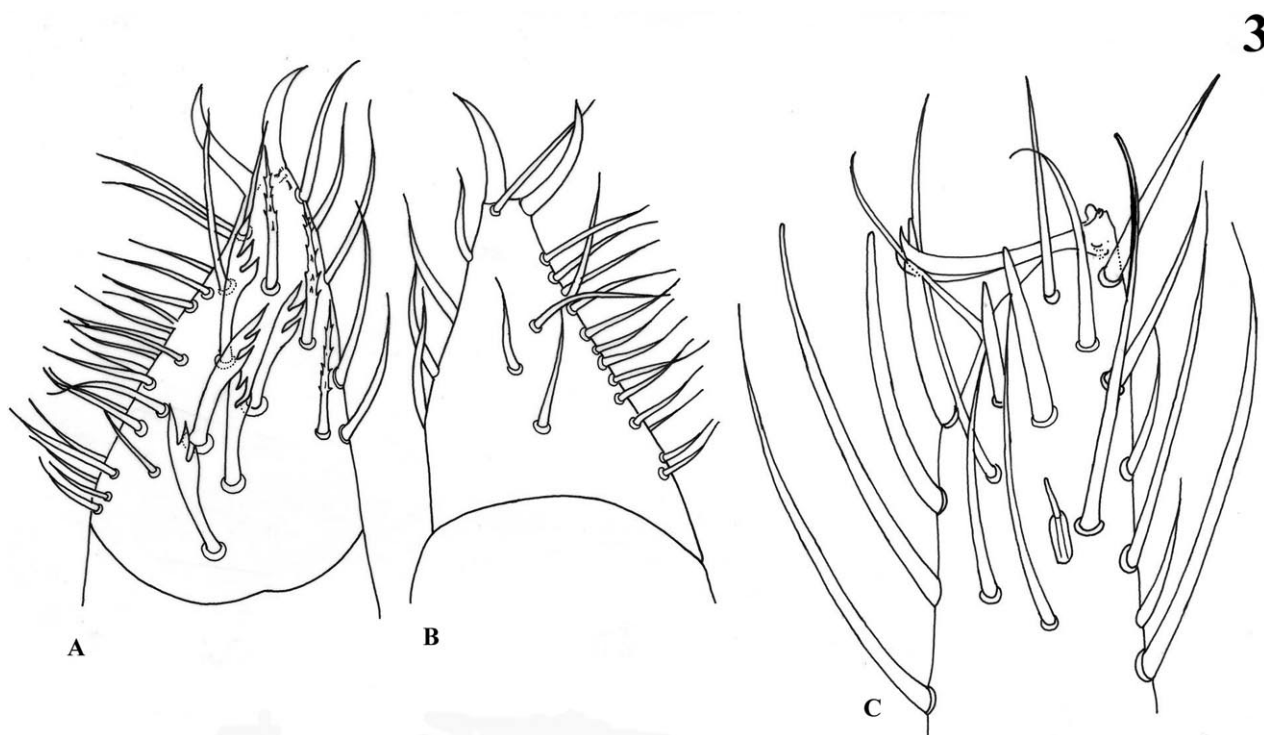


FIG. 3: *Indiacarus pratyushi*. A. — Tarsal region of pedipalp, ventro-lateral view, showing leaf setae; B. — Tarsal region of pedipalp, dorsal view; C. — Tarsus of leg I, dorsolateral view.

*Type Locality*: Lohgarh (Western Ghat), 18°42'N, 73°29'E, Altitude 1035 MSL, near Malawali, Lonavala, Pune, Maharashtra, India.

*Etymology*: The specific epithet is based on the name Pratyush K. MOHAPATRA, research scholar, Utkal University, who made the first collection of this species.

*Habits and habitat*: The opilioacarids were mostly found in moist, shaded areas with a well developed

litter layer. Most specimens were found clinging to the under-surface of rocks.

#### DISCUSSION

*Indiacarus* gen. nov. differs substantially from previously described genera. The genus differs from the geographically near genera *Paracarus* and *Siamaca-*

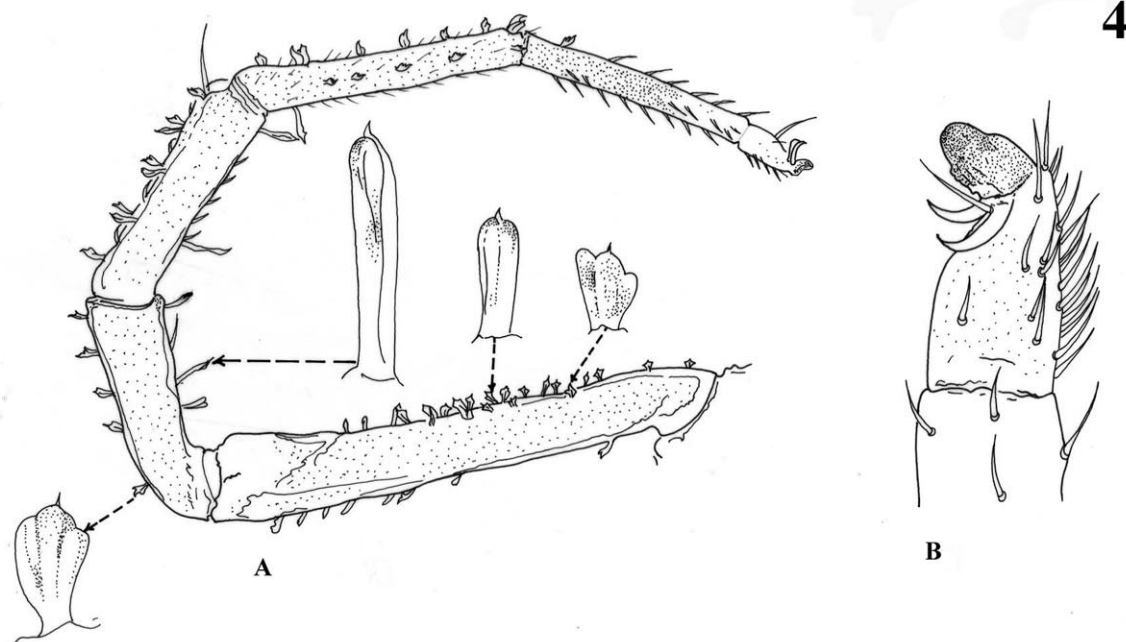


FIG. 4: *Indiacarus pratyushi*. A. — Leg II with setae, lateral view; B. — Tarsus of leg IV, lateral view.

rus by: (1) having two pairs of eyes and a discoid membranous WITH's organ. *Paracarus* and *Siamacarus* have three pairs of eyes and a biramous WITH's organ (VAN DER HAMMEN, 1968; LECLERC, 1989). (2) *Indiacarus* has two setae on the basal segment of the chelicera instead of one as in *Siamacarus*. Whereas the basal segment of chelicerae of *Paracarus* has no setae. *Indiacarus* differs from *Adenacarus* by (1) having two, rather than four setae on each sternapophysis (VAN DER HAMMEN, 1969); (2) having the opisthosomal intersegmental furrows not distinct, rather than distinct (as in *Adenacarus*). Segments XV- XVII in *Indiacarus* are without dorsal setae. In this regard the genus clearly differs from *Vanderhammenacarus*, *Panchaetes*, and *Salfacarus*, which have dorsal setae on those segments (VAN DER HAMMEN, 1977; LECLERC, 1989). *Indiacarus* differs from *Neocarus* by having four dorsal setae on segment XVIII, rather than one (Hammen, 1966; VÁZQUEZ GONZÁLEZ & KLOMPEN, 2002).

*Opilioacarus* and *Phalangi acarus* most closely resemble *Indiacarus*. *Indiacarus* differs from *Opilioacarus* by having extremely long legs I, about twice as long as the idiosoma (length of leg I: length of idiosoma = 2.50-2.80), whereas the legs I of *Opilioacarus* are similar to, or slightly longer than, the length of the idiosoma (GRANDJEAN, 1936). The long legs I appear to be shared with *Phalangi acarus*. *Indiacarus* differs from *Phalangi acarus*, by (1) the presence of only 5 leaf-like setae on the palp tarsus (*Phalangi acarus* has 7); (2) the colour of legs I, dark except for the tarsal region in *Indiacarus* and pale in colour in *Phalangi acarus*; (3) the absence of distinct violet rings on the legs II-IV; (4) the presence of 6 setae, 4 dorsal, 2 ventro-lateral, on segment XVIII (*Phalangi acarus* has 7 (COINEAU & VAN DER HAMMEN, 1979); (5) the shape of sternapophyses, slender and pointed in *Indiacarus*, robust and blunt in *Phalangi acarus*.

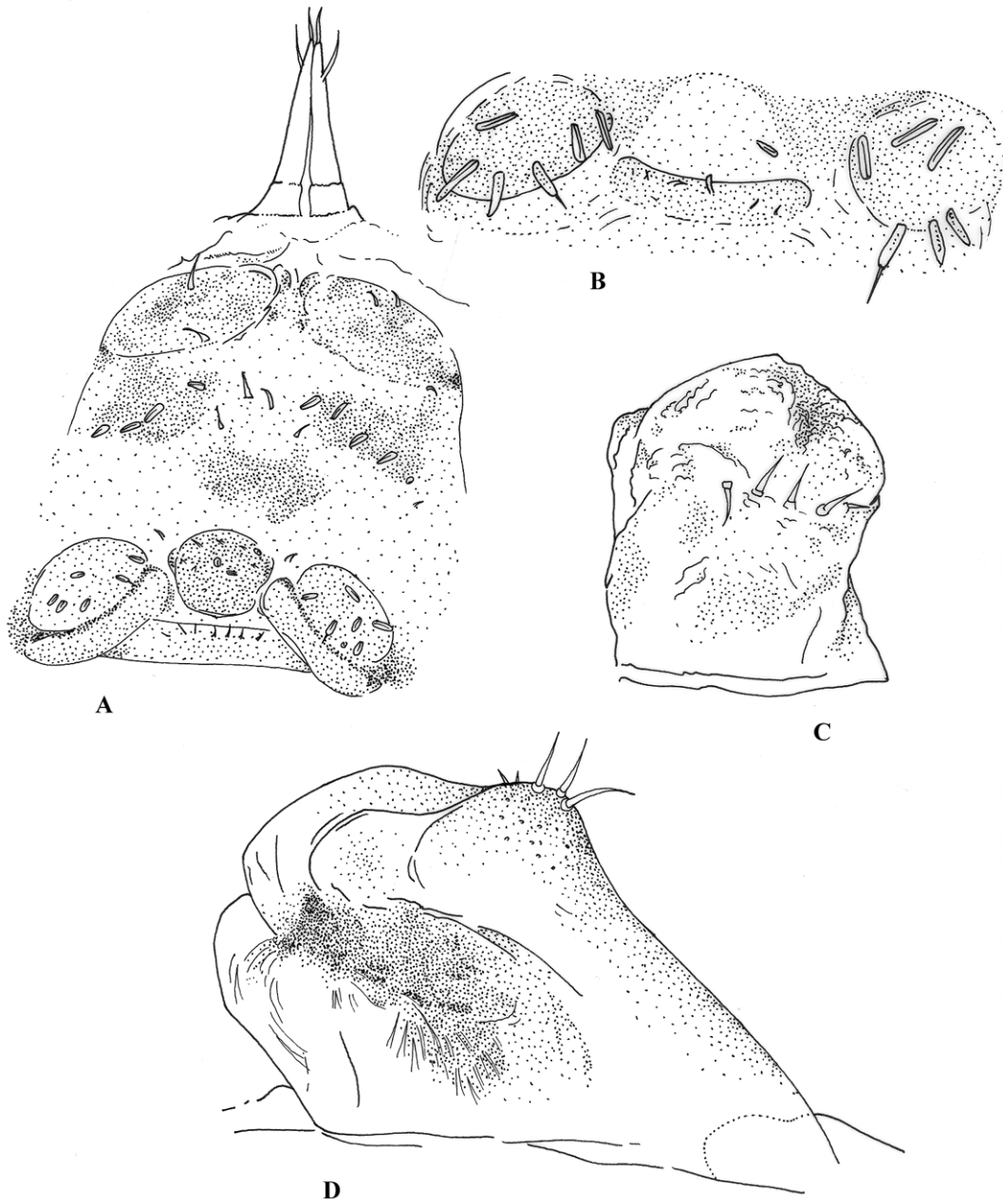


FIG. 5: *Indiacarus pratyushi*. A. — Sternogenital region of male, ventral view; B. — Genital region of female, ventral view; C. — Evaginated ovipositor, dorsal view; D. — Evaginated ovipositor, lateral view.

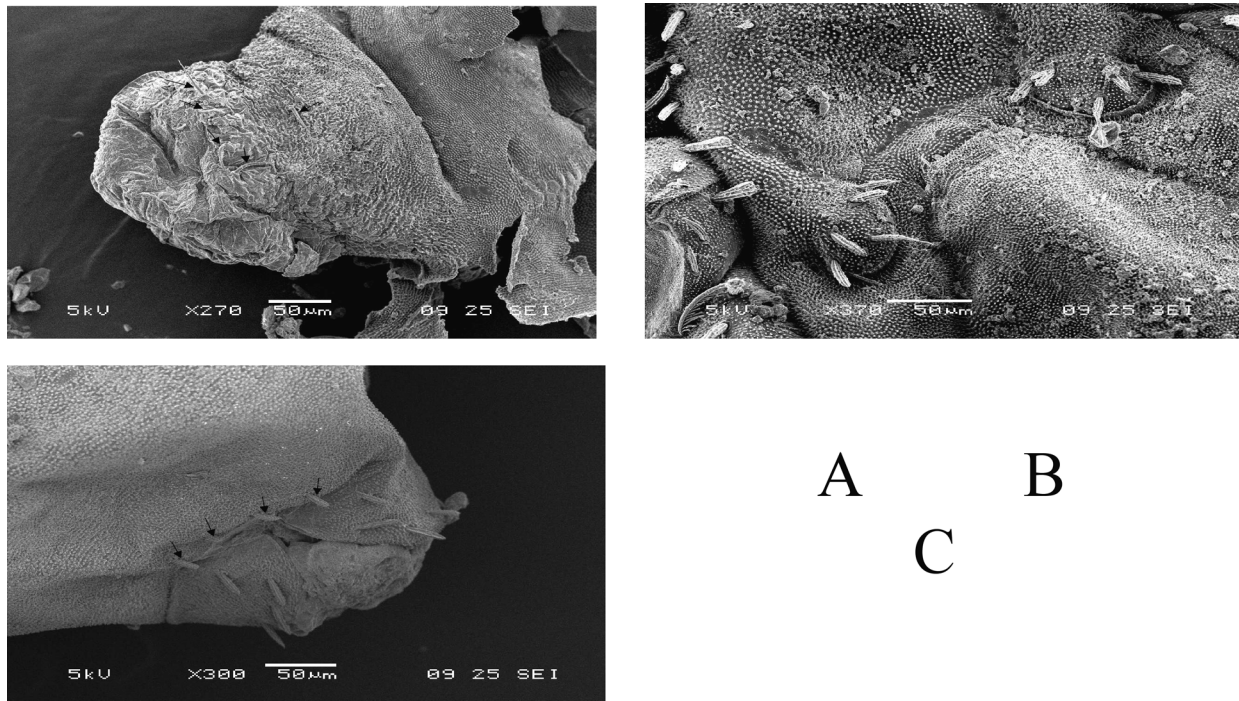


PLATE 1: A. — Evaginated ovipositor, showing setae. B. — Genital region of male. C. — Posterior region (dorsal view) showing setae in anal valve and segment VIII.

#### ACKNOWLEDGEMENTS

We are most thankful to Dr. J. S. H. KLOMPEN for his initial guidance and supply of generic keys, including other valuable concerned literature on this group, reviewing the text as well as figure plates time and again with sparing his valuable time and constant encouragement to complete this work. The authors are also grateful to Dr. M. Magdalena VAZQUEZ for her valuable comments for the improvement of paper. We are indebted to Dr. J. R. D. ALFRED, Director, Zoological Survey of India, Kolkata and Dr. A. S. MAHABAL, Scientist – E and Officer-in Charge, Zoological Survey of India, Western Regional Station, Pune for providing us the necessary laboratory and library facilities. Authors are also thankful to Pratyush K. MOHAPATRA for the first collection of the specimens from the locality and for handing over the specimens to us for study. We are also thankful to Mr. P.W. GARDE, Sr. Artist, ZSI, WRS, Pune for preparation of the final diagrams.

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