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The intertidal genus *Indopacifica* (Acari, Oribatida, Selenoribatidae): new species, juvenile morphology and distribution

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We would like to dedicate this publication to Dr. Ekaterina Alekseevna Sidorchuk, who died too early in a tragic accident this year. Despite her relatively young age, she was an outstanding acarological and paleontological researcher leaving her mark on many research fields; her passing is a great loss for science. Moreover, she was a good friend for many of us and though we will sadly miss her, we were lucky to experience her charming and enchanting nature in the precious moments that we had together.

Abstract

Two new intertidal oribatid mite species from the Indo-pacific region are described. *Indopacifica iohanna* **sp. n.** was found on the coasts of the Philippines and can be distinguished from its congeners by the lack of a ventral tooth on the claws. The larva and nymphs of this species show the same type of plication and setation typical for juveniles of other selenoribatid mites. *Indopacifica mauritiana* **sp. n.** was discovered on the coast of Mauritius and can be separated from its congeners by possessing only vestigial lamellar setae. A morphometric comparison of these two species and *Indopacifica pantai* from Thailand and Malaysia showed a clear separation between the three species. The known distribution of the genus *Indopacifica* stretches now from Mauritius in the West to the Philippines in the East and further occurrences within this area should be expected.

Keywords: taxonomy, ontogeny, morphometry, Mauritius, Philippines

Introduction

The genus *Indopacifica* Pfingstl, Shimano & Lienhard, 2019 belongs to the Selenoribatidae, an intertidal oribatid mite family whose members occur exclusively on subtropical and tropical shores of all oceans (e.g. Pfingstl & Schuster 2014). *Indopacifica* was recently proposed with two species, *Indopacifica pantai* Pfingstl, Shimano & Lienhard, 2019 and *Indopacifica parva* Pfingstl, Shimano & Lienhard, 2019 from the Andaman Sea and the Strait of Malacca, respectively. The former was reported from coasts of Singapore, Malaysia and Thailand and the latter only from Singapore and Malaysia (Pfingstl *et al.* 2019). Based on their wide distributions and on recent gene flow, as indicated by molecular genetic data, both species are good dispersers despite their wingless body and minute size (Pfingstl *et al.* 2019). Knowledge about their ecology is largely incomplete but they seem to inhabit and feed on diverse kinds of algae growing on littoral rocks.

Although the records of these two species are recent, *Indopacifica* was found nearly forty years earlier but was not recognized as a new genus. Talker *et al.* (1981) reported the discovery of selenoribatid mites from the coasts of the Philippines and classified the specimens as *Thalassozetes* sp. Recently, this material, including juveniles, was given to us for a detailed morphological analysis, which showed that they represent an undescribed species of *Indopacifica*. Therefore, the first aim of this paper is to provide a detailed description of adults and juveniles of this species. Additionally, further *Indopacifica* specimens, representing another new species, were recently discovered on the coast of Mauritius and their description is the second aim of this paper.

As *Indopacifica* species show only subtle morphological differences, another aim was to perform a morpho-

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metric study to separate them based on size and shape. Finally, we provide an updated overview of the distribution pattern of the genus.

Material and Methods

Sample collection

Recently collected samples of littoral algae were scraped off rocks with a knife and then put in Berlese-Tullgren funnels for about 24 hours to extract mites. Specimens were stored in absolute ethanol for morphological investigation.

Samples collected in the 1980s from the Philippines consisted of small intertidal rocks which were put in Berlese-Tullgren funnels as a whole and extracted specimens were preserved with 70% ethanol (Talker *et al.* 1981).

Sample locations

Indopacifica mauritiana: Mauritius, Islote Sancho; dense mat of algae growing on rock, median eulittoral; coordinates 20°30'13.2''S 57°26'54.9''N; 09.04.2018; coll. J. Baumann & F. Ferragut.

Indopacifica iohanna: Philippines, Maribago, littoral rock sample taken in front of the University of San Carlos Marine Station; Pangan-an and Sabang Island (no further details provided by collector), August and September 1980 (no exact date provided by the collector); coll. V. Storch, leg. R. Schuster.

Morphometric analyses

For species delimitation, 14 continuous morphological variables were measured in 20 specimens from Mauritius (*Indopacifica mauritiana*) and 17 individuals from the Philippines (*Indopacifica iohanna*). The measured data were subsequently size-corrected as described by Pfingstl *et al.* (2017) and afterwards ln(x+1) transformed. The variables were: (dorsal aspect) *bl*—body length, *dPtI*—distance between pedotecta I, *db*—distance between bothridia, nw_{da}—notogastral width on level of seta *da*, nw_{dm}—notogastral width on level of seta *dm*, nw_{dp}—notogastral width on level of seta *dp*; (ventral aspect) *cl*—camerostome length, *cw*—camerostome width, *dcg*—distance between camerostome and genital orifice, *dac3*—distance between acetabula 3, *al*—anal opening length, *aw*—anal opening width, (excluded *gl*—genital orifice length, *gw*—genital orifice width). Two variables, the length and width of genital plates, were subject to strong sexual dimorphism and thus were removed from the morphometric analysis. For a graphic illustration of these variables we refer to Pfingstl *et al.* (2019) (variable *efw* from the original set was excluded in advance because it does not exist in *I. mauritiana*). For further comparison we included the measurements of 51 specimens of *Indopacifica pantai* from Malaysia and Thailand published by Pfingstl *et al.* 2019.

Non-metric multidimensional scaling (NMDS) based on Euclidean distances was performed in order to visualize morphometric differences between the three species. Separation between the species was tested by PERMANOVA. The analyses were performed with PAST 3.11 (Hammer *et al.* 2001).

Drawings and descriptions

Preserved animals were embedded in Berlese mountant for microscopic investigation in transmitted light. Drawings were made with an Olympus BH-2 Microscope equipped with a drawing attachment. These drawings were first scanned, then processed and digitized with the free and open-source vector graphics editor Inkscape (https://inkscape.org).

Morphological terminology used in this paper follows that of Grandjean (1953) and Norton & Behan-Pelletier (2009). Genus-level characters are assumed and hence not mentioned in the species descriptions.

Collection acronyms and nomenclature follow Zhang (2018). IBUG—Institute of Biology, University of Graz, Graz, Austria. MNHM—Mauritius Natural History Museum, Port Luis, Mauritius. PNM—The National Museum, Manila, The Philippines. SMNG—Senckenberg Museum für Naturkunde Görlitz, Görlitz, Germany.

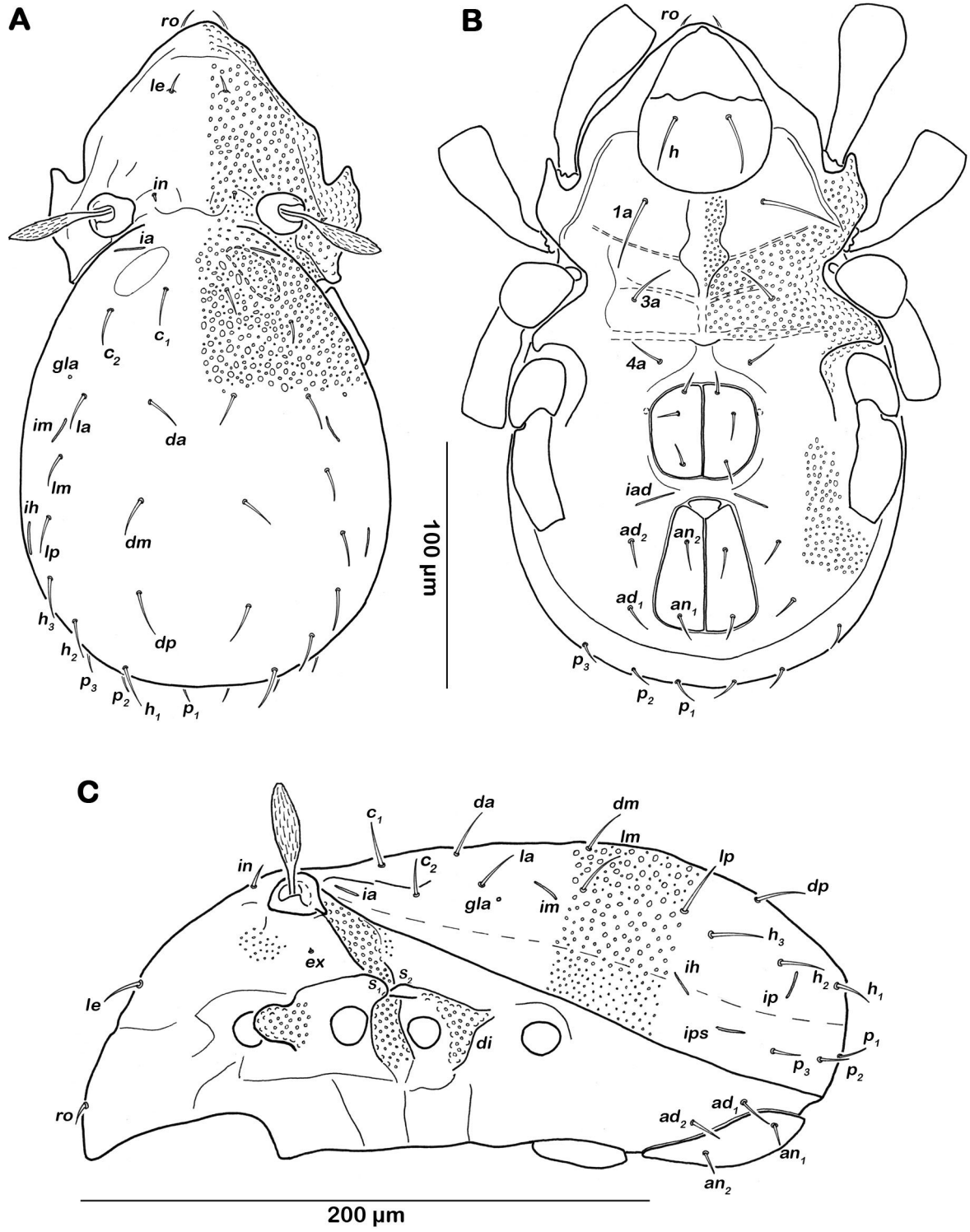

FIGURE 1. *Indopacifica iohanna* **sp. n.** adult female. A—dorsal view, legs omitted; B—ventral view, distal segments of legs omitted, subcapitulum only partly shown; C—lateral view, legs and entire gnathosoma omitted.

Results

Descriptions

Family Selenoribatidae Schuster, 1963

Genus *Indopacifica* Pfingstl, Shimano & Lienhard 2019

***Indopacifica iohanna* sp. n.** Resch & Pfingstl

Type material. Holotype: adult female, Philippines, Maribago, 1980, coll. V. Storch; preserved in ethanol, deposited in PNM (Zoology Division). Two paratypes (2 adult males) from the same sample are deposited in SMNG and additional paratypes are in IBUG.

Etymology. The specific epithet is the latinized name Johanna given as a noun in apposition; the species is dedicated to the daughter of Bettina Resch, who was pregnant with her when she performed her studies on this species as part of her Master's degree program.

Diagnosis. Slender gastronotic region; median longitudinal, hourglass-shaped depression on epimeron I; two pairs of adanal setae; proximoventral tooth on claws absent.

Indopacifica iohanna can be distinguished from all known congeners by the lack of a proximoventral tooth on each claw.

Description of adult. Measurements. Females (n = 28), length: 274–295 µm (mean 285 µm), width: 151–169 µm (mean 160 µm); males (n = 24), length: 250–280 µm (mean 263 µm), width: 140–167 µm (mean 155 µm).

Integument. Colour brown. Cerotegument of prodorsum, ventral region and legs granular. Notogastral cerotegument strongly granular with large granules irregularly surrounded by smaller granules.

Prodorsum (Figure 1A). Rostrum slightly rounded in dorsal view. Rostral (*ro*) and lamellar setae (*le*) simple and short. Interlamellar seta (*in*) thin, very short, exobothridial seta (*ex*) minute. Bothridium large cup with lateral incision.

Gnathosoma. Chelicera chelate, with two teeth on each digit (Figure 2A). Setae *cha* and *chb* of approximately same length, both dorsally slightly pectinate. Palp setal formula 0-2-1-3-8 (+ solenidion ω) (Figure 2B). Femur with paraxial porose area. Distal part of rutellum developed as thin, triangular, slightly inwardly curved membrane with longitudinal incision. Setae *a* and *m* long, smooth. Mentum regular, finely granular, seta *h* simple, long.

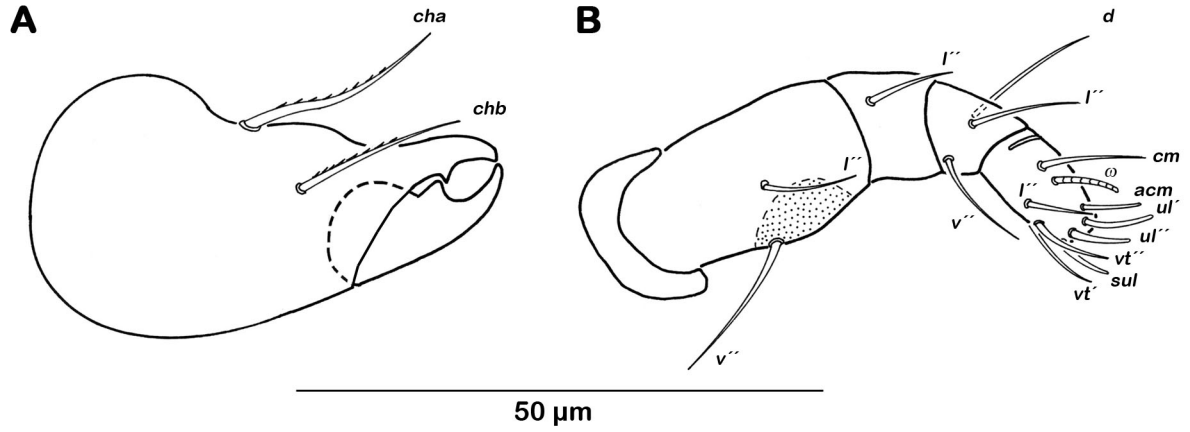

FIGURE 2. *Indopacifica iohanna* **sp. n.** adult mouthparts. A—right chelicera, antiaxial view; B—right pedipalp, antiaxial view.

Notogastral region (Figure 1A). Notogaster slender and oval in dorsal view. A pair of elliptic and slightly oblique depressions between lyrifissure *ia* and setae of *c*-row. Fourteen pairs of thin, setiform notogastral setae (length 10–15µm), c_1, c_2, *da*, *dm*, *dp*, *la*, *lm*, *lp*, h_{1-3}, p_{1-3}; c_3 absent. Orifice of opisthonotal gland *gla* next to seta *la*. Lyrifissure *im* between setae *la* and *lm*.

Lateral aspect (Figure 1C). Pedotectum I present, round, small. Lateral enantiophysis consisting of two opposite but slightly overlapping projections S_1 and S_2; former rounded, latter pointed. Discidium *di* developed as prominent conical bulge.

Podosoma and venter (Figure 1B). Median longitudinal, hourglass-shaped depression on epimeron I covered with fine granules and inconspicuous semicircular depression on posterior border of epimeron III. Three pairs of short, fine genital setae. Preanal organ triangular in ventral view, interior part anchor-shaped. Two pairs of simple adanal setae ad_{1-2}. Lyrifissure *iad* slightly oblique, next to anterior border of anal orifice.

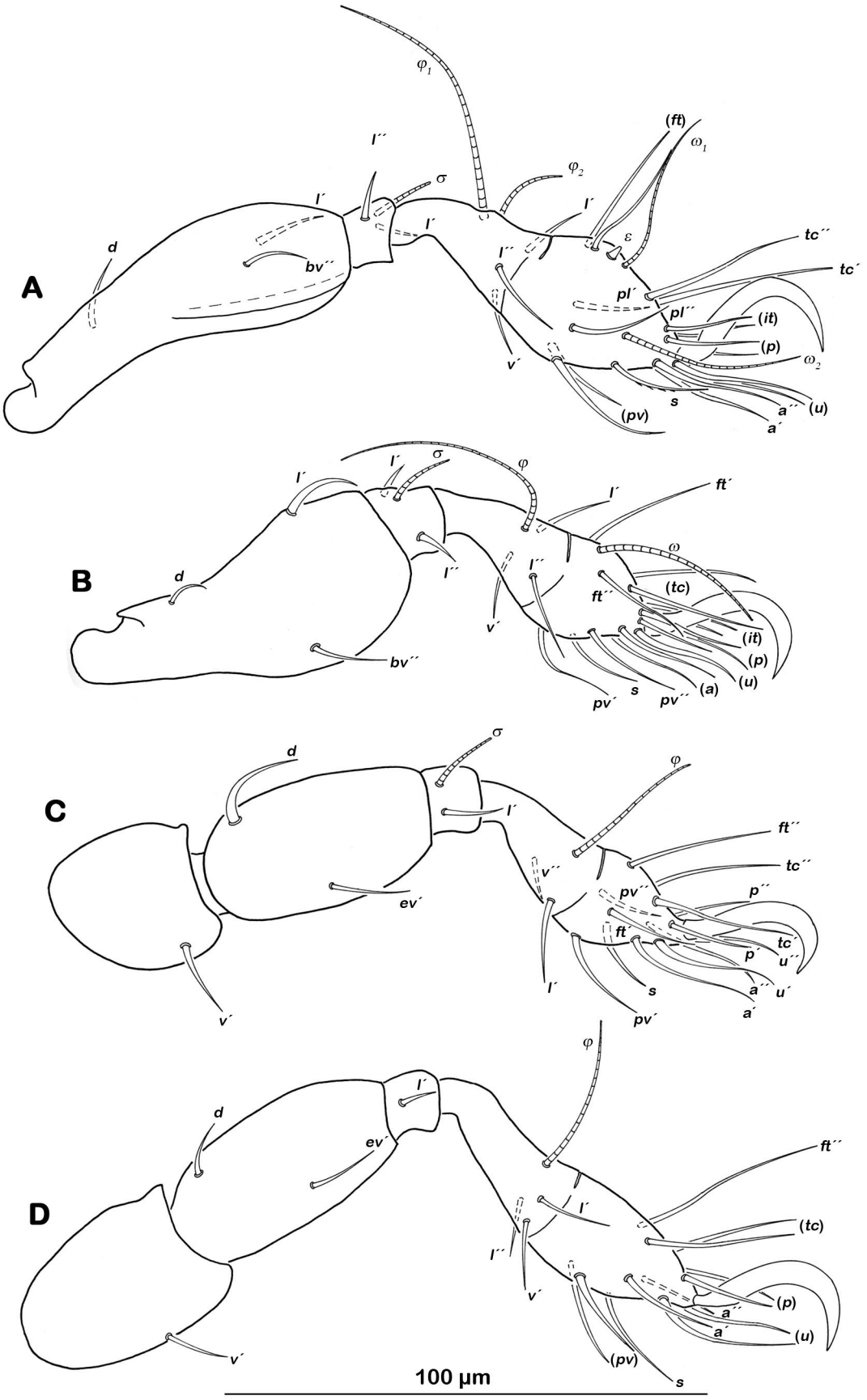

FIGURE 3. *Indopacifica iohanna* **sp. n.** adult legs, antiaxial view. A—right leg I; B—right leg II; C—left leg III; D—left leg IV.

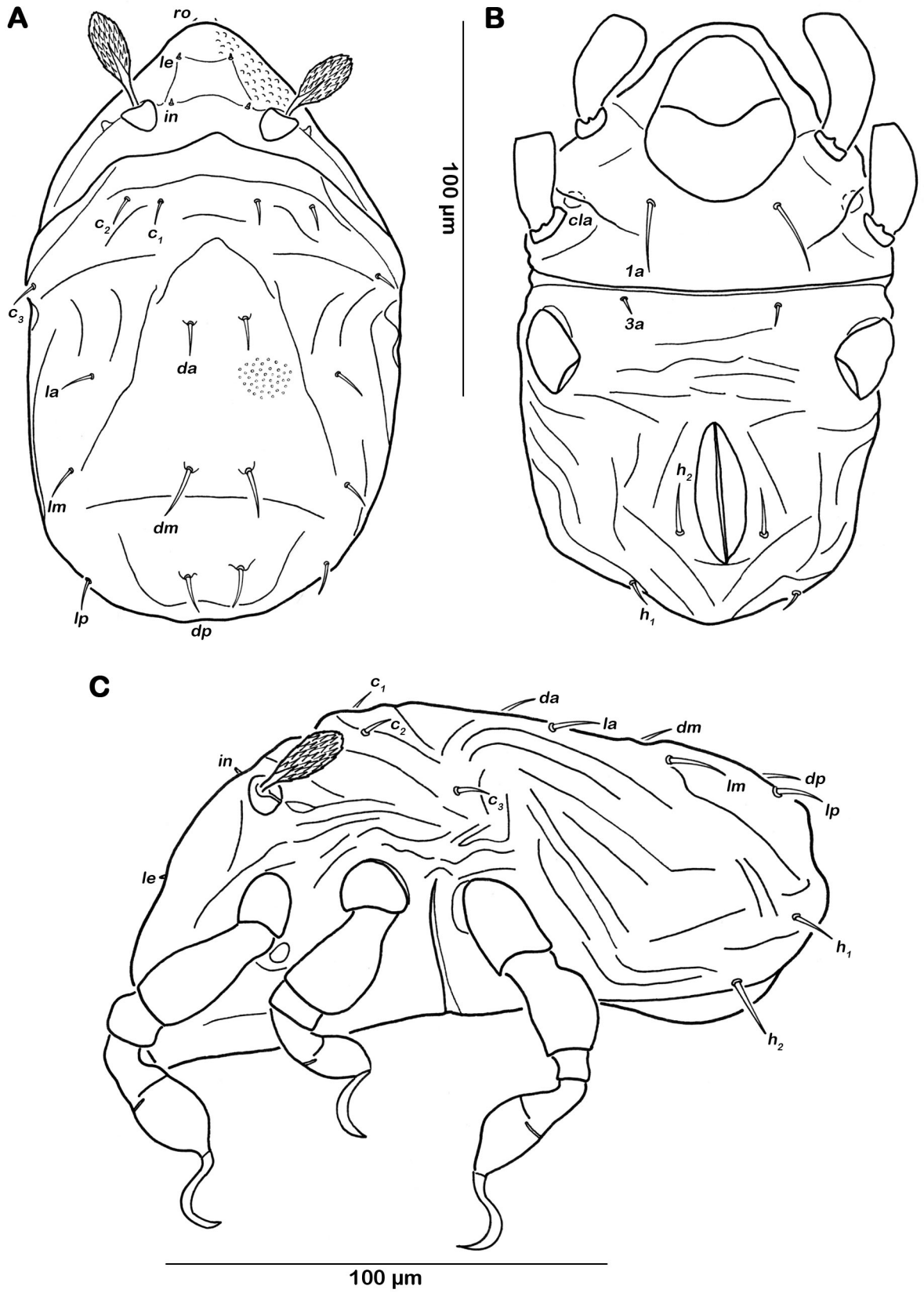

FIGURE 4. *Indopacifica iohanna* **sp. n.** larva. A—dorsal view; B—ventral view; C—lateral view.

Legs (Figure 3). Monodactylous. Long hook-like claws without ventral tooth. Cerotegument granular. No porose areas detectable. Setation and solenidia: Leg I (0-3-2-3-18) (1-2-2), leg II (0-3-2-3-15) (1-1-1), leg III (1-2-1-2-13) (1-1-0), leg IV (1-2-1-3-12) (0-1-0) (for details see Table 2).

Common features of juvenile stages. Colour brown. Integument plicate and soft, except for centrodorsal plate. Prodorsum triangular, anterior part finely granular, rostrum rounded. Rostral (*ro*), lamellar seta (*le*) and interlamellar seta (*in*) short, exobothridial seta (*ex*) vestigial, shaped like minute lamella. Sensillus clavate, distally spinose. Bothridium cup-like, laterally opened. Gnathosoma similar to that of adult stage. Cerotegument of venter finely granular, larger granules near leg insertions and ventral furrows. Ventral furrows typical for selenoribatid juveniles. In nymphal stages no distinct genital sclerites developed, genital opening thin longitudinal slit. Orifice of opisthonotal glands (*gla*) and cupules (*ia*, *im*, *ih*, *ip*, *ips*, *iad*) not detected in any stage (but absence not confirmed).

Larva. Length (N=4) 155–167 µm (mean 160 µm).
Gastronotic region (Figures 4A and 4C). Eleven pairs of notogastral setae; c_{1-3}, *da*, *dm*, *dp*, *la*, *lm*, *lp*, h_{1-2}; h_3 absent; h_2 longer than others. Weak transverse ridge on centrodorsal plate, just posterior to level of setae *dm* and *lm*.

Ventral region of idiosoma (Figure 4B). Epimeral setation 1-0-1, epimeral seta *1a* conspicuously longer than *3a*. Claparède's organ *cla* globular.

Legs. Setation and solenidia (Table 2): Leg I (0-3-2-3-16) (1-1-1), leg II (0-3-2-2-13) (1-1-1), leg III (0-2-1-1-13) (1-1-0).

Protonymph. Length (N=4): 175–203 µm (mean 189 µm).
Gastronotic region. Fifteen pairs of notogastral setae; c_{1-3}, *da*, *dm*, *dp*, *la*, *lm*, *lp*, h_{1-3} and p_{1-3}, all approximately same length.

Ventral region of idiosoma. Epimeral setation 1-0-1-1. Seta *4a* medially on epimeron IV. One pair of short genital setae. Aggenital setae absent.

Legs. Setation and solenidia (Table 2): Leg I (0-3-2-3-16) (1-1-2), leg II (0-3-2-2-13) (1-1-1), leg III (0-2-1-1-13) (1-1-0), leg IV (0-0-0-0-7) (0-0-0).

Deutonymph. Length (N=9): 212–240 µm (mean 227 µm).
Gastronotic region. Fifteen pairs of notogastral setae, same positions and shapes as in protonymph.

Ventral region of idiosoma. Epimeral setation 1-0-1-1. Two pairs of short genital setae arranged in a longitudinal row. Two pairs of adanal setae ad_{1-2} flanking anal valves.

Legs. Setation and solenidia (Table 2): Leg I (0-3-2-3-16) (1-2-2), leg II (0-3-2-2-13) (1-1-1), leg III (0-2-1-1-13) (1-1-0), leg IV (0-2-1-2-12) (0-1-0).

Tritonymph. Length (N=14): 252–283 µm (mean 266 µm).
Gastronotic region (Figures 5A and 5C). No difference to deutonymph.

Ventral region of idiosoma (Figure 5B). Epimeral setation 1-0-1-1.

Three pairs of short genital setae in longitudinal row. Two pairs of adanal setae ad_{1-2} and two pairs of anal setae an_{1-2}.

Legs. Setation and solenidia (Table 2): Leg I (0-3-2-3-18) (1-2-2), leg II (0-3-2-3-15) (1-1-1), leg III (0-2-1-1-13), leg IV (0-2-1-2-12) (0-1-0).

***Indopacifica mauritiana* sp. n.** Baumann & Pfingstl

Type material. Holotype: adult female, Mauritius, Islote Sancho, 09 Apr. 2018; coll. J. Baumann & F. Ferragut, preserved in ethanol, deposited in MNHM. Two paratypes (1 female and 1 male) from the same sample are deposited in SMNG and additional paratypes are stored in IBUG.

Etymology. This species is named after its type locality, Mauritius.

Diagnosis. Gastronotic region pear-shaped; rostral setae strongly inclined nearly lying on rostrum, lamellar setae vestigial; median circular depression on epimeron I; two pairs of adanal setae; proximoventral tooth on claws present.

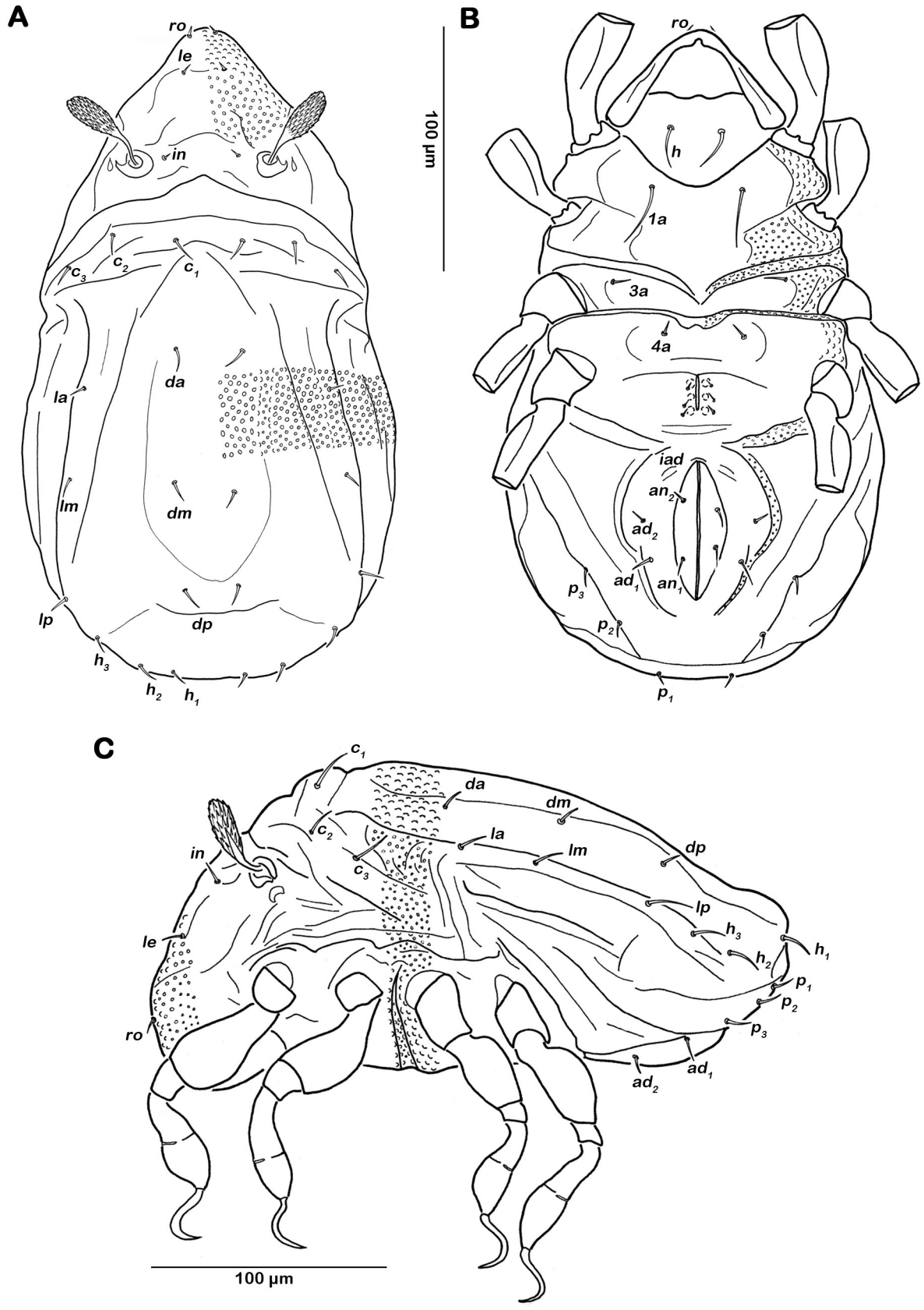

FIGURE 5. *Indopacifica iohanna* **sp. n.** tritonymph. A—dorsal view; B—ventral view; C—lateral view.

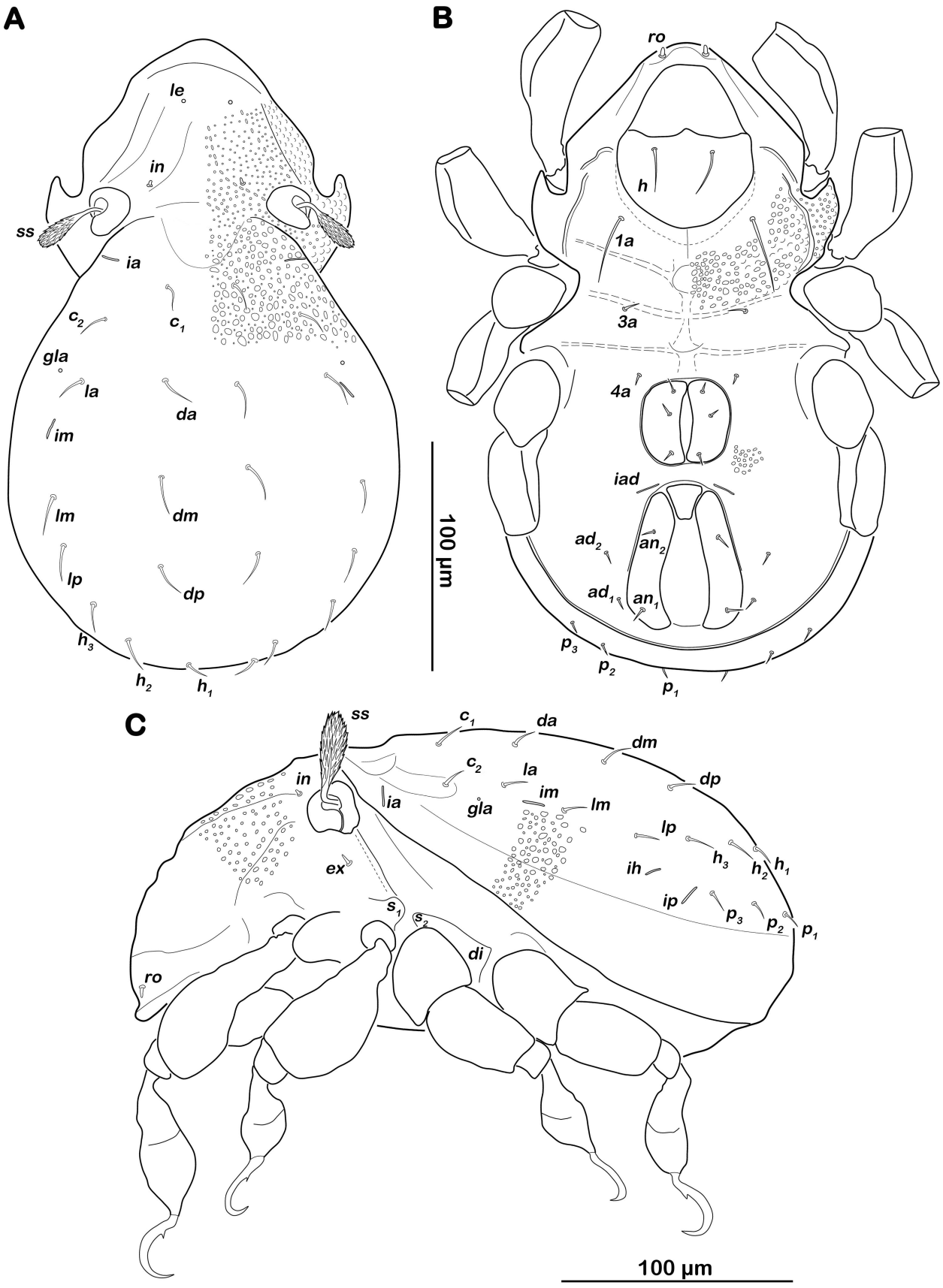

FIGURE 6. *Indopacifica mauritiana* **sp. n.** adult male. A—dorsal view, legs omitted; B—ventral view, distal segments of legs omitted, subcapitulum only partly shown; C—lateral view.

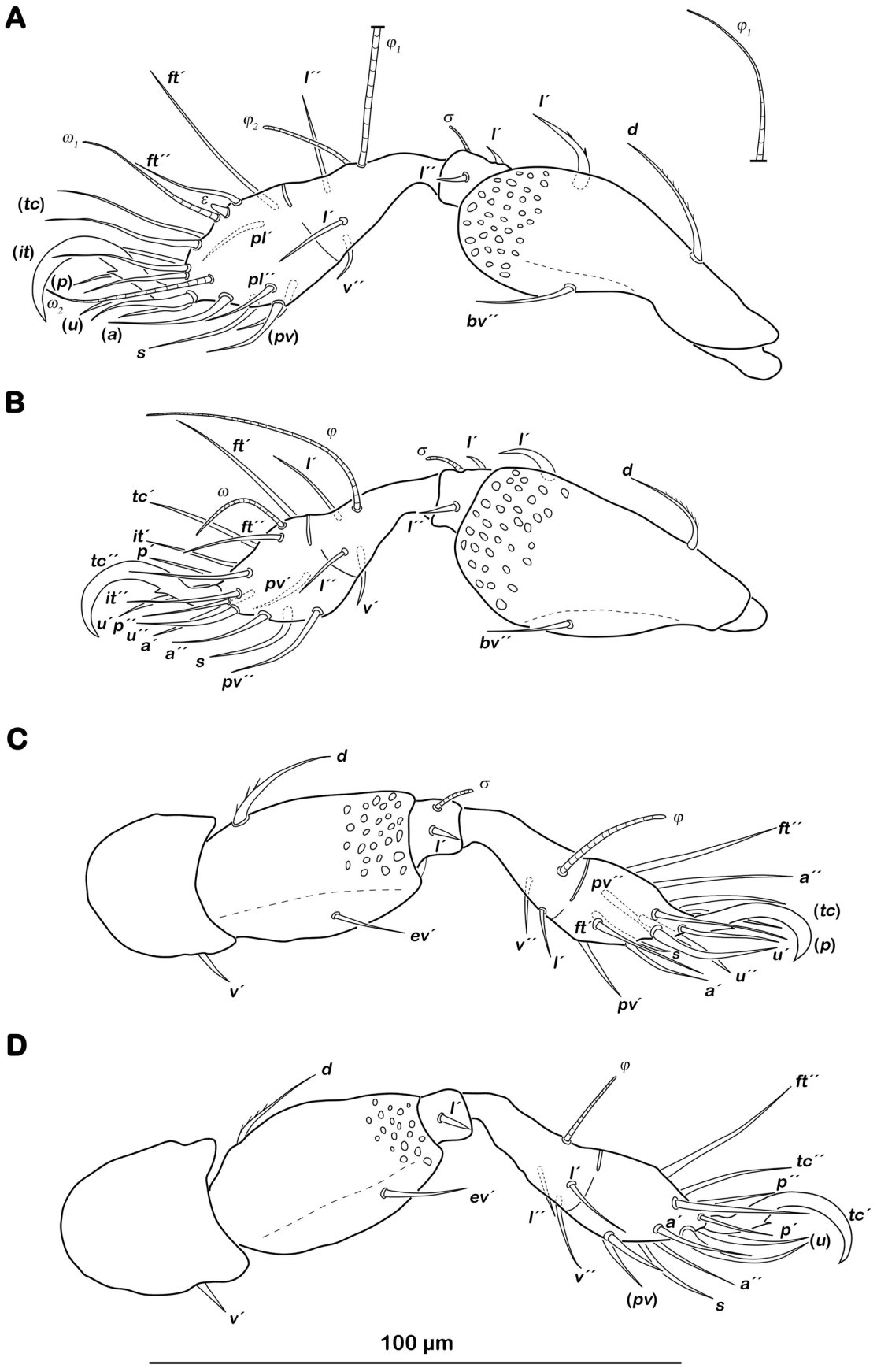

FIGURE 7. *Indopacifica mauritiana* **sp. n.** adult left legs, antiaxial view. A—leg I; B—leg II; C—leg III; D—leg IV.

TABLE 1. Comparison of measured variables among three *Indopacifica* species; values given in µm; minimum–maximum (mean±standard deviation).

variable	*I. iohanna* (N=17)	*I. mauritiana* (N=20)	*I. pantai* (N=51)
bl	259–295 (274±10.53)	270–292 (281±8.11)	319–356 (333±8.84)
dPtI	114–123 (119±2.14)	126–139 (131±3.24)	139–154 (147±3.31)
db	43–49 (45±1.58)	55–65 (61±2.39)	52–71 (65±3.27)
nw_{da}	129–157 (141±6.91)	154–175 (162±5.66)	175–206 (193±6.91)
nw_{dm}	142–163 (152±5.61)	163–182 (172±5.67)	191–219 (207±5.94)
nw_{dp}	114–144 (128±7.42)	142–163 (153±6.54)	163–194 (179±7.03)
cl	71–77 (75±1.75)	71–80 (75±2.80)	62–94 (90±4.47)
cw	52–55 (53±1.54)	59–62 (61±1.36)	62–68 (65±1.62)
dcg	71–83 (75±3.20)	59–74 (68±4.00)	71–86 (78±3.86)
dac3	86–92 (89±2.57)	92–102 (96±3.27)	108–123 (116±2.94)
gl	31–40 (35±3.17)	34–46 (40±3.26)	40–55 (48±4.25)
gw	34–46 (40±3.81)	37–46 (41±3.00)	46–62 (53±4.96)
al	52–59 (55±2.35)	59–65 (62±2.06)	69–77 (73±2.16)
aw	40–46 (43±1.59)	45–52 (48±1.86)	52–62 (56±2.72)

TABLE 2. *Indopacifica iohanna* **sp. n.**, chaetome and solenidia from larva to adult. First development of setae characterized by letters. ( ) = pairs of setae,-= no change with regard to preceding stage.

	Instars	Trochanter	Femur	Genu	Tibia	Tarsus
Leg I	larva	-	*d*, *bv′′*, *l′*	(*l*), *σ*	(*l*), *v′*, ϕ_1	(*pl*), (*pv*), *s*, (*a*), (*u*), (*p*), (*tc*), (*ft*), *ε*, ω_1
	protonymph	-	-	-	-	ω_2
	deutonymph	-	-	-	ϕ_2	-
	tritonymph	-	-	-	-	(*it*)
	adult	-	-	-	-	-
Leg II	larva	-	*d*, *bv′′*, *l′*	(*l*), *σ*	*l′*, *v′*, *ϕ*	(*pv*), *s*, (*a*), (*u*), (*p*), (*tc*), (*ft*), *ω*
	protonymph	-	-	-	-	-
	deutonymph	-	-	-	-	-
	tritonymph	-	-	-	*l′′*	(*it*)
	adult	-	-	-	-	-
Leg III	larva	-	*d*, *ev′*	*l′*, *σ*	*v′′*, *ϕ*	(*pv*), *s*, (*a*), (*u*), (*p*), (*tc*), (*ft*)
	protonymph	-	-	-	-	-
	deutonymph	-	-	-	-	-
	tritonymph	-	-	-	-	-
	adult	*v′*	-	-	*l′*	-
Leg IV	protonymph	-	-	-	-	(*pv*), (*u*), (*p*), *ft′′*
	deutonymph	-	*d*, *ev′*	*d*	*l′*, *v′*, *ϕ*	*s*, (*a*), (*tc*)
	tritonymph	-	-	-	-	-
	adult	*v′*	-	-	*l′′*	-

Indopacifica mauritiana differs from all congeners in having only vestigial lamellar setae and small rostral setae that fit to the rostrum, combined with a small circular depression in the middle of epimeron I.

Description of adult. Measurements. Females (n = 8), length: 272–292 µm (mean 286 µm), width: 166–182 µm (mean 175 µm); males (n = 12), length: 271–286 µm (mean 277 µm), width: 163–181 µm (mean 170 µm).

Integument. Colour brown. Cerotegument of all body parts with densely distributed large granules, notogastral cerotegument consisting of larger granules irregularly surrounded by smaller granules.

Prodorsum (Figure 6A). Rostrum rounded in dorsal view, slightly projecting anteroventrally in lateral view. Rostral seta (*ro*) very short, strongly inclined, nearly lying on rostrum (Figure 6B) and hence not visible in dorsal view. Lamellar seta (*le*) vestigial. Interlamellar seta (*in*) blunt and short, exobothridial seta (*ex*) short. Bothridium large cup with lateral incision.

Gnathosoma. Chelicera chelate, with two teeth on each digit. Setae *cha* and *chb* of approximately same length, both dorsally slightly pectinate. Palp setal formula 0-2-1-3-8 (+ solenidion ω). Femur with paraxial porose area. Distal part of rutellum developed as thin, triangular, slightly inwardly curved membrane with longitudinal incision. Setae *a* and *m* long, smooth. Mentum regular, finely granular, seta *h* simple, long.

Notogastral region (Figure 6A). Notogaster pear shaped in dorsal view. Anterior part of notogaster with weak transversal depression, best seen in lateral view. Fourteen pairs of thin, simple notogastral setae (length 10–13µm), c_1, c_2, *da*, *dm*, *dp*, *la*, *lm*, *lp*, h_{1-3}, p_{1-3}; c_3 absent. Orifice of opisthonotal gland *gla* lateral, between setae c_2 and *la*. Lyrifissure *ia* oblique in humeral area, lyrifissure *im* between setae *la* and *lm*.

Lateral aspect (Figure 6C). Cerotegument granular, larger granules on pedotectum I, discidium *di* and in acetabular regions. Pedotectum I present, round, small. Lateral enantiophysis consisting of two opposing rounded projections S_1 and S_2. Discidium *di* developed as prominent conical bulge.

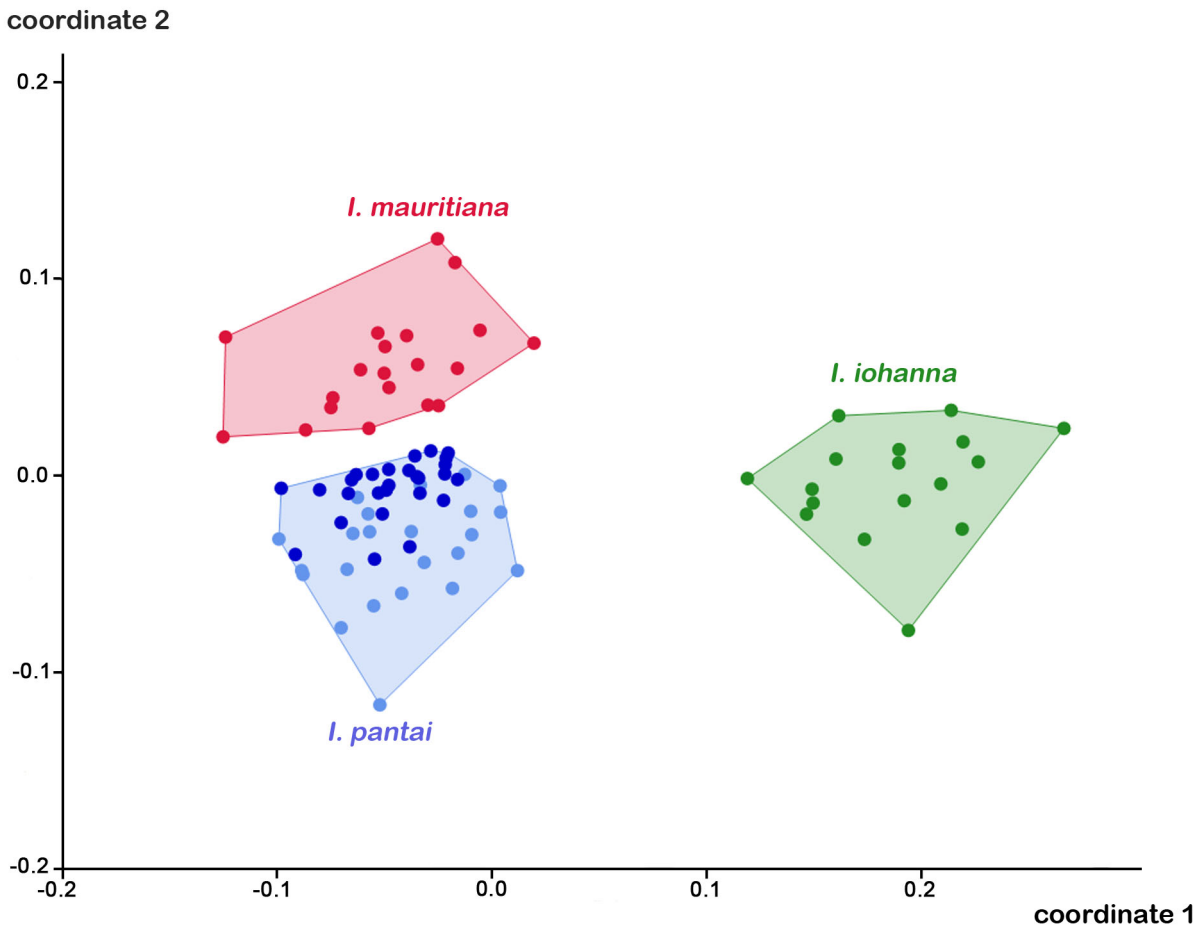

FIGURE 8. Non-metric multidimensional scaling (NMDS) on size-corrected, ln (x+1)-transformed morphometric data of *Indopacifica iohanna*. (green), *I. mauritiana*. (red) and *I. pantai* (blue; dark = Thailand, light = Malaysia).

Podosoma and venter (Figure 6B). Small median circular depression on epimeron I and inconspicuous semicircular depression on posterior border of epimeron III. Three pairs of short, fine genital setae. Preanal organ triangular in ventral view, interior part anchor-shaped. Two pairs of short anal setae an_{1-2} and two pairs of short adanal setae ad_{1-2}. Lyrifissure *iad* oblique, next to anterior border of anal orifice.

Legs (Figure 7). Monodactylous. Long hook-like claws with one small proximoventral tooth. Femora with ventral carina. No porose areas detectable. Dorsal seta *d* on all femora slightly barbed. Famulus ε on tarsus I short, broad, conical rod. Setation and solenidia: Leg I (0-3-2-3-18) (1-2-2), leg II (0-3-2-3-15) (1-1-1), leg III (1-2-1-2-13) (1-1-0), leg IV (1-2-1-3-12) (0-1-0).

Species delimitation based on morphometry

NMDS, with a stress of 0.164, shows a clear morphometric separation of the *Indopacifica* species included in this analysis (Figure 8). *Indopacifica iohanna* is placed more distant from *I. mauritiana* and *I. pantai*, which are grouped closer together. The *I. pantai* populations from Malaysia and Thailand overlapped and form one cluster. PERMANOVA with 10000 permutations revealed highly significant ($p < 0.001$) differences between all three species.

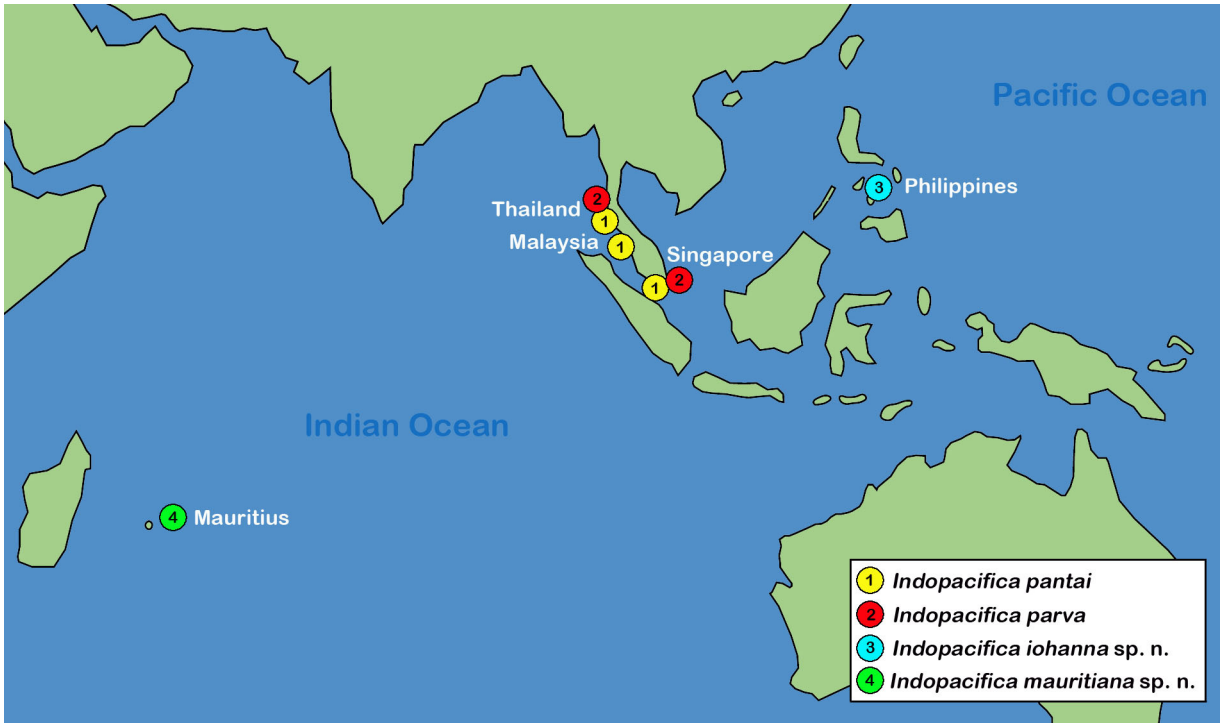

FIGURE 9. Map showing the distribution of the genus *Indopacifica* in the Indo-Pacific region. Numbers and colors refer to species as shown in legend.

Discussion

The genus *Indopacifica* shows two morphological groups, adults of the first group, containing *I. pantai* and *I. iohanna*, exhibit a longitudinal hourglass-shaped median depression on epimeron I, while those of the second group with *I. parva* and *I. mauritiana* possesses a smaller circular depression in the same position. Apart from this ventral character, the species show a very similar habitus and differ only in a few characters, e.g. the number of adanal setae (*I. pantai* with three pairs all others only two pairs), the shape of claws (absence of ventral tooth only in *I. iohanna*) or the reduction of particular setae (vestigial lamellar setae in *I. mauritiana*). By contrast, the multivariate analysis of morphometric characters (which did not include *I. parva*), clearly groups *I. pantai* with *I. mauritiana* , leaving *I. iohanna* separate. Since *I. iohanna* shows an overall slender body shape while *I. pantai* and *I. mauritiana* are much more rounded in this aspect (as can be seen in most width variables given in Table 1), a correlation between body width and shape of epimeral depression can be excluded.

Comparisons of juveniles are not yet possible, since only those of *I. iohanna* are known. Juveniles of this species show the type of plication, with a centrodorsal plate framed by specific lateral and ventral folds, which is typical for juveniles of the family Selenoribatidae (e.g. Grandjean 1966, Pfingstl & Schuster 2012).

When Talker *et al.* (1981) reported the occurrence of *I. iohanna*, then classified as *Thalassozetes* sp., they provided only a very short diagnosis and both dorsal and ventral habitus drawings. The diagnosis is consistent with that given herein but the drawings are somewhat misleading. First, strong prodorsal lamellar ridges are shown (Talker *et al.* 1981; p. 36, Figure 5a,) but these are in fact only very faint structures that hardly can be seen. Second, the median depression on epimeron I is somewhat unclear, not showing its exact shape. Third, three pairs of adanal setae are depicted but we found only two pairs. The first two deviations may be the result of a vague or unclear style of drawing but the third cannot be easily explained. We investigated more than 40 specimens from the same sample that Talker *et al.* (1981) used, but not a single individual showed three adanal setae. Unfortunately, we could not study the microscopic slides that were used for the drawings, so we are not able to confirm that they made an observational error, or drew a specimen that was aberrant, or even one that represented a syntopically occurring different species.

However, a clear mistake is given in the original descriptions of *I. pantai* and *I. parva* (Pfingstl *et al.* 2019); the text gives 16 setae for tarsus II but the drawings show only 15. The latter is clearly the correct number. Apart from this error, *I. iohanna*, *I. mauritiana* and *I. pantai* show identical leg setation, only *I. parva* differs in having three setae, (*l*) and *v´´*, on tibia III (instead of two, *l´*and *v´´*) and two setae, *l´* and *v´*, on tibia IV (instead of three, (*l*) and *v´*). Finally, Pfingstl *et al.* (2019) listed the absence of notogastral seta c_2 as a genus-level character but in fact, it is seta c_3 that is absent. Therefore, the absence of seta c_3 is characteristic for *Indopacifica*.

With the record of the two new species, a wider distribution of *Indopacifica* in the Indo-Pacific Ocean is now confirmed. Occurrences stretch from Mauritius in the West to the Philippines in the East (see Figure 9) and further records on the numerous islands and landmasses within this large biogeographic area should be expected.

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