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OXYOPPIA MUSTACIATA N. SP. FROM ANDEAN FORESTS OF NORTHWESTERN PATAGONIA AND KEY TO OXYOPPIINAE FROM ARGENTINA

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ABSTRACT — During a three-year survey of oribatid mites in soil and leaf litter of Andean North patagonian forests, specimens belonging to the genus *Oxyoppia* were collected. Even though the specimens could be recognized by the use of previous descriptions and existing keys as being close to *Oxyoppia (Oxyoppiella) suramericana*, morphological analyses suggest enough differences to propose a new species *Oxyoppia mustaciata* **n. sp.** A new identification key to species of Oxyoppiinae from Argentina is provided.

KEYWORDS — *Oppiidae; Oxyoppia; Oxyoppiella; Patagonia; Nothofagus; Austrocedrus*; SEM

INTRODUCTION

The cosmopolitan subfamily Oxyoppiinae Subías, 1989 includes 80 species, four of them have been previously cited for Argentina (Subías 2004, Subías 2013): *Oxyoppia (Oxyoppiella) scalifera* (Hammer, 1958), *Oxyoppia (Oxyoppiella) suramericana* (Hammer, 1958), *Sacculoppia singularis* Balogh and Mahunka, 1968 and *Subiasella (Lalmoppia) arcuata* (Hammer, 1958). A fifth species from Argentina new to science is described here. The Oxyoppiinae were defined as Oppiidae having lamellar crests on the prodorsum and protruding humeral processes developed on the anterior margin of notogaster (Subías and Balogh 1989). Originally the genus *Oxyoppia* Balogh and Mahunka, 1969 was defined as Oxyoppiinae having the prodorsum with costulae straight, converging and connected by a translamellar line, sensillus fusiform and ciliate, uncised rostrum, *le* nearer to *in* than to *ro* setae; notogaster with 10 pairs of setae including *c2,* setae *ad1* postanal and *ad3* preanal (Balogh 1983). The genus *Oxyoppia* has been subdivided in four subgenera *Oxyoppia (Oxyoppia)* Balogh and Mahunka 1969, *Oxyoppia (Aciculoppia)* Subías and Rodríguez, 1986, *Oxyoppia (Dzarogneta)* Kulijev, 1978 and *Oxyoppia (Oxyoppiella)* Subías and Rodríguez, 1986, based on the shape, the length and the setulae of sensilli (Subías and Rodríguez 1986). Until present work only eleven species were grouped in *Oxyoppia* (*Oxyoppiella)*, all of these range from 180 to 290 {μm}. *Oxyoppia (Oxyoppiella)* species were defined as having a unilaterally ciliated sensillus, 5 or 6 genital setae, generally direct apoanal *iad*, and generally a developed translamellar crest (Subías and Rodríguez 1986).

During a survey of oribatid mites carried out in the Northwestern Patagonian forests of Argentina, in the Nahuel Huapi National Park (Kun *et al.* 2010)

we found specimens belonging to *Oxyoppia (Oxyoppiella)* in soil and leaf litter of forests of Coihue (*Nothofagus dombeyi*), Ñire (*Nothofagus antarctica*) and Ciprés de la cordillera, (*Austrocedrus chilensis*). Fifty two specimens belong to *Oxyoppia (Oxyoppiella) suramericana* (Hammer 1958) but the remaining 415 specimens were assigned to the new species here described. In all sampled forests, this species was more abundant in soil than in leaf litter. The present work deals with the description of *Oxyoppia (Oxyoppiella) mustaciata* **n.sp**, and an updated key to the Oxyoppiinae found in Argentina is provided

MATERIALS AND METHODS

Mites were collected as reported elsewhere (Kun *et al.* 2010). Material examined (number of specimens in brackets) - Cerro Padre Laguna, 41°22′00"S, 71°31′05"W, 913 masl (meters above sea level); soil (62) and leaf litter (5) under *N. antarctica*; Arroyo Challhuaco 41°12′19"S, 71°19′04"W, 971 masl, soil (16) and leaf litter (5) under *N. antarctica*; Cerro Otto, 41º08′34"S, 71º19′43"W, 990 masl, soil (118) and leaf litter (32) under *A. chilensis*; Cerro LLao Llao, 41°02′48"S, 71°33′10"W, 987 masl, soil (107) and leaf litter (3) under *A. chilensis*; Parque Llao Llao, 41°02′52"S, 71°32′56"W, 888 masl, soil (48) and leaf litter (9) under *N. dombeyi*; Lago Gutierrez, 41°10′42"S, 71°25′01"W, 864 masl, soil (113) and leaf litter (5) under *N. dombeyi.* Mites were extracted with Berlese - Tullgren funnels, either mounted in Hoyer's medium or placed temporarily in pure lactic acid on cavity slides for measurement and illustration, or sputter-coated with gold for Scanning Electron Microscopy (SEM) examination. Drawings reflect observations carried out with optical microscope Olympus CH5-260. The differences with scanning photos is mainly due to SEM preparations which exert differential strong longitudinal and partially lateral stretching of specimens, consequently measures do not always match details seen at the optical microscope. Comparisons between specimens of *O. mustaciata* n. sp. and those of the sympatric species *O. suramericana* were made using both optical microscope and SEM. The holotype and two paratypes mounted in Hoyer's medium are deposited in the Acari collection at Museo de La Plata, La Plata, Argentina. Six gold sputter-coated paratypes together with 20 paratypes stored in two parts of 80 % ethylic alcohol-one part lactic acid, will be kept at the laboratory of the Zoology Department of Centro Regional Universitario Bariloche (Universidad Nacional del Comahue).

Oxyoppia (Oxyoppiella) mustaciata **N. SP.**

Measurements: Length of body 205 – 235 μm, Width of body 101 – 119 μm (number of measured specimens 45). Holotype 225 – 112 μm, Cerro Padre Laguna (Río Negro Province) November 2006, soil under *N. antarctica.*

Prodorsum (Figs. 1a, 2, 4, 5) — Rostrum rounded dorsally but sharp laterally, unilaterally externally barbulated *ro* setae, length exceeding the distance between their alveoli, and the tip of the rostrum; lamellar setae 3-barbulated, slightly shorter than *ro* setae, about one third shorter than the distance between their alveoli and located near the middle of prodorsum but slightly nearer to *in* setae; *in* setae unbarbulated, shorter than the distance between their alveoli; *ex* setae one-barbulated longer than *in* setae; *ro*, *le*, *ex* and *in* decrease in size in this order; costulae with straight section converging to an abrupt inwards curved tapering section connected to the transcostula by a thin curved stretch ending in the alveoli of *le* setae; curved section of each costula almost connected to an arched lateral ridge directed outwards and then back toward the external border of prodorsum; two pairs of parallel sigilla between the insertion of the *in* setae, first anterior pair rounded, second posterior pair oval transversally elongated; one pair of toothlike interbothridial tubercles each opposite and posterior to *in* setae overlap the anterior margin of notogaster; sensillus with fusiform head, 8-aciculated externally and 11-aciculated internally, longest external acicules nearly as long as sensillus head width, internal acicules very short only seen with SEM microscope; bothridium border parallelly striated, striations well defined anteriorly, extended posteriorly and converging to a bundle closing the ring of bothridium and bundle slit arching backwards toward the notogaster, bordered by a postbothridic

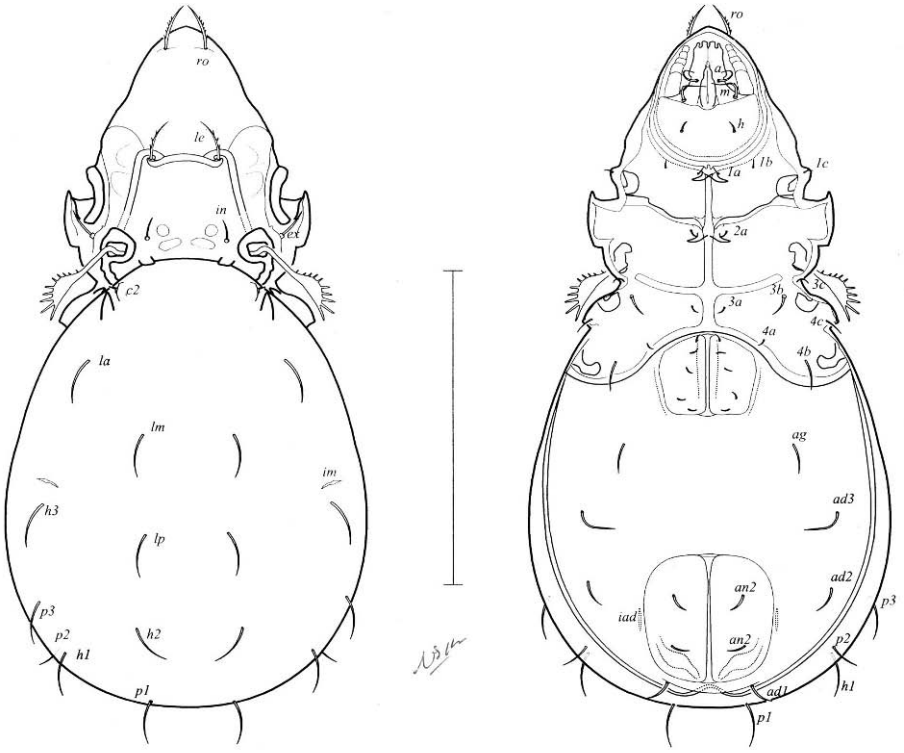


FIGURE 1: *O. mustaciata* **n. sp.**, female. a - Dorsal view; b - Ventral view; bar 100 μm

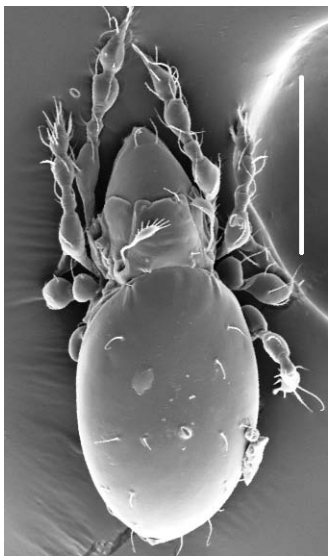


FIGURE 2: *O. mustaciata* **n. sp.** (SEM) – Female dorsal view; bar 100 μm

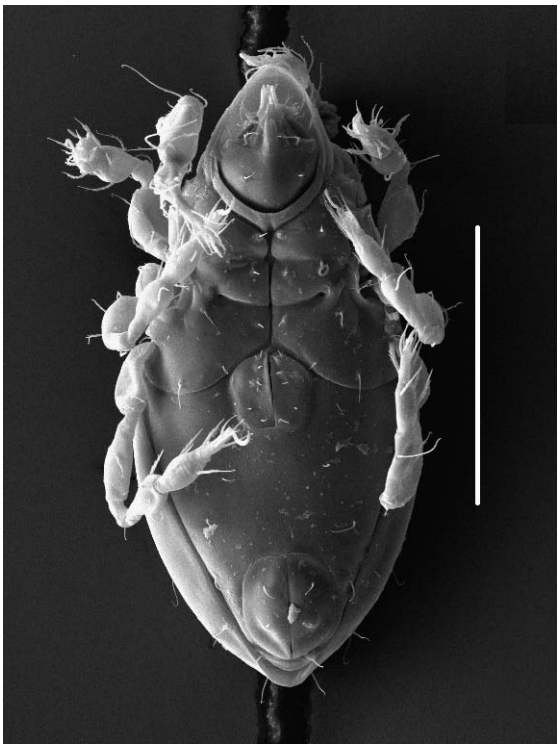


FIGURE 3: *O. mustaciata* **n. sp.** (SEM) – Female ventral view; bar 100 μm

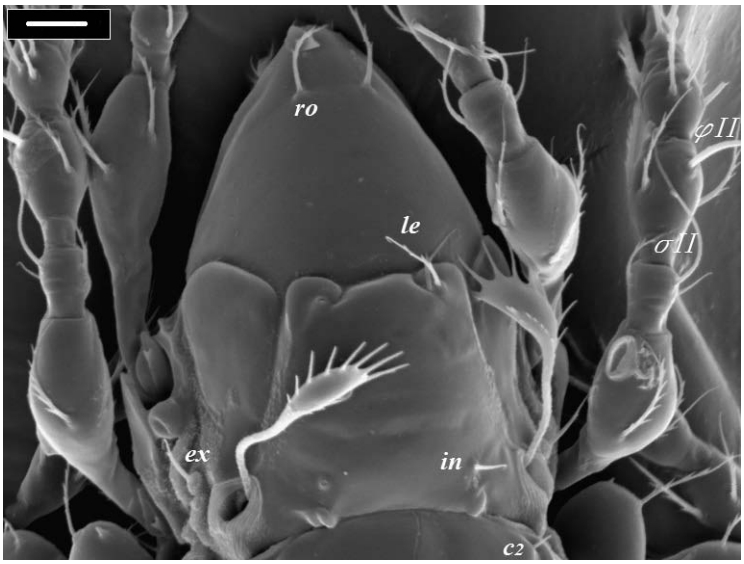


FIGURE 4: *O. mustaciata* **n. sp.** (SEM) – View of prodorsum; bar 10 μm.

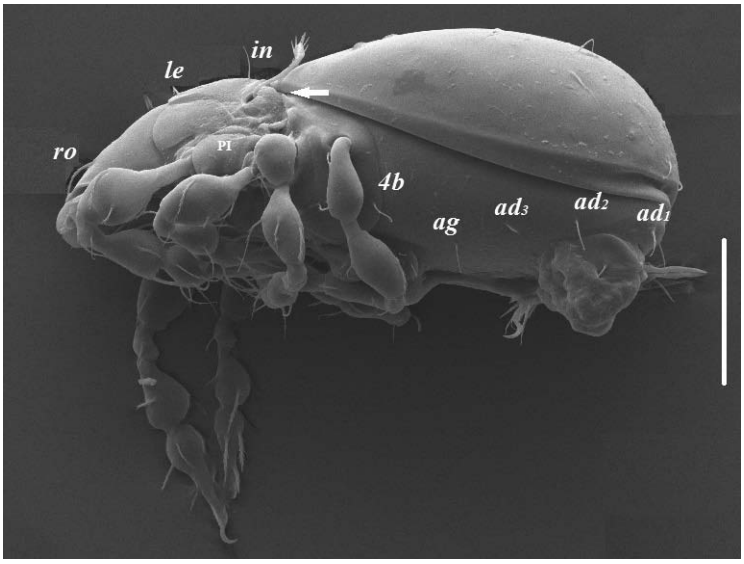


FIGURE 5: *O. mustaciata* **n. sp.** (SEM) – Lateral view; bar 50 μm. PI pedotectum I.

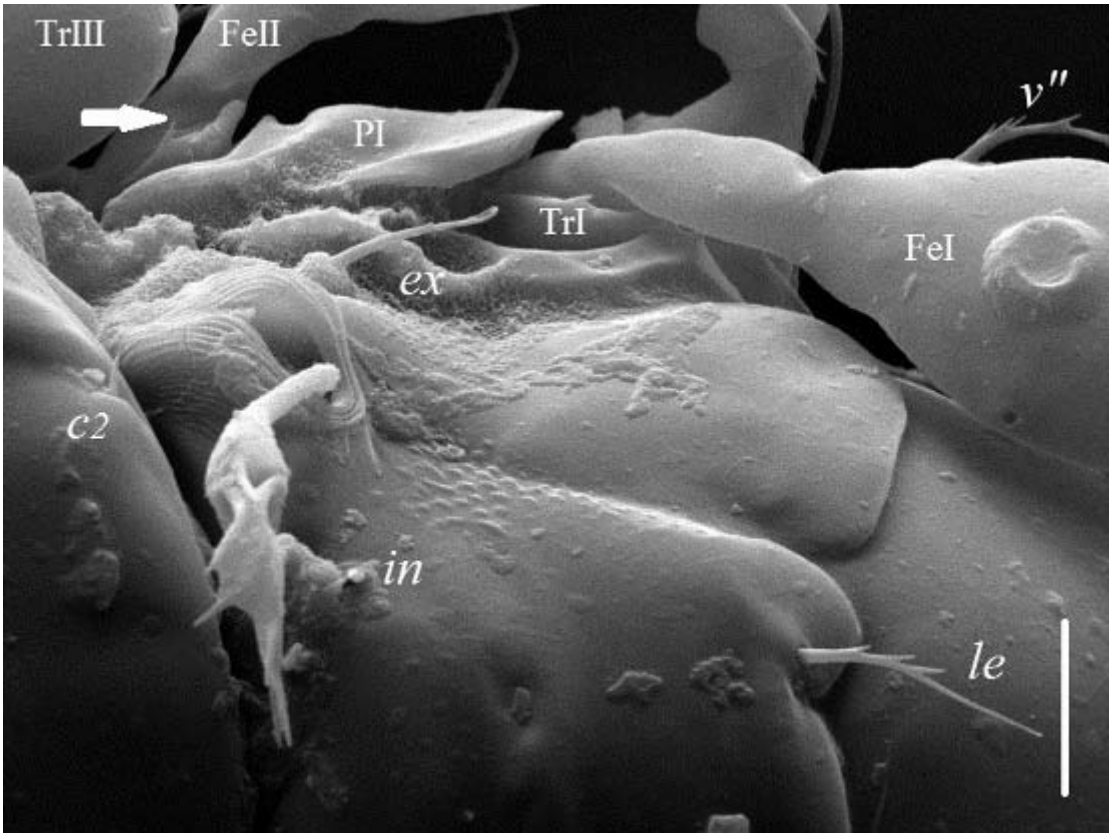


FIGURE 6: *Oxyoppia mustaciata* **n. sp.** (SEM) – Partial view of prodorsum; bar 10 μm; arrow indicates apophysis on Fe II. PI : pedotectum I.

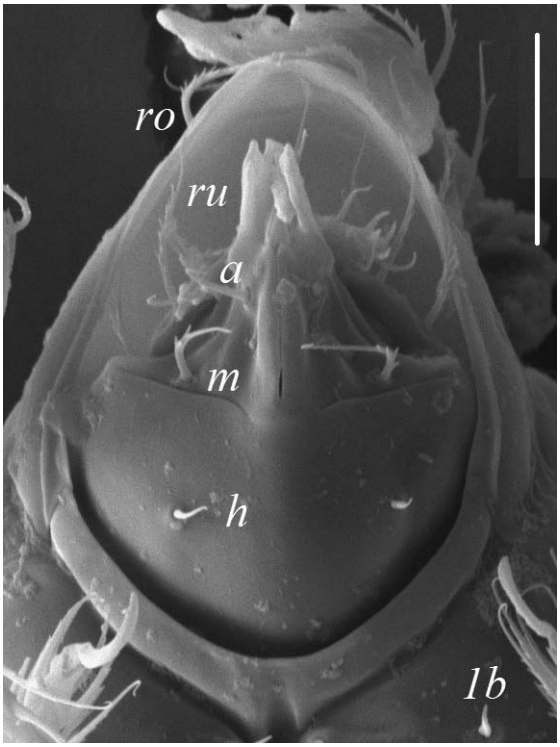


FIGURE 7: *O. mustaciata* **n. sp.** (SEM) – View of subcapitulum; bar 20 μm.

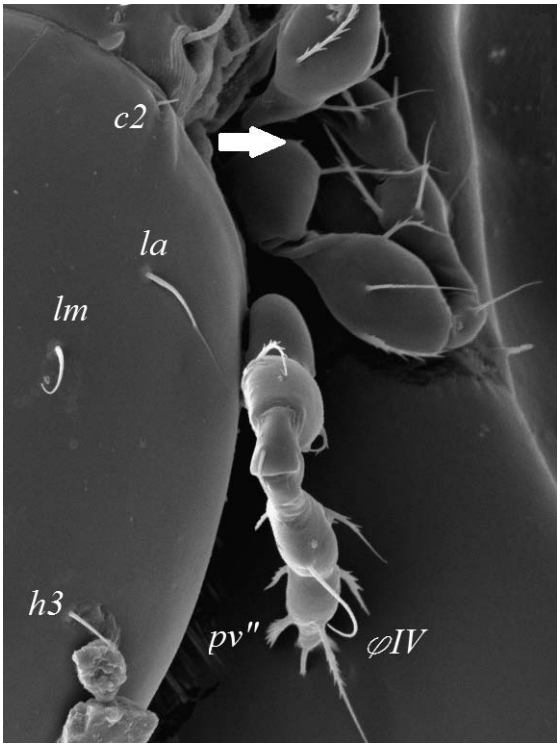


FIGURE 8: *O. mustaciata* **n. sp.** (SEM) – Partial view of notogaster bar 20 μm; arrow indicates trochanteral apophysis on right third leg.

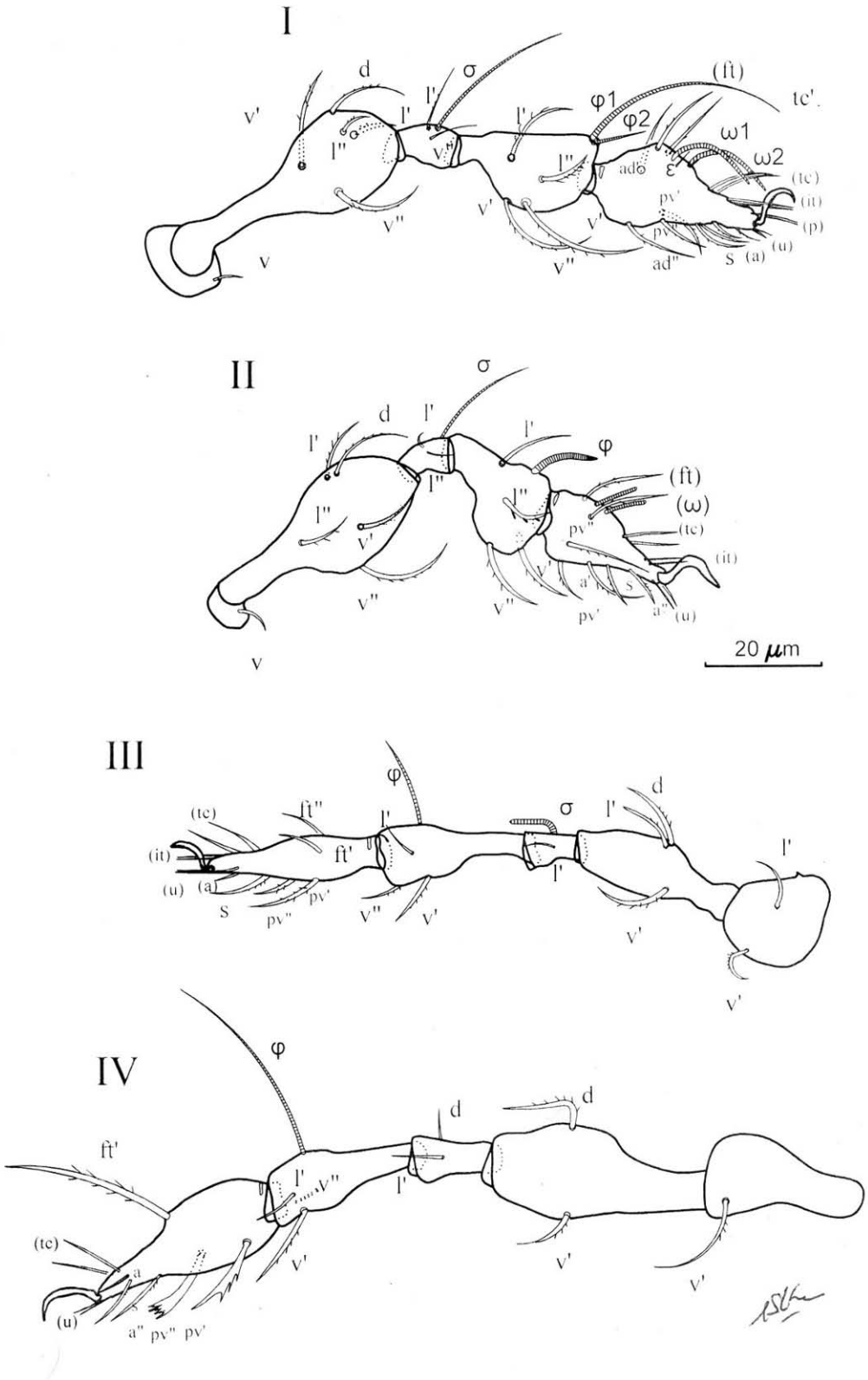


FIGURE 9: *O. mustaciata* **n. sp.** – Right legs I-IV, antiaxial view.

apophysis opposite to anterolateral border of notogaster next to humeral process (Fig. 1 and indicated by an arrow in Fig. 5).

Gnathosoma (Figs. 1, 3, 7) — Subcapitulum diarthric protected by the rostral tectum at rest with rectangular atelebasic rutella, forming distally short laminae with dorsal deep notch and ventrodistal tooth, oval chelicerae with two barbulated setae, hypostomal setae *h* shorter than *a* and *m*, *h* smooth, *a* and *m* finely barbulated, mentum with a U shaped thick carina.

Notogaster (Figs.1a, 2, 5) — Oval, smooth, anterior margin rounded, slender humeral processes standing opposite to posterior bothridial bundle and postbothridic apophysis of the abaxial anterior region of epimera 3, posterior margin rounded; ten pairs of thin setae, *c2* small and thin, pointing laterally outwards, spiniform with SEM, length less than one sixth of *la*; insertions of *lm*, *lp* and *h2* are located behind that corresponding to *la*, *h3* and *p3*; setae *p2* pointing outwards and backwards; lyrifissures *ia* opening internally to setae *c2, im* are oblique and anterior to *h3*.

Ventral region (Figs.1b, 3) — Borders of epimera 4 arched reaching not far than half of the genital shield; epimeric gutters 4 adaxially widening and ending close to the circumgenital opening, sagittal region of epimera connected to the narrow sternal furrow, apodemes 1, 2 and sejugal visible; half apodemes 2 higher than sejugal, epimeral setal formula 3-1-3-3, setae smooth and thin, setae *3b* and *4b* are the longest; genital plates smaller than anal, 5 pairs of short genital setae, separated in two groups, three anterior and fifth pairs arranged adaxially, fourth pair separated from the midline, one pair of aggenital setae separated and behind the genital plates, three pairs of adanal and two pairs of anal setae, anal and adanal setae 1 or 2-barbulated, *ad3* preanal, *ad1* postanal, *iad* in "paraanal" (Subías & Balogh 1989) position, slightly behind *ad2*. In the coxisternal region a large scalelike pedotectum I covers nearly all the femoro-trochanteral articulation on first leg (Figs 5 and 6).

Legs (Fig. 9) — Legs moniliform, slender and monodactylous, chaetotactic formula: for setae, from trochanters to ambulacra: I (1-5-2-4-18-1), II (1-5-2-4-13-1), III (2-3-1-3-13-1), IV (1-2-2-3-10-1); for solenidia, from genua to tarsi: I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). The proral setae are lacking on tarsi II, III and IV as occurs usually for other Oppiidae (Grandjean 1953; Subías and Arillo 1998).

A brief proximal apophysis directed dorsally on trochanter I and other two proximal and laterally directed on femur II, one sharp and the other blunt (Fig 6) and another is typically seen dorsally on trochanter III (Figs. 2,9). In tarsus IV seta *pv"* is fanlike (Figs. 8, 9) as it occurs in other Oppiidae (Lee and Subías 1991). Setae *pl* are lacking on tarsi I.

Solenidia according to Grandjean (1935), tactile: σI, ϕ*1*I, σII, ϕIII, ϕIV; baculiform: ω*a*II, ω*b*II, σIII; ceratiform: ω*1*, Iω2I, ϕII and piliform: ϕ*2*I. Solenidial formula from genua to tarsi: I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0), usual as for other Oppiidae (Grandjean 1935, Wauthy and Ducarme 2006, Kun 2012).

Remarks — *Oxyoppia mustaciata* is related to *O. suramericana* with whom it shares the same biotopes but differs in last having cuspis or lamellar apophysis and straight prodorsum lateral ridges converging to the lamellar cuspis. In *O. mustaciata* prodorsum lateral ridges are not straight but curved in all their length. *O. mustaciata* has a unique connection loop between costulae and transcostula involving the insertion of lamellar setae, second pair of translamellar sigilla oval transversally elongated, setae *in* is unbarbulated (one barbulated in *O. suramericana*) shorter and stiff setae *c2* (long and curved in *O. suramericana*), humeral processes rounded (flat in *O. suramericana*), notogastral setae *la* are anterior to *lm* and obliquely located (laterally in *O. suramericana*), different shape of femoral II proximal apophysis. As it also occurs in other small Oppiidae *pl* setae are lacking on tarsi I and III. The loss of setae in the legs of *O. mustaciata* could be related to its small size and presence in edaphic deep soil habitats as was already pointed out for *Neoppia discreta* and other Oppiidae (Subías & Arillo 1998). Coincidently with previous literature about *O. suramericana*, specimens of *O.mustaciata* are smaller than those belonging to the sympatric species *O. suramericana*.

Etymology — Species name refers to transcos-

tula aspect which jointly with *le* setae seems a moustache.

Key to Oxyoppiinae from Argentina.

1. Interbothridial tubercles present 4
— Interbothridial tubercles absent 2

2. Sensillus fusiform, elongated and pectinate, humeral processes well developed, a pair of chitinous caps on posterior region of notogaster covering *p3* setae, 231 – 250 μm, Córdoba province. . . . . *Sacculoppia singularis* (Balogh & Mahunka 1968)
— Sensillus fusiform ciliate, chitinous caps absent. 3

3. Transcostula arched, humeral processes poorly developed, *c2* absent, 10 pairs of equally long notogastral setae, 430 μm, Salta province. . . . . *Subiasella (Lalmoppia) arcuata* (Hammer 1958)
— Without transcostula but two transversal ridges between costulae, humeral processes well developped, 10 pairs of notogastral setae including short *c2*, 280 μm, Mendoza and Salta provinces . . . . . *Oxyoppia (Oxyoppiella) scalifera* (Hammer 1958)

4. Linear costulae with cuspis, transcostula linear, notogastral setae *la* and *lm* at the same level, *c2* curved and two thirds as long than *lm* 250 μm, Mendoza, Salta, Santa Cruz, Río Negro, Chubut, Buenos Aires provinces. . . . . *Oxyoppia (Oxyoppiella) suramericana* (Hammer 1958)
— Costulae curved distally without cuspis, transcostula arched, connected to costulae through a thin looped stretch, notogastral setae *la* anterior to *lm*, *c2* stiff and shorter about one tenth as long as *lm*, 205 – 235 μm, Río Negro province. . . . . *Oxyoppia (Oxyoppiella) mustaciata* **n. sp.**

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