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SOIL ORIBATID MITES FROM URUGUAY (I) (ACARI, ORIBATEI)
THREE NEW SPECIES FROM THE DEPARTMENT OF CERRO LARGO

BY Carlos PÉREZ-IÑIGO * and Manuela SARASOLA **

ABSTRACT: This paper is the first part of a study on the soil oribatid fauna of Uruguay. Three new species are described, namely: *Pheroliodes uruguayensis* n. sp., *Furcoppia (Monofurcoppia) austroamericana* n. sp. and *Eremaeozetes verai* n. sp.; a new subgenus is created for the monodactylous *Furcoppia* species.

RÉSUMÉ: Ce travail constitue la première partie de l'étude des oribates édaphiques de l'Uruguay. On décrit trois espèces nouvelles: *Pheroliodes uruguayensis* n. sp., *Furcoppia (Monofurcoppia) austroamericana* n. sp et *Eremaeozetes verai* n. sp.; un sous-genre nouveau a été créé pour les espèces monodactyles du genre *Furcoppia*.

The Uruguayan oribatid fauna has not been studied till now and the survey of the soil oribatid mites from Uruguay undertaken by the authors must therefore be of considerable interest. This study will be published as a series, the present paper being the first part.

The specimens were collected by one of the authors (M. SARASOLA) from soil samples from a river-bank wood and a neighbouring meadow, along the upper course of the Rio Negro, Department of Cerro Largo, Uruguay. The chosen area has been preserved from human activity and cattle grazing. The mean yearly temperature is 17-18° C., and the mean yearly rainfall is 1100-1200 mm.

*Pheroliodes uruguayensis* n. sp.
(figs. 1-13)

Number of specimens: 112 adult females, 85 adult males, 36 tritonymphs, 9 deutonymphs, 8 protonymphs and 16 larvae, all collected from forest soil.

Description of adult:

Dimensions: females 484-528 × 264-286 μm; males: 440-460 x 220-260 μm.

Colour and cerotegument: These mites are chestnut brown. The greater part of the specimens is covered by the nympha1 scalp, which is not firmly fixed and easily lost. A thick cerotegumentary layer is present, covering the whole body and the legs. This layer is difficult to remove.

Prodorsum: Rostrum widely rounded when seen from above. An oval light spot is present on rostral surface. Rostral setae thin, smooth and curved, apparently inserted on rostral edge. The lamellar setae, which also seem to be inserted near the rostral edge, in front of the rostral setae, are also thin, smooth and curved, a little shorter than the rostral ones. The thorn-like interlamellar setae are

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FIGS. 1-5: *Pheroliodes uruguayensis* n. sp., adult.
1. — Dorsal view; 2. — Ventral view; 3. — Lateral view; 4. — Sensillus; 5. — Tibia and Tarsus I.
very short. The rostral apodeme is well sclerotized on coxal region. The prodorsal surface is divided in two parts by a transversal groove that shows at both sides an enantiophysis which presents a posterior sharp tooth and a rounded anterior one. The anterior tooth is connected with the rostral apodeme and the posterior one with the central apodeme.

Surface in front of the transversal groove showing a small number of foveolae and a few irregular rugae. Rostrum not foveate. Surface of posterior part of prodorsum with rounded foveolae and a chitinous ridge between the interlamellar setae (bothridial + interlamellar apodeme).

Bothridia dorso-lateral, large and protruding. Sensillus rather long (72-78 μm), with an enlarged, flat, thin and light coloured head, covered by cerotegument, and a thin stem devoid of cerotegumentary layer.

Notogaster: Oval in shape. After removal of the juvenile scalps it shows a sculpture of rounded spots or foveolae, separated from each other by more than one foveolar diameter. The surface between the foveolae is covered by small granules. This pattern is most clearly visible on the central part of notogaster. The anterior region shows longish and badly defined light areas, the lateral and posterior regions are covered by granules.

Five pairs of notogastral setae present. Only the pairs lp (r2) and h1 are visible from above. They are of the same size and shape, rather long (about 18 μm), thin and smooth; lp inserted near fissure ip. Fissures ia, im and ip long and easily discernible.

Ventral surface: Cuticula of the epimeral region smooth. Coxisternal setae short and thin; formula 3-1-3-3. Ventral surface shows foveolae similar to dorsal ones. Seven pairs of short and thin genital setae, inserted in a longitudinal row. Three pairs of anal setae inserted near paraxial rim of anal plates. Three pairs of anal and one pair of adanal setae. Anal plates covered by rounded foveolae, latter absent from genital plates.

Notogastral setae pl, p2 and p3 visible in ventral view, but better seen laterally. Seta pl is almost at the same transversal plane than h1; p2 and p3 near one to the other, are inserted posterior to the plane of lp.

Lateral view: The insertions of the rostral and lamellar setae are easily observed by examining the mite in a lateral position. These setae are not inserted as close to the rostral edge as it seems in dorsal view, due to the strong curvature of the rostral surface.

The exostigmatic seta is very short, almost vestigial, inserted below the bothridium. No true pedotecta I and II are present, but there are pedotectal teeth. Tutorium absent.

Setae p1, p2 and p3 are clearly observed in this position, they are thin and smooth, but as long as other notogastral setae.

Legs: Genua, tibiae and tarsi all show well developed, proximal retrotecta or "sockets". Apophysis of tibia I large. All tarsi with a pedicel or pretarsus which is shorter than the claws. All legs tridactylous, nearly homodactylous.

Juvenile stages:


The characters of the juvenile stages are shown in figs. 6-13.

Discussion: PASCHOAL (1986) restricts the genus Pheroliodes Grandjean, 1931 to the species showing well developed prodorsal apodemata; lamellar setae inserted laterally, not on apophysis; seta p3 posterior to seta lp; dorsal lyrifissures large; seven pairs of genital setae, three pairs of anal setae; adults bearing exuviae loosely adherent to notogaster; femora without crests; and pretarsi (pedicels) short (about one fourth the length of the segment). The recent description of a Pheroliodes species from Argentina, bearing 10 pairs of genital setae (FERNANDEZ et al., 1991), modifies the diagnosis, since the number of genital setae can vary from 7 to 10 pairs.

The species of Pheroliodes can be divided into two groups: 1) species bearing short sensilli (sensillus shorter than distance between interlamellar setae) and 2) species with long sensilli (sensillus as long as the interlamellar distance or longer).
Figs. 6-13: *Pheroliodes uruguayensis* n. sp., juvenile stages.

Pheroliodes wehnckeii (Willmann, 1930); Ph. mirabilis (Hammer, 1958); Ph. nemoricultricus Paschoal, 1986; Ph. hammerae Pérez-Iñigo & Baggio, 1989 and Ph. inca Fernández, Martínez and Eguaras, 1991 belong to the first group.

Pheroliodes roblensis Covarrubias, 1968, Pheroliodes casabranquensis Paschoal, 1986, Ph. pellitus Paschoal, 1986 and the new species belong to the second group.

Pheroliodes uruguayensis can be distinguished from the other species in this group as follows:

1. Pheroliodes roblensis Covarrubias, 1968, from Chile. This is a considerably larger species, length 1118-1254 μm. The anterior prodorsal surface is foveate. Foveolae on notogaster very close together, such that the distance in between is shorter than the diameter of the foveolae.

2. Pheroliodes casabranquensis Paschoal, 1986, from Brazil. This species is smaller (length 411-440 μm) than the new species, the prodorsal surface is not foveate and the genital and anal apertures are contiguous.

3. Pheroliodes pellitus Paschoal, 1986, from Brazil. This is a smaller species (length 385-426 μm). The rostrum, epimeral and anal plates are foveate.

Furcoppia (Monofurcoppia) austroamericana n.subg., n.sp
(figs. 14-19)

Number of specimens: 13, collected from forest soil.

Dimensions: length 214-240 μm, width 125-152 μm.

Colour and cerotegument: Yellowish. The cerotegumentary layer is very thin and disappears quickly in warm lactic acid.

Prodorsum: Tip of rostrum tridentate, lateral teeth longer than the median one. These teeth are thin and sharp, difficult to see. The feathered and short rostral setae are inserted on small apophyses.

The lamellae are narrow, strongly convergent at the base, then elbowed towards the front; they are united at the centre of the prodorsum up to the anterior end, where two short and independent cusps support the insertions of the lamellar setae. These setae are rather short, not feathered, thick at their base and taper to a sharp end.

Interlamellar setae inserted close to the elbowed part of the lamellae, very thin, slightly feathered, and short (only a little longer than width of lamellae).

Bothridia large, with well developed walls. A triangular chitinous plate prolongs the paraxial wall under the lamella. Sensillus spindle-shaped; the tip, that wears very short barbs, is sharp. Exostigmatic setae as long as the interlamellar ones, and like them, very thin and feathered.

The tutorium can be seen at each side of the prodorsum, basal part rather wide but becoming thinner towards anterior end, which is not visible from above.

Notogaster: Oval in shape. Anterior border straight between bothridia. Well developed laminae humerales. Each lamina humeralis shows two rounded lobes, the posterior one bears a short, thin humeral seta.

Notogastral surface smooth, 10 pairs of very short, almost vestigial setae; three pairs visible only in ventral view.

Lateral view: Lamellae united to prodorsal surface only by its posterior part, as can be easily seen when the mite is observed in lateral position. The tutorium presents a curious curvature at the posterior part, it is straight in the middle region, ending in a thin and short free point at the level of the rostral setae. A remarkable chitinous ribbon runs between the bothridium and the acetabulum I. The exobothridic seta is inserted on this ribbon.

Two chitinous lines run back from the posterior lobe of the lamina humeralis.

Ventral view: Apodemata well developed, except apodeme 3, which is lacking. Surface of epimere III + IV shows a network pattern, rest of the ventral surface is smooth. Coxisternal formula is 3-1-2-3, epimeral setae almost vestigial. Six pairs of thin genital setae, three of which are inserted on anterior border of each plate. Adgenital (one pair) and adanal (three pairs) setae reduced to alveoli. Two, very thin, anal pairs present. Notogastral setae p1, p2 and p3 visible in ventral view, almost vestigial.
Figs. 14-19: *Furcoppia (Monofurcoppia) australamerican* n. sp.

A triangular and blunt discidium is present, as well as a carina circumpedica.

Legs: All tarsi monodactylous.

Discussion: All the previously known species of *Furcoppia* are tridactylous. BALOGH and MAHUNKA (1966) consider the tridactylous legs to be one of the characters that define this genus. The presence of only one claw on each tarsus separates the new species from the other known species of *Furcoppia* and justifies the creation of a new subgenus, *Monofurcoppia*.

Species of *Furcoppia* have been found in the Ethiopian region (*F. imitans* Balogh and Mahunka, 1966 and *F. tricornuta* Mahunka, 1978), the Oriental region (*F. parva* Balogh and Mahunka, 1967; *F. horakae* Mahunka, 1987), Polynesia (*F. cornuta* Hammer, 1972) and Mexico (*F. (Mexcoppia) hauseri* Mahunka, 1983). Recently, Pérez-Insigo and Baggio (in press) have described a species from Brazil.

*Eremaeozetes verai* n. sp.

(figs. 20-22)

Number of specimens: seven, collected from meadow soil.

Dimensions: 520-590 x 290-330 μm

Colour and cerotegument: Chestnut brown, a thick cerotegumentary layer covers the whole body, but not the legs. This cerotegument gives a peculiar aspect to the mite, which is rather different from that which appears after removing this layer. The cleaning of the animal is very difficult, it is necessary to boil the mite in lactic acid, and to remove the cerotegument by means of a needle.

Prodorsum: If the mite is observed uncleaned the prodorsal surface is covered by a cerotegumentary layer, concealing the lamellae and the interlamellary field. Only the sensilli and part of the bothridia are free. Other structures are not visible. The cerotegument shows a well-marked network pattern.

When the mite has been cleaned, the large lamellae can be seen. There is a pear-shaped interlamellary field, with the anterior end narrower than the posterior. This field shows a network pattern. Its posterior end presents an odd tubercle. The lamellae are long blades, with rounded anterior edges, fixed to the prodorsum by their posterior parts, fused in the middle, forming a sort of translamella; anterior halves parallel. Lamellar blades close together anteriorly, almost touching. The lamellar surface shows divergent striae, but not a network.

Lamellar setae not inserted on the tip of the lamellae, but on the inner margin, rather far from anterior end; they are straight, thin, smooth and rather long relative to the other setae. They are directed paraxially, in such a way that they are crossed in an X.

The rounded rostral outline can be seen by transparence, the short and curved rostral setae are inserted near its margin. No interlamellar setae visible. Bothridia large, opening laterally. Each sensillus has a thin stalk and a head formed by a membranous and rather irregular expansion.

Pedotecta I and II well developed, covering the basal articles of legs I and II.

Notogaster: The whole uncleaned notogaster is covered by a thick cerotegumentary layer, excepting the semicircular lenticulus, which is placed near the anterior margin. The central region is more elevated, especially the posterior half. The margin shows two humeral lobes at each side. The whole cerotegumentary layer shows a remarkable network pattern.

After cleaning, the notogaster shows a rounded anterior margin; lenticulus semicircular, with the anterior margin precise and the posterior one rather diffuse, placed very near the anterior notogastral margin. Laterally there is a rounded humeral lobe at each side, and a long, pteromorph-like expansion, directed ventrally. 10 pairs of notogastral setae, c2 and ln in the humeral region, la in the center, lp near the posterolateral margin, setae h1, h2 and h3 on small marginal apophyses, and p1, p2 and p3 on the margin. All setae thin, short and smooth. Prodorsal surface shows a network pattern, less marked than the cerotegumentary one. The pteromorph-like lateral expansions present striae.

The hypostome has a faint network pattern. Each genital plate bears six short, thin setae. Two pairs of anal setae, three adanal pairs and one adgenital
Figs. 20-22: *Eremaezetes verai* n. sp.
20. — Dorsal view (cleaned specimen); 21. — Ventral view (cleaned specimen); 22. — Lateral view of uncleaned specimen.
pair, all short and thin. Coxisternal formula 3-1-2-2, setae very short and difficult to discern. Ventral surface is covered by a network pattern, less marked than the cerotegumentary one.

Legs : Tarsi tridactylous, lateral claws much thinner than the central one.

Discussion : The new species is easily distinguishable from E. acutus Covarrubias, 1967 (from Chile), E. costulatus Mahunka, 1977 (from Bali), E. ephippiger Balogh, 1968 (from New Guinea), E. octomaculatus Hammer, 1973 (from Upolu), E. reticulatus Balogh, 1958 (from Angola) and E. tuberculatus Berlese, 1913 (from Java) which are all monodactylous species.

The known tridactylous species differ from the new species as follows:

Eremaeozetes woelkei Piffl, 1972 (from Sinumbu, Brazil) shows a very different type of cerotegumentary layer, the lenticulus is placed far from the anterior margin of notogaster, and the lamellar setae are very short, inserted very near the distal lamellar end.

Eremaeozetes gracilis Mahunka, 1985 (from South Africa) also has a different cerotegumentary network pattern. The lenticulus is placed far from the disjugal suture and the notogastral setae, though very small, have a dilated and rounded end.

There are a certain number of Eremaeozetes species with an unknown number of claws, but they can be distinguished from the species found in Uruguay by the following characters:

Eremaeozetes (Seteremaeozetes) oblectus P. Balogh, 1988 (from Sri Lanka) and E. tsavoensis Mahunka, 1987 (from Tanzania) have a different number of setae on the genital plates.

E. bituberculatus Mahunka, 1983 (from Tanzania), E. dividipeltatus Mahunka, 1985 (from St. Lucia) and E. ursulae Mahunka, 1985 (also from St. Lucia) present all or some of the notogastral setae dilated.

E. bilunatifer Balogh and Mahunka, 1981 (from Paraguay) has the lenticulus divided into two lunulate spots.

E. lineatus Mahunka, 1985 (from St. Lucia) has the lamellar setae inserted on small tubercles on tips of lamellae.

E. undulatus Mahunka, 1985 (from St. Lucia) and E. machadoi Mahunka, 1989 (from Angola) present the hypostome covered with rugae.

Derivatio nominis : This species has been named in honour of Prof. Horacio Vera, Universidad de la Republica, Montevideo, Uruguay

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