SOME PHYTOSEIID MITES OF PARAGUAY
(PHYTOSEIIDAE: ACARINA)

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ABSTRACT

A summary of the phytoseiids of South America is presented and 5 species are reported for the first time from Paraguay. These include Proprioseiopsis citri (Muma), Euseius citrifolius n. sp., Euseius fiece
manni n. sp., Euseius paraguayensis n. sp., and Galendromus sp. A key is constructed for the 3 new species of Euseius.

Dosse (1958) described Neoseiulus (= Typhlodromus) chilenensis
(Dosse) and Phytoseiulus riegieli Dosse from Chile and discussed their biology. Chant (1959) reported the following species from South America: Typhlodromina (= Typhlodromus (T.)) tropica (Chant) from Ecuador, Euseius (= Typhlodromus (A.)) concordis (Chant) from Argentina, Neoseiulus (= Typhlodromus (A.)) ornamentus (Athias-Henriot) from Chile, Amblyseius (= Typhlodromus (A.)) fraterculus Berlese from Argentina, Amblyseius (= Typhlodromus (A.)) perlongisetus Berlese from Argentina, Proprioseiopsis (= Typhlodromus (A.)) ovatus (Garman) from Ecuador, Amblyseius (= Typhlodromus (A.)) grandis (Berlese) from Argentina, and Phytoseiulus persimilis Athias-Henriot from Chile. Gonzalez and Schuster (1962) reported the following species from South America: Chileseius camposi Gonzalez and Schuster from Chile, Proprioseiopsis (= Amblyseius) globosus (Gonzalez and Schuster) from Chile and Argentina, Neoseiulus (= Amblyseius) chilenensis (Dosse) from Chile, Euseius (= Amblyseius) fructicola (Gonzalez and Schuster) from Chile, Amblyseius intermedius Gonzalez and Schuster from Chile, Amblyseius perlongisetus Berlese from Chile and Argentina, Amblyseius valpoensis Gonzalez and Schuster from Chile, Phytoseiulus riegieli Dosse from Chile, Meso
seiulus longipes (Evans) from Chile, Galendromus (= Metaseiulus) brevi
collis (Gonzalez and Schuster) from Chile, and Phytoseiulus (Pennaeolus) decoratus Gonzalez and Schuster from Chile. Sheils (1962) reported Neoseiulus (= Amblyseius) chascomensis (Sheils), and Athiasia (= Amblyseius) tucumanensis (Sheils) from Argentina. Ebara (1966) reported the following species from the State of Sao Paulo, Brazil: Euseius (= Amblyseius) sakagamii (Ebara), Euseius (= Amblyseius) hibiscii (Chant), Amblyseius longgensis (Muma), Proprioseiopsis (= Amblyseius) neotropicus (Ebara), Typhlodromips (= Amblyseius) akahirai (Ebara), Phytoseiulus chanti Ebara, Phytoseius (Pennaeolus) mumai Ebara, and Iphiseiodes (= Iphiseius) quadripilis (Banks). He also listed Amblyseius hexagonus Berlese and Euseius (= Amblyseius) finlandicus (Oudemans)

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from Argentina. De Leon (1966) reported the following 21 species from
British Guyana: Proprioseiopsis (=Amblyseius) cannaensis (Muma),
Iphiseiodes quadrupliis (Bank), Iphiseiodes kamahorae De Leon, Para-
Amblyseius ogdeni De Leon, Euseius alatus De Leon, Typhlodromalus arawak
De Leon, Amblyseius segregans De Leon, Amblyseius largoensis (Muma),
Amblyseius circumflexis De Leon, Amblyseius aerosilis (Muma), Ambly-
seius martius De Leon, Amblyseius guianensis De Leon, Typhlodromips
daviesi De Leon, Typhlodromips arcaus De Leon, Typhlodromips scleroti-
cus De Leon, Typhlodromips auratus De Leon, Phytoseius (Phytoseius)
rez De Leon, Phytoseius (Pennaseius) averrhoae De Leon, Phytoseius
(Pennaseius) guianensis De Leon, Typhloseiopsis funiculatus De Leon,
and Diadromus regularis (De Leon). Athias-Henriot (1967) reported
the following 10 species from South America: Proprioseiopsis (=Amblyseius)
edbakeri (A.-H.) from Argentina, Proprioseiopsis (=Amblyseius) don-
chariti (A.-H.) from Argentina, Proprioseiopsis mumaellus (A.-H.) from
Argentina, Cheloseius (=Amblyseius) australis (A.-H.) from Argentina,
Cheloseius (=Amblyseius) schusterellus (A.-H.) from Argentina, Ath-
eseius (=Amblyseius) gonzalezi (A.-H.) from Uruguay, Amblyseius de-
tonellus A.-H. from Argentina, Amblyseius prichardellus A.-H. from Ar-
gen, Amblyseius franzellus A.-H. from Argentina, Amblyseius sibirul-
lus A.-H. from Argentina. Denmark and Muma (1970) redescribed Ri-
coseius lozohaler (De Leon) from San Paulo, Brazil.

Recently a small collection of phytoselid mites collected in Paraguay
by Braulio Ramon Aranda Centurion was received from Dr. Carlos Flecht-
mann. The 3 genera and 5 species included in this collection add to the
known distribution of this family of mites in South America. The collec-
tion contained 3 undescribed species of the genus Euseius. Although this
family is generally considered predaceous, no observations were made on
the species reported in this paper.

Genus Proprioseiopsis Muma (1961)

Proprioseiopsis Muma 1961:277 (Type only); Muma and Denmark
1968:231.

Type: Typhlodromus (Amblyseius) terrestis Chant 1959, by original
designation (Muma 1961).

Diagnosis: Females are characterized by 3 pairs of dorsal setae, 3 pairs
of median setae, 8 pairs of lateral setae (some elongate and weakly plu-
moses), 2 pairs of sublateral setae on the interseutal membrane, 3 pairs of
sternal setae, and 3 pairs of preanal setae.

Dorsal scutum well sclerotized, usually smooth with indistinct lunate
areas on most species. Sternal scutum as wide or wider than long with
straight or concave posterior margin; sternum creased to reticulated or
smooth. Ventrianal scutum shield-shaped to pentagonal and creased to
reticulated with preanal pores. Peritreme long, extending to or between
L1 and verticAt. Peritremal scutum with an etcal strip that extends pos-
teriorly to leg IV exopodal scutum. Chelicerae normal with 6 to 14 den-
ticules on fixed finger and 0 to 4 on movable finger. Leg formula usually
1423, usually with no macrosetae on leg I. Macrosetae on Sge II and Sge
III of some species. All species have macrosetae on Sge IV, StI IV, and
St IV.
Males smaller than females but otherwise similar. Spermatodactyl with foot usually terminal, but with exceptions. Ventrianal scutum with 3 or 4 pairs of preanal setae and a pair of pores.

**DISCUSSION:** There are about 40 species in this genus, of which most species are found in or near ground litter. The arboreal dorsatus group is an exception. The genus is well represented in the Caribbean area and is worldwide in distribution.

**Proprioseiopsis citri** (Muma)

*Amblyseius* *citri* Muma 1962:1.

**DIAGNOSIS:** This species is closely related to *P. detritus* (Muma), but *citri* has a smooth dorsal scutum, longer M₃, L₁, L₄, and L₄, a small but distinctly swollen spermathecal atrium, and a differently shaped spermathecal cervix.

**TYPE:** Female holotype, allotype, and paratypes from citrus litter at Sebring, Florida, in USNM, Washington, D. C.

This species has been collected at Asuncion, Paraguay, 15 July 1968 (Braulio Ramon Aranda Centurion), on *Citrus* sp. It has been taken previously only on bark or in litter beneath citrus trees in Florida.

**Euseius** Wainstein 1962

**Type:** *Seiulus finlandicus* Oudemans 1915 (by original designation.)


*Euseius*, De Leon, 1966:86; Muma and Denmark (in press).

**DIAGNOSIS:** Females are characterized by 4 pairs of dorsal setae, 3 pairs of median setae of which M₃ is setiform and usually approximates M₁ and M₄ in length, 8 pairs of lateral setae which are usually setiform except L₃ is sometimes weakly plumose, 2 pairs of sublateral setae on the intercutal membrane (some species have S₁ on posterior projections of dorsal scutum), 3 pairs of sternal setae and 3 pairs of preanal ventrianal setae.

Chelicerae small with fixed finger edentate or with only 1 or 2 denticules usually distal to the medially located pilus dentilis. Sternum longer than wide and on newly mounted specimens distinctly to indistinctly lobate posteriorly. Peritreme short, extending anteriorly no further than L₂ or L₁. Peritremal scutum indistinguishable, fused with stigmatal scutum and leg IV expodial scutum. Ventrianal scutum elongate, frequently vase-shaped; the preanal setae more or less aligned in 2 transverse curved rows with median setae removed from anterior margin of scutum. Macrosetae sometimes present on the genu of legs II and III, Sge IV, Sti IV, and St IV are always present with the latter usually the longest.

Males are smaller but similar to females except the sublateral setae are on the dorsal scutum. Ventrianal scutum with 3 pairs of preanal setae. Spermatodactyl usually terminal with heel distinct and with a lateral process; toe frequently bent forward.

**DISCUSSION:** There are about 40 described species in this genus and many known undescribed species. It is worldwide in distribution and is a tree or shrub inhabiting genus. Although food habits are not well known for most species, several are known to be pollenophagus as well as predatory on Tetranychidae.
Fig. 1 to 4. Female *Euseius citrifolius* Denmark and Muma n. sp.
1. Dorsal and leg setation. 2. Ventral scuta and setation. 3. Posterior peritremal stigmatical development. 4. Spermathecal structures.

**KEY TO THE PARAGUAYAN SPECIES OF EUSEIUS WAINSTEIN**
*(BASED ON FEMALES)*

1. L₄ not more than one-half as long as L₃, dorsal scutum reticulate ......
   
   1. Euseius paraguayensis Denmark & Muma n. sp.

2. Sge III with macroseta knobbed bacillate; Sge, Sti and St IV macrosetae knobbed bacillate; dorsal scutum smooth .......................... 2

2. Euseius flechtmani Denmark & Muma n. sp.

2. Euseius citrifolius Denmark & Muma n. sp.

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*Euseius citrifolius* Denmark & Muma n. sp.

Fig. 1 to 4

**DIAGNOSIS:** *Euseius citrifolius* is distinguished from the closely related *Euseius vivax* (Chant and Baker) by having the macrosetae blunt setaceous, not knobbed setaceous as in *vivax*. *E. citrifolius* has anterior laterals much shorter than in *vivax*.

**FEMALE:** Length 316μ; width at L₄ 223μ. Dorsal scutum smooth with at least 3 small pores and 17 pairs of setae. Measurements of setae: verticales 28μ; D₁ 7μ, D₂, D₃ and D₄ 8μ; clunals 5μ; L₁ 30μ, L₂ 20μ, L₃ 21μ, L₄ 22μ.
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L₄ 39µ, L₅ 19µ, L₆ 20µ, L₇ 27µ, L₈ 64µ; M₁ and M₂ 13µ, M₃ 17µ; anterior sublaterals 11µ; posterior sublaterals 8µ. Sternal scutum smooth and about as wide as long. Ventrianal scutum shield-shaped with three pairs of preanal setae and a pair of pores. Peritreme extends forward to between L₁ and L₂. Chelicerae normal, but number of denticules cannot be seen. Leg formula 4:1.2.2.0. Macrosetae present on Sge II, Sge III and Sge IV. Length of macrosetae on leg IV as follows: Sge IV 47µ, Sti IV 34µ, St IV 58µ. Genu II 2, 2, 2, 1; Genu III 1, 2, 2, 0. Spermatheca tubular.

MALE: Unknown.

TYPE: Female holotype from Asuncion, Paraguay, 12 July 1968, on Citrus sp., in Florida State Collection of Arthropods (FSCA), Gainesville, Florida. Paratypes: 1 female with holotype; 1 female at Cecilio Baez, Paraguay, 6 January 1969, on Psidium guajava; 1 female at Coronel Oviedo, Paraguay, 11 January 1969, on Psidium guajava; 1 nymph at Caranday, Paraguay, 13 January 1969, on Prunus persica. All collections were made by Braulio Ramon Aranda Centurion.

Euseius flechtmani Denmark & Muma n. sp.

Fig. 5 to 10

DIAGNOSIS: This species is distinguished from Euseius casearicæ De Leon by the longer L₄, macrosetae Sge III is knobbed setaceous while casearicæ is setaceous, and the spermatheca is not as constricted as in casearicæ.

FEMALE: Length 322µ; width at L₄ 213µ. Dorsal scutum smooth with several small pores and 17 pairs of setae. Measurements of setae: ventrals 32µ; D₁ and D₂ 10µ, D₃ 14µ, D₄ 11µ; clunals 5µ; L₁ 41µ, L₂ 17µ, L₃ 31µ, L₄ 50µ, L₅ 15µ, L₆ 16µ, L₇ 18µ, L₈ 69µ; M₁ 8µ, M₂ 11µ, M₃ 12µ; anterior sublateral 14µ; posterior sublateral 11µ. Sternal scutum smooth and about as wide as long. Ventrianal scutum shield-shaped with 3 pairs of preanal setae. Peritreme extends forward to between L₁ and L₂. Chelicerae normal, but number of denticules cannot be seen. Leg formula 4:1.2.2.0. Macrosetae present on Sge II, Sge III, and Sge IV. Length of macrosetae on leg IV as follows: Sge IV 39µ, Sti IV 30µ, and St IV 52µ. Genu II 2, 2, 2, 1; Genu III 1, 2, 2, 1. Spermatheca tubular.

MALE: Smaller than female and the sublateral setae on the dorsal scutum. Ventrianal scutum with 3 pairs of preanal setae and a pair of pores. The spermatodactyl has terminal heel (foot usually terminal in this genus).

TYPE: Female holotype from San Lorenzo, Paraguay, July 1968 (Braulio Ramon Aranda Centurion), on Citrus sp., in FSCA, Gainesville, Florida.

Male allotype from Caranday, Paraguay, 13 January 1968 (Braulio Ramon Aranda Centurion), on Citrus sp. Paratypes: 1 female taken with the holotype; 2 females and 1 male at Coronel Oviedo, Paraguay, 11 January 1969, on Zea mays; 1 female at Lambare, Paraguay, 12 July 1968, on
Fig. 5 to 10. Female *Euseius flechtmani* Denmark and Muma n. sp. 5. Dorsal and leg structure and setation. 6. Ventral scuta and setation. 7. Posterior peritremal and stigmatal development. 8. Spermathecal structures (two views). 9. Male spermatodactyl structure. 10. Ventrianal scutum.

*Manihot esculenta* Crantz.; Coronel Oviedo, Paraguay, 11 January 1969, on *Manihot esculenta* Crantz.; Cecilio Raex, Paraguay, 8 January 1969, on *Citrus* sp.; Carandayty, Paraguay, 13 January 1969, on *Psidium guajava*; Cecilio Raex, Paraguay, 6 January 1969, on *Camponemesia rhomboe* Berg. All collections were made by Braulio Ramon Aranda Centurion.

**DISCUSSION:** Nothing is known about the food habits of this species.

*Euseius paraguayensis* Denmark & Muma n. sp.

Fig. 11 to 16

**DIAGNOSIS:** Distinguished from all other known species of the *sibelius* group by comparative lengths of dorsal scutal setae and length of the spermatheca which is short and distinct.

**FEMALE:** Length 819 μ, width at L4 227 μ. Dorsal scutum reticulate with several small pores and 17 pairs of setae. Measurements of setae: ventrals 20 μ; D1 and D3 13 μ, D2 18 μ, D4 16 μ; clunals 5 μ; L1 20 μ, L2 17 μ, L3 19 μ, L4 24 μ, L5 20 μ, L6 24 μ, L7 22 μ, L8 63 μ; M1 15 μ, M2 17 μ, M3 19 μ; anterior sublaterals 14 μ; posterior sublaterals 11 μ. Sternal scutum smooth and slight-
Fig. 11 to 16. Female *Euseius paraguayensis* Denmark and Muma n. sp. 11. Dorsal and leg structure and setation. 12. Ventral scuta and setation. 13. Posterior peritremal and stigmatal development. 14. Spermathecal structures. 15. Male spermatodactyl structure. 16. Male ventrianal scutum.

Body longer than wide. Ventrianal scutum elongate shield-shaped with 3 pairs of preanal setae and a pair of preanal pores. Peritreme extends between L₁ and L₄. Chelicerae normal, but denticules indistinct. Leg formula 4:1:3. Macrosetae present on Sge II, Sge III, and Sge IV. Length of macrosetae on leg IV as follows: Sge IV 41 μ, Sti IV 24 μ, and St IV 50 μ. Genu II 2, 2, 1; Genu III 1, 2, 1. Spermatheca tubular.

**MALE:** Smaller than female, sublateral setae on the dorsal scutum. Ventrianal scutum with 3 pairs of preanal setae and a pair of pores. The spermatodactyl has terminal heel (foot usually terminal in this genus).

**TYPE:** Female holotype from Cecilio Baez, Paraguay, 1 January 1969, on *Citrus* sp. Male allotype from San Lorenzo, Paraguay, July 1968, on *Cycas revoluta* Thunb. in FSCA, Gainesville, Florida. Paratype female from Carandayty, Paraguay, 13 January 1969, on *Citrus* sp. All collections were made by Braulio Ramon Aranda Centurion.
Genus Galendromus Muma 1961

Galendromus Muma 1961:68.

Type: *Typhlodromus floridanus* Muma 1955, by original designation.

**Diagnosis:** Females characterized by a reticulate dorsal scutum with 4 pairs of dorsal setae, 2 pairs of median setae, 9 pairs of simple or plumose lateral setae, 1 pair of anterior sublateral setae, 2 pairs of sternal setae, 4 pairs of preanal ventrianal setae, 1 or 2 pairs of ventrolateral setae, and a pair of caudal setae; 0 or 1 macroseta on St IV; legs I, II, and III without macrosetae or modified setae; leg formulae 1423 or 4123; pretreme variable in length from a point between L, and L, to the verticals, peritremal and stigmatal scuta indistinguishably fused; spermatheca with a tubular, vesicular, or fundibuliform cervix and a nodular or undifferentiated atrium; chelicerae normal; movable cheliceral finger with 0 or 1 denticule and fixed cheliceral finger with 1 to 3 denticules.

Males are similar to females, but smaller. Setation of the ventral scuta of both sexes is highly variable (Muma 1963).

**Discussion:** This genus is found from Canada to Chile. It is usually taken on trees, shrubs, and vines.

One very poorly preserved specimen belonging to this genus was collected at Carandayt, Paraguay, 13 January 1969 (Braulio Ramon Aranda Centurion) on *flex paraguayensis*. It is recorded here for extension of the known distribution of the genus. The specimen is a male so a subgeneric placement cannot be made with certainty.

**Literature Cited**


The Florida Entomologist 53(4) 1970