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DESCRIPTION AND RELATIONSHIPS OF *PARANILLOPSIS* NEW GENUS, TWO NEW SPECIES FROM ARGENTINA, AND A KEY TO THE NEOTROPICAL GENERA OF THE SUBTRIBE ANILLINA (COLEOPTERA: CARABIDAE: BEMBIDIINI)

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Abstract

Specimens of Anillina from Argentina are described for the first time. They belong to a **new genus,** *Paranillopsis,* and include two **new species,** *P. piguensis* (type species) and *P. pampensis.* External structural features of *Paranillopsis* show close relationship with the genus *Paranillus* Jeannel from Magadascar. Their vicariant distribution pattern, as for other taxa with similar patterns, is postulated to have resulted from the breakup of the Gondwanan supercontinent.

The subtribe Anillina (Bembidiini, Carabidae) comprises endogeous and troglobitic beetles that occur mostly in temperate areas (Jeannel 1937, 1963). The anillines of Europe and Asia Minor are well known (Jeannel 1937, 1963; Jeanne 1973), but this taxon is inadequately known in South America. Only seven monospecific anilline genera have been described from South America, whereas for Central America (Jeannel 1937; Vigna-Taglianti 1973; Erwin 1982; Zaballos 1997) and North America (Jeannel 1963; Barr 1995) several genera and species have been described. The taxa treated below are the first Anillina described for Argentina, and the new genus is the second genus of this subtribe described for southern South America.

Material and Methods

All the specimens were slide-mounted using standard procedures and examined under compound microscopy. Drawings were made with a camera lucida. Scales represent 0.1 mm.

Measurements: the only measurement reported is overall length, and was taken from the clypeus to the apex of the elytra. Other measurements are given as indices; the head length is considered from the clypeus to the posterior region; the pronotum length is from its base to its apex; and the elytron length is taken from the humeral angle to the apex. In every case, the width is maximum.

Descriptions are based on females, because no males were found. They were extracted from soil samples from the southern part of Buenos Aires Province (Argentina). The specimens were deposited in the Museo de La Plata (MLP), La Plata, and the Instituto Argentino de Investigaciones de Zonas Aridas (IADIZA), Mendoza.

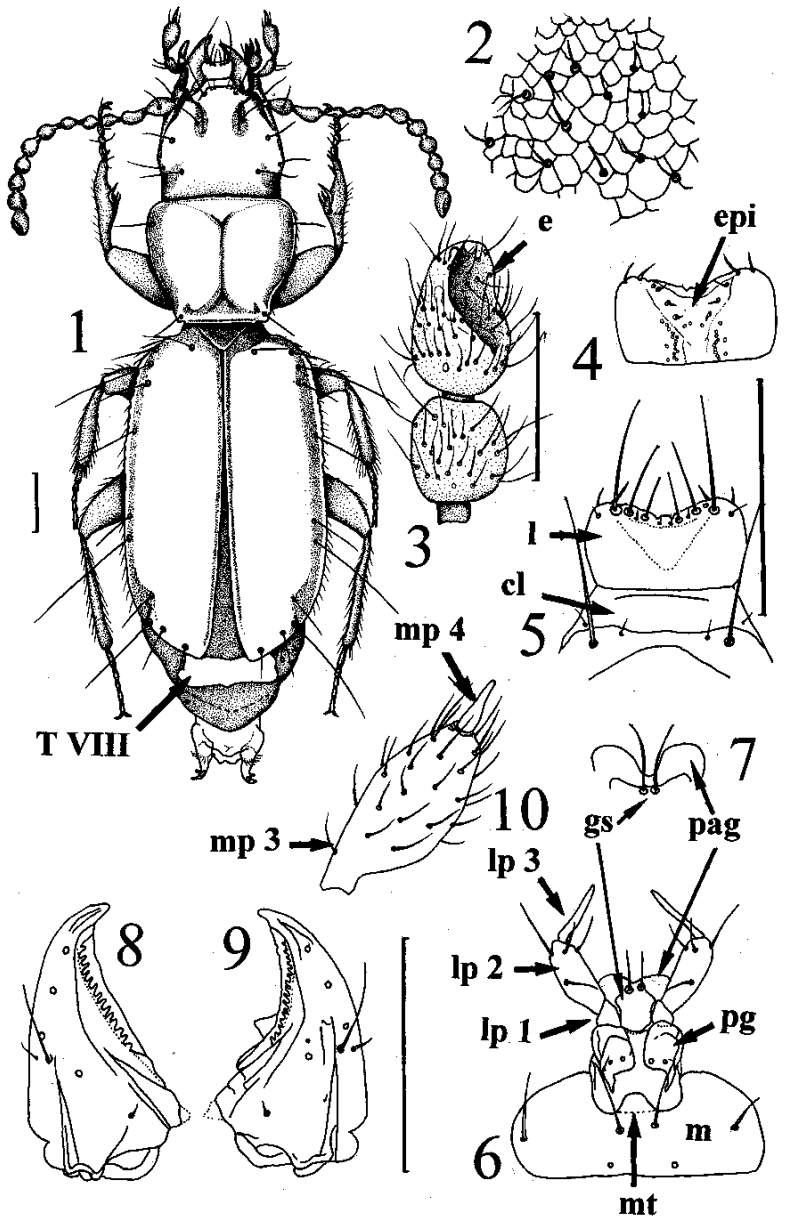
This new taxon is recognized as such because of its distinct structural features; the combination is unique, in terms of the known South American anillline assemblage. This new taxon presents similarities with the African genus *Paranillus*; however, differences in the labium structures have been considered by Jeannel to differentiate other genera of Anillina, and we follow this same criterion to erect the new genus *Paranillopsis*.

Terms for structural features of external morphology follow Jeannel (1963) and Vigna Taglianti (1973). Terms for the sclerites of the female genital segments and their appendages follow Ball and Shpeley (1983).

Systematic Treatment

Key to Neotropical Anillina genera, based on characters of adults

1 Mentum tooth absent 2
1′ Mentum tooth present 4
2 (1) Pronotum without setae; elytron with umbilical series type A (anillienée), with nine setae, seta 8 longest than setae 7 and 9 3
2′ Pronotum with two lateral setae on each side; elytron with umbilical series type B (scoptodipniennée), with ten setae, seta 9 longest than setae 7 and 8 (Ecuador) ..... *Zoianillus* Sciaky, 1994
3 (2) Antenna long, extended to base of elytron; mentum without setae (Brazil) ..... *Stylulites* Jeannel, 1963
3′ Antenna short, extended only half length of pronotum; mentum with two setae (Greater Antilles) ..... *Stylulus* Schaufuss, 1882
4 (1) Elytron with umbilical series type B (scoptodipniennée), seta 9 longest than setae 7 and 8 5
4′ Elytron with umbilical series type A (anillienée), seta 8 longest than setae 7 and 9 7
5 (4) Head without lateral frontal carinae; elytra fused (Galapagos Is.) ..... *Mystroceridius* Reichardt, 1970
5′ Head with lateral frontal carinae clearly visible and pronounced; elytra not fused 6
6 (5) Length 3 mm; pronotum cordiform; labrum quadrisetose; mentum and submentum fused; paraglossae distinct ..... *Honduranillus* Zaballos, 1997
6′ Length 2.5 mm; pronotum not cordiform; mentum and submentum not fused, free, labium with six setae; paraglossae indistinct. (Mexico) ..... *Mexanillus* Vigna-Taglianti, 1973
7 (4) Tarsi tetramerous (Peru) ..... *Anillotarsus* Mateu, 1980
7′ Tarsi pentamerous 8
8 (7) Mentum with at least four setae 10
8′ Mentum with two setae 9
9 (8) Pronotum with three lateral setae on each side; third elytra stria without fixed setae (Peru). ..... *Cryptocharidius* Etonti and Mateu, 1992
9′ Pronotum with two lateral setae on each side; elytra with three fixed setae on the third stria (Chile) ..... *Nothanillus* Jeannel, 1962
10 (9) Body elongate; ligula with rounded paraglossae; pronotum cordiform, lateral sides convergent posteriorly, posterior region smooth ..... *Paranillopsis* new genus
10′ Body wide; ligula without paraglossae; lateral margin of prothorax convex, with posterior region serulate (Central America and Mexico) ..... *Geocharidius* Jeannel, 1963



Figs. 1–10. *Paranillopsis piguensis* new species. **1)** Habitus, dorsal aspect; **2)** microsculture mesh pattern and pubescence; **3)** antennomere 10 and 11; **4)** labrum, ventral aspect, showing epipharynx; **5)** labrum and clypeus, dorsal aspect; **6)** labium, ventral aspect; **7)** labium, apex of glossal sclerite; **8)** right mandible, ventral aspect; **9)** left mandible, ventral aspect; **10)** maxillary palpomeres 3 and 4. Legend: **cl,** clypeus; **e,**-

Paranillopsis, new genus

Etymology. The name *Paranillopsis* is based on two classical words, the generic name *Paranillus,* and the suffix *opsis,* meaning similar to. Together, these words indicate that the new genus has features similar to, but not the same as, *Paranillus.*

Type species. *Paranillopsis piguensis* **new species**, here designated.

Diagnosis. Body elongate (Fig. 1), depigmented, wingless; eye traces lacking; antenna long, extended to base of elytra; mentum tooth present; ligula with rounded paraglossae; elytral chaetotaxy of type A (anillienée), without discal fixed setae, except the basal scutellar.

Description. Length 1.06–1.57 mm. Head and elytra integument with microsculpture mesh pattern isodiametric (Fig. 2), pronotum integument smooth; thick short pubescence present over the entire body. Uniform yellow brown color. Head almost same width as pronotum (Fig. 1), compressed or not in middle. Eyes absent. With four fixed setae, two supraorbital (Fig. 16, **sos**), one fronto-paramedial (Fig. 16, **fs**), and one ocular (Fig. 16, **os**). Lateral frontal carina clearly visible (Fig. 19, **lfc**). Antenna moniliform with 11 antennomeres, long, extended to base of elytra, with thick pubescence from the second antennomere, antennomere 11 excavated (Fig. 3, **e**). Labrum (Fig. 5, **l**) with six setae dorsally and concave anterior margin (Fig. 4); mandibles short with retinaculum and premolar tooth small and conical (Figs. 9–10); maxillar palpomere 3 large (Fig. 10, **mp 3**) and palpomere 4 subconical (Fig. 10, **mp 4**); labium with mentum (Fig. 6, **m**) and submentum not fused; mentum with simple tooth (Fig. 6, **mt**), two setae each in umbilicate punctures at base of median tooth and two lateral setae, epilobes not evident; submentum with four to eight setae; labial palpomere 2 (Fig. 6, **lp 2**) with few setae, palpomere 3 slender (Fig. 6, **lp 3**), as long as palpomere 2; ligula with paraglossae broadly rounded apically (Figs. 6 and 7, **pag**); glossal sclerite (Figs. 6 and 7, **gs**) with two central subapical setae. Pronotum transverse, cordiform, maximum width anteriorly and lateral margins posteriorly convergent; with two setae on each side, one anterior and another posterior; posterior margin narrower than anterior (Fig. 1); posterior angles distinct, sharp, and protruded. Elytra flat, long (three ot four times longer than wide), not extended to apex of abdominal tergum VIII, with humeral margin rounded or straight; lateral margins regularly denticulate throughout to insertion of umbilicate seta 8, each denticle at apex with small setula, basal setae present; discal setae absent; umbilical series (Figs. 1, 18, and 21) of nine setae, each seta inserted in umbilicate setigerous puncture, in three groups: basal, with setae 1–4, medial, with setae 5 and 6; and apical, with setae 7–9; setae 2, 6, and 8 largest; setigerous punctures 1–3 equidistant in sequence; setigerous puncture 4 more isolated, four times distance from 3 as 3 from 2, and similar distance from 5; setigerous punctures 5 and 6 close together; setigerous puncture 7 displaced mediad, 8 and 9 close together in form of pair geminée (series type A or anillienée of Jeannel 1963). Recurrent groove present (Fig. 21, **rg**). Protibiae broad, with a large spur on dorsal surface (Fig. 11, **ds**). Apical spur displaced to the middle the tibia (Figs. 11–12, **as**). Abdominal sterna IV–VII with two paramedian setae; VIII with four. Gonocoxites wide, stylus arquate (Fig. 13) with subapical setose organ with two nematiform setae (Fig. 13, **ns**) and two lateral strong ensiform setae (Fig. 13, **es**); spermatheca rounded (Figs. 14–15).

Phyletic relationships. *Paranillopsis* is included within the subtribe Anillina because it shares with other members of the subtribe the following char-

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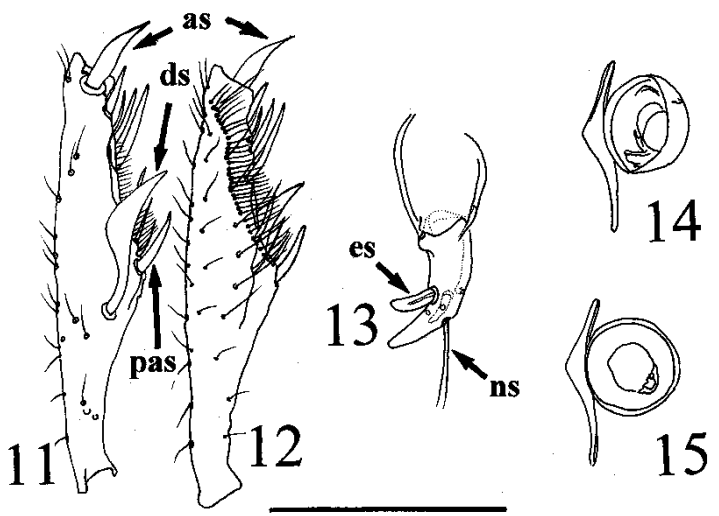
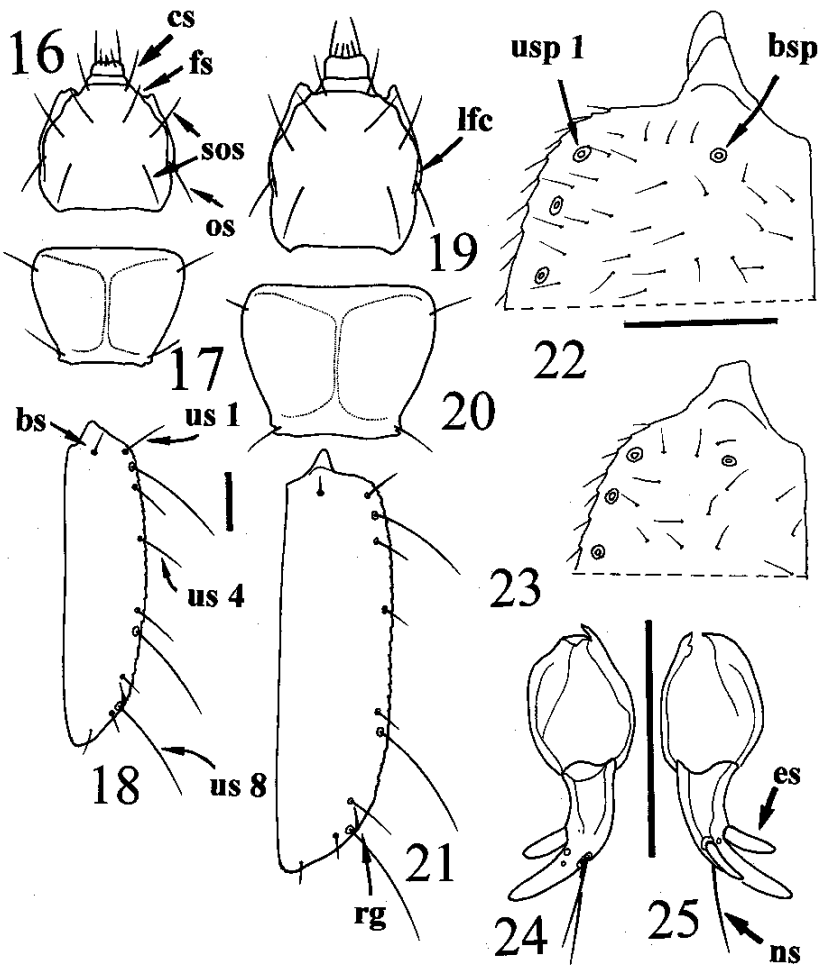
excavation; **epi,** epipharynx; **gs,** glossal sclerite; **l,** labrum; **lp 1, 2,** and **3,** lapial palpomeres 1–3; **m,** mentum; **mp 3** and **4,** maxillary palpomeres 3 and 4; **mt,** tooth of mentum; **pag,** paraglossa; **pg,** palpiger; **T VIII,** Tergum VIII.



Figs. 11–15. *Paranillopsis piguensis* new species. **11)** left protibia, dorsal aspect; **12)** right protibia, ventral aspect; **13)** sclerites of ovipositor, ventral aspect; **14–15)** female genitalia, spermatheca. Legend: **as,** apical spur; **ds,** dorsal spur; **es,** ensiform seta; **ns,** nematiform seta; **pas,** preapical spur.

acters: Eyes lacking and umbilical series of nine setae, and with the humeral group of four setigerous punctures, 1–3 close together near humerus, 4 distinctly posteriad 3. For drawing phylogenetic inferences within anilline genera there are two different character systems. The first hypothesis proposed by Jeannel (1937), and followed by others (Jeanne 1973; Vigna Taglianti 1980), is based on the disposition of setae of the umbilical series of elytra. The second one, based on the presence and absence of median mentum tooth, was also proposed by Jeannel (1963), and stated that the arrangement of anilline genera on the basis of two types of umbilical series is inadequate to show relationships. Because the system used by Jeannel in 1963 takes into consideration more features than that used in 1937, we follow the second system to infer the phylogenetic relationships and systematic placement of *Paranillopsis.* Within the subtribe Anillina, *Paranillopsis* belongs to the division Phanerodonta (Jeannel 1963), whose members have a mentum tooth, and within this group this genus is included in the phyletic series of *Paranillus,* because the elytra have lost discal setae, and the umbilical series is type A (anillienée). This phyletic line comprises only one genus, *Paranillus,* with eight species restricted to Madagascar. The new genus differs from *Paranillus* in details of the ligula, mentum, and in elytral length. In *Paranillopsis,* with ligula seemingly bilobed apically, the paraglossae are separate from one another and extended beyond the apex of the glossal sclerite; in *Paranillus,* with the ligula with apical margin truncate, the paraglossae are absent. In *Paranillopsis* epilobes are not evident; in *Paranillus* they are evident. In *Paranillopsis,* the elytra are not extended to abdominal tergum VIII; in *Paranillus,* tergum VIII is covered by the elytra. Thus *Paranillopsis* represents an additional clade



Figs. 16–18. *Paranillopsis piguensis.* **16)** Head, dorsal aspect; **17)** pronotum; **18)** elytron, dorsal aspect. **Figs. 19–21.** *Paranillopsis pampensis.* **19)** Head, dorsal aspect. **20)** pronotum; **21)** elytron, dorsal aspect. **Figs. 22–23.** Elytral base, dorsal aspect. **22)** *Paranillopsis piguensis*; **23)** *P. pampensis*. **Figs. 24–25.** Ovipositor, gonocoxites of *Paranillopsis pampensis.* **24)** Ventral aspect; **25)** dorsal aspect. Legend: **bs,** basal seta; **bsp,** basal setigerous puncture; **cs,** clypeal seta; **es,** ensiform seta; **fs,** frontal seta; **lfc,** lateral frontal carina; **ns,** nematiform seta. **os,** ocular seta; **sos,** supraorbital seta; **us 1, 4,** and **8,** umbilical seta 1, 4,and 8; **usp 1,** umbilical setigerous puncture 1.

(phyletic series of Jeannel 1963) in South America, because the other Neotropical genera are grouped in different phyletic series (Jeannel 1963; Reichardt 1970; Vigna Taglianti 1973; Mateu 1980; Etonti and Mateu 1992; Zaballos 1997).

Key to species of *Paranillopsis* based on characters of adults

1 Head not or sligthly constricted medially; medial and posterior part of the same width, without neck (Fig. 16); elytron with humeral angle obtuse, basal margin sloped (Fig. 23) ..... *P. piguensis* **n. sp.**

1′ Head constricted medially and narrowed on the posterior part, forming a neckclearly visible (Fig. 19); elytron with humeral almost perpendicular to suture (Fig. 22) ..... *P. pampensis* **n. sp.**

Paranillopsis piguensis, **new species**
Figs. 1–18, 23

Types. Holotype: female, Pigüe, Prov. Buenos Aires, 8-IV-1979, col. A. Delgado (MLP); Paratypes: 5 females, Pigüe, Prov. Buenos Aires, Argentina, 8-IV-1979, col. A. Delgado (MLP and IADIZA).

Specific epithet. The word piguensis is the Latinized adjectival from of Pigüe, the place which includes the known range of this species.

Type Locality. Pigüe, Prov. Buenos Aires, Argentina.

Diagnosis. See key for diagnostic features.

Description. Habitus as Figure 1. Length 1.06–1.38 mm. Color yellow-brown with reddish hues. Short pubescence over entire body (Fig. 2).

Head as long as broad (length/width = 1.00–1.14); mentum tooth rounded, large (Fig. 6); submentum with four to eight setae; labial palpomere 3 thin, as long as the 2 (Fig. 6); glossal sclerite bisetose, with the apex strongly bilobated (Figs. 6–7); maxillar palpomere 3 globose, palpomere 4 conical and short (Fig. 10); mandibles as long as wide (Figs. 8–9). Antennae moniliform (Fig. 1), antennomeres with pubescence short and dense over entire surface (Fig. 3).

Pronotum transverse (Fig. 1) (length/width = 0.75–0.81), constricted posteriorly, with posterior angles dentate.

Elytra long (length/width = 3.35–3.80); not covering the abdominal tergum VIII (Fig. 1); humeral angle obtuse (Figs. 1, 18, and 23).

Gonocoxites long (length/width = 2.00), stylus arcuate (Fig. 13).

Distribution. The material was collected in Pigüe, Buenos Aires province (Argentina). The samples were taken from humus, within the first 10–13 cm below the surface of the ground.

Paranillopsis pampensis, **new species**
Figs. 17–19, 21–23

Types. Holotype: female, Parque Nacional Ernesto Torquinst, Reserva Integral La Blanqueada (38° 1′S; 61° 58′W) 12-VII-89, Alzuet-Salazar-Martínez col. (MLP); Paratypes: 1 female, same data as the holotype (IADIZA); 1 female, same data as the holotype, differing only in the date: 6-X-1989 (MLP).

Specific epithet. The word pampensis is the Latinized adjectival from of pampa, the biogeographical province where this species occur.

Type Locality. Parque Nacional Ernesto Torquinst, Buenos Aires, Argentina.

Diagnosis. See key for diagnostic features.

Description. Habitus similar to *P. piguensis* (Figs. 17–19). Length 1.12–1.57 mm. Color yellow with olive tonalities. Pubescence as for *P. piguensis* (Fig. 2).

Head longer than *P. piguensis* (length/width = 1.27–1.45), constricted medially, and narrowed on the posterior part, forming a clearly visible neck (Fig. 17); mouthparts similar to *P. piguensis*.

Pronotum (Fig. 20) transversal (length/width = 0.78–0.89), similar in shape to *P. piguensis.*

Elytra longer than *P. piguensis* (length/width = 4.01–4.19), four times longer than wide (Fig. 19); basal edge of elytral humerus almost perpendicular to median line, in form of angle of 90° (Figs. 21 and 22).

Gonocoxites wider than in *P. piguensis,* stylus less arcuate (Figs. 24–25); spermatheca rounded, similar to *P. piguensis.*

Distribution. The material was collected in Tornquist, Buenos Aires Province (Argentina). The samples were taken on humus soil, within the first 10–13 cm, in steppe of *Stipa caudata* Trinius.

Evolutionary Considerations

The new material collected in Argentina has the diagnostic characters described by Jeannel (1963) for *Paranillus,* but other characters show that these two new species belong to a new genus, *Paranillopsis,* independent from *Paranillus.* The new genus constitutes the vicar of *Paranillus* in South America.

Jeannel (1962) stated that *Nothanillus,* the Chilean genus, was related to *Paranillus,* but one year later, in his monograph of Anillina of the world (Jeannel 1963), he stated that *Nothanillus* was related to the phyletic series of *Anillus,* and *Paranillus* to the Lemurian (Indian) groups of Anillina. The discovery of *Paranillopsis* permits inference of an ancient relationship between southern South America and South Africa, and changes the postulated phylogenetic relationships of *Paranillus,* now regarded as a Palaeantarctic element. Other arthropod groups, distributed in Buenos Aires and Córdoba Provinces in Argentina, and in southern Brazil, reflect this old relationship (Upper Jurassic for Jeannel 1967), like the opilionid genus *Ceratomontia* Roewer (Ringuelet 1959), with some species in Argentina and others in South Africa.

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