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## The Triassic insect fauna from Argentina. – Blattoptera, Glosselytrodea, Miomoptera, Auchenorrhyncha, and Coleoptera from the Los Rastros Formation (Bermejo Basin), Los Chañares locality (La Rioja Province)

RAFAEL GIOIA MARTINS-NETO, CARSTEN BRAUCKMANN, OSCAR F. GALLEG0, & MARIA J. CARMONA

**Abstract:** In this contribution several new fossil insect taxa of the orders Blattoptera, Miomoptera, Glosselytrodea, Auchenorrhyncha, and Coleoptera are described from the lower section of the Los Rastros Formation at the Los Chañares locality, La Rioja Province, Argentina. The formation is dated as early Late Triassic. A new subfamily, two new genera, and four new species are proposed: *Miomina riojana* n. sp. (Miomoptera), *Chanarelytrina nana* n. gen. n. sp. (Glosselytrodea), *Chanarescyтина carmonae* n. gen. n. sp. (Auchenorrhyncha, Scytinopteridae, Saaloscytininae n. subfam.) and *Argentinosyne bonapartei* n. sp. (Coleoptera, Permosynidae). Additionally, the previously described species from the upper section of the Los Rastros Formation are now also recorded at the Los Chañares locality: *Condorblatta lutzae* MARTINS-NETO & GALLEG0, in press (Blattoptera, Argentinoblattidae) and *Argentinocupes pulcher* MARTINS-NETO & GALLEG0, in press (Coleoptera, Cupedidae).

**Key words:** Triassic insects. Blattoptera, Miomoptera, Glosselytrodea, Auchenorrhyncha, Coleoptera. Los Rastros Formation. Argentina.

**Resumen:** En esta contribución se describen nuevos insectos fósiles de los órdenes Blattoptera, Miomoptera, Glosselytrodea, Auchenorrhyncha, y Coleoptera de la sección inferior de la Formación Los Rastros, en la localidad Los Chañares, Provincia de La Rioja, Argentina. Esta formación fue datada como del Triásico Tardío temprano. Se proponen una nueva subfamilia, dos géneros nuevos, y cuatro nuevas especies a saber: *Miomina riojana* n. sp. (Miomoptera), *Chanarelytrina nana* n. gen. n. sp. (Glosselytrodea), *Chanarescyтина carmonae* n. gen. n. sp. (Auchenorrhyncha, Scytinopteridae, Saaloscytininae n. subfam.), y *Argentinosyne bonapartei* n. sp. (Coleoptera, Permosynidae). Adicionalmente algunas especies previamente descritas para la sección superior de la Formación Los Rastros, son reportados para la localidad Los Chañares: *Condorblatta lutzae* MARTINS-NETO & GALLEG0, in press (Blattoptera, Argentinoblattidae) and *Argentinocupes pulcher* MARTINS-NETO & GALLEG0, in press (Coleoptera, Cupedidae).

**Palabras clave:** Insectos triásicos. Blattoptera. Miomoptera. Glosselytrodea. Auchenorrhyncha. Coleoptera. Formación Los Rastros. Argentina.

**Kurzfassung:** Aus dem unteren Abschnitt der Los Rastros Formation an der Lokalität Los Chañares, Provinz La Rioja, Argentinien, werden einige neue fossile Insekten-Funde der Ordnungen Blattoptera, Miomoptera, Glosselytrodea, Auchenorrhyncha und Coleoptera beschrieben. Die Abfolge wird in die frühe Ober-Trias eingestuft. Eine neue Unterfamilie, zwei neue Gattungen und vier neue Arten werden aufgestellt: *Miomina riojana* n. sp. (Miomoptera), *Chanarelytrina nana* n. gen. n. sp. (Glosselytrodea), *Chanarescyтина carmonae* n. gen. n. sp. (Auchenorrhyncha, Scytinopteridae, Saaloscytininae n. subfam.) und *Argentinosyne bonapartei* n. sp. (Coleoptera, Permosynidae). Außerdem sind nunmehr auch folgende schon früher aus dem oberen Profil-Abschnitt der Los Rastros Formation beschriebene Arten von der Lokalität Los Chañares nachgewiesen: *Condorblatta lutzae* MARTINS-NETO & GALLEG0, in press (Blattoptera, Argentinoblattidae) und *Argentinocupes pulcher* MARTINS-NETO & GALLEG0, in press (Coleoptera, Cupedidae).

**Schlüsselwörter:** Triassische Insekten. Blattoptera, Miomoptera, Glosselytrodea, Auchenorrhyncha, Coleoptera. Los Rastros Formation. Argentina.

# 1 Introduction

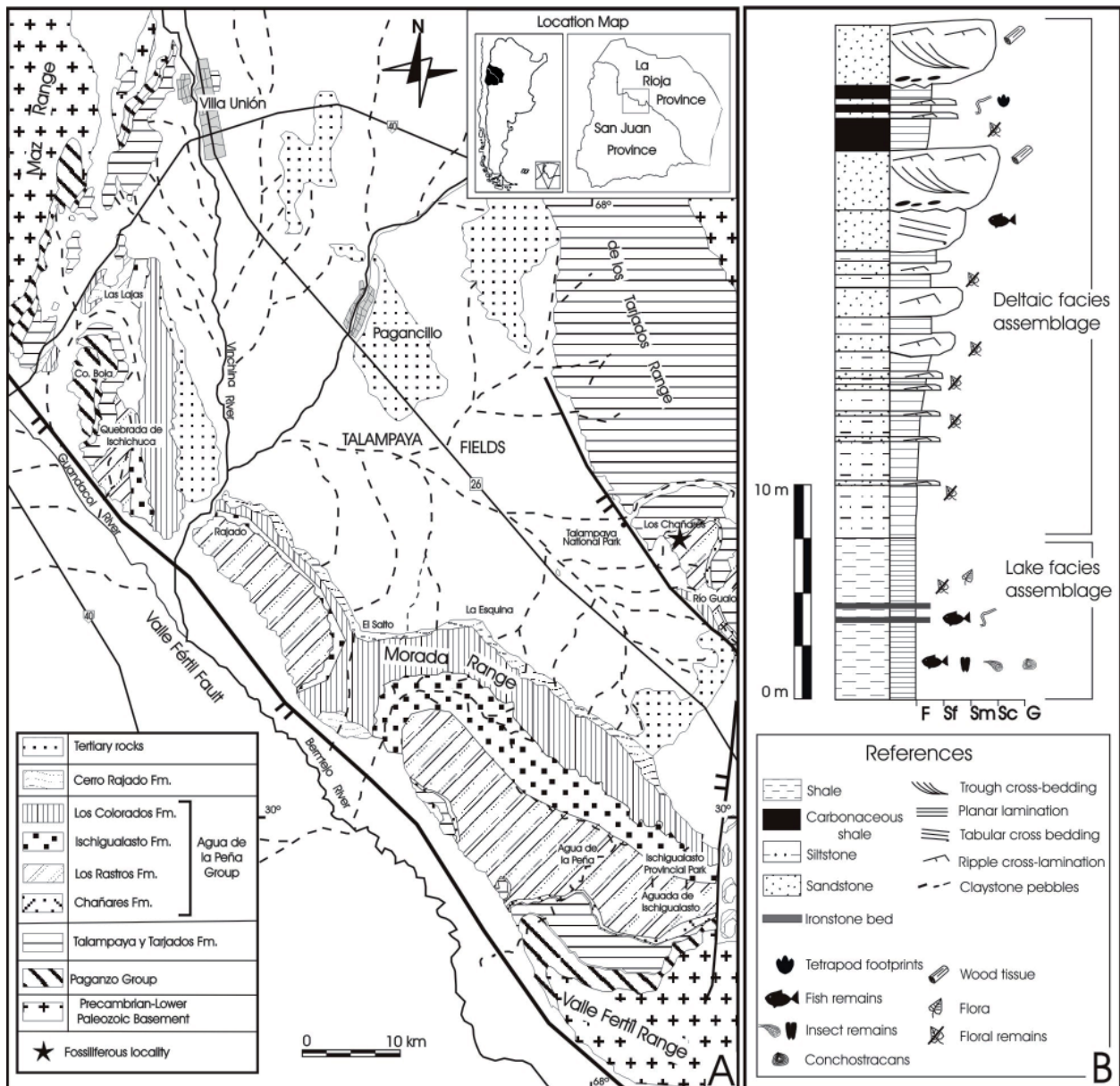
This article is a further contribution to a series on the Triassic insect faunas in Argentina. Here the fossil insects of the orders Blattoptera, Miomoptea, Glosselytrodea, and Coleoptera from the Los Rastros Formation (Los Chañares locality, La Rioja Province, fig. 1), are described. The historical facts and previously described insects as well as the geological setting were extensively discussed in GALLEGO (1997), GALLEGO & MARTINS-NETO (1999), MARTINS-NETO & GALLEGO (1999, 2001) and MARTINS-NETO et al. (2003, in press a, b).

The samples from the lower section (1st sedimentary cycle) of the Los Rastros Formation were

collected by OFG, Lic. ANDREA ARCUCCI, Drs. CATHERINE FORSTER, CATHLEEN MAY, and RAYMOND ROGERS during a field trip in 1995.

The terminology of the venation adopted here follows mainly that one proposed by KUKALOVÁ-PECK (1991).

The repository and institutional abbreviations used here are: PULR-I: Paleontology Collection, Museo de Ciencias Naturales, Universidad Nacional de La Rioja, La Rioja, Argentina; CTES-PZ: Paleozoological Collection, Facultad de Ciencias Exactas y Naturales y Agrimensura, Universidad Nacional del Nordeste, Corrientes, Argentina.



**Fig. 1.** Location map. **A:** Geological map of the Bermejo Basin, mainly Permian -Triassic/Jurassic (modified from STIPANIC & BONAPARTE 1979 and KOKOGIAN et al. 2001). **B:** Schematic section of the Los Rastros Formation indicating fossiliferous horizons.

## 2 Systematic paleontology

Order Blattoptera BRUNNER, 1882

Family Argentinoblattidae MARTINS-NETO & GALLEGRO (in MARTINS-NETO et al. in press a)

Genus *Condorblatta* MARTINS-NETO & GALLEGRO (in MARTINS-NETO et al. in press a)

Type species: *Condorblatta lutzae* MARTINS-NETO & GALLEGRO (in MARTINS-NETO et al. in press a), Río Gualo, La Rioja Province, Argentina, 5th cycle from Los Rastros Formation, early Late Triassic.

*Condorblatta lutzae* MARTINS-NETO & GALLEGRO (in MARTINS-NETO et al. in press a) (Fig. 2I, 3H)

Material: PULR-I 338.

Locality: Los Chañares, La Rioja Province, Argentina.

Stratigraphical unit and age: Los Rastros Formation (1st cycle), early Late Triassic.

Description (Fig. 2I, 3G): Fragment of tegmen (apex and anal area lacking), preserved length = 10.4 mm, preserved width = 5.4 mm. Costal margin parallel to anal margin. Costal area relatively small, occupying approximately 1/3 of the estimated total length of tegmen (approximately 16 mm). ScP long, with four distal branches. RA unbranched, without distal dichotomy. Radial area relatively narrow. RP short, concave, reaching the costal margin at about 2/3 from the base of the tegmen, with six relatively short and pectinate secondary branches; RP4-6 dichotomous. MA long and parallel to RP, with at least one apical dichotomy; origin of MA at 1/3 of the estimated length of tegmen. MP with at least one dichotomy, MP2 branching again. CuA with six main branches and several secondary branches, pectinate and parallel to the posterior margin.

Discussion: This specimen, apart from the missing anal area, is in all preserved morphological details identical with the holotype specimen from the upper section of the Los Rastros Formation and can therefore easily be regarded as conspecific.

Order Glosselytrodea MARTYNOV, 1938 [fide CARPENTER, 1992; now also named: Order Jurinida M. ZALESSKY 1928 by RASNITSYN in RASNITSYN & QUICKE (2002)]

Family Polycyrtellidae MARTYNOVA, 1952

*Chanarelytrina* MARTINS-NETO & GALLEGRO n. gen.

Etymology: Chanar- from Los Chañares (the region where the material was collected), and elytrina, suffix, diminutive, allusive to *Glosselytron* (from Greek *élytron* = cover).

Type species: *Chanarelytrina nana* MARTINS-NETO & GALLEGRO n. sp., designated here.

Diagnosis: Polycyrtellid fore wing small-sized (length about 3 mm), venation reduced: RA hidden in a slightly zigzagged line between the two rows of cells close to the anterior margin. RP and MA unbranched, MA originating from RP approximately in the mid-length of the wing.

Discussion: *Chanarelytrina* evidently differs from all other known Polycyrtellidae, including *Argentinoglosselytrina* MARTINS-NETO & GALLEGRO, 2001 from the upper section of the same Los Rastros Formation, by having a remarkably small size and a short MA (which is much longer and originates close to wing base in all other known genera).

Furthermore, in *Chanarelytrina* RA is hidden in a slightly zigzagged line between the two rows of cells close to the anterior margin. The other related genera have only one row of cells in this area. Then the vein between the precostal area and main wing is C+Sc (as for example in the fore wing of *Eoglosselytron*, compare with CARPENTER 1992: Fig. 1999.6a). This interpretation would mean that the main diagnostic and autapomorphic feature is the zigzagged, somewhat dissolved and hidden RA which clearly speaks for a separate genus.

*Chanarelytrina nana* MARTINS-NETO & GALLEGRO n. sp. (Fig. 2D, 3C).

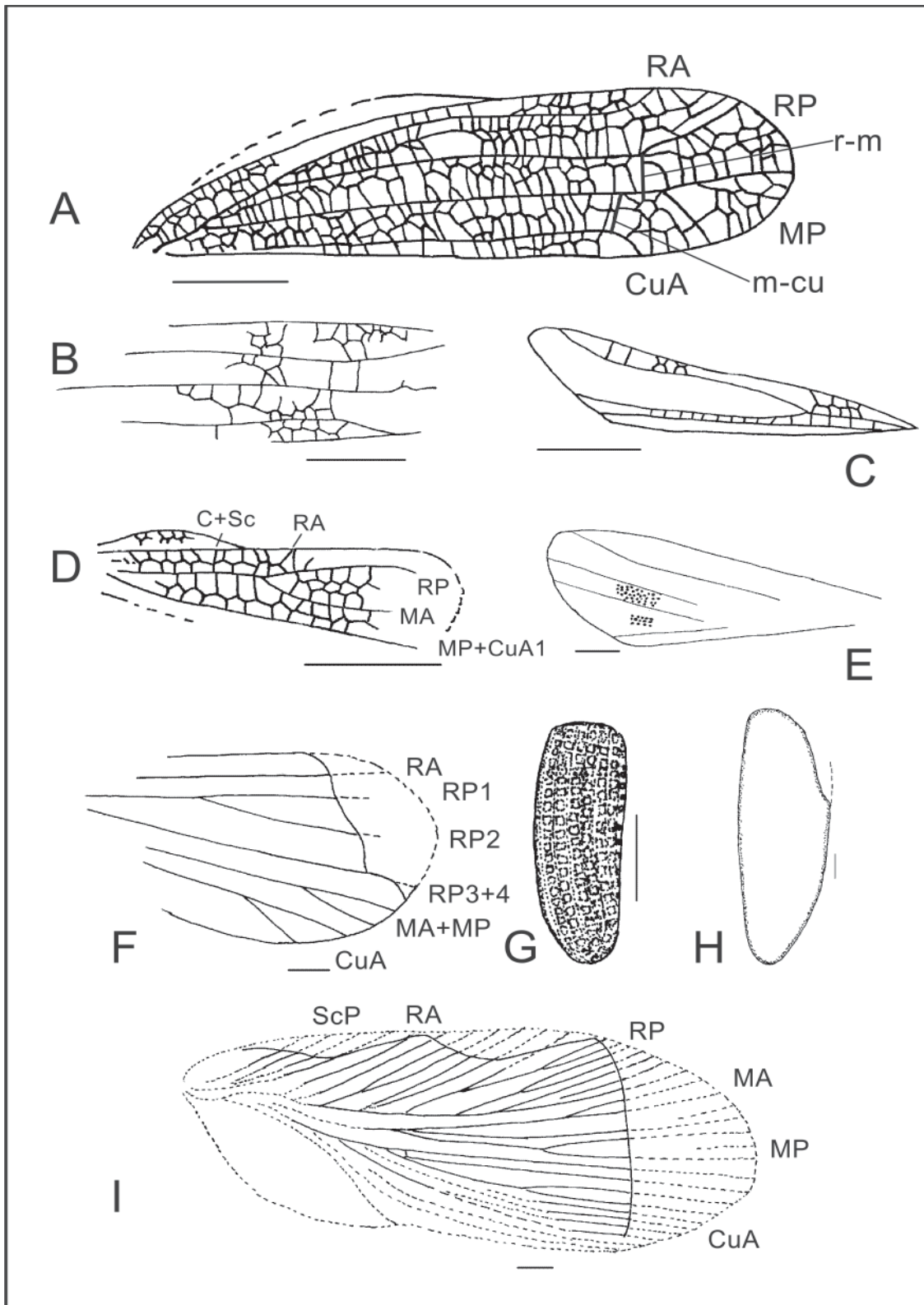
Etymology: From Latin *nanus* = small, allusive to the small size.

Holotype: PULR-I 334a (Fig. 2D, 3C).

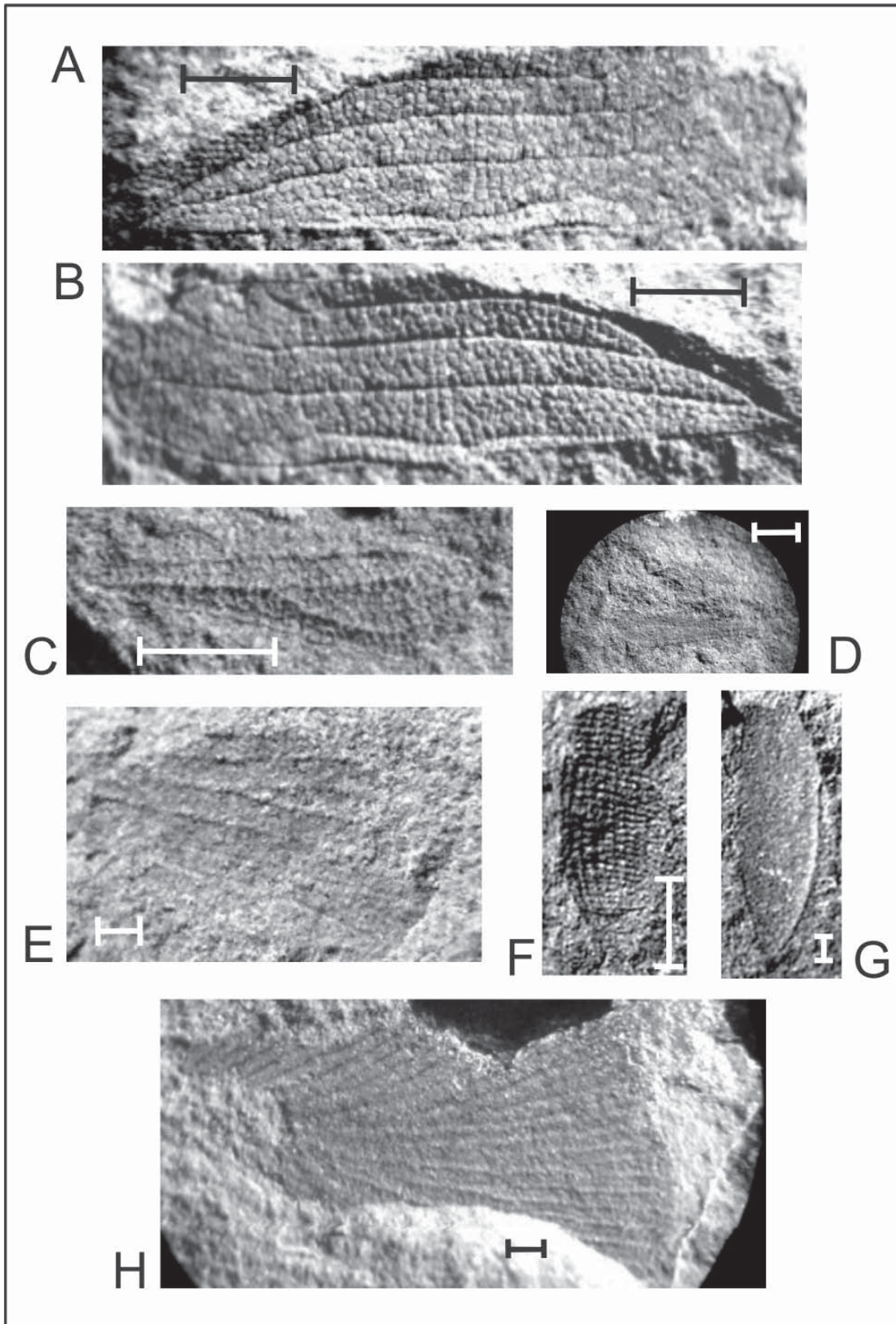
Type locality, type stratum and age: As for *Condorblatta lutzae* MARTINS-NETO & GALLEGRO (see above).

Diagnosis: As for the genus. – Estimated length of fore wing about 3 mm.

Description (holotype PULR-I 334a, Fig. 2D, 3C): Preserved length of fragmentary fore wing = 2.68 mm. Costal area short and narrow, restricted to the basal 1/3 of the wing, separated from the rest of the



**Fig. 2.** **A-C** *Chanarescyrtina carmonae* n. gen. n. sp. **A:** Drawn from the holotype specimen PULR-I 334c. **B:** Drawn from the paratype specimen PULR-I 336. **C:** Drawn from the additional specimen PULR-I 334e. **D:** *Chanarelytrina nana* n. gen. n. sp., drawn from the holotype specimen PULR-I 334a. **E:** Auchenorrhyncha indet., drawn from the specimen PULR-I 337. SACAR. **F:** *Miomina riojana* n. sp., drawn from the holotype specimen PULR-I 334b. **G:** *Argentinocupes pulcher* MARTINS-NETO & GALLEG0 (in MARTINS-NETO et al. in press b), drawn from the specimen PULR-I 334d. **H:** *Argentinosyne bonapartei* n. sp., drawn from the holotype specimen PULR-I 335. **I:** *Condorblatta lutzae* MARTINS-NETO & GALLEG0 (in MARTINS-NETO et al. in press a), drawn from the specimen PULR-I 338. – Scale bar = 1 mm.



**Fig. 3.** **A-B** *Chanarescytina carmonae* n. gen. n. sp. **A:** Drawn from the holotype specimen PULR-I 334c. **B:** Same specimen, counterpart. **C:** *Chanarelytrina nana* n. gen. n. sp., drawn from the holotype specimen PULR-I 334a. **D:** *Auchenorrhyncha* indet., drawn from the specimen PULR-I 337. SACAR. **E:** *Miomina riojana* n. sp., drawn from the holotype specimen PULR-I 334b. **F:** *Argentinocupes pulcher* MARTINS-NETO & GALLEG0 (in MARTINS-NETO et al. in press b), drawn from the specimen PULR-I 334d. **G:** *Argentinosyne bonapartei* n. sp., drawn from the holotype specimen PULR-I 335. **H:** *Condorblatta lutzae* MARTINS-NETO & GALLEG0 (in MARTINS-NETO et al. in press a), drawn from the specimen PULR-I 338. – Scale bar = 1 mm.

wing by a fused vein C+Sc. RA hidden in a slightly zigzagged line between the two rows of cells close to the anterior margin. RP and MA unbranched, RP long, subparallel to anterior margin, MA short, originating from RP approximately in the mid-length of the wing. MP+CuA1 long, oblique, very slightly concave (nearly straight), originating close to wing base. Cross-veins prominent, forming an irregular mosaic of heterogeneous cells over the entire wing surface.

Order Miomoptera MARTYNOV, 1927  
Family indet.

Genus *Miomina* MARTINS-NETO & GALLEGO, 1999

Type species: *Miomina mendozina* MARTINS-NETO & GALLEGO, 1999, from Quebrada del Durazno, south of the Cerro Cacheuta, Mendoza Province, Argentina, upper section of the Potrerillos Formation, early Late Triassic.

*Miomina riojana* MARTINS-NETO & GALLEGO n. sp.  
(Fig. 2F, 3E)

Etymology: Allusive to La Rioja, the Argentinean province where the material was collected.

Holotype: PULR I 334b (part), Fig. 2F, 3E, and PULR-I 334/1c (counterpart).

Type locality, type stratum and age: As for *Condorblatta lutzae* MARTINS-NETO & GALLEGO (see above).

Diagnosis: Fore wing. MA+MP as well as CuA with one dichotomy, respectively. Origin of RP3+4 close to wing base.

Description (holotype PULR I 334b, Fig. 2F, 3E): Fragment of fore wing, apical and basal areas lacking. Preserved length = 7.54 mm, width = 2.08 mm. RA straight, parallel to costal margin. RP tripartite, RP1+2 forking about mid-length of the wing, RP3+4 long, unbranched, originating close to the wing base. MA+MP forking far distally from the origin of RP2, close to the apical area. CuA branching between the origin of RP2 and the dichotomy of MA+MP.

Discussion: The new species is similar to *Miomina mendozina* MARTINS-NETO & GALLEGO, 1999 from the Potrerillos Formation (Mendoza Province, Argentina): Both share the unbranched RA, trifurcate

RP as well as, both, bifurcate MA+MP and CuA. Both species differ by the remarkably short terminal branches of MA+MP and similar short terminal branches of CuA (= CuA1 and CuA2; distinctly shorter than RP1 and RP2) in *M. riojana* n. sp. which are clearly longer in *M. mendozina*. Furthermore the origin of RP3 is closer to the wing base in *M. riojana* n. sp., whereas it originates at mid-length level of the wing in *M. mendozina*.

Order Auchenorrhyncha DUMERIL, 1806

Family Scytinopteridae HANDLIRSCH, 1906

Subfamily Saaloscytinae BRAUCKMANN, MARTINS-NETO & GALLEGO n. subfam.

Genera included: *Saaloscytina* BRAUCKMANN & SCHLÜTER, 1993, from the Triassic in Germany, and *Chanarescytina* n. gen. (described here).

Diagnosis: Fore wing with costal area proximally broad; forking of RA and RP relatively close to base of wing, within the proximal third (plesiomorphy); MP anteriorly close to apex, CuA more [*Saaloscytina*] or less [*Chanarescytina*] resolved into reticulation over the whole length (apomorphy); sculpture coarsely reticulate.

Genus *Chanarescytina* MARTINS-NETO, BRAUCKMANN & GALLEGO n. gen.

Type species: (and only known species): *Chanarescytina carmonae* MARTINS-NETO, BRAUCKMANN & GALLEGO n. sp., designated here.

Distribution: early Late Triassic; Argentina.

Diagnosis: Costal area relatively narrow (slightly narrower than in *Saaloscytina*). RP bipartite. Supporting veins r-m and m-cu well defined (apomorphy).

Discussion: The new genus is similar to *Saaloscytina* BRAUCKMANN & SCHLÜTER, 1993 in sharing the same characters diagnostic for the subfamily (compare BRAUCKMANN & SCHLÜTER, 1993: 186), but it differs by (1) the more slender shape of the wing, (2) the proximally narrower costal area (coinciding with the more slender shape; broader in *Saaloscytina*), (3) the distinctly bipartite RP (unbranched in *Saaloscytina*), and (4) the presence of distinct supporting veins r-m and m-cu (absent in *Saaloscytina*). The characters (1) – (3) are probably plesiomorphic, (4) is here believed as apomorphic (for discussion see below, chapter “Relationships of *Chanarescyti-*

na and *Saaloscytina* within Scytinopteridae”).

*Chanarescytina carmonae* MARTINS-NETO, BRAUCKMANN & GALLEGU n. sp.  
(Fig. 2A-C, 3A-B)

Etymology: In honour of Prof. MARIA JOSE CARMONA who discovered these specimens and the assemblage described here.

Holotype: PULR I 334c (part) Fig. 2A, 3A, PULR-I 334/1a (counterpart), Fig. 2B.

Paratype: PULR-I 336a, Fig. 2B, fragmentary fore wing, part and counterpart (PULR-I 336b).

Additional specimen probably belonging to this species: PULR I 334e Fig. 2C, isolated anal area, PULR-I 334/1b (counterpart) and PULR-I 339, fore wing, fragmentary basal part.

Type locality, type stratum and age: As for *Condorblatta lutzae* MARTINS-NETO & GALLEGU (see above).

Diagnosis: As for the genus.

Description (holotype PULR-I 334c, Fig. 2A, 3A-B): Fore wing long and relatively narrow. Apex rounded. Clavus suture straight. Sculpture strikingly coarse and reticulate. RA sigmoidal, unbranched. RP forking into RP1 and RP2 at the same level of distal ending of RA. MP forking into MP1 and MP2 a little bit distally of the level of the dichotomy of RP and the distal ending of RA; MP2 (the shorter branch) directed obliquely to posterior wing margin, reaching it close to the posterior apical area. CuA unbranched. Supporting veins r-m and m-cu well-marked, aligned with both RP and MP forks. Dimensions (holotype PULR-I 334c): Length of wing = 5.5 mm; preserved width = 1.8 mm.

Discussion: *Chanarescytina carmonae* n. sp. differs from *Saaloscytina perreticulata* BRAUCKMANN & SCHLÜTER, 1993 by the characters listed under the genus and by its larger dimensions.

Relationships of *Chanarescytina* and *Saaloscytina* within Scytinopteridae

The shape and main features of the venation of *Chanarescytina* gen. nov. and *Saaloscytina* largely resemble those of the Scytinopteridae. This is the reason why we group both genera within this family.

But they differ from the other included genera by the characters listed below.

The proximal distant origin of RP is considered as a plesiomorphy; in all other (more advanced) genera it is situated much more distally (e.g. within the distal half of the wing). However, the striking coarse reticulation of *Saaloscytina* and *Chanarescytina* n. gen. is considered as an apomorphy which was not previously known to this degree within the other Scytinopteridae. It totally covers the cross venation and causes the distal resolving of MP and large resolving of CuA. The combination of both, apomorphic and plesiomorphic characters is the reason why *Saaloscytininae* n. subfam. is proposed as a separate subfamily within the Scytinopteridae. The remaining genera of the family should now be placed in the nominate subfamily Scytinopterinae HANDLIRSCH, 1906.

Order Coleoptera LINNAEUS, 1758

Family Permosynidae TILLYARD, 1924 (including Ademosynidae PONOMARENKO, 1968)

Genus *Argentinosyne* MARTINS-NETO & GALLEGU (in MARTINS-NETO et al. in press b)

Type species: *Argentinosyne frenguelli* MARTINS-NETO & GALLEGU (in MARTINS-NETO et al. in press b), Río Gualo, La Rioja Province, Argentina, Los Rastros Formation, early Late Triassic.

*Argentinosyne bonapartei* MARTINS-NETO & GALLEGU n. sp.  
(Fig. 2H, 3G)

Etymology: Dedicated to the paleontologist Dr. JOSÉ BONAPARTE for his great contribution to the knowledge of the vertebrate fauna from Triassic sequences in Argentina.

Holotype: PULR I 335 (Fig. 2H, 3G).

Type locality, type stratum and age: As for *Condorblatta lutzae* MARTINS-NETO & GALLEGU (see above).

Diagnosis: Small species of *Argentinosyne*: estimated length of elytron approximately 9.5 mm, estimated width of elytron approximately 3.5 mm; relation L/W = 2.9.

Description (holotype PULR I 335, Fig. 2H, 3G): Rather medium-sized beetle of the permosynid / ademosynid complex. Elytron without well-delimited costae, about three times longer than wide (pre-

served length = 9.3 mm, preserved width = 3.25; exact relation L/W = 2.9), with conspicuous lateral border. Ornamentation constituted by homogeneously distributed granules over the whole surface.

Discussion: The new species is similar to *Argentinosyne frenguelli* MARTINS-NETO & GALLEGO from the upper section of the Los Rastros Formation in having the same ornamentation pattern (granulated), but it differs from the type species by its distinctly smaller size (more than 14 mm in *A. frenguelli*). *A. gonaldiae* MARTINS-NETO & GALLEGO (in MARTINS-NETO et al. in press b), also from the upper section of the Los Rastros Formation as well as from the Cacheuta Formation, differs from *A. bonapartei* n. sp. by its rugose ornamentation over the whole surface of the elytron. Additionally, *A. bonapartei* n. sp. differs from both previously known species of *Argentinosyne* by its length/width ratio = 2.9 (2.4 in *A. gonaldiae*, 3.5 in *A. frenguelli*).

Family Cupedidae LACORDAIRE, 1857 (not LATREILLE, 1825, as often cited; corrected authorship as indicated by CARPENTER, 1992: 285)

Genus *Argentinocupes* MARTINS-NETO & GALLEGO (in MARTINS-NETO et al. in press b)

Type species: *Argentinocupes pulcher* MARTINS-NETO & GALLEGO (in MARTINS-NETO et al. in press b), Río Gualo, La Rioja Province, Argentina, Los Rastros Formation, early Late Triassic.

*Argentinocupes pulcher* MARTINS-NETO & GALLEGO (in MARTINS-NETO et al. in press b)  
(Fig. 2G, 3F)

New material: PULR I 334d (part), Fig. 2G, 3F, and PULR-I 334/1d (counterpart).

Type locality, type stratum and age: As for *Condorblatta lutzae* MARTINS-NETO & GALLEGO.

Description (Fig. 2G, 3F). Length of elytron = 2.56 mm, width of elytron = 0.96 mm, surface with seven slightly curved granulated costae. Space between costae filled by eight homogeneous rows of square granules.

Discussion: This specimen is regarded as conspecific with the holotype from the upper section of the same Los Rastros Formation.

### 3 Final comments

These new records increase the diversity of the Triassic insect fauna of Argentina and Gondwana. Presently about 72 insect species from Argentinean Triassic sequences are known. Many of these records are new taxa while other records represent new and additional data on the distribution of previously described species. For example *Condorblatta lutzae* MARTINS-NETO & GALLEGO and *Argentinocupes pulcher* MARTINS-NETO & GALLEGO were recorded from two different depositional cycles (the first and the fifth one) of the Los Rastros Formation. This shows that their stratigraphical distribution covers the whole formation.

The presence of different species of the same genus (as for example *Miomina mendozina* MARTINS-NETO & GALLEGO, 1999 and *M. riojana* n. sp.; *Gallegomorphoptila* spp.) or different, but related genera could suggest an isolated evolution between the insect faunas of both the Cuyo and Bermejo Basins from the late Middle Triassic to the early Late Triassic. The endemic condition of the paleoentomofauna is also recorded and supported by the studies on fossil conchostracans from both basins (GALLEGO 1999 and 2001). But this should be proved by further material.

The presence of *Chanarescytina* n. gen. in Argentina is of particular interest. This genus is closely related to *Saaloscytina* from the German Triassic and its occurrence enlarges considerably the paleogeographic distribution of this peculiar group of Scytinopteridae, a family which is well represented in several Gondwanan localities (mainly in Australia and Argentina). All these data suggest, at least, a Early Triassic origin of these typical Triassic assemblages which reached a worldwide distribution. As far as known, the families which are representative for the Triassic period (Permosynidae, Polycyttellidae, Scytinopteridae, and Dymorphoptilidae) have an identical paleogeographic and biostratigraphical distribution and could therefore become a useful tool for the correlation of continental deposits and a global paleoecological view for the early Late Triassic times.

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#### Addresses of the authors:

- RAFAEL GIOIA MARTINS-NETO,  
Universidade Federal de Juiz de Fora – UFJF, Programa de Pós-graduação em Ciências Biológicas, Comportamento e Biologia Animal, Presidente da Sociedade Brasileira de Paleontropodologia, Campus Universitário – Martelos, 36036-900-Juiz de Fora, MG, <http://planeta.terra.com.br/educacao/paleoartropodologia>, [www.comportamento.ufjf.br](http://www.comportamento.ufjf.br),  
e-mail: [martinsneto@terra.com.br](mailto:martinsneto@terra.com.br),
- CARSTEN BRAUCKMANN,  
Institut für Geologie und Paläontologie, TU Clausthal;  
Leibnizstraße 10, D – 38678 Clausthal-Zellerfeld, Germany.  
e-mail: [carsten.brauckmann@tu-clausthal.de](mailto:carsten.brauckmann@tu-clausthal.de),
- OSCAR F. GALLEGOS and MARIA J. CARMONA,  
Paleontología (Facultad de Ciencias Exactas y Naturales y Agrimensura – Universidad Nacional del Nordeste) y Área Paleontología (Centro de Ecología Aplicada del Litoral – CONICET), Casilla de Correo 128, 3400 Corrientes – Argentina. E-mail: [ofgallego@hotmail.com](mailto:ofgallego@hotmail.com); [marijocarmona@hotmail.com](mailto:marijocarmona@hotmail.com)