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A New Upper Carboniferous Insect from Itararé Subgroup, Paraná Basin, Brazil

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Abstract - *Cacurgulopsis sanguinettiae* gen. et sp. nov. is described from Boituva sediments, Itararé Subgroup, Upper Carboniferous, Paraná basin, Brazil. This species belongs to a group of fossil insects, family Cacurgidae Handlirsch, 1911, exclusive of the Carboniferous which is one more datum for an Upper Carboniferous age for the Boituva sediments age determination.

Resumo - É apresentado o estudo do inseto *Cacurgulopsis sanguinettiae*, gen. et sp. nov. do Subgrupo Itararé, Carbonífero Superior da bacia do Paraná, proveniente da localidade de Boituva, São Paulo. Este novo inseto pertence à família Cacurgidae Handlirsch, 1911, exclusiva do Carbonífero se constituindo, assim, em um novo dado para a determinação da idade dos sedimentos de Boituva.

INTRODUCTION

The present new genus and species of fossil insect comes from the locality of Boituva, State of São Paulo, Itararé Subgroup, Paraná basin, Brazil (Fig.1). It follows the study of that paleoentomofauna by Pinto & Ornellas, 1978. The age of the Boituva sediments has been questioned by Petry

& Souza (1993). This new species brought new important data for the discussion of this question. It belongs to the Cacurgidae family, which is exclusive of the Pennsylvanian of Illinois and of Missouri in USA. It was found associated to *Narkemina rohdendorfi* Pinto & Ornellas, 1978 and to three other Narkeminidae a family found exclusively in the Carboniferous of the Kuznetzk basin, Russia and Pennsylvanian in Missouri, USA; to *Proedischia mezzalirai* Pinto & Ornellas, 1978 belonging to a group of Upper Carboniferous insects from Mazon Creek, USA. Certainly this paleofauna point to a Carboniferous age.

TAXONOMY

Classis Insecta Linné, 1758
Ordo Protorthoptera Handlirsch, 1906
Familia Cacurgidae Handlirsch, 1911

Diagnosis - Apparently related to Omalidae. Oval fore wing, broadly rounded apex; almost straight vein SC ending beyond the midwing; RS arising well before the midwing; apparently absent MA; CuA anastomosed with MP basally, diverging before level of origin of RP, then anastomosed with CuP1; numerous crossveins. Carboniferous.

Cacurgulopsis Pinto & Adami-Rodrigues, gen. nov.

Diagnosis - A Cacurgidae with a large wing; relation length-width 3:1; costal area about 1/5 of the wing width, with oblique veinlets, some furcate or bridged over by crossveins; ScP bifurcate distally and links to RA and to C; origin of RP a little in front of the level where MP is linked to CuA; there is a large space, with a thin vein network between R and MP+CuA; MP is not linked to RP; Cu branches reaching the posterior margin of the wing, occupying more than one half of the wing posterior margin; MP and the RP branches, each occupying almost the same length of the posterior distal margin; branches of Cu are oblique directed forward to the posterior margin; anal area mostly missed, the small area preserved presents a thin vein network; except

Figure 1 - Isopach Map of the Itararé Subgroup (Adapted from Ferreira, 1982).

for the basal area between RA and MP where there is a thin vein network, all the branches of the wing run regularly parallel; more or less regular round bodies of different sizes occur irregularly spread over the wing surface.

Type species- *Cacurgulopsis sanguinettiae* Pinto & Adami-Rodrigues sp. nov.

Remarks - The presence of some wings over the wing under description, as can be seen in the photographs at Plate 2, asked for an accurate observation to avoid misinterpretation about the veins.

Very important for the interpretation and relationship of this new genus were the papers of Brauckmann, *et al.*, 1985 and Kukalová-Peck & Brauckmann, 1992 and also Carpenter, 1992 in the Treatise on Invertebrate Paleontology. This new genus presents great similarity to the genera:

- 1) *Cacurgus* Handlirsch, 1911 (*C. spilopterus* - type species) (Pl. 1, Fig.1). From the Pennsylvanian of Mazon Creek, Illinois, USA, is similar in the general disposition of the veins specially MP, CuA and CuP and in the presence of the round bodies on the surface. However, the new genus differs mainly in having ScP linked to RA; most cross-veins are single, except for the back to cubital veins, and between RA and MP where there is a network of veins.
- 2) *Omalia* Beneden & Coemans, 1867 (*O. macroptera* - type species) (Pl. 1, Fig.2). From the Westphalian A of La Louvière Hainaut, Belgium, has very similar vein disposition, special cubital veins, but differs in having MP not linked to RP and ScP linked to RA.
- 3) *Ampeliptera* Pruvost, 1927 (*A. limburgica* - type species) (Pl. 1, Fig.3). Reinterpreted by Kukalová 1958, from the Namurian A of South Limburg, Netherlands, because it has ScP linked to RA, the general disposition of the veins, particularly MP-CuA-CuP, but it differs from the new genus not only in the small size and the network of crossveins all over the wing surface, but also by the strong curvature of RA distally.
- 4) *Heterologus* Carpenter, 1943 (*H. langfordorum* - type species) (Pl.1, Fig.4). From the Carboniferous (Pennsylvanian) of Mazon Creek, Illinois, USA. Very similar in the big size; the bifurcation of the distal end of ScP linked to RA and C, but it differs in having single cross-veins all over the wing, in the irregularity of the branches of RP; in a straight space between RA and MP; the CuP disposition, and in having the origin of

RP at the same level where MP is linked to CuA.

- 5) *Heterologopsis* Brauckmann & Koch, 1982 (*H. ruhrensis* - type species) (Pl. 1, Figs. 5a,b). From the Upper Namurian B of Ziegelei-Grube, Hagen-Vorhalle, Germany, also similar in having the same general disposition of the veins, specially the regularity of the branches of RP and the origin of RP that is not at the same level where MP is linked to CuA. However this species differs from the new one in the convex curvature of the anterior margin, ScP does not end in a fork and it is shorter; the veinlets from ScP to C are single; a large area with a vein network between MP and CuA and in the branches of Cu not being directed forward and CuA not reaching the posterior margin.

Cacurgulopsis sanguinettiae, gen. et sp. nov.

Pl. 1 Figs. 6a-c; Pl. 2, Figs. 1a-c

Derivatio nominis - In honour to Professor Yvonne T. Sanguinetti.

Holotypus - Two counter parts of an imprint of incomplete wing UFRGS MP-I-5290a,b.

Locus typicus - At 205m depth in Well nº 2 of the Instituto Geográfico e Geológico de São Paulo, Boituva City, São Paulo State, Brazil.

Stratum typicum - Boituva sediments, Itararé Subgroup, Upper Carboniferous.

Diagnosis - A large incomplete wing about 63mm long and 22mm wide. ScP bifurcating distally, the main branch linked to RA and the other linked to the C vein and sending off three veinlets to the costal margin. As it is a monotypic species, the other distinctive characteristics are those of the genus.

Description - A large incomplete wing measuring 63mm long and 22mm wide, the complete wing must have reached about 68mm long. About three times longer than its width. Costal margin almost straight for $\frac{3}{4}$ of its anterior length and bending slightly backward at the back quarter; posterior margin slightly concave bending smoothly to the narrowest round apical margin. C well developed at the margin; broad costal area narrowing forward with oblique veinlets from the ScP, some furcate and bridged over by cross-veins. ScP attaining two-third the length of the wing where it links to RA and sends one branch with three veinlets to the costa; it has, at the costal area, a serie of oblique branches some with bridged cross-veins and some furcate; ScP area narrower with straight crossveins; RA straight, almost reaching the apical end of the wing and sending off after the end of ScP, oblique

Plate 1

Figure 1 - *Cacurgus spilopterus* Handlirsch, 1911 from the Pennsylvanian, Carboniferous of the Vicinity of Mazon Creek, Illinois, USA 1.5x

Figure 2 - *Omalia macroptera* van Beneden & Coemans, 1867 from the Westphalian A of La Louvière, Prov. Hainaut, Belgium 1.5x

Figure 3 - *Ampeliptera limburgica* Pruvost, 1927 from the Namurian A of South Netherlands 3x

Figure 4 - *Heterologus langfordorum* Carpenter, 1943 from Carbonifere Formation, Carboniferous of Mazon Creek, Illinois, USA 1.5x

Figures 5a,b - *Heterologopsis ruhrensis* Brauckmann & Koch, 1982 from

the Namurian B of Ziegelei-Grube, Hagen-Vorhalle, Germany 1.5x

Cacurgulopsis sanguinettiae Pinto & Adami-Rodrigues, gen. et sp. nov. From Boituva sediments, Itararé Subgroup, Upper Carboniferous. Sample at 205m deep in the Well nº 2 of the Instituto Geográfico e Geológico do Estado de São Paulo, Boituva City, São Paulo State, Brazil. Holotypus UFRGS MP-I-5290a,b 1.5x

Figure 6a - from a positive imprint of an incomplete and distorted wing 1.5x

Figure 6b - from a negative imprint of the distal part of the wing 1.5x

Figure 6c - a reconstruction of the wing.

Cacurgulopsis sanguinettiae, gen. et sp. nov.

branches to the costa; RP rising at 1/4 of the wing length, running parallel to RA and sending off four oblique branches forwards, the first two forking distally being the other two single; a triangular large area between RA and CuA-MP has crossveins twisted into an irregular moderate network, this space narrows forward and presents straight crossveins with some bridged; MA absent; MP apparently anastomosed with CuA basally runs obliquely toward the posterior side linking to CuP at about 1/6 of the wing length. From this point rises MP, a straight branch, parallel to RA, which forks a little after the origin of RP; each branch forks again giving origin to long branches running forward until the apical margin, being the anterior one single and the others forking again, resulting in 8 branches at the apex margin. The MP+CuA vein forms basally a triangular cell with CuP. From the point where they link rises one strong oblique branch CuA which forks after a short distance; the anterior branch CuA runs straight, parallel to the trunk of MP and a little before the level of the bifurcation of MP it forks again forming two long branches twisted distally; the posterior branch forks just before the level of bifurcation of the anterior branch being the anterior branch single and the posterior branch forks distally living three marginal branches, CuP an oblique vein directed toward the posterior margin ends in a twig and sends off three oblique branches forward, the first branch and the third are single and the second forks only once, all of them ending at the posterior margin. The anal area is broadly lancet-shaped limited by an almost circular CuP-CuA-CuP vein; right behind to it there is a large network of crossveins separating them from the anal veins. In the other interstices most of the cross-veins are straight, single and in few places forked. More or less regular round bodies or marks are found irregularly spread over the wing surface.

Occurrence - The present species was found in rhythmites of a core from about 205m deep in the Well nº 2 of the Instituto Geográfico e Geológico de São Paulo, drilled for water in the Boituva City, São Paulo State, Brazil.

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REFERENCES

- Beneden, P.J. van, & Coemans, E. 1867. Un insecte et un gastéropode pulmoné du terrain houiller. *Bulletins de l'Académie royale des sciences, des lettres, et des beaux-arts de Belgique* (series 2) 23:384-401.
- Brauckmann, C. & Koch, L. 1982. Neue Insekten aus den Vorhalle-Schichten (oberes Namurium B) von Hagen-Vorhalle. *Dortmunder Beitr. Landeskd., naturwiss. Mitt.* 16: 15-26, Dortmund.
- _____; _____. & Kemper, M. 1985. Spinnentiere (Arachnida) und Insekten aus den Vorhalle-Schichten (Namurium B; Ober-Karbon) von Hagen-Vorhalle (West-Deutschland). *Geol. Paläont. Westf.* 3, 132s, 57Abb., 23Taf.
- Carpenter, F.M. 1943. Carboniferous insects from the vicinity of Mazon Creek, Illinois. *Sci. Pap. III. State Mus.* 3: 1-20.
- _____. 1992. Superclass Hexapoda. In: Kasler, R.L. (Ed.): *Treatise on Invertebrate Paleontology, Part R, Arthropoda* 4(3-4): I-XXII, 1-655, Geological Society of America, Inc., and University of Kansas Press, Boulder, Colorado.
- Ferreira, F.J.F. 1982. Alinhamentos Estruturais Magnéticos da Região Centro Oriental da Bacia do Paraná e seu significado Tectônico. In: *Geologia da Bacia do Paraná, Reavaliação da Potencialidade e Prospectividade em Hidrocarbonetos. Paulipetro*, São Paulo, 143-166.
- Handlirsch, A. 1906. Revision of American Paleozoic insects. *Proceedings U.S. Natural Museum* 29(1441):661-820.
- _____. 1911. New Paleozoic insects from the vicinity of Mazon Creek, Illinois. *American Journal of Sciences*. 4(31):297-326.
- Kukalová, J. 1958. On the systematic position of *Ampeliptera limburgica* Pruvost, 1927 (Insecta, Protorthoptera). *Věstník ÚÚG*, 23:377-379.
- Kukalová-Peck, J. & Brauckmann, C. 1992. Most Paleozoic Protorthoptera and ancestral hemipteroids: major wing braces as clues to a new phylogeny of Neoptera (Insecta). *Can. J. Zool.* 70: 2452-2473.
- Petri, S. & Souza, P.A. de 1993. Síntese dos conhecimentos e novas concepções sobre a bioestratigrafia do Subgrupo Itararé, bacia do Paraná, Brasil. *Revista do Instituto de Geociências*, 14(2):7-18.
- Pinto, I.D. & Ornellas, L.P. de 1978. Carboniferous insects (Protorthoptera and Paraplecoptera) from the Gondwana (South America, Africa and Asia). *Pesquisas*, 11:305-21.
- Pruvost, P. 1927. Sur une aile d'insecte fossile trouvée au sondage de Gulpen. *Jaarverstag van voor het nederlandsche mijngebied te Heerlen* 1926; 76-77, text-fig. 1.

Plate 2

Cacurgulopsis sanguinettiae Pinto & Adami-Rodrigues, gen. et sp. nov. From Boituva sediments, Itararé Subgroup, Upper Carboniferous. Sample at 205m depth in the Well nº 2 of the Instituto Geográfico e Geológico do Estado de São Paulo, at Boituva sediments, São Paulo State, Brazil. Holotypus UFRGS-MP-I-5290a,b

Figure 1a- positive imprint of an incomplete and distorted wing
Figure 1b- negative imprint of the distal part of the wing
Figure 1c- enlarged positive imprint of the basal part of the wing showing a detail of the cubital-anal area.

1a

1b

1c