REVISTA BRASILEIRA DE ZOOLOGIA

Revista brasileira de Zoologia, S. Paulo 3(6): 327 – 356 31.V.1987

A REVISION OF THE PLATEREMAEIDAE (ACARI: ORIBATEI)

Adilson D. Paschoal

RESUMO. A família Plateremaeidae é revista, e inclui os seguintes táxons: ***Plateremaeus*** *Berlese, com a única espécie* ***P. ornatissimus*** *(Berlese), do Brazil;* ***Allodamaeus*** *Banks, com as espécies* ***ewingi*** *(Banks), dos Estados Unidos,* ***coralgablensis,*** *sp. n. (localidade-tipo: Estados Unidos, Flórida, Coral Gables) e* ***ornatus*** *Balogh & Csiszár, da Argentina;* ***Lophoremaeus,*** *gen. n., com duas espécies:* ***mirabilis*** *Csiszár, da Bulgária, espécie-tipo, e* ***laminipes*** *(Berlese), n. comb., da Itália;* ***Paralopheremaeus****, gen. n., com a espécie* ***legendrei*** *(Balogh), n. comb., de Madagascar;* ***Calipteremaeus,*** *gen. n., com a espécie* ***yaginumai*** *(Aoki), n. comb., do Japão; as seguintes espécies são consideradas* ***incertae sedis: Plateremaeus carinulatus*** *(Berlese), do Brasil,* ***P. complanatus*** *(Berlese), do Chile,* ***P. rotundatus*** *Berlese, do Japão, e* ***P. tunicatus*** *(Balogh), do Zaire.*

ABSTRACT. The family Plateremaeidae is revised, and includes the following taxa: ***Plateremaeus*** *Berlese, with the only species* ***P. ornatissimus*** *(Berlese), from Brazil;* ***Allodamaeus*** *Banks, with the species* ***ewingi*** *(Banks), from the USA,* ***coralgablensis,*** *sp. n. (type-locality: USA, Flórida, Coral Gables), and* ***ornatus*** *Balogh & Csiszár, from Argentina;* ***Lophoremaeus,*** *gen. n., with two species:* ***mirabilis*** *Csiszár, from Bulgaria, the type-species, and* ***laminipes*** *(Berlese), n. comb., from Italy;* ***Paralopheremaeus****, gen. n., with the species* ***legendrei*** *(Balogh), n. comb., from Madagascar;* ***Calipteremaeus,*** *gen. n., with the species* ***yaginumai*** *(Aoki), n. comb., from Japan; the following species are considered* ***incertae sedis: Plateremaeus carinulatus*** *(Berlese), from Brasil,* ***P. complanatus*** *(Berlese), from Chile,* ***P. rotundatus*** *Berlese, from Japan, and* ***P. tunicatus*** *(Balogh, from Zaire.*

CONTENTS

Departamento de Zoologia, Escola Superior de Agricultura Luiz de Queiroz, Universidade de São Paulo, Piracicaba, SP.

INTRODUCTION

Plateremaeidae and related families are mostly inhabitants of forest biomes, being found in different strata of litter, also occurring in mosses and lichens which grow on the soil or on tree trunks. Most of the species enclosed in the family are tropical or subtropical, while Gymnodamaeidae, a related family, is for the greatest part found in temperate regions of the Northern Hemisphere.

Plateremaeidae, as well as Gymnodamaeidae, Licnodamaeidae and Licnobelbidae were placed by Grandjean (1965) in Gymnodamaeoidea on the basis of the tracheal system sub-normal and the absence of the centrodorsal setae. Licnodamaeidae and Licnobelbidae were succintly characterized by Grandjean (1954**a**, 1965); Gymnodamaeidae was reviewed by Paschoal & Johnston (1982**a**, 1982**b**); Plateremaeidae received no major contribution since its proposition by Tragardh (1931), being poorly understood mainly because the family characteristics were taken from a species wrongly placed in the type genus **Plateremaeus**, requiring a complete revision.

Tragardh proposed Plateremaeidae as a new family in 1931, having **Plateremaeus** Berlese as the type-genus. He based its characteristics almost exclusively on **Plateremaeus vestitus** Tragardh, 1931, namely: flat notogaster covered by a four-layer exuvia (one larval, three nymphal); body and legs covered by an abundant secretion (cerotegument); three-claw legs with narrow peduncles; leg articulations in sockets; femora, genua and tibiae distal ends narrow. The most striking character in Tragardh's version is leg articulation, on the basis of which he erected the new family Plateremaeidae. He properly observed that **Plateremaeus vestitus**, a species described by him from the Juan Fernandez Islands, presented the femur-genu, genu-tibia and tibia-tarsus articulations with sockets at the basal portions of genua, tibiae and tarsi and condyles at the distal portions of femora, genua and tibiae, in exactly the opposite way all other described species were arranged. Such peculiarity was also observed by him in the drawing, but not in the description of **Plateremaeus rotundatus** Berlese, 1913. Tragardh assumed then that all other described species of **Plateremaeus** i.e., **P. ornatissimus** (Berlese, 1888), **P. carinulatus** (Berlese, 1888), **P. complanatus** (Berlese, 1902) and **P. laminipes** Berlese, 1916, equally presented such peculiar feature. It is also his observation that **Platyliodes** Berlese, 1916 and **Neolides** Berlese, 1888 (= **Liodes** Heyden, 1826), two related genera to **Plateremaeus**, in the family Neoliodidae Willmann, 1930 (= Liodidae Grandjean, 1954**a**), presented socket articulations of the normal type, besides sessile claws. As a common feature between **Plateremaeus** and **Neoliodes**, Tragardh cites chaelicerae and concentric exuviae. On the basis of his observations he proposes Plateremaeidae and comments on its uniqueness with some resemblance to Neoliodidae.

The genus **Plateremaeus** was proposed by Berlese (1908) with **Damaeus ornatissimus** Berlese, 1888, a species collected by Aloysius Balzan, under bark, in Mato Grosso, Brazil, as the type-species. Berlese did not give any generic characteristic to the new genus and transferred **Eremaeus carinulatus** Berlese, 1888, a species also collected under bark in Mato Grosso, Brazil, and **Eremaeus complanatus** Berlese, 1902, a species from San Vicente, Chile, to **Plateremaeus**.

Up to Tragardh's paper proposing Plateremaeidae and featuring **Plateremaeus** on the basis of **Plateremaeus vestitus**, only two other species were described in the genus: **Plateremaeus rotundatus** Berlese, 1913, from humus in Samarang, Java, and **Plateremaeus laminipes** Berlese, 1916, from mosses in Vallombrosa, Italy. Prior to 1931, then, all the species which became members of Plateremaeidae were included in **Damaeus** Koch, 1836, **Eremaeus** Koch, 1836 and **Plateremaeus**.

In 1888, when **D. ornatissimus** and **E. carinulatus** were described, the genera **Damaeus** and **Eremaeus** belonged to Oribatidae (Berlese, 1883), sub-family Nothrinae (Berlese, 1888). In 1896 Berlese erected Damaeidae in which **Damaeus** was included and Nothridae, where he placed **Eremaeus**. Michael (1898) only accepted Oribatidae, divided into seven subfamilies among which Damaeidae and Nothrinae; **E. carinulatus** was transferred to **Damaeus**. In 1902 the third species of the group, **E. complanatus**, was described and placed in Oribatidae. At that same time, two species of **Damaeus**, i.e., **D. bicostatus** Koch, 1836 and **D. femoratus** Koch, 1840, were transferred to **Gymnodamaeus** Kulczynski, 1902, and in 1954**a** Grandjean erected Gymnodamaeidae. A complete survey of the literature concerning the Gymnodamaeidae was given by Paschoal & Johnston (1982**a**).

Since the establishment of **Plateremaeus** in 1908 till 1931, the genus is not referred to any family; it was not even cited in the general classification papers by Banks (1915), Ewing (1917) and Willmann (1931). In 1908, Paoli erected **Licneremaeus with Notaspis licnophora** Michael, 1882, as the type-species. He also described **L. pulcherrimus, L undulatus, L. latiflabellatus** and **L. tuberculatus,** all from Italy. Three other species in the genus were described later on: **L. caesareus** Berlese, 1910 (Italy), **L. discoidalis** Willmann, 1930 (Guatemala) and **L. fritchi** Sellnick, (fossile, Germany).

Willmann (1931) erected Belbidae for **Belba** Heyden, 1826, **Amerus** Berlese, 1896 and **Gymnodamaeus** (**Damaeus** was not recognised), and Eremaeidae for **Eremaeus** and **Licneremaeus** among others. **Plateremaeus** was omitted. **Neoliodes** and **Platyliodes** are in **Neoliodidae** also a new family proposed by him. Grandjean (1931) in reviewing **Licneremaeus** split it into four genera: 1) **Licneremaeus** Paoli **"sensu stricto"** for **L. licnophora** (type species), and two other new species from Venezuela: **L. discoidalis** and **L. exornatus**, all with anterior dorso-notogastral setae and adults and nymphs without exuviae; 2) **Licnodamaeus** Grandjean, new genus, for **L. undulatus** (type species), **L. pulcherrimus** and **L. costula** (a new species from Spain), all with posterior dorso-notogastral setae only, notogaster sculptured and adults without exuviae; 3) **Licnoliodes** Grandjean, new genus, for **L. andrei** (a new species from Spain and North Africa) being very close to **Licnodamaeus** but with laminar projections on legs; and 4) **Licnobelba** Grandjean, new genus, for **L. alestensis** (type species, new for France and Switzerland), **L. caesarea** and **L. latiflabellatus**, all with posterior dorso-notogastral setae only, smooth brilliant notogaster and adults and nymphs with scalps. He also erected the new genus **Pheroliodes** having **Cymberemaeus wekncke**i Willmann, 1930 as the type species, but failed to give any generic atribute to it.

According to Grandjean (1931), **Licneremaeus** presents very unique features not found in any of the other three genera: the kind of leg articulation; the disposition of the lamelar and rostral setae; and the anterior notogastral setae. Later on, in 1954**a**, he erected Licneremaeidae. **Licnodamaeus, Licnoliodes** and **Licnobelba** were said to have in common the same leg articulation described by Tragardh for **Plateremaeus**. He also comments that this special articulation occurs, modified in different ways, in **Neoliodes, Platyliodes, Gymnodamaeus** and **Plateremaeus**. Grandjean (1933) described **Licnoliodes adminensis** from Marrocos.

Banks (1947) proposed **Allodamaeus** as a new genus for **A. ewingi, a new species from litter at Durhan, North Carolina, USA; He considered it in Oribatidae, tribe Oribatini, being related to Gymnodamaeus**, both presenting the distal frontal tibiae projected over tarsal bases. On the basis of this character, Banks could separate **Allodamaeus,Gymnodamaeus** and **Jacotella** (another genus described by him and equally placed in Oribatidae) from **Belba, Oribata (= Damaeus** and other genera. Baker & Wharton (1952) considered **Neoliodes, Platyliodes, Poroliodes,** Gran-

djean, 1934 and **Teleioliodes** Grandjean, 1934 in **Neoliodidae; Gymnodamaeus, Allodamaeus, Jacotella, Damaeus, Amerus, Belba, Damaeobelba** Sellnick, 1928 and **Porobelba** Grandjean, 1936 in Belbidae; **Licnodamaeus, Licnoliodes, Licnobelba, Licneremaeus** plus 37 other genera in Eremaeidae; and **Plateremaeus in Plateremaeidae.**

Grandjean (1954**a**) segregated the Higher Oribatei in several families. **Liodes, Platyliodes, Poroliodes** and **Teleioliodes** were set together in the new family Liodidae; **Gymnodamaeus** in the new family Gymnodamaeidae; **Licnodamaeus, Licnoliodes** and **Licnobelba** in the new family Licnodamaeidae; **Belba, Damaeus, Damaeobelba, Porobelba** and **Metabelba** Grandjean, 1936, in Belbidae. **Plateremaeus, Pheroliodes** and **Allodamaeus** were not referred to in this publication. The four families were grouped together in Section 2, Eupheredermes, i.e., nymphs bearing exuviae; adults without exuviae generally, always pycnonotics, without the dorsocentral setae, having, a maximum of 11 pairs of notogastral setae and with normal tracheal system (except Liodidae). For **Licneremaeus** he erected the new family Licneremaeidae, set apart in Section 5, Poronoticae. In 1954**b**, Grandjean proposed 3 new genera for Gymnodamaeidae namely: **Arthrodamaeus, Plesiodamaeus** and **Aleurodamaeus**. Bulanova-Zachvatkina (1957) accepted Damaeidae but not Belbidae and Gymnodamaeidae. In her revision of the Damaeidae 3 subfamilies were established: Damaeinae Michael plus two other new subfamilies Amerinae and Gymnodamaeinae. **Arthrodamaeus** was synonymized to **Allodamaeus**. Damaeidae was placed in Belboidea Dubinin. Woolley (1957) described **Heterodamaeus**, a new genus from North America, with **Damaeus magnisetosus** Ewing, 1909 as the type species.

Balogh (1958) described **Gymnodamaeus tunicatus** from Zaire, placed in Belbidae. Later on, Balogh (1962) transferred it to **Plateremaeus**, Plateremaeidae. In Woolley & Baker (1958) Plateremaeidae appears in Hermannielloidea Dubinin, 1954. Hammer (1958) proposed **Pedrocortesia** as a new genus for **P. mirabilis**, a new species from Argentina. She considered the new genus in Eremaeidae Sellnick, 1928. Higgins & Mulaik (1958) redescribed **A. ewingi.** Hammer (1961) described four new species of **Pedrocortesia** namely: **P. grandis, P. intermedia, P. dentata and P. elegans** all from Peru. **Pedrocortesia** was transferred to Gymnodamaeidae and its similarity to **Plateremaeus** was stressed. The new genus **Pedrocortesella** Hammer, close to **Pedrocortesia**, was proposed and also placed in Gymnodamaeidae; Its type species, **P. pulchra**, was collected from moss in Peru.

Balogh (1961) grouped Plateremaeidae, Licnodameidae, Liodidae and Plasmobatidae together in the new superfamily Liodoidea. Gymnodamaeidae was not accepted, the genera **Gymnodamaeus, Plesiodamaeus, Aleurodamaeus, Pedrocortesia** and **Pedrocortesella** being transferred to Plateremaeidae. Besides these genera and **Plateremaeus**, Balogh placed in the family: **Allodamaeus, Jacotella** (previously in Oribatidae) and **Heterodamaeus** (previously in Belbidae). To Plateremaeidae was given new characteristics. However, since Balogh didn't take leg articulation as the main character, as did Tragardh, Gymnodamaeidae could be included in. Hammer (1962) described **Pedrocortesia australis** from Chile.

Csiszár, in Csiszár & Jeleva (1962), described **Plateremaeus mirabilis** from Bulgaria. Commenting on the systematic position of Plateremaeidae the authors stressed its uncertainty due to the poor description of Berlese's species, so to oblige Tragardh, and later on Balogh, to characterize the family on **P. vestitus** exclusively. They go on to quest whether **P. vestitus** is cogeneric with the species of **Plateremaeus** described by Berlese, since **P. mirabilis**, shown to be very close to **P. laminipes,** was completely different from **P. vestitus; P. mirabilis** was also said to be close to **P. rotundatus** and **G. tunicatus**. The following conclusions, based on the type

species **D. ornatissimus** and on **P. mirabilis** came out of this interesting investigation: 1) **Plateremaeus** characteristics: genitoanal formula (7 - 1 - 4 - 3); epimeral formula (8 : 7 : 12 : 4); 3 pairs of dorsal postero-marginal setae; sockets on legs; tarsi ends filiform. Diagnostic features: 4 pairs of anal setae; epimeral neotrichy; leg sockets and tarsi filiform. The following species were supposed to be included in: **D. ornatissimus, E. carinulatus, E. complanatus, P. rotundatus, P. laminipes, G. tunicatus** and **P. mirabilis;** 2) **P. vestitus** is not a true **Plateremaeus,** it is probably a **Pedrocortesia;** 3) Gymnodamaeidae is a valid family, from which **plateremaeus** must be removed off; and 4) **Plateremaeus,** as defined by them, should be placed in a new family or in Plateremaeidae reviewed.

Balogh (1962) described **Plateremaeus legendrei** and **Plateremaeus glaber** from Madagascar and transferred **G. tunicatus** to **Plateremaeus.** He also questioned whether **P. vestitus** is a true **Plateremaeus.** Pletzen (1963) described **Pedrocortesella africana** and **Pedrocortesella parva** from South Africa, and only considered **Plateremaeus, Allodamaeus, Pedrocortesia** and **Pedrocortesella** in Plateremaeidae. Balogh & Csiszár (1963) described **Allodamaeus ornatus** and **Licnodamaeus granulatus** from Argentina. **Allodamaeus** is cited in Gymnodamaeidae. Grandjean (1964) redescribed **Pheroliodes wehnckei** placed provisionally in Plateremaeidae as well as **Pedrocortesia,** a genus believed to be quite close to Pheroliodes or even a synonym of it. Regarding to the woks of Hammer, Balogh and Csiszár & Pletzen on Plateremaeidae, Grandjean commented that they should be accepted with restrictions since the type species **P. ornatissimus** was never redescribed. For a better understanding he recommended a comparative study with the Licnodamaeidae because of the many related features with Plateremaeidae. According to him Plateremaeidae differed from Gymnodamaeidae in the following characters: tarsi extended by pedicels; with a dorso-distal apophysis on Ts I; with femoral tracheae; and without true pedotecta I and II.

Balogh (1965) listed Plateremaeidae with **Plateremaeus, Pedrocortesia, Pedrocortesella** and **Pheroliodes; Allodamaeus** is listed under Gymnodamaeidae. These two families plus Licnodamaeidae and Liodidae are in Liodoidea. Grandjean (1965) in reviewing Licnodamaeidae erected Licnobelbidae for **Licnobelba.** According to him new family differed from Plateremaeidae in presenting a convex, smooth and brilliant notogaster, without tectum and with lateral tubes, and from Gymnodamaeidae in lacking pedotectum II. **Licnoliodes and Pheroliodes** were kept provisionally in Plateremaeidae due to the presence of notogastral tectum; famulus included in a closed pit, inside another one containing solenidium omega; femoral tracheae; and tarsi pedicels. **Licnodamaeus** was considered the only genus in Licnodamaeidae. Grandjean also noticed that trachea I and its stigma were missing in Plateremaeidae and in Licnodamaeidae, Licnobelbidae and Gymnodamaeidae (tracheal system subnormal), and that all these families presented no centrodorsal setae. He decided for grouping them all together in the new superfamily Gymnodamaeoidea.

Balogh & Mahunka (1965) described **Pedrocortesia fissurata** and **Pedrocortesia inaequalis** from Mongolia. Balogh (1966) described **Pedrocortesia franzi** from Tchad and **Pedrocortesia africana** from East Africa. He also suggested the number of anal setae to tell apart the genera of Plateremaeidae. Provisionally, as he stated, the species with 2 pairs should belong to **Pedrocortesia** or **Pedrocortesella;** those with 3 pairs to **Pheroliodes;** and those with 4 and 6 to **Plateremaeus.** Hammer (1966) described two **Pedrocortesia: P. rotoruensis** and **P. luteomarginata** and five **Pedrocortesella: P. gymnonotus, P. sexpilosus, P. cryptonotus, P. latoclava** and **P. nigroclava,** all from New Zealand. Covarrubias (1968) described **Pheroliodes roblensis** from Chile, showing its similarity to **Pedrocortesia rotoruensis.** He, as Grandjean, concluded that **Pedrocortesia** could be synonymized to **Pheroliodes.**

Balogh (1968) erected the new genus **Flammeremaeus** for the new species **F. gressitti** collected in New Guinea. Its affinity to **Pheroliodes** and **Pedrocortesia** (from which it differs by having 8 pairs of genital setae and an extra pair of setae on frontal notogaster), was enough to justify its inclusion in Plateremaeidae. Balogh also described **Pedrocortesella hardyi** from New Guinea. Balogh & Mahunka (1969) described **Allodamaeus trisetosus** from Bolivia and transferred to **Allodamaeus** the species **Gymnodamaeus elegantus**, from Argentina. Woolley (1969) proposed **Licnocepheus** as a new genus from beetles in the United States, and placed it in Licnodamaeidae. Perez-Iñigo (1969) in reviewing the Oribatids from Spain redescribed **Licnodamaeus pulcherrimus, L. caesarea, L. costula, L. montana** and **L. ádminensis,** all placed in Licnodamaeidae after Grandjean 1954**a**. Balogh (1970) described **Pedrocortesia vermicularis** from New Guinea. Aoki & Suzuki (1970) described **Pedrocortesella japonica** from Japan. Aoki Fujikawa (1971) described **Allodamaeus adpressus** also from Japan and proposed the new name **Allodamaeus tuberculatus** for **Allodamaeus ornatus** Balogh & Csiszár (name pre-occupied).

Balogh (1972) gave a new classification for the Oribatei in wich Gymnodamaeidea is placed in Polytricha (a group with more than 6 pairs of genital setae), with the following characteristics: 3 to 6 pairs of notogastral setae posteriorly; notogaster flat or excavated, occasionally with exuviae or cerotegument (adults); rostral and lamelar setae originated one close to the other: legs long and filiform or on sockets; anal plate with 3 to 6 pairs of setae. Under Gymnodamaeoidea he recognised Gymnodamaeidae, with the genera **Gymnodamaeus, Aleurodamaeus, Allodamaeus, Heterodamaeus, Jacotella, Licnoliodes,** and **Plesiodamaeus;** Plateremaeidae, with the genera **Plateremaeus, Pheroliodes, Pedrocortesia, Pedrocortesella** and Flammeremaeus; Licnodamaeidae with the genus **Licnobelba**. Aoki (1974) described **Pedrocortesia sculptrata** from Corea.

Paschoal (1975) and later on Paschoal & Johnston (1982**a**, 1982**b**), reviewed the Gymnodamaeidae in a numerical taxonomic study. **Gymnodamaeus, Jacotella, Arthrodamaeus, Plesiodamaeus** plus 6 new genera: **Odontodamaeus, Pleodamaeus, Nortonella, Johnstonella, Adrodamaeus** and **Idiodamaeus** were placed in Gymnodamaeidae. **Heterodamaeus** received the new name **Adrodamaeus** due to objetive synonymy. **Arthrodamaeus** was shown to be a valid genus, its synonymy with **Allodamaeus** being in error. **Allodamaeus** and **Licnoliodes** were placed provisionally in Plateremaeidae. The new family Aleurodamaeidae was proposed for **Aleurodamaeus**. Aoki (1977) described **Plateremaeus yaginumai** from Japan. Mahunka (1977) described **Licnoliodes apunctatus** from Greece.

Paschoal (1979) reviewed Plateremaeidae and re-characterized Gymnodamaeoidea in a Dissertation presented to the University of São Paulo, from which the present publication is an excerpt.

MATERIALS AND METHODS

Most of the species used for the revision of the Plateremaeidae are from South America and New Zealand; Some are from North America. **Damaeus ornatissimus,** the type species of **Plateremaeus**, from Mato Grosso, Brazil, deposited at the Berlese Collection in Florence, Italy, was studied by Prof. Donald E. Johnston, The Ohio State University, who produced a brief description and a drawing of the female holotype (type number 8/46), used by Paschoal (1975) in the Gymnodamaeidae revision. During his stay in Piracicaba, Brazil, Johnston collected specimens from litter, identical to the type seen at the Collection in Florence. Later on, Paschoal found the same specimens in sampling litter from rain forest in the State of São Paulo, one

of which from Presidente Venceslau, almost at the border with the State of Mato Grosso. By using the descriptions and drawings after Berlese and Johnston it became evident that the specimens were **D. ornatissimus**. The rediscovery of this species, 90 years after its description, was the main for this revision to be made.

The male holotype of **Allodamaeus ewingi** (Type MCZ Arachnida 3014), from North Carolina, U.S.A., was studied by Paschoal at the Museum of Comparative Zoology, Harvard University, and the paratypes at the Acarology Laboratory, Ohio State University.

Hammer's **Pedrocortesia** and **Pedrocortesella** type materials, deposited at the Zoologisk Museum, in Copenhagen, Denmark, were sent on loan by Dr. Henrik Enghoff. The following materials were received for study: **Pedrocortesella pulchra,** syntypes male and female 711, from Sillustani, Peru; **Pedrocortesella nigroclava,** holotype 87, Keri-Keri, New Zealand; **Pedrocortesella latoclava** holotype 285, Milford, New Zealand; **Pedrocortesella cryptonota,** paratype 236, Rotoiti Lake, New Zealand; **Pedrocortesella sexpilosa,** paratype 172, New Plymouth, New Zealand; **Pedrocortesella gymnonota,** paratype 272, Milford, New Zealand; **Pedrocortesia mirabilis**, syntype 202, El Angulo, Argentina; **Pedrocortesia dentata,** syntype 684, Machu Pichu, Peru; **Pedrocortesia grandis,** syntypes 398, 400, 405, Bisracuche and Cusco, Peru; **Pedrocortesia australis**, syntypes 1022, 1148, 1160, Tierra del Fuego, Chile and Patagonia, Argentina; **Pedrocortesia rotoruensis**, holotype 27, Roturua, new Zealand; **Pedrocortesia luteomarginata**, holotype 272, Milford, new Zealand.

Pheroliodes was not requested for this study because the type species **P. wehnckei** was properly described by Grandjean (1964), the same with **P. roblensis** described by Covarrubias (1968), and also because plenty of material was sampled in São Paulo and Minas Gerais.

Most of the areas surveyed for this study are in the State of São Paulo, comprising the central valley between the Piracicaba and Tietê Rivers, Median Mogiana and High Sorocabana. The reserve of Paço Bonito in Lavras, Minas Gerais, was also included in the survey. **Plateremaeus, Pheroliodes (= Pedrocortesia)** and **Lopholiodes** new genus seems to be wide-spread in forest litter. **Allodamaeus, Pedrocortesella, Licnodamaeus, Licnoliodes, Licnobelba** and **Flammeremaeus** were not found in any of the samples. With the exception of the former genera, the studies were based on the description in existing literature.

Neoliodes (= Liodes) and **Teleioliodes** (Neoliodidae) were collected in São Manoel, SP, being used in comparative studies to characterize Gymnodamaeoidea.

Almost all specimens were balsam mounted after being clarified by normal procedure. in only this way leg chaetotaxy could be properly investigated (Paschoal, 1975). Approximately 150 morphological characters were used to characterize the different taxa, the majority being qualitative characters.

REVISED CLASSIFICATION

The terminology used to describe taxa is basically the one after Grandjean (several papers), Paschoal (1975) and Paschoal & Johnston (1982**b**).

Plateremaeidae, as viewed by previous authors, was composed of the following genera: **Plateremaeus, Pheroliodes, Pedrocortesia, Pedrocortesella, Flammeremaeus** (Balogh, 1972), **Allodamaeus** and **Licnoliodes** (Paschoal, 1975; Paschoal

& Johnston 1982a). As a result of the present investigation only **Plateremaeus** and **Allodamaeus** remain in the family, plus three new genera: **Lopheremaeus** Paschoal, **Paralopheremaeus** Paschoal and **Calipteremaeus** Paschoal. **Pheroliodes** and **Licnoliodes** are included in the new family Pheroliodidae Paschoal. For Pedrocortesella the new family Pedrocortesellidae Paschoal is erected. **Pedrocortesia** is synonymized to **Pheroliodes. Flammeremaeus** is considered of "incertae sedis" till further studies.

Family PLATEREMAEIDAE Tragardh

Plateremaeidae Tragardh, 1931:567; Csiszár & Jeleva, 1962: 281; Grandjean, 1965: 103; Balogh, 1966: 69
Type genus: Plateremaeus Berlese, 1908.

Characteristics - Eupheredermes, i.e., nymphs retain exuviae from previous instars; adults without exuviae; Tracheal system sub-normal, i.e., only sejugal and trachea III present. Pycnonotics, i.e., notogaster without areae porosae. Body covered by a deep layer of cerotegument, reticulated generally and without microtubercules. Notogaster cuticle, prodorsum and venter smooth or foveate. Lamellar apodeme absent; other prodorsal apodeme present or absent. **le** lateral to dorso-lateral, close to **ro** and almost at the same level of it; **ro** ventral; **in** short, on small apophysis; bothridium dorsal, very close to notogaster; sensillum medium to long, flagellated and smooth or cylindrical with very short spines at distal end, or claviform with short spines, the club being reasonably expanded. Centro-dorsal setae absent; with six pairs of postero-lateral notogastral setae; **ps** seta ventral; **ps3** to the level of **r2** (lp) or almost; **hl** terminal, generally crossing each other at the sagital plane; **r2 (lp)** lateral, at the margin of notogaster, bent to the sagital plane; **r3 (lm)** dorsal, in most cases away from the margin, between **im** and **ip**. Dorsal lyrifissures small. Notogaster flat, rounded or oval. Notogastral tectum between lines **bng** and **lambda**. Median size mites. Apodeme I complete, in the shape of a long bar turned backward; other epimeral apodemes incomplete without apodematic projections well sclerotized. With epimeral neotrichy; apodeme I first row setae larger than the others, progressively longer antiaxially. Genital and anal apertures almost circular, with or without ornaments. Seven pairs of genital setae arranged in more than one longitudinal row; **ag** posterior to the genitalia, between both apertures; anal plate with a minimum of four and a maximum of eight pairs of setae, on a sole longitudinal row; three pairs of adanal setae, **adl** lateral to the plate. Tectopedia absent; pedotectal tooth **p** present; lateral carenae present; cotiloid and integument of acetabula I and II forming a blunt structure. Leg articulation with proximal sockets, i.e., sockets on proximal ends of tarsi, tibiae and genua; femoral and trochanteral tracheae present; tarsi I and II distal apophyses present; tibia I apophysis long, covering almost all the corresponding tarsus; trochanter and Tr - Fe articulation outside acetabula; proximal orientation of femora straight; tarsi pedicels long and narrow; legs tridactylous, with small claws, the median one being the strongest; free famulus or famulus enclosed in tarsus I.

The following common characteristics of leg chaetotaxy were observed in**Plateremaeus** and **Allodamaeus: ft"** Ts I - II anterior and close to **ft'; pv"** Ts I anterior to **pv'; pl"** Ts I - II anterior to **pl'; v'A** Ts I at the level of **v"Al;** solenidium **omega** I paraxial larger than **omega** 2 on Ts I; **d** Tb I anterior to **l'**: solenidium **fil** long, antiaxial, **fi2** short, paraxial on Tb I; solenidium **sigma** Ge I not very close to **d (l)** anterior to **(v)** on Tb II: **ft"** Ts III anterior and close to **ft'; pl'** absent on Ts III - IV: **d** Ge III - IV close to proximal margin; three **1'**, two posterior one anterior, and one

v antèrior to **d** on Fe III; **ft', (it), pl'** absent on Ts IV. Leg chaetotaxy - Ts: 19(2) - 17(2) - 16 or 15,13, 12; Tb 4(2) - 5(1)- 4(1) - 4(1); Ge 4(1) - 4(1) - 3 (1) - 3; Fe: 8 - 8 - 5 -5; Tr. 1 - 1 - 4 - 3.

KEY TO THE GENERA OF PLATEREMAEIDAE

1 - Smooth cuticle; rostral apodeme forming a triangular shaped structure; sensillum flagellated, long and bent; notogaster almost circular; **r3** dorsal close to the margin; with seven pair s of anal setae; pedotectal tooth **a** present; free famulus on Ts I; **p1"** absent on Ts III - IV . . . . . **Plateremaeus** Berlese, 1900

- Cuticle smooth or foveate; rostral apodeme forming no triangular shaped structure; sensillum flagellated, cylindrical or club shaped; notogaster oval or rounded; **r3** away from the margin; with six, five or fous pairs of anal setae; pedotectal tooth **a** absent; famulus enclosed in Ts I generally; **p1"** present or absent on Ts III - IV 2

2 - Sensillum flagellated or cylindrical; with four or six pairs of anal setae; with crests on leg segment 3

- Sensillum claviform; with five or six pairs of anal setae; leg segments without crests 4

3 - Sensillum cylindrical, long and straight; notogaster almost rounded in shape; **h1** well apart from its homologous seta; anal and genital apertures apart one from the other; with four pairs of anal setae; femoral crests well developed . . . . . **Lopheremaeus**, gen. n.

- Sensillum flagellated and bent; notogaster ovate; **h1** close to its homologous seta; anal and genital aperture contiguous; with six pairs of anal setae; femoral crests of small size . . . . . **Paralopheremaeus,** gen. n.

4 - Smooth cuticle; sensillum club well expanded; **h1** and **r2** at notogastral margin; anal genital apertures parcially joint together and with no ornamente; with six pairs of anal setae . . . . . **Allodamaeus** Banks, 1947

- Foveate cuticle; sensillum club poorly expanded; **h1** and **r2** subterminal; anal and genital apertures not very close one to the other and ornated; with five pairs of anal setae . . . . . **Calipteremaeus,** gen. n.

GENUS Plateremaeus BERLESE

Plateremaeus Berlese, 1908: 11; Tragardh, 1931: 566; Csiszár & Jeleva, 1962: 281; Balogh, 1966:69.
Type species: **Damaeus ornatissimus** Berlese, 1888.

Up to this survey the following species were still assigned to **Plateremaeus P. ornatissimus** (Berlese, 1888), Mato Grosso, Brazil (type species); **P. carinulatus** (Berlese, 1888), Mato Grosso, Brazil; **P. complanatus** (Berlese, 1902), San Vincente, Chile; **P. rotundatus** Berlese, 1913, Samarang, Java; **P. laminipes** Berlese, 1916, Vallombrosa, Italy; **P. vestitus** Tragardh, 1931, Juan Fernandez Islands, Chile; **P. tunicatus** (Balogh, 1958), Zaire; **P. mirabilis** Csiszár, 1962, Karlovo-Kalofer, Bulgaria; **P. legendrei** Balogh, 1962, Madagascar; **P. glaber** Balogh, 1962, Madagascar; and **P.yaginumai** Aoki, 1977, Kakeroma Island, Japan.

Due to the incomplete description of the type species and most of the others described later, one cannot be sure whether they but **P. ornatissimus** belong to **Plateremaeus**. For this reason **P. carinulatus, P. complanatus, P. rotundatus** and **P. tunicatus** are of "incertae sedis" till further investigations. **P. mirabilis** and **P. laminipes** are included in the new genus **Loopheremaeus** Paschoal; **P. legendrei** is the type species for the new genus **Paralopheremaeus** Paschoal; **P. yaginumai** is placed in the new genus **Calipteremaeus** Paschoal; **P. glaber** is placed in the new genus **Nooliodes** Paschoal; and **P. vestitus** is transferred to the new genus **Lyrifissella** Paschoal.

Diagnosis - Plateremaeus is close to the new genus **Paralopheremaeus** Paschoal from which it differs mainly by presenting smooth cuticle; **ex** small; notogaster rounded in shape; **r3 (1m)** at notogastral margin; larger number of epimeral setae; genital and anal plates without ornaments; nd seven pairs of genital setae.

Description - Body and legs covered by a thick layer of cerotegument, forming irregular to polygonal reticulous, without microtubercles. Cuticle smooth dorsally and ventrally on body and legs. Rostral apodeme in the shape of a triangular structure; central apodeme with mammillate structures; exobotridial, interlamellar and bothridial apodemata present **le** lateral; sensillum flagellate, long, smooth and bent. **ps3** at the same level of **r2 (1p), ps2** posterior ly to it; **ps1** linned with **h1; h1** close to its homologous seta crossing it at the sagital plane; **r3 (1m)** dorsal, close to notogastral margin. Notogaster rounded, a bit concave median size mites. Epimeral chaetotaxy 9: 7: 10: 7 (33 setae) Genital and anal apertures contiguous but not joint together; genital aperture oval; anterior margin of genitalia anterior to the level of coxae IV; apertures not ornamented. Genitoanal chaetotaxy 7 - 1 - 7 - 3; **g2, g3, g4, g5** close to inner margin of genitalia; genital plate with seven pairs of setae, exceptionally eight or nine pairs. Pedotectal tooth **a** present; oblique carenae absent. Free famulus on Ts I; **v"** at the level of **v'** on Tb I; **omega** 1, **omega** 2 of equal size on Ts II **fi** Tb II long, close to **d**, on the half of the segment; **sigma** Ge II close to **d; p1"** Ts III-IV absent; **d** Tb III posterior to **1'; fi** Tb III well apart from **d; sigma** Ge III away from **d. Leg;** chaetotaxy; Ts. 19(2) - 17(2) - 15-12; Tb. 4(2) - 5(1) - 4(1) - 4(1); Ge. 4(1) - 4(1) - 3(1) - 3; Fe. 8 - 8 - 5 - 5 ; Tr. 1 - 1 - 4 - 3.

Plateremaeus ornatissimus (Berlese)

Damaeus ornatissimus Berlese, 1888: 217, tab. XIII, fig. 1 Michael, 1898: 61
Plateremaeus ornatissimus, Berlese 1908: 11; Tragardh, 1931: 566.

Type - Female holotype, A. Berlese, Type 8/46, collected by Aloysius Balzan in Mato Grosso, Brazil, under bark, in 1888. Balsam mounted slide, poorly clarified with most legs broken or missing. At the Berlese Collection in Florence, Italy.

Described specimens (after being confronted with the type in Florence): Fourfemales, 5 males, A. Paschoal, slide 2-III - 78-4, from litter in Piracicaba, SP, collected by D. Johnston; 10 females, 4 males, A. Paschoal, slide 579, from litter in Aguas de São Pedro, S.P., collected by the author. Depository: Laboratório de Acarologia, Departamento de Zoologia, E.S.A. "Luiz de Queiroz", Piracicaba, S.P., Brazil.

Description - Tegument - Body and legs covered by a deep layer of cerotegument, without microtubercles, formed by small polygonal pieces, joint together but not in a real reticular way; leg cerotegument as high as the width of the segments. Smooth cuticle. Adults without exuviae. **Prodorsum - apo le** absent; **apo ro** well sclerotized laterally forming a triangular shaped structure pointed anteriorly and a long medial cylindrical piece extended almost to the rostrum apex; **apo c** reduced to two mammillate knobs anterior to **in**, forming two well sclerotized loops turned one to the other; **apo ex** as a small bar close to **ex**, pointed to bothridia; **apo in** a short bar bearing **in** at distal end; **apo bo** a weakly sclerotized bar linking bothridia; **le, ro** falciform, lateral, almost at the same level, **le** a bit anterior to **ro**, being large, bent to the direction of sagital plane, the ends not touching the correspondent setae of the other side; **le** on strong tubercle; **ro** on small apophysis; **ex** small, smooth, holding no cerotegument, a little below and ahead of bothridium; **in** small, smooth, straight, slender, with no cerotegument, turned up and to the sides, between bothridia, and on small protuberance; bothridium dorsal, directed up and backward, touching notogasters. Distance between bothridia: 178,7u (M), 192,5u (F). **ss** flagellate, smooth, large, narrowing progressivelly towards tip; **ss** base proclinate bending laterally after leaving bothridium; **ss** length: 300,4u (M), 301,4u (F). Prodorsum length: 281,8u (M), 288,7u (F). **Notogaster** - Dorsum flat, rounded, a bit concave. Notogastral tectum between lines **bng** and lambda. With five pairs of small lyrifissures; **ia, ip** almost parallel to notogastral margin; **im** oblique to the margin; **ih, ips,** close to **lambda** line. Latero-abdominal gland long, cylindrical, narrow open ed close to and after **im**. With six pairs of median size notogastral setae; **r3 (1m)** shorter than **h1**, dorsal, falciform, close to notogastral margin, anterior and close to **im**, being smooth, bent upwards and to the sagital plane, covered by cerotegument; **r2 (1p)** dorsolateral, falciform, at terminal margin of notogaster, not very close to **ip**, smaller than **h1**, at the same level of **r3**, being smooth with cerotegument, not on apophysis; **h1** lateral, falciform, larger than **r3** - **r2,** a little below notogastral margin and **r2**, close to its homologous seta, crossing it at sagital plane, being smooth, with cerotegument, not on apophysis; **ps1** ventral, at the same level of **ps2** and **ps3**, small ventrally bent; ps2, ps3 ventral, close to **ps1**, also ventrally bent; **ps2** posterior to **r2, ps3** at the level of r2. Notogaster length: 536,2u (M), 563,7u (F); width: 536,2u (M), 576,2u (F); length/width= 0,99 (M), 1.00 (F). **Epimeral region - a, m** long, smooth without cerotegument; **a** proclinate; **m** pointing to its homologous, alveolus on gena; **h** long, thick, with secondary spines and adherent cerotegument. Labio-genal apodeme weackly sclerotized. Mentotectum narrow. Mentum without transversal bar; **apo** I complete, well developed and sclerotized, close to acetabulum, forming a straigth bar pointed backwards, being paralel to the sagital plane, ended by a hook; sternal portion of **apo** I less esclerotized with a transversal bar linking the homologous parts; **apo** II incomplete, forming trapezoid blades at a great distance from sagital plane, with no apodematic extensions between homologous parts; **apo sj** incomplete; **apo** III reduced and **apo** IV as an oblique bar, weakly sclerolized, undulate ventrally, both incomplete, without apodematic extensions linking homologous parts. Epimeral chaetotaxy 9: 7: 10: 7 (neotrichy); epimeral setae short, smooth; **ep** I first row setae proclinate, larger than the others and progressivelly larger antiaxially among them, the two first pairs on mentotectum. **Genito-anal region**- Genital and anal apertures contiguous touching one another; genital aperture ovate; anal aperture almost circular. Proximal margin of genitalia anterior to the level of coxae IV. Apertures length and width: genital 139,2u (M), 139,2u (F), 110,7u (M), 114,2u (F); anal 153,5u (M) 178,5u (F), 124,9u (M), 139,2u (F). Genital plate inner margins weakly sclerotized and narrow; anal plate inner margins well sclerotized and broad; no ornaments on plates; **apo ad, apo ag** absent; pre-anal organ well developed; anal plate with three carenae; **ian** pore close to one carena. Genitoanal chaetotaxy: 7 - 1 - 7 - 3; **g2, g3, g4, g5** linned on the same parallel plane to the sagital one and close to it; **g1** away from the sagital plane, long, reclinate; **g6** also set apart from the plane being the longest; **g7** in a median plane between the two others, being long

and proclinate. Anal setae in one longitudinal row, at the inner margin of anal plate; usually with seven pairs of anal setae, sometimes eight or even nine pairs; **ag** posterior to the genitalia, between the two apertures; **ad** setae not on tubercles; **ad3** to a level correspondent to the anterior third of anal aperture, very close to it; **ad2** away from the aperture; **ad1** latero-posterior, close to the aperture. **Lateral characters** - Tectopedia absent (tutorium, pedotecta I - II and discidium); pedotectal tooth **p** present, resembling a pedotectum I when seen from above, but without being auriculate as in a true pedotectum; pedotectal tooth **a** also present, soon after **le** alveolus, smaller than **p**, strongly proclinate and sharp tipped; oblique lateral carenae absent; **apo** sj absent; tegument and cotiloid of acetabula I - II forming a blunt structure. **Legs** - Ts-Tb, Tb-Ge, Ge-Fe articulations with proximal sockets, i. e, sockets on proximal ends of Ts, Tb and Ge. Femoral and trochanteral tracheae present and with visible stigmata. Ts I - II with dorso-distal apophyses; Ts I **famulus** free, long, club shaped. Tr and Fe-Tr articulation of legs outside acetabula. Proximal Fe orientation, after articulation with Tr, almost straight Tarsi ended by long and narrow pedicels, as long as half of the segments. Tridactylous, with thin claws the median one being the strongest. Ts I - **ft"** alveolus anterior and close to **ft'**, paraxial; **pl"** anterior to **p1'**; **pv"** anterior to **pv'**; **v'A, v"A, pv'** close together, at the same transversal plane; **(a)** a little ahead of **s**, on proximal half of segment; **(u), (tc), (it)** almost at the same transversal plane; **omega** I paraxial, larger than **omega** 2, blunt; **omega** 2 pointed; **famulus** salient, long, clavate, below and between solenidia; Ts length: 157,lu (M), 164,2u (F). **Tb. I l" (d)** anterior to **l'**; **v"** close, at the same level of **v'**; tibial apophysis long, covering all the extension of tarsus, being dorsal, inclined antiaxially; **fi** I extremelly long, antiaxial; **fi** 2 short, paraxial, originated posteriorly to **fi** I; Tb length: 114,2u (M), 125u (F). Ge I - **1" l', v'** at proximal half of the segment, almost at the same level; **d** lightly anterior to the other setae, antiaxial; **sigma** setaceous, slender, antiaxial, not very, close to **d**; Ge length: 70,2u (M), 71,4u (F). **Fe I - d** long; antiaxial, proximal, a little ahead of the stigmatic aperture; two **1'** of equal size, five **l"** the proximal smaller; Fe length: 214,2u (M), 250u (F). **Tr I** - only one seta, ventral; Tr length: 71,4u (M), 73,2u (F). **Ts II - ft"** anterior to **ft'**; **p1'** present, posterior to **pl"**; **(pv)** close together at the same level; **omega** I, **omega** 2 close together, paraxial, of equal size, **omega** I ahead of **omega** 2; Ts length: 153,5u (M), 160,6u (F). **Tb II - d** antiaxial, at the same level of **(l); (v)** together, posterior to **d** and **(l),** at the same transversal plane; **fi** close to **d**, antiaxial, long, at half of the segment; Tb length: 107,1u (M), 110, 8u (F). **Ge** II - **d** long antiaxial; **l'** anterior to **l"**; **v'** close to **l'**; **sigma** setaceous, slender, long, close to **d**; Ge length: 67,8u (M) (F): **Fe II** - as in Fe I; Fe length: 174,9u (M), 185,6u (F). **Tr II** - as in Tr I; Tr length: 71,4u (M), 73,2u (F). **Ts III - ft'** present, posterior to **ft'**, almost lateral; **pl', pl"** absent; **(pv)** posterior to the level of **ft"**; solenidia absent; Ts length: 178,5u (M), 200u (F). **Tb III - d** antiaxial, posterior to **l'**; **v"** anterior to **v'**; **fi** antiaxial, long, quite apart from **d**; Tb length: 142,8u (M) (F). **Ge III - d** long, antiaxial, close to proximal margin; **v', l'** close together; **sigma** long, antiaxial, away from **d**; Ge length: 64,3u (M), 68,8u (F). **Fe III - d** long; three **l'**, two anterior one posterior to **d**; one **v'**; Fe length: 167,8u (M), 189, 1u (F). Tr III - three **l'** one **v** antiaxial; Tr length: 110, 2u (M), 115,7u (F). Ts IV - **ft'** absent; **(it)** absent; **pl"** absent; **pv"** ahead of **pv'**; solenidia absent; Ts length: 196,9u (M), 203,5u (F). **Tb IV** - as in Tb III; length: 217,8u (M), 224,9u (F). **Ge IV** - as in Ge III; Ge length: 821u (M), 103u (F). **Fe IV - d** long; one **l'** three **v**; Fe length: 199,8u (M), 214,2u (F). **Tr IV** - three **l'**; with a long dorsal crest; Tr length: 232u (M), 250u (F). **Leg chaetotaxy** - Ts: 19 (2) - 17 (2) - 15 -12; Tb: 4(2) - 5 (1) - 4(1) - 4(1) - Ge: 4(1) - 4(1) - 3 (1) - 3 ; Fe: 8 - 8 - 5 - 5; Tr: 1 - 1 - 4 - 3.

Geographical distribution and habitat - Mato Grosso, Brazil, under bark (Berlese, 1888; Michael, 1898). Piracicaba. Águas de São Pedro, Botucatu, São Manuel, Presidente Venceslau (State of São Paulo), Brazil, in tropical rain forest litter (New references).

Figure 1 - **Plateremaeus ornatissimus** (Berlese). Male, dorsal, Águas de São Pedro, SP, Scale = 200u.

Discussion - The species holotype, deposited at the Berlese Collection in Florence, was studied by Prof. Donald E. Johnston, The Ohio State University, who produced a statement of the type general conditions, a brief description and a detailed drawing of the female. In 1978, during his stay in Brazil, at the author's laboratory, Johnston collected specimens from litter identical to Berlese's type seen at the Collection. Later on, I found the same specimens in litter from several samples in a survey in the State of São Paulo, one being very close to the border with Mato Grosso. By comparing the specimens with Berlese's and Johnston's descriptions and drawings it became evident that we had finally found **P. ornatissimus**, so the revision of the Plateremaeidae would be possible. Berlese's description is exaggerateby poor in details; he only mentions the following features: color dark brown; sensillum long, filiform; **in** large; "abdomem" discoidal, concave with elevated margins; presence of a horned structure between legs I - II; legs with broad margins; length 1000u, width 550u.

GENUS Allodamaeus BANKS

Allodamaeus Banks,1947: 118; Bulanova-Zackvatkina, 1957: 14; Higgins & Mulaik, 1958: 132; Balogh, 1961: 267; 1965: 24; 1972: 58; Aoki & Fujikawa 1971: 113; Paschoal, 1975: 278; Paschoal & Johnston, 1982**a**: 456.
Type species: Allodamaeus ewingi Banks, 1947.

Allodamaeus was proposed as a new genus by Banks (1947), for a new species, **A. ewingi**, collected from litter in North Carolina, U.S.A.; he considered it close to **Gymnodamaeus** but in Oribatidae. Baker & Wharton (1952) referred **Allodamaeus** in Beldidae. Grandjean (1954) erected **Arthrodamaeus**, a new genus of Gymnodamaeidae which later on, in 1957, was placed into synonymy with **Allodamaeus**, in Damaeidae, by Bulanova-Zachvatkina (1957). Higgins & Mulaik (1958) redescribed and detailed **A. ewingi** with illustrations. Balogh (1961) considered **Arthrodamaeus** a new synonym of **Allodamaeus** in the spite of the fact that it was formerly synonymized by Bulanova-Zachvatkina; **Allodamaeus** was placed by him in Plateremaeidae (= Gymnodamaeidae). Csiszár & Jeleva (1962) reported that Gymnodamaeidae should be considered a valid family apart from Plateremaeidae. Balogh & Csiszár (1963) described **Allodamaeus ornatus** a new species from Argentina; the genus was placed in Gymnodamaeidae a procedure which was also followed by Balogh (1965) and Balogh (1972). Rafalski (1966) transferred **Arthrodamaeus pusillus** (Berlese) and **Arthrodamaeus parvulus** Kunst to **Allodamaeus**. Bulanova-Zachvatkina (1967) transferred **Arthrodamaeus femoratus** (Koch) and **Arthrodamaeus hispanicus** (Grandjean) to **Allodamaeus**. Balogh & Mahunka (1969) described **Allodamaeus trisetosus**, a new species from Bolivia and transferred to **Allodamaeus** the species **Gymnodamaeus elegantulus** (Hammer). Perez-Iñigo (1969) redescribed **A. reticulatus** and **A. hispanicus** in **Allodamaeus**. Aoki & Fujikawa (1971) described **Allodamaeus apressus** from Japan and proposed the new name **Allodamaeus tuberculatus** for **A. ornatus** Balogh & Csiszár (pré-occupied name); they also provided a key for **Allodamaeus**. Paschoal (1975), Paschoal & Johnston (1982**a**, 1982**b**) in reviewing the Gymnodamaeidae excluded **Allodamaeus** from this family and placed it provisionally in Plateremaeidae; the synonymy of **Arthrodamaeus with Allodamaeus** was shown to be erroneous. Paschoal (1984**a**) transferred back to **Arthrodamaeus: A. reticulatus, A. hispanicus, A. femoratus** and **A. parvulus,** and considered **A. pusillus** a "species inquirendum". Paschoal (1984**b**) transferred **A. elegantutus** to **Idiodamaeus** Paschoal.

A complete survey of the literature was presented in a former paper by Paschoal (1984**d**).

Diagnosis - Allodamaeus is close to **Calipteremaeus** Paschoal n. gen. (Paschoal, 1984**d**) from which it differs mainly by the following characteristics: smooth cuticle on notogaster, genitoanal and epimeral regions; sensillum clavate; **h1, r2 (1p)** terminal, smooth, at notogastral margin; with no apodematic bonds on epimeral region; epimeral chaetotaxy: 10: 8(7): 11:6; genital and anal apertures contiguous, parcially joint together and with no ornaments; six pairs of anal setae.

Description - Body and legs covered by thick cerotegument, forming an irregular to polygonal reticulum, without microtubercles; notogastral, epimeral, genitoanal region and legs covered by a smooth cuticle forming no foveae; prodorsal cutiole smooth or foveate. Lamelar and central apodemata absent; **apo ex, apo in** present or not; **apo bo** forming a complete bar. **le** dorso-lateral, very close to **ro**, lightly anterior to it and not on apophysis; **ex** below and anterior to bothridium; **in** short, thick, not on tubercle; sensillum clavate, moderately expanded distally. **ps3** at the same level of **r3 (1m); ps2** at the same level of **r2 (1p); ps1** anterior to **h1;h1** close to its homologous seta, crossing each other at the sagital plane; **r3** dorsal, away from notogastral margin, between **in** and **ip**, closer to **ip** than to **im**. Notogaster circular. Epimeral apodemata without apodematic extensions (except **apo** I); epimeral chaetotaxy 10: 8(7): 11:6 (= 35 or 34 setae). Genital and anal apertures contiguous, parcially joint, almost circular; genitalia proximal margin anterior to coxae IV; genital and anal apertures with no ornaments; genitoanal chaetotaxy 7 - 1 - 6 - 3; **g2** and **g3** or **g2, g3, g5, g6** close to inner margin of genitalia; anal plate with six pairs of setae. Pedotectal tooth **a** absent; lateral carenae present on prodorsum. Famulus enclosed on Ts I; **v"** anterior to **v'** on Tb I; **omega** 1 larger than **omega** 2 on Ts II; **fi** Tb II short, close to **d**, away from distal margin; **sigma** Ge II away from **d; pl"** present on Ts III-IV; **d** Tb III at the same level of **1'; fi** Tb III close to **d**; **sigma** Ge III not far way from **d**. Leg chaetotaxy: Ts 19(2) - 17(2) - 16 - 13; Tb 4(2) - 5(1) - 4(1) - 4(1); Ge. 4(1) - 4(1) - 3(1) - 3; Fe. 8 - 8 - 5 -; Tr. 1 - 1 - 4 - 3.

Allodamaeus ewingi Banks
(Figure 2)

Allodamaeus ewingi Banks, 1947:119; Higgins & Mulaik, 1958:
131; Paschoal, 1975: 282; Paschoal & Johnston, 1982**a**:
456.

Types - Male holotype, at the Museum of Comparative Zoology, Harvard University (Arachnida Nº 3014) and male and female paratypes at the Acarology Laboratory, Ohio State University (Type Nº 3014), from forest litter, Duke University, Durhan, North Carolina, U.S.A., collected by A.S. Pearse, in March-April 1947.

Diagnosis - A. ewingi is close to **Allodamaeus coralgablensis** Paschoal n. sp., from which it differs mainly by the following characteristics: reticula absent on anterior prodorsum and lateral hysterosoma; **apo ro** reduced; **apo bo** with no pliers shaped structure; **le** dorso-lateral, behind and close to **ro; ro** not on apophysis; **r2 (1p)** present; epimeral chaetotaxy 10: 8: 11: 6; epimere I last seta of the first row as high as two thirds the length of infracapitulum; **g2, g3, g4, g6** close to inner margin of genitalia; **g1, g5, g7** away from it; **ad2** further away from the sagital plane than **ad1, ad3; pv"** Ts I at the same level of **pv'; v', v"** at the same level on Tb III.

Description - Tegument - Cuticle granulose, covered by abundant cerotegument, with no microtubercles, covering all body and legs; leg cerotegument as high as the width of the segments. Reticula absent on anterior prodorsum and lateral hysterosoma; polygonal network of cerotegument all over dorsal body. Exuviae absent on adults and present on imatures. **Prodorsum - apo le** absent; **apo ro** reduced; **apo ex, apo c** and **apo in** absent; **apo bo** as a complete well sclerotized bar forming no pliers shaped structure **le** dorso-lateral lightly behind **ro; ro** lateral; **le, ro** large, smooth, turned to the sagital plane, **le** tip touching its homologous seta; **ro** well projected beyond the tip of its homologous seta; **ro, le** not on apophyses; **ex** minute, smooth, not on tubercle, lightly behind and ahead of bothridium. **in** smooth, short, thick, projected upward, between bothridia, not on tubercle. Bothridium dorsal, salient, projected upward, leaned against notogaster; distance between bothridia: 152,3u (M), 154.1u (F); **ss** of median size, reclinate, pilose distally, forming a small head; **ss** length: 185.7u (M,F). Prodorsum length: 231,3u (M), 238,8u (F). **Notogaster** - Dorsum flat; notogaster circular; notogastral tectum between lines **bng** and **lambda**. Five pairs of small lyrifissures; **ia, im, ip** almost paralel to notogastral margin; **ih, ips** ventral, close together and to **lambda**. Latero abdominal gland short, its opening posterior to **im**. Six pairs of notogastral setae; **r3 (1m)** not on tubercle, of median size, smooth, projected upward and forward, dorsal, away from notogastral margin, between **im** and **ip**, closer to **ip** than to **im; r2 (1p)** short, smooth, not on apophysis, bent to the sagital plane, dorso-lateral, well at notogastral margin; **h1** short, not on apophysis, smaller than **r3**, smooth, lateral, well at notogastral margin, crossing its homologous seta at sagital plane; **ps** setae ventral, not on apophysis; **ps1** further away from its homologous seta than **h1; ps2, ps3** close together; **ps2** to the level of **r2, ps3** anterior to it. Notogaster length: 455,2u (M), 462,6u (F); width: 466.4u (M,F); length/width: 0,98 (M), 0.99 (F). **Epimeral region** - Setae **a, m, h** long, bent, spiny, **a** away from **m**. Labio-genal apodeme well sclerotized; mentotectum broad; mentum with no transversal bar; **apo** I complete, well developed at coxal portion, forming a straight bar parallel to the sagital plane, ended by a hook, and weakly developed at sternal portion forming a transversal bar, both portion being joint in a triangular shaped chitinous structure; **apo** II incomplete, forming well sclerotized trapezoidal blades and with no apodematic bonds between homologous apodemata; epimeral furrow II not delimited; **apo sj** incomplete, triangular; posterior margin of sejugal furrow weakly sclerotized; **apo** III-IV incomplete, furrows not delimited. Epimeral chaetotaxy 10: 8: 11: 6 (neotrichy); epimeral setae short, smooth; **ep. I** first row setae close to **apo** I, bent forward, larger than the others, progressively bigger antiaxially, the last one being as high as two thirds the length of infracapitulum. **Genitoanal region** - Genital and anal apertures contiguous, partially joint, the contours still well delimited, almost circular; proximal margin of genitalia anterior to coxae IV; genitalia length: 111.9u (M,F), width: 100.7u (M), 99u (F); anal aperture length: 138,u (M), 104.5u (F). Inner margins of genitalia weakly sclerotized, narrow, and inner margin of anal plate well sclerotized, both with no ornaments; **apo ad, apo ag** absent. Genitoanal chaetotaxy 7 - 1 - 6 - 3; **g2, g3, g4, g6** aligned, close to inner margin of genitalia; **g1, g5, g7** away from the inner margin; anal setae aligned, close to inner margin of anal plate; **ag** posterior to genitalia, between both apertures; **ad** setae not on tubercles; **ad3** at a level equivalent to the proximal half of anal plate; **ad2** further away from sagital plane than the others; **ad1** lateral to the plate. **Lateral features** - Tutorium, pedotecta I - II and discidium absent; with a pedotectal tooth **p,** resembling a pedotectum I when seen from above, being not auriculiform however; lateral carenae present; **apo sj** absent; tegument and cotylo d of acetabula I - II forming a blunt structure. **Legs** - Ts - Tb, Tb - Ge, Ge - Fe articulations with proximal sockets, i. e., sockets at proximal ends of tarsi, tibiae and gennua. Femoral and trochanteral tracheae present. Dorso-distal apophises of Ts I-II with enclosed famuli. Tochanter and Fé Tr articulation of all legs outside acetabula; proximal femora straight; tarsi ended by long and narrow pedicels, not as long as half the segments; tridactylous, with small claws, the medial one stronger than the laterals. **Ts. I ft"**

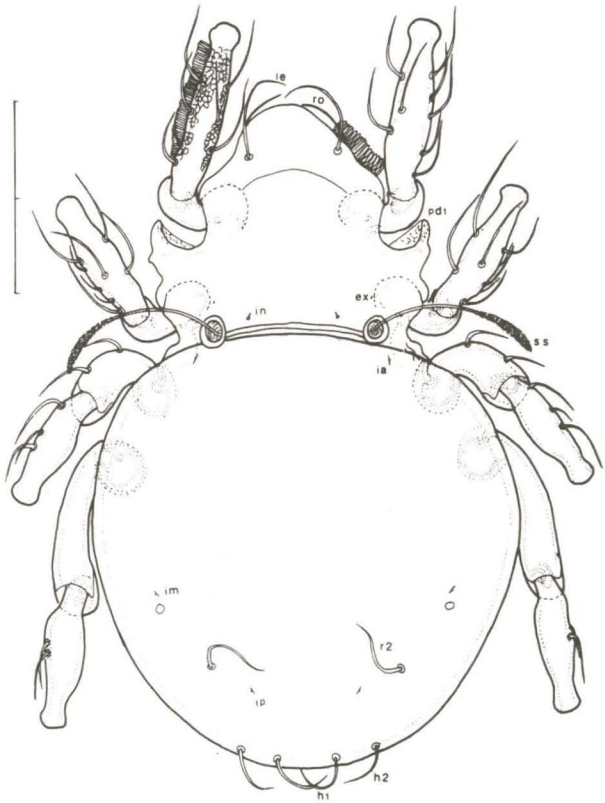

Figure 2. **Allodamaeus ewingi** Banks. Male holotype, dorsal, Durhan, North Carolina, U.S.A, Scale = 100u.

paraxial, close to **ft'**, anterior to it; **p1'** posterior to **p1"**; **pv"** almost at the same level of **pv'**; **(vA)** close together at the same transversal level; **(a)** at proximal half of the segment, close to **s; omega** 1 paraxial, larger than **omega** 2; famulus enclosed; **Tb. I** - tibial apophysis dorsal, antiaxial, covering almost all tarsus; **fi** 1 very long, antiaxial; **fi** 2 short, paraxial; **v"** at the same level of **v'**; **1" (d)** anterior to **1'**; Tb length 119.u (M,F). **Ge I - 1', 1", v'** at proximal half of the segment, at the same transversal plane; **d** anterior, antiaxial, long; **sigma** bristly, antiaxial, not very close to **d; Ge** length 56u (M,F). **Fe I - d** long, antiaxial; two **l'** of equal size, five **l"** the proximal length 186.6u (M.F). **Tr I** - only one seta, ventral; Tr length - 57u (M,F). **Ts II - ft', pl'** away from proximal margin, posterior and close to **ft", pl"**, respectivelly; **(pv)** close together, at the same level; **omega** 1 to the side of **omega** 2, paraxial, a little larger and anterior to **omega 2;** Ts length 100.7u (M,F). **Tb II - d** long, antiaxial, almost at the same level of **l', l"; (v)**, a little behind **l', l"**; **fi** close to **d**, antiaxial, short; Tb length 82.1u (M,F). **Ge II - d** long, antiaxial; **l', l", v'** at the same transversal plane, close to proximal margin;**sigma** as in **Ge I;** Ge length 54u (M,F). **Fe II - d** long, antiaxial; **l', l"** as in **Fe I;** Fe length 156.7u (M,F). Tr II - as in Tr. I; Tr length 57u (M,F). **Ts III - ft'** present, posterior and close to **ft"; ft"** at proximal portion of the segment; **pl"** present, posterior to **ft"; (pv)** posterior to **ft"**; solenidium absent. **Tb III - d** antiaxial, at the same level of **l'; w', v"** at the same transversal plane; **fi** antiaxial, close to **d. Ge III - d** long, antiaxial, close to proximal margin; **v'** posterior to **l'; sigma** antiaxial, close to **d. Fe III - d** long; three **l'**, two anterior one posterior to **d; v** close to **l'. Tr III** - three **l'** one **v** antiaxial. **Ts IV - ft', (it), pl'** absent; **pl"** close to proximal margin; **pv', pv"** at the same level; solenidia absent. **Tb IV - v"** lightly anterior to **v'**; other setae as in Tb III. **Ge IV** - setae as in Ge III; solenidium absent. **Fe IV - d** long; **l'** three **v. Tr IV** - three **l'**. Leg chaetotaxy - Ts. 19(2) - 17(2) - 16 - 13; Tb. 4(2) - 5(1) - 4(1) - 4(1); Ge. 4(1) - 4(1) - 3(1) - 3; Fe. 8 - 8 - 5 - 5; Tr. 1 - 1 - 4 - 3.

Geographical distribution and habitat - Durhan, North Carolina, U.S.A., from forest litter.

Discussion - Since its publication, **A. ewingi** was redescribed twice: firstly by Higgins & Mulaik (1958) and secondly by Paschoal (1975). The first redescription, based on topotypes, added only a few characters and some drawings to the original description. A more precise redescription, based on the holotype and paratypes, including drawings, was provided by. Paschoal (1975) in a Ph.D. dissertation. Paschoal's unpublished description could be enlarged now, with several new characters, due to the discovery of another species of **Allodamaeus** from Florida.

Allodamaeus coralgablensis
(Figure 3)

Types - Female holotype Nº 15-II-74-2, at the Acarology Laboratory, Ohio State University, in pine litter from Coral Gable, Florida, U.S.A, collected by Donald E. Johnston in February 15, 1974; Five paratypes, as above, deposited at the Acarology Laboratory, U.S.A, and at the Department of Zoology, E.S.A. "Luiz de Queiroz", Piracicaba, Brazil; One female Nº 11-XII-65, at the Canada National Collection, Ottawa, Canada, from Jussanhop, Highlands Hammack State Park, Florida, in April 4, 1964.

Diagnosis - **A. coralgablensis** is close to **A. ewingi** from which it diferrs mainly by the following characteristics: reticula present on anterior prodorsum and lateral hysterosoma; **apo ro** strong; **apo bo** with pliers shaped structures; **le** lateral, lightly anterior to **ro; ro** on small apophysis; **r2** absent; epimeral chaetotaxy 10: 7: 11: 6;

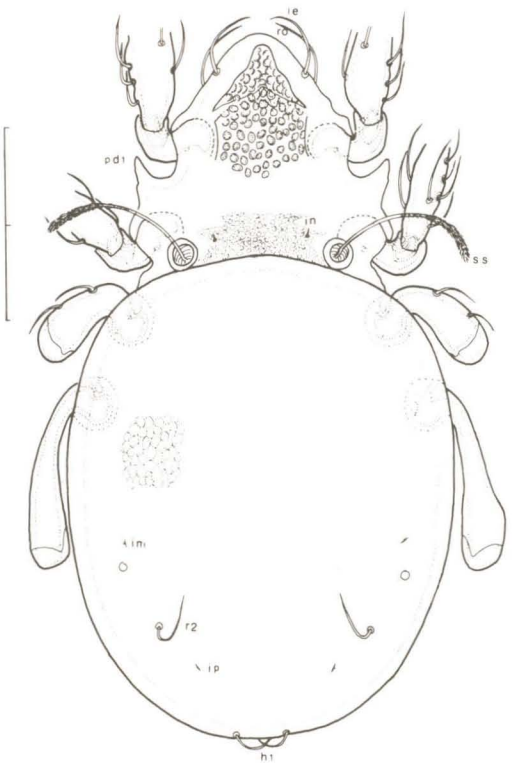

Figure 3.**Allodamaeus coralgablensis**, sp., n. Female holotype, dorsal. Coral Gables, Florida, U.S.A. . Scale = 100u.

epimere I last seta of the first row as high as half the length of infracapitulum; genital setae in a different arrangement; **ad3** further away from the sagital plane than **ad2, ad1**; **pv"** anterior to **pv'** on Ts I; **v"** anterior to **v'** on Tb I - III.

Description - Tegument - Cuticle granular, with abundant cerotegument forming no microtubercles, covering all body and legs; leg cerotegument as high as the width of the segment. Polygonal reticula on anterior prodorsum, lateral hysterosoma, dorsal notogaster, apodemata I - II and mentum. Exuviae absent on adults. **Prodorsum - apo le** absent; **apo ro** strong, not very close to **ro** setae bases; **apo c, apo ex** absent; **apo bo** as a complete, well sclerotized bar forming two pliers shaped structures pointed to **in. le, ro** lateral, close together, **ro** lightly behind **le,** both large, smooth, bent to the sagital plane, tip touching their homologous setae only; **ro** on small apophisis; **ex** minute, smooth, lightly below and ahead of bothridium; **in** smooth, thick, short, straight, projected upward, not on tubercle, between bothridia. Bothridium dorsal, salient, projected upward, leaned against notogaster; distance between bothridia 137u (M,F); **ss** of median size, reclinate, pilose distally forming a small head; **ss** length 214u (M), 196.4u (F). Prodorsum length: 213.1u (M), 233.7u (F); width: 261.2u(M), 288.7u(F). **Notogaster** - Dorsum, flat; rounded notogaster; notogastral tectum between **bng** and **lambda**. Five pairs of small lyrifissures; **ia, im, ip** almost paralel to notogastral margin; **ih, ips** ventral, close together and to **lambda**. Latero-abdominal gland short, opening posteriorly to **im**. Five pairs of notogastral setae; **r3** not on tubercle, of median size, smooth, directed upward and forward, away from notogastral margin, between **im, ip,** closer to **ip** than to **im; r2** absent; **hi** short, smooth, lateral, well at notogastral margin, bent to the sagital plane, crossing its tip with the homologous seta; **ps** setae ventral, bent ventrally, progressivelly shorter from **ps1** to **ps3**, on small apophyses; **ps1** lightly distant from its homologous seta than **h1; ps2, ps3** close together; **ps2** posterior and **ps3** anterior to **ip**. Notogaster length: 453.7u (M), 508.7u (F); width: 416,2u (M), 426.2u (F); length/width: 1.10(M), 1.19(F). **Epimeral region - a, m, h** long, curved, bristly, away from **m.** Labio - genal apodeme well sclerotized; mentotectum broad; mentum with no transversal bar. Apodemata I through IV as in the type species. Epimeral chaetotaxy 10: 7: 11: 6 (neotrichy); epimeral setae short, smooth; **ep.I** first row setae close to **apo** I, bent forward, larger than the others, progressivelly bigger antiaxially, the last one as high as half the length of infracapitulum. **Genitoanal region** - Genital and anal apertures contiguous, **paracially** joint, the outlines well delimited still, almost circular; proximal margin of **genitalia** anterior to coxae IV; **genitalia** length 114.2u (M), 142.8u (F); width 107.1u (M), 110.7u (F); anal aperture length 132,1u (M), 149,9u (F); width: 121.4u (M,F) Inner margin of **genitalia** weakly sclerotized, narrow and inner margin of anal plate well sclerotized, narrow, both plates without ornaments; **apo ad, apo ag** absent. Genitoanal chaetotaxy 7 - 1 - 6 - 3; **g1, g5, g6** aligned, medianly set on the plate; **g4** isolated from the others, close to outer margin; **g2, g3, g7** closer to the sagital plane, **g2, g3** being the closest and aligned; **g3, g4** almost at the same transversal level; anal setae on only one longitudinal row, on inner margin; **ag** posterior to genitalia, between both apertures; **ad** setae not on tubercles; **ad3**, at a level equivalent to the middle of the anal plate, being the farthest from the sagital plane; **ad2, ad1** closer to this plane: **ad1** lateral to the anal aperture. Ovipositor long; four setae on both lobes; **tau** I larger than the others; **tau a, tau b, tau c** different transversal planes; **psi** I longer than **psi** 2; **k** of the same size. Male genital organ with six pairs of equal sized setae; **P** long and well sclerotized; pre-anal organ well developed; anal plate with a longitudinal carena close to the anal setae and two carenae antiaxial, forming an arc close to the anterior and posterior margin; **iam** pore close or on this carena of the anterior margin. **Lateral characters** - Tectopedia absent (tutorium, pedotecta I - II, discidium); other characters as described for the type species. **Legs** - Ts - Tb, Tb - Ge, Ge - Fe articulations with proximal sockets, i. e., sockets on proximal ends of tarsi, tibiae and gennua. Femoral and trochanteral tracheae present. Dorso-distal apophises of Ts I - II with enclosed famuli.

Trochanter and Fe - Tr articulation of all legs outside acetabula; proximal femora straight; tarsi ended by long and narrow pedicels, not as long as half the segments; tridactylous, with small claws, the medial one being the strongest. **Ts I - ft"** anterior and close to **ft', paraxial; pl"** anterior to **pl', pv"; anterior to pv'; v'A, v"A, pv'** close together, at the same transversal plane; **(a)** lightly anterior to **s,** on proximal half of the segment; all other tactile setae invariable; **omega** I paraxial, larger than **omega** 2; enclosed famulus in a duct; Ts length 114.2u(M), 117.8u (F). **Tb I - l" (d)** anterior to **1'; v"** very close and anterior to **v';** tibial apophysis well developed, covering almost all tarsus, dorsal, antiaxial; **fi** 1 ex tremeli long, antiaxial; **fi** 2 short, paraxial. Tb length 121.4u (M), 128.5u (F). **Ge I - 1", 1', v'** on proximal half of the segment, almost at the same transversal plane; **d** a bit anterior, antiaxial; **sigma** bristly, narrow, antiaxial, not very close to **d**Ge length 60.7u (M), 64.3u (F); **Fe I - d** long, antiaxial; two **1'** of equal size, five **1"** the proximal smaller; Fe length 189.2u (M), 200u (F). **Tr I** - only one seta, ventral; Tr length 53.5u (M), 57u (F). **Ts II - ft"** anterior to **ft'; p1'** posterior to **pl"; (pv)** close together and at the same level; **omega** I paraxial, close, lightly anterior and larger than omega 2; Ts length 110.7u (M), 114.2u (F). **Tb II - d** antiaxial, almost at the same level of **l', l"; (v)** lightly behind these setae and at the same transversal plane; **fi** close to **d,** short, away from distal margin; Tb length 78.5u (M), 89.2u (F). **Ge II - d** long, antiaxial; **l', l"** at the same level, close to proximal margin; **v'** close to l'; **sigma** bristly, narrow, antiaxial, away from **d**; Ge length 50u (M), 57.1u(F). **Fe II - d** long, antiaxial; **l', l"** as in Fe I; Fe length 153.5u (M), 167.8u (F). **Tr. II** - one seta, ventral, Tr length 50u (M), 53. 6u (F). **Legs III - IV segments** as in the type species except **v"** of Tb III which is anterior to **v'.** Measurements (lengths) - **Ts III** 121.4u (M), 139.2u (F); **Tb III** 96.4u (M), 98.5u (F); **Ge III** 46.4u (M), 55u (F); **Fe III** 124.9u (M), 124.9u (F); **Tr III** 107u (M), 114.2u (F): **Ts IV** 139.2u (M), 142.8u (F); **Tb IV** 135.7u (M), 146.4u (F); **Ge IV** 57u (M), 64.3u (F); **Fe IV** 125u (M), 153u (F); **Tr IV** 160.6u (M), 196.3u (F). **Leg chaetotaxy** - Ts: 19(2) - 17(2) - 16 - 13; Tb: 4(2) - 5(1) - 4(1) - 4(1); Ge: 4(1) - 4(1) - 3(1) - 3. Fe: 8 - 8 - 5 - 5; Tr: 1 - 1 - 4 - 3.

Geographical distribution and habitat - Coral Gables, Florida, U.S.A., in pine litter; Jussanhop, Florida, U.S.A., Highlands Hammack State Park, unknown substrate.

NOTES ON Allodamaeus

1 - Due to the synonymy of **Arthrodamaeus** with **Allodamaeus,** shown to be erroneous by Paschoal (1975) and Paschoal & Johnston (1984**a**, 1984**b**) the following described species were transferred back to **Arthrodamaeus** by Paschoal (1984**a**): **A. reticulatus** (Berlese), **A. hispanicus** (Grandjean), **A. femoratus** (Koch) and **A. parvulus** (Kunst). **A. pusillus** (Berlese) was considered "species inquirendum".

2 - NEW COMBINATIONS

Idiodamaeus trisetosus (Balogh & Mahunka) n. comb.

Allodamaeus trisetosus Balogh & Mahunka, 1969: 259 fig. 5.

Geographical distribution and habitat - Guayaramerin, Bolívia, Habitat not mentioned (Balogh & Mahunka, 1969).

Discussion - **I trisetosus** is very close to **I. illecebrosus** Paschoal, Brazil, and from **I. elegantulus** (Hammer), Argentina, from which it differs mainly by the larger setae **hl** and **ps** and by having longitudinal apodemata laterally on notogaster. References on **Idiodamaeus** Paschoal are found in Paschoal (1975), Paschoal & Johnston (1984**a**, 1984**b**) and Paschoal (1984**b**)

Gymnodamaeus adpressus (Aoki & Fujikawa) n. comb.

Allodamaeus adpressus Aoki & Fujikawa 1971:115, fig. 1 - 5

Geographical distribution and habitat - Kita - Hiyama, Hokkaido, Japan, in forest litter of Hiba Arbor-vita. (Aoki & Fujikawa, 1971).

Discussion - With the exception of **A. exingi**, of the genus **Allodamaeus, G. adpressus** and **G. ornatus**, of the genus **Gymnodamaeus**, and **A. ornatus (= A. tuberculatus)** "incertae sedis", all other species cited and keyed out by Aoki & Fujikawa (1971) actually belong to **Arthrodamaeus**. **G. adpressus** differs from the other **Gymnodamaeus** species mainly by the large development and curvature of **r2** and **hl**. The species presents in reality five pairs of notogastral setae (**ps1, ps2, ps3** small) and not two as mentioned by its authors (See Paschoal, 1984**a**)

Allodamaeus ornatus Balogh & Csiszár

Allodamaeus ornatus Balogh & Csiszár, 1963: 471, fig 11-12
Allodamaeus tuberculatus Aoki & Fujikawa, 1971: 113 nom nov ; NEW SYNONYM

Geographical distribution and habitat - Rio Negro, El Bolsón, Monte Piltriquitron, Argentina, in forest litter of **Libocedrus - Lomatia** (Balogh & Csiszár, 1963)

Discussion - By presenting a well developed pedotectum I; notogaster flat, four pairs of posterior notogastral setae only; two pairs of anal setae; and absence of exuviae on adults, this species must be in Gymnodamaeidae. **h1** and **ps** setae positions remind **Jacotella** Banks; the lesser number of genital setae (six pairs?) reminds **Joshuella** Wallwork; the sensillum shape reminds **Idiodamaeus** Paschoal. The incomplete description of this species do not allow, however, to precise its toxonomic position in any of these genera It may be reasonable to think of it as a new genus

Aoki & Fujikawa (1971) considered **Allodamaeus ornatus** Balogh & Csiszár, 1963 a homonym of **Gymnodamaeus ornatus** Hammer, 1952 after having transferred it to **Allodamaeus;** The new name **Allodamaeus tuberculatus** Aoki & Fujikawa, 1971 was, then, proposed for **A. ornatus** Balogh & Csiszár. However, Paschoal (1975, 1984**c**) redescribed **Gymnodamaeus ornatus** Hammer as a true **Gymnodamaeus**. That being so the species **A. ornatus** Balogh & Csiszár is a valid one, being now placed in "incertae sedis" until further studies. **A. tuberculatus** Aok & Fujikawa is, in consequence, an objective synonym of **A. ornatus** Balogh & Csiszár.

Genus Lopheremaeus gen n

Type species: Plateremaeus mirabilis Csiszár, 1962
(in Csiszár & Jeleva, 1962)

Diagnosis -- **Lopheremaeus** is close to **Paralopheremaeus** Paschoal new genus, from which it differs mainly by the following characteristics: absence of prodorsal apodemata or, conversely, apodemata poorly esclerotized; sensilum cylindrical, long, bearing very short spines at distal end; rounded notogaster; **h1** well apart from its homologous seta; smaller species, less than 650u; epimeral apodemata with weak apodematic bonds of irregular margins due to integument foveae; epimeral chaetotaxy 8 : 7 : 12 : 4 (?); genital and anal apertures set apart one from the other; with four pairs of anal setae and seven pairs of genital setae

Description -- Body and leg integument foveate dorsally and ventrally Prodorsal apodemata absent or poorly sclerotized, almost invisible **le** seta ventral, almost at the same level of **ro; ex** long; sensillum cylindrical, long, straight, bearing very short spines at distal end. **h1** seta quite apart from its homologous, the tips only crossing each other at the sagital plane; **r3 (1m)** dorsal, away from notogastral margin. Notogaster circular. Epimeral chaetotaxy 8 : 7: 12: 4(?) Genital and anal apertures apart one from the other and almost circular; apertures ornated with cuticular thickenings and foveae. Genitoanal chaetotaxy: 7 - 1 - 4 - 3; **g1, g3, g4** and **g6** setae close to inner margin of **genitalia;** anal plate with four pairs of setae. Femora with well developed crests dorsally and ventrally

Terminology -- **Lopheremaeus** (gr **lophus + eremaeus)** means an **"eremaeus"** with crests, referring to the laminated excrescences of femora The genus is masculine in gender

Lopheremaeus mirabilis (Csiszár) n comb

Plateremaeus mirabilis (Csiszár, 1962 (in Csiszár & Jeleva, 1962) : 283, fig 1 - 3.

Types --- Holotype (J. Csiszár) collected in Karlovokalofer; Bulgaria, from litter under bush, 900 meters high, in June 1956; One paratype collected in Varna, Bulgaria, from manure-straw mixture at a beach, in September 1956 Depository: Hungarian Natural History Museum, Budapest, Hungary

Diagnosis --- **L. mirabilis, according to Csiszár, in Csiszár & Jeleva (1962), is close to L. laminipes** (Berlese) n comb. by presenting four pairs of anal setae, epimeral neotrichy and crests on dorsal and ventral femur It differs from **L laminipes** by presenting a light cerotegument, without heavy black punctation and by notogastral sculpture

Description (Based on the brief description and drawings presented by Csiszár, in Csiszár & Jeleva, 1962) --Body length: 530u; width: 312u. Prodorsum, notogaster, epimeral region, genitoanal region (including plates) and legs intensivelly foveate, notogastral foveae large and close to each other, being semicircular or irregular at the margins; prodorsum and foveae oval and of a lesser diameter; ventral foveae semicircular to irregular. **Prodorsal apodemata** absent or poorly esclerotized. **le** seta almost at the same level of **ro**, being lateral; **ex** long, proclinate; **in** minute; sensillum long, straight, bending backward and to the outside, being cylindrical and smooth proximally, bearing very short spines distally. Notogaster rounded and flat;

r3 (1m) large, bent to the sagital plane, dorsal and away from notogastral margin; **r2 (1p)** lateral, at notogastral margin, equally long, bent to the sagital plane **h1** set apart from its homologous seta, the distal tips only crossing each other at sagital plane; **ps** setae probably at normal position. Epimeral apodemata weakly sclerotized and with irregular margins due to foveae; epimeral chaetotaxy 8 : 7 : 12: 4(?); epimere I first row setae bent forward, of larger size than the others and progressivelly bigger antiaxially. Genitoanal chaetotaxy formula : 7 - 1 - 4 - 3; genital setae on two longitudinal rows; **g1, g3, g4, g6** close to the inner margin of genital plate; **g2, g5, g7** forming a second row close to the outer margin of plate; **ag** seta posterior to the genital plate. Genital and anal plates aproximatelly rounded, distant from one another by less than the length of genital plate; anal setae on just one longitudinal row. Leg articulations on proximal sockets; tarsi ending by long and narrow pedicels, tridactylous, the lateral claws being extremelly thin; tibia I distal apophysis long, covering almost all of tarsus length; femora with well developed dorsal and ventral crests.

Geographical distribution and habitat –Karlovo-Karlofer and Varna, Bulgaria, in litter under bush and in a mixture of manure-straw in a beach.

Lopheremaeus laminipes (Berlese), n. comb.

Plateremaeus laminipes Berlese, 1916 : 64; Csiszár & Jeleva, 1962: 281

Types ---Some specimens (Sintypes) collected from mosses in Vallombrosa, Italy, probably at the Berlese Collection in Florence, Italy.

Diagnosis --**L. laminipes**, according to Csiszár, in Csiszár & Jeleva (1962), is close to **L. mirabilis** (Csiszár) n. comb., Bulgaria, by having four pairs of anal setae; epimeral neotrichy; femoral crests dorsally and ventrally; and by its size around 600u. It differs from this species by presenting a heavy black dotted cerotegument and by the notogastral sculpture forming black, polygonal reticulous.

Geografical distribution and habitat --- Vallombrosa, Italy, from mosses.

Discussion --Berlese's (1916) description of **L. laminipes** is extremelly short, with no important details and with no illustration. The presence of femoral crests, epimeral neotrichy, the anal plate with four pairs of setae (these two last features needing to be checked, however, by examining the types) and its great similarity to **L. mirabilis,** as stated by Csiszár, are enough to include it in the new genus **Lopheremaeus.**

Genus Paralopheremaeus gen. n.

Type species: Plateremaeus legendrei Balogh, 1962

Diagnosis ---**Paralopheremaeus** is close to **Lopheremaeus** Paschoal n. gen., from which it differs mainly by the following characteristics : prodorsal apodemata present, except **apo le;** sensillum flagellate, smooth, bent distally; notogaster ovate; **h1** close to its homologous seta; larger species; epimeral apodemata without apodematic bonds; epimeral chaetotaxy 8 : 7 : 10 : 4(?): genital and anal apertures contiguous; six pairs of anal setae and 7(6) pairs of genital setae.

Description –Body and leg integument foveate dorsally and ventrally; Prodorsal apodemata present, except **apo le; apo ro** with a transversal bar, forming no triangular shaped structure; **apo ex** ending by mammilate formations. **le** seta lateral; **ex** well developed; sensillum flagellate, smooth, bent distally. **h1** seta close to its homologous, crossing each other at sagital plane; **r3 (1m)** dorsal, away from notogastral margin. Notogaster ovate. Epimeral chaetotaxy 8 : 7 : 10 : 4(?). Genital and anal apertures contiguous, not joint, almost circular; proximal margin of **genitalia** anterior to the level of coxae IV; genital and anal apertures foveate; genitoanal chaetotaxy 7(6) - 1 - 6 - 3(1)(?); **g2, g3, g4, g6,** close to inner margin of **genitalia**; anal plate with six pairs of setae. With small crests on leg segments.

Terminology ---**Paralopheremaeus** (g. **para + lophos + eremaeus**) means a close or similar genus to **Lopheremaeus**, being masculine in gender.

Paralopheremaeus legendrei (Balogh), n. comb.

Plateremaeus legendrei Balogh, 1962 : 421, fig. 5 - 6

Type --Holotype, collected by Balogh in Madagascar, from unknown substrate. Depository : not mentioned.

Diagnosis –**P. legendrei,** as **L. mirabilis,** presents the dorsal and ventral integument foveate, with circular large foveae on notogaster; **le** lateral; **ex** long; dorsal bothridium leaned against notogaster; **r3 (1m)** large, dorsal, falciform, away from the margin; **r2 (1p)** lateral, falciform, close to its homologous seta, crossing one another at the sagital plane; epimeral apodemata weakly sclerotized; epimeral neotrichy; genital setae on two longitudinal rows; genital and anal apertures approximately circular; tarsi pedicels narrow/ and long, with three claws, the laterals being slender; presence of crests on leg segments. **P. legendrei** differs from **L. mirabilis** by presenting the ventral foveae as regular as the dorsal ones; prodorsum with transversal apodemata well sclerotized; sensillum flagellate; notogaster ovate; **h1** close to its homologous seta; larger body size; genital and anal apertures contiguous; six pairs of anal setae; and the disposition of the genital setae.

Description (Based on the brief description and drawings made by Balogh, 1962) ---Body length: 756u: width: 378u; integument intensivelly foveate on notogaster, prodorsum and genitoanal region (plates inclusive), with large, uniform and regular foveae all over the body; **le** lateral, almost at the same level of **ro; ex** proclinate, well developed; **in** minute; sensillum flagellate, smooth, long, bent distally, the tip proclinate; bothridium dorsal, touching notogaster. Notogaster ovate, flat; **r3 (1m)** large, falciform, turned backward and to the sagital plane, dorsal and away from notogastral margin; **r2 (1p)** lateral, falciform, large, turned to the sagital plane, well at notogastral margin; **h1** falciform, long close to its homologous seta, crossing each other at sagital plane; **ps** setae probably at normal position. Epimeral apodemata without apodematic bonds (except apo I); epimeral chaetotaxy 8 : 7 : 10 : 4(?); epimere I first row setae bent forward, of bigger size than the others and progressivelly larger antiaxially. Genital and anal apertures almost circular in shape, contiguous; genitoanal chaetotaxy 7(6) - 1 - 6 - 3(1)(?); genital setae on two longitudinal rows, **g1, g5,** and perhaps **g7,** away from inner margin of **genitalia, g2, g3, g4, g6,** close to it; anal setae on one sole longitudinal row, at inner margin of the plate. Leg articulations with proximal sockets; tarsi pedicels thin and long, tridactylous; small claws, the lateral being slender; leg segments with small crests.

Geografical distribution and habitat --Madagascar, substrate not mentioned.

Discussion ——Although Balogh (1962) could not describe **P. legendrei** in detail, since he had only one specimen at hand, it was possible to detect very unique characters, namelly: a flagellate sensillum on an oval body, with foveate integument and an anal plate bearing six pairs of setae, which are not found together in any other species of related genera. Other features pointed out by Balogh are questionable, namelly the presence of only six pairs of genital setae instead of the normal seven pairs presented in all other species of Plateremaeidae, and the anal plate with only one pair of adanal setae, instead of the usual three pairs. He reported his difficulties in counting the ventral setae due to the sculptured ventral integument which could have hidden some of the setae. Becouse of that, it seems reasonable to think of seven and not six pairs of genital setae, and three, not one, pair of adanal setae, which are the most probable numbers.

GENUS Calipteremaeus gen. n.

Type species : Plateremaeus yaginumai Aoki, 1977.

Diagnosis ——**Calipteremaeus,** gen. n. is close to **Allodamaeus** Banks, (Paschoal, 1984**b**) from which it differs mainly by the following characteristics: cuticle foveate on notogaster, prodorsum, genitoanal and epimeral regions; sensillum not clavate, ending by a small head with very short spines; **h1, r2** (lp) subterminal, close to distal margin of notogaster, covered by cerotegument; epimere apodematic bonds of irregular sides due to the presence of foveae; epimeral chaetotaxy 7 : 1 : 9 : 4(?); genital and anal apertures not very close one to the other and ornate; with five pairs of anal setae.

Description ——Dorsal and ventral body cuticle foveate, forming polygonal reticula. **Apo le, apo ro** absent; **apo c** and **apo ex** with mammillate protuberances pointing one to the other; **apo in** present, linked to **apo ex. le** dorso-lateral, sensillum ending by a little expanded head of very short spines. Notogaster circular, with concavities. **h1** subterminal, close to notogastral margin, covered by cerotegument, and at a short distance from its homologus seta; **r2** (lp) subterminal, close to the margin, covered by cerotegument; **r3 (lp)** dorsal, smooth, bent upward and forward. Epimeral chaetotaxy 7 : 1 : 9 : 4 (= 21 setae ?). Genital and anal apertures not very close one to the other, almost circular and ornate. Genitoanal chaetotaxy 7 : 1 : 5 : 3 ; **g2, g4** close to inner margin of **genitalia**, all other setae forming an arch parallel to the outer margin.

Terminology ——**Calipteremaeus** (gr. **Kaluptein + eremaeus**) means **"eremaeus"** with coverture, referring to the cerutegument and foveae of body. The genus is masculine in gender.

Calipteremaeus yaginumai (Aoki), n. comb.

Plateremaeus yaginumai Aoki, 1977 : 89, fig. 6 - 9.

Types – Holotype Nº YNU-4, preserved in alcohol, collected at Yumishi Mountain, Kakeroma Island, Southwest Japan, by H. Suzuki, in March 25, 1972, from a non mentioned substrate. Depository: Yokohama National University.

Diagnosis – C. yaginumai is close to **Allodamaeus coralgablensis** Paschoal (Paschoal, 1984**b**), Florida, by presenting prodorsal and latero-hysterosomal reticula; **apo ex, apo in** forming pliers shaped structures; dorsal bothridium projected upward; **ss** clavate, pilose at the tip; **r3 (lm)** dorsal, directed forward; epimeral neo-

trichy; epimere I first row setae bent forward, larger than the other and progressively larger antiaxially; genital and anal apertures almost circular; genital setae arranged in more than one longitudinal row; **ag** posterior to **genitalia**; **ad3** further away from the anal plate than **ad2, ad1**; leg articulations with proximal sockets; and tarsi ending by narrow pedicels. It differs from **A. coralgablensis** mainly by the characteristics presented in the description below.

Description (based on the brief description and drawings by Aoki) – Cuticle strongly foveate on notogaster, prodorsum, genitoanal and epimeral regions, forming polygonal reticula; **apo le, apo ro** absent; **apo c** raised, ending by a long mammillate protuberance facing similar structure of **apo ex; apo ex** linked to its homologous part by a transversal bar; **apo in** united to **apo ex** and then to **in** seta. **le** dorso-lateral; **ss** ending by a little expanded head of very short spines. Notogaster circular, presenting concavities. **r2 (1p)** present, subterminal, close to notogastral margin; **r3 (1m)** dorsal, short, smooth, bent upward and forward; **h1** subterminal, close to notogastral margin, covered by cerotegument and at a short distance from its homologous seta. Epimeral chaetotaxy 7 : 1 : 9 : 4(?); anal and genital apertures not very close together, almost circular and with ornaments. Genitoanal chaetotaxy 7 : 1 : 5 : 3; **g2, g4** aligned, close to inner margin of **genitalia**; other genital setae forming an arch parallel to the outer margin of **genitalia**. Apodematic bonds presented by almost all epimeral apodemata (except, perhaps, **apo** III), showing irregular sides due to presence of foveae. Body size 710u X 390u. Leg articulations with proximal sockets; tarsi ending by narrow pedicels.

Geografical distribution and habitat – Kakeroma Islands, Japan, from non referred substratum..

Discussion – Aoki (1977) description of **C. yaginumai** present no major details and his figures are incomplete, the legs being missing. However, from what was provided in the original description and from what could be infered from the drawings, **C. yaginumai** seems to conform well with the characteristics of Plateremaeidae reviewed by Paschoal (1979, 1984**a**), being close to **Allodamaeus** Banks, (Paschoal 1984**b**). The unique features presented by this species strongly suggest the erection of the new genus **Calipteremaeus**: notogaster with foveae and concavities, also common on prodorsum, genitoanal region and epimeral region; sensillum lightly expanded distally forming a small head; **hl ro** subterminal; deficient epimeral neotrichy; the disposition in arch of the genital setae; the presence of only five pairs of anal setae; and anal and genital plates ornate, not very close one to the other.

Unplaced Plateremaeidae

Due to the impossibilities in classifying, because of the poor descriptions and incomplete drawings, the following described species are considered of unknown position till further studies:

Plateremaeus carinulatus (Berlese)

Eremaeus carinulatus Berlese, 1888: 217, tab. XIII, fig. 2
Damaeus carinulatus, Michael, 1898: 60.
Plateremaeus carinulatus, Berlese, 1908: 11, Csiszár & Jeleva, 1962: 282.

Species collected in Mato Grosso, Brazil, under bark. The short description presented by Berlese only permits to remove it from **Plateremaeus**. it seems to have strong tarsal claws, short pedicels, ovate notogaster and a cylindrical straight sensillum.

Plateremaeus complanatus (Berlese)

Eremaeus complanatus Berlese, 1902, in Berlese & Leonardi, 1902: 12

Plateremaeus complanatus, Berlese 1908: 11; Csiszár & Jeleva, 1962: 282.

Species from San Vincente, Chile, of unknown substrate, described in 3 lines and with no drawing. It must not be a **Plateremaeus** due to the cylindrical and straight sensillum. It is also a large size mite: l.l00u.

Plateremaeus rotundatus Berlese

Plateremaeus rotundatus Berlese, 1913: 96, tab. VII, fig. 76; Csiszár & Jeleva, 1962: 282

Species from Samarang, Java, in humus. It is not a **Plateremaeus** by presenting a claviform black sensillum; cuticle foveate; three strong claws in short pedicel; and notogastral setae marginal. It may belong to the new families Lirissellidae Paschoal or Hammeriellidae Paschoal.

Plateremaeus tunicatus (Balogh)

Gymnodamaeus tunicatus Balogh, l958, 9; Csiszár & Jeleva, 1962: 282.

Plateremaeus tunicatus, Balogh, l962 : 42l.

Species from Zaire of unknown substrate, poorly described and with no illustrations. Csiszár & Jeleva (1962) reported that it has 4 pairs of anal setae and epimeral neotrichy, being close to **P. mirabilis** and to one undescribed species from Madagascar. In having such features it could be placed in the new genus **Lopheremaeus** Paschoal; however it apparently does not present femoral crests, and occurs in Central Africa not in Europe.

REFERENCES

Aoki, J. 1974. Oribatid mites from Korea. **Acta Zool. Acad. Sci. Hung.** 20(3-4): 233-242.

Aoki, J. 1977. New and interesting species of oribatid mites from Kakeroma Islands, Southwest Japan. **Acta Arachnol.** 27 (special nº): 84 - 94. .

Aoki, J. & T. Fujikawa. 1971. A new species of the genus **Allodamaeus** Banks (Acari: Gymnodamaeidae): Taxonomic notes on Oribatid mites of Hokkaido V. **Annot. Zool. Jap.** 44(2): 113 - 116.

Aoki, J. & K. Suzuki. 1970. A new species of the genus **Pedrocortesella** from Japan (Acari, Cryptostigmata). **Bull. nat. Sci. Mus. Tokio** 13(2): 117 - 120.

Baker, E.W. & G.W. Wharton. 1952. An introduction to Acarology. The Macmillan Company, N. York 465 p.

Balogh, J. 1958. Oribatides nouvelles de l'Afrique tropicale. **Revue de Zoologie et de Botanique Africanes** 58 (1-2): 1 - 34.

Balogh, J. 1961. identification keys of world oribatid (Acari) families and genera. **Acta. Zool. Ac. Sc. Hung.** 7(3-4): 243-344.

Balogh, J. 1962. new oribatids from Madagascar (Acari). **Ann. Hist. Nat. Mus. Hung.** 54 Zool.: 419 - 423.

Balogh. J. 1965. A synopsis of the world oribatid (Acari) genera. **Acta. Zool. Ac. Sc. Hung,** 11(1-2): 5 - 99.

Balogh, J. 1966. On some oribatid mites from Tchad and East Africa collected by Prof. H. Franzs, Viena. **Opusc. Zool. Inst. Zoosyst.** Budapest 6: 69-77.

Balogh, J. 1968. New oribatids (Acari) from New Guinea. **Acta Zool. Acad. Sci. Hung.** 14(3-4): 259 - 285.

Balogh, J. 1970. new oribatids (Acari) from New Guinea II. **Acta Zool. Acad. Sci. Hung.** 16: 291 - 344.

Balogh, J. 1972. The oribatid genera of the world. Akadémiai Kiadó, Budapest. 188 p.

Balogh, J. & J. Csiszár. 1983. The zoological results of Gy. Topál's collectings in South Argentina. 5. Oribatei (Acarina). **Ann. Hist. Nat. Mus. Hung.** 55: 463 - 485.

Balogh, J. & S. Mahunka. 1965. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei 34. Acarina: Oribatei: **Ann. Hist. Nat. Mus. Nat. Hung.** 57: 451 - 465.

Balogh, J. & S. Mahunka. 1969. The scientific results of the Hungarian soil zoological expeditions to South America 12. Acari: Oribatids from the materials of the second expedition. III. **Acta Zool. Acad. Sci. Hung.** 15(3-4): 255 - 275.

Banks, N. 1915. The acarina or mites. USDA Report Nº 108: 1 - 153.

Banks, N. 1947. On some Acarina from North Carolina. **Psyche** 54(2): : 110 - 141.

Berlese, A. 1883. Ercursione in Sicilia, Acarofauna Sicula (1ª Serie). Bull. Soc. Ent. Ital. 15: 212 - 220.

Berlese, A. 1888. Acari Austro-Americani quos collegit Aloysius

Balzan. **Bull. Sco. Ent. Ital.** 20, 13(1-2): 171 - 222.

Berlese, A. 1896. Acari, Myriapoda et Scorpiones hucusque in Italia reperta. Ordo Cryptostigmata (Oribatidae): 1 - 98.

Berlese, A. 1908. Elenco di generi e specie nuove di acari. **Redia** 5(1): 1 - 15.

Berlese, A. 1913. Acari nuovi. **Redia** 9(1): 77 - 111

Berlese, A. 1916. Centuria prima di Acari nuovi. **Rediz 12**(1): 19-67.

Berlese, A. B. G. Leonardi, 1902. Acari sudamericani. **Zool. Anz - 25** (659-684): 12

Bulanova-Zackvatkina, E.M. 1957. Materials to the systematics and ecology of armored mites of the family Damaeidae Berlese, 1896 (Acariformes, Oribatei). **Mosk. Gos. Univ. Lomossova:** 1 - 15. (In Russian).

Bulanova-Zackvatkina, E. M. 1967. Armoured mites, Oribatidze. Kisher School Moskuz, 1 a 254 (In Russian).

Covarrubias, R. 1968. Observations sur le genre **Pheroliodes** I. **Pheroliodes roblensis** n. sp. (Acarina, Oribatei). **Acarologia** 10 (4): 657 - 695.

Csiszár, J. & M. Jeleva. 1962. Oribatid mites (Acari) from Bulgarian soils. **Acta Zool., Budapest,** 8: 273 - 301.

Ewing, H.E. 1917. A synopsis of the genera of beetle mites, with special reference to the North American fauna. **Ann. Ent. Soc. Amer.** 10(2): 117 - 132.

Grandjean, F. 1931. Le genre **Licneremaeus** Paoli (Acariens) **Bull. Soc. Zool. France** 56: 221 - 250.

Grandjean, F. 1933. Oribatides de l'Afrique du Nord (1re Série). **Bull. Soc. Hist. Nat. Afrique Nord** 24(8): 308 - 323.

Grandjean, F. 1954**a**. Essai de classification des oribates (Acariens). **Bull. Soc. Zool. France** 78(5- 6): 421 - 445

Grandjean, F. 1954**b**. Observation sur les oribates (28e Série). **Bull. Mus. Hist. Nat. Paris,** 2e Série 26(2): 204 - 211.

Grandjean. F. 1964. **Pheroliodes wehnckei** (Willman) (Oribate). **Acarologia** 6(2): 353 - 386.

Grandjean, F. 1965. Nouvelles observations sur les Oribates (4e Série). **Acarologia** 7(1): 91 - 112.

Hammer, M. 1958. Investigations on the oribatid fauna of the Andes Mountains I. The Argentina and Bolivia. **Biol. Skr. Dan. Vid. Selsk** 10(1): 1 - 129.

Hammer, M. 1961. Investigations on the oribatid fauna of the Andes Mountains II. Peru. **Biol. Skr. Dan. Vid. Selsk** 13 (1): 1 - 157.

Hammer, M. 1962. Investigations on the oribatid fauna of the Andes Mountains. III. Chile. **Biol. Sks. Dan. Vid. Selsk.** 13(2): 1 - 97.

Hammer, M. 1966. Investigations on the oribatid fauna of New Zealand. Part I. **Biol. Skr. Dan. Vid. Selsk.** 15 (2): 5 - 108.

Higgins, H.G. & S. B. Mulaik. 1958. Notes on **Allodamaeus ewingi** Banks (Acarina: Oribatei: Belbidae). **Proc. Ent. Soc. Wash.** 60 (3): 131 - 133.

Mahunka, S. 1977. Neue und interessante Milben aus dem Genfer Museum XXX. Weitere beitrage zur Kenntnis der Oribatiden fauna Griechenlands (Acari: Oribatida). **Rev. Suisse Zool.** 84(4): 905-916.

Michael. A.D. 1898. Oribatidae. **Das Tierreich**, Berlin: 1 - 93.

Paoli, G. 1908. Monografia de genere **Damaeosoma** Berlese e generi affini. **Redia** 5: 31 - 91.

Paschoal, A. 1975. A revison of the Gymnodamaeidae (Acari, Oribatei): A numerical taxonomic study. Ph. D. dissertation, The Ohio State University, Columbus, 374 p.

Paschoal, A.D. 1979. Revisão da família Plateremaeidae e recaracterização da superfamília Gymnodamaeoidea (Acari: Oribatei).
Tese Livre-Docência, E.S.A. "Luiz de Queiroz", USP, 373 p.

Paschoal, A.D. & D.E. Johnston. 1982**a**. A numerical taxonomic revision of the Gymnodamaeidae (Acari: Oribatei). **Rev. Bras. Biol.** 42(2): 439 - 459.

Paschoal, A.D. & D.E. Johnston. 1982**b**. Revised classification of the Gymnodamaeidae (Acari: Oribatei) with a key to the genera. **Rev. Bras. Biol.** 42(2): 461 - 466.

Pérez-Iñigo, C. 1969. Acaros oribátidos de suelos de España peninsular e islas Baleares (Acari:Oribatei) Parte II. **Eos, Madrid** 45 : 241 - 317.

Pletzen, R. van. 1963. Studies on South African oribatei (Acarina) II. Plateremaeidae Tragardh, 1931; genus **Pedrocortesella** Hammer, 1961. **Acarologia** 5(3): 438 - 442.

Tragardh, I. 1931. Pacific mites: Acarina from the Juan Fernandez Islands. Natural History of Juan Fernandez and Eastern Islands. **Uppsala**. 3(4) : 553 - 628.

Willmann, C. 1931. Moosmilben oder Oribatiden (Oribatei). Em Dahl Die Tierwelt Deutschlands 22 : 79 - 200.

Woolley, T.A. 1957. Redescriptions of Ewings Oribatid mites V - Families Belbidae and Opiidae (Acarina : Oribatei). **Entomol. News** 68(8): 211 - 222.

Woolley, T.A. 1969. A new and phoretic oribatid mite (Acarina : Cryptostigmata : Licnodamaeidae). **Proc. Ent. Soc. Wash.** 71(4): 476 - 481.

Woolley, T.A. & E.W. Baker, 1958. A key to the super families and principal families of the Oribatei (Sarcoptiformes: Acarina). **Entomol. News** 69(4): 85 - 92.