**Universidade de São Paulo
Escola Superior de Agricultura “Luiz de Queiroz”**

Taxonomy of Rhodacaroidea mites (Acari: Mesostigmata)

Raphael de Campos Castilho

Thesis submitted in partial fulfillment of the
requirements for the degree of Doctor in Science.
Area of concentration: Entomology

**Piracicaba
2012**

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Adviser:
Prof. Dr. **GILBERTO JOSÉ DE MORAES**

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To GOD

Source of perseverance and life,

To my mother

Sonia Regina de Campos

For her love, tenderness and comprehension.

To my partner

Karina Cezarete Semençato

for her love, patience and unfailing support to me

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ABSTRACT

Taxonomy of Rhodacaroidea mites (Acari: Mesostigmata)

The mite superfamily Rhodacaroidea is a member of the order Mesostigmata. The families Digamasellidae Evans, Halolaelapidae Karg, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae Oudemans and Teranyssidae Halliday constitute this superfamily. The main morphological characteristic considered in this study for inclusion of mites in the Rhodacaroidea is the insertion of seta *st4* on the sternal shield. These mites have been found in soil, litter, rodent nests, mosses, lichens, termite nests, on Coleoptera [mainly bark beetles (Curculionidae: Scolytinae)] and in galleries made by them in tree trunks. Digamasellids, ologamsids and rhodacarids are commonly mentioned in the literature as predators of nematodes, small insects, mites and springtails, and at least one species, appears to have potential as a biological control agent against insect and mite pests in the soil. The taxonomic concepts of the families belonging to Rhodacaroidea are confusing do to the frequent taxonomic changes over time. As a consequence, it has been quite often difficult to determine to which family a determined species of this group belongs. Several authors contributed significantly to the taxonomic knowledge of Rhodacaroidea, but few are still professionally active. The general objective of this thesis was to establish the bases to facilitate the identification of Rhodacaroidea mites. Diagnoses of the genera of Rhodacaridae, a key for their identification and an updated list of the species within each genus were prepared. This family is presently composed of 148 species arranged in 15 genera. A dichotomous key to the genera as well as updated and complemented lists of the species within each genus of Digamasellidae, Laelaptonyssidae, Ologamasidae and Teranyssidae were also prepared. Digamasellidae is composed of 277 species arranged in 11 genera, Laelaptonyssidae, 8 species in one genus, Ologamasidae 450 species in 44 genera and Teranyssidae, a single species. The species of the rhodacarid genera *Interrhodeus* Karg, *Pennarhodeus* Karg, *Poropodalius* Karg and *Protogamasellopsis* Evans and Purvis were examined and a characterization of the genera, diagnoses of each species, complementary descriptions of some species and a key to help in the separation of the species of each genus were provided. The re-examination of those species allowed the conclusion that they are correctly placed in the Rhodacaridae. Also as result of this work, a new genus and five new species of Rhodacaridae and four new species of Ologamasidae were described and new records of mites of those groups were determined, as the result of analyses of mites from southern Brazil and Iran. A taxonomic key to separate the 60 species of *Gamasiphis* (Ologamasidae) described from different parts of the world was prepared. The study conducted represents a significant contribution to the knowledge of the taxonomy of Rhodacaroidea.

Keywords: Soil mites; Predators; Biological control; Digamasellidae; Laelaptonyssidae; Ologamasidae; Rhodacaridae; Teranyssidae

RESUMO

Taxonomia de ácaros Rhodacaroidea (Acari: Mesostigmata)

Os ácaros da superfamília Rhodacaroidea são membros da ordem Mesostigmata. As famílias Digamasellidae Evans, Halolaelapidae Karg, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae Oudemans e Teranyssidae Halliday constituem esta superfamília. A principal característica morfológica considerada neste estudo para a inclusão de ácaros em Rhodacaroidea é a inserção de seta *st4* no escudo esternal. Estes ácaros são encontrados no solo, folheto, ninhos de roedores, musgos, líquens, ninhos de cupins, em Coleoptera [principalmente besouros de casca (Curculionidae: Scolytinae)] e em galerias feitas por estes em troncos de árvores. Os Digamasellidae, Ologamasidae e Rhodacaridae são comumente citados na literatura como predadores de nematóides, pequenos insetos, ácaros e Collembola. Pelo menos uma espécie parece ter potencial como agente de controle biológico contra insetos e ácaros pragas que ocorrem no solo. Os conceitos taxonômicos das famílias pertencentes à Rhodacaroidea são confusos devido às mudanças taxonômicas frequentes ao longo do tempo. Como consequência, frequentemente, é difícil de se determinar a que família uma determinada espécie deste grupo pertence. Vários autores contribuíram significativamente para o conhecimento taxonômico das espécies de Rhodacaroidea, mas poucos desses ainda estão profissionalmente ativos. O objetivo geral desta tese foi estabelecer as bases para facilitar a identificação de ácaros Rhodacaroidea.. A elaboração da diagnose dos gêneros de Rhodacaridae, uma chave para a identificação destes e uma lista atualizada das espécies dentro de cada gênero foram preparadas. Esta família é atualmente composta por 148 espécies distribuídas em 15 gêneros. Uma chave dicotômica para a separação dos gêneros, bem como uma atualização e complementação das listas das espécies dentro de cada gênero de Digamasellidae, Laelaptonyssidae, Ologamasidae e Teranyssidae também foram preparadas. Digamasellidae é composta de 277 espécies de 11 gêneros, Laelaptonyssidae, 8 espécies de um gênero, Ologamasidae 450 espécies de 44 gêneros e Teranyssidae, uma única espécie. As espécies de *Interrhodus* Karg, *Pennarhodus* Karg, *Poropodalius* Karg e *Protogamasellopsis* Evans e Purvis, todos Rhodacaridae, foram examinadas, realizando-se a caracterização dos gêneros, a diagnose de cada espécie, descrições complementares de algumas espécies e uma chave para ajudar na separação das espécies de cada gênero. A reavaliação dessas espécies permitiu a conclusão de que estas estão corretamente colocadas em Rhodacaridae. Também como resultado deste trabalho, um novo gênero e cinco novas espécies de Rhodacaridae assim como quatro novas espécies de Ologamasidae foram descritas e novos registros de ácaros desses grupos foram estabelecidos, como resultado do estudo de ácaros do sudeste do Brasil e Iran. Uma chave taxonômica para separar as 60 espécies de *Gamasiphis* (Ologamasidae) descritas de diferentes partes do mundo foi preparada. O estudo realizado representa uma significativa contribuição para o conhecimento da taxonomia de Rhodacaroidea.

Palavras-chave: Ácaros de solo; Predadores; Controle biológico; Digamasellidae; Laelaptonyssidae; Ologamasidae; Rhodacaridae; Teranyssidae

1 INTRODUCTION

The mite superfamily Rhodacaroidea is a member of the order Mesostigmata. In a recent publication, Lindquist; Krantz and Walter (2009) considered Digamasellidae Evans, Halolaelapidae Karg, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae Oudemans and Teranyssidae Halliday to constitute superfamily. The main morphological characteristic considered in this study for inclusion of mites in the Rhodacaroidea is the insertion of seta *st4* on the sternal shield. Members of all of these families, except the ologamasid *Oriflammella* Halliday and the members of Halolaelapidae, have this characteristic. The latter family is in need of a detailed revision to determine whether or not it should be included as Rhodacaroidea. Therefore, Halolaelapidae is not considered in this study.

Digamasellidae, Ologamasidae and Rhodacaridae mites have been found in soil, litter, rodent nests, mosses, lichens, and other types of organic matter in contact with the soil. In addition, digamasellids have been found on Coleoptera, mainly bark beetles (Curculionidae: Scolytinae), and in galleries made by them in tree trunks. Digamasellids, ologamsids and rhodacarids are commonly mentioned in the literature as predators of nematodes, small insects, mites and springtails (KARG, 1971; LEE, 1974; MOSER, 1975; ENDA; TAMURA, 1977; WALTER; HUNT; ELLIOTT, 1988; ABOU-EL-SOUD; SHOEIB, 2000; BEAULIEU; WALTER, 2007). At least one species, *Protogamasellopsis posnaniensis* Wiśniewski and Hirschmann (Rhodacaridae), appears to have potential as a biological control agent against insect and mite pests in the soil (CASTILHO et al., 2009).

Laelaptonyssidae and Teranyssidae mites have been found from termite nests, but the details of the relationship between those organisms are not known. Krantz (2000) suggested laelaptonyssid to be phoretic on termites rather than parasitic, feeding on nematodes in the termites' nest material.

However, the taxonomic concepts of the families belonging to Rhodacaroidea are confusing, leading to a very complex taxonomic history because of the frequent changes over time. As a consequence, it has been quite often difficult to determine to which family a determined species of this group belongs. Most descriptions of species and other taxonomic works on mites of this group referred and still refer to most species as Rhodacaridae.

The whole world is going through a lack of specialists in the taxonomy of many different types of organisms, and the same has been observed in relation to mites of this group. Several authors contributed significantly to the taxonomic knowledge of

Rhodacaroidea species, namely C. Willmann, W. Hirschmann, P.A.J. Ryke, G.C. Loots, E.E. Linquist, W. Karg, D.C. Lee, G.I. Shcherbak, J. Wiśniewski, R.B. Halliday and others. However, few of those are still active.

Rhodacaroids as a group have potential as biological control agents of soil pests (CASTILHO et al., 2009) and are commonly found in tropical regions (MINEIRO; MORAES, 2001; SILVA; MORAES; KRANTZ, 2004). However, the success of the search process to the use of predators depends on the correct identification of the organisms involved. A question then arises: how to change this situation in order to facilitate the identification of species of this group?

The general objective of this thesis is to establish the bases to facilitate the identification of Rhodacaroidea mites. Therefore, specific objectives were established:

- Review the literature concerning the taxonomy of Rhodacaridae, to present a new characterisation of the family and the included genera, to construct keys for identification of genera, as well as to update and complement the a list of the species considered to belong to the Rhodacaridae, with relevant taxonomic information about each;
- Review the literature concerning the taxonomy of Digamasellidae, Laelaptonyssidae, Ologamasidae and Teranyssidae, to construct a key for the identification of genera of these groups, as well as to update and complement the lists of species considered to belong to the these families, with relevant taxonomic information about them;
- Provide redescrptions of *Interrhodeus* Karg, *Pennarhodeus* Karg; *Poropodalius* Karg and *Protogamasellopsis* Evans and Purvis and their included species, and the preparation of keys for identification of species of these genera;
- Provide the description of one new genus and three new species, and report the rhodacarid species found in surveys conducted in southeastern Brazil;
- Provide the description of two new species of Rhodacaridae found in surveys conducted in Iran;
- Provide the description of four new species of *Gamasiphis* (Ologamasidae) from Piracicaba, Brazil and a taxonomic key to separate the world species of this genus.

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2 CATALOGUE OF THE MITE FAMILY RHODACARIDAE OUDEMANS, WITH NOTES ON THE CLASSIFICATION OF THE RHODACAROIDEA (ACARI: MESOSTIGMATA)

Abstract

The Rhodacaridae Oudemans are free living, cosmopolitan, edaphic mites, which are considered in the literature to be predators. The taxonomic concept of the family has changed considerably over time, making it very difficult for non-taxonomists to decide on the correct placement of many species. Even taxonomists sometimes find it difficult to determine whether a given species belongs to this family or not, because many of the old descriptions are not sufficiently detailed. Also, the family placement of some genera has been very unstable. A historic review of the literature on the classification of the Rhodacaridae is presented. Diagnoses are given for the families of Rhodacaroidea is given, followed by a checklist of genera and sub-genera for each family. The families included are Digamasellidae Evans, Halolaelapidae Karg, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae and Teranyssidae Halliday. Diagnoses are given for the genera of Rhodacaridae, and a key for their identification, derived from a standardized database of character states. Finally, a list of species within each genus of this family was updated and complemented, giving relevant taxonomic information about the respective types, and providing references to nomenclatural changes, synonymy, and redescriptions of each species. In total, 148 rhodacarid species and one subspecies are listed in this work, arranged in 15 genera. The most diverse genera are *Afrodacarellus* Hurlbutt and *Rhodacarus* Oudemans, each with about 20% of the valid species. Five of the genera are monotypic. Taxonomic confusion surrounds some groups of species, especially in the genus *Rhodacarus*. It appears that *Rhodacarus calcarulatus* Berlese, *R. coronatus* Berlese, *R. pallidus* Hull, *R. reconditus* Athias-Henriot and *R. roseus* Oudemans have often been misidentified, and these species are in need of detailed revision.

Keywords: Catalogue; Dichotomous key; Rhodacaroidea; Soil mites; Taxonomy

Resumo

Rhodacaridae Oudemans são ácaros de vida livre, cosmopolitas, edáficos e considerados na literatura como predadores. O conceito taxonômico da família mudou consideravelmente ao longo do tempo, tornando-se muito difícil para não-taxonomistas decidir a classificação correta de muitas espécies. Mesmo para taxonomistas, às vezes é difícil determinar se uma determinada espécie pertence a esta família ou não, porque muitas das descrições antigas não são suficientemente detalhadas. Além disso, a classificação de alguns gêneros da família tem sido muito instável. Uma revisão da literatura sobre a classificação dos Rhodacaridae é apresentada. Diagnósticos são dados para as famílias de Rhodacaroidea, seguindo-se pela apresentação de uma lista de gêneros e sub-gêneros para cada família. As famílias incluídas são Digamasellidae Evans, Halolaelapidae Karg, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae e Teranyssidae Halliday. Diagnósticos e uma chave para a identificação são dados para os gêneros de Rhodacaridae. Estes foram elaborados tendo como base um banco de dados padronizado da caracterização das espécies. Por fim, uma lista de espécies de cada gênero foi atualizada e complementada, fornecendo informações taxonômicas relevantes sobre os respectivos tipos, e fornecendo referências a mudanças nomenclaturais, sinônimas e redescrições de cada espécie. No total, 148 espécies e uma subespécie de Rhodacaridae arranjados em 15 gêneros estão listadas neste trabalho. Os gêneros mais diversos são *Afrodacarellus* Hurlbutt e *Rhodacarus* Oudemans, cada um com cerca de 20% das espécies válidas. Cinco dos gêneros são monotípicos. Incertezas ainda existem em relação a alguns grupos de espécies, especialmente em *Rhodacarus*. Aparentemente, *Rhodacarus calcarulatus* Berlese, *R. coronatus* Berlese, *R. pallidus* Hull, *R. reconditus* Athias-Henriot e *R. roseus* Oudemans têm sido freqüentemente identificados incorretamente. Essas espécies necessitam de uma revisão detalhada.

Palavras-chave: Catálogo; Chave dicotômica; Rhodacaroidea; Ácaros de solo; Taxonomia

3 CATALOGUE OF THE MITE FAMILIES DIGAMASELLIDAE, LAELAPTONYSSIDAE, OLOGAMASIDAE AND TERANYSSIDAE (ACARI: RHODACAROIDEA: MESOSTIGMATA), AND A KEY TO THE WORLD GENERA OF THESE FAMILIES

Abstract

The taxonomic concepts of Digamasellidae Evans, Laelaptonyssidae Womersley, Ologamasidae Ryke and Teranyssidae Halliday, families belonging to Rhodacaroidea, are confusing and have changed considerably over time, making it difficult to determine to which family a determined species of this group belongs. A brief historic review of the literature on the classification of these families is presented. A dichotomous key to the genera is provided, derived from a standardised database of character states. A list of species within each genus was updated and complemented, giving relevant taxonomic information about the respective types, and providing references to nomenclatural changes, synonymy and redescrptions of each species. In total, 277 digamasellid species and one subspecies arranged in 11 genera, eight laelaptonyssid species arranged in one genus, 450 ologamasid species arranged in 44 genera and one teranyssid species are listed in this work.

Keywords: Catalogue; Soil mites; Taxonomy

Resumo

Os conceitos taxonômicos de Digamasellidae Evans, Laelaptonyssidae Womersley, Ologamasidae Ryke e Teranyssidae Halliday, famílias pertencentes a Rhodacaroidea, são confusos e têm mudado consideravelmente ao longo do tempo, tornando difícil determinar a qual família pertence uma determinada espécie deste grupo. Uma breve revisão histórica da literatura sobre a classificação dessas famílias é apresentada. Uma chave dicotômica para os gêneros é fornecida, derivada de um banco de dados padronizado da caracterização das espécies. Uma lista de espécies de cada gênero foi atualizada e complementada, fornecendo informações taxonômicas relevantes sobre os respectivos tipos, e fornecendo referências a mudanças nomenclaturais, sinônimas e redescritções de cada espécie. No total, 277 espécies de Digamasellidae arranjadas em 11 gêneros, oito espécies de Laelaptonyssidae arranjadas em um gênero, 450 espécies de Ologamasidae arranjadas em 44 gêneros e uma espécie de Teranyssidae estão listadas neste trabalho.

Palavras-chave: Catálogo; Ácaros de solo; Taxonomia

4 REVISION OF THE GENERA *Interrhodeus*, *Pennarhodeus* and *Poropodalius* (ACARI: RHODACARIDAE)

Abstract

The genera *Interrhodeus* Karg, *Pennarhodeus* Karg and *Poropodalius* Karg are redescribed on the basis of one species of *Interrhodeus*, four species of *Pennarhodeus* and five species of *Poropodalius*, including the type species of each genus. All species are redescribed on the basis of the type specimens, and keys for the separation of the species of the latter two genera are provided. Re-examination of these species shows that these three genera are correctly placed in the family Rhodacaridae.

Keywords: Rhodacaroidea; Soil mites; Taxonomy

Resumo

Os gêneros *Interrhodeus* Karg, *Pennarhodeus* Karg e *Poropodalius* Karg são redescritos com base em uma espécie de *Interrhodeus*, quatro espécies de *Pennarhodeus* e cinco espécies de *Poropodalius*, incluindo as espécies tipo de cada gênero. Todas as espécies são redescritas com base em espécimes-tipo. As chaves para a separação das espécies dos dois últimos gêneros são fornecidas. A reavaliação dessas espécies mostra que esses três gêneros estão corretamente colocados na família Rhodacaridae.

Palavras-chave: Rhodacaroidea; Ácaros de solo; Taxonomia

5 REVISION OF THE GENUS *Protogamasellopsis* (ACARI: MESOSTIGMATA: RHODACARIDAE)

Abstract

Protogamasellopsis Evans and Purvis is revised based on the examination of the types or specimens collected in Brazil of the seven species of this genus. A characterization of the genus, diagnoses of the species examined, complementary descriptions of some species and a key to help in the separation of the species of this genus are provided.

Keywords: Rhodacaroidea; Soil mites; Taxonomy

Resumo

Protogamasellopsis Evans and Purvis é revisado com base no exame dos tipos ou espécimes coletados no Brasil das sete espécies deste gênero. Uma caracterização do gênero, diagnoses das espécies examinadas, descrições complementares de algumas espécies e uma chave para ajudar a separação das espécies deste gênero são apresentadas.

Palavras-chave: Rhodacaroidea; Ácaros de solo; Taxonomia

6 RHODACARIDAE MITES (ACARI: MESOSTIGMATA: RHODACAROIDEA) FROM THE STATE OF SÃO PAULO, BRAZIL, WITH DESCRIPTIONS OF A NEW GENUS AND THREE NEW SPECIES

Abstract

This paper reports the occurrence of five species of Rhodacaridae mites collected in the State of São Paulo, Brazil. One of these corresponded to a new genus and a new species, described as *Binodacarus brasiliensis* Castilho and Moraes, 2010; two correspond to new species of known genera, described as *Multidentorhodacarus paulista* Castilho and Moraes, 2010 and *Rhodacarus matatlanticae* Castilho and Moraes, 2010; and two correspond to described species, *Afrogamasellus citri* Loots, 1969 and *Protogamasellopsis dioscorus* (Manson, 1972).

Keywords: Litter; Rhodacaroidea; Soil; Taxonomy

Resumo

Esse artigo reporta a ocorrência de cinco espécies de ácaros Rhodacaridae coletadas no Estado de São Paulo, Brasil. Uma dessas correspondeu a um novo gênero e espécie, descrita como *Binodacarus brasiliensis* Castilho e Moraes, 2010; dois corresponderam a novas espécies de gêneros conhecidos, descritas como *Multidentorhodacarus paulista* Castilho e Moraes, 2010 e *Rhodacarus matatlanticae* Castilho e Moraes, 2010; e dois corresponderam a duas espécies descritas, *Afrogamasellus citri* Loots, 1969 e *Protogamasellopsis dioscorus* (Manson, 1972).

Palavras-chave: Folhedo; Rhodacaroidea; Solo; Taxonomia

7 TWO NEW SPECIES OF RHODACARIDAE (MESOSTIGMATA: RHODACAROIDEA) FROM IRAN

Abstract

Multidentorhodacarus n. sp. 1 and *Rhodacarellus* n. sp. 2 (Acari: Mesostigmata: Rhodacaroidea: Rhodacaridae) are described and figured. These are the first descriptions of Rhodacaridae mites from Iran.

Keywords: *Multidentorhodacarus*; *Rhodacarellus*; Soil mites; Taxonomy

Resumo

Multidentorhodacarus n. sp. 1 e *Rhodacarellus* n. sp. 2 (Acari: Mesostigmata: Rhodacaroidea: Rhodacaridae) são descritos e ilustrados. Estas são as primeiras descrições de ácaros Rhodacaridae do Irã.

Palavras-chave: *Multidentorhodacarus*; *Rhodacarellus*; Ácaros de solo; Taxonomia.

8 A NEW SPECIES OF *Gamasiphis* (ACARI: OLOGAMASIDAE) FROM BRAZIL, WITH A KEY TO SPECIES FROM THE NEOTROPICAL REGION

Abstract

Gamasiphis paulista Castilho, Moraes and Narita, 2010 was described based on specimens representing all postembryonic stages, collected from litter and soil in Piracicaba, State of São Paulo. This is the first species of *Gamasiphis* described from Brazil. A key is provided for the separation of species of this genus known from the Neotropical Region.

Keywords: Mesostigmata; Rhodacaroidea; Edaphic mite; Litter; Taxonomy

Resumo

Gamasiphis paulista Castilho, Moraes e Narita, 2010 foi descrito com base em espécimes representando todas os estágios pós-embriônicos, coletados em folhedo e solo em Piracicaba, Estado de São Paulo. Essa é a primeira espécie de *Gamasiphis* descrita do Brasil. Uma chave é construída para a separação das espécies descritas desse gênero da região Neotropical.

Palavras-chave: Mesostigmata; Rhodacaroidea; Ácaros edáfico; Folhedo; Taxonomia

9 THREE NEW SPECIES OF *Gamasiphis* (ACARI: MESOSTIGMATA: OLOGAMASIDAE) FROM BRAZIL, WITH COMPLEMENTARY INFORMATION ABOUT *Gamasiphis plenosetosus* KARG AND A KEY TO THE WORLD SPECIES OF THE GENUS

Abstract

Gamasiphis Berlese is one of the most diverse genera of Ologamasidae, with 68 species, corresponding to about 15% of the species of the family. Until now, a single species of this genus was known from Brazil. *Gamasiphis* n. sp. 1, *Gamasiphis* n. sp. 2 and *Gamasiphis* n. sp. 3 are described based on the morphology of adult females and males collected from litter and soil in Piracicaba, São Paulo State, Brazil. The holotype of *Gamasiphis plenosetosus* Karg, 1994 was examined, given its close similarity to the latter species, and complementary morphological information about it is provided. A key for the separation of females of the 60 recognizable world species of *Gamasiphis* is provided.

Keywords: Edaphic mites; Litter; Rhodacaroidea; Taxonomy

Resumo

Gamasiphis Berlese é um dos gêneros mais diversos de Ologamasidae, com 68 espécies, correspondendo a cerca de 15% das espécies da família. Até agora, uma única espécie deste gênero era conhecida do Brasil. *Gamasiphis* n. sp. 1, *Gamasiphis* n. sp. 2 e *Gamasiphis* n. sp. 3 são descritas com base na morfologia de fêmeas e machos adultos coletados de folheto e solo em Piracicaba, Estado de São Paulo. O holótipo de *Gamasiphis plenosetosus* Karg, 1994 foi examinado devido à sua semelhança com a última espécie, e informações morfológicas complementares foram fornecidas. Uma chave para a separação de fêmeas adultas de 60 espécies conhecidas de *Gamasiphis* do foi fornecida.

Palavras-chave: Ácaros edáficos; Folheto; Rhodacaroidea; Taxonomia

10 FINAL CONSIDERATIONS

The results of this work are considered to represent a significant contribution to those interested on the taxonomy of the Rhodacaroidea. One of the main results refers to the updating and complementation of the species list within each of the families composing this superfamily. The revision of four genera, the description of 5 new species and the redescription in total or in part of 17 species are also considered relevant. Also of high interest was the preparation of the diagnosis of the families Digamasellidae Evans, Laelaptonyssidae Womersley, Ologamasidae Ryke, Rhodacaridae Oudemans and Teranyssidae Halliday and of the genera of Rhodacaridae, as well as the preparation of dichotomous keys for the genera of all families and for the world species of *Gamasiphis*, one of the large genera of Ologamasidae.