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Notes on mites associated with Myriapoda
IV. New taxa in the Heterozerconidae (Acari, Mesostigmata)

by A. FAIN

Summary

Four new genera and three new species are described in the family Heterozerconidae : *Afroheterozercon ancoratus* g. n., sp. n., from the nest of termites in Zaïre; *Asioheterozercon* g. n. (type series : *Heterozercon audax* BERLESE, 1910); *Amheterozercon* g. n. (type species : *Heterozercon oudemansi* FINNEGAN, 1931); *Maracazercon joliveti* g. n., sp. n., and *Heterozercon microsuctus* sp. n., both from a diplopod in Brasil. A key is given to the genera known in this family.
Key-words : Taxonomy, Acari, Myriapoda, Termites.

Résumé

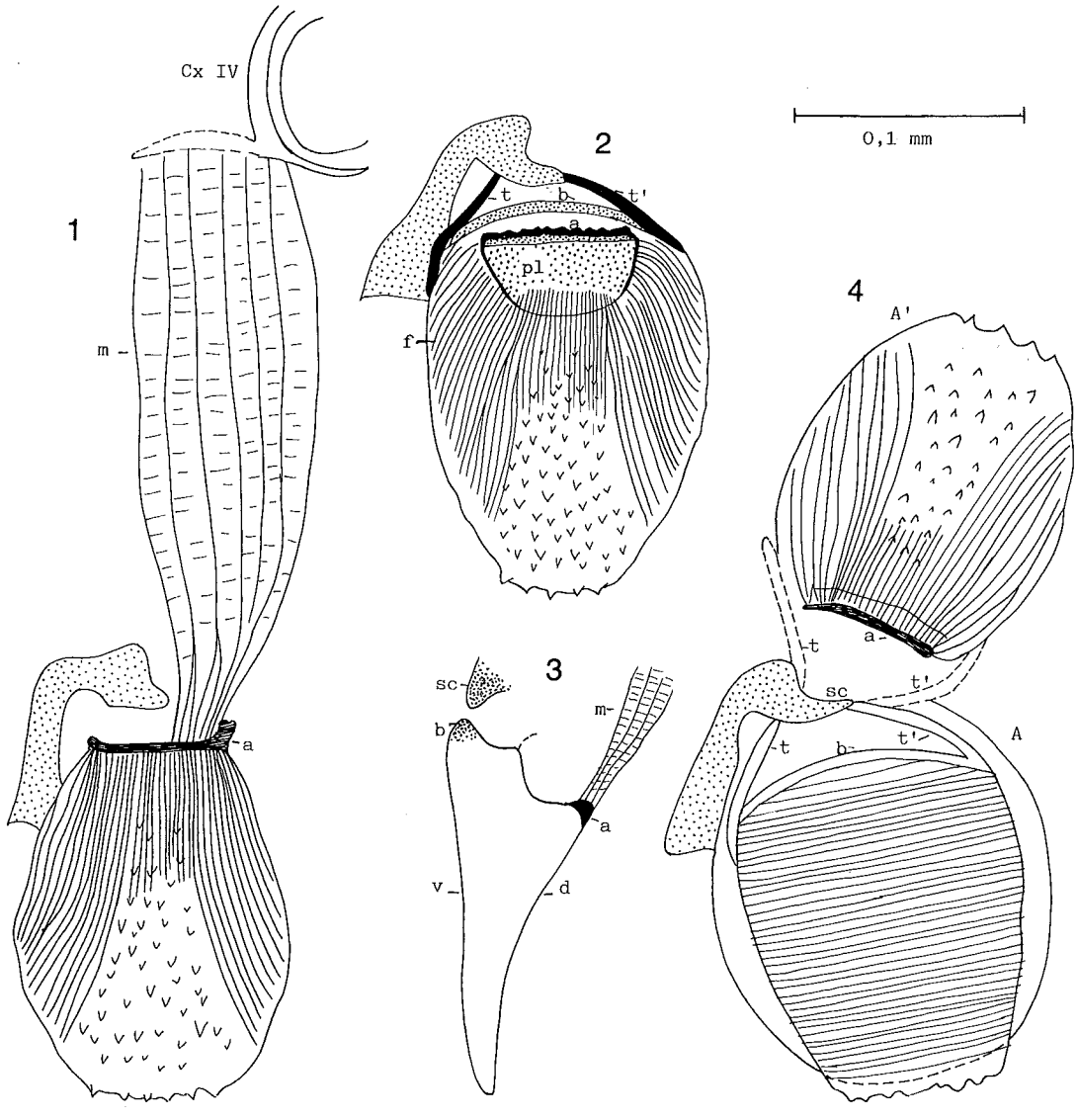
Quatre nouveaux genres et trois nouvelles espèces sont décrits dans la famille Heterozerconidae : *Afroheterozercon ancoratus* g. n., sp. n., d'un nid de termites au Zaïre; *Asioheterozercon* g. n. (espèce type : *Heterozercon audax* BERLESE, 1910); *Amheterozercon* g. n. (espèce type : *Heterozercon oudemansi* FINNEGAN, 1931); *Maracazercon joliveti* g. n., sp. n. et *Heterozercon microsuctus* sp. n. toutes deux récoltées sur un diplopode au Brésil. Une clé est donnée des genres de la famille Heterozerconidae.
Mots-clefs : Taxinomie, Acari, Myriapoda, Termites.

Introduction

This paper deals with the study of a small collection of mites of the family Heterozerconidae collected from tropical Africa and Brasil and containing 3 new species. Two of these species were found on a diplopod collected by Dr P. Jolivet (Paris) in Brasil, the third species was found by R.P. A. Bouillon (Louvain-la-Neuve) in the nest of termites in Zaïre and was deposited in the Museum of Tervuren.
The African species resembles the 2 new species that we have described recently from Zaïre but they differ markedly from those described from other parts of the world, i.e. Brasil and Malaya. Moreover, the two new species described herein from Brasil show important differences with *Heterozercon oudemansi* described from the same country. We think, therefore, that all these species cannot be included in the single genus *Heterozercon* and we propose to create 4 new genera to accomodate them.

Historical review

In 1888, Berlese described *Heterozercon degeneratus* a new genus and a new species represented by a single ovigerous female found under the bark of a tree, in Mato Grosso, Brasil.
In 1892 (p. 97), Berlese created for this genus the family Heterozerconidae.
Eigth other species have been described in this genus :
Heterozercon latus BERLESE (1901) : represented by a single female found in the nest of a termite *Anoplotermitis pacifici*, from Tacuru Pucu, Paraguay. In 1904, Silvestri redescribed the species.
Heterozercon audax BERLESE (1910) : described from *Scolopendra* sp. and *Spirostreptus* sp. from Java (male and female).
Heterozercon cautus BERLESE (1923) : represented by a male collected in East Africa. Host and locality unknown.
Heterozercon elapsus VITZTHUM (1925, 1926) represented by a single female found on *Thyropygus* (Spirostreptoidea), from Sumatra. Later on, Vitzthum found new specimens and synonymized this species with *H. audax*.
Heterozercon oudemansi FINNEGAN (1931) : represented by male and female found on a snake *Epicrates cenchris* imported from the region of Upper Amazona.
Heterozercon elegans LIZASO (1979) : represented by specimens of both sexes found on snakes : *Waglerophis merremii, Mastigodryas bifossatus* and *Erythrolamprus aesculapii*, from several places in Brasil.
Heterozercon spirostreptus FAIN (1988) : specimens male and female found on *Spirotreptus cornutus*, from the Mayumbe forest, Zaïre.
Heterozercon pachybolus FAIN (1988) : represented by only one specimen male found on *Pachybolus macrosternus* (Diplopoda), from the forest of Kwango river, in Zaïre.
The family Heterozerconidae also contains *Allozercon fecundissimus*, a genus and species created by Vitzthum (1926) and found in the soil in Buitenzorg, Java.
In the present paper we describe 4 new genera and 3 new species, all in the family Heterozerconidae.



Figs. 1-4. Afroheterozercon spirostreptus *(Fain). Structure of the sucker : 1. Dorsal (deep) surface, with its deep sclerite (a) and the muscles (m) attached to it and originating from coxa IV (cx IV). – 2. Sucker stretched, in dorsal view showing the punctate plate (pl) serving for the attachment of the fibers (f). – 3 Sucker in lateral view with the attachment sclerites (a, b and sc) and muscles (m). (Remark : v = ventral surface; d = dorsal surface). – 4. Sucker in two positions : In ventral (superficial) view (A), with its tendons (t and t') joining the sclerites b and sc. – In dorsal view (A') : same sucker turned upside down.*

Material examined

We have studied the following material :

1. Typical series of *Heterozercon spirostreptus* FAIN, *H. pachybolus* FAIN and *Afroheterozercon ancoratus* gen. nov., spec. nov.
2. Typical series of *Maracazercon joliveti* gen. nov., spec. nov.
3. Holotype male of *Heterozercon microsuctus* spec. nov.
4. Holotype female and paratype male of *Heterozercon oudemansi* FINNEGAN.
5. Paratypes, male and female, of *Heterozercon elegans* LIZASO.
6. A male and 4 females of *Heterozercon* sp. close or identical with *H. audax* and collected in Malaysia by Dr Audy.

Description of new genera

1. Genus **Asioheterozercon** gen. nov.

Definition :

In both sexes : Tarsus and tibia I much narrower than the other segments of this leg. Genito-ventral shield separated from the endopodal shields or sclerites. Anterior region of dorsum, close to the anterior margin, with 20 to 40 relatively long and stiff setae. Lateral margins of body with a few microsetae mostly situated dorsally. Posterior margin of body with a thin short membrane bearing on its dorsal surface 1 or 3 pairs of long and rather thick setae (up to 450 µm long) and 20 to 30 very thin and short setae (15 to 45 µm long). Venter with one pair of lyrifissures situated between the suckers and the lateral anal setae. Anal shield with 5 setae.

Male : Dorsal shield extending close to the anterior margin of the body and bearing the long anterior setae and laterally numerous small spines. This shield bears a network of lines and numerous microsetae. Femur II with 3 strong ventral spines foring a strong grip with 2 thick unequal ventral spines situated on genu and tibia II. Palpal trochanter with its apico-internal angle strongly produced and bearing 2 setae.
Female : Dorsal shield not reaching the anterior margin of body and bearing only the microsetae, the network of lines is lacking. Palpal trochanter with an antero-internal process prolonged by a large transparent membrane; it bears only one seta.

Type species :
Hetrozercon audax BERLESE, 1910. This species was collected from *Scolopendra* sp. and *Spirostreptus* sp. in Java.

We were not able to see the type of *H. audax,* conserved in the Berlese collection of Florence. Our generic definition is based mainly on the original description of Berlese, and also on that of Vitzthum (1925 and 1926) of his *H. elapsus,* a new species found in Sumatra and that he later considered as a synonym of *H. audax.* Moreover, we have in our collection 4 females and 1 male of a species collected by Dr Audy from a diplopod in Malaysia. These specimens agree more closely with the description of Berlese than with *H. elapsus,* because they bear on the posterior margin of the body one pair of long setae as in *H. audax* (= "*postice longe bisetus*"), while in *H. elapsus* there are 3 pairs of long setae (= "drei lange haarpare"). It is possible that *H. elapsus* is in fact, a valid species.

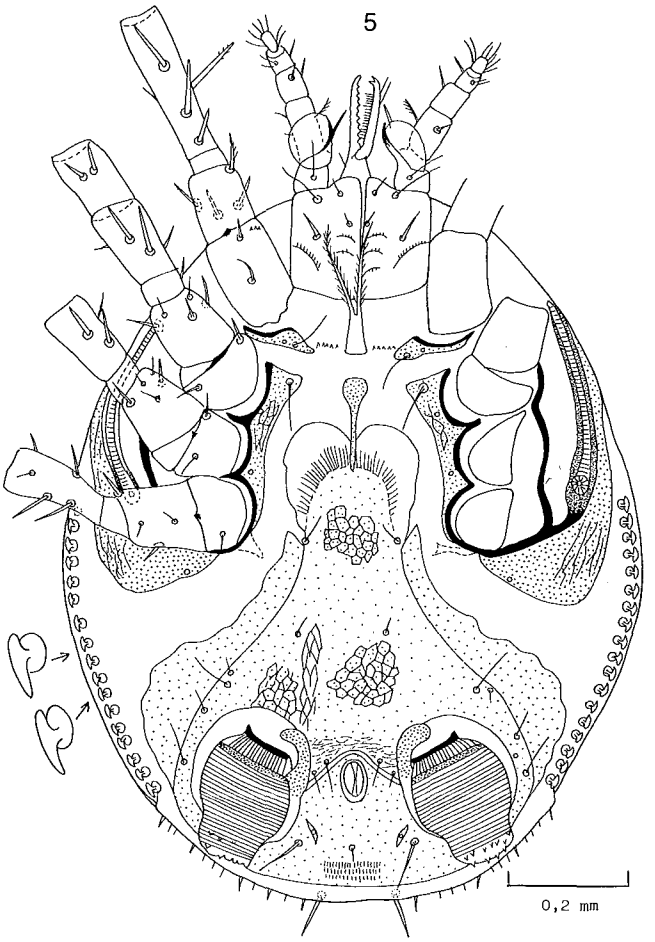


Fig. 5. – Afroheterozercon spirostreptus *(Fain). Holotype female in ventral view.*

2. Genus **Afroheterozercon** gen. nov.

Definition :
In both sexes : Tarsus and tibia I only slightly narrower than the other segments of leg I. Anterior part of the dorsum
without long and stiff setae. Lateral or latero-ventral regions of the hysterosoma with numerous small anchor-like spines. Posterior margin of body with a short membrane bearing dorsally a pair of paramedian thick setae 60-75 µm long and numerous short setae. Venter with one pair of lyrifissures situated on the anal shield, inside the lateral anal setae. Anal shield with 3 pairs of setae. Dorsal shield with a network and bearing only microsetae.
Male : Opisthogenital shield fused laterally with the endopodal and the metapodal shields. Femur II with a very thick ventral spine, the genu and tibia II without ventral spines. Palpal trochanter with a short interno-anterior process.
Female : Opisthogenital shield not fused with the endopopal or metapodal shields. Palpal trochanter with a sclerotized interno-anterior process bearing a large transparent membrane.

Type species :
Heterozercon spirostreptus FAIN, 1988 (= *Afroheterozercon spirostreptus* (FAIN, 1988 comb. nov.). Other species : *Afroheterozercon pachybolus* (FAIN, 1988 comb. nov.) and *Afroheterozercon ancoratus* spec. nov. It is possible that *Heterozercon cautus* BERLESE, 1923, described from East Africa, also belongs to this genus.

3. Genus **Amheterozercon** gen. nov.

Definition :
In both sexes : Tarsus and tibia I only slightly narrower than the other segments of leg I. Anterior region of dorsum with one pair of short setae. Dorsal shield with only microsetae and bearing a network of lines less developed in the female. Lateral margin of hysterosoma with 30-50 small conical blount spines about 30 µm long. Posterior margins of body with a short membrane bearing 28-33 spines attenuated apically, 75 to 150 µm long. Opisthogenital shield not fused with endopodal or metapodal shields and bearing 2 pairs of lyrifissures, one on the anal shield, the other immediately in front of the suckers. Anal shield with 3 setae.
Male : Femur, genu and tibia II with spinous setae, not thick spines, on their ventral surface.

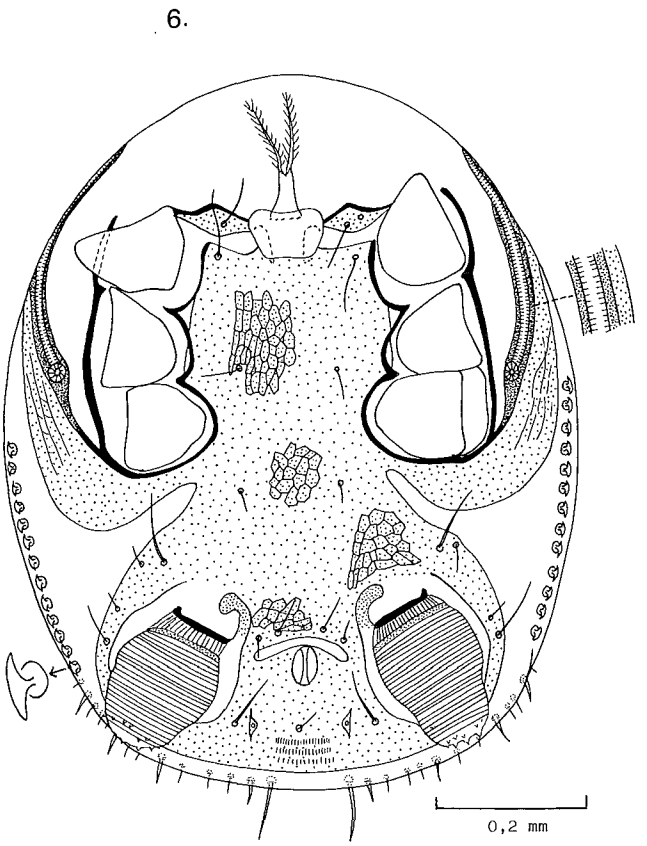


Fig. 6. – Afroheterozercon spirostreptus *(Fain). Paratype male in ventral view.*

Type species :
Heterozercon oudemansi FINNEGAN, 1931 (Syn. *Heterozercon elegans* LIZASO, 1979).

4. Genus **Maracazercon** gen. nov.

Definition :
In both sexes : Tarsus and tibia I not narrowed. Dorsal shield with a network of lines and numerous microsetae. Lateral margins and latero-ventral regions of the hysterosoma with 10-15 pairs of small conical and recurvate spines with apices oriented posteriorly and 25-30 µm long. Posterior margin of body with a short membrane bearing dorsally 25-30 setae, most of them short (15-25 µm) and very thin, and only a few slightly spinous and 30-40 µm long. Anal shield with 3 setae. Lyrifissures as in *Amheterozercon.*
Male : Absence of small setae in anterior region of dorsum. Opisthogenital shield fused laterally with endopodal shields but not fused with metapodal shields. Femur, genu and tibia II with ventral setae only slightly thicker than other setae of these segments.
Female : Anterior region of dorsum with a pair of setae 30 µm long. Opisthogenital shield not fused with endopodal or metapodal shields.

Type species :
Maracazercon joliveti spec. nov.

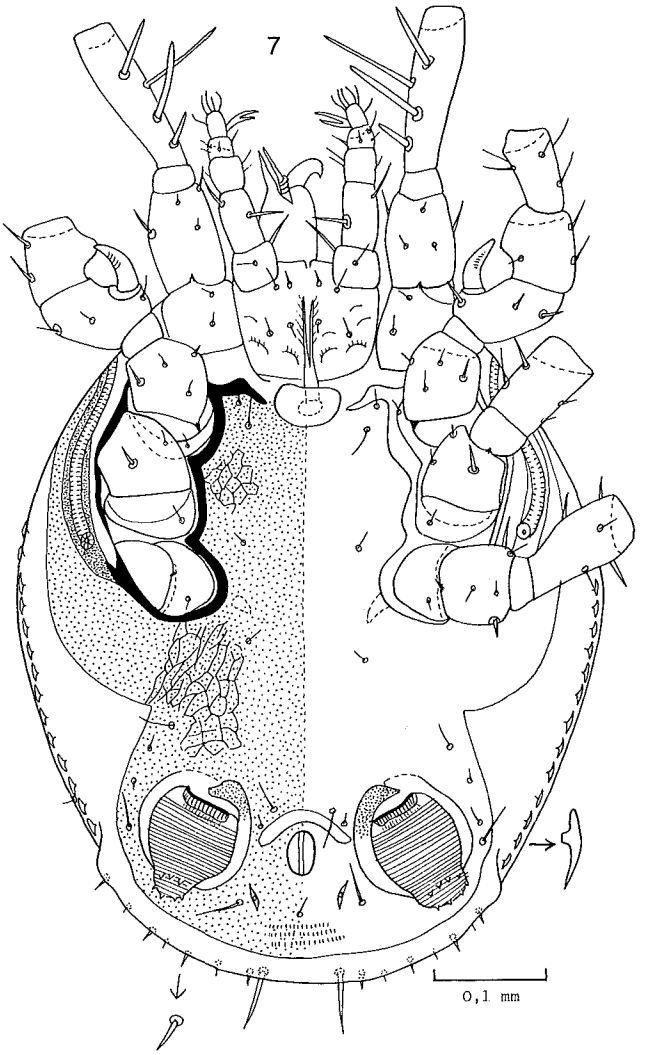


Fig. 7. – Afroheterozercon pachybolus *(Fain). Holotype male in ventral view.*

5. Genus **Heterozercon** BERLESE, 1888

The type species of this genus is *Heterozercon degeneratus* BERLESE, 1888. This species is represented by a single female deposited in the Berlese acarotheca in Firenze. he original description and figures are very incomplete and do not allow to recognize the species or the genus. We list herein the few available characters given in the description and the figures of Berlese :

1. Size of body : 1.050 µm long and 800 µm wide.
2. Suckers very small, set close to the anus.
3. Opisthogenital shield with anterior part very wide and broadly rounded.
4. Ventral spines of femur I long, equal in length and width.
5. Tarsus I with one apical thin seta much longer than the other tarsal setae.
6. Lateral margins of body lacking setae, posterior margin of body with 4 to 6 very small setae.

H. degeneratus was found under the bark of a tree in Mato Grosso, Brasil.

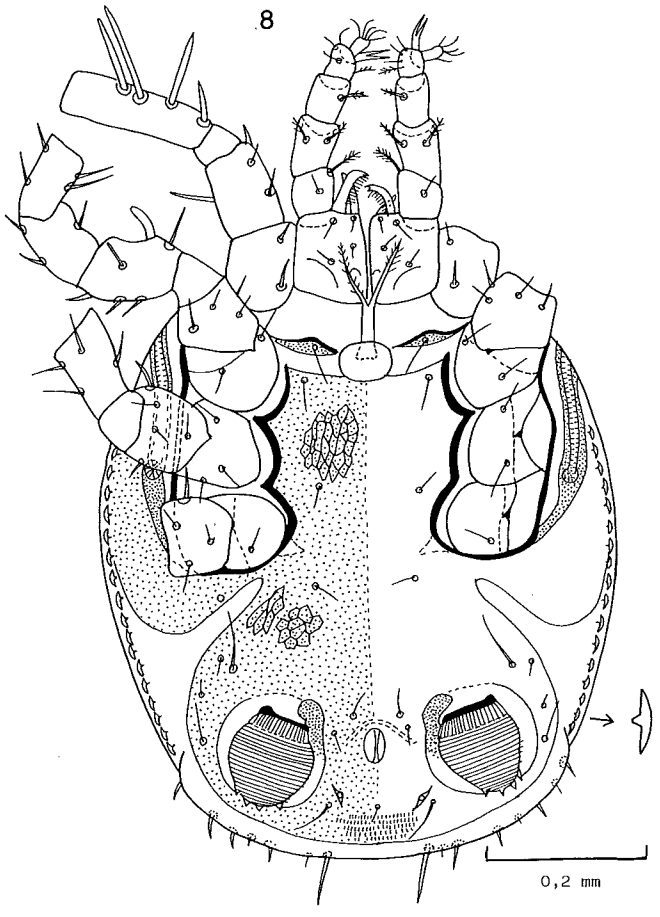


Fig. 8. – Afroheterozercon ancoratus *spec. nov. Holotype male in ventral view.*

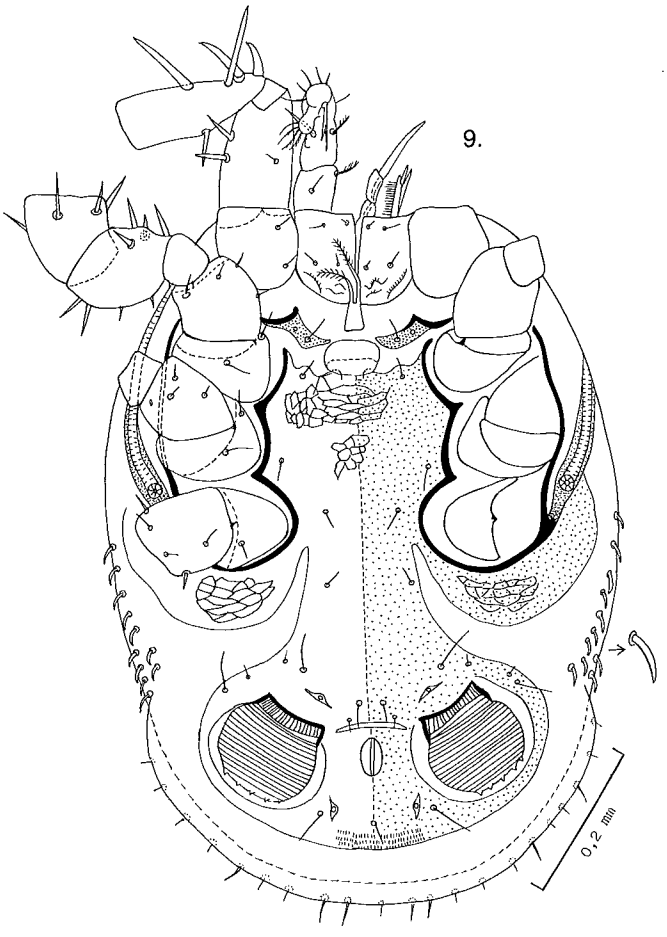


Fig. 9. – Maracazercon joliveti *spec. nov. Holotype male in ventral view.*

We describe herein a new species, *H. microsuctus,* represented by a single male found on a diplopod from Brasil. It is tentatively placed in the genus *Heterozercon* because it shows some resemblances with this genus, e.g. the small size of the suckers and of the posterior body setae.

Remarks about some organs in the Heterozerconidae

1. *Opisthogastric suckers* (figs. 1-4).

The shape and the function of the ventral suckers is until now not clearly understood.

We have dissected several paratypes of *A. spirostreptus* in order to study the different parts composing these organs. The following structures have been observed : The sucker is a disc-like organ flattened dorso-ventrally and contained in a cuplike cavity of the body. In lateral view (fig. 3) the disc is triangular with a short anterior base whose both angles (a and b) represent the lateral parts of transverse sclerotized bands. This disc is free laterally and posterelaterally and it is possible to lift it upwards and to turn it upside down (fig. 4) by inserting a thin needle beneath its posterior margin.

The anterior part of the disc is attached to the body by means of two bundles of tendons, one superficial, the other situated more deeply. The superficial tendons (t and t') arise from the lateral parts of a sclerotized band (b). They are directed forwards where they attach to the sclerite (sc) situated on the anterior margin of the sucker cavity. The deeper tendons arise from several thick bundles of muscles (m) inserted anteriorly to an internal and deep process op coxae IV. They attach to the sucker along a sclerotized band (a).

The superficial (ventral) layer of the sucker consists of a very thin tranversely striated membrane (fig. 4A). Immediately below this membrane is a layer of very thin fibrils (not depicted in the figures) apparently attached to the deep surface of the striated membrane. More deeply is a layer of thicker longitudinal fibres (f) that attach forwards to a chitinous plate (pl); these thicker fibres are poorly developed in the median area of the sucker. More deeply is a very thin non striated membrane forming the deep (dorsal) surface of the sucker. This membrane bears a variable number of triangular scales confined to the median and posterior parts of its surface (fig. 1). This transparent membrane and the scales are directly in contact with the bottom of the sucker cavity.

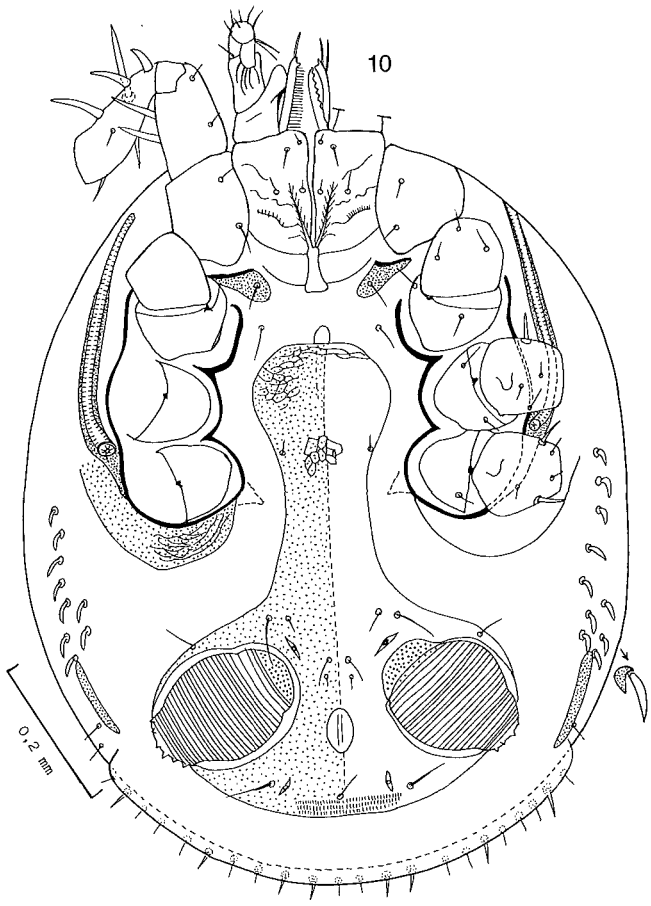


Fig. 10. – Maracazercon joliveti *spec. nov. Paratype female in ventral view.*

Function of the sucker : From the complicated structure of this organ it is possible to make a suggestion concerning the sucking mechanism. We think that the production of the vacuum necessary for the attachment of the mite to the host proceeds from a double mechanism : first the contraction of the fine fibrils attached to the deep surface of the striated membrane. By this contraction the membrane is depressed and a vacuum is produced between the membrane and the host. The second mechanism consists of the contraction of the deep muscles joining coxa IV and the deeper sclerite of the sucker (a). By this contraction the sucker is attracted inside its cavity, thus enhancing the vacuum. The role of the thicker longitudinal fibres (f) of the sucker is probably to increase the consistency of the organ. The function of the dorsal scales could be to fix firmly the dorsal surface of the sucker in the cavity during the sucking process.

2. *Lyrifissures*

There are 2 pairs of lyrifissures in the New World genera *Amheterozercon, Maracazercon* and probably *Heterozercon* and only one pair in the Old Word genera *Afroheterozercon* and *Asioheterozercon.* One pair is situated on the anal shield (present in all genera), the other on the ventral shield, immediately in front of the suckers (only in New World genera).
In the anterior part of the body there are 2 or 3 small inconstant pores which are probably remnants of lyrifissures.

3. *Chelicerae of the females* (figs. 12-14)

They are very uniform in shape in the different genera and species. The two digits are long and equal or subequal in length. The fixed digit bears a file of small teeth along its ventral border. The basal third or quart of the digit is devoid of teeth. At the base of these teeth is a spinous seta. The number of the teeth may vary according to the species. The movable digit bears a comb with very thin and rather long setiform teeth extending nearly the whole dorsal border of the digit. Ventrally this digit bears, in its apical third, 2 chitinized and transparent, generally blade-like processus. In *Maracazercon joliveti* one of these processes starts from the base of the digit.
Between the two digits we have observed the presence in all the species of 2 soft and transparent membranes inequal in length and generally bearing numerous hair-like projections. The short membrane, mostly bare, is inserted on the base of the fixed digit; the longer membrane, generally "hair-like", is inserted on the base of the movable digit (fig. 12, m and m').

4. *Chelicerae of the male* (figs. 15-22)

The scape of the male chelicerae is an important character in the systematics of the Heterozerconidae.
They consist of the following organs, from dorsal to ventral surface : dorsal digit – spermatodactyl (fused with the base of the fixed digit) – a small membrane with a few setiform processes – a large membrane with numerous setiform processes and inserted on the base of the movable digit – movable digit. The fixed digit is very short and rounded and often slightly bilobate in *Asioheterozercon* sp (specimen from Malaysia), *Amheterozercon oudemansi, Maracazercon joliveti* and *Heterozercon microsuctus.* In the 3 known species of *Afroheterozercon* it is well developed but variable in length according to the species, and attenuated at the apex.
The spermatodactyl is always twisted in its basal half; its apical half is either cylindrical and attenuated apically (in *Asioheterozercon, Afroheterozercon* and *Maracazercon*) or irregular, thicker than the basal half and with an expanded and truncate apex (in *Amheterozercon* and *Heterozercon microsuctus*).
The movable digit has a more uniform shape. It is always long and bears a comb with setiform processes extending nearly the whole length. The ventral border of this digit bears in its apical half one or two chitinous processes, either cylindrical or blade-like and variable in length.
In *Afroheterozercon pachybolus* there is a thick and long additional process between the two digits, its bears the long interdigital membrane (figs. 18-19).

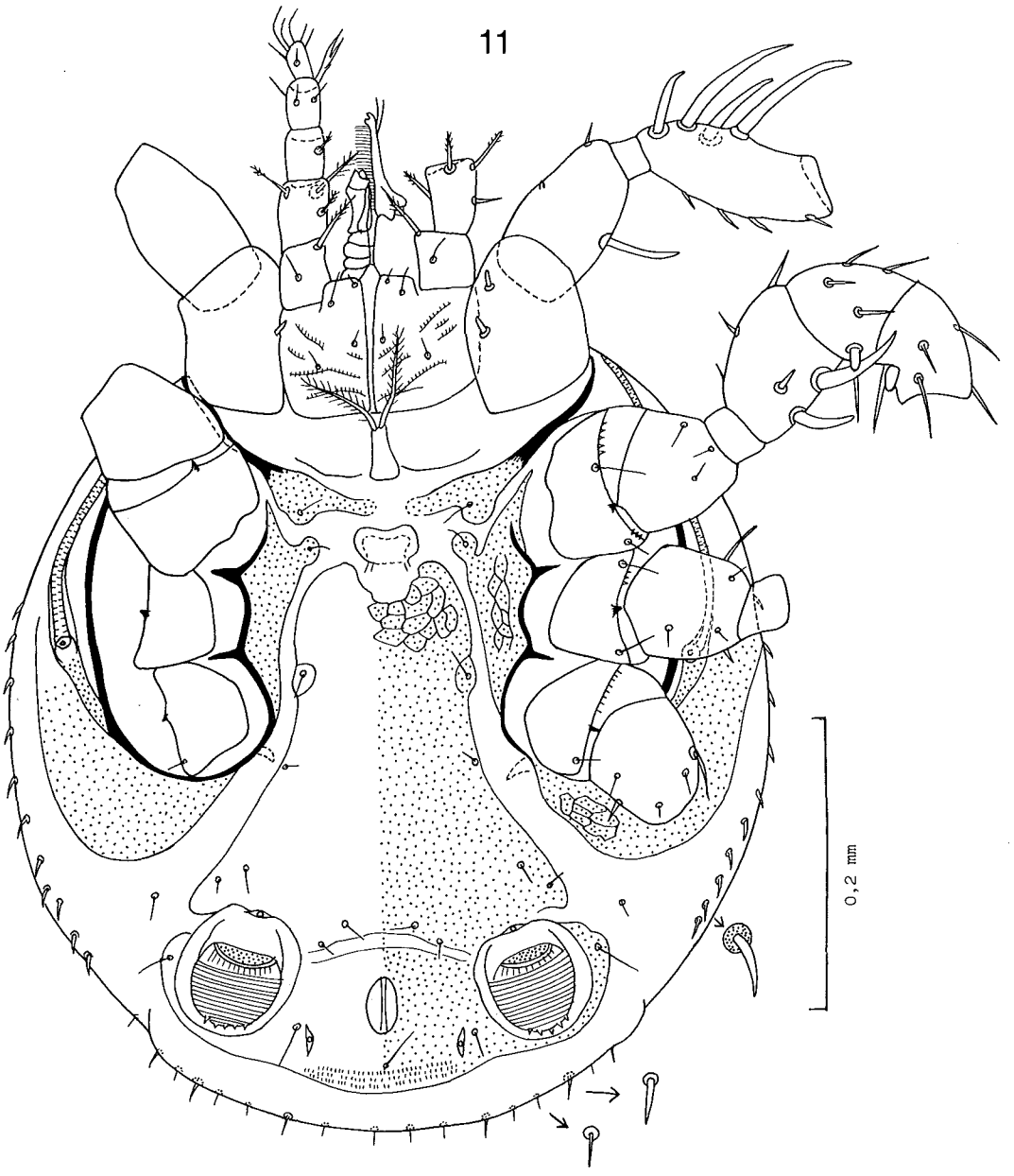
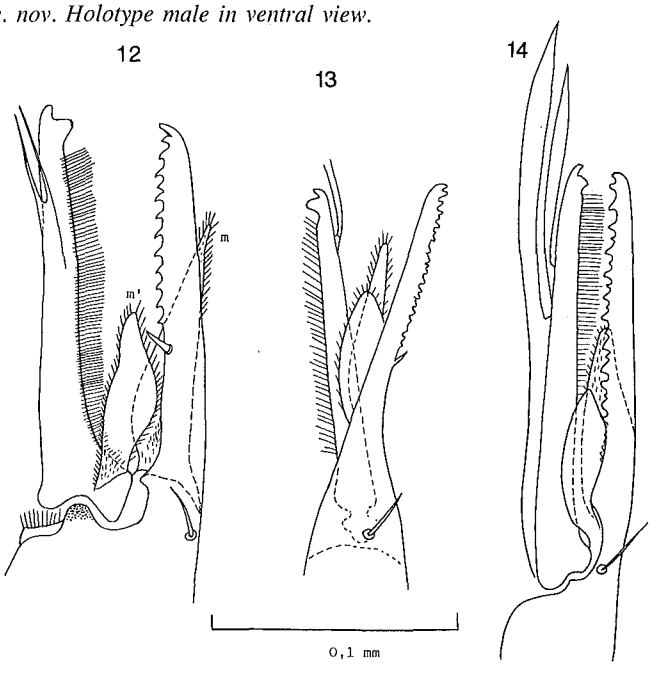


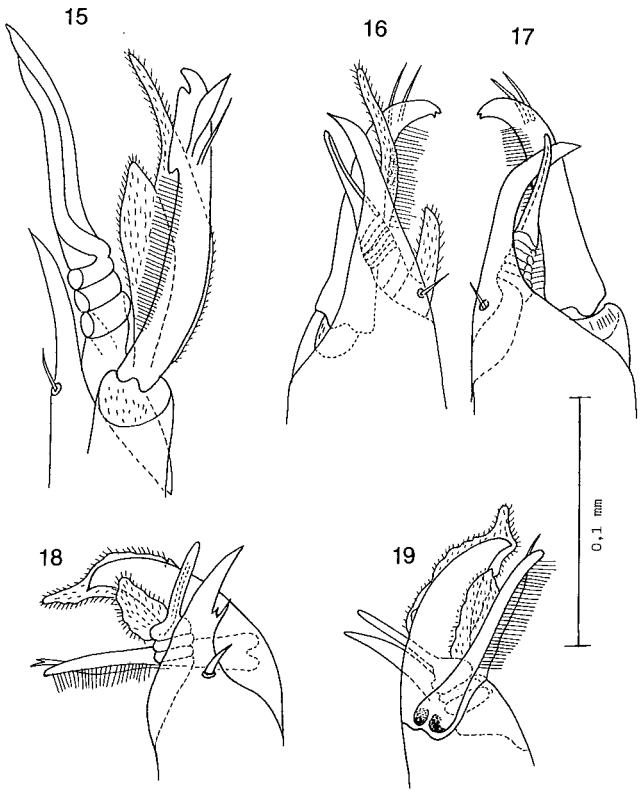
Fig. 11. – Heterozercon microsuctus *spec. nov. Holotype male in ventral view.*

5. *Chaetotaxy of the legs*

In the females of *Afroheterozercon spirostreptus, Amheterozercon oudemansi* (a specimen of *A. elegans*) and *Asioheterozercon* sp., specimen from Malaysia) the chaetotaxy of legs I-IV is as follows : Tibiae 10-8-8-8; genua 10-9-10-10; femora 11-10-7-7; trochanters 6-5-5-5; coxae 2-2-2-1. In the female of *Maracazercon joliveti* the femora bear 11-9-6-6 setae, other segments as in the preceeding species.



Figs. 12-14. – *Female chelicerae in : 12.* Afroheterozercon spirostreptus *(Fain) (in dorsolateral view). 13.* Afroheterozercon ancoratus *spec. nov. (in dorsal view). 14.* Maracazrcon joliveti *spec. nov. (in dorsolateral view) (Remark : m and m' = interdigital membranes).*



Figs. 15-19. – *Male chelicerae in the genus* Afroheterozercon *: 15.* A. spirostreptus *(Fain) (in ventrolateral view); 16 and 17.* A. ancoratus *spec. nov. (in dorsolateral view); 18.* A. pachybolus *(Fain) (in dorsal view); 19.* A. pachybolus *in ventral view.*

Tarsi II, in both sexes, with a strong apical or preapical spine in all the New World species, this thick spine is lacking in the Old World species.

6. *Other organs*

Anal shield : This shield is rarely free. Generally it is either completely or nearly completely fused with the ventral shield. This shield bears the 3 anal setae.
In *Asioheterozercon,* however it bears 5 setae. In all the species the median anal seta is followed by a cribrum much wider than long and formed of numerous very small teeth.
Gnathosoma : The hypostome is reduced and bears only 2 pairs of setae. The internal malae are membranous and the corniculi have not been observed. Deutosternum very narrow and observable only in flattened specimens, it bears in its posterior half, 4 to 5 rows of 1 to 5 very small and thin denticles. Gnathosomal base bearing 2 pairs of setae, the paramedian being slightly more anterior than the posterior one, and several transverse and rounded toothed ridges.
Lateral sclerites or shields on the ventral surface : in all the species the endopodal shields are fused posteriorly with the exopodal, the peritrematic and the metapodal shields (figs. 5-11).
Tectum : The tectum is rounded, generally poorly sclerotized and without chitinous-apical pointed processes in *Afroheterozercon.* In *Amheterozercon* the tectum is rounded and bears strong sclerotized spinelike apical processes. In *Asioheterozercon* (specimens from Malaysia) the tectum is wide and truncate with the anterior border straight and slightly serrate.

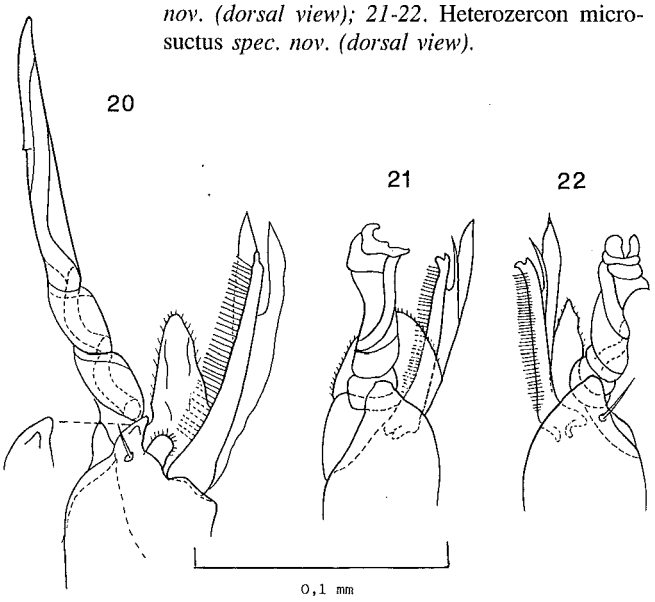
Key to the genera of Heterozerconidae

1. *In both sexes :* Tarsus and tibia I strongly narrowed, about half as wide as the genu I. Anterior region of dorsum with 20-40 stiff setae 55-90 µm long. Anal shield with 5 setae. Opisthogenital shield free, not fused with endopodal or metapodal shields. One pair of lyrifissures. Posterior margin of body with very small setae and 1 or 3 pairs of strong and long or very long setae (until 450 µm).
Male : On leg II the femur, genu and tibia bear 3, 1 and 1 thick ventral spines respectively . . . .
Asioheterozercon gen. nov.

In both sexes : Tarsus and tibia I normal, not distinctly narrowed. Anterior region of dorsum with either one pair of short setae of without setae. Posterior margin of body with setae not exceeding 150 µm in length. Anal shield with 3 setae. Other characters variable 2

2. *In both sexes :* Ventral surface with one pair of lyrifissures (situated on the anal shield). Ventrolateral regions of hysterosoma with numerous small anchor-like spines.
Male : Opisthogenital shield fused with endopodal and metapodal shields. Femur II with one very thick ventral spine; genu and tibia II with thin ventral setae.
Female : Opisthogenital shield free . . . . . .
Afroheterozercon gen. nov.

Figs. 20-22. – *Male chelicerae : 20.* Maracazercon joliveti *spec. nov. (dorsal view); 21-22.* Heterozercon microsuctus *spec. nov. (dorsal view).*



In both sexes : Ventral surface with two pairs of lyrifissures (one on anal shield and one in front of suckers). Ventro-lateral regions of hysterosoma without anchor-shaped setae. Other characters variable 3

3. *In both sexes :* Opisthogenital shield free. Ventro-lateral regions of hysterosoma with 40-50 conical and blunt species. Posterior margin of body with about 30 spines with pointed apices, the longest of about 150 µm long.
Male : Femur, genu and tibia I lacking thick ventral spines . . . . . *Amheterozercon* gen. nov.

In both sexes : Ventro-lateral regions of hysterosoma with small spines directed posteriorly. Posterior margin with only short or very short and thin setae.
Male : Opisthogenital shield either free or fused with endopodal shields. Ventral setae of femur II variable.
Female : Opisthogenital shield free in *Maracazercon* and probably also in *Heterozercon* 4

4. *In male :* Suckers well developed. Opisthogenital shield fused with endopodal and metapodal shields. Femur, genu and tibia II with short moderately thick spines or spinous setae . . . . . *Maracazercon* gen. nov.

In male : Suckers small. Opisthogenital shield free. Femur II with 2 strong inequal ventral spines, genu and tibia II with a thick and short blunt spine . . . . . *Heterozercon microsuctus* spec. nov.

Study of the species

1. **Afroheterozercon spirostreptus**
(FAIN, 1988) comb. nov.
Heterozercon spirostreptus FAIN, 1988 : 237
(Figs. 1-6; 12; 15; 23)

In our previous description we had depicted the female and the male of this species. In the meantime we have dissected the mouth parts and the suckers of this species and we can give now more complete and accurate drawings of these organs. Moreover the situation of some setae on the opisthogenital shield was not accurately depicted. For these reasons we give herein new figures of this species.

2. **Afroheterozercon pachybolus**
(FAIN, 1988) comb. nov.
Heterozercon pachybolus FAIN, 1988 : 241
(Figs. 7; 18-19; 25)

We give herein the first drawing of the ventral surface of the holotype male of this species as well as a new complete figure of the chelicerae (figs. 18-19).

This species is distinguished from the two other species in the genus by the shape of the chelicerae (with an additional sclerite between the digits) and the fusion of the jugular plates with the endopodal shields.

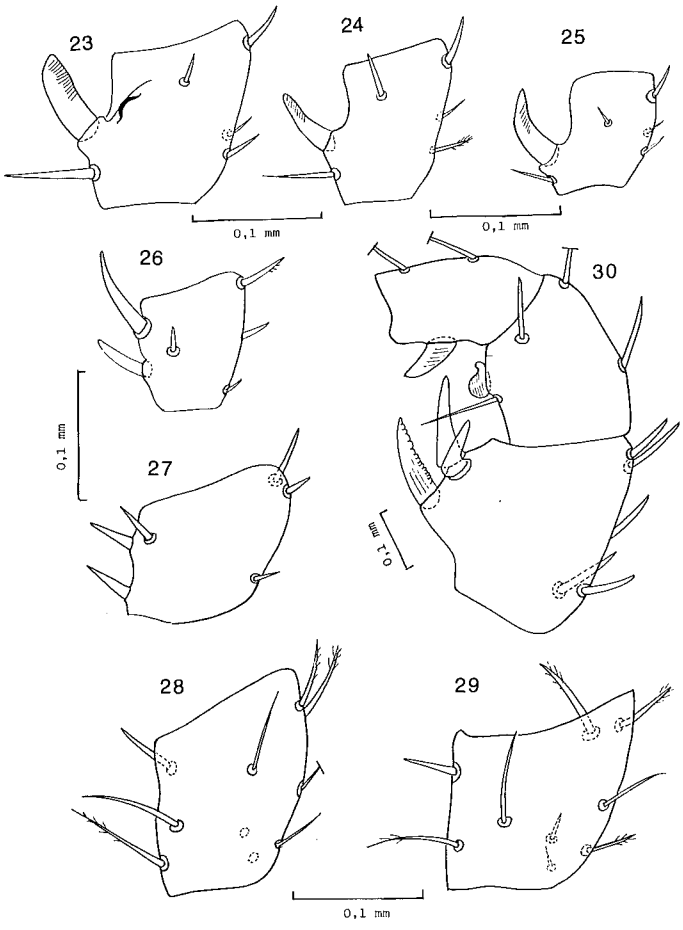
3. **Afroheterozercon ancoratus** spec. nov.

Male (figs. 8; 16-17; 24) : Idiosoma in the holotype 789 µm long and 615 µm wide (maximum width). In one paratype these measurements are 789 × 576 µm. Lateral and ventrolateral regions of hysterosoma with 16 to 19 pairs of small anchor-shaped spines, about 25 µm long. Posterior margin of the body with a membrane bearing dorsally several pairs of inequal setae : one pair is paramedian and formed of long and narrow spines 75 µm long, 4 pairs are shorter and thinner spinous setae 25-45 µm long and 3 pairs are very thin and short setae. *Ventral surface :* Jugular plates separated from endopodal and opisthogenital shields, they bear the first pair of sternal setae and a pair of pores. Opisthogenital shield fused with the endopodal shield and posteriorly to the metapodal shield; it bears 2 pairs of setae in its podosomal part and 7 pairs of thin setae and on its opisthosomal part, they are 15-80 µm long. Anal shield incompletely fused with opisthogenital shield and bearing 3 setae. *Legs :* Femur I with 4 ventral spines, the basal one distinctly shorter (45 µm) than the 3 distal ones (75-120 µm). Femur II with a strong ventral slightly curved and blunt spine, 48 µm long and 14 µm thick. Genu and tibia II with thin ventral setae. *Gnathosoma :* Fixed digit 70-80 µm long, relatively thick and curved in its apical half or third. Spermatodactyl 70-75 µm long, its straight narrow part is 30 µm long. Movable digit relatively very thick and curved apically, with a bifid apex, its length is 90 µm. Both digits separated by two inequal transparent membranes bearing setiform processes (see above).

Female (fig. 13) : The 3 females of our collection are ovigerous and contain 2 to 5 non-embryonated eggs; they measure (length × width, in µm) : 1.035 × 795; 1.010 × 816; 900 × 708. Lateral and posterior margins as in the male but the anchor-like spines are more numerous (20 to 22 pairs). *Ventral surface :* Very close to *A. spirostreptus*. *Legs :* Femur I with 4 ventral spines, the most proximal is 45 µm long, the more distal ones are 90, 105 and 75 µm long. Tarsus II without a strong subapical spine. *Gnathosoma :* Fixed cheliceral digit 115 µm long, movable digit 120 µm long.

Host and locality :
Holotype male found in a nest of termites (*Cubitermes*), near river Luki, Mayumbe forest, Bas-Zaïre. (Coll R.P. Bouillon, 23.IV.1965). Paratypes : 2 males and 3 females with the same data as holotype. Holotype in the Museum of Tervuren. One male and one female paratypes in collection of the author.

Remarks :
This species is distinguished from *A. spirostreptus* and *A.*



Figs. 23-30. – *Femur II in the males : 23.* Afroheterozercon spirostreptus (Fain); 24. A. ancoratus *spec. nov.; 25.* A. pachybolus *(Fain); 26.* Heterozercon microsuctus *spec. nov.; 27.* Maracazercon joliveti spec. nov.; 28. Amheterozercon oudemansi *(Finnegan) (paratype); 29.* A. elegans *(Lizaso) (paratype); 30.* Asioheterozercon *sp. (?* A. audax*), specimen from Malaysia (femur, genu and tibia II).*

pachybolus in the male especially by the shape of the cheliceral digits. From the first species it differs by the much shorter length of the spermatodactyl, as long as the fixed digit, while in *A. spirostreptus* the spermatodactyl is twice as long as the fixed digit. From *A. pachybolus* it differs by the thicker and curved aspect of the movable digit (thin and straight in *A. pachybolus*) and the absence of a sclerite between the two digits (a large sclerite in *A. pachybolus*). Moreover, in the male of *A. pachybolus* the opisthogenital shield is more developed than in the male of *A. ancoratus,* in its anterior part it includes the jugular shields and in its median part it is more broadly fused with the metapodal shields.

The female is very close to that of *A. spirostreptus.* It is distinguished from the latter by the smaller size of the body and of the cheliceral digits. Moreover, in the female of this new species the posterior border of coxae IV presents a small, heavily sclerotized, organ in the shape of a tube with thick walls and an expanded base (size 12 × 18 µm). The signification of this organ is unknown. We have not seen this organ in any other species of Heterozerconidae.

4. **Maracazercon joliveti** spec. nov.

This new species is named for Dr P. Jolivet (Paris) who provided us with the diplopod carrying these mites.

Male (figs. 9; 20; 27; 31) : Idiosoma, in the holotype, 870 µm long and 605 µm wide. Measurements in 3 paratypes (in µm) : 840 × 580; 835 × 590; 825 × 600. Lateral and latero-ventral regions of hysterosoma with 11 pairs of small curved cylindroconical spines with blunt apices directed backwards and 15-23 µm long. Posterior margin of body with 11 pairs of short and inequal setae, among which 7 pairs of very thin and short (10-15 µm), the other slightly spinous and longer (18-37 µm). *Ventral surface :* Opisthogenital shield not fused with the jugulars but fused with the endopodals. At the level of coxa IV this shield has a very narrow contact with the metapodal shield but more posteriorly both shields are separated by a long incision. This shield bears 9 pairs of inequal setae (15 to 55 µm) and 2 pairs of lyrifissures (one pair in front of the suckers, the other on the anal shield). Anal shield incompletely fused with opisthogenital shield and bearing 3 setae, the median shorter (30 µm) than the laterals (60-70 µm). *Legs :* Femur of leg I with 4 ventral spines measuring 45 × 12 µm and 60 × 12 µm for the two proximals and 100 × 9 and 100 × 11 µm for the two distals. Legs II thicker than the other legs, the femur II with 2 moderately thick spines with very fine apices 40 µm long and 7-8 µm thick. The genu and tibia II with slightly spinous ventral setae. Tarsus II with a voluminous preapical spine 37 µm long and 18 µm wide (at base). *Chelicerae :* Fixed digit very short, rounded and irregularly bifid. Spermatodactyl very long (160 µm), thick and twisted in its basal third or half. Movable digit 90 µm long, bearing the usual setiform processes and on its convex surface 2 chitinous transparent processes of which one starts from the base of the digit. There are 2 interdigital soft very inequal membranes.

Female (figs. 10; 14; 32) : Length and width of idiosoma in 4 paratypes (in µm) : 1.100 × 825; 1.080 × 840; 1.050 × 720; 1.020 × 790. Two of these specimens contains 2 non-embryonated eggs, another contains only one young egg and the other no eggs. Latero-ventral regions of hysterosoma and posterior margin with setae or spines as in the male. *Ventral surface :* Jugular shields free. Second pair of sternal setae situated on the soft cuticle. Opisthogenital shield completely fused with anal shield, the latter bearing 3 setae. There are 2 pairs of lyrifissures. Suckers voluminous and strongly oblique. Legs I as in the male but the femoral spines are slightly smaller. Tarsus II with a strong subapical spine smaller than in the male (33 µm long, 9,5 µm wide at its base). *Chelicerae :* Fixed digit 135 µm long, with 25-30 small and inequal teeth. Movable digit 150 µm long, bearing two transparent chitinous blade-like processes as in the male.

Host and locality
Holotype male and 8 paratypes male, 7 paratypes female collected on *Spirostreptus* sp. from Ihla da Maraca, N. Brasil (3°25' N; 6°40' W). Holotype and 3 paratypes male, 3 paratypes female in the Institut royal des Sciences naturelles de Belgique. One male and one female paratypes in the British Museum (Nat. Hist.). Other specimens in the collection of the author.

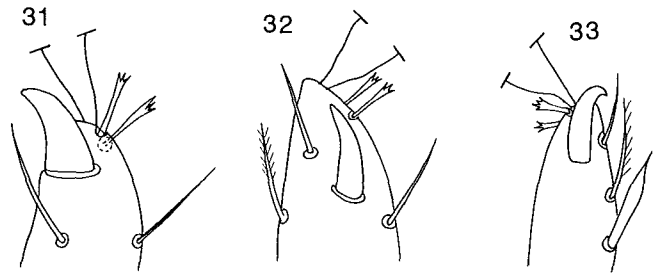
5. **Amheterozercon oudemansi**
(FINNEGAN, 1931) comb. nov.
Heterozercon oudemansi FINNEGAN, 1979 : 1349
Heterozercon elegans LIZASO, 1979 : 139. Syn. nov.
(Figs. 28-29)

We have compared the holotype female and a paratype male of *H. oudemansi* with paratypes (2 males and 1 female) of *H. elegans* and could not find any significant difference between the two species.
The actual length and maximum width (in µm) of the idiosoma of these specimens are as follows : Types of *A. oudemansi :* female 1.540 × 1.010, male 1.350 × 880; *A. elegans :* female 1.680 × 1.350; male 1.550 × 1.250. These differences in size can be explained by the fact that the types of *A. oudemansi* are strongly retracted, especially in their transverse diameter, their lateral borders being partly rolled up, probably because they had been mounted in an unsuitable medium (e.g. Hyrax). Moreover these specimens are not very clear and some characters are difficult to observe. The specimens of *H. elegans,* on the contrary, are very clear and distinctly flattened. According to the drawing of the female given by Finnegan the second pair of sternal setae is situated on the internal margin of the endopodal plate. Actually, it appears to us that these setae are situated on small rounded independant platelets, as in *A. elegans.* Moreover the anal plate in the male bears 3 distinct setae (not 2 as in the drawing) and the lyrifissures have not been depicted, the latter have also been overlooked by Lizaso. *A. oudemansi* appears to be specialized for snakes. It is known from 4 different genera and species of South American snakes (see above) and from widely remote areas in Brasil (Upper Amazona, Mato Grosso, Minas Gerais, Sao Paulo and Santa Catarina).

6. **Heterozercon microsuctus** spec. nov.

This species is known only from the male. It is tentatively placed in the genus *Heterozercon* until the female is discovered. Actually it resembles the holotype of *H. degeneratus* BERLESE by the small size of the suckers and the poor development of the chaetotaxy along the lateral and posterior margins of the body.

Male (figs. 11; 21-22; 26; 33) : Holotype 605 µm long and 540 µm wide (idiosoma). Dorsal shield covering almost the whole dorsal surface and bearing microsetae and a well-developed network pattern. Lateral borders of the hysterosoma with 11 pairs of small spines about 10 µm long and slightly curved and directed posteriorly. Posterior margin of body with a short membrane bearing dorsally 9 pairs of short setae, of which 3 pairs are slightly spinous and longer (12 µm) than the 6 other very thin pairs (6 to 9 µm). *Ventral surface :* Opisthogenital shield not fused with endopodal, metapodal and anal shields and bearing 7 pairs of setae 8 to 35 µm long. Anal shield with 3 setae. There are two pairs of lyrifissures, one on anal shield, the other in front of the suckers. The cavities containing the suckers are small (diameters 90 × 78 µm). *Legs :* Femur I with 4 strong ventral spines of which 2 are smaller (48 × 7 and 60 × 6 µm) than the other (93 × 12 and 95 × 13 µm). Femur II with 2 strong ventral spines very inequal in size (60 × 12 and 38 × 9 µm respectively). Genu and tibia II with a strong ovoid ventral spine. Tarsi II with a strong subapical hooklike spine (30 µm long and 9 µm thick). *Chelicerae :* Fixed digit very short and rounded. Spermatodactyl sinuous, thickened in its apical half and with truncated apex, it is 65 µm long. Movable digit 70 µm long with the usual comb formed of setiform processes and 2 blade-like processes very inequal in width.



Figs. 31-33. – *Apical region of tarsi II in* Maracazercon joliveti *spec. nov. male (31) and female (32) and* Heterozercon microsuctus *spec. nov. male (33).*

Host and locality
Holotype and only known specimen collected from *Spirostreptus* sp. from Ihla da Maracas, Northern Brasil (3°25' N; 61°40' W).
Holotype in the Institut royal des Sciences naturelles de Belgique.

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