

# ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN  
(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 44 no. 8

29 december 1969

---

## STUDIES ON OPILIOACARIDA (ARACHNIDA) III. OPILIOACARUS PLATENSIS SILVESTRI, AND ADENACARUS ARABICUS (WITH)

by

L. VAN DER HAMMEN

Rijksmuseum van Natuurlijke Historie, Leiden

With 5 text-figures

The present paper deals with two species of Opilioacarida, viz., *Opilioacarus platensis* Silvestri (1905) and *Adenacarus arabicus* (With, 1904). Both are already mentioned in the first part of my series of studies on Opilioacarida (Van der Hammen, 1966); at that time I had seen only their original descriptions. Recently, however, I have been able to study specimens of both species. The material of *O. platensis* was kindly put at my disposal by Dr. E. Piffel (Vienna), who discovered it among material collected by Mr. O. Wölke in South Brazil. Through the kindness of Dr. S. L. Tuxen (Copenhagen), I was enabled to examine personally the holotype and single known specimen of *A. arabicus*. It is a pleasure to me to express here my sincere thanks to Dr. Piffel, Mr. Wölke, and Dr. Tuxen for their valuable contributions to my studies of the Opilioacarida.

Both species dealt with here have been described shortly after the first discovery of Opilioacarida. Of both species, new records had never been published. Although the two original descriptions are rather detailed, a number of characters of interest to me had not been mentioned. This is especially important in the case of *A. arabicus*, because it represents a genus of which the diagnosis was based on the original description only. In the case of *O. platensis* the material extended, moreover, our knowledge of the geographical distribution of the species.

The paper is composed in the following way. After the redescrptions, a revised diagnosis is given of the genus *Adenacarus*. This is followed in its turn by a series of remarks on subjects of general importance, and by addi-

tions to the glossaries published in the first and second parts of the present series (Van der Hammen, 1966, 1968). Just as in these parts, an alphabetic list of abbreviations, a summary, and a list of references conclude the paper.

***Opilioacarus platensis* Silvestri, 1905**

Locality. — Sinumbu (29° 30' S. lat., 52° 30' W. long.), South Brazil; altitude 200 m.

Materials. — Twenty-nine specimens, viz., two deutonymphs, six female tritonymphs, two male tritonymphs, six adult females, thirteen adult males; leg. O. Wölke, don. Dr. E. Piff. l.

The specimens are in a rather bad condition. The colour is poorly preserved, partly because in many cases the interior has contracted. Leg I was lacking in all specimens studied by me; legs II, III, and IV were present in a number of cases (a great number of loose legs, at the bottom of the tube, were of little use). Some specimens returned more or less to their original shape when a small hole was made in the opisthosoma with the aid of a minution needle, and when thereupon they were very gently warmed in diluted lactic acid. After all, the complete material together appeared suited for a partial redescription of the species.

Identity. — I have not studied the type material of the present species, although it is still preserved in the "Istituto di Entomologia" in Portici (Napoli), Italy. However, there can be no doubt about the identity of the material studied here.

The measurements of our specimens are in accordance with those mentioned by Silvestri, as far as the lengths of idiosoma and legs are concerned; the breadth of the idiosoma as mentioned by Silvestri is too large, probably because of pressure by the cover slip.

The number of setae on sternal and genital verrucae as figured by Silvestri falls within the range of the present material.

Measurements. — Length, breadth (in mm), and ratio length : breadth of both sexes, and of all stases present in the material, are given in table 1 (averages are placed between brackets).

Table 1. Measurements of sexes and stases

	length	breadth	ratio length : breadth
deutonymph	0.83-0.88 (0.86)	0.42-0.44 (0.43)	2.00
female tritonymph	1.13-1.27 (1.21)	0.53-0.63 (0.58)	2.01-2.15 (2.09)
male tritonymph	1.00-1.03 (1.01)	0.50-0.52 (0.51)	2.00
female	1.19-1.88 (1.55)	0.56-0.88 (0.73)	2.04-2.25 (2.13)
male	1.32-1.55 (1.42)	0.62-0.73 (0.69)	1.98-2.18 (2.04)

Length and breadth (and to a less degree the ratio length : breadth) increase from the immature stases to the adult. Although the measurements of both sexes overlap, the average female is slightly larger than the average male; as a rule, males are relatively broader than females.

Because none of the specimens presented a complete series of appendages (leg I, moreover, was absent in all cases), the measurements of the legs are obtained by combining the available data of the material. The ratio length of the leg : length of the idiosoma is given in table 2.

Table 2. Ratio length leg: length idiosoma

leg II ♂	1.11-1.25
leg III ♀	1.08-1.14
leg III ♂	1.05-1.31
leg IV ♂	1.86-2.00

Probably, leg I of the species is slightly longer than leg IV (as in other species of *Opilioacarus*). Consequently, all legs of the species are probably longer than the body; this is indeed mentioned by Silvestri (1905).

Habitus and colour. — The specimens present the typical habitus of an Opilioacarid. As mentioned above, the colour is poorly preserved. A comparative study of the complete material, however, results in the following description. The rostrum and the lateral borders of the prodorsum are blue; the median part of the prodorsum presents two longitudinal blue stripes. The opisthosoma presents dorsally a number of transverse, segmentally arranged blue stripes. The legs are more or less ringed; between the blue parts the cuticle is greenish.

Cuticle. — The cuticle presents the normal sculpture of small cones.

Prodorsum. — The papilliform setae of the prodorsum are slightly longer than in *O. texanus* (Chamberlin & Mulaik). There are two pairs of eyes, and a distinct oculorostral groove.

Opisthosoma. — The disposition of the stigmata is slightly different from that of *Opilioacarus texanus*: stigmata 4 are more widely separate than stigmata 3 (cf. fig. 1 D, E); a laterodorsal view of one of the stigmata is represented in fig. 1C.

Segment XVIII presents three setae: an unpaired dorsal one ( $pd_x$ ) and a pair of lateroventrals (fig. 2A, B:  $pa_1$ ), just as in *O. texanus*.

Anal tubercle. — A comparative study of the anal tubercle in the extensive material, demonstrates that it does not consist of two segments, as I supposed

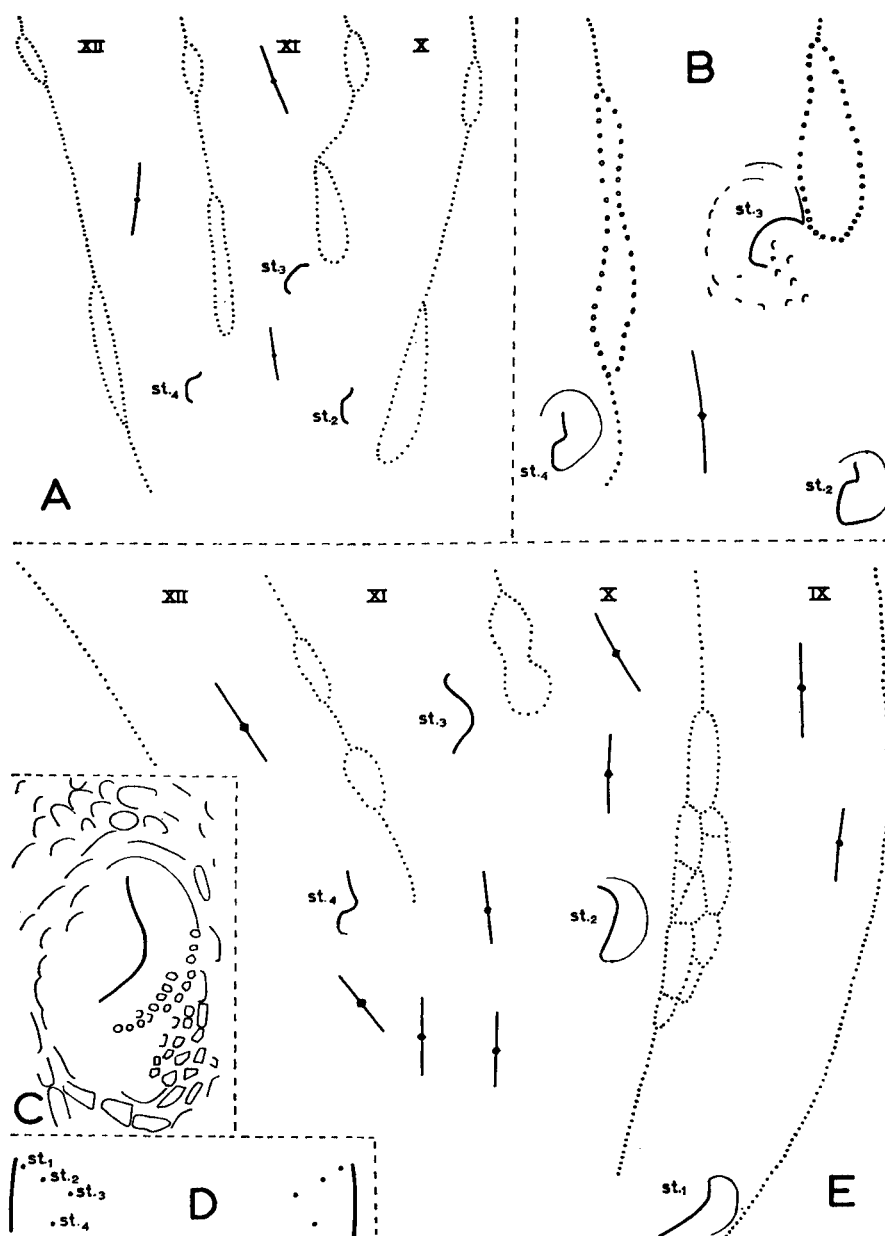


Fig. 1. *Opilioacarus platensis* Silvestri; A, laterodorsal view of stigmata of deutonymph; B, idem, enlarged detail; C, laterodorsal view of stigma 3 of adult female; D, disposition of stigmata in adult female (schematized dorsal view); E, laterodorsal view of stigmata of adult female; A, E,  $\times 370$ ; B, C,  $\times 710$ ; D,  $\times 55$ .

in my study of *O. texanus* (cf. Van der Hammen, 1966), but of only one segment; there is one serie of muscles. Consequently, the total number of segments is nineteen instead of twenty. The anal orifice can not only be closed, but also retracted, resulting in an apparent disappearance of the

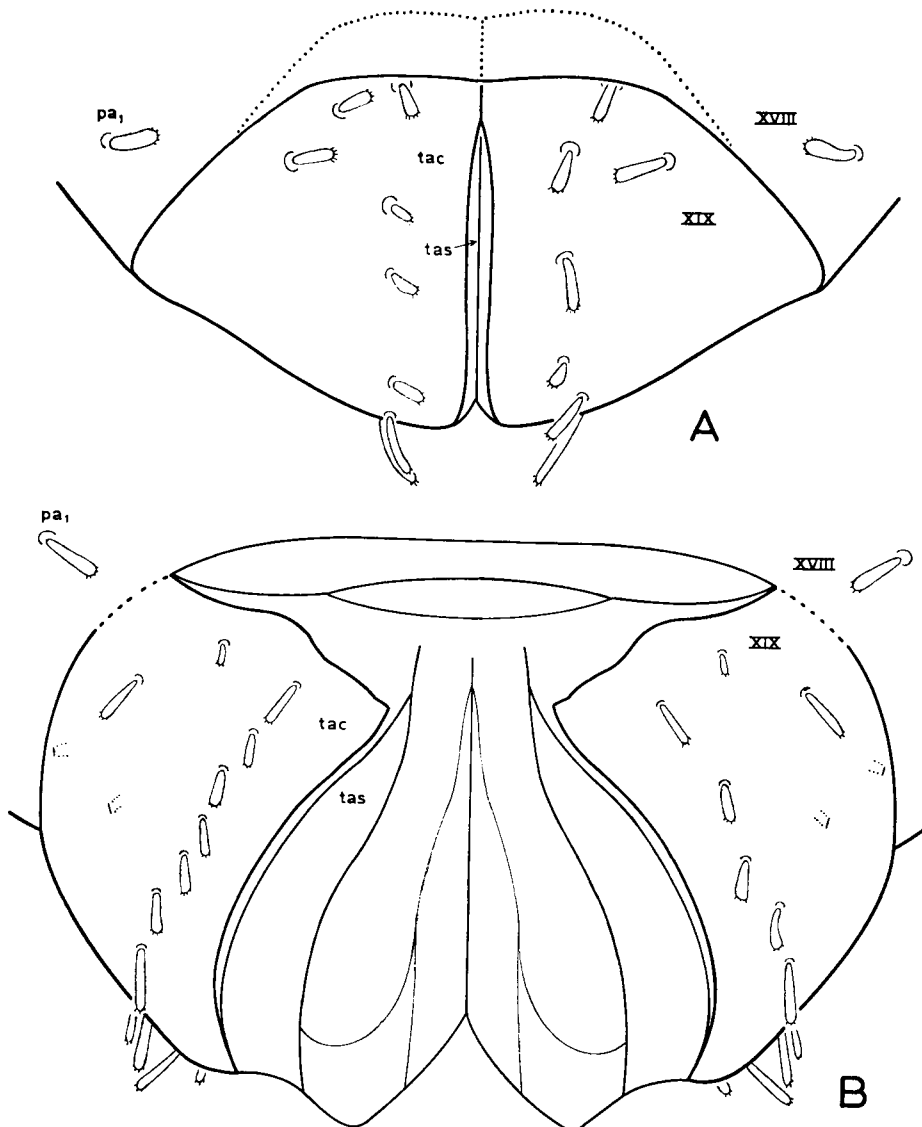


Fig. 2. *Opilioacarus platensis* Silvestri, anal tubercle; A, retracted with anal orifice closed (drawn after a male); B, extended with anal orifice opened (drawn after a female); A, B,  $\times 370$ .

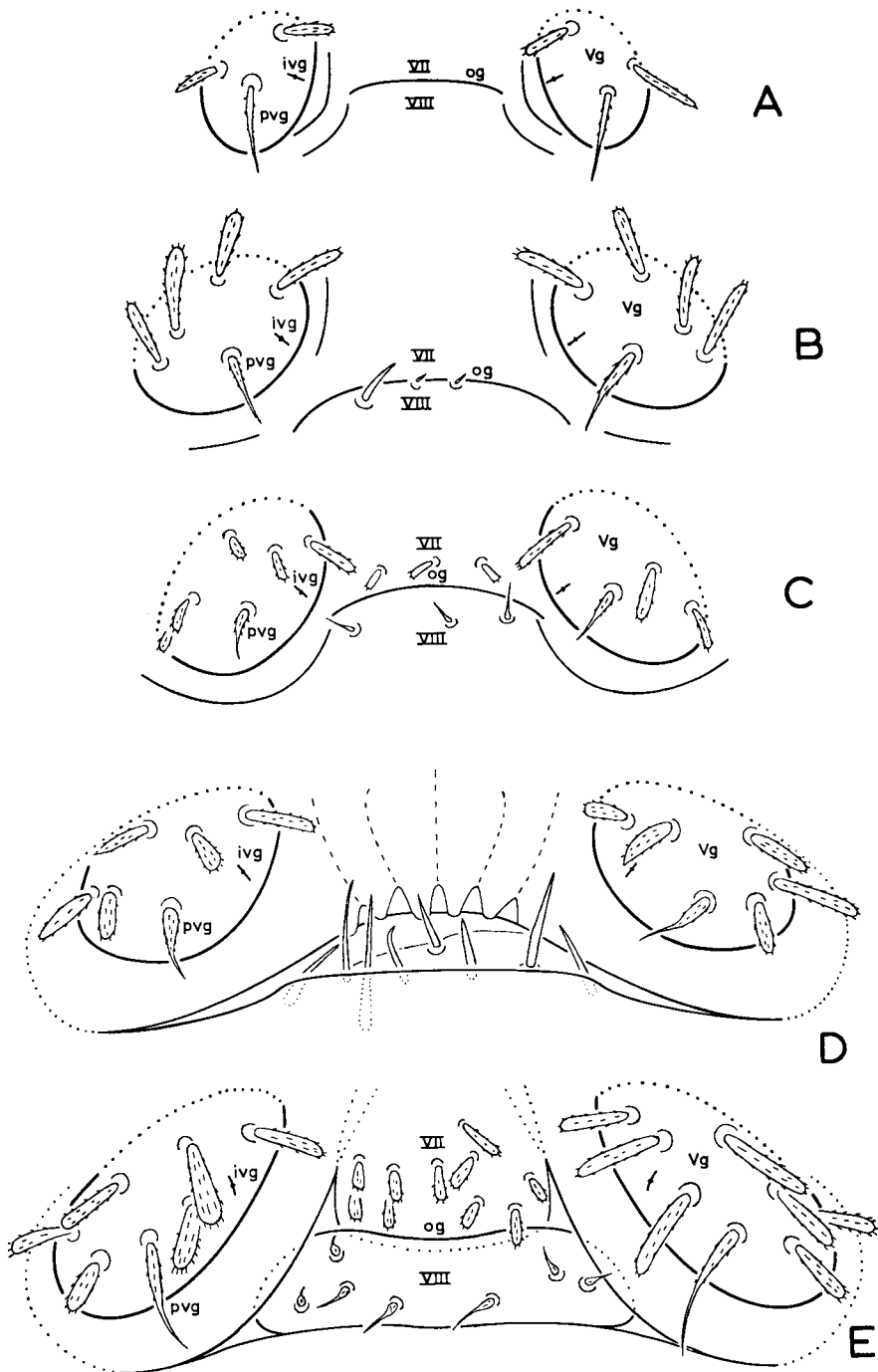


Fig. 3. *Opilioacarus platensis* Silvestri, genital region; A, deutonymph; B, female tritonymph; C, male tritonymph; D, female (folded condition probably caused by egg laying); E, male; A-E,  $\times 370$ .

separate tubercle (cf. fig. 2A, B). This explains for instance the apparent absence of one opisthosomatic segment in the original figure of *Paracarus hexophthalmus* (Redikorzev).

Genital region. — The genital verrucae each present one composite seta and five or six (rarely four) papilliform setae in the female (fig. 3D), and four to six (rarely seven) in the male (fig. 3E). The female pregenital area was covered by a fold in all females studied here; there are possibly no pregenital setae (in one case, I doubted whether there were two). The male pregenital area presents six to ten papilliform setae, arranged in two or three irregular rows. The female presents six to nine pointed genital setae, the male five to ten; those of the male are probably composite.

Sternal region. — The sternal verrucae each present in both sexes one composite seta, two or three (rarely four) spiniform setae, and one lyrifissure (*ivs*) (cf. fig. 4A). Sometimes the spiniform setae present small branches. The sternapophyses present the usual two setae: one terminal and one lateral (antaxial).

Gnathosoma (fig. 4C). — The cheliceral frame consists of the small tegulum, the synaptic tectum, and the cheliceral sheaths; these have nearly the same shape as in other known species of Opilioacarida.

The infracapitulum presents the usual types of infracapitular setae. The rutellum has five more or less equal teeth; the basal tooth is smaller than in *O. texanus*. With's organ is disk-shaped. The corniculus (*pl*<sub>1</sub>) is rather small. The usual four circumbuccal setae are all present. In both sexes there are constantly one *lvm*, one *ldm*, and one *lvph*. The other infracapitular setae are variable in number: 2-4 (♀) or 1-3 (♂) *vm*; 0-2 or 3 *lm*, 1-3 (♀) or 0-2 (♂) *vp*; these numbers are not completely certain because displacements often occur.

Chelicera. — The cheliceral trochanter presents one dorsal seta (*cht*), the principal cheliceral segment three setae with a more or less laterodorsal position (*ch*<sub>1</sub>'', *ch*<sub>2</sub>'', *ch*<sub>2</sub>'). Position and size of these setae resemble those of *O. texanus*.

Palp. — The palp resembles that of *O. texanus*. The chaetotaxy has not been studied in detail.

Legs. — The measurements (lengths) of the leg segments (only of those legs that were present) are given in table 3 (measurements are in mm).

As mentioned above, all legs are longer than the body (presupposed that leg I is indeed also longer than the body). In those specimens where legs II and III were both still present, leg II was always slightly longer than leg III. The legs present the same primary and secondary segments as in *O.*

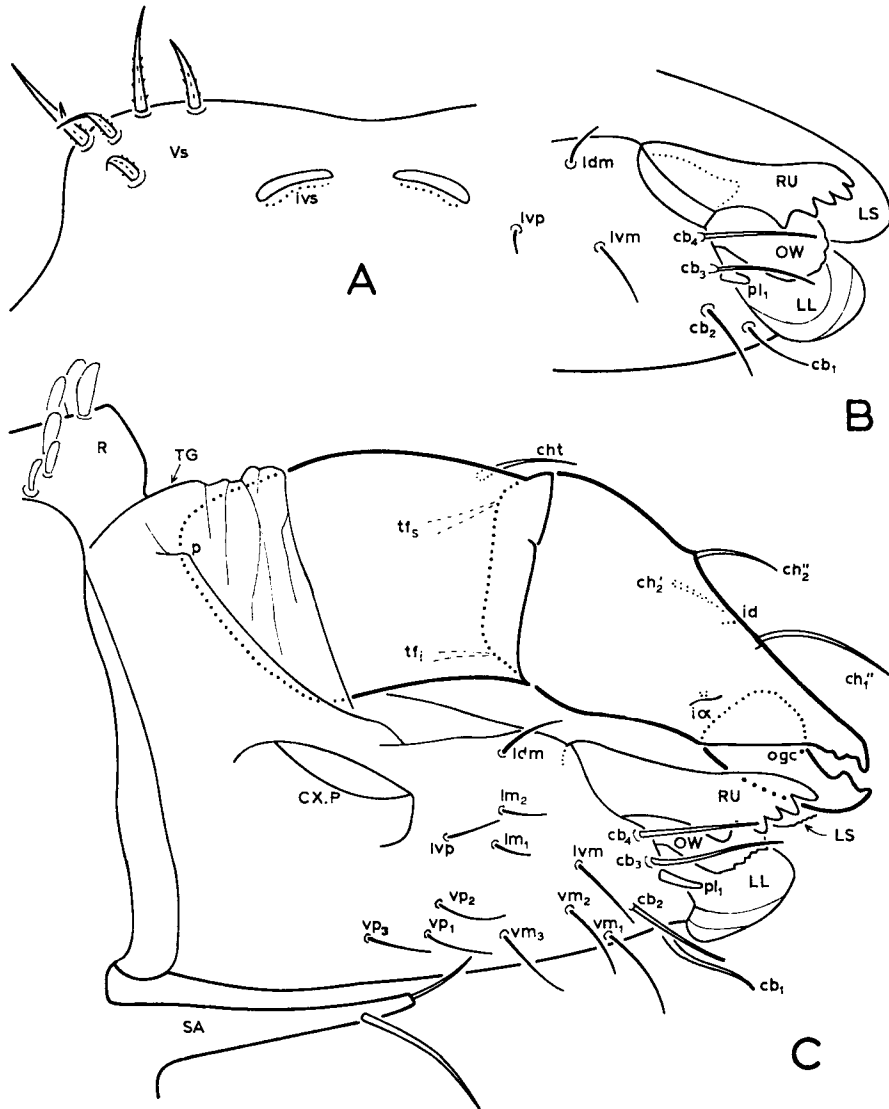


Fig. 4. *Opilioacarus platensis* Silvestri; A, sternal verruca of adult female; B, infracapitulum of deutonymph (lateral view); C, gnathosoma of adult female (lateral view); A, B,  $\times 370$ ; C,  $\times 235$ .



Table 3. Measurements of the leg segments

	leg II ♂	leg III ♀	leg III ♂	leg IV ♂
trochanter 1 or trochanter	0.18-0.20	0.15-0.16	0.13-0.15	0.20-0.26
trochanter 2		0.12-0.15	0.10-0.12	0.18-0.19
femur	0.41-0.46	0.35-0.44	0.34-0.39	0.52-0.59
genu	0.23	0.24-0.31	0.22-0.25	0.34-0.40
tibia	0.21-0.26	0.26-0.31	0.25-0.28	0.45-0.49
basitarsus	0.28-0.29	0.28-0.37	0.27-0.30	0.37-0.41
telotarsus (incl. acrotarsus, pretarsus, and apotele	0.34-0.37	0.32-0.40	0.31-0.32	0.38-0.43
Total 1)	1.70-1.77	1.72-2.14	1.62-1.82	2.46-2.78

1) The total numbers represent the total lengths of individual legs; they are not obtained by simply adding the numbers in each column.

*texanus*. Trochanter II and trochanter 1 III present the usual dorsal apophysis *AT*. Tibia and basitarsus III present a dorsal row of curved solenidions, which nearly reach the apical part of the basitarsus.

Development. — The material studied here comprised two deutonymphs, six female tritonymphs, and two male tritonymphs. The stases differ in size (female tritonymphs, moreover, are slightly more slender). They are also recognizable by a number of other characters (number of stigmata, various numbers of setae).

The deutonymph has only three pairs of stigmata; stigma 1 is absent, although segment IX is present (cf. fig. 1A, B). All stigmata are present in the tritonymph.

Segment XVIII has three setae in deutonymph, tritonymph, and adult. With's organ is present in all cases.

The numbers of setae on sternal and genital verrucae, in the pregenital and genital regions (cf. fig. 3), and the numbers of infracapitular and cheliceral setae, are listed in table 4 (an asterisk (\*) indicates that it concerns a composite seta).

The complete number of circumbuccal setae, and of *lv**m*, *ldm*, and *lv**p* is already present in the deutonymph (fig. 4B); this number persists in tritonymph and adult. The numbers of setae of tritonymphal origin are apparently less stable.

The deutonymph has only a small number of setae on sternal and genital verrucae; these, however, still fall within the range of the tritonymph.

The dorsal seta of the cheliceral trochanter lacks in the deutonymph and in part of the tritonymphs.

Apart from the size, the different stases can be distinguished with certainty in the following way. The deutonymph has only three pairs of stigmata. The

Table 4. Numbers of setae in various stases

	deutonymph	female tritonymph	male tritonymph
<i>Vs</i>	1 + 1*	(1-4) + 1*	2 + 1*
<i>Vg</i>	2 + 1*	(2-4) + 1*	(3-5) + 1*
pregenital	0	0	3-5
genital	0	0-5	3-4
<i>cb</i>	4	4	4
<i>vm</i>	0	0-3	0-1
<i>lvm</i>	1	1	1
<i>lm</i>	0	0-3	0-1
<i>ldm</i>	1	1	1
<i>vp</i>	0	0-2	1-2
<i>lvp</i>	1	1	1
cheliceral trochanter	0	0-1	0-1
principal chel. segment	2-3	3	3

female tritonymph has no pregenital setae. The male tritonymph presents a variable number of pregenital setae. The genital setae of female tritonymph and of adult female are spiniform; those of male tritonymph and of adult male are apparently composite.

Geographical distribution. — The species was known from Posadas (Argentina) and Salto (Uruguay). It is here recorded from Sinumbu (South Brazil). Sinumbu is roughly about 400 km SE of Posadas, and 950 km NE of Salto. The known area of distribution in South America extends now from 22° 25' to 31° 27' S. lat., and from 57° 50' to 52° 30' W. long.

Relationship and diagnostic characters. — The species is closely related to *O. texanus* by most of its characters, and especially by the presence of three setae on segment XVIII (according to preliminary observations this number is five in *O. segmentatus* With). It can at once be distinguished from both species by the relative length of legs II and III (longer than the body). The ratio length : breadth of the idiosoma of *O. platensis* is about equal to that of *O. segmentatus*, but smaller than that of *O. texanus*.

#### **Adenacarus arabicus** (With, 1904)

Locality. — Aden.

Material. — One male specimen, labelled "*Eucarus arabicus*, typ. With"; it forms part of the Collection of the Universitetets Zoologiske Museum, Copenhagen, Denmark (collection number 19159). Without doubt the specimen represents the holotype, originating from the E. Simon Collection. It is the single known specimen of the species. It is not in a very good condition: the opisthosoma is slightly deformed and damaged; all appendages (chelicerae, palps, and legs) are missing. However, all details of interest to me

(with the exception of the appendages) were still distinctly visible, although the specimen had to be handled with the utmost care.

Identity. — Because the specimen represents the holotype, there can be no doubt about its identity.

Measurements. — Length of the idiosoma of the single specimen studied here 1.79 mm; breadth about 0.87 mm (the opisthosoma is damaged in its broadest part); ratio length: breadth about 2.0. With (1904: 186) mentions 1.80 mm as length, and 0.50 mm as width; the last-mentioned record is certainly an error (probably due to a misprint).

According to With the length of leg II is 2.60 mm; the length of leg III 2.40 mm. These two legs were still present when With prepared the original description of the species; at that time legs I and IV, however, were already missing (these legs will be much longer than legs II and III, so that all legs will be longer than the body). All appendages are now lacking; slides of legs II and III are not present in Copenhagen.

Habitus and colour. — The specimen studied here has the typical habitus of an Opilioacarid. The prodorsum presents a bluish pattern; light parts are especially present around the dark violet eye-patches, and in front of the transverse prodorsal furrow. The opisthosoma presents dorsally vague, bluish, segmental stripes. Gnathosoma and coxae of the legs are vaguely bluish; the ventral surface of the idiosoma in pale.

Cuticle. — The cuticle of the species presents the usual sculpture of numerous small cones.

Prodorsum. — The papilliform setae of the prodorsum are rather long. There are two pairs of eyes. The oculorostral groove is distinct.

Opisthosoma. — The stigmata have nearly the same disposition as in *Opilioacarus platensis* (cf. fig. 1D); stigmata 4 are more widely separate than stigmata 3. No setae are present on segment XVIII, just as in *Paracarus hexophthalmus*.

Anal tubercle. — The anal tubercle (segment XIX) presents numerous papilliform setae. It is the only setae-bearing segment of the opisthosoma (with the exception of the genital region).

Genital region. — The single specimen studied here represents a male. The genital verrucae each bear five or six papilliform setae and one composite seta. The sculptured pregenital area presents ten pointed setae arranged in two irregular rows. The genital segment is ventrally folded; apparently it presents five pointed (probably composite) setae.

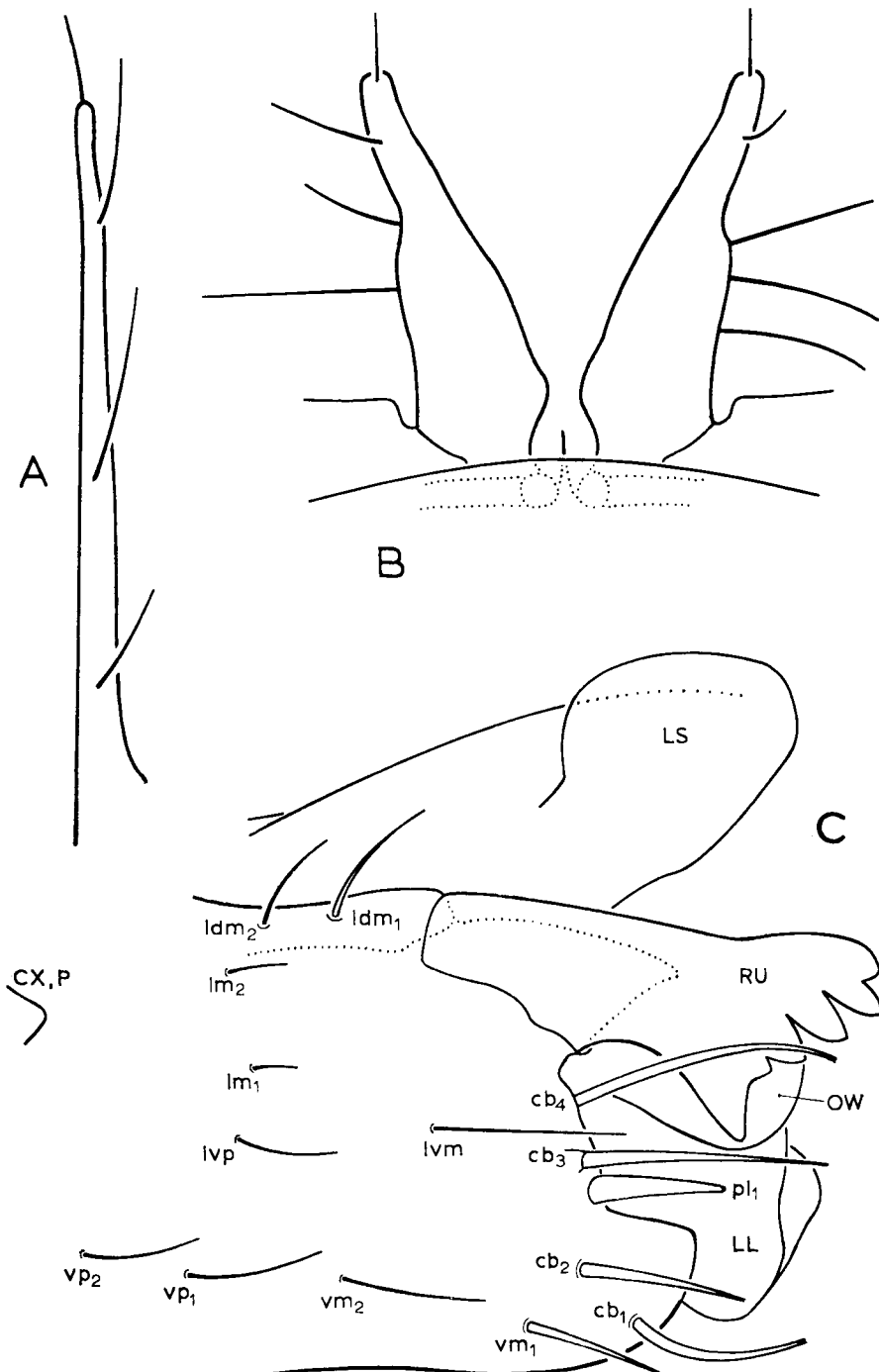


Fig. 5. *Adenacarus arabicus* With), male; A, lateral (antiaxial) view of right sternapophysis; B, oblique view (ventral and frontal) of pair of sternapophyses; C, lateral view of infracapitulum; A-C,  $\times 490$ .

Sternal region. — The sternal verrucae each present one or two spiniform setae and one composite seta. According to With (1904 : 176, 183), the sternapophyses each bear three median, outwardly directed setae, beside the terminal one. The right sternapophysis presents indeed one terminal and three antiaxial setae; the left, however, presents one terminal and four antiaxial setae (cf. fig. 5B). The antiaxial setae are rather long. The sternapophyses have a rather broad base when studied in ventral view; in lateral view, however, it appears that dorso-ventrally they are strikingly flattened (cf. fig. 5A).

Gnathosoma. — In the specimen studied here, the chelicerae are absent. The short tegulum and the synaptic tectum are both present.

The infracapitulum (fig. 5C) presents the usual type of infracapitular setae. The rutellum presents six teeth, the proximal of which is distinctly larger; one of the teeth is characterized by With as a secondary basal tooth of the large posterior one; this small tooth is situated in front of the large one. With's organ, which was thought to be absent by With, is present in its usual shape. The corniculus is rather long. The four circumbuccal setae are present; they have their usual, more or less curved shape; their tips are slightly split. There are three *vm* setae, one *lvm*, one or two *lm*, two *ldm*, two *vp*, and one *lvp*.

Appendages. — As mentioned above, all appendages are lacking. According to With (1904 : 183), the chelicerae have the usual shape, and legs II and III are both much longer than the body.

Geographical distribution. — The species is known only from Aden.

#### DIAGNOSTIC CHARACTERS OF THE GENUS *ADENACARUS*

The original diagnosis of the genus *Adenacarus* Van der Hammen (1966: 49) was founded on the original description of *Eucarus arabicus* With. It now appears that some of the characters mentioned are not altogether correct: the presence of distinct intersegmental furrows represents a variable character of probably all Opilioacarida; the sternapophyses have four or five setae; it is difficult to characterize one of the rutellar teeth as secondary basal; With's organ is not absent.

The present redescription now results in the following revised diagnosis of the genus.

#### ***Adenacarus*** Van der Hammen, 1966

Prodorsum with a great number of rather long, papilliform setae, and with two pairs of eyes. Segment XVIII without setae. Sternapophyses flattened, with four or five setae. Rutellum with six teeth; With's organ present; cor-

niculus long; two pairs of laterodorsal infracapitular setae. Legs II and III longer than the body.

Type-species: *Eucarus arabicus* With, 1904.

#### RELATIONSHIP OF THE GENUS *ADENACARUS*

The general habitus of *Adenacarus arabicus* is that of all known Opilioacarida. The absence of setae on segments VII-XVII (with the exception of the genital region) differentiates it at once from the primitive genus *Panchaetes*. The absence of setae on segment XVIII is also met with in *Paracarus*; however, *Adenacarus* is distinctly different from *Paracarus* by the absence of the third pair of eyes, and by the presence of With's organ (i.e. by the specialized shape of  $pl_2$ ). The presence of four or five setae on each of the sternapophyses is a character unknown in other Opilioacarida; consequently, it differentiates *Adenacarus arabicus* at once from all other species. Several characters of the infracapitulum, viz., the shape of the rutellum (large proximal tooth with anteriorly at its base a small tooth), and the long corniculus ( $pl_1$ ) are characteristic of the type and single known representative of the genus.

*Adenacarus* should be considered an isolated genus of Opilioacarida, showing some relationships with *Paracarus* and *Opilioacarus*.

#### REMARKS

##### REMARK 1. NUMBER AND DISTINCTION OF THE STASES IN OPILIOACARIDA

Naudo (1963) described the larva and two nymphs of *Panchaetes dundoensis* Naudo. A nymph of *P. dundoensis* var. *condensus* was supposed to represent a tritonymph. The characters mentioned by Naudo as distinguishing characters of the stases are partly confirmed here. Although larva and protonymph are absent in the material of *O. platensis* studied by me, the series of stases overlaps Naudo's series of *P. dundoensis*; this means that the presence of a tritonymph (which, moreover, is sexed) in Opilioacarida is now definitely proved. Consequently, primitive Anactinotrichida have three nymphs, just as most Actinotrichida.

The main changes in the course of the postembryonic ontogeny are the following. The number of stigmata is zero in the larva, two pairs in the protonymph, three pairs in the deutonymph, and four pairs in tritonymph and adult. Judging from the description by Naudo (1963), stigmata 2 and 3 are of protonymphal origin, stigma 4 of deutonymphal, stigma 1 of tritonymphal; the tritonymphal base level of stigma 1 is confirmed by the present observations. (In my first study on Opilioacarida (Van der Hammen, 1966 :

59), I erroneously interpreted the stigmata of the protonymph as stigmata 1-2, and those of the deutonymph as stigmata 1-3).

The number of setae on the sternal verrucae is zero in the larva, unknown in the protonymph, two and more in the following stases. The number of setae on the genital verrucae is zero in the larva, one in the protonymph, three in the deutonymph; it further increases in an irregular way in the subsequent stases. Larva and protonymph have no pregenital and genital setae; these numbers increase in an irregular way in the following stases, dependent on the sex. The tritonymph is sexed; female tritonymphs have in *O. platensis* spiniform or papilliform genital setae, but no pregenital setae; male tritonymphs have a variable number of pregenital setae, and genital setae which are probably composite.

The cheliceral trochanter has no setae in the larval, protonymphal, and deutonymphal stases; the single dorsal seta appears in the tritonymphal or the adult stage.

A separate trochanter 2, in the case of legs III and IV, is formed in the tritonymph.

Among the dorsal opisthosomatic setae, only the unpaired seta  $pd_x$  of segment XVIII is of larval origin.

REMARK 2. THE PRIMARY AND SECONDARY SEXUAL CHARACTERS OF *OPILIOACARUS TEXANUS* (CHAMBERLIN & MULAİK)

My first observations on primary and secondary sexual characters in *Opilioacarus texanus* (cf. Van der Hammen, 1966: 17-21, fig. 5) are not completely in accordance with the above-mentioned results. Two pregenital setae were supposed to be present in the female; the supposed female genital organs, however, remind of those of the male as observed in other species: the structure of the egg is singular. I wonder whether the described specimens represent indeed normal females. Because only fragments of my original material now remain, the observations could not be repeated. Reinvestigation of an extensive series of specimens of *O. texanus* will be very important.

REMARK 3. THE CHAETOTAXY OF THE CHELICERAE IN OPILIOACARIDA

The single dorsal seta of the cheliceral trochanter, which has received here the notation *cht*, is apparently subject to an ascendant regression: its base level is tritonymphal or adult in *O. platensis*, whilst it is absent in the adult of *Paracarus hexophthalmus*.

The three setae of the principal cheliceral segment in most Opilioacarida

have received here the notations  $ch_1''$ ,  $ch_2''$ ,  $ch_2'$ . According to an observation by Naudo (1963: fig. 13), these setae are of larval origin in the genus *Panchaetes*; in a deutonymph of *O. platensis*, however, one of them was missing at one side. The principal cheliceral segment of *Paracarus* presents four setae; the notation of the additional seta (of which the base level is unknown) is  $ch_3'$ .

#### REMARK 4. THE CHAETOTAXY OF THE LEGS IN OPILIOACARIDA

The legs of Opilioacarida present a distinct neotrichy which is evidently in connection with their increased length; it concerns a linear cosmio-trichy (cf. Van der Hammen, 1968: 71). It is not yet certain whether the setae in question are idiotaxic. It will be necessary to study a complete post-embryonic ontogeny. Apparently there is a distinct increase in the number of verticils from larva to adult. I return to the problem of the notation in my study of the development of a *Panchaetes* species.

#### GLOSSARY

The following is an addition to the glossaries published in my preceding studies on Opilioacarida (Van der Hammen, 1966, 1968). It is again divided into a synonymic list and a list of terms used in the present series of papers. It contains a rather great number of new synonyms because I have now included also terms from a number of general acarological (or arachnological) studies (Vitzthum, 1931; Snodgrass, 1948; Hughes, 1959; Evans, Sheals & Macfarlane, 1961). Although I have not yet studied in detail *Opiliocarus italicus* (With), I have already included the synonyms from a recent redescription of that species (Brignoli, 1967). I have added also some synonyms from papers by With (1904) and Silvestri (1905); these synonyms had been omitted from previous lists.

There are only a small number of additions to my list of terms. These concern terms recently introduced by me in other papers (Van der Hammen, 1968a, 1969).

#### LIST OF SYNONYMS (SUPPLEMENT)

Addomen (Brignoli) - opisthosoma.  
Appendicular processes (Snodgrass) - rutellum + With's organ.  
Capsules (Evans, Sheals & Macfarlane) - Genital verrucae.  
Corniculi maxillares (Vitzthum) - rutella.



- Coxae of pedipalpal appendages (Hughes) - infracapitulum.  
 Coxal lobes associated with the hypostome (Snodgrass) - rutellum + With's organ.  
 Cucurbitulae copulatoriae (Silvestri) - genital verrucae.  
 Deutosternum (Hughes) - subcapitular groove (taenidium).  
 Endites of palpal appendages (Hughes) - rutellum + With's organ.  
 Epistom (Vitzthum) - tegulum.  
 Epistome (Snodgrass) - cervix.  
 Hypostome (Snodgrass) - lateral lips.  
 Hysterosoma (Evans, Sheals & Macfarlane) - opisthosoma.  
 Hysterosoma (Hughes, Vitzthum) - opisthosoma, dorsally with posterior part of prosoma (between furrows *tr* and *dj*).  
 Labiales Tritosternum (Vitzthum) - sternapophyses.  
 Labrum (With) - labrum + cervix.  
 Malae maxillares internae (Vitzthum) - With's organ.  
 Maxillae (Vitzthum) - infracapitulum.  
 Median bifid process (Snodgrass) - sternapophyses.  
 Opisthosoma (Hughes, Vitzthum) - opisthosoma, dorsally without segment VII (and part of segment VIII).  
 Palpal tarsus (With) - palpal tibia + tarsus.  
 Palpal tibia (With) - palpal genu.  
 Paralabra (Hughes) - lateral lips.  
 Patella (Brignoli) - genu.  
 Pedipalp coxae (Snodgrass) - infracapitulum.  
 "Peli" *FH* (Brignoli) - papilliform setae.  
 "Peli" *PH* (Brignoli) - ordinary setae.  
 Pointed hair (With) - ordinary seta.  
 Pretarsus of palp (Snodgrass) — palpal apotele.  
 Propodosoma (Evans, Sheals & Macfarlane) - prosoma.  
 Propodosoma (Hughes, Vitzthum) - prosoma, dorsally without posterior part (between furrows *tr* and *dj*).  
 Prosoma (Hughes, Vitzthum) - prosoma, dorsally with segment VII (and part of segment VIII).  
 Sense hair (With) - solenidion (?).  
 Subcheliceral plate (Hughes) - cervix.  
 Tarsus der Mandibulae (Vitzthum) - cheliceral apotele.  
 Tectum (Snodgrass) - tegulum.  
 Tibia der Mandibulae (Vitzthum) - distal part of principal cheliceral segment.  
 Tritosternum (Evans, Sheals & Macfarlane) - sternapophyses.

## LIST OF TERMS (SUPPLEMENT)

Prostethidium - The anterior part of the prodorsum, anteriorly of the transverse furrow *tr*.

Poststethidium - The posterior part of the prodorsum, between furrow *at* and the disjugal furrow (*dj*).

Stethosoma - The prosoma without the gnathosoma.

## ALPHABETIC LIST OF ABBREVIATIONS USED IN FIGS. 1-5

- |  |   |
|--|---|
| <i>cb</i> <sub>1-4</sub> , circumbuccal setae.   | <i>pl</i> <sub>1</sub> , one of the paralabial setae (the corniculus).    |
| <i>ch</i> <sub>1</sub> ", <i>ch</i> <sub>2</sub> ", <i>ch</i> <sub>2</sub> ", setae of principal cheliceral segment. | <i>pvg</i> , the single composite seta of the genital verruca.            |
| <i>cht</i> , seta of cheliceral trochanter.  | <i>R</i> , rostrum.   |
| <i>CX.P</i> , coxal region of palp.  | <i>RU</i> , rutellum.   |
| <i>ivg</i> , lyrifissure of genital verruca.   | <i>SA</i> , sternapophysis.   |
| <i>ivs</i> , lyrifissure of sternal verruca.   | <i>st</i> 1-4, stigmata.  |
| <i>ia</i> , antaxial lyrifissure of chelicera.   | <i>tac</i> , sculptured part of anal valves.                              |
| <i>ldm</i> , <i>ldm</i> <sub>1-2</sub> , laterodorsal infracapitular setae.  | <i>tas</i> , smooth, sclerotized part of anal valves.                     |
| <i>LL</i> , lateral lip.   | <i>tf</i> <sub>i</sub> , inferior tendon of principal cheliceral segment. |
| <i>lm</i> <sub>1-3</sub> , mediolateral infracapitular setae.  | <i>tf</i> <sub>s</sub> , superior tendon of principal cheliceral segment. |
| <i>LS</i> , labrum.  | <i>TG</i> , tegulum.  |
| <i>lvm</i> , lateral medioventral infracapitular seta.   | <i>Vg</i> , genital verruca.  |
| <i>lvp</i> , lateral posteroventral infracapitular seta.   | <i>vm</i> <sub>1-3</sub> , medioventral infracapitular setae.             |
| <i>og</i> , genital orifice.   | <i>vp</i> <sub>1-2</sub> , posteroventral infracapitular setae.           |
| <i>ogc</i> , orifice of cheliceral gland.  | <i>Vs</i> , sternal verruca.  |
| <i>OW</i> , With's organ.  | VII-XII, XVIII, XIX, opisthosomatic segments.                             |
| <i>p</i> , laterodorsal prominence of synaptic tectum.   |   |
| <i>pa</i> <sub>1</sub> , lateroventral seta of segment XVIII.  |   |

## SUMMARY

In the present paper redescrptions are given of *Opilioacarus platensis* Silvestri (1905) and *Adenacarus arabicus* (With, 1904). The paper is part of a morphological study and a taxonomic revision of all known species of the group.

The material of *O. platensis* comprised deutonymphs, female and male tritonymphs, and adults. Special attention is paid to the differences between the two sexes, and between the various stases. Details of interest for a taxonomic study are described and figured, and a system has been developed for the notation of the setae of the chelicerae and those of segment XVIII. The anal tubercle is now regarded as consisting of only one segment (segment XIX).

The redescription of *Adenacarus arabicus* is based on the type-specimen and single known representative. Special attention is paid to characters not mentioned in the original description. A revised diagnosis has been prepared of the genus *Adenacarus*, of which the relationship is discussed.

In a series of remarks, some problems of general interest are summarized.

## REFERENCES

- BRIGNOLI, P. M., 1967. Su *Opilioacarus italicus* (With) (Acarina, Notostigmata). — *Fragm. Ent.*, 5: 111-121, figs. 1-15.
- EVANS, G. O., J. G. SHEALS & D. MACFARLANE, 1961. The terrestrial Acari of the British Isles. An introduction to their morphology, biology and classification 1. Introduction and biology. — London.
- HAMMEN, L. VAN DER, 1966. Studies on Opilioacarida (Arachnida) I. Description of *Opilioacarus texanus* (Chamberlin & Mulaik) and revised classification of the genera. — *Zool. Verh.*, 86: 1-80, figs. 1-21.
- , 1968. Studies on Opilioacarida (Arachnida) II. Redescription of *Paracarus hexophthalmus* (Redikorzev). — *Zool. Meded.*, 43: 57-76, figs. 1-4.
- , 1968a. Introduction générale à la classification, la terminologie morphologique, l'ontogénèse et l'évolution des Acariens. — *Acarologia*, 10: 401-412.
- , 1969. Notes on the morphology of *Alycus roseus* C. L. Koch. — *Zool. Meded.*, 43: 177-202, figs. 1-7.
- HUGHES, T. E., 1959. Mites, or the Acari. — London.
- NAUDO, M. H., 1953. Acariens Notostigmata de l'Angola. — *Publ. Cult. Co. Diam. Ang., Lisboa*, 63: 13-24, figs. 1-22.
- SILVESTRI, F., 1905. Note Aracnologiche I-III. *Redia*, 2: 239-261, pls. 21-24.
- SNODGRASS, R. E., 1948. The feeding organs of Arachnida, including mites and ticks. — *Smithson. Misc. Coll.*, 110 (10): 1-93, figs. 1-29.
- WITH, C., 1904. The Notostigmata, a new suborder of Acari. — *Vidensk. Medd. Naturh. Foren. Kjøbenhavn*, 1904: 137-192, pls. 4-6.