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SOME ORIBATEI FROM GHANA. V. TWO MEMBERS OF THE FAMILY TRHYPOCHTHONIIDAE, INCLUDING A DESCRIPTION OF A NEW GENUS

BY

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INTRODUCTION.

In a previous paper in this series (Wallwork 1960 b) I described two new species of the genus Allonothrus van der Hammen, namely A. monodactylus and A. russeolus, citing the "fan-shaped" notogastral hairs as a consistent feature of the genus. My collections contain a third species possessing many of the characteristics of the genus, but remarkable in that the notogastral hairs of the adults are not "fan-shaped". Single specimens of tritonymphal and deutonymphal stages have been taken with the adults, and these nymphal stages do bear "fan-shaped" notogastral hairs; they also show a serial development of these hairs towards the adult type. This species, designated Allonothrus ghanensis, is described below.

The second part of this paper contains a description of a new species related to the genus Trhypochthonius, but differing from other members of this genus in several important respects. Dr. van der Hammen has very kindly examined the only specimen I possess, and has confirmed these differences. This species is described below as the type for a new genus, Afronothrus; a discussion of its systematic position is given after the species description.

The localities from which these specimens were taken are indicated herein only by place-names. A more detailed description of these has been given previously (Wallwork 1960 a).

Allonothrus ghanensis n. sp. (Fig. 1-5).

Collected in Ghana : 31 adults, 1 tritonymph, 1 deutonymph.

Adult.

Average length : 521.1 μ (range : 497.0 μ — 540 μ).
Average width : 269.0 μ (range : 248.5 μ — 277 μ).

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Colour reddish-brown, somewhat obscured by detritus particles adhering to the gummy cerategument. The incrustation of these particles is particularly marked on the posterior margin of the abdomen, where it forms a dense coat over the hairs in this region. The microsculpture of the integument shows the pattern characte-

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**Fig. 1-2. — Allonothrus ghanensis** n. sp. Adult.

Fig. 1. Dorsal view. — Fig. 2. Ventral view. c₁₁, c₂₁, c₃₁, d₁₁, d₁₂, e₁, e₂, f, h₁, h₂, h₃, ps₁, ps₂, ps₃, ps₄ = notogastral hairs; ia, im, ih, ips = fissures; gla. = aperture of lateral abdominal gland; an = anal plate; ad = adanal plate.
ristic of the genus *Allonothrus*. The surface of the prodorsum and the ventral surface are covered with minute punctuations. The integument of the dorsal surface of the hysterosoma bears a reticulate pattern (Fig. 1), composed of large areolae surrounded by dark chitinised ridges. The areolae are similar in size to those of *A. monodactylus*, and are relatively larger than those in *A. russeolus*. The chitinised ridges separating the areolae carry a thin dark line, which forms a reticulate pattern around the areolae. This line is also found in *A. russeolus*, but not in *A. monodactylus*. Other features of the dorsum characteristic of *Allonothrus*, include the arrangement of ridges on the prodorsum, comprising a pair of lateral ridges, a pair of central ridges which are strongly convergent as in *A. russeolus*, and an interrupted transverse ridge just posterior to the level of the pseudostigmata which is also present in *A. russeolus*, but lacking in *A. monodactylus*. There are no teeth on the lateral margin of the prodorsum. The sensillus is of the *Notrus* type, thickened, tip slightly expanded, distal portion of the organ setose. Exobothridial hair is lacking, but a structure resembling its insertion (also present in *A. monodactylus* and *A. russeolus*) is present lateral to the pseudostigmata.

Rostrum is without incision, rostral hairs inserted on dorso-lateral margins of rostrum, bilaterally feathered, longer than their mutual distance, curving forwards in front of the rostrum, tips strongly incurved. Lamellar hairs inserted on prominent tubercles on the prodorsum just posterior to the rostrum, about 120 μ long, 4-5 times longer than their mutual distance, thickened, bilaterally feathered, curving slightly outwards for the proximal half of their length, tips convergent. Interlamellar hairs very short, curved, bilaterally feathered, inserted just median to the pseudostigmata. The rostral, lamellar, and interlamellar, hairs occupy positions similar to the corresponding hairs in other *Allonothrus* species, but differ from these in that they do not have the characteristic "fan" shape. This is also true of the notogastral hairs, of which there are 30 (Fig. 1). Notogastral hairs are thickened, conspicuously bilaterally feathered; the hairs near the posterior margin of the abdomen much longer than those anterior to them; thus *c1, c2, c3, c4, d1, and e1, are 40-50 μ long; d1 is 70 μ long; e1, f2, h1, and h2, are about 220 μ long. The fissures ia and im and the aperture of the lateral abdominal gland are clearly visible in their usual positions, in dorsal view. The pleural hollows into which legs III and IV are inserted can also be seen in the dorsal view as a curved chitinised band. This band is indicated by the broken lines in Figure 1. The fissure ip was not seen.

Ventrally the labium is very similar to that of *Allonothrus schuilingi* van der Hammen 1953. The hypostome is well differentiated, rounded posteriorly, narrowing somewhat anteriorly; hypostomal hairs moderately long, bilaterally feathered; the median hair on the maxillocoxa is short, the anterior hair is moderately long. A mentotectum is present, the two halves being incompletely separated by a narrow V-shaped fissure.

The main features of the ventral surface are shown in Figure 2. The epimeral setal formula is (3-x-3-3), a feature also characteristic of the other members of this
genus. Epimeral hair Ia is short and smooth, Ib is long and smooth, Ic is shorter than Ib, bilaterally feathered; hair 2a is short and smooth, as is 3a. 3b is long, smooth or minutely feathered, 3c is long and bilaterally feathered; 4a is short and smooth resembling 1a, 4b is long, smooth or minutely feathered, 4c long and conspicuously feathered.

The arrangement of the genital, anal, and adanal, plates is very similar to other species of this genus, particularly *A. russeolus*. There are 12 pairs of genital setae inserted along the inner margins of the genital plates, closely grouped anteriorally, fairly long, bilaterally feathered, the penultimate and ultimate pairs posteriorally being rather shorter than the rest. Two pairs of anal setae, smooth or minutely feathered, anterior pair slightly shorter than the posterior pair; three pairs of adanal setae, bilaterally feathered, becoming progressively longer posteriorly. Fissures ian, iad, ips, and ih, are clearly visible in ventral view.

The chaetotaxy of tibia and tarsus I (Fig. 3) clearly establishes this species as a member of the genus *Allonothrus*, for the arrangement is very similar to that described for *A. schuilingi* (see *VAN DER HAMMEN* 1955, Fig. 7 b). $q_2$ is very large and thick on the tibia, $q_1$ and the hair $d$ are closely adposed. Solenidions $\omega_2$ and

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**Fig. 3.** *Allonothrus ghanensis* n. sp. Adult. Tibia and tarsus of leg I. Antiaxial.
ω₁ are directed and remote from ω₁ on the tarsus; there is one additional hair (Ad).
All tarsi are tridactyle, the claws being equal in size.

Tritonymph.
Length : 500 μ.

Fig. 4. — Allonothrus ghanensis n. sp. Tritonymph. Dorsal view. (Notations as in Fig. 1-2).
Fig. 5. — Id., Deutonymph. Dorsal view. (Notations as in Fig. 1-2).

The specimen is weakly chitinised, features of the ventral surface not always clearly distinguishable. The animal was also flattened during the mounting process and an accurate measurement of its width could not be made. The appearance of the dorsal surface is shown in Figure 4. The hairs on the anterior half of the
notogaster have the "fan-shaped" structure found in the other members of the genus; posteriorally the hairs are longer and thinner, in some cases with rounded tips resembling those of *A. russeolus*, in others the tips narrow to a point as in the adult.

Ventrally the genital plates carry 8-9 pairs of setae having the same form as in the adult; two pairs of anal setae and three pairs of adanal are similar to those of the adult. The fissures ian and iad are clearly visible.

All tarsi are monodactyle, the chaetotaxy of tarsus I being similar to that of the adult in every other respect.

Deutonymph.

Length : 355 μ.

This stage can be recognised by the presence of only two genital suckers, the absence of anal setae, and the presence of a fully developed sensillus.

The integument is weakly chitinised and folded in various places, rendering a complete examination of all the features difficult. The features of the dorsal aspect are generally distinct and these are shown in Figure 5. The general shape is similar to that of the deutonymph of *A. schuilingi* (see *van der Hammel* 1955, Fig. 5 c). Only 28 notogastral hairs are present (*h*₃ is missing on each side although a structure resembling its insertion is present); these show the same form and arrangement as in the tritonymph described above, although they are relatively smaller in some instances.

Ventrally the genital setae could be seen with difficulty; four pairs were noted. The adanal fissure iad and three pairs of adanal hairs are present; there are no anal setae. All tarsi are monodactyle; tibia I lacks ½.

Distribution of *A. ghanensis* in Ghana: Essuboni Forest Reserve (7 adults, 1 deutonymph); Nsawam (2 mi. N. on Bunso Rd.) (2 adults); Dompim (1 adult); Konongo (19 adults, 1 tritonymph); Old Tafo (1 adult); Aburi (1 adult).

Remarks. Balogh's (1958) description of *Pseudonothrus hirtus* n. gen. n. sp. from Angola corresponds in several respects to the description of *A. ghanensis* given above. Balogh's description is too short for adequate comparison between the Angola and Ghana forms. The measurements given for the length of the lamellar hair (100 μ) and the notogastral hairs *d*_1 (95 μ) and *d*_2 (80 μ) differ somewhat from those given for *A. ghanensis* above.

*Afronothrus* n. gen.

The main diagnostic features of this genus are briefly summarized as follows: notogaster bears 30 hairs, the posterior ones being much longer than the anterior; the fissure ip is large and transverse; two pairs of adanal hairs; anal hairs lacking or virtual (one pair); four pairs of genital setae; tarsi tridactyle, claws unequal in size.

A more detailed discussion of these features will be given after the following description of the type, *A. incisivus* n. sp.
Afronotbrus incisivus n. sp. (Fig. 6-8).

Collected in Ghana: 1 adult female (carrying one egg).

Length: 504.1 μ; width: 269.8 μ.

Colour pale brown; mid-dorsal portion of prodorsum and notogaster almost transparent. Microsculpture of the prodorsum consists of minute punctuations; the notogaster has an ornamentation of polygons arranged in a regular manner. This general pattern is very similar to that described in Trhypochthonius montanus van der Hammen (see VAN DER HAMMEN 1956, Fig. 1 c & 1 d). Rostrum rather blunt in dorsal view; rostral hairs inserted antero-laterally on rostrum, spiniform, 45 μ long, slightly divergent along the proximal half of their length, directed forwards in front of the rostrum, as long as their mutual distance, without barbs although the surface of each hair is slightly roughened when viewed under high magnification. Lamellar hairs inserted only a short distance behind the rostrums, 30 μ long, slightly shorter than their mutual distance, spiniform, straight, directed forwards and slightly outwards over the rostrum, without barbs, surface slightly roughened. Interlamellar hairs very long (115 μ), inserted median to the pseudostigmata, spiniform, straight, smooth, directed postero-medially over the surface of the notogaster, with tips almost touching, as long as their mutual distance. Pseudostigmata with rounded aperture, internal walls ornamented with a regular pattern of striae. Sensillus spatulate, rather short, fusiform head as long as the stalk. Exobothridial hair lacking.

Notogaster shield-shaped, narrowing posteriorly, only slightly convex; with a lateral incision on each side just behind the humeral region, from which the species derives its name. Notogaster is unidentifiable, f1 is absent, hairs smooth or slightly roughened; c1 very short; c2 longer, inserted on lateral margins in humeral region. Immediately anterior to the insertion of c2 is a small truncated tubercle. The two hairs c2 are unequal in length in the specimen, the right one (equal in length to c2) is half as long as the left one (equal in length to c2) ; hair d2 is shorter than d1. The hairs on the posterior half of the notogaster are generally much longer than those on the anterior half; h2 is especially long (Fig. 6); ps1 and ps2 inserted on prominent ridges near the posterior margin; ps1 is a thick blunt spine. Fissures ia and ip are clearly seen in dorsal view; im is seen only with difficulty; all these fissures are aligned transversely (i.e. at right angles to the long axis of the body). The aperture of the lateral abdominal gland (gia) is quite distinct near the lateral margins of the notogaster. The postero-lateral margins of the notogaster are more strongly chitinised than the mid-dorsal portion.

Details of the ventral surface are shown in Figure 7. Labial hairs h, m and a, are present. Epimeral setal formula (3-1-3-2); hairs arranged as shown in the Figure. Genital plates narrower anteriorly than posteriorly, median margin of each plate thickened; four pairs of genital setae seen clearly (although a fifth
pair may be present on the inner posterior margins), two pairs inserted close together anteriorally, moderately long, the remaining pairs more widely spaced posteriorally. No aggenital setae. Anal plates long and narrow, setae absent or with one pair virtual; the fissure ian is circular in shape, located near the anterior margin of the anal plate. Adanal plates with two pairs of simple setae; fissure iad present at the same level as ian. Hair ps₃ is present. The fissure ih is present, but difficult to see.

The chaetotaxy of tarsus I (Fig. 8) shows a clear relationship with the genus *Trhypochthoni*us. In the Figure I have followed the normal procedure of designating the paraxial hairs with superscript (') and the antiaxial hairs with superscript ('); notations in parentheses indicate that the hair is paired. On the tarsus, solenidions ω₁, ω₂, and ω₃ are present, ω₃ being remote from ω₂ as in the *Trhypochthoni*us group. The famulus ε is present. There is only one additional (paraxial) hair present; this condition differs from *Trhypochthoni*us in which there are three,
but resembles *Allonothrus*. The hairs (tc) are very long, almost as long as ft'. The solenidions \( \varphi_1 \) and \( \varphi_2 \) are present on tibia I, \( \varphi_1 \) being closely adposed to the hair \( d \). All tarsi are tridactyle; the median claw is smaller than the two laterals.

Distribution in Ghana: Nkwanta (1 adult).

Remarks. The exact relationship between the Trhypochthoniidae, Trhypochthoniellidae, and the Malacochnothridae, is uncertain at the present time. Reference should be made to the works of Knulle (1957), Van der Hamm (1953, 1955a, 1955b, 1955c), Grandjean (1939, 1940), and Willmann (1931), for accounts of the known genera of these three groups. Following Knulle's method of presentation, I list below the important features of the genus *Afronothrus*.

1. Seven fissures present; \( ia, im, ip \), dorsally; \( ian, iad, ips, ih \), ventrally. The fissure \( ip \) is large and transversely aligned.
2. Three adoral hairs.
3. Two pairs of anal setae.
4. Anal setae absent or reduced to a single (virtual) pair.
5. Notogastral hairs \( ps_1, ps_2 \), and \( h_y \), much longer than the rest.
6. Sensillus present; spatulate in shape.
7. Notogaster unideficient; \( f_1 \) lacking.
8. Exobothridial hair lacking.

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**Fig. 8.** *Afronothrus incisivus* n. gen. n. sp. Adult. Tibia and tarsus of leg I. Antiaxial.

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9. Hypostome present.
10. Epimeral setal formula (3-1-3-2).
11. $ω_3$ is remote from $ω_4$; hairs $f'$ and $(tc)$ are long.
12. Tarsi tridactyle; heterodactyly.

Thus characterised, the genus *Afronothrus* does not fall into any of the genera known at the present time. It is more closely related to the genus *Trhypochthonius* than to any of the other genera; evidence for this is found in the chaetotaxy of tarsus I (particularly the position of $ω_4$), the shape of the sensillus, and the absence of the exobothridial hair. The long hairs on the posterior portion of the notogaster, the number of genital setae, the absence of anal setae, the presence of the hair $m$ on the mentum, and the long hairs $(tc)$ on tarsus I, indicate affinities with the Malacognothridae. Members of this last-named family (and also the Trhypochthoniidae) possess three adanal setae, whereas in *Afronothrus*, as in *Trhypochthionellus*, there are only two.

*Afronothrus* resembles *Allonothrus* in the possession of only one additional hair on tarsus I.

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REFERENCES


