

AMERICAN MUSEUM NOVITATES

Number 434

Published by
THE AMERICAN MUSEUM OF NATURAL HISTORY
New York City

Oct. 14, 1930

59.54, 2D. 16.9: 57.99 M

MITES OF GENUS *DINOAMASUS* (*DOLAEA*) FOUND IN THE ABDOMINAL POUCH OF AFRICAN BEES KNOWN AS *MESOTRICHIA* OR *KOPTORTHOSOMA* (XYLOCOPIDÆ)¹

BY NORMA LEVEQUE

Dinogamasus Kramer (*Dolaea* Oudemans, *Paragreenia* Cockerell) is a genus of Acarina living commensally with carpenter bees of genus *Mesotrichia*, which have a pouch in the first abdominal segment. These bees are found only in the tropical or semitropical regions of the Old World, as Africa, south and east of the Sahara, the Oriental tropics, such as the Indo-Malay region and the tropical islands as far east as the Philippines; which regions thus define the known distribution of the mites.²

Dinogamasus has been found in the galleries which Mesotrichian bees drill in timber, as well as in the invaginated chitinous pouch on the anterior face of the first abdominal segment of the female bees. The opening to the pouch is just dorsal to the point of connection of the abdomen and thorax. The females of almost all species of Mesotrichian bees have the pouch. The few species which do not have it have a slight groove and depression at the corresponding place where the opening into the pouch should be. It is thought that the species of *Dinogamasus* are not parasites on the bees, that is, that they are not living upon any tissues of the bees and are doing no harm, nor may they be called symbionts, if we use that term in the strict sense. It is judged that they are commensals.³

The mites evidently live upon excess pollen which may adhere to the back of the bees or which may litter their galleries in timber and become the fertile bed for an attacking fungus. This conclusion was reached after examining a group of unkempt *Mesotrichia bombiformis* from the Philippine Islands. A heavy growth of fungus was embedded

¹The major number of specimens collected were obtained by the American Museum Congo Expedition, 1909-1915.

²Future publications are planned which will give a survey of *Dinogamasus* of the Oriental regions, and a survey of the correlation of the distribution of all groups of species of *Dinogamasus* with the groups of carpenter bees.

³By the term commensalism we mean an association between animals which is mutually beneficial. "It does not, however, imply an organic union such as prevails among symbiotic forms, but merely a more or less permanent association for mutual good." Lull, 'Organic Evolution.'

in a matting of pollen on the thorax. The pouches in these bees were, with one or two exceptions, devoid of the mites.

Dr. A. C. Oudemans, in *Zoologischer Anzeiger*, Vol. XXVII, No. 4, Dec. 1903, has assembled several early reports about the mites being found with the bees. He traced the earliest record to the publication by a Hollander, Mr. Brillman, in 1839, in *Tijdschrift voor Nederlandsch Indie*, Vol. II, pp. 360-364. Mr. Brillman called the mites "little animals," and described them as having only six legs; however, it is assumed that he did not observe correctly, and that the "little animals" were the mites of this genus. Then in 1846, Mr. H. Zollinger, presumably a German, described mites found with what he thought was *Xylocopa violacea*, but which doubtless was an Asiatic *Mesotruchia*, in *Natuur-en Geneeskundig Archief van Nederland's Indie*, Vol. III, p. 295. Mr. Frantzius, in 1851, in *Entomologischen Zeitung*, from Stettin, Vol. XII, page 236, seems to have translated Zollinger's article. However, the small-sized mite described must be of the genus *Trichotarsus*, which is commonly found on the bees or in the nests, but is quite distinct from this genus *Dinogamasus*. Dr. Oudemans also found that Mr. R. T. Maitland, a Hollander, found the mites, which he called *Gamasus saccicola*, in a sort of sack in the abdomen of *Xylocopa latipes*. This was reported in 1856 in *Handlingen der Nederlandsche Entomologische Vereeniging*.

Mr. R. C. L. Perkins reported the discovery of the mites with the bees in *Entomologist's Monthly Magazine*, Ser. 2, Vol. X, pp. 37-39, Feb., 1899. Mr. E. Ernest Green, government entomologist in Ceylon, had made a similar discovery a few months previously, but did not publish it until three years later in the same magazine, Ser. 2, Vol. XIII, Oct., 1902. Dr. J. D. Alfken, of Bremen, called Dr. Oudemans' attention to these mites and the latter established the genus *Greenia*, naming two species: *Greenia perkinsi*, 1901, in *Tijdschrift der Nederlandsche, Dierkundigen Vereeniging*, Ser. 2, Vol. VII, pp. 52-60, and *Greenia alfkeni*, 1902, in *Entom. Berichten*, VI, p. 37.

The name *Greenia* was preoccupied (Kirby, 1896). Banks, in 1904, proposed the name *Greeniella*, *Proceedings of the U. S. National Museum*, Vol. XXVIII, p. 56, which likewise was preoccupied (Cockerell, 1900). (Berlese gave *Greeniella* to a subgenus of *Iphiopsis* in 1913, *Redia*, Vol. IX, page 80.) Cockerell established the name *Paragreenia* in a footnote on page 448 of *Entomological News*, XVIII, 1907. Oudemans, in 1912, in *Entomologischen Berichten*, Vol. III, page 262, gave the name *Dolaea*, evidently not knowing of Cockerell's *Paragreenia*.

It has recently come to light that in 1898 Dr. Kramer of Magdeburg established the genus *Dinogamasus*, giving a very brief description of *Dinogamasus crassipes* (Zoologischer Anzeiger, Vol. XXI, pp. 417-418). A recently published, more detailed description of this species (Archiv für Naturgeschichte, Vol. XCII, part A, Sect. 4, pp. 112-115, 1928) has determined without question that *Dinogamasus* is the genus. Kramer's specimens were collected in 1888 or 1890 on "large bumble bees" in German East Africa by Dr. F. Stuhlmann. Two of the *Mesotrichia* (*Xylocopa*) which might easily have been the host are recorded from Stuhlmann's collection of about this time. They are: *M. conjuncta* Smith, taken at Bagamoyo, and *M. nigrita* Fabricius, from the same locality on the east coast of Tanganyika Territory (German East Africa).

From Nathan Banks, 'The Acarina or Mites,' U. S. Dept. of Agri. Report No. 108, (1915), the following summaries have been made concerning the characters of the groups to which *Dinogamasus* belongs:

PARASITOIDEA.—Distinct spiracle upon a stigmal plate on each side of body (usually ventral) near third or fourth coxæ or a little behind; palpi free; skin often coriaceous or leathery; hypostome small, without teeth; venter without furrows; body often with coriaceous shields; posterior margin never crenulate; no eyes.

PARASITIDÆ.—Palpi not enlarged at tip; spiracles situated behind coxæ III; genital aperture not or scarcely behind the hind coxæ; no anterior part of body separated by a suture.

PARASITINÆ.—Spiracles and peritremes ventral; shield or chitinous surface about anus; first pair of legs lateral to mouth opening; dorsal surface of body does not project in front of camerostome; male genital opening usually on anterior margin of sternal plate (sometimes in middle); jaws of mandibles toothed, rarely styleate or needle-like. Usually not found on animals except insects.

Kramer gave as the outstanding generic character of *Dinogamasus* the absence of the peritreme, but he described and figured a lance-shaped shield which extends anteriorly from the chitinized ring surrounding the spiracle. He did not name this structure. This shield is called a peritreme by Tragardh in his description of *D. (Greenia) sjöstedti*, 1904. Oudemans, in his original description of this genus (*Greenia perkinsi*, 1901) also emphasized the absence of a peritreme. However, in a late publication (*Dolaea schoutedeni* and *D. collarti*, 1929) he calls the circular plate around each of the spiracles the peritreme, and the shield extending forward, the peritrematium. Vitzthum calls the anteriorly directed plate the peritrematula, "obwohl die Peritremata selbstverständlich fehlen," ("although of course the peritremes are lacking").

I shall call the circular shields surrounding the spiracles the stigmal plates, and shall call the anteriorly directed chitinized shields peritrematula.

The peritrematalia are very distinct and of definite form on most species but they may be quite indistinct because of poor chitinization and may be entirely lacking on some species.

Other generic characters are as follows: the fixed digit is often shorter than movable digit; one pair of claws on all pretarsi; certain hairs on legs I and II are modified to stubby, blunt, heavily chitinized, swollen structures which are herein called "blunt cones"; stigmal plate is about twice as long as broad, sometimes only slightly longer than broad; coxæ have two spines on legs I, II, III, and one on IV.

The African forms of *Dinogamasus* are quite distinct from the species of the Oriental tropics. There is a similarity in the range of sizes, as well as in diversity of structural features, but the species of the two regions are quite distinct, just as the species of their "host" fall into groups in the two major regions.

Specific characters are based especially on the number and arrangement of cones on legs I and II, as well as on the size and shape of the body and the dorsal shield and the three ventral shields, on the form of the mandibles, and on the length, number, and arrangement of hairs on the body.

Variations in the length of legs and in width and length of body will be found among specimens taken from the same bee. This may be due to individual variations among the animals, or to the manner in which the legs are spread and to the compression of the cover-glass flattening the body.

The specimens were prepared for study as follows:

1. Placed in a strong solution of KOH until the soft parts were cleaned away and only the chitinous exoskeleton left. Time: cold method, 24 hours; but if heated almost to boiling point, 15 minutes or more. The cold method is much preferred.
2. Washed in water to remove all traces of KOH.
3. Placed in 50 per cent alcohol for 30 minutes, then into 100 per cent alcohol for an hour.
4. Placed in xylene for an hour or longer.
5. Usually two specimens were placed in thin balsam on a slide; the mouth-parts of one were separated from the body in order to show the mandibles, and the other specimen was well spread out before the cover-glass was slipped into place.

Unless otherwise stated the mites have been taken from bees obtained by the American Museum Congo Expedition, 1909-1915. Types of new species of *Dinogamasus* herein recorded, as well as specimens from different localities and from different hosts, are deposited with The American Museum of Natural History, New York City. Paratypes will be found at the National Museum, Washington, D.C.

The following species of *Dinogamasus*, found on Mesotrichian bees (and on a bat), have been previously described:

- Dinogamasus crassipes* Kramer, 1898. Nymph; on "bumble-bee-like" specimens collected by Dr. F. Stuhlmann, 1888 (1890?), German East Africa. A meager description, merely sufficient to establish the genus. Zool. Anzeiger, XXI, pp. 417-418.
1928. A posthumous description, published by Oudemans, giving more details. Archiv für Naturgeschichte, XCII, Abt. A, Heft 4, pp. 112-115.
- Greenia perkinsi* Oudemans, 1901. Until 1929 considered the type of the genus "Wander-nymph," on *Koptorthosoma tenuiscapa*, Java and India. Tijdschr. Nederland. Dierk. Ver., VII, pp. 60-62, Pl. II, figs. 30-35.
1912. *Greeniella perkinsi* Vitzthum. Called a nymph. Zeitschrift für wissenschaft. Insektenbiol., VIII, pp. 95-96.
1919. *Dolaea perkinsi* (Oudemans). Called a female and redescribed by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 5-7.
- Greenia alfkeni* Oudemans, 1902. Nymph; on *Koptorthosoma æstuans*, Malacca, India. Merely established in Entom. Berichten Nederland. Ver., VI, p. 37.
1903. A detailed description and again called "n. sp." in Tijdschr. v. Entom., XLV, pp. 126-128, Pl. x, figs. 1-5.
1912. *Greeniella alfkeni* Vitzthum. Called a nymph, in Zeitschrift für wissenschaft. Insektenbiol., VIII, p. 94.
1919. *Dolaea alfkeni* (Oudemans). Redescribed and called a female by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 8-10.
- Greenia sjöstedti* Tragardh, 1904. Nymph and female; on *Xylocopa nigrita*, Kameroun, West Africa. Entom. Tidskrift, XXV, pp. 151-156.
1919. *Dolaea sjöstedti*, discussed by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 16-17. (Probably = *Dinogamasus crassipes* Kramer. See page 6.)
- Greenia jacobsoni* Berlese, 1910. Female; on *Xylocopa æstuans*, Java. Redia, VI, Fasc. 2, p. 263.
1919. *Dolaea jacobsoni*. Discussed by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, p. 17.
- Greenia hirtissima* Berlese, 1910. Female; on a bat, *Pteropus edulis*, Batavia, Java. Redia, VI, Fasc. 2, p. 263.
1919. *Dolaea hirtissima*. Discussed by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, p. 18.
- Dolaea braunsi* Vitzthum, 1914. "Nymph of the first form"; on *Xylocopa caffra* and *Koptorthosoma nigrita*, Willowmore, Cape Colony, and Amani, German East Africa. Zool. Anzeiger, XLIV, pp. 315-318.
1919. Considered a female and redescribed by Vitzthum in Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 10-13.
- Dolaea maxima* Vitzthum, 1919. First called *Dolaea braunsi*, "nymph of the second stage," by Vitzthum in Zool. Anzeiger, XLIV, pp. 318-320, 1914; found on *Koptorthosoma nigrita*, Amani, German East Africa.
- In 1919, Vitzthum decided this was not a form of *braunsi*. He called it *Dolaea maxima*, female; Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 13-17. (Doubtless = *Dinogamasus crassipes* Kramer. See page 6.)

- Dolaea amaniensis* Vitzthum, 1919. Male and female; on *Koptorthosoma nigrita*, Amani, German East Africa. Archiv für Naturgesch., LXXXV, Abt. A, Heft 5, pp. 18-20.
- Dolaea affinis* Berlese, 1918. Female; on *Xylocopa* sp., Italian Somalia. Redia, XIII, pp. 131-132.
- Dolaea villosior* Berlese, 1918. Female; on *Xylocopa nigrita*, Blantyre, Nyasaland. Redia, XIII, p. 132.
- Dolaea vitzthumi* Oudemans, 1926. "Nymph of the third stage" and female; on *Koptorthosoma* sp., Buitenzorg, Java. Entom. Berichten, VII, p. 144. First called *Dolaea affinis* Oudemans, 1926. Entom. Berichten, VII, p. 68.
- Dolaea collarti* Oudemans, 1929. On *Koptorthosoma nigrita*, Stanleyville, Congo. Entom. Berichten, VII, p. 422.
- Dolaea schoutedeni* Oudemans, 1929. On *Koptorthosoma nigrita*, Belgian Congo. Entom. Berichten, VII, p. 423. (See *Dinogamasus crassipes*, below.)

After examining many groups of mites taken from different bees of the same species, both from the same locality and from every locality from which the bee had been collected, I found only the same species of *Dinogamasus* present (with the exception that *Mesotrichia caffra*, from Rikatla and Seychelles, had a species¹ different from the *D. braunsi*, specimens sent me by Vitzthum "from *caffra*, Willowmore"). Six very closely related species of *Mesotrichia* of the *flavorufa* group had the one species, *D. villosior*, present. The several new species belonging to the *braunsi* group were taken from small and medium-sized bees which show sexual dimorphism, the males having short yellow hairs on the black integument, giving an olive-green color, the females being black and usually having distinctive bandings of yellow or white hairs.

***Dinogamasus crassipes* Kramer**

Specimens of *Mesotrichia nigrita* obtained by the Congo Expedition from Malela, Zambi, Stanleyville, Gamangui, Avakubi, and Niangara, which are localities ranging from the estuary to the headwaters of the northwest tributaries of the Congo River, and from Kilimandjaro, German East Africa, and specimens taken from *M. conjuncta* from Kilimandjaro, collected by W. L. Abbott (Amer. Mus. specimen), had the same species of *Dinogamasus* present.

This has led me to believe that the several large-sized mites, *Dinogamasus crassipes* Kramer, *Greenia sjöstedti* Tragardh, *Dolaea maxima* Vitzthum, and possibly *Dolaea schoutedeni* Oudemans may be synonymous. They are all recorded from the one host, *M. nigrita*. The measurements of length and width of the mite and the general descriptions of its body compare favorably, but the listing of the number of

¹*Dinogamasus cockerelli*, new species.

Dinogamasus crassipes Kramer

Hosts:
M. nigrita
 Kilimandjaro
 Belgian Congo
M. conjuncta
 Kilimandjaro

Length: 3240 μ
 Width: 1900 μ

Tarsus I, 3 cones
 Tibia I, 3 cones
 Patella I, 4 cones

Leg I, 2000 μ
 II, 1900 μ
 III, 2500 μ
 IV, 3000 μ

Tarsus II, 3 cones
 Tibia II, 3 cones
 Patella II, 3 cones
 Femur II, 1 cone

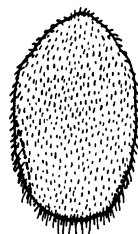


Fig. 1a
Dorsal side



Fig. 1b
Stigmal plate and
peritrematium

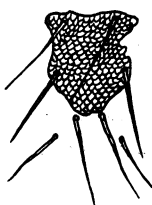


Fig. 1c
Sternal shield



820 μ x 340 μ
Fig. 1d
Genital shield



660 μ x 300 μ
Fig. 1e
Anal shield



Fig. 1f
Mandible

Dinogamasus villosior (Berlese)

Hosts:

M. flavorufa
 Belgian Congo
M. combusta
 Belgian Congo
 Kilimandjaro
 Abyssinia
M. subcombusta
 Belgian Congo
M. chapini
 Belgian Congo
M. perpunctata
 Belgian Congo
M. mixta
 Benguela

Length: 1900 μ -2240 μ
 Width: 1100 μ -1300 μ

Tarsus I, 3 cones
 Tibia I, 3 cones
 Patella I, 3 cones

Leg I, 1340 μ -1560 μ
 II, 1160 μ -1340 μ
 III, 1600 μ -1880 μ
 IV, 1820 μ -2100 μ

Tarsus II, 4 cones



Fig. 2a
Dorsal side



Fig. 2b
Stigmal plate and
peritrematium

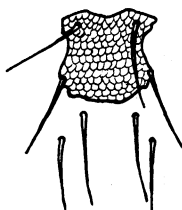
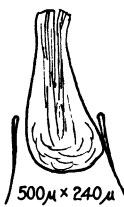


Fig. 2c
Sternal shield



500 μ x 240 μ
Fig. 2d
Genital shield



400 μ x 220 μ
Fig. 2e
Anal shield



Fig. 2f
Mandible

Fig. 1. *Dinogamasus (Dolaea) crassipes* Kramer.

Fig. 2. *Dinogamasus (Dolaea) villosior* (Berlese).

cones on legs I and II varies among the different authors. This discrepancy may be due to the preparation of the specimens for study, for unless the specimen was cleared of the soft parts before it was mounted for examination with the microscope it would be difficult to count the number of cones on the segments; or it may be due to the fact that blunt cones and sharply pointed similar structures, which I call "heavy bristles," have not been consistently distinguished by the different workers.

The species of *Dinogamasus* which I found in all of the various specimens of *Mesotrichia nigrita* and *M. conjuncta* examined was the same as the specimen of *Dolaea maxima* Vitzthum, sent me by Dr. Vitzthum, although it did not agree with my interpretation of his description of legs I and II of *maxima* given in 1919, Archiv für Naturgeschichte, LXXXV, Abt. A, Heft 5, p. 16.

The description of *Dinogamasus crassipes* Kramer, with a few exceptions, is the same as this species. It appears to me that: (a) the "pores" described in the apical third of tarsus I may easily be the point of attachment of fine hairs which have been broken off; (b) the distal blunt cone dorsal on tibia II may be an abnormally developed cone since that position is not the usual one for such a structure, or this may be a cone accidentally broken off from some other position on the legs and accidentally placed in that position on this segment; (c) the four cones listed on tarsus II and tibia II may not all have been blunt cones, one of these "cones" may have been the thick, stiff, sharply pointed structure about the same size as the three blunt cones, which condition is found on my specimens. Since records show that Stuhlmann, the collector of the bees from which Kramer's mites were taken, recorded *Mesotrichia nigrita* and *M. conjuncta* from German East Africa at about this time, it may be safely assumed that *D. crassipes* came from one of these species.

Figure 1 shows: *a*, dorsal side of body, dots show extent of posterior part of dorsal shield; *b*, stigmal plate and peritrematium; *c*, sternal shield; *d*, genital shield; *e*, anal shield; *f*, mandible.

In Table I is listed a comparison of this species, which was found to be the same as *Dolaea maxima* Vitzthum, with some of the other named species found on *Mesotrichia nigrita*, any or all of which may presumably be the original *Dinogamasus crassipes* Kramer.

***Dinogamasus villosior* (Berlese)**

Berlese records this species from *Mesotrichia* (*Xylocopa*) *nigrita*, but I have not found it on *nigrita* and doubt if the host was correctly

TABLE I. Comparison of Descriptions of Species Thought to be Identical with *Dinogamasus crassipes* Kramer

My specimens: (same as specimen labelled <i>Dolaea maxima</i>) sent to me by Dr. Vitzthum	Description of: <i>Dolaea maxima</i> Vitzthum	Description of: <i>Dinogamasus crassipes</i> Kramer	Description of: <i>Greenia sjöstedti</i> Tragardh	Description of: <i>Dolaea schoutedeni</i> Oudemans ¹
Host: <i>M. nigrita</i> Kilimandjaro Belgian Congo <i>M. conjuncta</i> Kilimandjaro	Host: <i>M. nigrita</i> Amani, German East Africa	Host: Probably <i>nigrita</i> or <i>conjuncta</i> (See p. 8) German East Africa	Host: <i>nigrita</i> Kameroun, W. Africa	Host: <i>nigrita</i> Stanleyville, Congo
Length: $\pm 3240\mu$ Width: $\pm 1900\mu$	Length: 3130 μ Width: 2040 μ	Length: 3 mm. Width: 2 mm.	Length: 3 mm. Width: 1½ mm.	Length: 3266 μ Width: 1866 μ
Legs I: $\pm 2000\mu$ II: $\pm 1900\mu$ III: $\pm 2500\mu$ IV: $\pm 3000\mu$	Given as half of actual length in original description ²			Leg I: 2453 μ II: 2200 μ III: 2626 μ IV: 3240 μ
Blunt cones on: Tarsus I: 3 one basal-dorsal one basal-outer one midway-outer Tibia I: 3 two basal-dorsal one basal-outer Patella I: 4 one midway- outer two basal-dorsal one basal-outer	Cones ("Zapfen") on: Tarsus I: 3 Tibia I: 4 Patella I: 4	Cones on: Tarsus I: 3 Tibia I: 4 Patella I: 4	Cones on: Tarsus I: 3 Tibia I: 3 Patella I: 3 Femur I: 1	Cones on: Tarsus I: 3 Tibia I: 3 Patella I: 3
Blunt cones on: Tarsus II: 3 one outward on basitarsus one ventral-outer, nearer apex one outer, very near apex Tibia II: 3 one ventral-outer-midway one dorsal-basal-outer one midway-outer Patella II: 3 same as tibia II Femur II: 1 one ventral, less than midway	Cones on: Tarsus II: 2 Tibia II: 3? Patella II: 3? Femur II: 3?	Cones on: Tarsus II: 3 Tarsus II: 4 Patella II: 4 Femur II: 1	Cones on: Tarsus II: 3 Tibia II: 3 Patella II: 3 Femur II: 1	Cones on: Tarsus II: 2 Tibia II: no description Patella II: no description Femur II: no description

¹"Indisputably these *sjöstedti*, *marima*, and *schoutedeni* are very closely related. Careful comparison of the type is desirable in order to determine if the three are good species." Translated from Oudemans' discussion of *schoutedeni*, Entom. Berichten, No. 166, Deel VII, p. 424, March 1, 1929.

²Verified by Dr. Vitzthum.

determined. I have found it only on the following bees which are all closely related members of the *flavorufa* group (large robust bees with dark pubescence, dark wings iridescent with purple, green, or blue): *Mesotrichia flavorufa* from Kasonsero and from Lubumbashi, Katanga, Belgian Congo, 1921, J. Bequaert Collection; *M. combusta* from Kili- mandjaro, German East Africa, W. L. Abbott, National Museum specimen, from Sagawieti, Abyssinia, and from Banana, Leopoldville, Kwamouth, and Kinshasa in Belgian Congo; *M. subcombusta* from Banana, Boma, Zambi, and Malela, all in Belgian Congo; *M. torrida* from Avakubi and from other Congo localities; *M. chapini* from Faradje and Garamba, Belgian Congo; *M. perpunctata* from Malela, Belgian Congo; and on *M. mixta* from Benguela (this latter a National Museum specimen collected by F. C. Wellman).

The mites vary somewhat in size. This may be due to the manner in which the body is spread in the balsam and compressed under the coverglass, or to natural variation and to food supply. The largest and one of the smallest specimens were both taken from the pouch of a *M. combusta* from Sagawieti, Abyssinia. Measurements are given for comparison:

Length, 2240 μ . Width, 1300 μ . Legs: I, 1560 μ ; II, 1340 μ ; III, 1880 μ ; IV, 2100 μ .
Length, 1900 μ . Width, 1100 μ . Legs: I, 1340 μ ; II, 1160 μ ; III, 1600 μ ; IV, 1820 μ .

Berlese fails to mention the knife-shaped peritrematalia which extend anteriorly from the stigmal plates. More or less variation was noted among my specimens.

Figure 2 shows: *a*, dorsal side; *2b*, stigmal plate and peritrematalium; *2c*, sternal shield; *2d*, genital shield; *2e*, anal shield; *2f*, mandible.

THE *Braunsi* GROUP

A number of slightly differing species, all with the general characters of *Dinogamasus braunsi* (Vitzthum), made it very difficult to identify the true *braunsi* until comparison was made with the specimen kindly sent me by Dr. Vitzthum, obtained from *Mesotrichia caffra* from Cape Colony. The following general characters are listed which will identify a member of this group, and then the key will help to distinguish between the several species.

Length of body: from 1.0 mm. to 2.0 mm.

Coxal spines on legs I, II, and the posterior one of leg III are enlarged. On trochanter I, ventral, a finely pointed inflated basal hair, also two blunt cones distal, the inner one usually being curved. On femur I, ventral, four short hairs (one or two species have only three), the basal one of which is often modified as a small blunt cone,

and the other basal one may be enlarged at the base, forming a short, sharply pointed spine. Tarsus I with one blunt cone basal-dorsal, and two outward; patella I and tibia I with two dorsal and two outward blunt cones. Patella II and tibia II with a large "hooked" spine midway, ventral or outward, also two blunt cones outward, and a small spine midway, ventral, inward from the "hooked" spine on each segment. The large "hooked" spine found on each of these two segments is an outstanding characteristic of members of this *braunsi* group. Tarsus II with a very heavy thick apical cone and a small blunt cone ventral near apex, and a larger one outward nearer base of segment.

The hairs dorsal on legs I and II are quite heavy and long, longest on femora.

Sternal shield usually broader than long; second pair of sternal hairs are on the shield near the posterior corners. The anterior margin of the shield is often so thinly chitinized that its boundary is not easily recognized and the first pair of sternal hairs may appear to be off of the shield.

Metasternal hairs and genital pair usually as heavy as sternal hairs.

Anal shield elongate, its greatest width through anal opening. Unpaired anal hair usually midway between opening and the posterior end of shield.

Fixed digit of mandibles from one-third to two-thirds shorter than movable digit.

Frequency, length, and pattern of marginal hairs, as well as the few hairs of the central bald area of dorsal shield, will help in determining the various species. In the accompanying figures the dotted line indicates the extent of the shield on the dorsal side.

The relative size of stigmal plate varies in different species. The peritrematalia are very faintly chitinized. On some specimens of a species they may be discerned, on others not; hence it seemed hardly worth while to give full descriptions.

KEY TO SEPARATE THE NEW SPECIES OF *Dinogamasus* BELONGING TO *braunsi* GROUP

1. Ventral side of femur I with three or four unmodified sharply pointed hairs 2.
 Ventral side of femur I with one of the proximal hairs modified, forming a blunt
 cone or a chitinized spine 4.
2. Small-sized animal, only slightly over 1 mm. in length *parvus*.
 Medium sized, about 1.5 mm. in length 3.
3. Dorsal shield with not more than six pairs of hairs arranged in the median line
 of the bald area *cockerelli*.
 Dorsal shield with many hairs in median line *acutus*.
4. Hairs (usually 3) ventral on tibia I as heavy as or heavier than the enlarged
 modified hair ventral on femur I; the five pairs of enlarged coxal spines with
 slightly rounding tip *inflatus*.
 Hairs ventral on tibia I slender and fine; coxal spines sharply pointed 5.
5. Femur I, ventral, with one fine hair, one blunt cone, and one spine 6.
 Femur I, ventral, with two fine hairs, one blunt cone, and one spine 7.
6. The outwardly placed blunt cones on leg I and all the blunt cones on leg II not
 showing antero-posterior flattening *brevihirtus*.

- All blunt cones of leg I and basitarsus II, and the very coarse apical cone of tarsus II, showing decided antero-posterior flattening *bequaerti*.
7. Anterior end of body pointed; dorsal shield pointed posteriorly and leaving a decidedly wide margin of soft skin *productus*.
Anterior end of body rounding or truncated; dorsal shield almost covering body or leaving a moderate margin of soft skin 8.
8. Small, measuring about 1.1 mm. in length; leg IV about as long as body. *oudemansi*.
Larger, measuring more than 1.5 mm.; leg IV not so long as body 9.
9. Not more than 20 hairs scattered through median area of dorsal shield; all hairs of dorsal shield short, about one-third or one-fourth the length of the marginal hairs *heteraspis*.
More than 20 hairs in median area; hairs of dorsal shield at least one-half the length of the marginal hairs *braunsi* (Vitzthum).

***Dinogamasus braunsi* (Vitzthum)**

Specimens of *braunsi* from *Mesotrichia caffra*, Cape Colony, were sent to me by Dr. Vitzthum, whereby I was able to determine the true *braunsi* from among the several species so similar.

I found *braunsi*, varying slightly in size, on: *M. caffra mossambica*, Southern Rhodesia, collected by C. Tylor, National Museum specimen; *M. lateritia*, Tana River, Chandler Expedition, 1892-93, National Museum specimen; *M. senior*, from Usambara, German East Africa, from Benguela Hinterland, and from Kigonsera, Nyasaland.

Those from *senior* were the largest, measuring 1800 μ ; width, 1000 μ ; leg I, 1200 μ ; II, 1000 μ ; III, 1200 μ ; IV, 1300 μ . Those from *caffra mossambica* were about 200 μ less in all measurements. The specimens of *braunsi* sent by Dr. Vitzthum varied in size, but were about as large as those taken from *M. senior*.
















The following features are characteristic of the species *braunsi*:

On femur I, ventral, one small blunt cone, one small sharp spine, two fine hairs. All spines on coxæ are sharply pointed.

The dorsal shield leaves a margin of soft skin extending from the second legs around the posterior end of body. Hairs on dorsal shield are rather long and soft. A bald area extends through the central region from the anterior end of the shield to midway back, and on this bald area there are only four pairs of hairs, the third pair of which is rather widespread. This bald area is followed by a median strip of slightly shorter hairs, three abreast, extending posteriorly but lacking at the posterior end of the shield, leaving a small circular bald area. See figure 3a.

Sternal shield poorly chitinized anteriorly.

Stigmal plate: 120 μ × 100 μ . What appears to be a peritrematalium is faintly discernible on a few of the best prepared specimens. Genital shield with almost parallel sides; anterior margin in most specimens truncate; posterior margin slightly rounding.

		Dorsal side	Anal shield	Mandible	
<i>Dinogamasus braunsi</i> (Vitzthum)	<p>Length: 1800μ Width: 1000μ</p> <p>Hosts: <i>M. caffa</i> <i>mosambica</i> S. Rhodesia <i>M. lateritia</i> Tana River <i>M. senior</i> Usambara, and Nyasaland</p>	<p>Leg I, 1200μ II, 1000μ III, 1200μ IV, 1300μ</p> <p>Femur I, (ventral) 1 cone 1 spine 2 fine hairs</p>	 <p>Fig. 3a</p>	 <p>360μ \times 220μ Fig. 3b</p>	 <p>Fig. 3c</p>
<i>Dinogamasus acutus</i> , n.sp.	<p>Length: 1600μ Width: 960μ</p> <p>Host: <i>M. luleola</i> Belgian Congo</p>	<p>Leg I, 1100μ II, 900μ III, 1100μ IV, 1260μ</p> <p>Femur I, (ventral) 4 fine hairs</p>	 <p>Fig. 4a</p>	 <p>390μ \times 190μ Fig. 4b</p>	 <p>Fig. 4c</p>
<i>Dinogamasus brevihirtus</i> , n.sp.	<p>Length: 1560μ Width: 800μ</p> <p>Host: <i>M. doti</i> Belgian Congo</p>	<p>Leg I, 1100μ II, 900μ III, 1000μ IV, 1100μ</p> <p>Femur I, (ventral) 1 cone 1 spine 1 hair</p>	 <p>Fig. 5a</p>	 <p>300μ \times 160μ Fig. 5b</p>	 <p>Fig. 5c</p>
<i>Dinogamasus cockerelli</i> , n.sp.	<p>Length: 1480μ Width: 760μ</p> <p>Hosts: <i>M. caffa</i> Rikatla, Tana R. <i>M. incerta</i> var. <i>seychellensis</i> Seychelles, Indian Ocean</p>	<p>Leg I, 1060μ II, 900μ III, 940μ IV, 1020μ</p> <p>Femur I, (ventral) 4 fine hairs</p>	 <p>Fig. 6a</p>	 <p>300μ \times 180μ Fig. 6b</p>	 <p>Fig. 6c</p>
<i>Dinogamasus inflatus</i> , n.sp.	<p>Length: 1600μ Width: 880μ</p> <p>Host: <i>M. æstuans</i> Suez</p>	<p>Leg I, 1100μ II, 960μ III, 900μ IV, 1100μ</p> <p>Femur I, (ventral) 1 cone 1 spine 2 fine hairs</p>	 <p>Fig. 7a</p>	 <p>400μ \times 220μ Fig. 7b</p>	 <p>Fig. 7c</p>

See text for Tibia I

See text for Tibia I

Figs. 3 to 7. Species of African *Dinogamasus* (*Dolaea*), belonging to *braunsi* group, found in *Mesotrichia* (*Koptorthosoma*).

Anal shield: $430\mu \times 220\mu$ (130μ at posterior edge). Surface scaled and pitted at posterior end; sides of shield posterior to the opening unevenly chitinized, in fact, corrugated; unpaired hair midway between anal opening and posterior margin. See figure 3b.

The fixed digit of the mandible is short. See figure 3c.

***Dinogamasus acutus*, new species**

FEMALE.—Belongs to *braunsi* group. Length: 1600μ . Width: 960μ . Legs: I, 1100μ ; II, 900μ ; III, 1100μ ; IV, 1260μ .

On femur I, ventral, four unmodified fine hairs, the median one being the finest, the two proximal being slightly heavier.

Dorsal shield leaving a margin of soft skin around body posterior to second legs. A margin of soft hairs, five or more abreast, surrounds the body, leaving a bare central area on the dorsal shield on which about twenty hairs are arranged somewhat irregularly, followed to near the posterior part of the shield by a median strip two, three, or four hairs abreast. See figure 4a.

Sternal plate poorly chitinized anteriorly.

Stigmal plate: $110\mu \times 90\mu$. A poorly chitinized narrow peritrematium extends anteriorly.

Genital shield with almost parallel sides, anterior margin tapering to a point, posterior margin rounding.

Anal shield: $390\mu \times 190\mu$ (100μ wide at posterior edge); circular area at base pitted; lateral margins slightly more chitinized than central area. Unpaired anal hair midway between anal opening and posterior margin. See figure 4b.

The mandible is shown in figure 4c.

Holotype from Faradje, Congo.

HABITAT.—*Mesotrichia luteola*, from the following localities in Belgian Congo: Faradje, Banana, Boma, Matadi, Malela, Garamba, Niangara, Lisala, Stanleyville, Coquilhatville, and Medje.

***Dinogamasus brevihirtus*, new species**

FEMALE.—Belongs to *braunsi* group. Length: 1560μ . Width: 800μ . Legs: I, 1100μ ; II, 900μ ; III, 1000μ ; IV, 1100μ .

On femur I there are usually one blunt cone, one sharp spine, and one fine hair, all about the same length. One specimen was found having two short hairs besides the cone and spine, otherwise this occurrence of three structures on the ventral side of femur I could have been used for identification purposes.

The dorsal shield leaves a narrow margin of soft skin from legs II around end of body. There are only three or four rows of soft hairs around the margin of the body, those on the shield being quite short. Three or four pairs of short hairs in the central bald area; two pairs, also short, median in posterior quarter; one pair, longer, near the posterior margin of shield. An outstanding specific character is the shortness of these few hairs on the shield. See figure 5a.

Sternal shield about as long as wide (200μ). Margin somewhat irregular.

Genital shield: wedge-shaped, 180μ wide at posterior truncated end; anterior end with rounding point.

Stigmal plate: $140\mu \times 100\mu$; no peritrematalia discernible.

Anal shield: $300\mu \times 160\mu$ (100μ at posterior margin, 80μ at narrowest width just above base). See figure 5b. Unpaired hair midway between anal opening and posterior margin. Many long hairs on ventral side surrounding anal shield.

Four of the hairs on the inner side of the next to the last segment of the palps are slightly swollen and blunt. The fixed digit of the mandible is .6 the length of the movable. See figure 5c.

Holotype from Stanleyville.

HABITAT.—*Mesotrichia cloti* from Stanleyville and Niangara, Belgian Congo.

Dinogamasus cockerelli, new species

FEMALE.—Belongs to *braunsi* group. Length: 1480μ . Width: 760μ – 800μ . Legs: I, 1060μ ; II, 900μ ; III, 940μ ; IV, 1000μ – 1020μ .

Femur I, ventral, four fine hairs.

Dorsal shield leaving a margin of soft skin extending from the second legs around the end of the body. Hairs, relatively long and soft, three or four abreast, bordering the body, leaving the central area of the shield bare except for four pairs spread in the central part and two pairs near the posterior part of the shield. See figure 6a.

Sternal shield: $270\mu \times 160\mu$.

Stigmal plate slightly ovate; $130\mu \times 110\mu$. A poorly defined peritrematalium extends forward fusing with the shield which cups around the edge near leg II.

Genital shield: 380μ long by 100μ at posterior end. The sides almost parallel, the posterior end rounding, the anterior end, slightly spread, ending in a right angle.

Anal shield: $300\mu \times 180\mu$ (100μ at posterior edge). Circular area at base with fine pitting. Lateral margin of shield slightly more heavily chitinized. See figure 6b.

Chitinized blunt cones on legs I and II have a tendency to be flattened or even grooved, and may show a notched tip. The dorsal hairs on legs I and II are quite heavy and stout, those on legs II are longer.

The fixed digit of the mandibles is very short; the movable digit, broad through the basal half, is quite straight, and is curved slightly only near the apex. See figure 6c.

Holotype from *M. incerta seychellensis*, Seychelles, Mahé.

HABITAT.—*Mesotrichia caffra* from Rikatla, Delagoa Bay, collected by Junod; also *M. incerta seychellensis* from Seychelles, Mahé, Indian Ocean, collected by J. S. Gardiner, December, 1905.

Dinogamasus inflatus, new species

FEMALE.—Belongs to *braunsi* group. Length: 1600μ . Width: 880μ . Legs: I, 1100μ ; II, 960μ ; III, 900μ ; IV, 1100μ .

On femur I, a small blunt cone, one pointed spine, two fine hairs, all short and about the same length. On tibia I, the three ventral hairs are much larger than the ventral hairs of patella I and femur I. Blunt cone on basitarsus quite heavy. Coxal spines on legs I and II and the posterior one on coxa III seem even more inflated than is usual for species of this *braunsi* group; and they have a slightly blunt tip rather

than the customary finely pointed tip: the anterior spine on coxa III and the one on coxa IV are sharply pointed.

The dorsal shield leaves a narrow margin from the region of coxa III around the posterior end of the body. A border irregularly formed of three or four rows of rather long soft hairs surrounds the body, leaving a large central elongated bare area upon which four pairs of hairs are found in the anterior two-thirds of the area, and with eleven hairs arranged in the median strip in the last quarter of the body but not reaching the end of the dorsal shield. Hairs extend rather farther in on the shield in oblique rows posterior to legs IV. See figure 7a.

Mandibles with very short fixed digit. See figure 7c.

Space between pairs of legs so constricted that sternal shield, second and third pairs of sternal hairs and metasternal pair almost touch legs II or III.

Sternal shield rather evenly chitinized across anterior border.

Sides of genital shield almost parallel.

Stigmal plate: $130\mu \times 100\mu$. Peritrematalium is abbreviated, triangular in form, with apex pointing toward extension of dorsal shield which extends around to the ventral side of the body near legs II and III.

Anal shield: $400\mu \times 220\mu$ (120μ near posterior margin). Base pitted; center of anal opening marks anterior fourth of length of shield; unpaired hair is about mid-way on shield; a slight furrow near lateral margins. See figure 7b.

Legs II, III, and IV are relatively short, the tarsal segments being very short.

HABITAT.—*Mesotrichia æstuans* from Suez, Lisht, Egypt; collected by A. Hrdlicka; National Museum specimen.

***Dinogamasus heteraspis*, new species**

FEMALE.—Belongs to *braunsi* group. Length: 1800μ . Width: 1000μ . Legs: I, 1100μ ; II, 960μ ; III, 1100μ ; IV, 1300μ .

Femur I, ventral, with one small blunt cone, one sharply pointed spine, and two pointed hairs.

Dorsal shield almost covers entire back, narrow margin may be seen on some specimens from near legs IV to point near the end of body. Three or four rows of hairs surround the body from near the vertex to near the posterior end. Marginal hairs rather long and soft, especially those on the soft skin; those on shield are shorter, especially those of posterior half. Four pairs of hairs on large bare area of shield; a few hairs in median line near posterior end of shield. See figure 8a.

Sternal shield rather evenly chitinized. Third pair of sternal hairs (on soft skin) are quite close to the posterior margin of shield.

Stigmal plate: $140\mu \times 100\mu$. Peritrematalia faintly chitinized, very narrow, on some specimens abbreviated, on others found to extend to the dorsal shield cupping around body near legs II.

Anal shield: $440\mu \times 220\mu$, especially heavily and unevenly chitinized with lateral corrugations in posterior portion. See figure 8b.

Mandible: see figure 8c.

Holotype from Medje.

HABITAT.—*Mesotrichia imitator* from the following localities in Belgian Congo: Poko, Avakubi, Niangara, Stanleyville, Medje, and Banana.

***Dinogamasus productus*, new species**

FEMALE.—Belongs to *braunsi* group. Length: 1380 μ . Width: 720 μ . Legs: I, 950 μ ; II, 760 μ ; III, 900 μ ; IV, 1100 μ .

The hairs around the body are rather fine and soft and are not so numerous as usually found on members of *braunsi* group, nor are the dorsal hairs on femur I and II and patella I and II relatively so long as usual.

On femur I, ventral, there are a blunt cone, a small sharp spine, and two fine hairs, the more basal of the two hairs being quite rudimentary.

The sides of the body are almost parallel; the anterior end is wedge-shaped, the posterior end broad. The dorsal shield cuts in near legs III leaving a rather wide margin of soft skin around the posterior two-thirds of the body. Four or six rows of soft hairs border the body, only two or three rows of these extend irregularly on to the lateral margin of the posterior half of the dorsal shield. Four pairs of hairs are arranged on the central bald area of the shield, and about seven pairs are scattered in the median area near the posterior end. See figure 9a.

The sternal shield is 210 μ wide at posterior margin; the anterior margin is poorly chitinized.

The metasternal hairs are more wide-spread than second sternal pair.

Genital shield: 310 μ long, 140 μ wide near posterior end; sides almost parallel.

Anal shield: 300 μ \times 150 μ (100 μ near posterior end). Posterior area finely pitted; lateral margins somewhat corrugated; unpaired hair midway between anal opening and posterior end of shield. See figure 9b. Hairs on soft skin surrounding anal shield soft and weak.

Stigmal plate: 100 μ \times 80 μ .

Mandible: fixed digit about one-half the length of the movable, the latter slender, curving in from a rather broad base. See figure 9c.

HABITAT.—*Mesotrichia divisa* from Umbilo, Durban, Natal; collected by A. L. Bevis, 1917; American Museum specimen.

***Dinogamasus parvus*, new species**













FEMALE.—Belongs to *braunsi* group. Length: 1060 μ . Width: 660 μ . Legs: I, 880 μ ; II, 700 μ ; III, 780 μ ; IV, 880 μ .

Body ovate, with greatest width between legs II and III; anterior end truncate. Dorsal shield covers the back except for a narrow margin from legs III around posterior end of body. A border of three, four, or five irregular rows of hairs extends around the margin of the shield from near the median anterior region to near the median posterior region. Hairs of shield are relatively long though they are not so long as those on the lateral margin of the body. Five pairs of hairs are symmetrically arranged in the median central area; six or seven hairs are distributed in two irregular rows posteriorly, but they do not reach to the posterior end of the shield. See figure 10a.

Stigmal plate: 100 μ by 80 μ —relatively large for so small an animal (compare with size of *D. acutus*).

Sternal shield is fairly evenly chitinized; margin somewhat irregular; 200 μ wide by 110 μ long.

Anal shield: 220 μ long by 140 μ wide (80 μ wide near posterior end). Numerous

			Dorsal side	Anal Shield	Mandible
<i>Dinogamasus heteraspis</i> , n.sp.					
Length: 1800 μ	Leg I, 1100 μ		Fig.8a	440 μ × 220 μ	Fig.8b
Width: 1000 μ	II, 960 μ				Fig.8c
	III, 1100 μ				
	IV, 1300 μ				
Host: <i>M. imitator</i>	Femur I, (ventral)				
Belgian Congo	1 cone				
	1 spine				
	2 fine hairs				
<i>Dinogamasus productus</i> , n.sp.					
Length: 1380 μ	Leg I, 950 μ		Fig.9a	300 μ × 150 μ	Fig.9b
Width: 720 μ	II, 760 μ				Fig.9c
	III, 900 μ				
	IV, 1100 μ				
Host: <i>M. divisa</i>	Femur I, (ventral)				
Durban, Natal	1 cone				
	1 spine				
	2 fine hairs				
<i>Dinogamasus parvus</i> , n.sp.					
Length: 1060 μ	Leg I, 880 μ		Fig.10a	220 μ × 140 μ	Fig.10b
Width: 660 μ	II, 700 μ				Fig.10c
	III, 780 μ				
	IV, 880 μ				
Host: <i>M. codinai</i>	Femur I, (ventral)				
Lisala, Congo	3 weak, fine hairs				
<i>Dinogamasus oudemansi</i> , n.sp.					
Length: 1100 μ	Leg I, 900 μ		Fig.11a	280 μ × 160 μ	Fig.11b
Width: 700 μ	II, 700 μ				Fig.11c
	III, 900 μ				
	IV, 1060 μ				
Host: <i>M. stuhlmanni</i>	Femur I, (ventral)				
Rikatia	1 cone				
	1 spine				
	2 fine hairs				

Figs. 8 to 11. Species of African *Dinogamasus* (*Dolaea*), belonging to *braunsi* group, found in *Mesotrichia* (*Koptorthosoma*).

long soft hairs, similar to the marginal hairs, are on the soft skin posterior to the hind legs.

This species may be distinguished from the other members of *braunsi* group by the presence of three fine weak hairs on ventral side of femur I, and by the following structures on ventral side of trochanter I: one curved blunt cone, one spine, one inflated hair with attenuated tip (the latter structure basal). The structures ventral on trochanter II are unmodified medium-sized spine-like hairs. The outwardly directed large cone midway on patella II and tibia II which is customarily blunt in the *braunsi* group is of the usual large robust form, but is decidedly sharply pointed. The blunt cone outward-basal on these two segments is not more than one-half the length of the sharp-pointed midway structure.

Mandibles: fixed digit is two-thirds the length of the movable digit. See figure 10c.

Holotype from *M. codinai*, Lisala, Congo.

HABITAT.—Found in *Mesotrichia codinai* (Dusmet), from Lisala, Congo; J. Bequaert, collector; November, 1924. (Bequaert collection.) Also found in a similar bee which might well be *codinai* but is in too poor condition for determination; from Medje, Belgian Congo, (American Museum Congo Expedition).

***Dinogamasus oudemansi*, new species**

FEMALE.—Belongs to *braunsi* group. Length, 1100 μ . Width: 700 μ . Legs: I, 900 μ ; II, 700 μ ; III, 900 μ ; IV, 1060 μ .

Leg IV almost as long as the body. The enlarged coxal spines on legs I, II, and posterior of III seem unusually large. Femur I with one blunt cone, one sharp spine, and two fine hairs.

Greatest width of body near coxæ II. Anterior end of body truncated.

Dorsal shield leaves a narrow margin of soft skin from the third legs around the end of the body. A border of long soft hairs extends around the body on to the dorsal shield. Four pairs of hairs are arranged on the central bald area; sixteen or eighteen long hairs are in the median area of the posterior third of the shield. See figure 11a.

Sternal shield wider than long.

Anal shield: 280 μ \times 160 μ (90 μ at posterior end). Unpaired hair midway between anal opening and posterior end. See figure 11b. All hairs of the ventral side are unusually long and finely pointed.

Mandible: fixed digit is slightly less than one-half the length of the movable digit. See figure 11c.

HABITAT.—*Mesotrichia stuhlmanni*, Rikatla, Delagoa Bay; collected by Junod; National Museum specimen.

***Dinogamasus bequaerti*, new species**

FEMALE.—Belongs to *braunsi* group. Very similar to *D. brevihirtus* by having on femur I, ventral, one fine hair, one blunt cone and one spine. It is distinguished from *brevihirtus* by its smaller size, and by the decided antero-posterior flattening of the blunt cones on leg I and basitarsus II, and by the slight flattening of the

basal cone of patella II and tibia II. However, the blunt cones of *brevihirtus*, dorsal and basal on leg I, show some flattening.

Length: 1440 μ . Width: 740 μ . Legs: I, 1000 μ ; II, 800 μ ; III, 900 μ ; IV, 1020 μ .

Dorsal shield almost covers entire back; a narrow margin extends from legs II to posterior end of body. A few very short hairs are found in the posterior one-fourth of the shield and are correspondingly sparing in numbers around the margin of the shield and on the soft skin, where a few longer hairs are intermingled. Through the median central area there are about four pairs of very short fine hairs symmetrically spread in the characteristic arrangement of the *braunsi* group.

Sternal shield shows poor chitinization anteriorly, so that the first pair of sternal hairs are not on the heavier portion. The posterior margin shows more or less irregular erosion. The second pair of sternal hairs are placed on the lateral margins of the shield at its greatest width (200 μ). Length of shield: 190 μ . Third pair of sternal hairs, 70 μ apart; fourth sternal pair, 130 μ apart.

Genital shield is 330 μ long and 140 μ wide at greatest width at rounding posterior end.

Anal shield: 270 μ long, 200 μ wide (100 μ at posterior end); a marked lateral corrugation extends from curved region toward the posterior end of the shield; the posterior margin is heavily scaled and pitted.

The hairs on the ventral surface of the body surrounding the anal shield are long, fine, and numerous.

Stigmal plate: 130 μ by 90 μ .

Palpitarsus with two swollen blunt short hairs on inner side near apex. Basal hair on each maxilla similar in size and structure to the basal hair ventral on trochanter I and trochanter II.

Coxal spines are heavy, swollen and sharply pointed, and, as is characteristic of the *braunsi* group, the anterior spine of coxa III is small, the one on coxa IV is slender. The blunt cones on legs I and II are in number and position typical of members of this group, but the blunt cones on leg I are compressed, the greatest diameter being at right angles to the axis of the leg, and they are notched at the tip. The hooked spine on patella II and tibia II are large and well curved anteriorly. The basal-lateral cone on these same segments is about half the size of the midway-lateral cone on the segment, while the basitarsal cone of leg II is intermediate in size and shows compression. The coarse heavily chitinized apical cone in some views seems somewhat flattened and recurved outwardly. The midway-ventral blunt cone on tarsus II is very short—scarcely longer than broad. The modified hairs ventral on femur I will help to separate this species from other members of the *braunsi* group (except *brevihirtus*). There is a short slender blunt cone, and a finely tipped spine-like hair whose base is as large as the blunt cone, and a more slender fine hair, the last being more distal on the segment. Trochanter I, ventral, has a swollen hair with long attenuated tip, and placed more distally, a blunt cone outward and a slightly curved more stout blunt cone inward. Trochanter II, ventral, has a slightly swollen hair with a long attenuated tip, a blunt cone distal, and a stiff, more slender, sharp spine outward-midway.

Mandible: fixed digit about half as long as the movable digit. The latter is well curved and is broad at the base.

HABITAT.—On *Mesotrichia albifimbria* Vachal, from Bamanian, Coquilhatville, Belgian Congo; Dr. J. Bequaert, collector; July, 1924

