

MEGACELAENOPSIDAE, A NEW FAMILY OF CELAENOPSOIDEA  
(ACARI : MESOSTIGMATA)

BY

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ABSTRACT

*Megacelaenopsis* n.g. and *Peloroceles* n.g. are described and placed in a new family, *Megacelaenopsidae*.

RÉSUMÉ

*Megacelaenopsis* n.g. et *Peloroceles* n.g. sont décrits et placés dans une nouvelle famille, les *Megacelaenopsidae*.

This is the second paper extracted from a larger study (FUNK, 1968) in which the classification of the celaenopsoid mites was revised by the procedures of numerical taxonomy. With the proliferation of the creation of new families within the Acari, one may become repelled by the thought of erecting still more families; however, one must do his best to interpret "... what the populational relationships in question are in nature and to express those relationships in the proper nomenclatural way" (SMITH, 1970). Within the entire study (FUNK, 1968), three distinct entities were isolated from forms belonging to previously described families. One of these entities is the topic of this report.

The mites were studied with a Zeiss phase contrast microscope and measurements were made by means of a Bausch and Lomb Filar micrometer eyepiece. Drawings were made with the aid of a Bausch and Lomb VH micro-projector.

The chaetotactic terminology used is that of HIRSCHMANN (1957) for the dorsal setae and that of EVANS (1963) for the leg setae.

Traditionally, the classification of the Mesostigmata has been based largely on the structure of the female genital shield or shields; a notable exception to this tradition is a revision of the Ascidae by LINDQUIST and EVANS (1965). Following tradition and the interpretation of the Celaenopsoidea by TRÄGÅRDH (1950) and CAMIN and GORIROSSI (1955), the two new species here described (called C2 and C7 in the original work) were initially placed in the Celaenopsidae. As a result of numerical taxonomic investigations of the Celaenopsoidea which included phenograms based on correlation coefficients and distance coefficients and a centroid component analysis, a more logical interpretation of the placement of C2 and C7 can be made. All of the analyses indicated that both of the supposed celaenopsid species are phenetically distinct from *Celaenopsis*

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and *Pleuronectocelaeno* of the Celaenopsidae and possibly more similar to the Diplogyniidae and Euzerconidae.

Although the fusion of the latigynial and mesogynial shields in C2 and C7 indicate a relationship to the Celaenopsidae, other morphological features of these mites do not.

The most obvious, but, definitely least convincing difference is size ; both C2 and C7 are almost twice as large as the described species of the Celaenopsidae. This size difference contributed quite heavily to isolating C2 and C7 from the Celaenopsidae in the numerical analyses, except in the analysis using correlation coefficients where size, as such, is less important. Even in clustering procedures based on correlation coefficients, both C2 and C7 remain distinct.

Another difference is the complete separation, by a suture, of the endopodal and ventral shields ; a similar, but partial separation occurs in the Schizogyniidae. This separation is absent in the Celaenopsidae as well as in the Euzerconidae. Further study is needed to determine the prevalence of this characteristic in the Diplogyniidae. No intent is made here to imply that this endopodal-metapodal suture is any more or less important than any other feature of the mites in this study, although, it could be used as a " key " character for C2 and C7.

The species referred to as C2 (*Megacelaenopsis oudemansi* n. sp.) also differs from the Celaenopsidae by a partial division of each ventro-lateral shield, the presence of branched corniculi, a rounded body form, the lack of separate metasternal shields in the female and the lack of movable hypostomal processes and gnathosomal setae in the male.

Species C7 (*Pelorocelaenopsis camini* n. sp.) differs from the Celaenopsidae by the presence of the endopodal-metapodal suture, the presence of five rather than six setae on trochanter I, nine setae instead of ten on femur I and seven setae instead of eight on tibia IV, the presence of external lateral processes on the vaginal sclerites in the female, the presence of a sclerotized ridge in the sternal area of the male and the lack of movable hypostomal processes in the male.

Comparison of the characteristics of C2 and C7 discussed above and of the figures of these two species included in this paper may lead one, as I have been tempted to do, to describe each as the type of a new family. In the analyses of the correlation coefficients and the distance coefficients, these two species repeatedly showed a low similarity value, but, in a centroid component analysis, they emerged quite close together as a well isolated assemblage. These contradictory results demand a certain amount of caution. Therefore, at least until further information is available, C2 and C7 will be recognized as members of two distinct genera in the same family.

#### **Family Megacelaenopsidae n. fam.**

*Female* (Fig. 1) : Venter of gnathosoma with basal, transverse row of small denticles. Deutosternal groove not extending to posterior margin of gnathosoma, with three transverse rows of very minute denticles or no distinguishable rows. Gnathosomal setae (g.s. 4) smooth or setose. Anterior margin of hypostome smoothly curved, not forming extension bearing anterior hypostomal setae (g. s. 1). Membranous portion of hypopharynx without comb-like serrations. Corniculi stout and branched or not branched or toothed. Tectum triangular, not lobed nor toothed, without central spine. Palpal claw with two or three tines.

Idiosoma more or less rounded to elongate-oval in outline, with or without distinct shoulders. Dorsal surface not hypertrichous. Nineteen or 21 pairs of marginal setae, including il and sl.

Tritosternum variable, not diagnostic. This structure is not delineated in the figures because it was obscured by other structures.

Three pairs of sternal setae, two pairs of lyriform pores and a single pair of oval pores on sternal shield.

Metasternal shields fused with or free from sternal shield; when free, shorter than one-fourth medial length of sternal shield.

Mesogynial and latigynial shields completely fused with ventroanal shield and with each other. Metapodal sutures present, continuous with suture that separates endopodal shields from genitoventroanal shield except at its anterior end. No postanal shield. Ventromarginal shields present. Posterolateral pore present. Stigmata between coxae III and IV.

*Male* : Similar to female except for presence of holoventral shield. Gnathosomal base not separated from palpal coxae. Hypostome symmetrical.

*Diagnosis* : Celaenopsoid mites with mesogynial and latigynial shields completely fused with ventroanal shield, and with third endopodal and metapodal shields free from ventral shield except at anterior end.

*Type genus* :

*Megacelaenopsis* n. g.

Key to the genera of Megacelaenopsidae

- i. Corniculi branched. Palpal claw three-tined. Ventromarginal shields partially divided posterior to coxae IV, not fused with peritremalia. Median separation of latigynials a short longitudinal slit. Trochanter I with six setae, femur I with ten setae and tibia IV with eight setae. *Megacelaenopsis*  
Corniculi unbranched. Palpal claw two-tined. Ventromarginal shields entire, fused with peritremalia anterior to coxae III. Median separation of latigynials a broad, shallow indentation. Trochanter I with five setae, femur I with nine setae and tibia IV with seven setae. . . . *Pelorocelaenopsis*

Genus *Megacelaenopsis* n. g.

*Female* (Fig. 1) : Gnathosoma typical for family. Deutosternal groove with three transverse rows of very minute denticles. Membranous hypostomal processes smooth and finger-like. Hypostomal setae almost in straight line. Membranous hypostomal processes present, blunt and smooth, located distally to *g. s. 1*. Membranous portion of hypopharynx single, shorter than sclerotized portion. Gnathosomal setae smooth. Corniculi ending in sharp point, with two tree-like projections arising from mesal surface and extending anterior to point. Anterior seta of palpal trochanter very strongly setose. Movable digit of chelicerae with one bilobed tree-like excrescence. Palpal claw with three tines.

Idiosoma more or less rounded, with distinct shoulders. Dorsal surface of idiosoma with anterior median seta and 50 pairs of setae. Nineteen pairs of setose marginal setae, including *il* and *sl*.

Basal piece of tritosternum wider than long, laciniae setose, entirely free from one another, more than four times as long as basal piece. Metasternal shields free or fused with sternal shield; when free, shorter than one-fourth median length of sternal shield. Metasternal setae and pores present. Mesogynial and latigynial shields leaving short, median longitudinal slit in genital area approximately one-half the distance between sternal setae 2 in length. Vaginal sclerites without laterally directed projection. Eight pairs of setae on genitoventroanal shield including

those associated with anus. Ventromarginal shields partially divided just posterior to coxae IV, extending forward anterior to coxae III, but not fused with peritremalia. Posterior portion of ventromarginal shield with more than 25 accessory pores and two setae. Posterolateral pore within ventromarginal shield. Peritremes sinuous, extending to anterior margin of coxae I.

*Male* : Gnathosoma similar to that of female. Hypostome symmetrical but very different from that of female, with strong, blunt hypostomal processes lateral to anterior hypostomal setae. Gnathosomal setae (*g. s.* 4) and posterolateral hypostomal setae (*g. s.* 3) absent. Chelicerae without accessory process on movable digit.

The genus name *Megacelaenopsis* is derived from a combination of the Greek *megas* meaning large and the generic name *Celaenopsis*, in reference to this mite's general celaenopsid appearance. This is a monotypic genus.

*Type-species* :

*Megacelaenopsis oudemansi* n. sp.

***Megacelaenopsis oudemansi* n. sp.**

FEMALE

(Fig. 1)

Measurements are given in Table 1.

*Gnathosoma* typical for family and genus. Lateral edge of tectum smooth. Hypostomal and gnathosomal setae smooth. Gnathosomal setae (*g. s.* 4) extending almost to bases of *g. s.* 3. Median posterior hypostomal setae (*g. s.* 2) longer than other two pairs, one-fourth longer than *g. s.* 1; lateral posterior hypostomal setae (*g. s.* 3) shortest, approximately three-fourths as long as *g. s.* 1.

*Idiosoma* rounded, with prominent shoulders. Dorsal shield with surface more or less reticulate anteriorly and somewhat shagreened posteriorly, with anterior median seta and 50 pairs of setae of which approximately 36 pairs are heavy and setose, subequal in length to marginal setae, remainder being shorter and smooth. Seventeen pairs of heavy, setose marginal setae, excluding *il* and *sl*.

Metasternal shields fused with sternal shield, but separate from each other. Sternal setae smooth. Sternal setae 1 approximately one-fourth longer than distance between their bases. Sternal setae 2-4 located along posterior margin of sternal shield. Sternal setae 2 three-fourths length of sternal setae 1. Sternal setae 3 and 4 three-fourths length of sternal setae 2.

Median separation of latigynials approximately one-third length of sternal shield.

Genitoventroanal shield with eight subequal pairs of smooth setae. Three pairs of large and two pairs of small oval pores present posterior to anus. Third endopodal shields free, except at anterior end, from genitoventroanal plate.

Genua III and IV with setae *pdI* similar to other leg setae. Coxa II with short blunt spur directed posterolaterally from wall of segment.

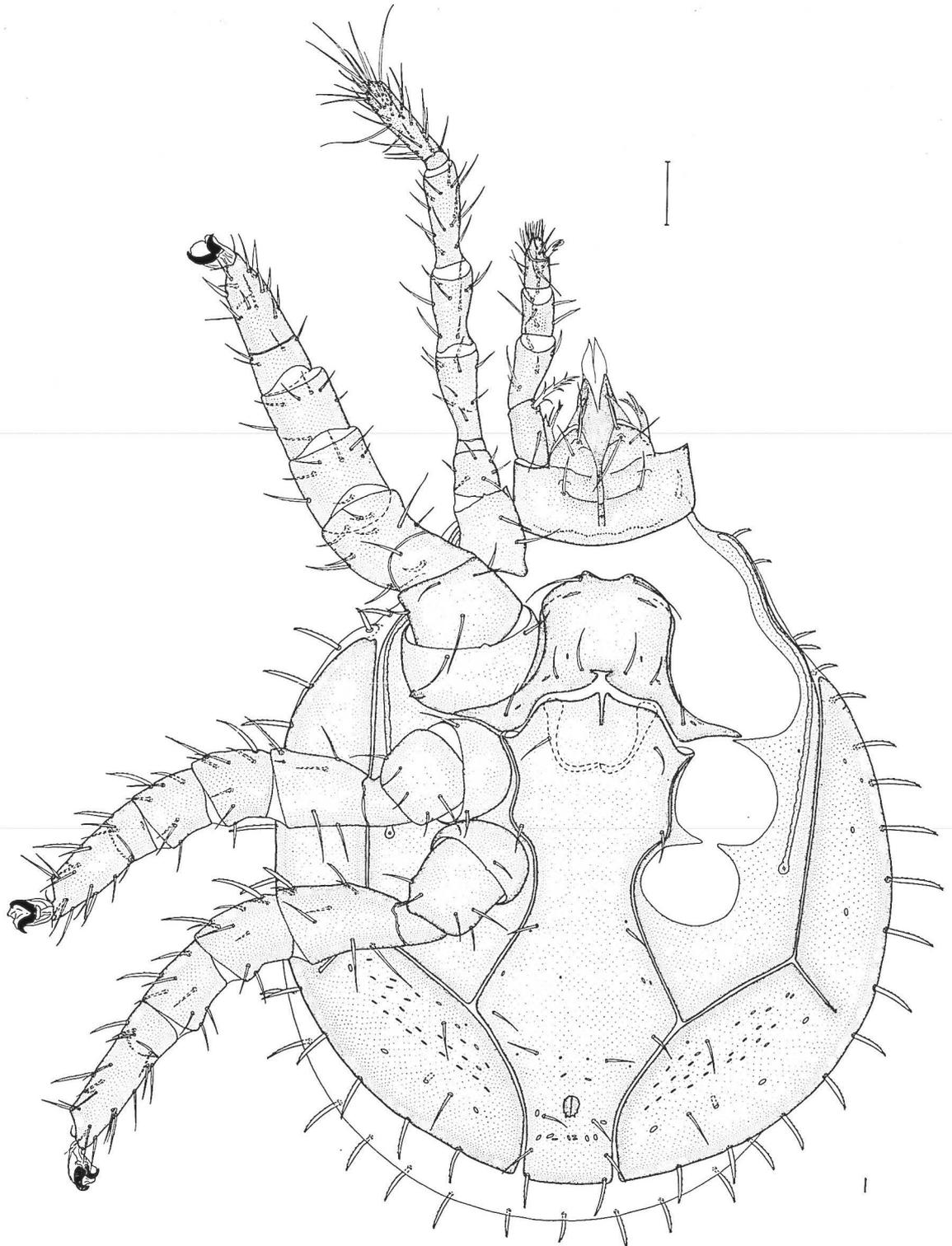


FIG. 1. *Megacelaenopsis oudemansi* n. g., n. sp. Female, ventral.

Note : The scale line represents 100  $\mu$ .

TABLE I. — *Megacelaenopsis oudemansi* n. g., n. sp. Measurements of Female and Male

	Y	cs	Range	C. V.
Adult ♀ n = 4				
Dorsal shield :				
Length	1177.0μ	13.81	1164.0-1190.0	1.08
Width	970.3	10.02	960.6- 982.2	0.92
Sternal shield :				
Length	232.6	13.39	220.7- 246.6	5.12
Width	431.6	17.92	411.1- 450.0	3.69
Distance between sternal setae 2	299.7	28.47	285.6- 337.5	8.45
Length of tarsus IV	253.1	12.85	238.0- 263.9	4.51
Gnathosomal width	270.5	14.05	255.3- 285.6	4.62
Adult ♂ n = 4				
Dorsal shield :				
Length	1131.5	36.92	1099.1-1176.9	2.86
Width	911.9	72.06	822.1- 973.6	7.02

Abbreviations : Y = mean ; cs = corrected standard deviation (using Dixon and Massey's correction factor  $c = 1 + \frac{1}{4(n-1)}$ ) ; C. V. = coefficient of variability.

MALE  
(Figs. 2-4)

Measurements are given in Table I.

*Gnathosoma* (Fig. 2) similar to female except that anterior hypostomal setae are larger, posterior lateral hypostomal setae missing and hypostomal processes hypertrophied, being strong and blunt with a membranous and pointed extension from their lateral margin. Chelicerae as in female.

*Idiosoma* as in female except for presence of holovenral shield which bears 11 pairs of smooth setae (Fig. 3), all but anterior two pair (sternal setae 1 and 2) subequal, one-third longer than remaining holovenral setae. Dorsal shield as in Fig. 4.

Legs as in female.

TYPE DATA :

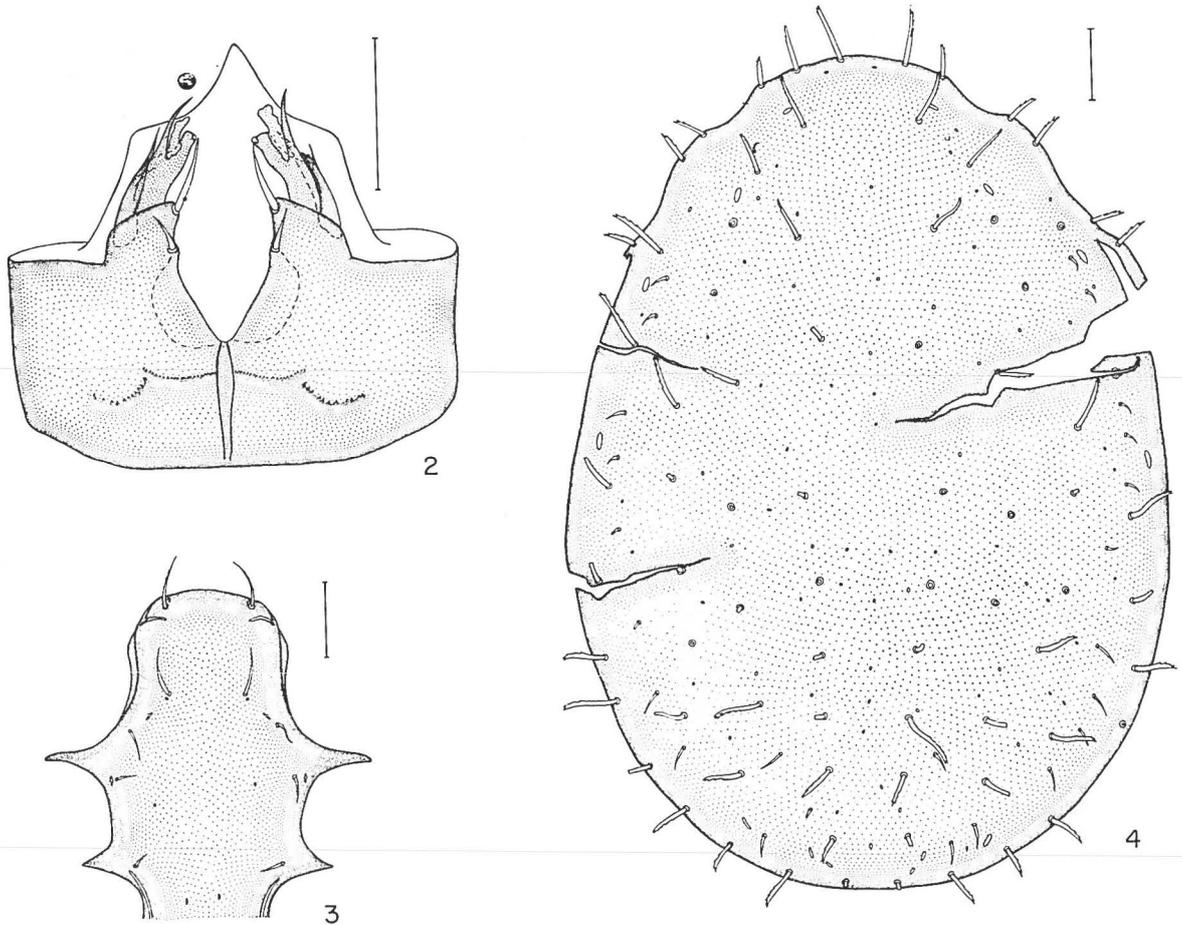
Type habitat : unknown.

Holotype : ♀, Panama, Changuinola Dist., Boc. Toro, no other data. To be deposited in the U. S. National Museum, Washington, D. C., U. S. A.

Allotype : ♂, Costa Rica, at Charleston, S. C., U. S. A., 20 June 1932, on banana leaf (G. Gay, Charleston 3135). To be deposited in the U. S. National Museum, Washington, D. C., U. S. A.

Paratypes : 2 ♀♀, same data as holotype ; 2 ♀♀, C. R., Hamburg Farm, Sta. Clara, 30 May 1925 (F. Neverman) ; 1 ♀, Mexico, at New Orleans, La., U. S. A., 20 Nov. 1935 (U. S. N. M., N. O. No. 14,584, 35-21941) ; 1 ♀, Costa Rica (in cargo), at Charleston, S. C., U. S. A., 17 Oct. 1932, on banana leaf (G. Gay, Charleston No. 3332) ; 1 ♂, same data as allotype ; 1 ♂, Costa Rica, inter-

cepted at Boston, Mass., U. S. A., 6 June 1927, on beetle in banana rubbish in cargo (C. A. Davis, Boston No. 3667); 1 ♂ Guatemala, at Mobile, Ala., U. S. A., in banana debris (J. Robinswood, Mobile No. 3584); 1 ♂, Panama, at Charleston, S. Car. U. S. A., 30 Nov. 1932, on beetle in banana debris (G. Gay); 1 ♂, Panama, Changuinola Dist., Boc. Toro, no other data.



FIGS. 2-4. *Megacelaenopsis oudemansi* n. g., n. sp. Male. 2) Gnathosoma, ventral; 3) Sternal area; 4) Dorsal. Note: The scale line represents 100  $\mu$ .

Material deposited in the British Museum (Nat. Hist.), London, England (1 ♀, 1 ♂); the Institute of Acarology, Wooster, Ohio, U. S. A. (1 ♀, 1 ♂); the Snow Entomological Museum, The University of Kansas, Lawrence, Kansas, U. S. A. (1 ♀, 1 ♂). The remaining material is deposited in the U. S. Nat. Mus., Washington, D. C., U. S. A. (3 ♀♀, 2 ♂♂).

The type series is mounted in Hoyer's medium and the coverslips are ringed with Zut lacquer. This species was called C2 in the original study (FUNK, 1968).

The specific epithet is in honor of the famous Dutch acarologist C. A. OUDEMANS.

#### Genus *Peloroceles* n. g.

*Female* (Fig. 5): Gnathosoma typical for family. Deutosternal denticles not arranged in distinguishable rows. Membranous hypostomal processes long and toothed, not fingerlike. Hypo-

stomal setae arranged in triangle. Membranous portion of hypopharynx double, about as long as sclerotized portion. Gnathosomal setae setose. Corniculi stout, smooth, not branched or toothed. Anterior seta of palpal trochanter very weakly setose. Movable digit of chelicerae with three tree-like excrescences. Palpal claw with two tines.

Idiosoma elongate-oval in outline, without shoulders. Twenty-one pairs of marginal setae, including il and sl. Tritosternum present, but not shown in Fig. 5. Basal piece approximately one-third length of lacinae. Lacinae fused for approximately two-thirds their length. Meta-sternal shields free from sternal shield except at lateral corner. Metasternal setae absent. Mesogynial and latigynial shields completely fused with ventral shield and with each other. A slight rounded depression marking separation of latigynial shields at their anterior margins. Vaginal sclerites with long lateral projection. Genitoventroanal shield with 10 pairs of setae, including those associated with anus. Ventromarginal shields entire, fused with peritremalia anterior to coxae III. Posterolateral pore between ventromarginal and dorsal shields. Peritreme relatively straight, curving onto dorsum anterior to coxa I.

TABLE 2. — *Pelorocelaenopsis camini* n. g., n. sp. Measurements of Female and Male

	Y	cs	Range	C. V.
Adult ♀ n = 2				
Dorsal shield :				
Length	1263.5μ	—	1211.6-1315.4	—
Width	893.6	—	874.1- 913.0	—
Sternal shield :				
Length	183.9	—	181.7- 186.1	—
Width	502.0	—	476.0- 527.9	—
Distance between sternal setae 2	103.8	—	NONE	—
Length of tarsus IV	335.4	—	333.2- 337.5	—
Gnathosomal width	255.3	—	238.0- 272.6	—
Adult ♂ n = 4				
Dorsal shield :				
Length	1104.5	84.18	1042.8-1194.3	6.78
Width	784.3	45.72	735.6- 817.8	5.18

Abbreviations : Y = mean ; cs = corrected standard deviation (using Dixon and Massey's correction factor  $c = 1 + \frac{1}{4(n-1)}$ ) ; C.V. = coefficient of variability.

*Male* : Gnathosoma similar to that of female except that it possesses two, rather than one, pairs of membranous hypostomal processes. Chelicerae with large, blade-like accessory process arising from base of movable digit.

The genus name *Pelorocelaenopsis* is derived from a combination of the Greek *Peloros* meaning huge and the generic name *Celaenopsis*, in reference to this mite's general celaenopsid appearance. This genus is monotypic.

*Type-Species* :

*Pelorocelaenopsis camini* n. sp.

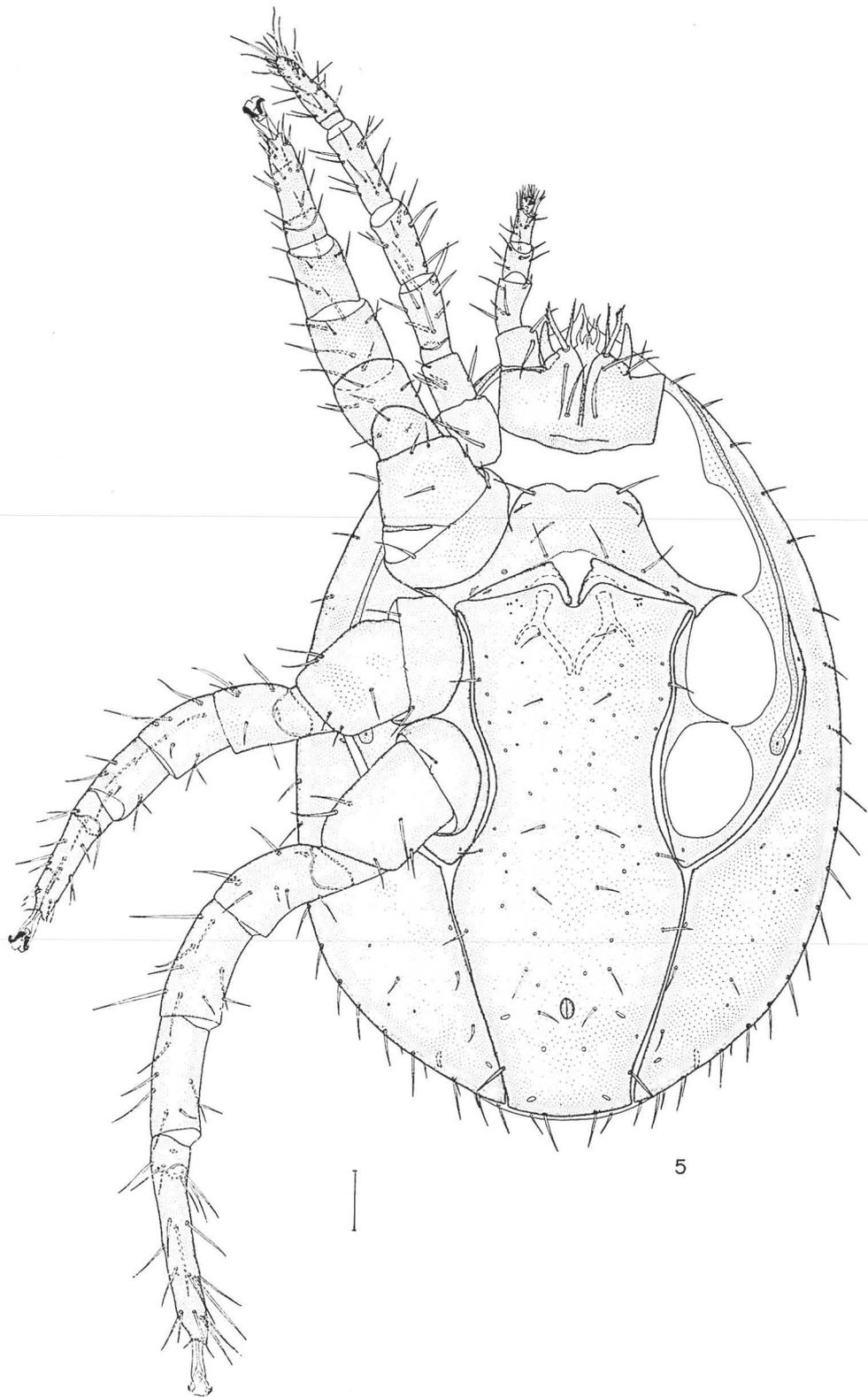


FIG. 5. *Pelorocelaenopsis camini* n. g., n. sp. Female, ventral.  
Note : The scale line represents 100  $\mu$ .

*Peloroceles camini* n. sp.

FEMALE

(Fig. 5)

Measurements are given in Table 2.

*Gnathosoma* typical for family and genus. Lateral edge of tectum smooth. Deutosternal groove with more than ten denticles not arranged in distinguishable rows. Hypostomal and gnathosomal setae setose; anterior hypostomal setae much stronger than posterior two pairs. Gnathosomal setae (*g. s. 4*) only slightly longer than distance between bases of gnathosomal setae and *g. s. 2*. First and second pairs of hypostomal setae subequal in length to gnathosomal setae. Setae *g. s. 3* two-thirds the length of *g. s. 2*.

*Idiosoma*. Surface of dorsal shield somewhat reticulate with short, smooth setae. Dorsal setae shorter than length of anal opening.

Sternal setae smooth, subequal in length, one half as long as distance between bases of sternal setae 1.

Ventral setae vary from one to one and one half times as long as length of anal opening.

Two pairs of oval pores and one pair of circular pores present within anal region.

Genua III and IV with setae *pd1* similar to other leg setae. This species differs from other celaenopsoid mites by the possession of five setae instead of six on trochanter I, nine setae instead of ten on femur I and seven setae instead of eight on tibia IV.

MALE

(Fig. 6 & 7)

Measurements are given in Table 2.

*Gnathosoma* (Fig. 6) similar to female except that it possesses two, rather than one, pairs of membranous hypostomal processes.

*Idiosoma*. Holovenral shield with 13 pairs of smooth setae (Fig. 7), subequal in length to those of female. First pair of sternal setae greatly flattened and membranous. Sternal area with strong ridge between sternal setae 2.

Legs as in female.

*TYPE DATA* :

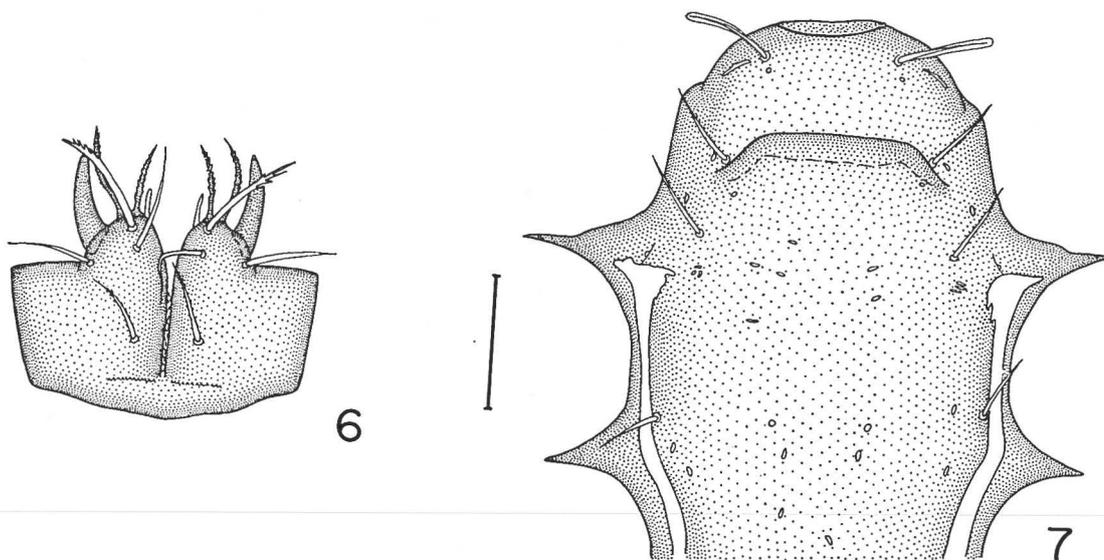
Type habitat : unknown.

Holotype : ♀, Congo, Yangambi, Oriental Province, 1953 (C. Donis, R-2412 Z-1597). To be deposited in the U. S. National Museum Washington, D. C., U. S. A.

Allotype : ♂, same data as holotype. To be deposited in the U. S. National Museum, Washington, D. C., U. S. A.

Paratypes : 1 ♀, same locality, 1952 (C. Donis, R-2421 Z-1677); 1 ♂, same locality, 1952 (C. Donis, R-2409 Z-1537); 1 ♂, same locality, 1952 (C. Donis, R-2412 Z-1608); 1 ♂, same locality, 1952 (C. Donis, R-2412 Z).

Material deposited in the Institute of Acarology, Wooster, Ohio, U. S. A. (1 ♂); the British Museum (Natural History), London, England (1 ♂). The remaining material is deposited in the Snow Entomological Museum, The University of Kansas, Lawrence, Kansas, U. S. A. (1 ♀, 1 ♂).



FIGS. 6-7. *Pelorocelaenopsis camini* n. g., n. sp. Male. 6) Gnathosoma, ventral; 7) Sternal area.  
Note : The scale line represents 100  $\mu$ .

The type series is mounted in Hoyer's medium and the coverslips are ringed with Zut lacquer. This species was called C7 in the original study (FUNK, 1968).

The specific epithet is in honor of Dr. Joseph H. CAMIN for his guidance during the progress of this study.

As a result of a study of Berlese's acarine material, Dr. J. H. CAMIN has indicated (personal communication) that the species *Celaenopsis angulata* Berlese, 1916 (Slide No. 169/34 in the Berlese Collection) and *Celaenopsis (Neocelaeno) cryptodonta* (BERLESE, 1901) Berlese, 1910 (Slide No. 21/11 in the Berlese Collection) may belong to the family Megacelaenopsidae as they both have the general facies of *Pelorocelaenopsis*.

#### LITERATURE CITED

- BERLESE (A.), 1901. — In : Berlese (A.) and Leonardi (G.) : Acari sud americani. — Zool. Anz., **25** : 12-18.  
BERLESE (A.), 1910. — Brevi diagnosi di generi e specie nuovi di Acari. — Redia, **6** (2) : 346-388.  
BERLESE (A.), 1916. — Centuria secondi di Acari nuovi. — Redia, **12** : 125-177.  
CAMIN (J. H.) and GORIROSSI (F. E.), 1955. — A revision of the suborder Mesostigmata (Acarina), based on new interpretations of comparative morphological data. — Chicago Acad. Sci., Spec. Publ., No. **11** : 1-70.  
EVANS (G. O.), 1963. — Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari : Mesostigmata). — Bull. Brit. Mus. (Nat. Hist.) Zool., **10** (5) : 275-303.  
FUNK (R. C.), 1968. — Revision of the family Euzerconidae and its relationships within the superfamily Celaenopsoidea (Acarina : Mesostigmata), aided by the techniques of numerical taxonomy. — Ph. D. Dissertation, The University of Kansas, Lawrence. 258 pp., 7 append., 153 figs.  
HIRSCHMANN (W.), 1957. — Rumpfbehhaarung und Rückenflächen. — Schriftenreihe für vergleichende Milbenkunde Fürth / Bay Acarologie — Gangsystematik der Parasitiformes, **1** : 1-20, i-v pls. 1-26.

- LINDQUIST (E. E.) and EVANS (G. O.), 1965. — Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina : Mesostigmata). — Mem. Ent. Soc. Canada **47** : 64 pp.
- SMITH (H. M.), 1970. — The compleat taxonomist. — The Biologist **52** (3) : 108-111.
- TRÄGÅRDH (I.), 1950. — Studies on the Celaenopsidae, Diplogyniidae, and Schizogyniidae (Acarina). — Arkiv. for Zoologi, Ser. 2, **1** (25) : 361-451.