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A note on mites associated with *Heliocopris japedus* KLUG from KenyaMICHAEL COSTA¹⁾

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Through the courtesy of Dr. G. RACK (Universität Hamburg, Zoologisches Institut und Zoologisches Museum) I received 139 slides with mounted mesostigmatic mites, all collected from a single beetle. The slides bear the following data: ex *Heliocopris japedus* KLUG (the taxonomic problems pertaining to the genus *Heliocopris* HOPE are discussed below), Ost-Afrika, Kenya, Tsavo Park. Ende Februar 1972. H. WILKENS leg. Eing. Nr. A 13/73. The mites were mounted with splinters of cover-glasses in order to avoid extensive flattening. The mites belong to six species as follows (classification after KARG, 1971):

Eviphidoidea KARG, 1965

Eviphididae BERLESE, 1913

1. *Eviphis hastatellus* (BERLESE, 1910)

Macrochelidae v. VITZTHUM, 1930 s. KARG, 1965

Macrochelinae v. VITZTHUM, 1930

2. *Macrocheles africanus* RYKE & MEYER, 1958 status novum3. *Macrocheles nemontanus* RYKE & MEYER, 19584. *Holostaspella caelata* BERLESE 1910

Pachylaelapinae v. VITZTHUM, 1931

5. *Pachylaelaps heliocopridis* RYKE & MEYER, 19586. *Elaphrolaelaps rackae* COSTA, sp. nov.

The mites of the superfamily Eviphidoidea are carnivorous, feeding apparently mainly on nematodes, which can be found in the soil and litter, in manure and compost heaps and especially at the interface of fresh cattle (or other large vegetarian mammals) droppings and soil. Many species of Eviphidoidea have developed phoretic habits to a varying extent and often coprid beetles are the main carriers. Various degrees of host-specificity have also been recorded.

As most of the species determined in this study have been recorded in the literature only once and in order to facilitate their study in view of the problems created by uncertain host taxonomy (vide discussion), most species are figured and redescribed here.

Eviphis hastatellus (BERLESE) (fig. 1)*Copriphis hastatellus* BERLESE, A., 1910, Redia 6 : 262*Eviphis hastatellus* RYKE, P. A. J. and MEYER, M. K. P., 1957, Ann. Mag. Nat. Hist. Ser. 12, Vol. 10 : 599 (female only).*Eviphis hastatellus hastatellus* SPIES, A. and RYKE, P. A. J., 1965, Mems. Inst. Invest. cient. Mocamb., Serie A, 7 : 224 (male).

This species is represented in the collection by 19 female specimens with the following dimensions: Dorsal shield, length: x^*) = 596.8 μ ; s = 6,9; a = 580—610 μ ; width: x = 430.8 μ ; s = 8.2; a = 420—440 μ . *E. hastatel-*

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*) x for mean.

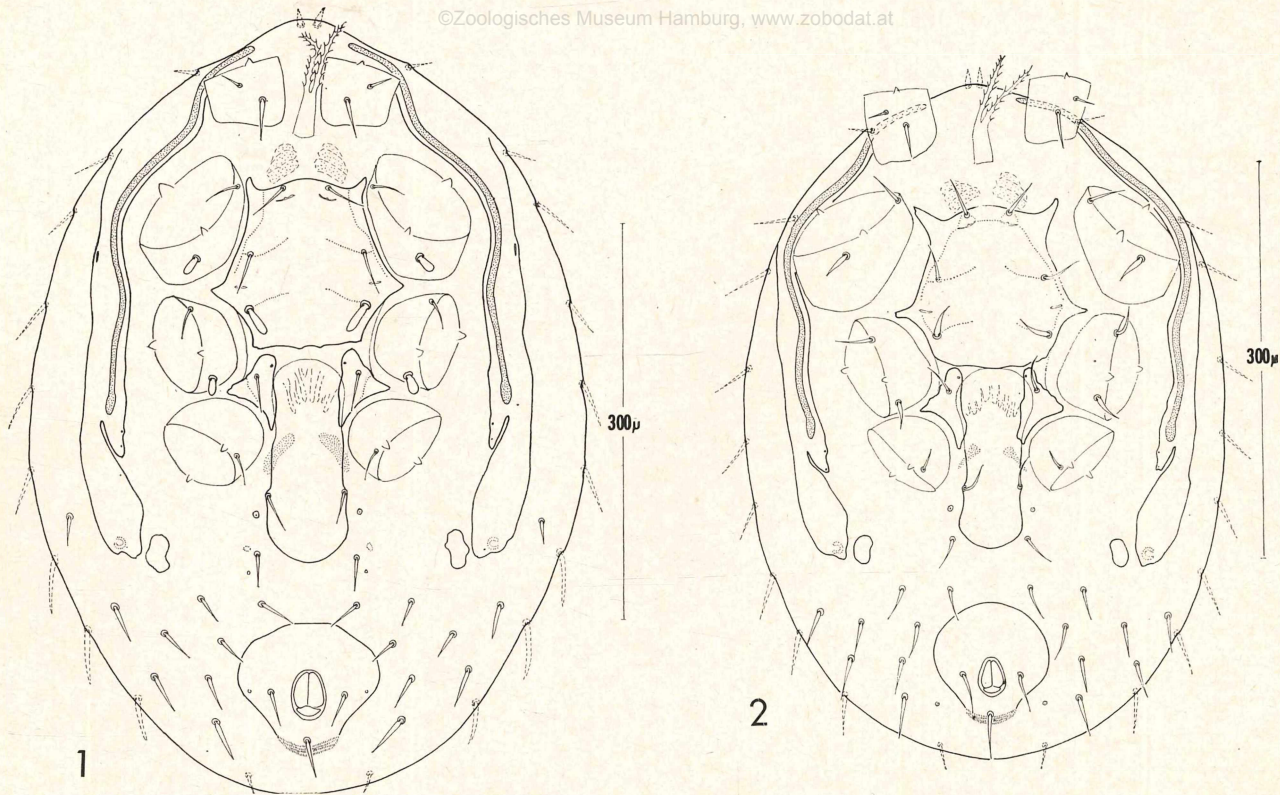


Fig. 1—2 Female, venter. 1 *Eviphis hastatellus* (BERLESE); 2 *Eviphis transvaalensis* RYKE & MEYER.

lus seems to be rather variable in regard to its dimensions which are recorded for the female as 450 μ long and 380 μ wide by BERLESE (specimens ex *Helicopriss hamadryas* FAB., Cape of Good Hope) and 517 μ long and 330 μ wide by RYKE and MEYER (specimens ex *Onitis* sp., *H. hamadryas* FAB. and *H. gigas* L., Potchefstroom). The size differences may be possibly correlated with the association with different hosts, however, they may be also an expression of a size cline of decreasing dimensions from North to South in Africa, South of the Sahara. This is apparent also in comparing size differences of other species collected in Kenya and in Potchefstroom (vide *Macrocheles africanus* RYKE and MEYER and *M. nemontanus* RYKE and MEYER in the present study).

The best diagnostic character of *H. hastatellus* are the blunt, rounded spur-like setae on coxae II and III and on the sternal shield (St. 3) (fig. 1). The shape of these setae separates easily three rather similar species, namely *E. hastatellus* (BERL.), *E. transvaalensis* RYKE & MEYER (setae spur-like and acuminate, fig. 2) and *E. stephanianinus* (BERL.) (setae „normal“, not differing from the remaining setae. This species has been figured recently by SHOEMAKE & KRANTZ, 1966). The status of these three species is discussed by these authors and their conclusions are accepted here. RYKE and MEYER proposed also the synonymy of *E. rufus* OUDS. 1913 and *E. exemplaris* VITZT., 1925 with *E. hastatellus* (BERL.), this has been accepted by SHOEMAKE and KRANTZ.

The family Eviphididae is apparently in the need of a thorough generic revision (J. B. KETHLEY, personal communication), for the purposes of this study the conservative use of the generic names has been accepted provisionally.

Macrocheles africanus RYKE & MEYER, status novum (fig. 3—6, 8)

Macrocheles merdarius africanus RYKE & MEYER, 1958. J. ent. Soc. S. Africa, 21 : 146 figs. 19—22.

This species is represented in the collection by 34 females with the following dimensions (measurements of 25 specimens): Dorsal shield: length: x = 681.1 μ ; s = 24.3; a = 640—740 μ ; width: x = 413.9 μ ; s = 19.9; a = 390—485 μ ; Ventroanal shield: length: x = 220.1 μ ; s = 9.8; a = 200—235 μ ; width: x = 184.0 μ ; s = 11.0; a = 165—215 μ .

Dorsum: The dorsal shield (fig. 3) covers usually the dorsum completely, it bears 28 pairs of short and simple setae. The vertical setae (i1) are stouter and more robust than the regular setae, setae J5 are slightly pectinate and about half the length of S5. The shield is ornamented with punctuate lines. The peritremes are very long and extend anteriorly beyond the insertions of setae r1. The tripartite tectum is shown in fig. 5. — Venter: (fig. 4): All the paired ventral setae are simple and needlelike, only the postanal seta is weakly pilose distally. The sternal shield (140 μ long and 135 μ wide at the level of St2) with a deeply concave anterior margin, it is weakly ornamented with punctuate lines. The ventroanal shield is markedly longer than wide, its ornamentation is similar to that of the sternal shield. The gnathosome is normal for the genus. — Tarsus II (fig. 8) with several spur-like distal setae.

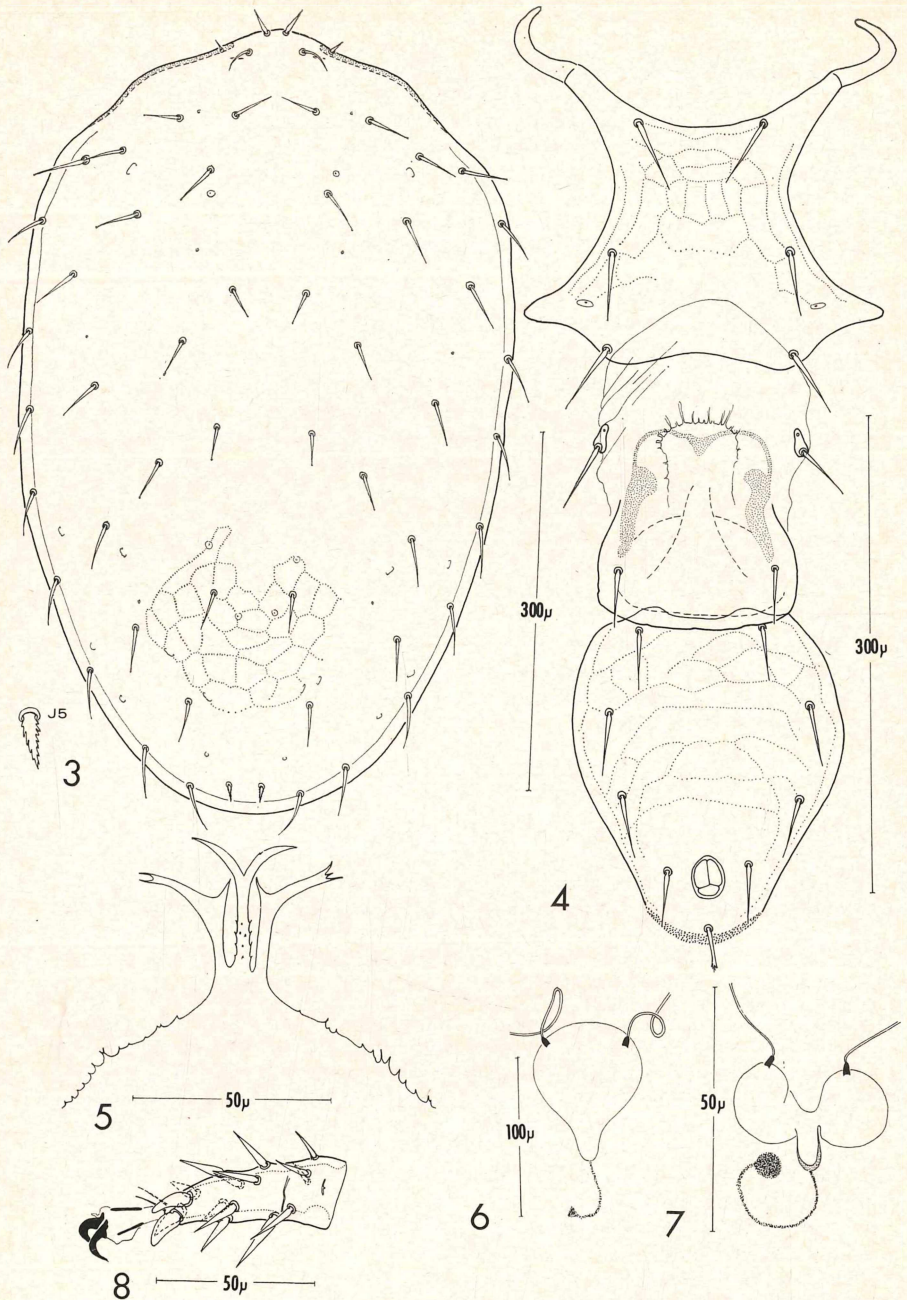


Fig. 3—8 *Macrocheles africanus* RYKE & MEYER, female. 3 dorsal shield; 4 shields of the venter; 5 tectum; 6 sacculus foemineus; 7 sacculus foemineus of *Macrocheles merdarius* (BERLESE); 8 tarsus II.

Notes: RYKE & MEYER (op. cit.) state that this form differs from *M. merdarius* (BERL.) in its dimensions, ornamentation and other small characters but could not justify the erection of a new species, treating it as a new subspecies, namely *Macrocheles merdarius africanus*. The range of dimensions of *M. merdarius* is fairly variable (as in most other arthropods!) according to various authors (Table I):

Table I. Dimensions of dorsal shield of *M. merdarius* after various authors.

Length of dorsal shield	Author
484 μ	SELLNICK, 1940
445—490 μ	EVANS & BROWNING, 1956
0.40—0.51 mm	BREGETOVA & KOROLEVA, 1969
426—518 μ ($x = 482.11 \mu$)	FILIPPONI & PEGAZZANO, 1963
400—510 μ	KARG, 1970
435—540 μ ($x = 503.8 \mu$)	Present study (<i>M. merdarius</i> from Israel).

The length of the dorsal shield of *M. africanus* exceeds the maximal known length of *M. merdarius* widely, however, the average length of the dorsal shield of *M. africanus* in the present collection ($x = 681.1 \mu$) exceeds the dimensions given by RYKE & MEYER for the same form (length 605 μ , width 308 μ) by a similar magnitude.

PETROVA (1960) points out the possible importance of the morphology of the sacculus foemineus for diagnostic purposes in the Macrochelidae and describes the sacculi of eight species, including that of *M. merdarius*. COSTA (1967 a, 1967 b) described the sacculus of *M. robustulus* (BERL.), of several species of the *pisentii* group and discusses its function. In *M. merdarius* (fig. 7) the sacculus is of the double-bladder structure which seems to be characteristic for the majority of macrochelids (PETROVA, op. cit.). In *M. africanus*, however, the structure of the sacculus is totally different, consisting of a single large membraneous sac (fig. 6) which is very similar to the shape found in the members of the *pisentii* group.

The large dimensions, the shape of the distal setae of tarsus II and the form of the sacculus foemineus show that *M. africanus* is a species which is similar to *M. merdarius*, but apparently not closely related to it.

Macrocheles nemontanus RYKE & MEYER (fig. 9—12)

Macrocheles nemontanus RYKE & MEYER, 1958; J. ent. Soc. S. Africa, 21 : 139, figs. 1—7.

This species is represented in the collection by 11 females with the following dimensions: Dorsal shield: length: $x = 1013.8 \mu$; $s = 12.7$; $a = 945—1040 \mu$; width: $x = 624.7 \mu$; $s = 18.9$; $a = 585—645 \mu$; Ventroanal shield: length: $x = 320.2 \mu$; $s = 14.7$; $a = 295—340 \mu$; width: $x = 326.2 \mu$; $s = 15.2$; $a = 310—355 \mu$. The species has apparently not been recorded since its original description.

Dorsum: (fig. 9): The dorsal shield bears 29 pairs of setae, of which seven pairs (r 1, z 2, z 3, i 5, J 2, J 3, J 5) are smooth or nearly so (a slight serration may be apparent at high magnifications and phasecontrast), the remaining setae are highly pilose. The long vertical setae (i 1) are inserted

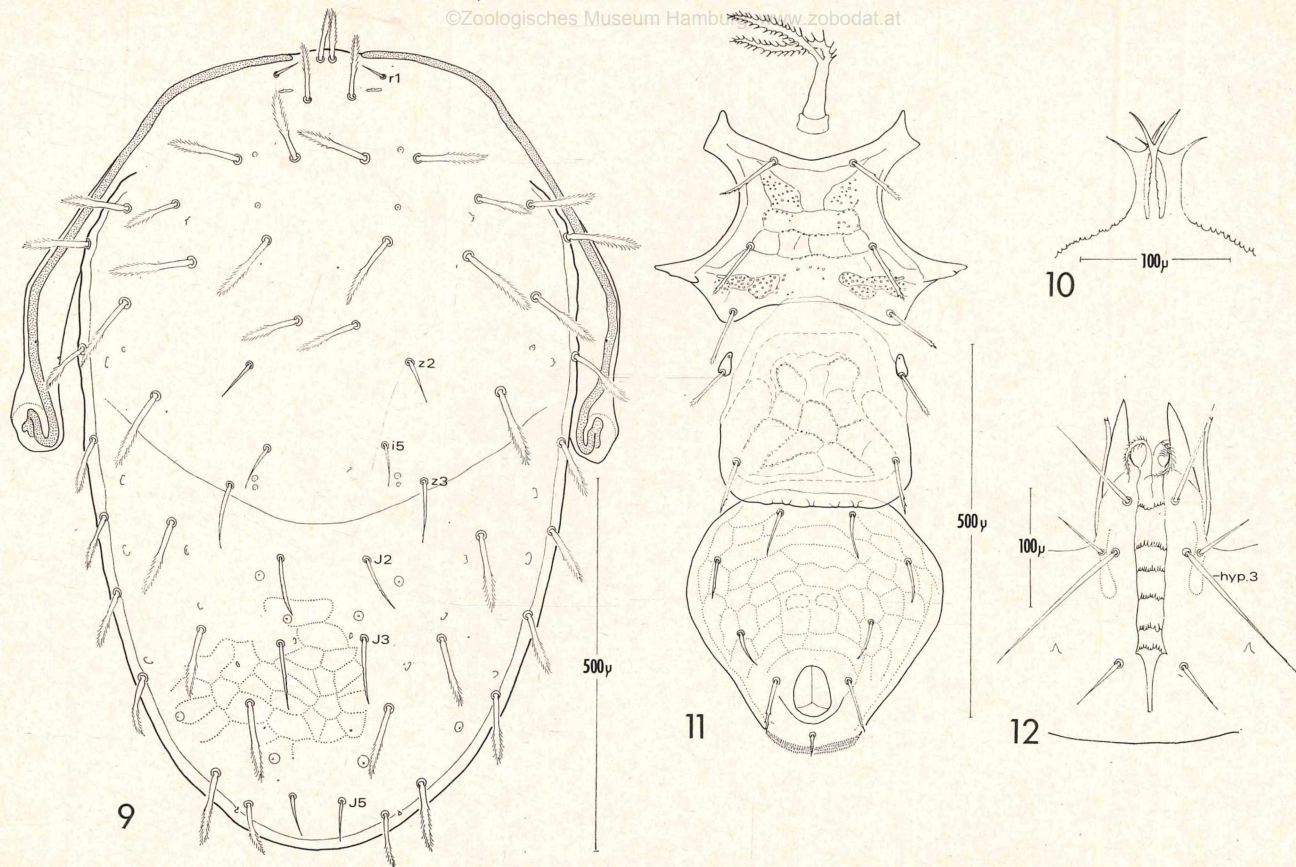


Fig. 9—12 *Macrocheles nemontanus* RYKE & MEYER, female. 9 dorsal, shield; 10 tectum; 11 shields of venter; 12 gnathosome, ventral view.

close to each other, their bases being separated by a distance which is smaller than the base diameter. The shield is finely granulated and ornamented throughout, the dividing line between its anterior and posterior parts being very marked. — The peritremes are very long and extend anteriorly beyond the insertions of setae r 1. The tripartite tectum is shown in fig. 10. — Venter: (fig. 11): The sternal shield ($185\ \mu$ long at midline and $255\ \mu$ wide at the level of St 2) with concave anterior and posterior margins. The sternal setae are slightly pilose distally. Highly porous area punctata are characteristic. The metasternal setae are inserted on small metasternal shields, they, as well as the genital setae, are weakly pilose distally. The three pairs of preanal setae and the anal setae are smooth to weakly serrate. The ventroanal shield is about as long as wide. The gnathosome (fig. 12) with six rows of deutosternal teeth and very long hyp. 3 setae. The salivary stily are long and narrow.

Notes: Although the specimens in this collection are markedly larger than those of the original description (stated by RYKE & MEYER as: Length of dorsal shield — $825\ \mu$, width — $550\ \mu$) they have been assigned to *M. nemontanus* because of the following diagnostic characters: Details of the chaetotactic pattern and setal shapes of 29 (!) pairs of dorsal setae; the extreme anterior extensions of the peritremes and the host association. — Twenty-nine pairs of dorsal setae are characteristic of *M. montanus* WILLMANN, 1951 which suggested the name of the present species [incidentally, according to KRAUSS, 1970 *M. montanus* WILLMANN, 1951 is a synonym of *M. montivagus* (BERLESE, 1887)], of several species of the *bregetovae* group (EVANS & HYATT, 1963) which are associated with South American coprid beetles, and of *M. cristatus* and *M. saceri* (COSTA, 1967 b). — RYKE & MEYER (op. cit.) recorded *M. nemontanus* from the following scarabaeid beetles: *Helicocpris gigas* L., *Copris elphenor* KLING, *Scarabaeus funebris* BOH., and *Oryctes boas* F.

Holostaspella caelata BERLESE (fig. 13—14)

Holostaspella caelata BERLESE. 1910, Redia 6: 248.

Twenty-six females belonging to this species are represented in the collection, they have the following dimensions: dorsal shield: length: $x = 601.5\ \mu$; $s = 11.5$; $a = 580\text{--}620\ \mu$; width: $x = 357.7\ \mu$; $s = 11.5$; $a = 335\text{--}380\ \mu$; ventroanal shield: length: $x = 195.2\ \mu$; $s = 6.2$; $a = 180\text{--}205\ \mu$; width: $x = 170.2\ \mu$; $s = 7.5$; $a = 155\text{--}190\ \mu$. The widths of the shields plotted against their lengths, and the regression coefficient are shown in figs. 13, 14, the data agree very well with those given by FILIPPONI and PEGAZZANO (1967). *H. caelata* BERLESE has been recently described and figured by FILIPPONI & PEGAZZANO (op. cit.) and KRANTZ (1967). The former included *H. caelata* sensu RYKE & MEYER (1958) in their concept of the species, whereas KRANTZ assigned a new species, namely *H. similis* KRANTZ, 1967 to the mites described by RYKE and MEYER. KRANTZ separates the two species by the following key characters:

- 15 $Mg_1\text{--}Mg_5$ long enough to reach or surpass insertions of setae behind them; L_6 surpassing insertions of D_9 . Africa *H. caelata*
 — $Mg_1\text{--}Mg_5$ short, not nearly long enough to reach insertions of setae behind them; L_6 not surpassing insertions of D_9 ; South Africa *H. similis*

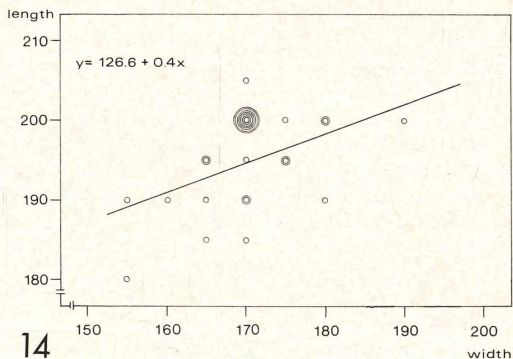
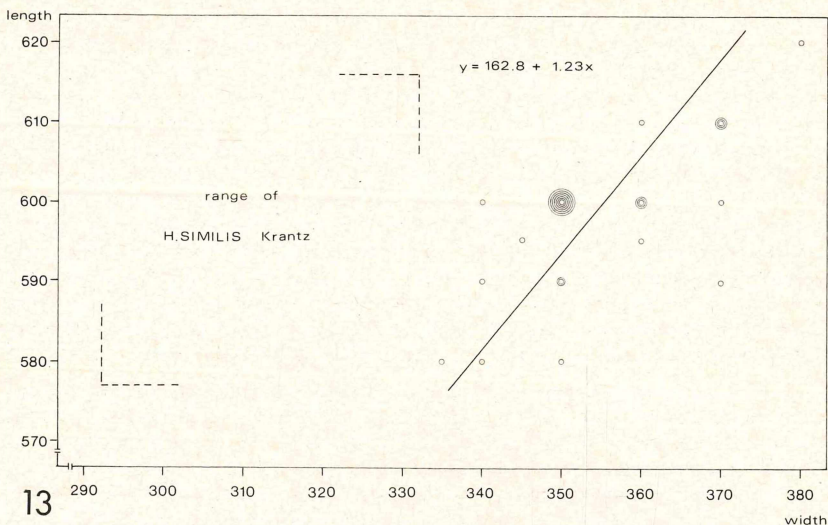


Fig. 13—14 *Holostaspella caelata* BERLESE, female. 13 range of dimensions of dorsal shield (in micrometers); 14 range of dimensions of ventro-anal shield (in micrometers).

In the text he adds: Mg setae (all!, M. C.) reaching or surpassing setae behind them in *H. caelata*; Mg₁₋₇ short, smooth or nearly so, not reaching insertions of setae behind them in *H. similis*. — The degree of pectination of the setae seems to be rather variable, but in all the specimens in this collection, setae L₆ clearly surpass the insertions of D₉ and have therefore been assigned to *H. caelata*. Fig. 13 shows also that the dimensions of the idiosoma (after KRANTZ, 1967) of *H. similis* fall outside the rank of *H. caelata*.

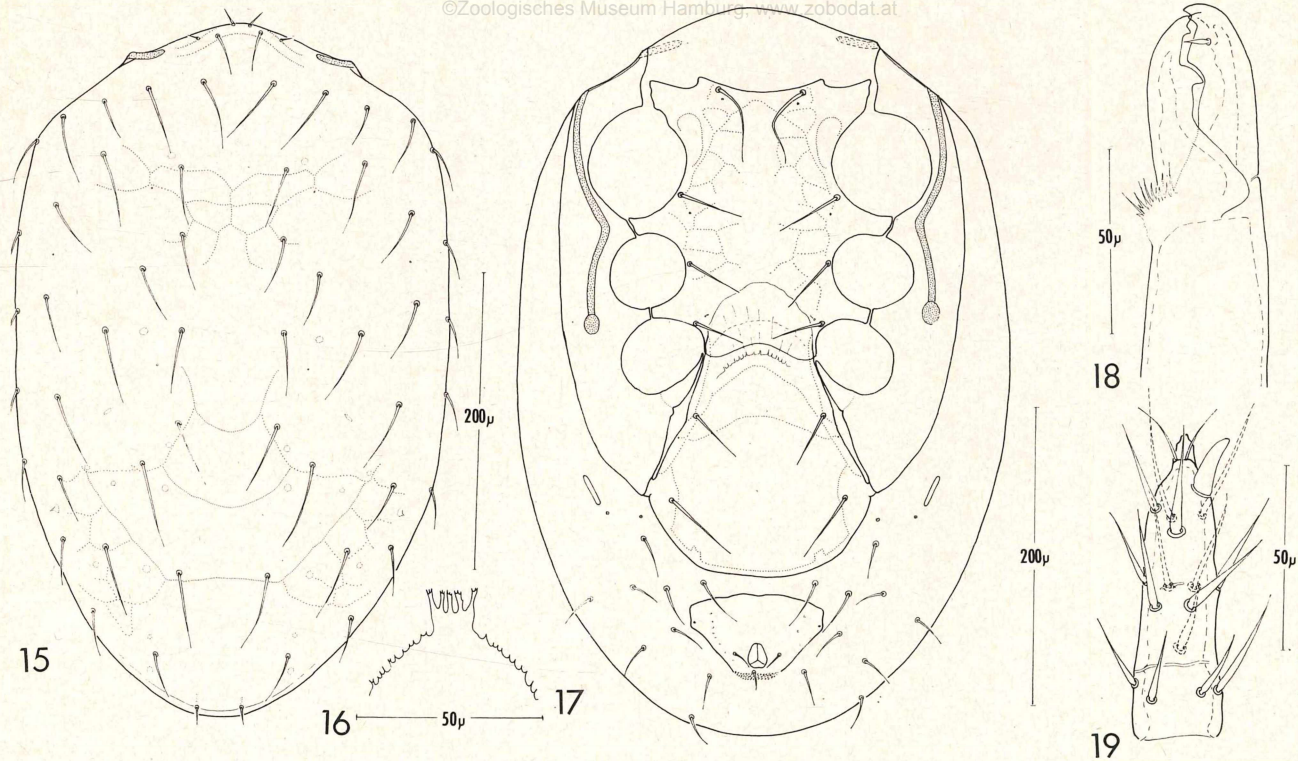


Fig. 15—19 *Pachylaelaps heliocopridis* RYKE & MEYER, female. 15 dorsal shield; 16 tectum; 17 venter; 18 chelicera; 19 tarsus II.

Pachylaelaps heliocopridis RYKE & MEYER (fig. 15—24)

Pachylaelaps heliocopridis RYKE & MEYER, 1958, J. ent. Soc. S. Africa, 21: 152, figs. 35—40.

This species is represented in the collection by 25 females and 23 males. The male has not been described previously.

Female: Dorsal shield: length: $x = 483.1 \mu$; $s = 12.5$; $a = 460-510 \mu$; width: $x = 313.3 \mu$; $s = 11.5$; $a = 290-330 \mu$.

Dorsum: The dorsal shield (fig. 15) covers nearly the whole dorsum, it bears 30 pairs of long, needle-like, setae (e. g. J3 is 55μ long). The vertical setae are short (about half the length of i2), setae J5 are short and less than half the length of setae J4. The shield is well ornamented, several transverse lines in the posterior part of the shield are very prominent. The tectum (fig. 16) is without neck. — **Venter**: (fig. 17): The setae of the sternal-metasternal shield (165μ long at midline, 110μ wide at St2) are long and needle-like, they are much longer than the ventral setae which are inserted on the soft integument. The genito-ventral shield (200μ long at midline, 150μ wide at widest part) has a circular posterior margin, it is markedly longer than wide. The anal shield is much wider than long (58μ long, 92μ wide), it bears rather short anal setae. With the exception of the corniculi, the female gnathosome is similar to that of the male (fig. 22), the chelicera (fig. 18) with bidentate movable and fixed digits. — Tarsus II (fig. 19) with only one subterminal spur, the remaining tarsal setae being long and attenuate.

Male: Dorsal shield: length: $x = 477.0 \mu$; $s = 16.1$; $a = 440-500 \mu$; width: $x = 292.1 \mu$; $s = 10.5$; $a = 270-315 \mu$.

Dorsum: The dorsal shield is basically identical to that of the female, no sexual dimorphism could be detected in the tectum (fig. 20). — **Venter**: The venter (fig. 21) is covered by a holovenral shield which bears 8 pairs of simple, long setae in addition to the short anal setae. The gnathosome (fig. 22) is normal for the genus, with six rows of deutosternal denticles. The chelicera (fig. 23) with an inflated and very short spermatophoral process, which is about 0.77 the length of the movable digit. Leg II with a very strong protuberance on the femur (fig. 24) and with small, wart-like swellings on the genu and tibia. Tarsus II identical to that of the female, with a single subterminal spur.

Notes: The best diagnostic character of this species is the spermatophoral process of the male (the male was not described by RYKE & MEYER). This is very similar to the process of *Pachylaelaps brevicrinatus* HIRSCHMANN & KRAUSS, 1965, a species which is closely related and possibly synonymous with *P. heliocopridis*. No information is given about the locality and possible host of *P. brevicrinatus* and none could be obtained.

An additional species of the genus, namely *P. ambulacralis* RYKE & MEYER, has been recorded from *Heliocopris gigas* L.

Elaphrolaelaps rackae sp. nov. (fig. 25—30)

Only a single female of this species is represented in the collection, the specimen is dissected into the dorsal shield and the ventral parts and mounted on one slide.

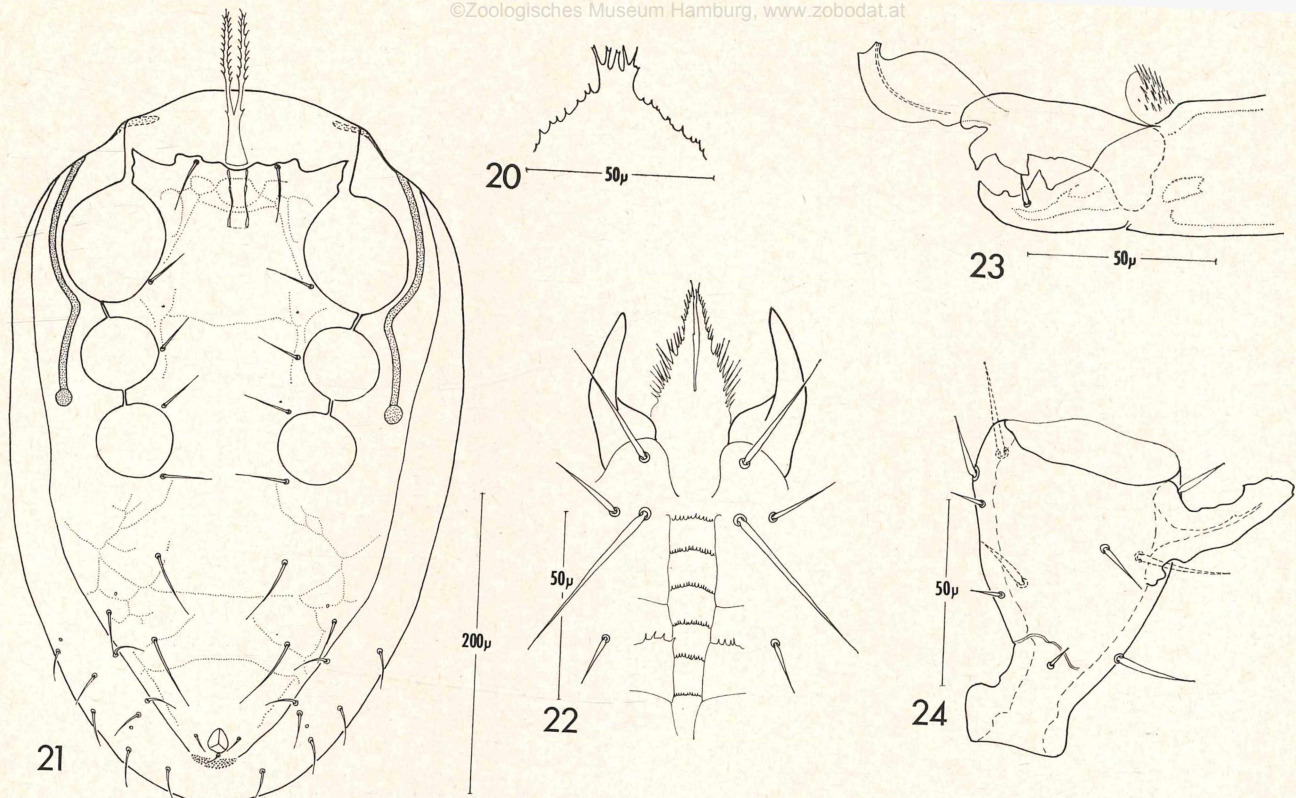


Fig. 20—24 *Pachylaelaps heliocopridis* RYKE & MEYER, male. 20 tectum; 21 venter; 22 gnathosome, ventral view; 23 chelicera and spermatophoral process; 24 femur II.

Female: The dorsal shield is $1610\ \mu$ long and $1180\ \mu$ wide (at its widest part), it is well ornamented throughout (fig. 25). The distribution of the simple, relatively short (e. g. J 1 — $70\text{--}75\ \mu$) setae is assymetric and at least 35 pairs of setae are present: the 35 setae on the left hand side of the shield are matched by 35 setae in identical positions on the right hand side, however, on the right side of the shield 4 additional setae are inserted (one near J 1, the remaining three at the antero-lateral margin). The vertical setae are not different from the remaining setae. The tectum (fig. 25) with a short neck and denticulate anterior margin. — The well ornamented sternal-metasternal shield (fig. 26) is fused with the endopodal shields and bears 4 pairs of long sternal setae (St 1 — $220\ \mu$ long). The genito-ventral shield is also well reticulated, it bears two pairs of setae. Together with the fused peritrematal-exopodal shields the ventral shields form a nearly circular armoured plate. The anal shield ($350\ \mu$ long and $255\ \mu$ wide) with a rounded anterior margin and short anal setae. — The gnathosome (fig. 27) regular, with six rows of small subequal, deutosternal denticles. Small denticles are present also on the posterior lateral ridge of the capitular groove and on two rows of denticles external to the hypostomal setae. The chelicera (fig. 28) with bidentate movable digit and two large irregularly shaped teeth on the fixed digit. The pilus dentilis is simple and straight. — Distinct claws are absent from all the tarsi but the empodia are well developed. Tarsus II (fig. 29) with well developed attenuate strong setae but without blunt, spur-like, setae. Femur II (fig. 30) bears a long ventral sword-like seta that is about $175\ \mu$ long.

Notes: The large mites of the genus *Elaphrolaelaps* have been only rarely collected, they all seem to be associated with scarabaeid beetles of the subfamily Coprinae, in tropical regions. The following four species have been described so far:

Elaphrolaelaps fenestratus BERLESE, typical species. Female: $1500\ \mu$ long, $1000\ \mu$ wide; ex *Copris* sp., Java. — A. BERLESE, 1910, Redia, 6: 257.

Elaphrolaelaps formidabilis BERLESE. Female: $1750\ \mu$ long, $1250\ \mu$ wide; male: $1550\ \mu$ long, $1200\ \mu$ wide; ex *Catharsius satyrus* KOLBE, Mlanje Boma, Nyasaland; ex *Copris elphenor* KLING, Pietersburg, Transval. — A. BERLESE, 1918, Redia, 13: 140. — A. SPIES and P. A. J. RYKE, 1965. Mem. Inst. Invest. Cient. Mocamb., 7. Serie A. p. 208, figs. 1—12.

Elaphrolaelaps terrificus BERLESE. Male: $620\ \mu$ long, $400\ \mu$ wide, East Africa. — A. BERLESE, 1921, Redia, 14: 187.

Elaphrolaelaps sternalia RYKE. Female: $1085\ \mu$ long, $705\ \mu$ wide; male: $1215\ \mu$ long, $810\ \mu$ wide; ex *Catharsius tricornutus* DEG., Mozambique. — P. A. J. RYKE, 1959. Mem. Est. Mus. Zool. Univ. Coimbra, 258: 4, figs. 10—22.

Elaphrolaelaps rackae sp. nov. seems to be closely related and similar to *E. formidabilis* BERL. (sensu SPIES and RYKE), the two species can be separated by the following characters:

1. Deutosternal denticles of the two anterior transverse ridges subequal (fig. 27), ventral, sword-like seta on femur II about half the length of the femur (fig. 30), no blunt, spur-like setae on tarsus II (fig. 29) *Elaphrolaelaps rackae* sp. nov.
- Deutosternal denticles on the two anterior transverse ridges unequal (fig. 31), ventral sword-like seta on femur II about a third the length of the femur (fig. 33), two terminal, blunt and spur-like setae on tarsus II (fig. 32) *E. formidabilis* BERLESE

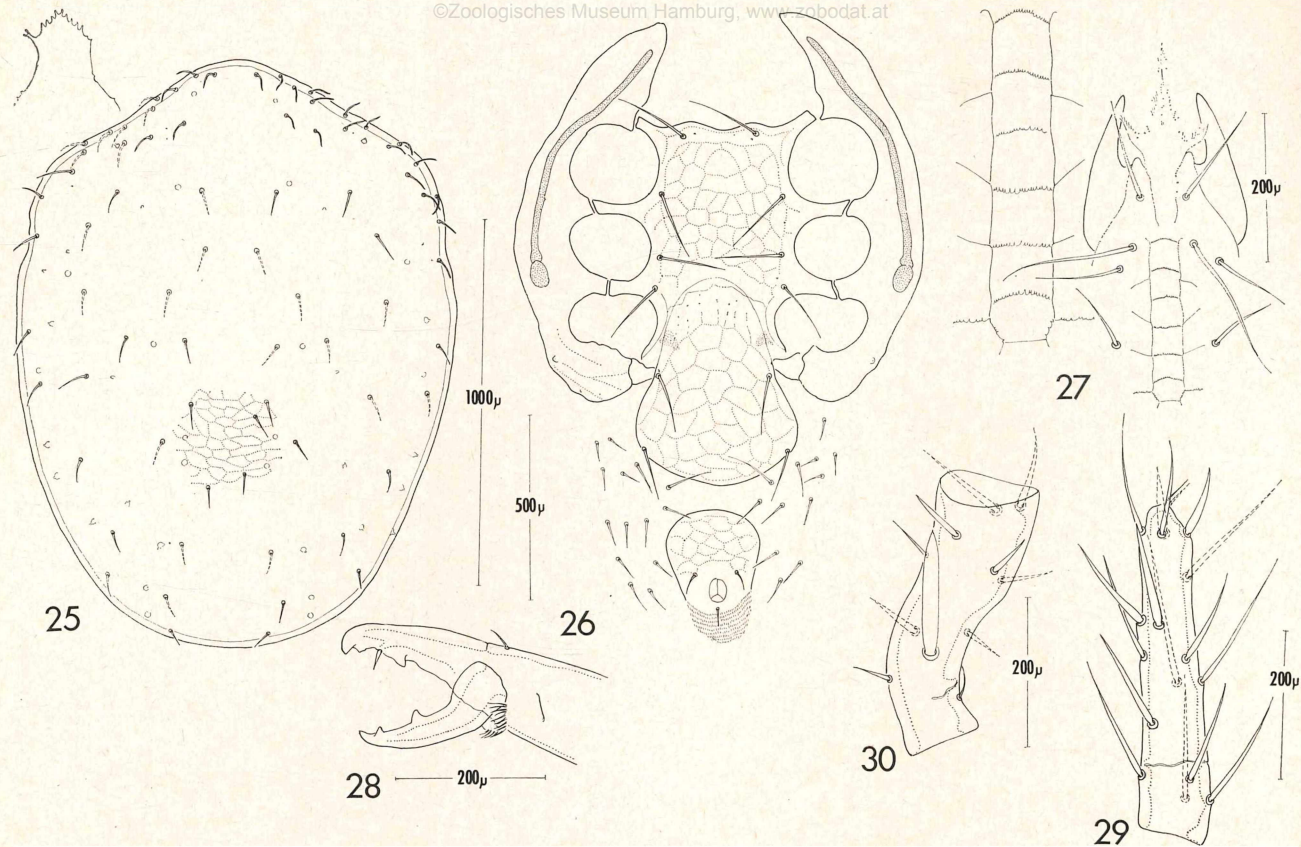


Fig. 25—30 *Elaphrolaelaps rackae* COSTA sp. nov., female. 25 dorsal shield and view; 28 chelicera; 29 tarsus II; 30 femur II. tectum; 26 venter; 27 gnathosome, ventral

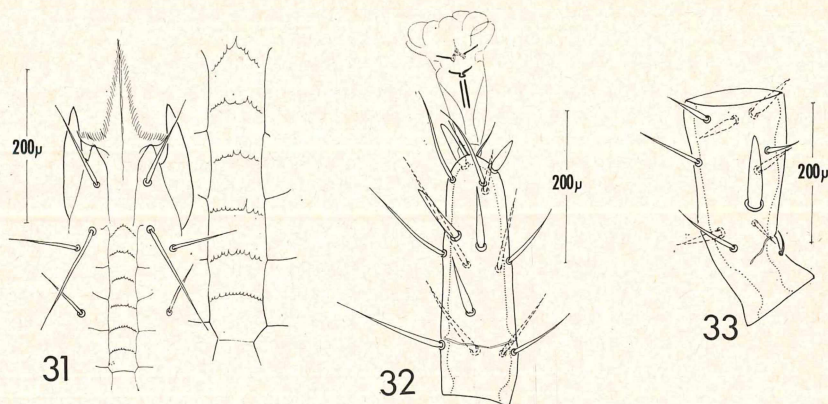


Fig. 31—33 *Elaphrolaelaps formidabilis* BERLESE (sensu SPIES & RYKE), female. 31 gnathosome, ventral view; 32 tarsus II; 33 femur II.

Discussion

The genus *Heliocopris* HOPE comprises 51 described species (BALTHASAR, 1963) of which one species has a palaearctic distribution, four species are oriental and 46 species are of ethiopic distribution. The ethiopic region is apparently the center of origin of the Coprini, all of which are thermophile and xerophile. In the Coprini we find the highest degree of brood care of the Scarabaeids, the females remaining with the brood pills until the emergence of the next generation. It has been stated (COSTA, 1969) that in social insects and in insects with well developed broodcare the association with mites is facilitated, because an uninterrupted chain of hosts aids in the transfer of the symbionts from one host to the other. In addition, insects feeding on manure and fresh dung, form excellent carriers for nematophagous acari. The association of *Copris hispanus* L. with mesostigmatic mites has been found to be very rich in species and no less than 19 species of mites have been collected from this host (COSTA, 1963). A similar number of associated mites can be expected from *Heliocopris* spp.

The known records of mesostigmatic mites associated with various *Heliocopris* spp. are summarized in Table II (data chiefly after the review of HALFFTER and MATTHEWS, 1971). It seems that many of the mites are host specific at the generic or even at the species level; the paucity of records does not allow yet any definite conclusions to be made.

The taxonomy of the genus *Heliocopris* HOPE is in a rather unsatisfactory state, and many mistakes have been made especially in the determination of female specimens (BALTHASAR, op. cit.). RYKE & MEYER (op. cit.) record *Heliocopris gigas* L. as one of their hosts, but *Heliocopris*

Table II. Records of mesostigmatic mites associated with beetles of the genus *Helicocopriss* HOPE (Scarabaeidae, Coprinae) (The first two are not of Ethiopic distribution).

	Mites →	
<i>Helicocopriss</i> spp.		
<i>H. bucephalus</i> F.		
<i>H. gigas</i> L.*		
<i>H. andersoni</i> BATES		
<i>H. antenor</i> (OLIVIER)		
<i>H. dilloni</i> GUERIN		
<i>H. faunus</i> BOHEMAN		
<i>H. hamadryas</i> F.		
<i>H. haroldi</i> KOLBE		
<i>H. hunteri</i> WATERHOUSE		
<i>H. neptunus</i> BOHEMAN		
<i>H. pirkal</i> F.		
<i>Helicocopriss</i> sp.		
* see discussion		
		<i>Alliphis evansi</i> R. & M.
		<i>Alliphis santodiasi</i> R. & M.
		<i>Eviphis c. cultratellus</i> BERLESE
		<i>Eviphis hastatellus</i> (BERLESE)
		<i>Eviphis transvaalensis</i> R. & M.
		<i>Pelethiphis eiseleni</i> R. & M.
		<i>Pelethiphis geyeri</i> R. & M.
		<i>Pelethiphis vaneedeni</i> R. & M.
		<i>Holostaspella caelata</i> BERLESE
		<i>Holostaspella foai</i> BERLESE
		<i>Holostaspella similis</i> KRANTZ
		<i>Macrocheles africanus</i> R. & M.
		<i>Macrocheles nemontanus</i> R. & M.
		<i>Macrocheles neovernalis</i> R. & M.
		<i>Macrocheles transvaalensis</i> R. & M.
		<i>Neopodocinum afrum</i> BERLESE
		<i>Neopodocinum jaspersi</i> (OUDEMANS)
		<i>Neopodocinum javensis</i> KRANTZ
		<i>Neopodocinum magna</i> KRANTZ
		<i>Neopodocinum maius</i> BERLESE
		<i>Pachylaelaps ambulacralis</i> R. & M.
		<i>Pachylaelaps helicopridis</i> OUDEMANS
		<i>Parasitus helicopridis</i> OUDEMANS

gigas OLIVIER is also recorded in the literature. According to BALTHASAR these two are not synonymous! *H. gigas* L. is distributed only in the following countries: Egypt, Lybia, Ethiopia (incl. Erythrea), Somali and Arabia. In view of this it seems necessary to reconsider the records of *H. gigas* L. by RYKE & MEYER. It is well possible that differences between the original records and the dimensions of the mites as recorded in this study, are correlated with host differences. Only a close association between a coleopterist and a mite specialist can shed light on this. It seems to me that a thorough investigation of the *Heliocopriss*-Acari association is very promising in aiding in the solution of several problems: taxonomy, parallel evolution, development of host-specificity and speciation. It may provide valuable information on the biology and ecology of both the hosts (coprine beetles) and their symbionts (mesostigmatic mites).

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