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Ryszard HAITLINGER

New canestriniid mites (*Acari*, *Astigmata*, *Canestriniidae*) associated with beetles of the families *Carabidae*, *Scarabaeidae*, *Tenebrionidae* and *Passandridae* (*Insecta*, *Coleoptera*)

[With 51 text-figures]

Abstract. New genera: *Farahanella, Sandrophela, Ambilohylla* and *Saniothiana* and the following new species of mites have been found on a carabid, a passandrid, four tenebrionids and two scarabaeids: *Megacanestrinia beloniana* n. sp. from *Tefflus purpuripennis* CH. from Tanzania, *Farahanella suatoha* n. sp. from *Odontopezus cupreus* FABR. from Zair, *Sandrophela kokodaica* n. sp. from *Passandra trigemina* NEWM. from New Guinea, *Ambilohylla favosa* n. sp. from *Damatris formosus* LEP. from Madagascar, *Saniothiana pycnosa* n. sp. from *Pycnocerus* sp. from Africa, *S. barumbaica* n. sp. from *Odontopezus cupreus lucens* GEB. from Cameroon, *Diplognatophilus ethiopicus* n. sp. from an undetermined *Cetoniinae* from Ethiopia and *Cetonicola vatus* n. sp. from *Poecilophila hebracea* OL. from Tanzania.

Most canestriniid mites are known from palearctic *Carabidae* (COOREMAN 1950, 1954, 1958, SAMŠINAK 1964, 1965, 1971), fewer have been described from *Scarabeidae*, mainly from European and African *Cetoniinae* (COOREMAN 1955, LAVOIPIERRE 1958). Only few are known from *Tenebrionidae*, mostly from the palearctic genus *Blaps* (SAMŠINAK 1970, BERON 1975). No canestriniid mites have been described from *Passandridae* to date.

In this study some canestriniids have been found on members of the families just named, four new genera: *Farahanella*, *Sandrophela*, *Ambilohylla* and *Saniothiana* being erected for four new species. Besides, four new species of *Megacanestrinia* TRÄGÅRDH, *Diplognatophilus* COOREMAN and *Cetonicola* COOREMAN are described and figured.

Hysterosoma of the canestriniid mites bears various pairs of dorsal setae, very difficult to identify. The designations used are in the first place to facilitate their identification. All measurements are given in microns.

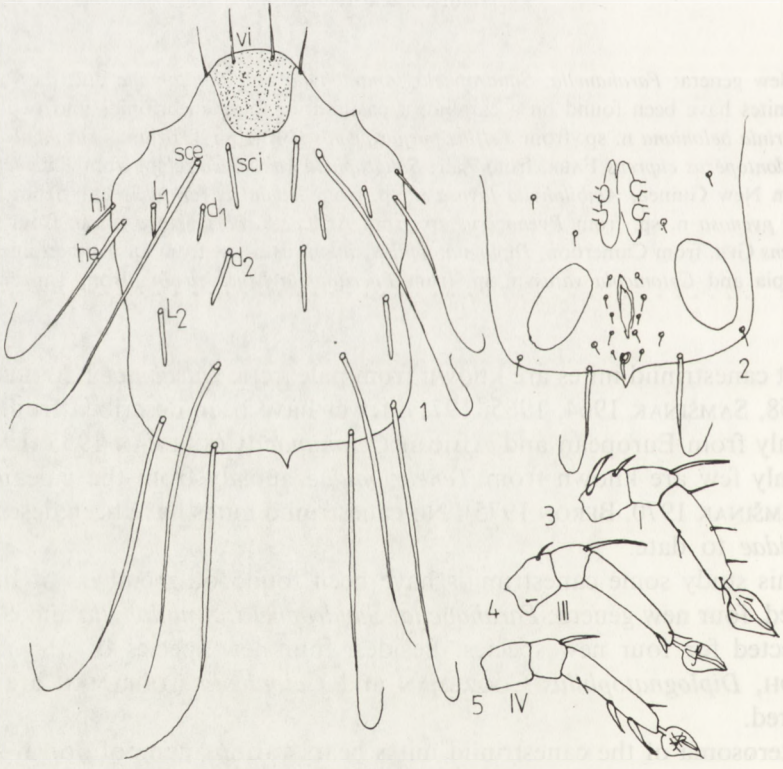
Mites were obtained from the collection of beetles of the Institute of Zoology, Polish Academy of Sciences, Warsaw (*Megacanestrinia beloniana*, *Ambilohylla favosa*, *Farahanella suatoha*, *Sandrophela kokodaica*, *Saniothiana pycnosa*, *S. barumbaica*, *Cetonicola vatus*) and Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Cracow (*Diplognatophilus ethiopicus*). I would like to express my sincere thanks to Dr A. Ślipiński (Warsaw), Prof. dr J. Pawłowski and Prof. dr A. Szeptycki (Cracow) for the loan of the specimens.

Descriptions of new genera and new species

Megacanestrinia Trägårdh, 1906

Megacanestrinia beloniana n. sp.

Female (holotype). Idiosoma with 13 pairs of dorsal setae; of them five pairs long, remaining pairs semilong. All setae smooth, *vi* and *ve* thin. Propodosoma with distinctly pigmented and punctated plate. Posterior margin of idiosoma with sharp process (Fig. 1). Ventral part of idiosoma with one pair of semilong setae, at

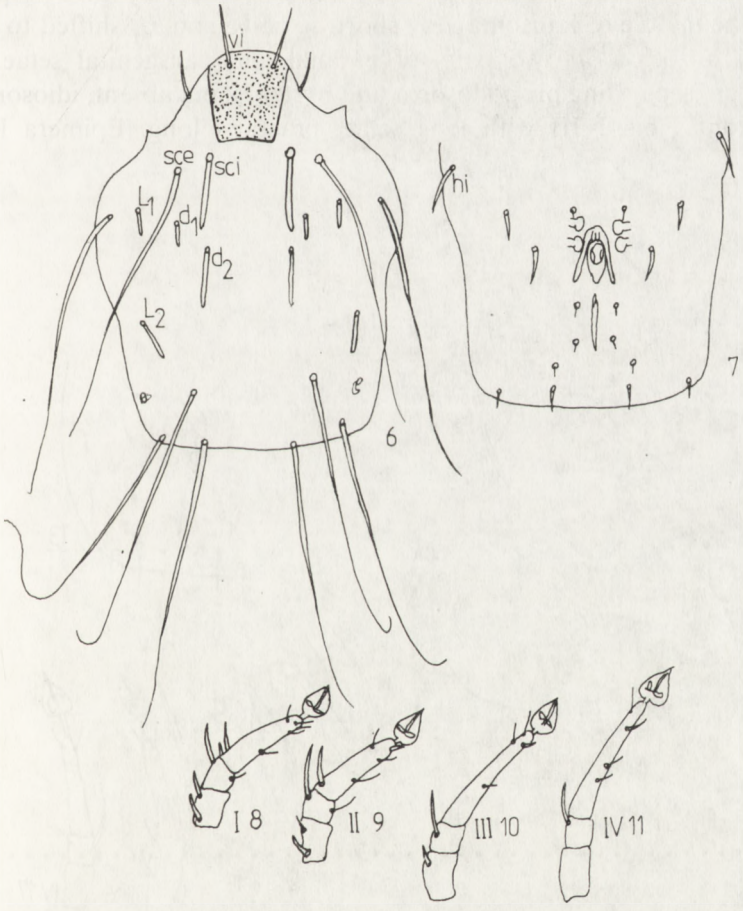


Figs. 1–5. *Megacanestrinia beloniana* ♀. 1 – dorsal view of idiosoma; 2 – ventral view of idiosoma; 3–5 – tarsus – genu I, III, IV.

posterior idiosomal margin, four pairs of short paranal setae, two pairs of short postanal and one pair of posterolateral setae. Near the genital region there is only one pair of setae (Fig. 2). Epimera I free. Legs with long tarsi I–IV, tarsus IV with two thick setae; seta on tibia I–IV relatively short (Figs. 3–5).

Measurements. Length of idiosoma 704 holotype (656 paratype), width of idiosoma 488 (480), *vi* 60 (54), *sci* 100 (80), *sce* ~ 600 (~ 599), *hi* 66 (52), *he* ~ 450 (~ 500), L_1 46, L_2 86, d_1 48 (48), d_2 90 (–), Ta I 136 (120), Ta II 150 (144), Ta III 180 (172), Ta IV 224 (234).

Male. Idiosoma with 12 pairs of dorsal setae; of them five pairs long, remaining ones semilong or short. Propodosoma with pigmented and punctated plate (Fig. 6). At anal region there are two pairs of short setae; above the genital region one pairs of setae, laterally to it two pairs of somewhat longer setae. At posterior margin of opisthosoma there are two pairs of setae (Fig. 7). Legs with long tarsi I–IV, seta on tibiae I–IV short (Figs. 8–11).



Figs. 6–11. *Megacanestrinia beloniana* ♂. 6 – dorsal view of idiosoma; 7 – ventral view of idiosoma; 8–11 – tarsus – genu I–IV.

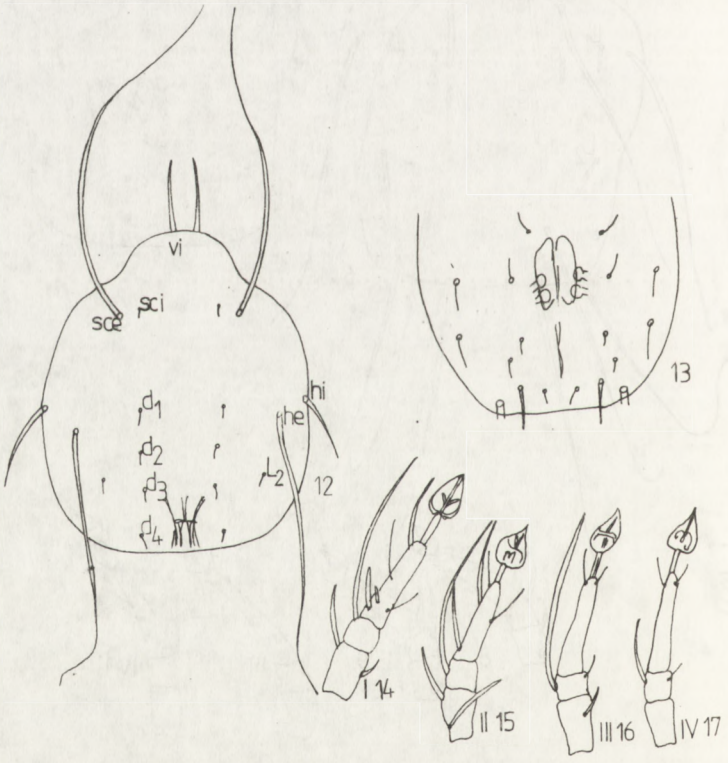
Measurements. Length of idiosoma 536, width 410, *vi* 40, *sci* 74, *sce* ~ 400, *hi* 50, *he* ~ 340, L_1 24, L_2 30, d_1 20, d_2 56, Ta I 108, Ta II 112, Ta III 156, Ta IV 204. Penis 60.

Remarks. Differential features of new species are large propodosomal plate, delicate *vi* and *ve*, free epimera I, long tarsi I–IV, short tibial setae and other details. Hitherto only one species of the genus – *M. mucronata* TRÄG. (TRÄGÅRDH 1906) has been known. TRÄGÅRDH's description is laconic and hence the length of idiosoma has to be regarded as the only feature distinguishing *M. mucronata* from *M. beloniana*.

Types. Tanzania, holotype female, one paratype female, one paratype male from *Tefflus purpuripennis* CH. (*Carabidae*); specimens in collection of the IZ PAS, Warsaw.

Farahanella gen. nov.

Female. Idiosoma wide, oval, long dorsal setae only in 3–4 pairs, setae situated in the middle of idiosoma very short, setae *he* and L_1 shifted to the middle of idiosoma or below it; two pairs of paranal and paragenital setae. All setae smooth. Suture separating propodosoma and hysterosoma absent, idiosoma with no ornamentation. Tibia I–III with long setae, praetarsi long. Epimera I fused.



Figs. 12–17. *Farahanella suatoha* ♀. 12 – dorsal view of idiosoma; 13 – ventral view of idiosoma; 14–17 – tarsus – genu I–IV.

Type species: *Farahanella suatoha* n. sp.
Gender: feminine.

Farahanella suatoha n. sp.

Female (holotype). Idiosoma with ten pairs of dorsal setae, *sce* and L_1 are ultralong, *he* semilong, remaining ones short or very short, especially setae of series *d*. Posterior part of idiosoma bears characteristic cuticular formation (Fig. 12). Ventral part of idiosoma with 9 pairs of setae; two paranal and two paragenital ones (Fig. 13). Tarsi I–IV not very long, tarsi IV longer than remaining ones, praetarsi long (Figs. 14–17).

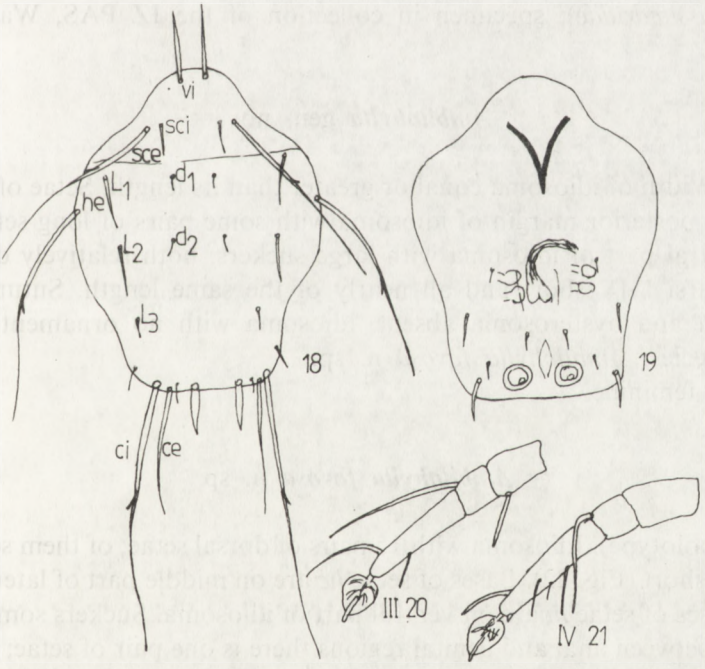
Measurements. Length of idiosoma 544, width 440, *vi* 60, *sce* ~460, *hi* 94, d_1 10, d_2 10, d_3 12, d_4 12, *he* ~470, L_2 10, Ta I 80, Ta II 72, Ta III 86, Ta IV 106.

Remarks. Differential features of new species are the *he* and L_1 shifted to posterior part of idiosoma, series *d* of setae very short and long praetarsi.

Types. Zair, holotype female from *Odontopezus cupreus* FABR. (*Tenebrionidae*); specimen in collection of the IZ PAS, Warsaw.

Sandrophela gen. nov.

Male. Idiosoma widest at the level of the basis of *he* setae, three pairs of long dorsal setae with a prominent spikelet each. Seriae *d* and *L* setae present. Epimera I V-shaped, penis long, two big suckers near posterior margin of opisthosoma



Figs. 18–21. *Sandrophela kokodaica* ♂. 18 – dorsal view of idiosoma; 19 – ventral view of idiosoma; 20–21 – tarsus – genu III–IV.

present. Suture separating propodosoma from hysterosoma present; idiosoma with no ornamentation. Tarsi of legs I–IV with membraneous pads in which the claw considerably exceeds the tip of each pad.

Type species: *Sandrophela kokodaica* n. sp.

Gender: feminine.

Sandrophela kokodaica n. sp.

Male (holotype). Idiosoma with 14 pairs of dorsal setae; of them three pairs long bearing one spikelet each. Setae of seriae *L* longer than those of seriae *d*. Middle of posterior margin of idiosoma with one pair of thick setae (Fig. 18). Ventral part of idiosoma with five pairs of short setae; posterior part of anal region there are two big suckers; distance between them is relatively long. Genital apparatus long (Fig. 19). Epimera I V-shaped. Tibia I–IV with one long seta each. Claw of tarsi I–IV distinctly exceeding tip of pads (Figs. 20–21).

Measurements. Length of idiosoma 504, width 448, *vi* 100, *sci* 34, *sce* ~ 350, *he* ~ 340, L_1 40, L_2 40, L_3 20, d_1 16, d_2 10, Ta III 96, Ta IV 106. Genital apparatus 120.

Remarks. Differential features of new species are spikelets on *sce*, *he* and *ci*, one pair of thick setae on posterior margin of idiosoma, big suckers relatively distant, and long penis.

Types. New Guinea, Kokoda, holotype male from *Passandra trigemina* NEWMAN (*Passandridae*); specimen in collection of the IZ PAS, Warsaw.

Ambilohylla gen. nov.

Male. Width of idiosoma equal or greater than its length. Setae of seriae *d* and *L* very short; posterior margin of idiosoma with some pairs of long setae. All setae smooth. Ventral part of idiosoma with large suckers, both relatively distant. Penis short, also tarsi I–IV short and all nearly of the same length. Suture separating propodosoma and hysterosoma absent, idiosoma with no ornamentation.

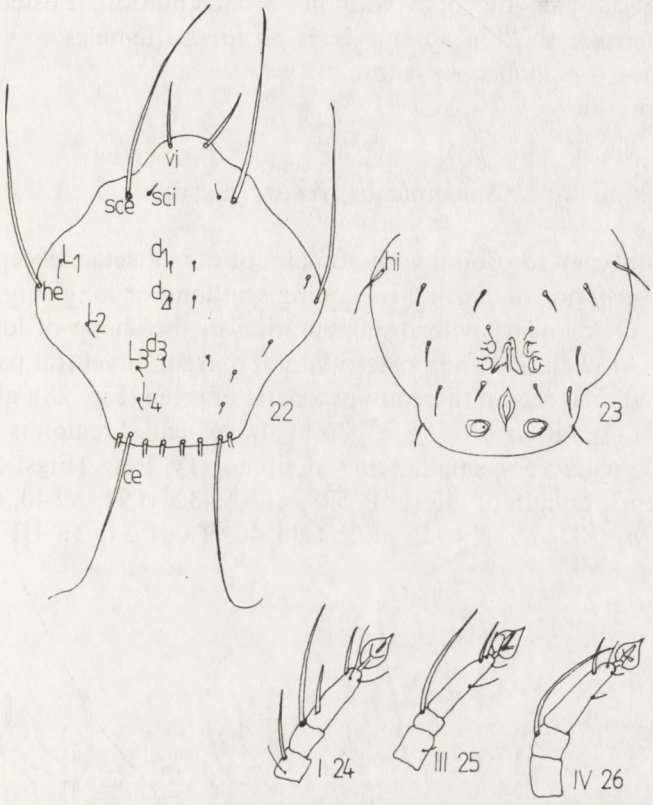
Type species: *Ambilohylla favosa* n. sp.

Gender: feminine.

Ambilohylla favosa n. sp.

Male (holotype). Idiosoma with 15 pairs of dorsal setae; of them setae of seriae *d* and *L* very short (Fig. 22). Bases of setae *he* are on middle part of lateral margin of idiosoma; bases of setae *hi* are on ventral part of idiosoma. Suckers somewhat below anal region; between anal and genital regions there is one pair of setae; arrangement of dorsal and ventral setae as in Fig. 23. Genital apparatus short. Tarsi I–IV short, seta of tibiae I–IV long (Figs. 24–26).

Measurements. Length of idiosoma 408, width 424, *vi* 52, *sci* 12, *sce* ~ 240, *hi* 44, *he* ~ 210, L_1 14, L_2 10, L_3 10, L_4 10, d_1 10, d_2 10, d_3 10, Ta I 56, Ta II 62, Ta III 64, Ta IV 64. Genital apparatus 46.



Figs. 22–26. *Ambilohylla favosa* ♂. 22 – dorsal view of idiosoma; 23 – ventral view of idiosoma; 24–26 – tarsus – genu I, III, IV.

Remarks. Differential features of new species: tarsi II–IV short and all of the same length, shape of idiosoma and its width, short genital apparatus and other details.

Types. Madagascar, holotype male from *Damatria formosus* Lep. (*Tenebrionidae*); specimen in collection of the IZ PAS, Warsaw.

Saniothiana gen. nov.

Female. Idiosoma weakly elongated with soft thin dorsal setae. At posterior margin of idiosoma there are 8–9 pairs of setae; of them two pairs long. Ornamentation of dorsal part of idiosoma present on the whole area or in some parts of it in the shape of longitudinal or transverse lines. Suture separating

propodosoma and hysterosoma poorly visible. Epimera I fused. Tarsi I–IV very short with small pads; claw on pads I–IV strongly developed, they exceed tip of pads.

Male. Idiosoma with short seriae of *d* setae. Suture separating propodosoma and hysterosoma not visible; idiosoma with no ornamentation. Posterior margin of opisthosoma concave; suckers absent. Legs as in the females.

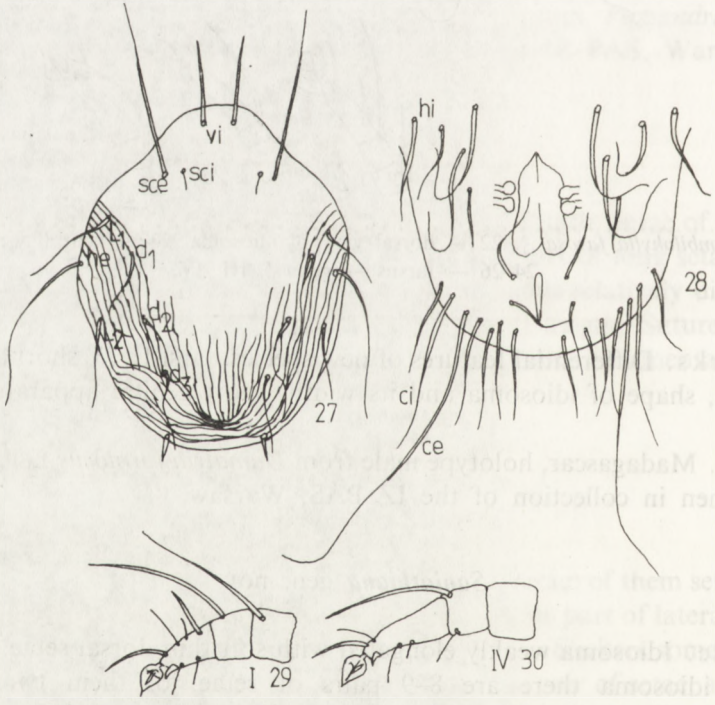
Types species: *Saniothiana pycnosa* n. sp.

Gender: feminine.

Saniothiana pycnosa n. sp.

Female (holotype). Idiosoma with 10 pairs of dorsal setae; except *sci* and one pair of setae of posterior margin all remaining semilong or long (Fig. 27). Posterior and lateral part of idiosoma with ornamentation in the shape of longitudinal and transverse lines. At posterior and postero-lateral margin in ventral part of idiosoma 7 pairs of setae; at anal region there are two pairs of setae (Fig. 28); above them also 5 pairs of setae, all semilong or long, e. g. seta above genital region is 176 long. Tarsi I–IV very short, pads very small, seta on tibia I–IV long (Figs. 29–30).

Measurements. Length of idiosoma 528, width 432, *vi* 94, *sci* 40, *sce* 210, *he* 208, d_1 130, d_2 166, d_3 120, L_1 114, L_2 136, Ta I 40, Ta II 34, Ta III 40, Ta IV 46.



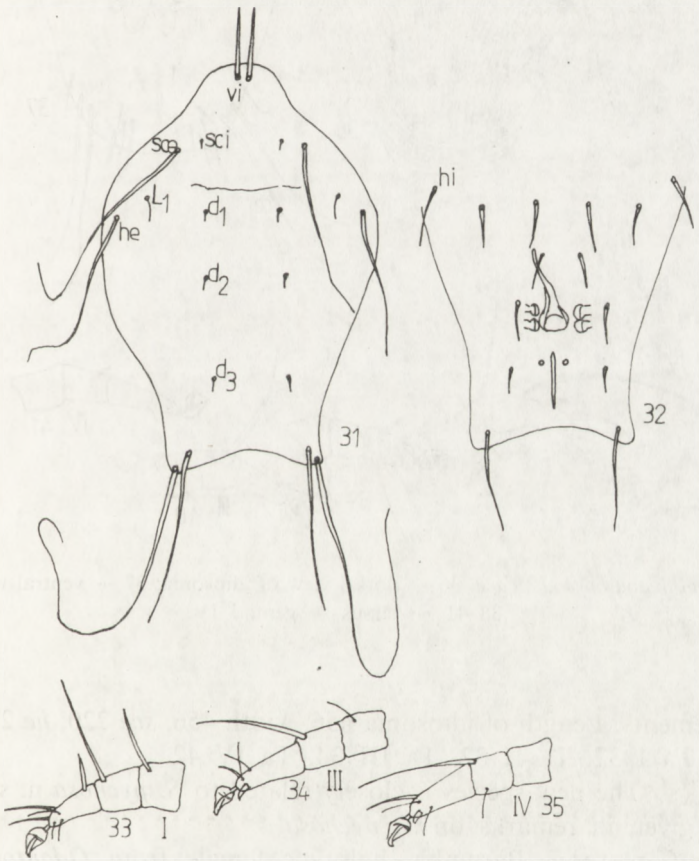
Figs. 27–30. *Saniothiana pycnosa* ♀. 27 – dorsal view of idiosoma; 28 – ventral view of idiosoma; 29–30 – tarsus – genu I, IV.

Male. Idiosoma widest at the level of the basis of setae *he*. All idiosomal setae, except *sce*, *he*, *ci* and *ce* are short or very short (Fig. 31). Ventral part of idiosoma with one pair of setae at anal and genital region each, below anal region there is one pair of setae; suckers absent (Fig. 32). Tarsi I–IV very short, pads small, claws I–IV are strongly developed (Figs. 33–35).

Measurements. Length of idiosoma 464 (496), 376 (376) *vi* 70 (–), *sce* ~160 (~140), *hi* 60 (46), *he* ~80 (~ 90), Ta I 28 (32), Ta II 30 (30), Ta III 28 (32), Ta IV 38 (40). Penis 60 (64), L_1 22 (–).

Remarks. The new species is closely related to *S. barumbaica* n. sp. Females can be distinguished basing on the shape and ornamentation of idiosoma and length of dorsal and ventral setae.

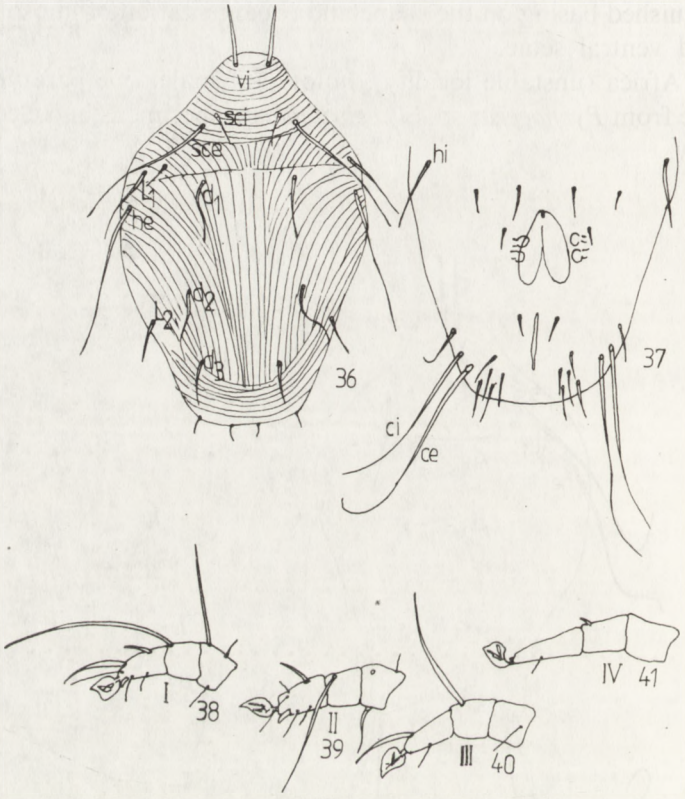
Types. Africa (unstable locality), holotype female, one paratype female and paratype male from *Pycnocerus* sp. (*Tenebrionidae*); specimens in collection of the IZ PAS, Warsaw.



Figs. 31–35. *Saniothiana pycnosa* ♂. 31 – dorsal view of idiosoma; 32 – ventral view of idiosoma; 33–35 – tarsus – genu I, III, IV.

Saniothiana barumbaica n. sp.

Female (holotype). Idiosoma with 11 pairs of dorsal setae; of them only *sce* and *he* long. Whole area of idiosoma with ornamentation in the shape of longitudinal and transverse lines. Suture separating propodosoma and hysterosoma visible (Fig. 36). Postero-lateral margin of ventral part of opisthosoma with 8 pairs of setae; at anal region one pair of setae (Fig. 37), except two pairs all setae short. Tarsi I–IV very short, pads very small (Figs. 38–41).



Figs. 36–41. *Saniothiana barumbaica* ♀. 36 – dorsal view of idiosoma; 37 – ventral view of idiosoma; 38–41 – tarsus – genu I–IV.

Measurements. Length of idiosoma 656, width 456, *sce* 220, *he* 230, d_2 104, d_3 88, L_1 150, Ta I 32, Ta II 32, Ta III 34, Ta IV 42.

Remarks. The new species is closely related to *S. pycnosa* n. sp; differential features are given in remarks on *S. pycnosa*.

Types. Cameroon, Barumba, holotype female from *Odontopezus cupreus lucens* Geb. (*Tenebrionidae*); specimen in collection in the IZ PAS, Warsaw.

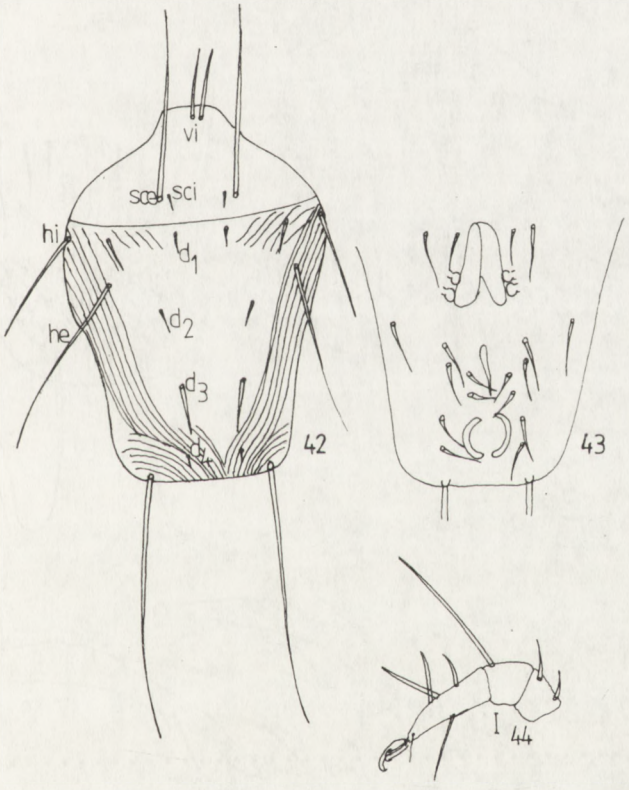
Diplognatophilus COOREMAN, 1955

Diplognatophilus ethiopicus n. sp.

Female (holotype). Idiosoma with 11 or 12 pairs of dorsal setae; of them *sce*, *hi*, *he*, *ci* and *ce* long or semilong; remaining ones short or very short (*sci*, d_4) (Fig. 42). All setae smooth. Suture separating propodosoma and hysterosoma present. Idiosoma weakly ornamented in the shape of longitudinal lines (its lateral and posterior part only). Ventral part of opisthosoma with a specific cuticular structure; at this structure there are two pairs of setae. Anal region with four pairs of paragenital setae and genital region with two pairs of setae (Fig. 43). Epimera I V-shaped. Legs I–IV with narrow pads and claw exceeds tip of pads (Fig. 44).

Measurements. Length of idiosoma 464, width 320, *vi* 70, *sci* 10, *sce* 220, *hi* 126, *he* broken, d_1 18, d_2 18, d_3 40, d_4 6, L_1 40, Ta I 48, Ta II 48, Ta III 66, Ta IV 66.

Remarks. *D. ethiopicus* is closely related to *D. africanus* COOR. collected from *Rhabdotis sobrina* GORY et PERCHERON from Zair (Ndeko, Katanga) (COOREMAN



Figs. 42–44. *Diplognatophilus ethiopicus* ♀. 42 – dorsal view of idiosoma; 43 – ventral view of idiosoma; 44 – tarsus – genu I.

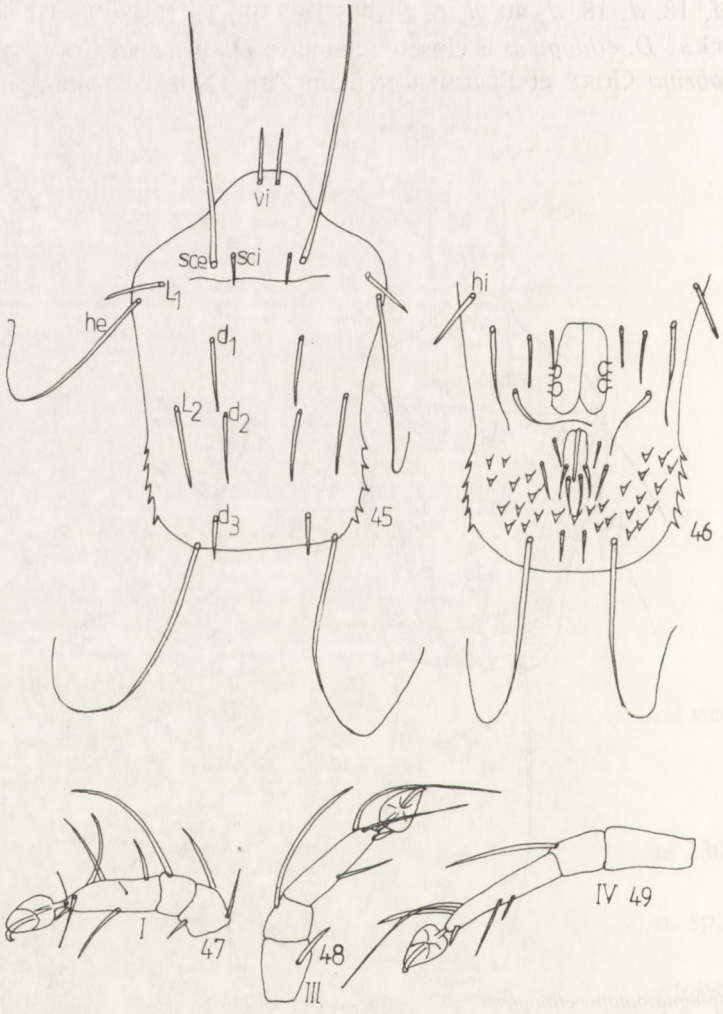
1955).Females of new species can be distinguished basing on shorter d_1, d_2, longer d_3, *he* and the presence of cuticular structure.

Types. Ethiopia, holotype female from undetermined *Cetoniinae* (*Scarabaeidae*); specimen in collection of the ISEZ PAS, Cracow.

Cetonicola Cooreman 1955

Cetonicola vatus n. sp.

Female (holotype). Idiosoma with 10 pairs of dorsal setae; of them *sce*, *he* and *ce* long; remaining ones semilong or short. All setae smooth. Suture separating propodosoma and hysterosoma visible only in middle part of idiosoma. Posterolate-

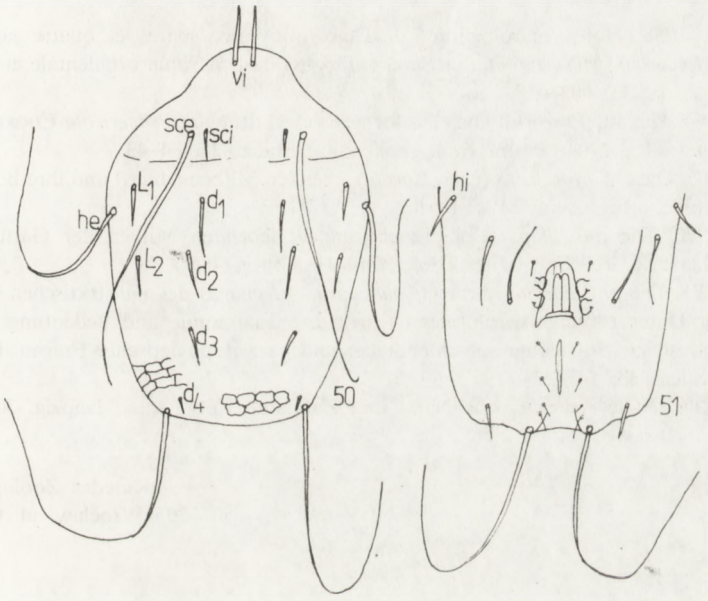


Figs. 45–49. *Cetonicola vatus* ♀. 45 – dorsal view of idiosoma; 46 – ventral view of idiosoma; 47–49 – tarsus – genu I, III, IV.

ral margins of idiosoma with about five spikes (Fig. 45). Ventral part of idiosoma bears below anal region triangular spikes; at anal region four pairs of setae below it one pair of setae, at genital region four pairs of setae, of them two pairs long (Fig. 46). Legs I–IV with big pads and distinctly visible claws (Figs. 47–49).

Measurements. Length of idiosoma 504, width 344, *vi* 50, *sci* 40, *sce* and *he* are broken, *hi* 64, d_1 100, d_2 94, d_3 36, L_1 70, L_2 broken, Ta I 70, Ta II 68, Ta III 82, Ta IV 96.

Male. Idiosoma with 11 (or 12) pairs of dorsal setae; among all idiosomal setae only *sce, he, ci* are long. All setae smooth. Lateral and posterior part of dorsal idiosoma with poorly visible ornamentation cellular in shape (Fig. 50). Anal region with two paranal setae, below them two short pairs of setae. Genital region with one pair of paragenital setae, near them there are two pairs of many times longer setae. Genital apparatus as in Fig. 51.



Figs. 50–51. *Cetonicola vatus* ♂. 50 – dorsal view of idiosoma; 51 – ventral view of idiosoma.

Measurements. Length of idiosoma 432, width 328, *vi* 40, *sci* 20, *sce* ~ 380, *hi* 36, d_1 60, d_2 60, d_3 36, d_4 14, L_1 32, L_2 28, Ta I 76, Ta II 74, Ta III 80, Ta IV 94. Genital apparatus 72.

Remarks. Two species belong to this genus; *C. hispidus* Coor. and *C. robertsoni* Lav. (Cooreman 1955, Lavoipierre 1958). *C. vatus* can be distinguished from *C. hispidus* (females) basing on ventral opisthosoma with triangular spikes, shorter d_1 and absence of opisthosomal cuticular formation; it differs from *C. robertsoni* in longer d_1, situated of d_2, d_3 and no ornamentation on dorsal part of idiosoma.

Types. Tanzania, holotype female and paratype male from *Poecilophila hebracea* Ol. (*Cetoniinae*, *Scarabaeidae*); both specimens in collection of the IZ PAS, Warsaw.

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Katedra Zoologii AR
50–205 Wrocław, ul. Cybulskiego 20

STRESZCZENIE

[Tytuł: Nowe gatunki roztoczy (*Acari*, *Astigmata*, *Canestriniidae*) związane z chrząszczami *Carabidae*, *Scarabaeidae*, *Tenebrionidae* i *Passandridae* (*Insecta*, *Coleoptera*)]

Opisano 4 nowe rodzaje roztoczy: *Farahanella*, *Sandrophela*, *Ambilohylla*, *Saniothiana* oraz 8 nowych gatunków: *Megacanestrinia beloniana* n. sp. zebrany z *Tefflus purpuripennis* (*Carabidae*) z Tanzanii; *Farahanella suatoha* n. sp. zebrany z *Odontopezus cupreus* (*Tenebrionidae*) z Zairu; *Sandrophela kokodaica* n. sp. zebrany z *Passandra trigemina* (*Passandridae*) z Nowej Gwinei; *Ambilohylla favosa* n. sp. zebrany z *Damatris formosus* (*Tenebrionidae*) z Madagaskaru; *Saniothiana pycnosa*

n. sp. zebrany z *Pycnocerus* sp. (*Tenebrionidae*) z nieokreślonego miejsca w Afryce; *S. barumbaica* n. sp zebrany z *Odontopezus cupreus lucens* (*Tenebrionidae*) z Kamerunu; *Diplognatophilus ethiopicus* n. sp. zebrany z nieoznaczonego przedstawiciela *Cetoniinae* z Etiopii oraz *Cetonicola vatus* n. sp. zebrany z *Poecilophila hebracea* (*Scarabaeidae*) z Tanzanii.

РЕЗЮМЕ

[Заглавие: Новые виды клещей (*Acari, Astigmata, Canestriniidae*) связанные с жуками *Carabidae, Scarabaeidae, Tenebrionidae* и *Passandridae* (*Insecta, Coleoptera*)]

Описали 4 новых рода клещей: *Farahanella, Sandrophela, Ambilohylla, Saniothiana* и 8 новых видов: *Megacanestrinia beloniana* n. sp. собранный с *Tefflus purpuripennis* (*Carabidae*) из Танзании; *Farahanella suatoha* n. sp. собранный с *Odontopezus cupreus* (*Tenebrionidae*) из Заира; *Sandrophela kokodaica* n. sp. собранный с *Passandra trigemina* (*Passandridae*) с Новой Гвинеи; *Ambilohylla favosa* n. sp. собранный с *Damatris formosus* (*Tenebrionidae*) с Мадагаскара; *Saniothina pycnosa* n. sp. собранный с *Pycnocerus* sp. (*Tenebrionidae*) из Африки (без более точного местонахождения); *S. barumbaica* n. sp. собранный с *Odontopezus cupreus lucens* (*Tenebrionidae*) из Камеруна; *Diplognatophilus ethiopicus* n. sp. собранный с неопределенного представителя *Cetoniinae* из Эфиопии и *Cetonicola vatus* n. sp. собранный с *Poecilophila hebracea* (*Scarabaeidae*) из Танзании.

Redaktor pracy – dr Stanisław A. Ślipiński