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Four new species of canestriniid and heterocoptid mites from China

(Acari, Astigmata, Canestriniidae, Heterocoptidae)

Ryszard Haitlinger

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Two new species of canestriniid mites (Canestriniidae) and two new species of heterocoptid mites (Heterocoptidae) are described from China. *Photia melchiori*, spec. nov. is associated with *Carabus* spec. (Carabidae) and *Canestrinia kacperi*, spec. nov. is associated with *Carabus subformosus* (both Canestriniidae). *Heterocoptus kamillae*, spec. nov. is associated with *Aspidomorpha miliaris* (Chrysomelidae, Cassidinae) and *H. hannae*, spec. nov. is associated with *Basipronota bisignata* (Cassidinae) (both Heterocoptidae).

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Introduction

To date, rather few species belonging to the families Canestriniidae and Heterocoptidae are known from China, Thibet, Taiwan, Hainan, and Hongkong. The first descriptions of canestriniid mites from China, Thibet, and Taiwan were given by Samšinák (1971). He described *Canestrinia pekingensis* from China and Thibet and *C. illegalis* from Taiwan. Later, Summers & Schuster (1981, 1982) described from passalid beetles: *Apalotacarus trullus* associated with *Leptaulax bicolor formosanus* Doesburg and *A. aristatus* associated with *Aceraius grandis hirsutus* Kuwert, both from Taiwan; moreover *Melisia superba* associated with *A. g. hirsutus* from Taiwan and *M. sentosa* associated with undetermined Passalidae from Hainan. The following species have been described in subsequent years: *Coleopterophagus belzebubi* Haitlinger associated with *Potosia aerata* (Er.) from Taiwan, *P. funebris* (Gory & Perch.) from China, *C. rudolfi* Haitlinger associated with *P. brevitarsis* (Lewis) from China, *Gioharattia maharae* Haitlinger associated with *Thaunestopeus cupripes* Wal. (Cetoniinae) from Hongkong, *Percanestrinia viviannae* Haitlinger from undetermined host from China, *Beeriphotia volkeri* Haitlinger associated with *Carabus angulicollis antaeus*, *Canestrinia ramoni* Haitlinger associated with *C. coelestis giganteus*, and *C. paavoi* Haitlinger associated with *C. grandis* (Carabidae), all from China (Haitlinger 1989, 1990b, 1992, 1994). Additional 14 species were described from various extra-Chinese countries: *Uriophela arieli* Haitlinger from Far East of Russia, *Photia polymorpha* Samšinák from Siberia and Japan, *Canestrinia pictura* Samšinák and ?*Coleopterophagus berlesei* Kishida, both from Japan, *Apalotacarus protensis* Summers & Schuster and *Canestrinia vlachiana* Samšinák, both from North India, *Contramelisia vietnamensis* Samšinák, *Melisia baloghi* Samšinák, *M. mahunkai* Samšinák, *M. occidii* Samšinák, *M. jadwigae* Haitlinger, *M. rutae* Haitlinger, *M. helenae* Haitlinger and *M. hieronimae* Haitlinger, all from North Vietnam (Kishida 1924, Samšinák 1969, 1971, Summers & Schuster 1981, Haitlinger 1990a, 1991). This a rather small number of species, and one should to expect many more species of canestriniids on these territories.

The knowledge of Heterocoptidae in China is restricted to only one species from Hainan: *Honiarrea lagossa* Haitlinger associated with *Passandra heros* (Passandridae) (Haitlinger 1990c). In general, knowledge of this family is very unsatisfactory because only 10 species are known thorughout the world. Besides the species mentioned above, from Asia were recorded also *Heterocoptes tarsii* Fain from Borneo (Sarawak), *H. nolae* Haitlinger from Andaman Isl., *H. lottae* Haitlinger from North Vietnam, *Cassiocoptes mikki* Haitlinger from Sumatra, *Nolaecoptes vonettae* Haitlinger from Sikkim, and *Abboticoptes eddae* Haitlinger from Philippines (Fain 1967, Haitlinger 1996).

In this paper two new species of canestriniid mites and two new species of heterocoptid mites are described, all from China.

The type material is deposited in the Museum of Natural History, Wrocław University (MNHWU) and in the Institute of Systematic and Experimental Zoology of the Polish Academy of Sciences, Cracow (ISEZPAS).

Terminology

The terminology of structure and setal notation is based on Fain (1987) and Haitlinger (1994). Gnathosoma length (GL) was measured between base and tip of rostrum; gnathosoma width (GW), at posterior margin of gnathosoma. All tarsi (Ta) were measured excluding pads. Length of ultralong setae is given approximately. These setae are most often convolute. All measurements are given in micrometers (μm).

Photia melchiori, spec. nov.

Figs 1-6

Types. Holotype: ♀, ex *Carabus* spec. (Coleoptera, Carabidae), from unknown locality in China. – Paratypes: additional 4♀♀ (MNHWU).

Diagnosis. *Photia melchiori*, spec. nov. differs from other species of the genus by the following combination of characters: 1. the bases of setae l1, l2 and d1 are shifted relatively far from the line that divides propodosoma from hysterosoma (character shared with *P. hejniana* Samšinák, *P. saetolata* Cooreman, and *P. graeca* Cooreman); 2. very long setae l1, l2 (shared charecter with *P. lusitanica* Samšinák): 3. only 6 pairs of setae in anal and postanal regions (without setae l5, d5); 4. very short posterior margin of idiosoma and narrowing opisthosoma.

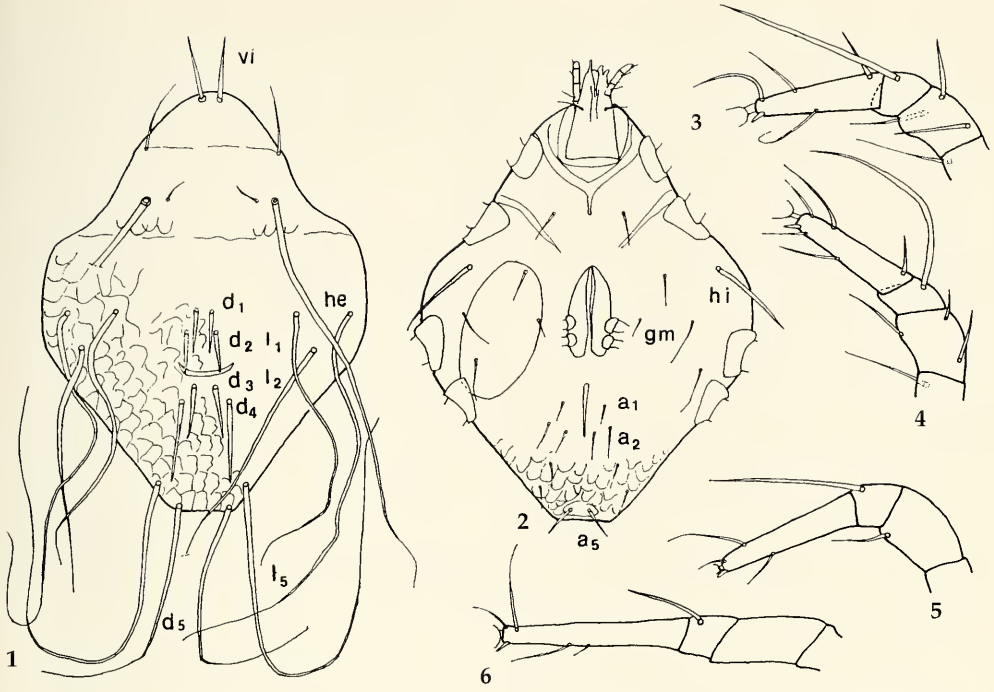
Description

Female holotype. Idiosoma longer than wide. Dorsum of idiosoma with 13 pairs of setae; 6 pairs as sce, l1, l2, l5, d5, he ultralong. The seriae d in median line of dorsum; setae d5 are ultralong, among the remaining ones d4 are the longest. The distance between bases of setae d2 is greater than between setae d1; also distance between bases of setae d4 is greater than between setae d3. Between setae d2 and d3 a curved cuticular formation is situated. The bases of setae d1 and l1 are distinctly shifted to the back relatively far from the line separating propodosoma from hysterosoma. Setae l2 placed near setae l1. The bases of setae he on almost the same level as l1. Setae sci very small. Setae vi relatively long and thick; below them placed thin setae scx. Both sides of idiosoma and its posterior area ornamented as in Fig. 1. The ornamental lines also placed below bases of sce.

Ventral side of idiosoma with ornamentation on posterior region; it bears one pair of relatively long setae hi, two pairs of genital setae and three pairs of anal setae beside the anal opening. Moreover there are three pairs of setae cx. Gnathosoma relatively long (Fig. 2).

Legs I-IV as in Figs 3-6; tarsi IV distinctly longer than the remaining ones, with pairs of mediventral setae; proximal seta about 3 times as long as those of posterior seta (Fig. 6). Solenidia on tibiae I-III distinctly longer than solenidion on tibia IV. Dorsal distal seta on genu I somewhat shorter than two remaining setae; dorsal distal seta on genu II at least half as long as the remaining ones (Figs 3-4). For measurements see table 1.

Etymology. The name of the species was derived from the name Melchior.



Figs 1-6. *Photia melchiori*, spec. nov., ♀. **1.** Idiosoma, dorsal view. **2.** Idiosoma, ventral view. **3.** Leg I, tarsus-femur. **4.** Leg II, tarsus-femur. **5.** Leg III, tarsus-genu. **6.** Leg IV, tarsus-genu.

Canestrinia kacperi, spec. nov.

Figs 7-18

Types. Holotype: ♀, ex *Carabus subformosus* Sem., Guanzhou (Kanton), China. – Paratypes: 1♀, 2♂♂, same data as holotype (ISEZPAS).

Diagnosis. *Canestrinia kacperi*, spec. nov. is very similar to *C. ramoni* Haitlinger. Females can be distinguished from this species by dorsal ornamentation, shorter setae vi (62-64 to 102), longer tarsi I-IV (Ti III greater about 28 nm) and gnathosoma (120 to 100); males of *C. ramoni* are unknown. Males of *C. kacperi* are similar to *C. illegalis* Samšinák. They differ by shape of opisthosoma, the greater distance between suckers, thicker setae a4 and the distance between d3-d4.

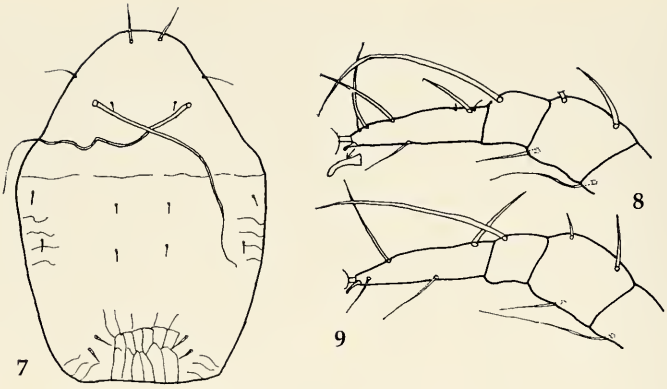
Description

Female holotype. Dorsum weakly ornamented in posterior part and very weakly at lateral margins. Suture between propodosoma and hysterosoma present. Idiosoma longer than wide; it bears 12 pairs of dorsal setae, 3 pairs of setae long: sce, he, l5, (setae he and l5 on margins of the idiosoma – Fig. 16); 9 pairs of setae short of which vi, d3 and d4 are somewhat longer and thicker than the others. Distance between bases of setae d3, d4 greater than between bases of setae d1, d2 (Fig. 7).

Ventral side of idiosoma with 2 pairs of short genital setae and 6 pairs of anal setae. Posterior to anal region 2 pairs of rather short setae and 2 pairs of long setae. At posterior margin of opisthosoma a small caudal capsule is situated. Gnathosoma rather short (Fig. 16).

Legs III-IV with tarsi longer than tarsi I-II; tarsi IV longest (Figs. 17-18). Setae on tibiae I-III distinctly longer than seta on tibia IV. Both genua I-II with a dorsal distal seta that is shorter than the dorsal proximal seta (Figs. 8-9).

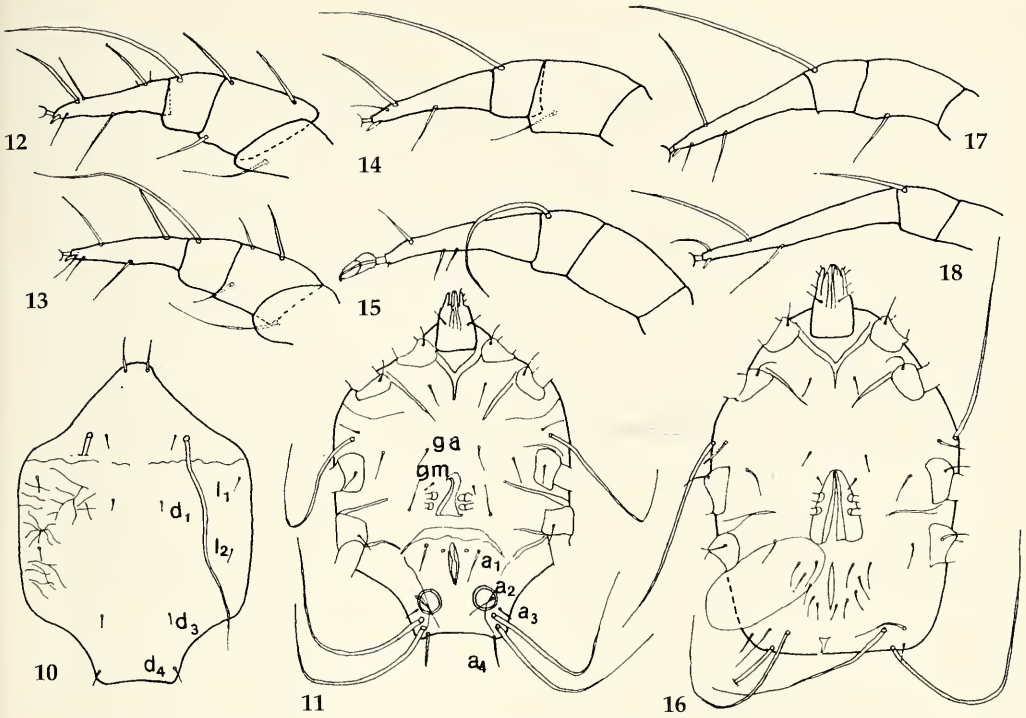
For measurements see table 1.



Figs 7-9. *Canestrinia kacperi*, spec. nov., ♀. **7.** Idiosoma, dorsal view. **8.** Leg I, tarsus-femur. **9.** Leg II, tarsus-femur.

Tab. 1. Metric data for *Photia melchiori*, spec. nov. and *Canestrinia kacperi*, spec. nov. Abbreviations: H: holotype; P: paratype; gda: dorsal anterior seta on genu I; gdp: dorsal posterior seta on genu I; sge: seta on genu III; st: setae on trochanters III-IV.

	Photia melchiori					*Canestrinia kacperi*						
	H ♀	P ♀	P ♀	P ♀	P ♀	H ♀	P ♀	P ♂	P ♂	P ♂	P ♂	P ♂
Length of idiosoma	504	560	568	592	576	645	728	512	544	632	576	560
Width of idiosoma	400	416	420	464	460	472	536	408	456	528	456	448
Gl	100	100	92	120	96	120	126	96	112	100	104	104
GW	56	60	60	60	62	62	70	52	60	66	64	70
Genital apparatus	–	–	–	–	–	–	–	–	86	80	84	–
vi	74	64	66	76	74	62	64	54	62	56	60	52
d1	52	54	–	–	52	20	–	–	–	–	–	–
d2	58	–	–	–	–	18	–	–	–	–	–	–
d3	56	60	60	62	76	40	–	–	–	–	–	–
d4	100	108	106	120	116	30	–	–	–	–	–	–
d5	330	290	330	390	–	330	–	–	–	–	–	–
11	310	280	280	332	316	22	24	–	24	–	–	–
12	264	290	296	270	–	20	–	–	–	–	–	–
13	–	–	–	–	–	92	–	–	–	–	–	–
14	–	–	–	–	–	30	–	–	–	–	–	–
15	544	500	–	532	–	440	–	–	–	–	–	–
hi	100	94	84	100	86	44	50	40	40	–	40	40
sci	22	22	20	26	24	24	26	–	22	26	26	22
Ta I	74	76	72	80	76	82	86	80	80	80	76	76
Ta II	–	74	74	80	76	84	84	–	78	86	74	74
Ta III	94	100	100	104	102	110	108	84	90	–	84	88
Ta IV	126	122	126	132	132	140	136	106	112	110	106	108
SoTi I	136	140	142	140	–	170	162	140	140	142	142	140
SoTi II	130	120	–	140	134	154	–	126	130	134	134	126
SoTi III	114	110	100	106	108	140	126	120	120	120	124	124
SoTi IV	65	54	42	60	50	56	74	90	88	86	94	86
gda	40	40	40	40	36	–	38	40	42	40	44	–
gdp	46	–	44	42	40	54	46	52	50	56	50	46
sge	–	50	40	66	48	44	44	40	44	40	–	–
st III	–	32	40	–	30	40	–	–	46	–	–	–
st IV	–	36	42	–	34	42	–	–	40	–	–	–



Figs 10-15. *Canestrinia kacperi*, spec. nov., ♂. **10.** Idiosoma, dorsal view. **11.** Idiosoma, ventral view; **12.** Leg I, tarsus-femur. **13.** Leg II, tarsus-femur. **14.** Leg III, tarsus-genu. **15.** Leg IV, tarsus-genu.
Figs 16-18. *Canestrinia kacperi*, spec. nov., ♀. **16.** Idiosoma, ventral view. **17.** Leg III, tarsus-genu. **18.** Leg IV, tarsus-genu.

Male. Dorsum of idiosoma with ornamentation at lateral margins. Suture between propodosoma and hysterosoma present. Opisthosoma narrow with short posterior margin. All dorsal setae, except sce, short. Setae vi somewhat longer and thicker than other ones (Fig. 10).
Ventral side of idiosoma with one pair of anterogenital setae ga above genital apparatus and four setae in genital region. Genital apparatus as in Fig. 11. Between genital apparatus and anal opening a trapeziform cuticular formation is situated. Between coxae IV and posterior margin of opisthosoma a cuticular fold. Distance between two big suckers relatively large. Gnathosoma as in Fig. 11.

Legs IV bear the longest tarsi; medioventral with two setae unequal in length. Tarsi I-III with ventroapical spur which is very small. All setae on tibiae I-III almost subequal in length; seta on tibia IV curved and shorter (Fig. 15). Dorsal setae on genu I almost equal in length, ventral apical seta somewhat thinner (Fig. 12). Dorsal setae on genu II unequal; distal seta distinctly shorter (Fig. 13).

For measurements see table 1.

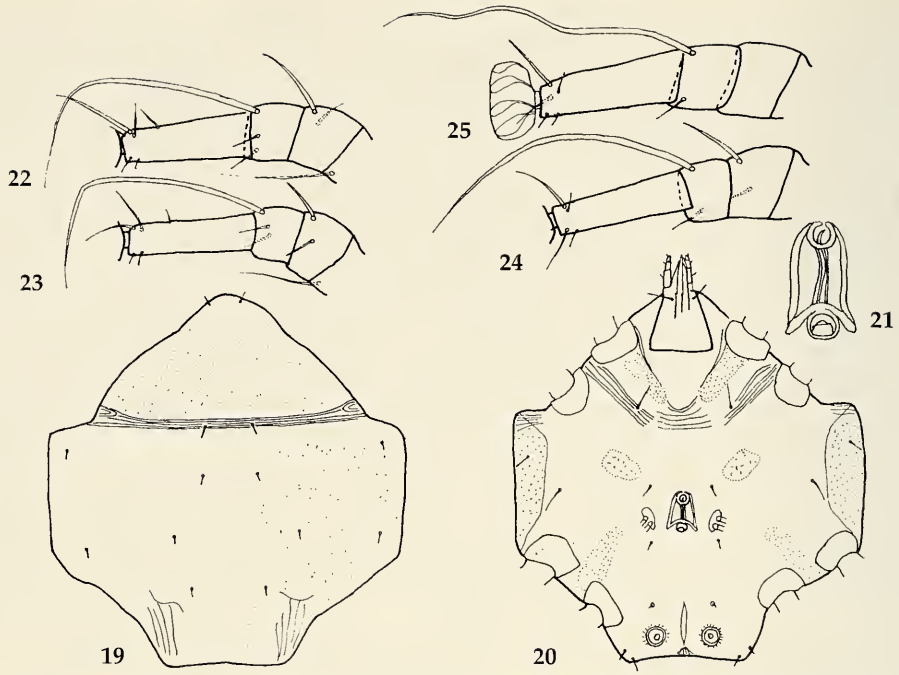
Etymology. The name of the species was derived from the name Kacper.

Heterocoptes hannae, spec. nov.

Figs 19-31

Types. Holotype: ♂, Shanghai, China, obtained from *Basipronota bisignata* (Boheman) (Coleoptera, Chrysomelidae, Cassidinae). – Paratype: 1♀, same data as holotype (MNHWU).

Diagnosis. *Heterocoptes hannae*, spec. nov. differs from *H. tarsii* Fain (males) by only punctated dorsum, without ornamentation, shape of genital apparatus and opisthosoma, and ornamentation on ventral



Figs 19-25. *Heterocoptes hannae*, spec. nov., ♂. **19.** Idiosoma, dorsal view. **20.** Idiosoma, ventral view. **21.** genital apparatus. **22.** Leg I, tarsus-femur. **23.** Leg II, tarsus-femur. **24.** Leg III, tarsus-genu. **25.** Leg IV, tarsus-genu.

surface. From *H. kamillae*, spec. nov. males differs in shape of posterior margin of opisthosoma (almost straight), punctated areas at lateral margins on ventral surface, and distinctly shorter solenidia on tibiae I-IV. Females of *H. hannae* differ from females of *H. kamillae* in dorsal and ventral ornamentation and shorter solenidia I-IV.

Description

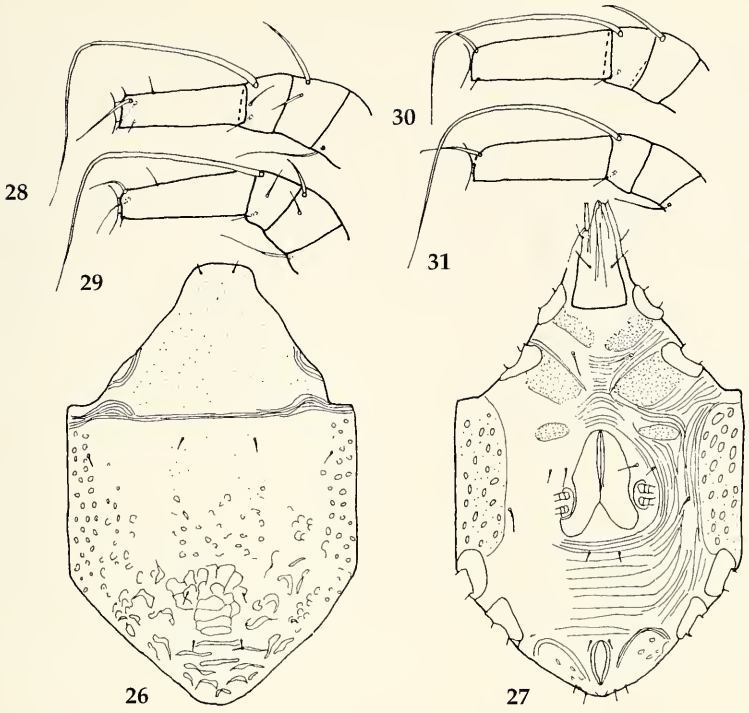
Male holotype. Idiosoma slightly longer than wide. Opisthosoma very short. Transverse lines divide propodosoma from hysterosoma. Dorsum punctated except for median part, and with some longitudinal lines on posterior margin. All dorsal setae minute (Fig. 19). Ventral posterior margin of idiosoma bears two suckers. Distance between suckers relatively long. Anal opening placed between suckers and near posterior margin of idiosoma. Genital apparatus as in Fig. 21. Ventral surface of idiosoma with punctated area at coxae I, between coxae III-IV, at lateral margins of idiosoma, and somewhat above genital apparatus. Cuticular lines visible between coxae I-II and beyond coxae IV. Ventral setae very short. Near posterior margin of idiosoma two pairs of setae and above suckers one pair of minute setae. Genital region with two pairs of setae. Setae hi on punctated area. Gnathosoma as in Fig. 20.

Legs I-IV with very long solenidia and tibiae; solenidion on tibia IV somewhat longer than the remaining ones (Figs 22-25). Genu I with distal seta (dorsal) about three times longer than proximal seta. Differences of length of setae on genu II distinctly less (Fig. 23).

For measurements see table 2.

Female. Idiosoma longer than wide. Transverse lines divide propodosoma from hysterosoma. Whole propodosoma punctated; hysterosoma only in its anterior part, the rest of dorsal surface ornamented as in Fig. 26. Dorsal setae very short. Ventral side of idiosoma with anus near its posterior margin. Whole ventral surface ornamented; at lateral margins with punctated and circular areas; additional punctated areas situated at coxae I and II and somewhat below them. The remaining areas covered by lines (Fig. 27). Two pairs of setae on posterior margin of idiosoma, one pair in anal region, two pairs in genital region, and one pair below this region. Gnathosoma as in Fig. 27.

Legs I-IV as in males with solenidia on tibiae III-IV not longer than solenidia on tibiae I-II. Distal seta



Figs 26-31. *Heterocoptes hannae*, spec. nov., ♀. **26.** Idiosoma, dorsal view. **27.** Idiosoma, ventral view. **28.** Leg I, tarsus-femur. **29.** Leg II, tarsus-femur. **30.** Leg III, tarsus-genu. **31.** Leg IV, tarsus-genu.

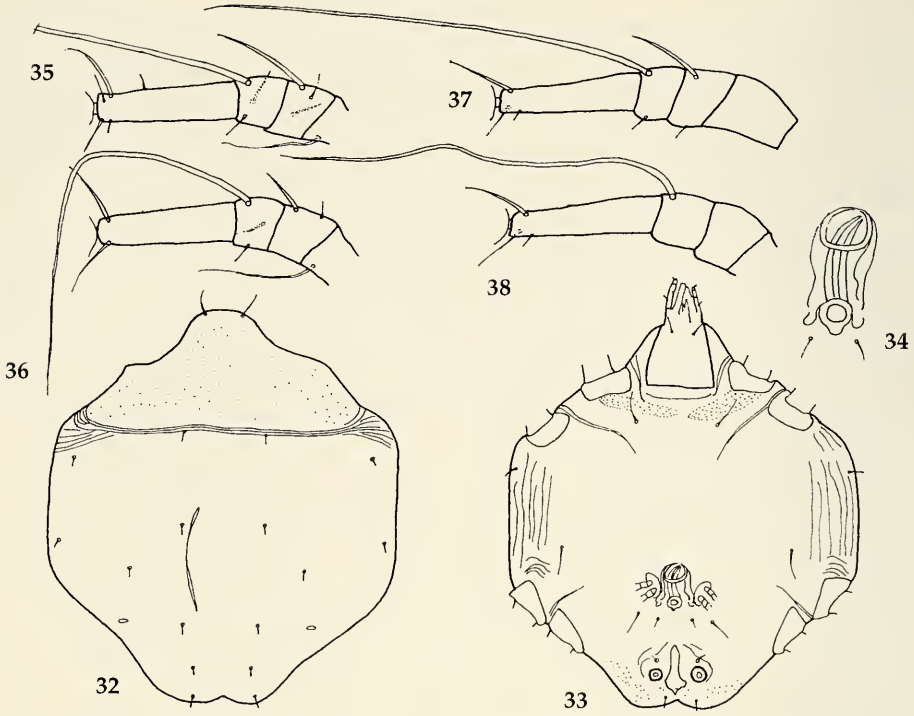
on genu I distinctly longer and thicker than proximal seta; differences between setae on genu II smaller.

For measurements see table 2.

Etymology. The name of the species has derived from the name Hanna.

Tab. 2. Metric data for *Heterocoptes hannae*, spec. nov. and *H. komillae*, spec. nov. H: holotype, P: paratype.

	H. hannae		*H. komillae*	
	H ♂	P ♀	H ♂	P ♀
Length of idiosoma	492	528	496	464
Width of idiosoma	444	408	416	412
Genital apparatus	50	–	52	–
D	46	–	26	–
GL	106	108	108	94
GW	78	76	76	76
vi	–	–	20	20
Ta I	92	102	94	88
Ta II	92	102	96	94
Ta III	92	110	96	102
Ta IV	96	120	96	102
SoTi I	~216	~240	306	256
SoTi II	~ 204	222	296	266
SoTi III	206	~258	324	288
SoTi IV	230	~250	~280	254
sge	52	60	64	–



Figs. 32-38. *Heterocoptes kamillae*, spec. nov., ♂. **32.** Idiosoma, dorsal view. **33.** Idiosoma, ventral view. **34.** genital apparatus. **35.** Leg I, tarsus-femur. **36.** Leg II, tarsus-femur. **37.** Leg III, tarsus-femur. **38.** Leg IV, tarsus-genu.

Heterocoptes kamillae, spec. nov.

Figs 32-44

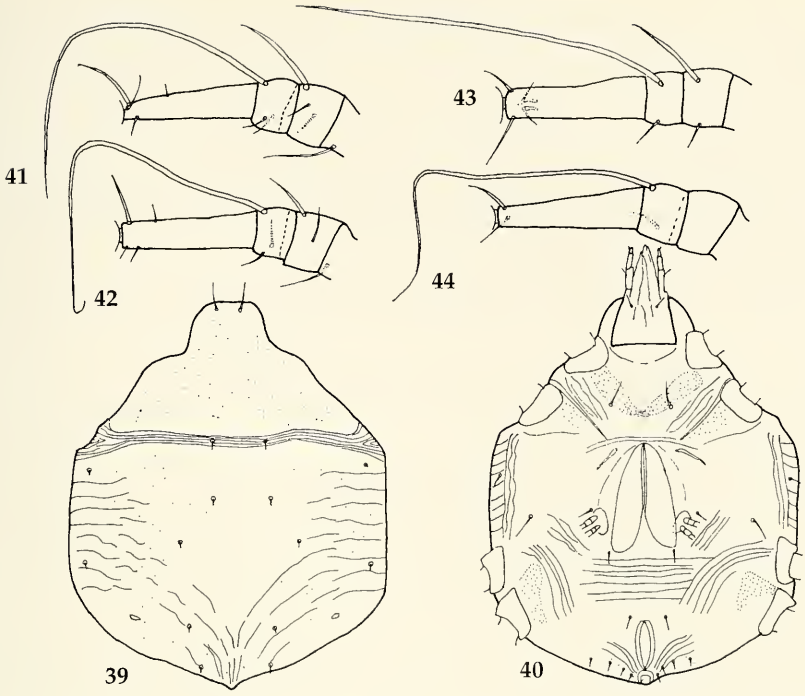
Types. Holotype: ♂, ?Solin-Ho, Yunnan, China, obtained from *Aspidomorpha miliaris* (L.) (Coleoptera, Chrysomelidae, Cassidinae). – Paratype: 1♀, same data as holotype (MNHWU).

Diagnosis. *Heterocoptes kamillae*, spec. nov. (males) differs from *H. tarsii* Fain by shape of genital apparatus, concave posterior margin of idiosoma, and absence of ornamentation on dorsum. For differences between ♂♂ and ♀♀ of *H. kamillae*, spec. nov. and *H. hannae*; spec. nov. see diagnosis of *H. hannae*.

Description

Male. Idiosoma longer than wide. Posterior margin of opisthosoma concave in central part. Propodosoma divided from hysterosoma by transversal lines. Whole dorsum punctated. All dorsal setae minute, except setae vi which are distinctly longer than the remaining ones. Setae d1 placed on transverse lines that separate propodosoma from hysterosoma (Fig. 32). Ventral surface of idiosoma with punctated areas at coxae I and near posterolateral margins of idiosoma. Longitudinal lines and short transverse lines placed near lateral margins of idiosoma. Two suckers and anus situated near posterior margins of idiosoma. Genital apparatus as in Fig. 34. Gnathosoma longer than wide. All ventral setae short. Below genital region with two pairs of setae; internal pair shorter. Above and below suckers with one pair of setae each (Fig. 33).

Tarsi IV somewhat longer than others. Solenidion on tibia III longer than the remaining ones. Dorsal distal seta on genu I a many times longer than proximal seta and distinctly thicker; also ventral seta short. Dorsal distal seta at least two times longer than proximal seta and distinctly thicker (Figs 35-38).



Figs 39-44. *Heterocoptes kamillae*, spec. nov., ♀. **39.** Idiosoma, dorsal view. **40.** Idiosoma, ventral view. **41.** Leg I, tarsus-femur. **42.** Leg II, tarsus-femur. **43.** Leg III, tarsus-genu. **44.** Leg IV, tarsus-genu.

Measurements. Length of idiosoma 504, width of idiosoma 436, vi 20, genital apparatus 52, TaI 94, TaII 96, TaIII 96, TaIV 96, SoTi I 306, SoTi II 296, SoTi III 324, SoTi IV ~280, distal seta on genu I 64, length of gnathosoma 108, width of gnathosoma 76, distance between anal suckers (measured between their internal margins) 26.

Female. Idiosoma somewhat longer than wide. Entire surface of propodosoma punctated; also hysterosoma on both sides punctated. Propodosoma separated from hysterosoma by transverse lines. Hysterosoma ornamented as in Fig. 39. Opisthosoma very strongly reduced. Setae d1 placed on transverse lines. All dorsal setae minute, except setae vi, which are at least 2-3 times longer. Ventral surface of idiosoma ornamented; punctated areas placed near coxae II and IV; lines arranged obliquely, longitudinally and transversely as shown in Fig. 40. Anal opening near posterior margin of opisthosoma. Above anus a pair of setae; at posterior margin of opisthosoma four pairs of short setae. In genital region two pairs of setae. Gnathosoma longer than wide.

Tarsi I-II equal in length, tarsi III-IV somewhat longer than I and II. Solenidion on tibia III longer than the other ones. Distal setae on genua I, III longer than analogous seta on genu II (Figs 41-44).

Etymology. The name of the species has derived from the name Kamilla.

Acknowledgments

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