

SEVEN NEW ORIENTAL-AUSTRALASIAN CHIGGERS
(ACARINA, TROMBICULIDAE)

by

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During 1961, an attempt was made to bring the taxonomic work on new chiggers accumulated in this laboratory up to date. Many of the species fell into natural groups, and descriptions of species of five genera are now in press (*Whartonia*, *Walchiella*, *Laurentella*, *Doloisia* and *Schoutedenichia*). The remainder of the material is described below. It comprises seven new species — some single species assigned to well-defined genera (*Guntherana* and *Schöngastia*), and others assigned only tentatively to broad genera (*Trombicula* and *Euschöngastia*).

Trombicula cooli n. sp.

Types. — Holotype larva and three paratype larvae from a gecko, *Hemidactylus flaviviridis* (Gekkonidae), Lucknow, Uttar Pradesh, India, B. K. Tandan, examined through the courtesy of Dr. C. E. YUNKER. Also three damaged specimens with the same data. Holotype larva in U.S. National Museum, Washington; one paratype larva each in British Museum (Natural History), London; Rocky Mountain Laboratory, Hamilton; Institute for Medical Research, Kuala Lumpur.

Larva with medium-sized oval idiosoma, length 231 μ in an unengorged specimen, 440 μ in a semi-engorged specimen, and 561 to 649 μ in mounted replete specimens.

Body setation. — Dorsal setae ever so slightly clavate when examined closely, those in second row being 28 μ long. DS arranged 2.6.8.8.6.4.2. Humeral setae single, 38 μ long. VS about 35 in number, those near anus 22 μ long. Sternal setae 2 + 2.

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Scutum clearly pentagonal, with outline slightly variable as figured. Surface weakly punctate. All scutal setae weakly barbed, $PL > AL = AM$. SB fairly widely separated, in line with PL. Sensillae filamentous, ciliated in distal half. Eyes 2 + 2, on distinct ocular plates; posterior pair weak.

Gnathosoma. — Galeal setae nude. Cheliceral blade unarmed except for tricuspid cap. Apart from the tarsala, the palpal formula is B.n.bnb. Palpal tarsus indistinct. Palpal claw 2-pronged, the accessory prong being ventro-external.

Legs all 7-segmented. Coxal formula 1.1.1. Specialized setation as follows — Tarsus I with pretarsala, subterminala, parasubterminala, tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with three genualae and microgenuala. Tarsus II with pretarsala, tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Tibia III with tibiala; genu III with genuala. Mastitarsala III absent.

Standard data in micra of larval scutum of *T. cooli* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
72	94	28	29	33	62	27	30	31	39	64
74	94	29	30	31	61	26	—	34	36	69
73	94	30	29	—	—	27	32	35	37	69

Notes. — In AUDY's key (1956) to the chiggers of reptiles etc., *Trombicula cooli* n. sp. runs to couplet 15, and is much nearer to *T. ileisi* (RADFORD) than to *Eutrombicula* s. s. This is evidenced by its clearly pentagonal scutum, the palpal formula, and the absence of mastitarsala III. *T. ileisi* was described from an African mamba (*Dendraspis viridis*) in a zoo in England. I have not seen material of this species, but have had the assistance of figures prepared by AUDY from one of RADFORD's paratypes. These figures agree well with RADFORD's, all tarsi being quite stout in lateral view, and the scutum being clearly pentagonal, sparsely punctate, and with AW approximately 52 μ . RADFORD shows a dorsal setal pattern commencing 2.8.8. In *T. cooli*, all tarsi are elongate, AW is 72—74 μ , and the dorsal setal pattern commences 2.6.8.

Trombicula calva n. sp.

Types. — Holotype larva from the wing of a bat B47960, Ban Na (Banna), a village at the foot of Khao Luang (elevation 1,788 m), Nakhon Si Thammarat (variously spelt Nakon Sritamaras, Nakawn Sri Tamarat), Thailand, 5—10.V.1958, T. C. Maa. In Bishop Museum, Honolulu.

Larva. — Idiosoma in mounted engorged specimen 495 \times 352 μ .

Body Setation. — Dorsal setae cylindrical, shortly barbed, arranged 2.6.6.2.6.6.4.2. Humeral setae single, 34 μ long; DS 31 μ long; CS 26 μ long. Ventral setae 32 in number, those near anus 29 μ long. Sternal setae 2.2.

Scutum broadly trapezoidal. Anterior margin slightly concave, with small convexity above AM setal base. Lateral margins straight. Posterior margin weakly convex behind SB, but straighter near PL's. AM and AL setae set well away from margin of shield, but PL at corners. PL > AL = AM. SB nearer level of PL than that of AL. Sensillae filamentous, with about nine ciliations each. Surface of scutum fairly uniformly punctate behind AL setae. Anterior band not punctate, and apparently denser than rest of scutum; with two ovate weakenings or "windows" between AM and AL. Eyes distinct, 2 + 2.

Gnathosoma. — Galeal setae nude. Cheliceral bases broad; blade also very broad basally, tapering quickly to a point. In addition to the tarsala, the palpal formula is B.B.bbB. The number of branched setae on the palpal tarsus is uncertain, but possibly five. Tibial claw trifurcate.

Legs all 7-segmented. Coxal formula 1.1.1. Specialized setation as follows — Tarsus I without subterminala and parasubterminala, but with two pretarsalae, slender tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with three genualae and microgenuala. Tarsus II without pretarsala, but with tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Leg III with elongate tibiala and genuala.

Standard data in micra of larval scutum of *T. calva* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
54	74	18	26	14	40	29	31	30	39	52

Notes. — Among the Oriental-Australasian chiggers of bats, *Trombicula calva* n. sp. should be compared with *T. philipi* WOMERSLEY from New Guinea and *T. taphozous* WOMERSLEY from Malaya (see AUDY, 1952). All three have rectangular scuta, with a transverse band across the anterior portion more densely sclerotized than the remainder of the scutum, and with two ovate weakening or "windows". In *T. calva*, the dorsal setae are few, the pattern commencing 2.6.6. *T. philipi* and *T. taphozous* are both very much hairier, and, after the humerals, have several rows of at least ten setae.

Trombicula koongi n. sp.

Types. — Holotype larva and twenty-four paratype larvae from a bat, *Megaderma spasma* (Megadermidae), Ulu Langat, Selangor, Malaya,

8.III.1957. Type material distributed as for the following species, *T. niehoffi* n. sp.

Larva. — An elongate-bodied species, with idiosoma 385 to 473 μ long and 264 to 319 μ wide in mounted engorged specimens.

Body setation. — Dorsal setae cylindrical, shortly barbed, arranged 2.6.6.6.6.6.2. Humeral setae single, 32—36 μ long. Dorsal setae 25—30 μ long; caudal setae 23—26 μ long. Ventral setae about 42 in number, those near anus 18—23 μ long. Sternal setae 2 + 2.

Scutum transverse. Anterior margin slightly concave; lateral margins almost straight, nearly parallel. Posterior margin shallowly convex. Surface marked with two zones of very large geometric punctae. Scutal setae weakly barbed; PL > AM = AL. Sensillary bases close together, much nearer to level of PL than that of AL. Sensillae filamentous, barbed on basal third, but with longer ciliations on remainder of shaft. Eyes oval, 1 + 1.

Gnathosoma. — Galeal setae n/b. Chelicerae broad-based, with blades short and thick, with small tricuspid cap. Apart from the tarsala, the palpal formula is B.B.bn/bb.5b. Subterminala absent. Palpal claw 3-pronged.

Legs all 7-segmented. Coxal formula 1.1.1. Tarsus I with basal bar. Specialized setation as follows — Tarsus I with two pretarsalae, tarsala and microtarsala, but without subterminala and parasubterminala; tibia I with two tibialae and microtibiala; genu I with three genualae and microgenuala. Tarsus II with pretarsala, tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Tibia III with tibiala; genu III with elongate genuala.

Standard data in micra of larval scutum of *T. koongi* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
59	66	15	25	12	37	25	—	30	36	—
55	67	15	26	11	37	26	31	—	35	—
60	74	17	26	14	40	27	33	32	39	51 +
52	64	15	24	11	35	25	31	30	35	55
60	70	16	25	11	36	27	30	29	38	—
54	68	15	25	11	36	30	—	29	34	—
57	69	16	25	13	38	29	34	—	38	—

Notes. — *Trombicula koongi* n. sp. may be immediately recognized by its peculiarly sculptured scutum.

It is convenient here to consider the specialized setation of the legs of this species, together with the three species discussed in the notes to the preceding species. In *T. calva* and *T. taphozous*, there are two pretar-

salae I, while pretarsala II is lacking. Further, the subterminala and parasubterminala of tarsus I are also lacking in both species. In *T. koongi*, the setation is the same, except that pretarsala II is present. In the one paratype of *T. philipi* I have seen, one pretarsala is present on both tarsi I and II, and the subterminala and parasubterminala of tarsus I are present. All four species are parasites of bats.

***Trombicula niehoffi* n. sp.**

Types. — Holotype larva and nine paratype larvae from two species of bats, *Hipposideros* spp. (Rhinolophidae, possibly *H. diadema* and *H. larvatus* according to Dr. J. L. HARRISON), Tjiampea Caves, Bogor, Java, June 1961, R.D. and party. In company with *Whartonia caobangensis* SCHLUGER, which is subcircular in outline, and not elongate-oval. Holotype larva and one paratype larva in British Museum (Natural History), London; paratypes distributed between U.S. National Museum, Washington; Rocky Mountain Laboratory, Hamilton; and both my laboratories.

Larva. — A large elongate-oval chigger with idiosoma 1,023 μ long in mounted engorged specimens like that illustrated.

Body setation. — Dorsal setae cylindrical, arranged 4.10.10. 8 + c. 20. Humeral setae duplicated. Ventral setae about 32 in number. Sternal setae 2 + 2.

Scutum subquadrate, but wider posteriorly than anteriorly. Anterior margin sinuous; posterior margin almost rectilinear; lateral margins eroded, irregularly concave. Surface weakly punctate. AM and PL setae weakly barbed, similar to DS; AL scutal setae strongly barbed. PL > AM > AL. Sensillary bases fairly close together, much nearer to level of PL than that of AL. Sensillae filamentous, especially in distal half; with about ten fine ciliations. Eyes strong, 2 + 2, the diameter of the posterior pair about equal to that of SB.

Gnathosoma. — Galeal setae nude. Cheliceral blade short and stout, unarmed except for tricuspid cap. Apart from the tarsala, the palpal formula is n.n.nnn.7b.S. Palpal claw 2-pronged.

Legs all 7-segmented. Coxal formula 1.1.1. Specialized setation as follows — Tarsus I with pretarsala, subterminala, parasubterminala, tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with two genualae and microgenuala. Tarsus II with pretarsala, tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Tibia III with tibiala; genu III with two mastigenualae; telofemur III with mastifemorala.

Standard data in micra of larval scutum of *T. niehoffi* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
60	83	23	40	14	54	44	—	—	80	—
56	82	24	42	14	56	46	65	43	90	—
59	83	25	41	14	55	46	68	49	87	77
57	84	24	43	14	57	46	63	46	79	—
54	79	23	41	13	54	42	60	46	80	68 +
57	81	23	40	14	54	43	57 +	46	82	—
60	83	25	—	—	—	47	65	48	80	—
56	82	23	40	—	—	47	63	—	84	83
54	83	23	40	14	54	46	57	47	76	—

Notes. — Three other Oriental species of bat chiggers with quadrate scuta, SB near level of PL, and four elongate sensory setae on leg III may be compared with *Trombicula niehoffi* n. sp. *T. insolli* PHILIP and TRAUB from Malaya and *T. bandupi* HIREGAUDAR and BAL from India each have a dorsal setal pattern commencing 2.8, while in *T. niehoffi* the pattern commences 4.10, the humerals being duplicated. *T. giga* SCHLUGER from Vietnam also has duplicated humerals, but its scutum has a characteristically eroded posterior margin and very long PL setae (105—108 μ long). In *T. niehoffi*, the posterior scutal margin is rectilinear, and PL 76—90, av. 82 μ . The imperfectly known *T. piercei* EWING also fits in this group, for which the name *Chiroptella* VERCAMMEN-GRANDJEAN is available.

Euschöngastia thompsoni n. sp.

Euschöngastia "THOM" AUDY, 1956, Bull. Raffles Mus., 28: 97.

Types. — Holotype larva and seven paratype larvae, all from four *Rattus bowersi* as follows — Ulu Langat, Selangor, Malaya, 5 and 12. VIII. 1952, and 5.I.1954; Maxwell's Hill, Perak, Malaya, 20.III.1958. Type material distributed as for the preceding species, *T. niehoffi* n. sp.

Larva. — Idiosoma in mounted engorged specimens from 517 \times 363 μ to 616 \times 440 μ .

Body setation. — Dorsal setae long, very slender, and shortly barbed; arranged approximately 2.8.9.2.7.7.4.2. Humeral setae single, 90—100 μ long; DS 71—83 μ long, CS 51—64 μ long. Ventral setae about 48 in number, those immediately in front of anus 31-33 μ long.

Scutum much wider than deep, fairly uniformly punctate. Anterior margin fairly straight, but with convexity around AM setal base. Lateral margins also virtually straight. Posterior margin deeply and evenly convex. Scutal setae slender and shortly barbed. PL » AM > AL. Sensillary bases at level of PL, set well apart. Sensillae slenderly clavate, attenuate distally, and with few barbules. Eyes weak, 1 + 1.

Gnathosoma. — Galeal setae usually with one lateral branchlet. Chelicerae with minute distal tooth dorsally in addition to tricuspid cap. In addition to the tarsala, the palpal formula in B.b.nnb.B + 5b.S. Tibial claw 2-pronged.

Legs all 7-segmented. Coxal formula 1.1.1. Tarsus I with apical and basal bar. Specialized setation as follows — Tarsus I with pretarsala, subterminala, parasubterminala, tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with two genualae and microgenuala. Tarsus II with pretarsala, tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Tibia III with tibiala; genu III with genuala.

Standard data in micra of larval scutum of *E. thompsoni* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
70	92	30	26	24	50	26	—	39	86	—
69	97	29	29	27	56	30	59	43	92	—
76	99	31	29	27	56	27	62	46	104	—
72	98	33	30	26	56	26	62	44	96	—
71	94	31	31	25	56	30	62	51	86	62 × 9
69	95	31	26	25	51	25	—	38	—	61 × 7

Notes. — The assignation of this new species to *Euschöngastia* is purely tentative, as it will not fit into any of the recently clarified groups of Oriental-Australasian chiggers with expanded sensillae (AUDY and DOMROW, 1957). It is, nevertheless, a most characteristic species, and readily recognized.

Guntherana taylorae n. sp.

Types. — Holotype larva from an allied rat, *Rattus assimilis*, Pearl Beach, New South Wales, 9.VIII.1955, B. E. HORNER and J. M. TAYLOR. In Queensland Museum, Brisbane.

Larva. — A large oval species, but idiosomal length unavailable because of rupture during mounting procedure. Cuticle crenulate.

Body setation. — Dorsal setae about 86 in number, very long and very strongly barbed, one or two barbs on one side of shaft being particularly strong and outstanding. DS immediately behind scutum 117 μ long. CS only 62 μ long, but still strongly barbed. VS ciliated and shorter still, about 102 in number, those near anus 51 μ long. Sternal formula 2.16.

Scutum strong, with distinct margins, twice as wide as deep; surface punctate. Anterior margin concave, but with median convexity around base of AM. Lateral margins very short, due to forward displacement of PL setae. Posterior margin very deep, almost three-sided, and very

slightly concave medially. All setal bases strongly formed, except that of AM. AL setae very short, strongly barbed. AM seta set well behind level of AL setae, well barbed. PL setae similar to DS, i.e. very strongly barbed, with one or two barbs particularly heavy. $PL > AM > AL$. SB well behind level of PL. Sensillae broadly clavate, spiculate. Eyes distinct, 1 + 1.

Gnathosoma. — Galeal setae nude. Chelicerae unarmed except for tricuspid cap. Cheliceral bases punctate, with postero-external angle extended and hyaline. Apart from the tarsala, the palpal formula is P.b.nnb.5B. Subterminala absent. Femoral seta curved inwardly over gnathosoma, as often in this group. Palpal claw 3-pronged.

Legs all 7-segmented. Coxae strongly punctate; coxal formula 1.1.1. Coxae III clearly separated from coxae II, its anterior margin evenly curved, and not distinctly angled. Tarsi each with single basal bar. Specialized setation as follows. Tarsus I with pretarsala, subterminala, parasubterminala, tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with three genualae and microgenuala. Tarsus II with pretarsala, tarsala and microtarsala; tibia II with two tibialae; genu II with genuala. Tibia III with tibiala; genu III with genuala.

Standard data in micra of larval scutum of *G. taylorae* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
61	83	34	23	21	44	14	65	38	104	37 × 17

Notes. — *Guntherana taylorae* n. sp. is a member of the *smithi* species group of the subgenus *Derrickiella* (see DOMROW, 1960). It will key out near *G. (D.) mackerrasae* (WOMERSLEY), but is separable by the degree of angulation of the cheliceral base and the anterior margin of coxa III, the position of tarsala and microtarsala I, and the relative lengths of the dorsal and caudal setae.

Schöngastia palmata n. sp.

Types. — Holotype larva and one paratype larva from a night-jar R 70040, Phan Rang, Vietnam, 11.VI.1960. Holotype larva in Bishop Museum, Honolulu; paratype larva in British Museum (Natural History), London.

Larva. — Idiosoma of mounted engorged specimen $517 \times 341 \mu$.

Body setation. — Dorsal setae cylindrical, shortly barbed, arranged 2.8.6.6.4.4.2. Humeral setae single, 38μ long; DS 34μ long; CS 32μ long. Ventral setae about 30 in number, those near anus 29μ long. Sternal setae 2.2.

Scutum. — Margins (particularly lateral and posterior ones) ill-defined, and obscured by cuticular striae. In fact, much of the scutum shows

traces of such striae. The general shape is hexagonal, the anterior margin being longer than the posterior, and the posterolateral margins longer than the anterolaterals. Surface punctate, with two shallow depressions behind SB, which lie slightly behind level of PL. All scutal setae, especially AL and PL, palmate. $AL > PL > AM$. AM set well behind AL. Sensillae clavate. Two pairs of large eyes present.

Gnathosoma. — Galeal setae nude. Chelicerae dentate, with four teeth in addition to tricuspid cap. In addition to the tarsala, the palpal formula is B.n.nnn.B + 6b.S. The dorsal seta on the palpal tarsus is distinctly clavate. Tibial claw 3-pronged.

Legs all 7-segmented. Coxal setation 1.1.1. Specialized setation as follows — Tarsus I with pretarsala, subterminala, parasubterminala, tarsala and microtarsala; tibia I with two tibialae and microtibiala; genu I with three genualae and microgenuala. Tarsus II with pretarsala, tarsala, and microtarsala; tibia II with two tibialae; genu II with genuala. Tarsus III with weakly barbed mastitarsala in addition to strongly barbed ordinary setae; tibia III with tibiala; genu III with genuala.

Standard data in micra of larval scutum of *S. palmata* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
44	70	16	29	27	56	24	—	—	62	39 × 14
48	72	18	30	27	57	26	43	78	63	41 × 16

Notes. — In WOMERSLEY's key (1952), *Schöngastia palmata* n. sp. comes near *S. philipi* WOMERSLEY and KOHLS, 1947, of which I have examined a specimen labelled "type" by KOHLS. Apart from the degree of ciliation of the scutal setae, there are other differences as follows —

AM not reaching SB or AL; ventral palpal tibial seta strong and heavily branched; dorsal palpal tarsal seta slender and tapering

..... *S. philipi*.

AM reaching well beyond SB and AL; ventral palpal tibial seta slender and nude; dorsal palpal tarsal seta distinctly clavate

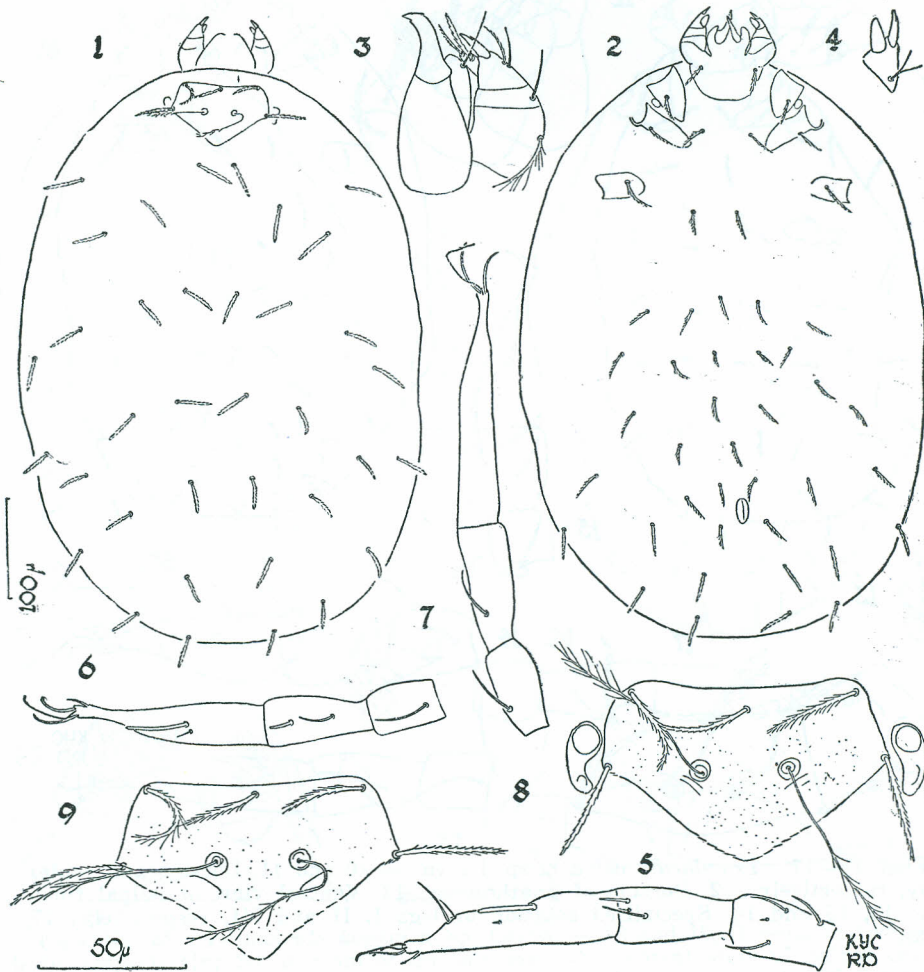
..... *S. palmata*.

SUMMARY.

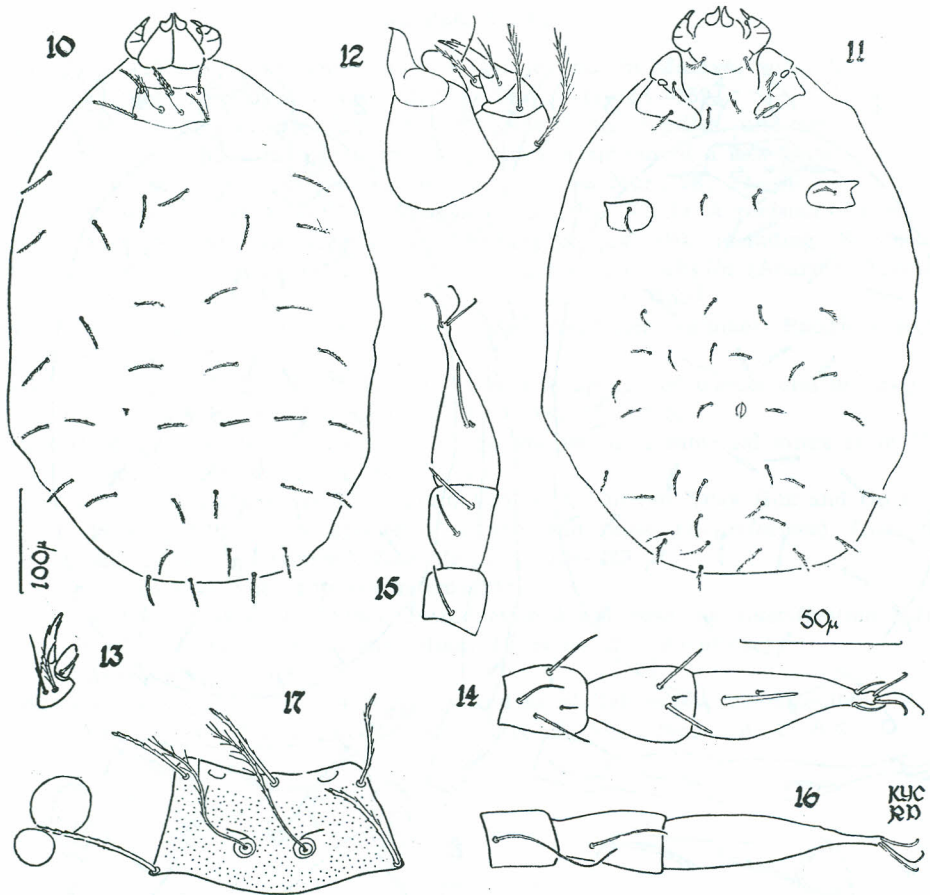
Seven new trombiculine chiggers are described as follows — *Trombicula cooli* n. sp. from a gecko, *Hemidactylus flaviviridis*, India; *T. calva* n. sp. from a bat, Thailand; *T. koongi* n. sp. from a bat, *Megaderma spasma*, Malaya; *T. niehoffi* n. sp. from bats, *Hipposideros* spp., Java; *Euschöngastia thompsoni* n. sp. from *Rattus bowersi*, Malaya; *Guntherana taylorae* n. sp. from *Rattus assimilis*, Australia; *Schöngastia palmata* n. sp. from a night-jar, Vietnam.

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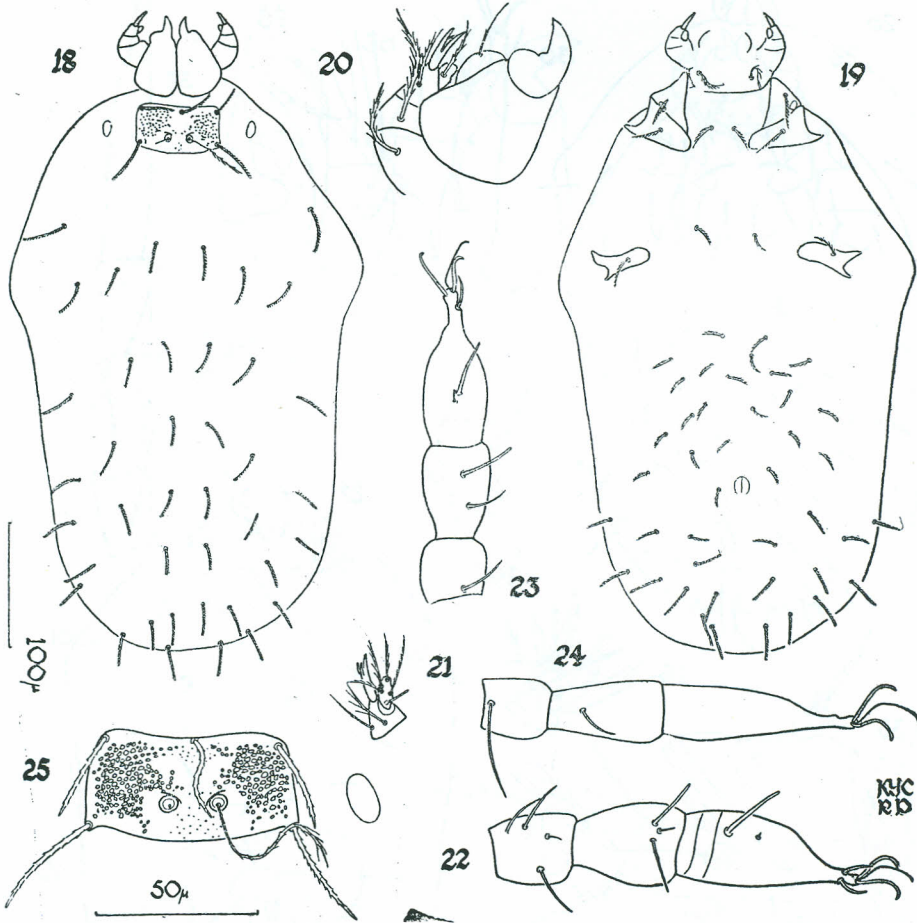
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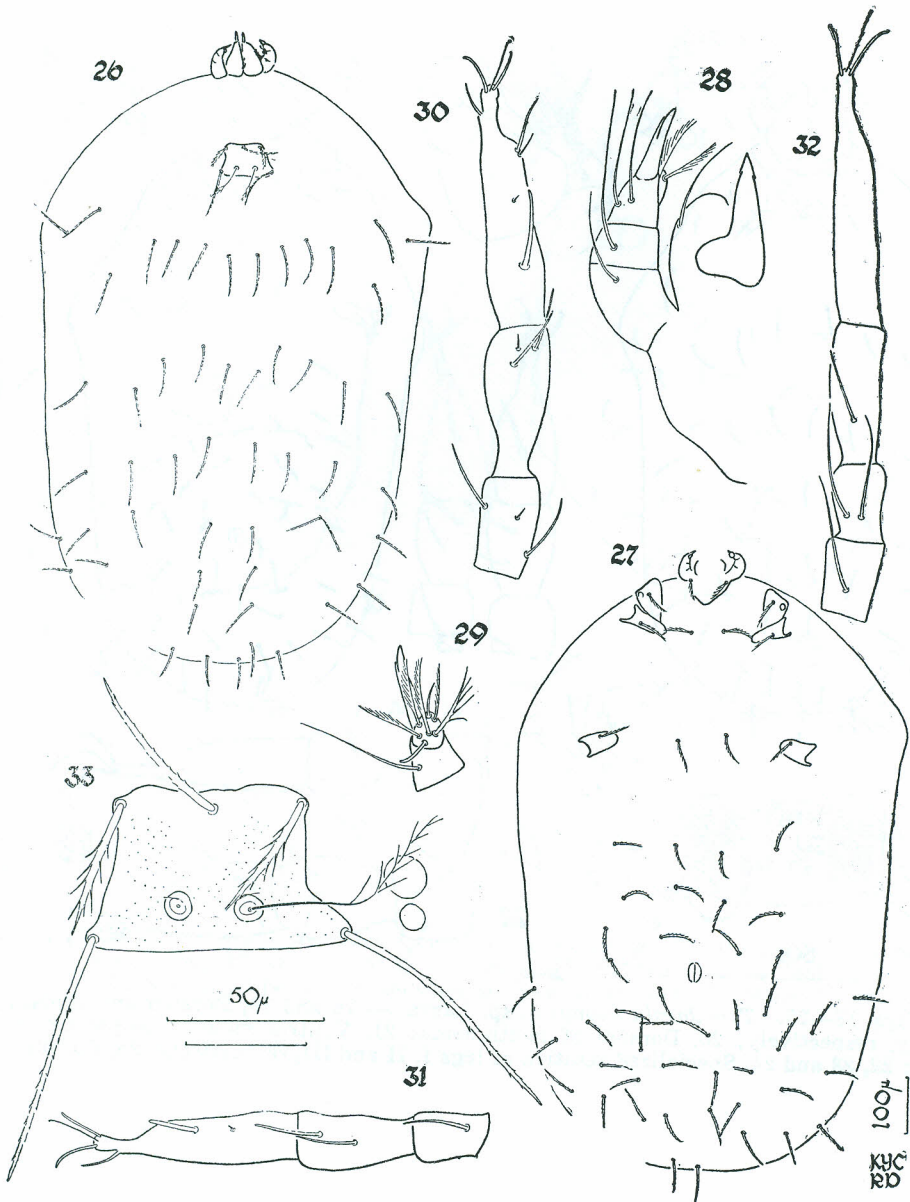
Figs. 1—9. *Trombicula cooli* n. sp. Larva. — 1 and 2, Dorsum and venter of body, respectively; 3, Dorsum of gnathosoma; 4, Ventral view of palpal tibiotarsus; 5, 6 and 7, Specialized setation of legs I, II and III, respectively; 8 and 9, Scuta.



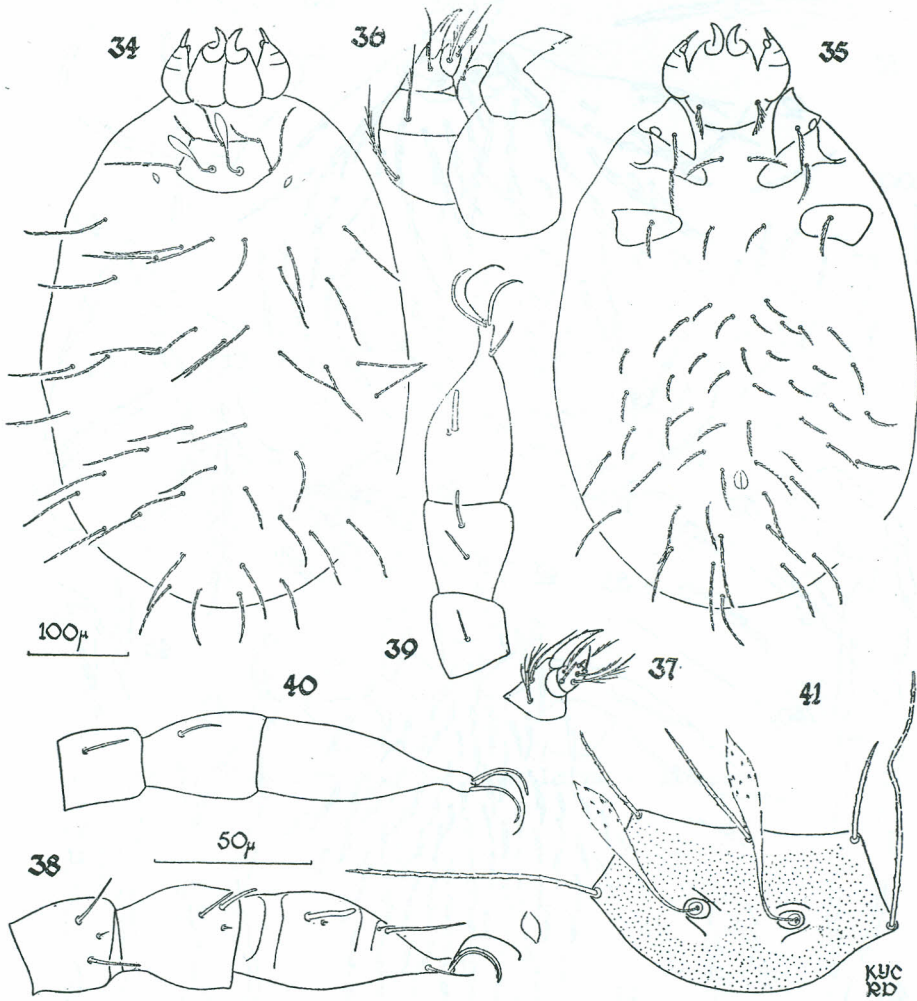
Figs. 10—17. *Trombicula calva* n. sp. Larva. — 10 and 11, Dorsum and venter of body, respectively; 12, Dorsum of gnathosoma; 13, Ventral view of palpal tibio-tarsus; 14, 15 and 16, Specialized setation of legs I, II and III, respectively; 17, Scutum.



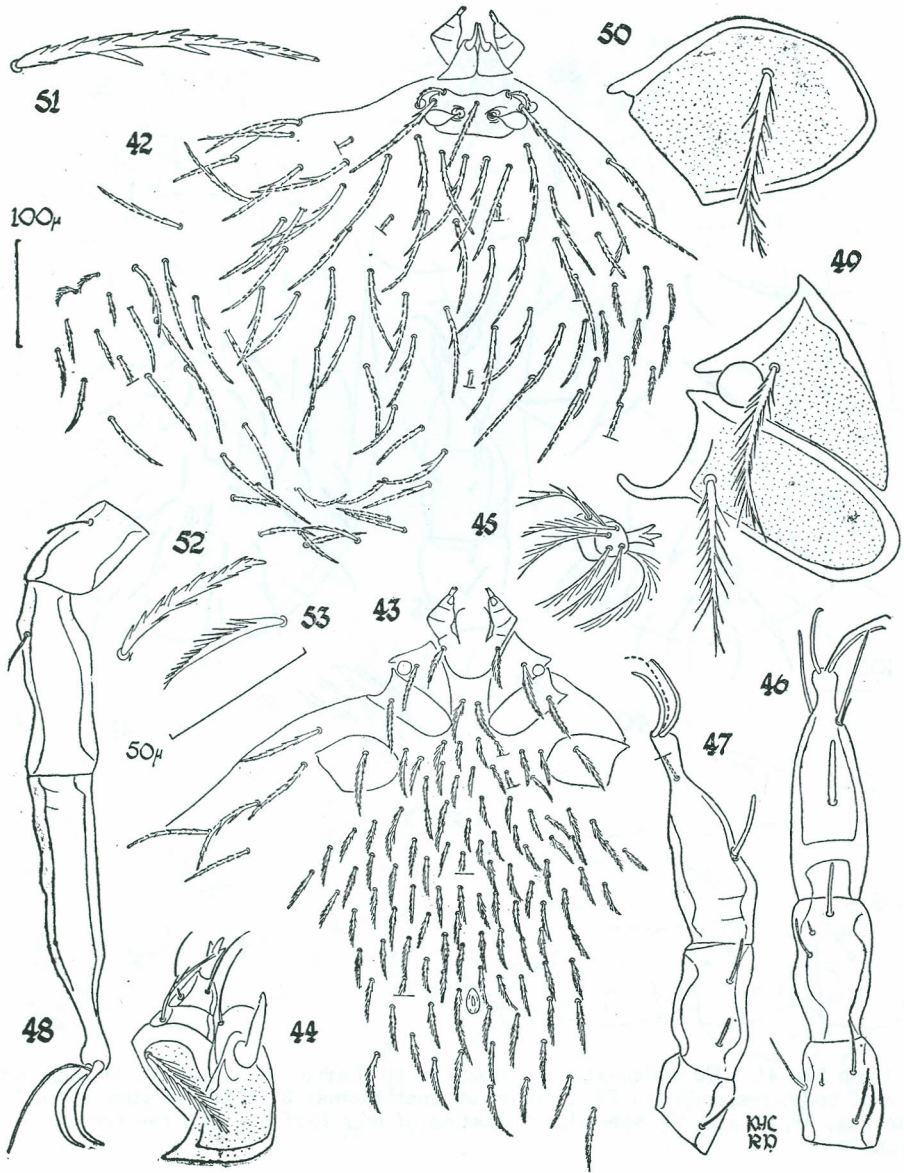
Figs. 18—25. *Trombicula koongi* n. sp. Larva. — 18 and 19, Dorsum and venter of body, respectively; 20, Dorsum of gnathosoma; 21, Ventral view of palpal tibio-tarsus; 22, 23 and 24, Specialized setation of legs I, II and III, respectively; 25, Scutum.



Figs. 26—33. *Trombicula niehoffi* n. sp. Larva. — 26 and 27, Dorsum and venter of body, respectively; 28, Dorsum of gnathosoma; 29, Ventral view of palpal tibio-tarsus; 30, 31 and 32, Specialized setation of legs, I, II and III; 33, Scutum.



Figs. 34—41. *Euschöngastia thompsoni* n. sp. Larva. — 34 and 35, Dorsum and venter of body, respectively; 36, Dorsum of gnathosoma; 37, Ventral view of palpal tibiotarsus; 38, 39 and 40, Specialized setation of legs I, II and III, respectively; 41, Scutum.



Figs. 42—53. *Guntherana taylorae* n. sp. Larva. — 42 and 43, Dorsum and venter of body, respectively; 44, Dorsum of gnathosoma; 45, Ventral view of palpal tibiotarsus; 46, 47 and 48, Specialized setation of legs I, II and III, respectively; 49, Coxae I and II; 50, Coxa III; 51, Dorsal seta; 52 and 53, Caudal and ventral setae, respectively.

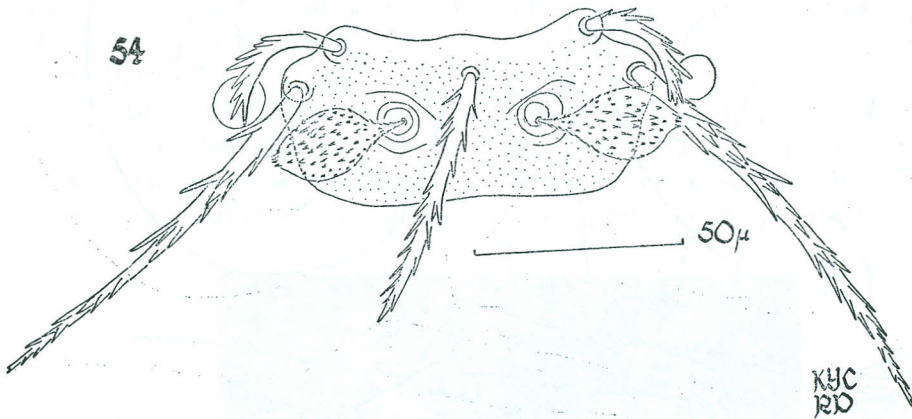
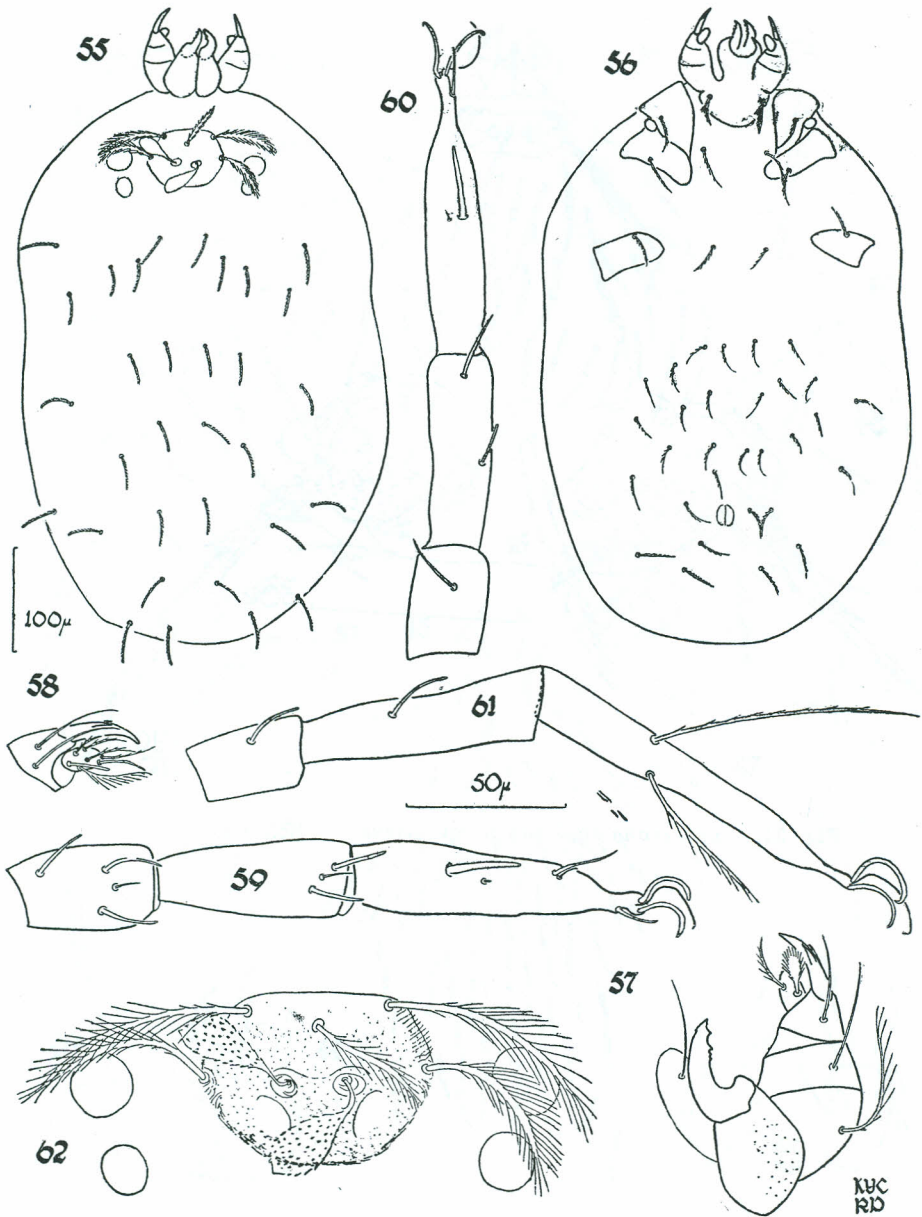


Fig. 54. *Guntherana taylorae* n. sp. Larva. — Scutum.



Figs. 55—62. *Schöngastia palmata* n. sp. Larva. — 55 and 56, Dorsum and venter of body, respectively; 57, Dorsum of gnathosoma; 58, Ventral view of palpal tibiotarsus; 59, 60 and 61, Specialized setation of legs I, II and III, respectively; 62, Scutum.