

THE ASIAN SPECIES OF *WHARTONIA* (ACARINA, TROMBICULIDAE)

by

ROBERT DOMROW

Institute for Medical Research, Kuala Lumpur ¹⁾.

The eight known Asian species of the leeuwenhoekine genus *Whartonia* are all ectoparasites of bats, both Megachiroptera and Microchiroptera. The first four species described were those of RADFORD (1954 b) from Yemen, HIREGAUDAR and BAL (1956 a, b) from India, and WOMERSLEY (1957) from Malaya. During 1959, six further names were proposed independently by three groups of authors for S.E. Asian forms (SCHLUGER et al., March, Vietnam; MIYAZAKI et al., Ryukyu Is.; CHEN and HSU, December, Kwangtung). The paper of MIYAZAKI et al. is undated, but was submitted for publication on March 20.

It is difficult to recognize the three Arabian and Indian species from the data available, but it is believed that the six forms described in 1959 represent only three species. Several new host and distributional records for all S.E. Asian species are detailed, and a striking new species, *W. brevis*, is described from Laos.

Genus *Whartonia* EWING.

Whartonia EWING, 1944, Proc. biol. Soc. Wash., 57: 102.

Brennanella RADFORD, 1954 a (Nov.), Parasitology, 44: 268. Nomen nudum.

Brennanella RADFORD, 1954 b (Dec.), Fieldiana (Zool.), 34: 302. New synonymy.

Dr. E. W. BAKER has kindly examined the holotype of *Brennanella longispina* for me, and says the legs are 6-segmented, the femora not being divided. The above synonymy is therefore evident.

Whartonia caobangensis SCHLUGER.

Whartonia sp. "B" AUDY, 1956, Bull. Raffles Mus., 28: 100.

Whartonia caobangensis SCHLUGER, in SCHLUGER et al., 1959, Zool. Zh., 38: 422. From *Hipposideros armiger* (Rhinolophidae), Vietnam.

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Whartonia recurvata CHEN and HSU, 1959, Acta zool. sin., 11: 549 and 556. New synonymy. From *Pipistrellus pipistrellus* (Vespertilionidae) and *Hipposideros poutensis*, Kwangtung.

The original descriptions agree well enough for the above synonymy to be accepted. CHEN and HSU figure "an irregular group of short spines" behind each SB. In freshly mounted Javan material, in exactly the same position and of same size, there were seen immediately beneath the scutum two groups of granular cells.

Material examined. — Numerous larvae from *Hipposideros* sp., Batu Caves, Selangor, Malaya, 27. II. 1952, 18. II. 1953; four larvae from *Hipposideros* sp., Kepong, Selangor, 22. XII. 1952; numerous larvae from two species of *Hipposideros* (possibly *H. larvatus* and *H. diadema* according to Dr. J. L. HARRISON), Tjiampea Caves, near Bogor, Java, June 1961, R.D. and party.

Notes. — In Malaya, *Whartonia caobangensis* may be found in company with *W. prima* SCHLUGER q.v., and in Java it was found with a still undescribed trombiculid species near *Trombicula insolli* PHILIP and TRAUB. Four AM setae were noted in one specimen from the Batu Caves. In the standard data below, the first seven specimens are old Malayan mounts in polyvinyl alcohol; the last six are Javan specimens freshly mounted into Hoyer's medium from spirit.

Standard data in micra of larval scutum of *W. caobangensis* SCHLUGER.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
98	104	37	35	16	51	24	69	56	82	112
98	104	37	35	—	—	24	72	53	85	120
93	101	35	38	13	51	27	72	53	—	—
96	104	37	37	13	50	27	72	59	—	—
93	98	35	37	16	53	24	69	59	82	—
93	98	35	37	16	53	26	69	56	88	128
96	101	35	40	16	56	26	72	51	90	—
99	104	41	38	13	51	24	64	56	76	—
98	98	37	38	14	52	24	67	52	78	—
98	101	37	37	16	53	24	64	50	74	—
96	98	37	37	13	50	24	68	52	77	—
99	100	38	36	14	50	22	67	50	77	—
99	102	39	38	14	52	24	67	57	80	—

Whartonia salifa SCHLUGER. Figs. 1—9.

Whartonia salifa SCHLUGER, in SCHLUGER et al., 1959, Zool. Zh., 38: 419. From *Hipposideros fulvus*, Vietnam.

Material examined. — Twelve larvae from *Taphozous melanopogon* (ballonuridae), in abandoned temple, Phan Rang, South Vietnam, 20. 1960, Lim Boo Liat.

Notes. — I had already had this species figured as distinct from the others known to me before seeing the paper of SCHLUGER et al. The accompanying text is therefore now restricted to the scutal standard data.

Standard data in micra of larval scutum of *W. salifa* SCHLUGER.

	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
	96	38	43	17	60	31	61	52	78	87 +
	98	36	48	19	67	33	62	48	76	77 +
2	103	39	—	—	—	—	—	—	76	92 +
3	96	38	—	—	—	—	—	—	—	—
4	97	35	—	—	—	—	—	—	—	—
5	103	38	49	19	68	31	64	55	82	100
6	98	38	46	19	65	31	—	57	83	64 +

Whartonia prima SCHLUGER.

Whartonia prima SCHLUGER, in SCHLUGER et al., 1959, Zool. Zh. 38: 418. From *Hipposideros fulvus* and *H. armiger*, Vietnam.

Whartonia iwasakii MIYAZAKI, KAMO and KAWASHIMA, 1959, Kyushu J. med. Sci., 10: 94. New synonymy. From *Hipposideros purpis*, Ryukyu Is.

Whartonia mapaensis CHEN and HSU, 1959, Acta zool. sin., 11: 550 and 557. New synonymy. From *Hipposideros poutensis*, Kwangtung.

The above synonymy is, I believe, evident from the original descriptions.

Material examined. — Six larvae from bat, Stop 43 No. 136, in caves near aerodrome at Xieng Khouang, Laos, 4. VIII. 1960, R. E. LEECH; five larvae from the body of bats, Stop 44 Nos. 171—190, in cave near aerodrome at Xieng Khouang, 20. VIII. 1960, R. E. L.; three larvae from *Hipposideros armiger debilis*, Chantabun (variously spelt Chantaboun, Chantaburi, Chanthaburi, Chanda Buri on the maps I have consulted), Thailand, 21. IV. 1937, H. C. DEIGNAN; one larva from *Hipposideros* sp., Batu Caves, Selangor, Malaya, 18. II. 1953; one larva from *Rhinolophus* sp., Bundu Tuhan, Mt. Kinabalu, British North Borneo, 26. V. 1952, U.S. Army and Colonial Office Medical Research Units.

Notes. — The second Laotian series was accompanied by eight specimens of *Whartonia brevis* n. sp., q.v., and four specimens near *Trombicula giga* SCHLUGER. The Malayan specimen was accompanied by four *W. caobangensis* SCHLUGER q.v. and two *Trombicula revelae* AUDY.

In the table of standard data below, the first five specimens are from Laos, freshly mounted into Hoyer's (the fourth specimen has two AL's

on one side). The sixth and seventh specimens are old mounts in PVA from Malaya and Borneo, respectively.

Standard data in micra of larval scutum of *W. prima* SCHLUGER.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL
—	—	48	48	19	67	32	106	77	106
136	138	48	51	16	67	35	112	82	117
—	—	—	—	—	—	—	114	82	109
125/130	136	48	51	16	67	29	—	67	112
—	—	—	—	—	—	—	—	—	114
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133	144	53	53	21	74	40	88	85	98
125	130	51	59	19	78	48	114	—	117

Whartonia penthetor WOMERSLEY.

Whartonia sp. "PEN" AUDY, 1956, Bull. Raffles Mus., 28: 100.

Whartonia penthetor WOMERSLEY, 1957, Stud. Inst. med. Res., Malaya, 28: 103. From *Penthetor lucasi* (Pteropodidae), Malaya.

Material examined. — The type series, and very numerous specimens (one with 3 AM setae) from the type host, *Penthetor lucasi*, Ulu Langat, Selangor, Malaya, 27. VII. 1954; Bukit Lagong, Selangor, 16. IX. 1953; Kepong, Selangor, 23. I. 1950, 27. II. 1950, 20. X. 1954; fifteen larvae (apparently mislabelled), *Hylomys* (Erinaceidae), Tenompok, Mt. Kinabalu, British North Borneo, 19. VIII. 1953. Also 22 larvae from *Eonycteris spelaea* (Pteropodidae), Tjiampea Caves, near Bogor, Java, 24. IV. 1961, Lie Kian Joe.

Notes. — From the standard data below (the upper series from Malayan specimens freshly mounted into PVA from spirit, the lower from Javan specimens freshly mounted into Hoyer's from spirit), it will be seen that PW is often slightly less than AW. Additional paired values are:

AW	128,	130,	130,	130,	133,	133,	133,	138,	138,	141
PW	125,	120,	125,	128,	130,	133,	136,	133,	136,	133.

Standard data in micra of larval scutum of *W. penthetor* WOMERSLEY.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
135	136	48	54	17	71	41	81	70	85	—
142	136	50	54	18	72	31	85	72	84	—
136	135	44	58	15	73	32	81	69	84	—
129	136	48	54	17	71	36	79	65	82	114
135	133	46	56	15	71	35	84	66	86	—
139	138	52	55	16	71	37	85	69	89	—
139	136	44	56	16	72	37	86	74	89	—
136	138	44	51	16	67	30	75	—	82	—

139	136	44	56	15	71	36	85	72	85	114
138	136	45	53	19	72	35	88	77	90	—
146	144	48	—	—	—	29	—	—	—	—
141	133	48	53	16	69	36	85	74	82	—
138	136	45	51	16	67	35	—	77	90	—
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140	143	48	55	16	71	37	80	69	93	—
140	140	51	48	18	66	37	80	60	89	—
153	160	49	53	18	71	37	91	66	91	—
145	151	49	53	17	70	38	83	66	88	—
146	144	47	47	20	67	35	80	69	89	—
145	143	48	53	20	73	37	80	56	87	—

Whartonia longispina (RADFORD) n. comb.

Brennanella longispina RADFORD, 1954 a (Nov.), Parasitology, 44: 268. Nomen nudum.
Brennanella longispina RADFORD, 1954 b (Dec.), Fieldiana (Zool.), 34: 303. From *Rhinolophus clivosus acrotis*, Yemen.

Whartonia brennani HIREGAUDAR and BAL.

Whartonia brennani HIREGAUDAR and BAL, 1956 a, Agra Univ. J. Res. (Sci.), 5: 125.
 From *Hipposideros bicolor fulvus*, Bombay.

Whartonia indica HIREGAUDAR and BAL.

Whartonia indica HIREGAUDAR and BAL, 1956 b, Ind. J. Ent., 18: 253. From *Rhinolophus rouxi*, Bombay.

Whartonia brevis n. sp. Figs. 10—15.

Type material. — Holotype larva and seven paratype larvae from the body of bats, Stop 44 Nos. 171—190, in caves near the aerodrome at Xieng Khouang, Laos, 20. VIII. 1960, R. E. LEECH. In Hoyer's medium. Holotype in U.S. National Museum, Washington; paratypes in Bishop Museum, Honolulu; British Museum (Natural History), London; Rocky Mountain Laboratory, Hamilton; and both my laboratories.

Diagnosis: A useful diagnostic character for this species is the ratio PW/AP. In all the known Oriental species, this ratio is within the range 2 to 5. In *W. brevis* n. sp., the ratio is 10.

Larva. — A large species, with idiosoma subcircular in outline when engorged, about $759 \times 737 \mu$ in size.

Body setation. — All setae finely tapering, and weakly barbed. DS arranged about 4.18.11.11.9.2. Humeral setae duplicated, 76μ long; DS 67μ long; CS 58μ long. Sternal complex represented by a transverse row of about 10 setae in front of coxae III. Ventral setae about 58 in number, those near anus 58μ long.

Scutum extremely shallow; AL and PL very close together, resulting in AW and PW being very large in relation to AP and SD. Anterior margin concave, rectilinear medially, giving, in combination with the strongly biconvex posterior margin, the appearance of the letter "W". All scutal setae distinctly barbed; $PL > AM > AL$. Sensillary bases well behind line of PL's, set fairly wide apart. Sensillae filamentous, very fine distally. Eyes absent.

Gnathosoma. — Galeal setae nude. Chelicerae lacking in all specimens. In addition to the tarsala, the palpal formula is n.n. Bnn. B + 6 b. Subterminala absent. The dorsal seta on the tibia is heavily barbed. Palpal claw probably with three adpressed prongs.

Legs slender, all 6-segmented. Coxal setal formula 2.1.1. Tarsus III with about 16 branched setae. 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 and microgenuala. Tibia III with tibiala; genu III with genuala.

Standard data in micra of larval scutum of *W. brevis* n. sp.

AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	Sens
—	—	—	—	—	—	10	—	40	80	—
—	—	—	—	—	—	—	—	43	85	—
—	—	—	—	—	—	—	56	43	—	114
—	—	—	21	11	32	11	53	—	72	104
—	—	—	21	10	31	11	—	—	72	106
—	—	—	20	10	30	10	48	—	74	—
101	112	50	20	11	31	11	—	—	74	—

Notes. — These larvae were accompanied by five specimens of *Whartonia prima* SCHLUGER q.v. These latter were elongate-oval in outline, and could easily be separated by the naked eye from the quite circular specimens of *W. brevis*.

SUMMARY.

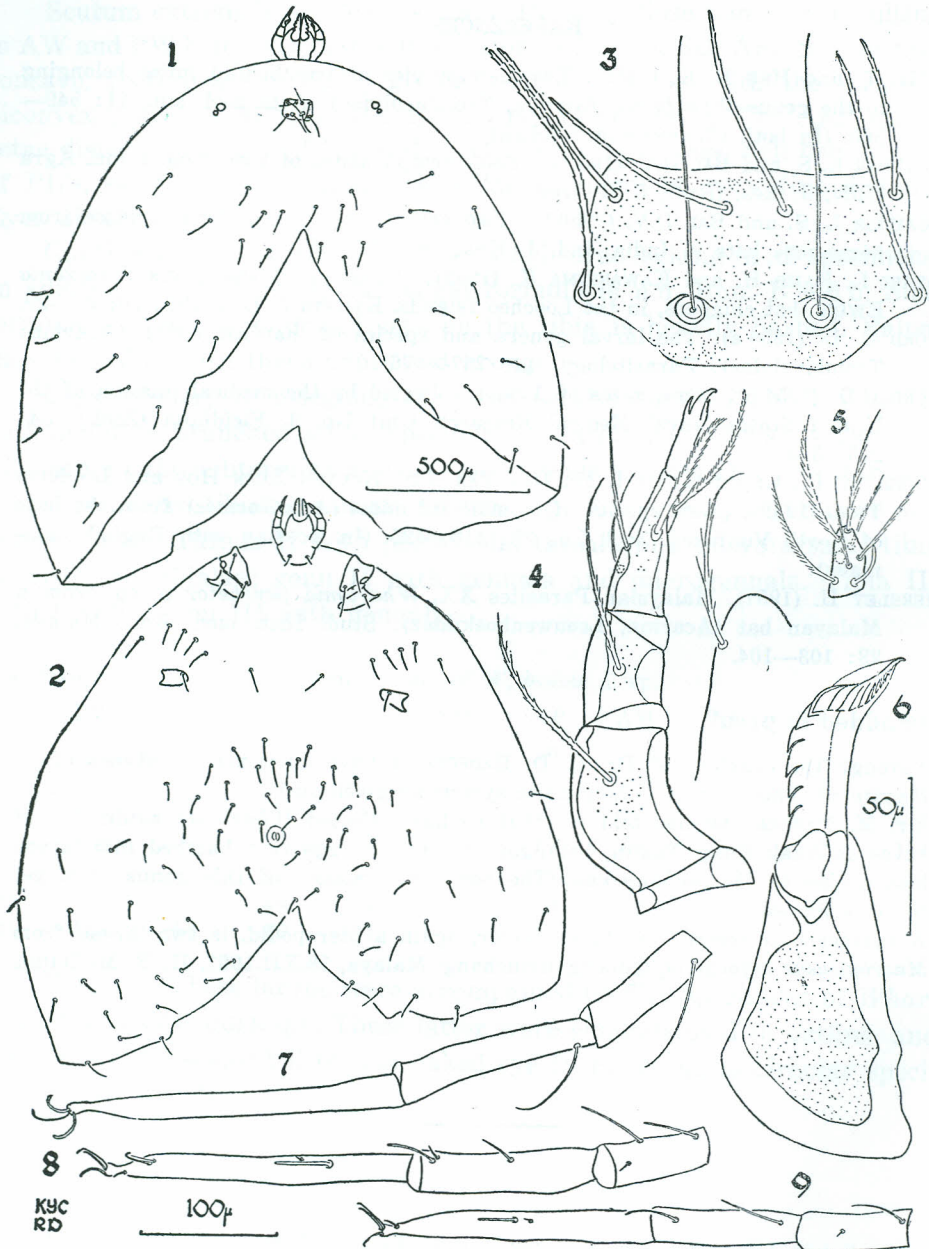
The Asian species of *Whartonia* are listed, and new host and distributional records given for the S.E. Asian species. *W. brevis* n. sp. is described from Laotian bats. The following new synonymy is established: *Brennanella* RADFORD, 1954 b = *Whartonia* EWING, 1944; *W. recurvata* CHEN and HSU, 1959 = *W. caobangensis* SCHLUGER, in SCHLUGER et al., 1959; and *W. iwasakii* MIYAZAKI, KAMO and KAWASHIMA, 1959 = *W. mapaensis* CHEN and HSU, 1959 = *W. prima* SCHLUGER, in SCHLUGER et al., 1959.

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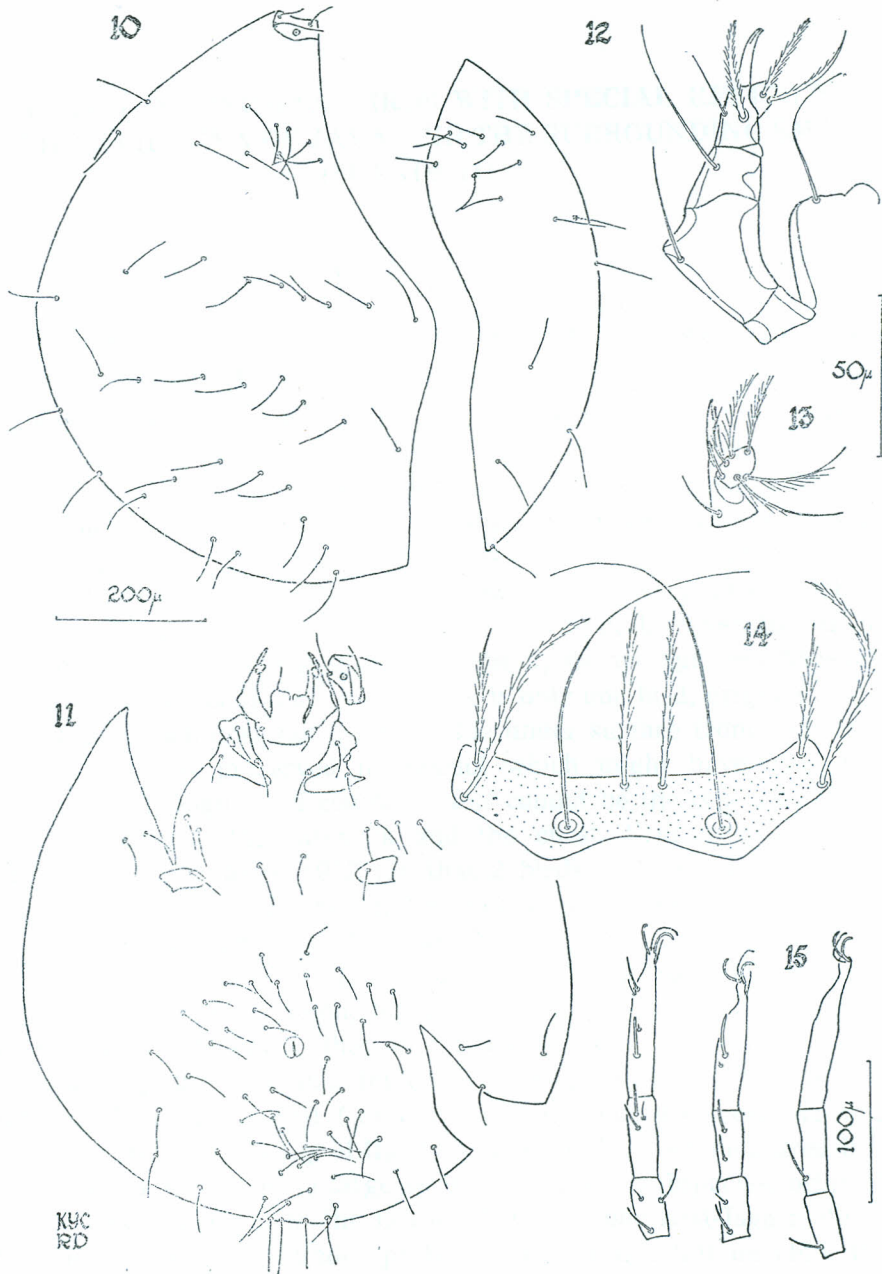
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Notes added in proof.

- (1) Through the courtesy of Dr. C. D. RADFORD, I have examined paratypes of *B. longispina*. These confirm the generic synonymy given on p. 1.
 - (2) Mr. M. NADCHATRAM has told me that he has collected *Whartonia* adults in bat caves at Anak Bukit Takun, Selangor, which laid eggs that hatched into larvae identifiable as *W. caobangensis*. The post-larval stages of this genus have yet to be described.
 - (3) A further host record for *W. penthetor*, again a pteropodid, is two larvae from *Macroglossus lagochilus*, Gunong Brinchang, Malaya, 13.XII.1961, H. E. McCLURE.
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Figs. 1—9. *Whartonia salifa* SCHLUGER. — 1, Dorsum of body; 2, Venter of body; 3, Scutum; 4, Dorsal view of palp, with galeal seta; 5, Ventral view of palpal tarsus; 6, External view of chelicera; 7, 8 and 9, Specialized setation of legs III, I and II, respectively.



Figs. 10—15. *Whartonia brevis* n. sp. — 10, Dorsum of body; 11, Venter of body; 12, Dorsal view of palp, with galeal seta; 13, Ventral view of palpal tibiotarsus; 14, Scutum; 15, Specialized setation of legs I, II and III, from left to right.