

Six new species of *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) from South-East Asia

R. Haitlinger

Haitlinger, R., 1999. Six new species of *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) from South-East Asia. *Misc. Zool.*, 22.2: 51-68.

Six new species of Leptus Latreille, 1796 (Acari, Prostigmata, Erythraeidae) from South-East Asia.— Six new larval *Leptus* are described: *L. ilzae* n. sp. and *L. augusti* n. sp. both from *Hypomeces equamosus* Herbst (Curculionidae), *L. holgeri* n. sp. from undetermined Orthoptera, all from Laos, *L. agenori* n. sp. from plants from Malaysia, *L. astrubali* n. sp. and *L. addari* n. sp., both from plants from Thailand. Key for *Leptus* larvae of Asia and New Guinea is given.

Key words: Acari, Erythraeidae, *Leptus*, South-East Asia, New species.

(*Rebut*: 31 V 99; *Acceptació condicional*: 23 IX 99; *Acc. definitiva*: 25 XI 99)

Ryszard Haitlinger, Dept. of Zoology, Agricultural Academy, 50-205 Wrocław, Cybulskiego 20, Polska (Poland).

Introduction

In Asia the following 31 species of *Leptus* are known: *L. asahinai* Kawashima, *L. saigusai* Kawashima, *L. japonicus* Kawashima, *L. gifuensis* Kawashima, *L. kyushuensis* Ishii, *L. kuroshimaensis* Kato & Kitahara all from Japan, *L. hidakai* Kawashima from Japan and Singapore, *L. calidus* Shiba, *L. hozumii* Shiba, *L. cameronensis* Shiba both from Malaysia, *L. siemsseni* Oudemans, *L. zhutingensis* Zheng, *L. hupingshanicus* Zheng, *L. shimenensis* Zheng, *L. brachypodos* Zheng, *L. dolichopodos* Zheng, *L. sulciscutus* Zheng all from China, *L. gagrellae* Oudemans, *L. managarus* Haitlinger, *L. admeti* Haitlinger, *L. terebrans* Vitzthum all from Indonesia, *L. guus* Haitlinger from Turkmenia, *L. auliacus* Haitlinger from Kazakhstan, *L. batoricus* Haitlinger from Mongolia, *L. alkmenae* Haitlinger from India, *L. phuketicus* Southcott from Thailand, *L. tetrigiis* Southcott from Sri Lanka, *L. fathipeuri* Haitlinger & Saboori from Iran, *L. horiacus* Haitlinger from Syria, *L. tammuzi* Haitlinger from Syria, Israel and Saudi Arabia and *L. zhangii* Saboori & Atamehr from Iran (OUDEMANS, 1912; ISHII, 1953; KATO & KITAHARA, 1958; KAWASHIMA, 1958; SHIBA, 1976; SOUTHCOTT, 1988, 1994; HAITLINGER, 1990, 1994, 1998; HAITLINGER & SABOORI, 1996; ZHENG, 1996a, 1996b; BAKER & SELDEN, 1997; SABOORI & ATAMEHR, 1999).

In this paper a further six new species from Laos, Thailand and Malaysia are described. A total of 22 species (including those from China) are now known from South-East Asia.

Material and methods

The new species were obtained from plants, excluding *L. ilzae* and *L. augusti* obtained from *H. equamosus* (Curculionidae) and *L. holgeri* obtained from undetermined Orthoptera. The mites were mounted on slides in Berlese fluid. All specimens were collected by R. Haitlinger in April 1997. The terminology and abbreviations are adapted from WELBOURN & YOUNG (1987) and SOUTHCOTT (1988) with some modifications. Measurements are expressed in micrometers (μm). Holotypes are deposited in the Museum of Natural History, Wroclaw University (MNHWU).

Abbreviations used in the text are: IL. Length of idiosoma; IW. Width of idiosoma; AW. Distance between centres of bases of AL scutalae; PW. Distance between centres of bases of PL scutalae; AA. Distance between centres of bases of anterior sensillary setae; SB. Distance between centres of bases of posterior sensillary setae; ISD. Intersensillary distance between levels of centres of anterior and posterior sensillary setae of scutum; L. Length of scutum; W. Width of scutum; AP. Distance between centres of bases of AL and PL scutalae of the same side; AL. Length of anterolateral scutala; PL. Length of posterolateral scutala; AM. Length of anterior sensillary seta of dorsal scutum; S. Length of posterior sensillary seta of dorsal scutum; DS. Length of all dorsal idiosomal setae; GL. Length of gnathosoma measured between bases of palpcoxae and tip of chelicerae; pgl. Length of palpgenu; Oc. Diameter of eyes; 1a. Length of seta between coxae I; 2a. Length of setae between coxae II; PaScFed. Length of seta on dorsal surface of palpfemur; PaScGed. Length of seta on dorsal surface of palpgenu; 1b. Length of seta on coxa I; 2b. Length of seta on coxa II; 3b. Length of seta on coxa III; Ta. Length of tarsus; Ti. Length of tibia; Ge. Length of genu; Tf. Length of telofemur; Bf. Length of basifemur; Tr. Length of trochanter; Cx. Length of coxa. ζ . Eupathidia on tarsi; ω . Solenidia on tarsi; ϕ . Solenidia on tibiae; δ . solenidia on genuae; κ . Microseta on tibiae and genuae; ϵ . Femulus on tarsi.

Results

Fam. Erythraeidae Robineau-Desvoidy, 1828
Gen. *Leptus* Latreille, 1796

Leptus ilzae n. sp. (figs. 1-8)

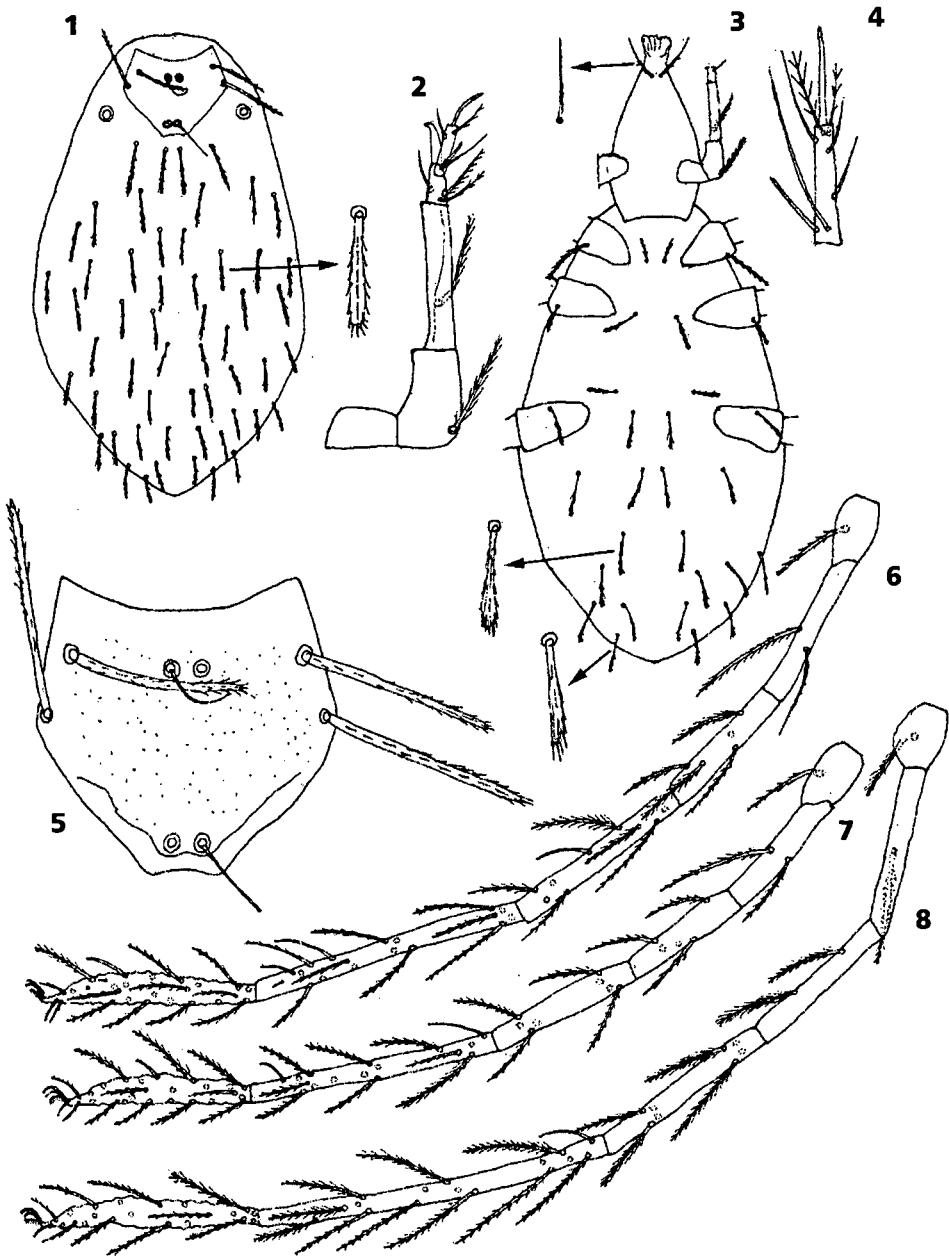
Examined material

Holotype larva, Vangvieng, Laos, 8 IV 1997, from *Hypomeces equamosus* Herbst (Curculionidae, Tanymecinae), from legs; 1 L paratype, the same data as in holotype; leg. R. Haitlinger. Holotype deposited in MNHWU.

Description

Larva

Dorsal scutum with anterior border concave, anterolateral borders rather long, almost



Figs. 1-8. *Leptus ilzae* n. sp.: 1. Idiosoma, dorsal view; 2. Palp, ventral view; 3. Idiosoma, ventral view; 4. Palptarsus; 5. Scutum; 6. Leg I, trochanter-tarsus; 7. Leg II, trochanter-tarsus; 8. Leg III, trochanter-tarsus.

Leptus ilzae sp. n.: 1. Idiosoma, vista dorsal; 2. Palpo, vista ventral; 3. Idiosoma, vista ventral; 4. Palpotarso; 5. Scutum; 6. Pata I, trocànter-tarso; 7. Pata II, trocànter-tarso; 8. Pata III, trocànter-tarso.

straight, posterolateral borders slightly concave. Posterior pole of scutum at posterior sensillae sockets with line; scutum punctate. Anterior sensillae sockets somewhat below level of anteroscutalae bases. Sensillae partly broken, with setules on distal half. Scutalae AL and PL each with many small setules; AL < PL (fig. 5). Dorsum of idiosoma with ~54 setae similar to scutalae, 54-76 μm long (fig. 1). Diameter of eyes 14-16.

Ventral surface of idiosoma: sternalae 1a and 2a rather short and setulose. Between coxae II and III four setae; medial setae longer than lateral. Behind coxae III 16 slightly setulose setae. Coxalae I-III all setulose; I > III > II (fig. 3).

Leg lengths (with coxae, without claws)
I 1024 holotype, 988 paratype; II 898, 878;
III 1098, 1060. $l_p = 3020, 2926$.

Leg setal formula

Leg I. Ta-1 ω , 1 ϵ , 1 ζ , ~23B; Ti-2 ϕ , 1 κ , 15B; Ge-1 δ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 6).

Leg II. Ta-1 ω , 1 ζ , ~21B; Ti-2 ϕ , 14B; Ge-8B; Tf-5B; Bf-2B; Tr-1B (fig. 7).

Leg III. Ta-1 ζ , 21B; Ti-1 δ , 15B; Ge-8B, Tf-2B, Bf-1B, Tr-1B (fig. 8).

Length of ω I 40 μm holotype; ϕ I (distal) 32 μm holotype, 24 μm paratype; ϕ I (proximal) 46, 48; δ I 44, 42.

Gnathosoma (GL measured between basis capituli and tip of hypostomal lip) long with slightly barbed hypostomalae (fig. 3). Palpfemorala and palpgenuala partly broken, each with setules. Palptarsus with 8 setae (1 ω , 2B, 5N), two with relatively long setules (fig. 4). Palpal setal formula 0,1,1,3,8.

Metric data are given in table 1.

Remarks

The new species is especially similar to *L. kyushuensis* Ishii. It can be distinguished from the latter by the presence of κ on tarsus I, lack of the wide branched terminal to the posterior claw, shape of scutum, slightly barbed hypostomalae and number of ventral setae (together with 1a, 2a and 3a) 24-27 to 33.

Etymology

The name of the species has been derived from the name Ilza.

Leptus augusti n. sp. (figs. 9-16)

Examined material

Holotype larva, Vangvieng, Laos, 8 IV 1997, from *Hypomeces equamosus* Herbst (Curculionidae, Tanymecinae); 1 L paratype, the same data as in holotype; leg. R. Haitlinger. MNHWU.

Description

Larva

Dorsal scutum with concave anterior border; posterolateral borders concave in their posterior parts. Whole scutum punctate. Anterior sensillae sockets on level between anterior and posterior bases of scutalae. All scutalae with setules on 2/3 their distal lengths. Sockets of posterior sensillae surrounding cuticular line. Sensillae with setules on distal part (fig. 12). Dorsum with ~50 barbed setae, 48-62 μm long (fig. 9). Diameter of eyes 16-18 μm .

Ventral surface of idiosoma: sternalae 1a and 2a barbed, subequal in length. Between coxae II-III four setae, the first pair about half the length of the second pair. Behind coxae III ~19 barbed setae. Coxalae I-III barbed, coxa I 68-76 μm long (fig. 11).

Leg lengths. I 882 holotype, 864 paratype; II 812, 782; III 974, 948. $l_p = 2668, 2594$.

Leg setal formula:

Leg I. Ta-1 ω , 1 ζ , ~24B; Ti-2 ϕ , 14B; Ge-1 δ , 1 κ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 14)

Leg II. 1 ω , 1 ζ , ~20B; Ti-2 ϕ , 14B; Ge-1 κ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 15).

Leg III. Ta-1 ζ , ~20B; Ti-1 ϕ , 15B; Ge-8B; Tf-5B; Bf-1B; Tr-1B (fig. 16).

Length of ω I 26 μm holotype, 28 μm paratype; ϕ I (distal) 20, 24; ϕ I (proximal) 38, 44; δ I 34, 34.

Gnathosoma long, 210 μm in holotype, 202 μm in paratype, with nude hypostomalae. Palpgenuala and palpfemorala distinctly barbed (palpfemorala broken) (fig. 13). Palptarsus with 7 setae (with solenidion); two bearing some setules (fig. 10). Palpal setal formula: 0,1,1,3,7.

Metric data are given in table 1.

Remarks

L. augusti n. sp. is similar to *L. kyushuensis* and *L. ilzae* n. sp. It differs from both species in

Table 1. Metric data for larvae of: 1. *Leptus ilzae* n. sp.; 2. *L. augusti* n. sp.: H. Holotype; P. Paratype. (All measurements are given in μm .) (For abbreviations see Material and methods.)

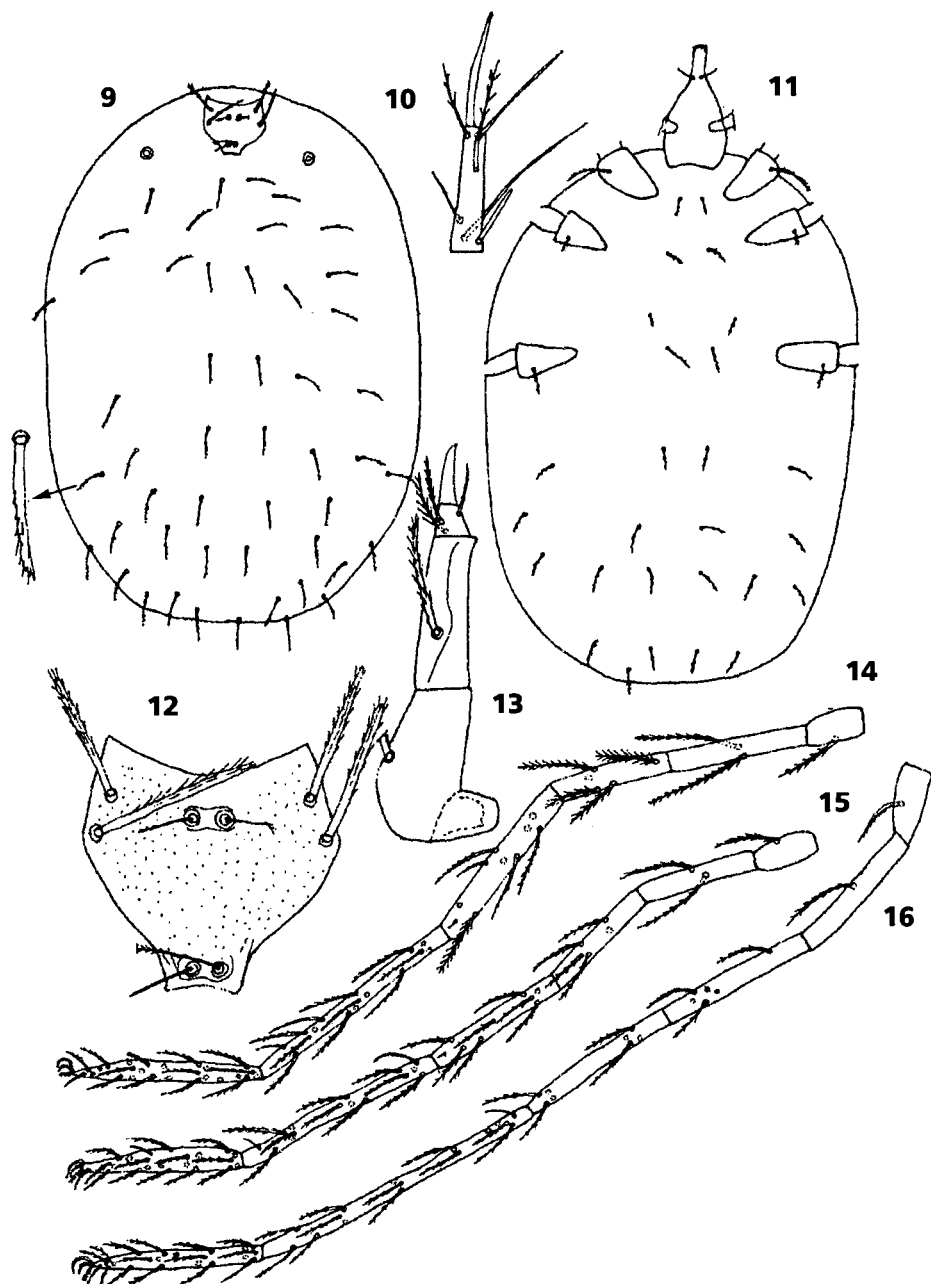
Valores métricos de las larvas de: 1. *Leptus ilzae* sp. n.; 2. *L. augusti* sp. n.: H. Holotipo; P. Paratipo. (Todas las medidas en μm .) (Para las abreviaturas ver Material y métodos.)

	1		2			1		2	
	H	P	H	P		H	P	H	P
IL	603	926	926	1111	Tal	184	172	162	162
IW	368	654	678	~825	TII	246	240	206	200
AW	102	96	82	82	Gel	170	166	148	150
PW	122	120	98	86	TfI	122	122	100	106
AA	14	16	14	13	BfI	140	144	124	114
SB	13	16	14	12	TrI	68	64	56	52
ISD	74	78	62	62	CxI	94	80	86	80
L	136	118	114	108	TalI	154	154	140	136
W	134	124	104	106	TIlI	228	212	184	184
AP	26	28	16	16	Gell	136	136	124	126
AL	88	82	62	56	TfII	108	112	104	96
PL	92	-	68	68	BfII	112	108	108	100
AM	-	-	-	32	TrII	64	60	60	54
S	-	-	-	-	CxII	96	96	92	86
DS	60-70	54-76	52-60	48-62	TalII	184	180	160	162
GL	240	244	210	202	TIIII	316	290	264	250
pg1	80	80	66	64	GellI	156	152	142	142
Oc	16	14	18	16	TfIII	140	136	132	126
1a	-	50	42	34	BfIII	146	146	124	120
2a	50	50	42	42	TrIII	62	62	60	56
PaScFed	-	70	-	64	CxIII	94	94	92	92
PaScGed	-	-	56	48	TII/AW	2.41	2.50	2.51	2.44
1b	82	86	68	76	AW/AL	1.16	1.17	1.32	1.46
2b	42	34	34	36	L/W	1.01	0.95	1.10	1.02
3b	60	52	46	50	AL/PL	0.96	-	0.91	0.82
					AW/ISD	1.38	1.23	1.32	1.32

shorter AL (56-62 to 81 and 82-88, respectively), length of leg I (864-882 to 990 and 988-1024, respectively) and other characteristics.

Etymology

The name of the species has been derived from the name August.



Figs. 9-16. *Leptus augusti* n. sp.: 9. Idiosoma, dorsal view; 10. Palptarsus; 11. Idiosoma, ventral view; 12. Scutum; 13. Palp, dorsal view; 14. Leg I, trochanter-tarsus; 15. Leg II, trochanter-tarsus; 16. Leg III, trochanter-tarsus.

Leptus augusti sp. n.: 9. Idiosoma, vista dorsal; 10. Palpotarso; 11. Idiosoma, vista ventral; 12. Scutum; 13. Palpo, vista dorsal; 14. Pata I, trocánter-tarso; 15. Pata II, trocánter-tarso; 16. Pata III, trocánter-tarso.

Leptus holgeri n. sp. (figs. 17-24)

Examined material

Holotype larva, Vangvieng, Laos, 8 IV 1997, from undetermined Orthoptera; 12 L paratypes, the same data as in holotype; leg. R. Haitlinger. MNHWU.

Description

Larva

Dorsal scutum with anterior border concave; posterior border short also slightly concave. Anterior sensillae sockets somewhat below level of anteroscutalae bases. Anterior sensillae and posterior sensillae with some setules at the top. All scutalae with setules on 2/3 their distal length. PL longer or equal in length to AL. Sockets of posterior sensillae surrounding cuticular line. Whole scutum punctate (fig. 21). Dorsum with ~45 weakly barbed setae, 50-70 μm long (fig. 17). Diameter of eyes 6-14 μm .

Ventral surface of idiosoma: sternalae 1a and 2a setulose, subequal in length. Between coxae II and III four setae, the first pair distinctly shorter. Behind coxae III ~18 barbed setae. Coxalae I-III barbed, coxala I 64-80 μm long (fig. 18).

Leg lengths: I-768 holotype, 726-802 paratypes; II-684, 646-720; III-826, 792-860. $l_p = 2278, 2164-2382$.

Leg setal formula

Leg I. Ta-1 ω , 1 ζ , ~22B; Ti-2 ϕ , 15B; Ge-1 δ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 22).

Leg II. Ta-1 ω , 1 ζ , ~18B; Ti-2 ϕ , 14B; Ge-8B; Tf-5B; Bf-2B; Tr-1B (fig. 23).

Leg III. Ta- ~23B; Ti-1 δ , 15B; Ge-8B; Tf-5B; Bf-1B; Tr-1B (fig. 24).

Length of ω I 26 holotype, 24-28 paratypes; ϕ I (distal) 20, 18-24; ϕ I (proximal) 38, 28-38; δ I 32, 28-40.

Gnathosoma long, with slightly barbed hypostomatae. Palp-genuatae and palpfemoratae barbed; palpfemoratae longer than palp-genuatae (fig. 20). Palptarsus with 8 setae; four of them slightly barbed (fig. 19). Palpal setal formula: 0,1,1,3,8.

Metric data are given in table 2.

Remarks

L. holgeri n. sp. belongs to the group species bearing only one palp-genuata and with

length of Ti I between 140-172 μm . *L. meloidarum* Beron, *L. agenori* n. sp. and *L. addari* n. sp belong to this group in Asia. It differs from *L. meloidarum* in shorter AW (88-96 to 100-110), ISD (70-78 to 64-72), longer AP (24-30 to 16-24) and Tal (146-160 to 122-134); from *L. agenori* in longer PW (106-118 to 100-106), Tal (146-160 to 138-140) and shape of the scutum; from *L. addari* in longer Tal (146-160 to 114) and AW (88-96 to 62).

Etymology

The name of the species has been derived from the name Holger.

Leptus agenori n. sp. (figs. 25-31)

Examined material

Holotype larva, Kota Bahru, Malaysia, 21 IV 1997, from wings of undetermined Orthoptera; 1 L paratype, Nopparattara n. Krabi, Thailand, 23 IV 1997, from wings of undetermined Orthoptera; leg. R. Haitlinger; MNHWU.

Description

Larva

Dorsal scutum with concave anterior border, anterolateral and posterolateral borders slightly convex. At posterior sensillae sockets short cuticular lines laterally placed. Anterior sensillae sockets almost on level of anteroscutalae bases. Sensillae damaged in holotype; anterior and posterior sensillae with setules on distal half in paratype. Whole scutum punctate. Scutalae AL and PL with setules on distal half. AL > PL or are equal (fig. 28). Dorsum with ~43 setae, 44-64 μm long, slightly barbed on distal half (fig. 25). Diameter of eyes 16 μm .

Ventral surface of idiosoma: sternalae 1a and 2a well setulose, 46 μm holotype, 40 μm paratype and 52, 42, respectively. Four setae between coxae II and III; the first pair is shorter. Behind coxae III ~21 setae, slightly setulose on distal half. Coxalae I-III all setulose (fig. 27).

Leg lengths: I-686 holotype, 696 paratype; II -616, -616; III-754, 758. $l_p = 2056$ holotype, 2070 paratype.

Leg setal formula:

Leg I. Ta-1 ω , 1 ζ , 18B; Ti-2 ϕ , 1 κ , 14B; Ge-1 δ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 29).

Table 2. Metric data for larvae of: 1. *L. holgeri* n. sp.; 2. *L. agenori* n. sp. (All measurements are given in μm .) (For abbreviations see Material and methods.)
 Valores métricos de las larvas de: 1. *L. holgeri* sp. n.; 2. *L. agenori* sp. n. (Todas las medidas en μm .) (Para las abreviaturas ver Material y métodos.)

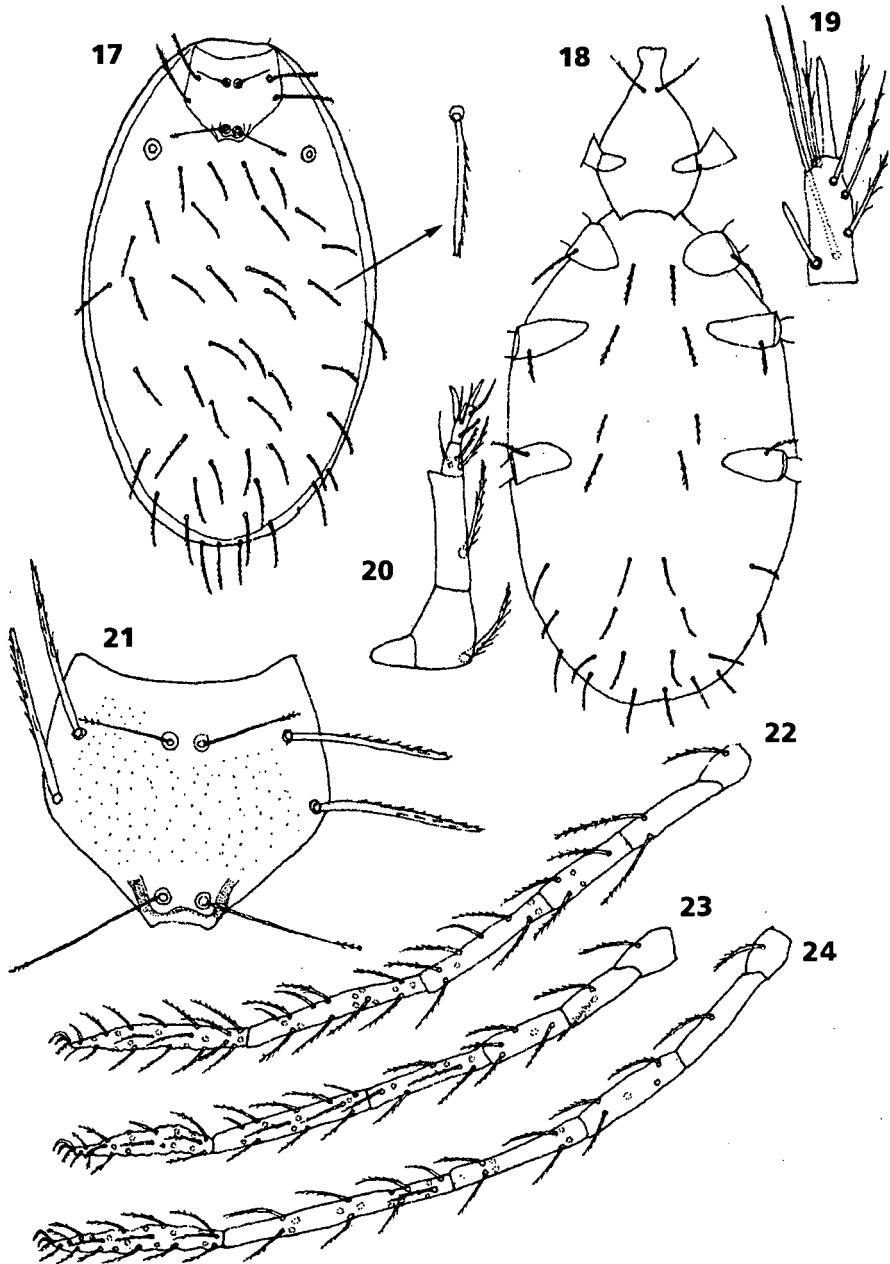
	1		2			1		2	
	H	P	H	P		H	P	H	P
iL	685	508-933	489	349	Tal	152	146-160	138	140
IW	393	213-578	296	247	Til	166	154-172	144	152
AW	96	88-96	90	82	Gel	134	122-140	114	122
PW	116	106-118	106	100	Tfl	84	80-86	76	80
AA	12	12-14	12	12	Bfl	102	86-104	86	86
SB	15	14-18	14	16	Trl	54	46-64	52	54
ISD	74	70-78	70	70	Cxl	76	70-88	76	62
L	128	118-130	116	122	Tall	132	122-136	122	118
W	128	120-130	114	110	Till	142	134-146	124	130
AP	26	24-30	?30	?16	Gell	106	102-116	92	98
AL	68	64-74	74	70	Tfil	82	74-86	70	68
PL	72	70-76	70	70	Bfil	86	76-90	68	68
AM	46	48-56	-	48	Tril	52	50-60	54	52
S	74	70-80	76	64	Cxll	84	78-90	86	82
DS	50-64	50-70	50-64	44-56	Talll	146	142-156	136	134
GL	230	214-230	208	210	Tilll	208	202-220	186	192
pgl	64	62-70	62	64	Gelll	122	112-124	110	110
Oc	12	6-14	16	16	Tflll	100	96-108	90	96
1a	50	40-54	46	40	Bflll	106	100-106	94	88
2a	52	46-54	52	42	Trlll	56	52-60	56	54
PaScFe	-	52-64	-	62	Cxlll	88	76-92	82	84
PaScGe	58	60-66	-	54	L/W	1.00	0.94-1.05	1.02	1.11
1b	72	64-80	74	60	Til/AW	1.73	1.67-1.80	1.60	1.85
2b	38	36-42	36	34	AW/AL	1.46	1.24-1.45	1.22	1.17
3b	58	54-62	62	46	AL/PL	0.92	0.86-1.00	1.06	1.00
					AW/ISD	1.30	1.19-1.33	1.28	1.17

Leg II. Ta-1 ω , 1 ζ , ~17B; Ti-2 ϕ , 14B; Ge-8B; Tf-5B; Bf-2B; Tr-1B (fig. 30).

Leg III. Ta-17B; Ti-1 ϕ , 15B; Ge-8B; Tf-5B; Bf-1B; Tr-1B (fig. 31).

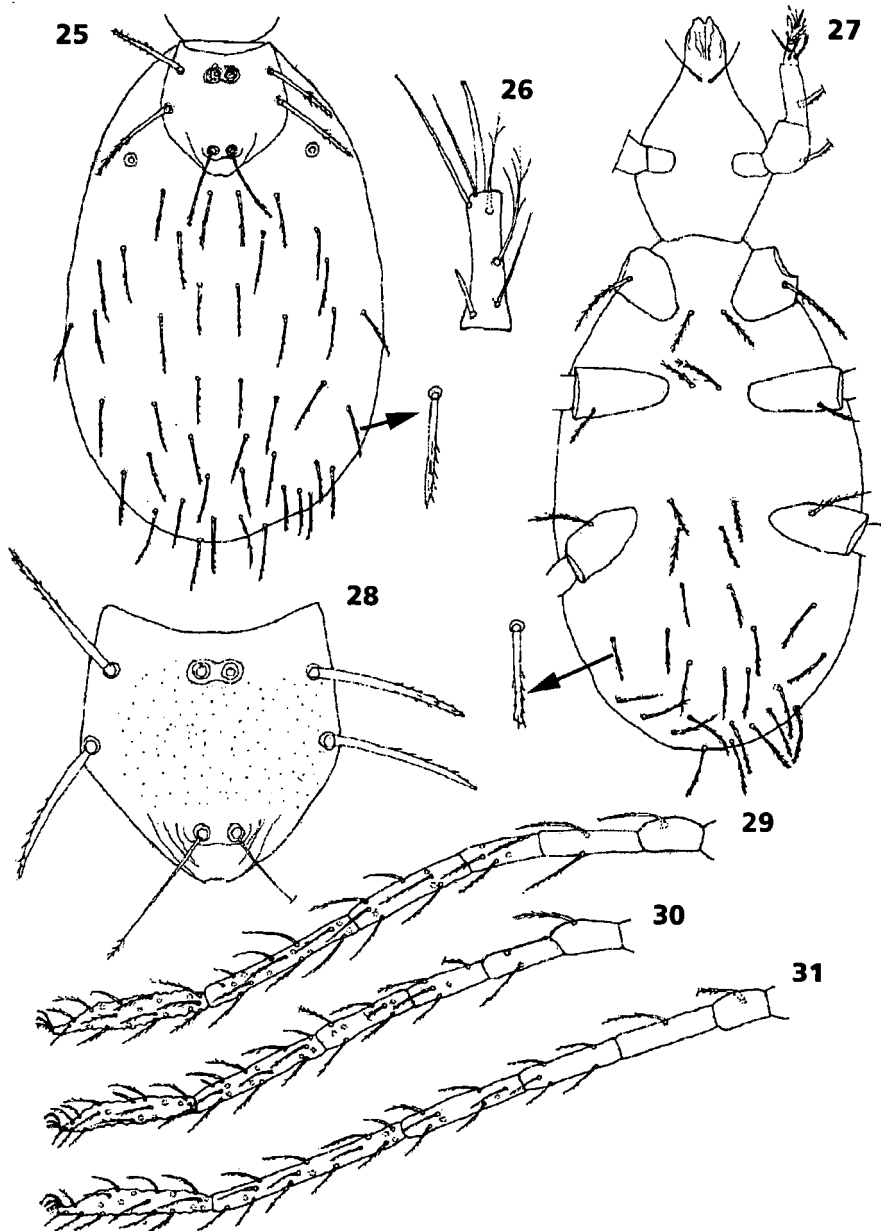
Length of ω 22 holotype, 25 paratype; ϕ l (distal) 18, 22; ϕ l (proximal) ?32, ?36; δ l 32, 36.

Gnathosoma long, with nude hypostomalae (fig. 27). Palpfemorale and palpgenuale



Figs. 17-24. *Leptus holgeri* n. sp.: 17. Idiosoma, dorsal view; 18. Idiosoma, ventral view; 19. Palptarsus; 20. Palp, ventral view; 21. Scutum; 22. Leg I, trochanter-tarsus; 23. Leg II, trochanter-tarsus; 24. Leg III, trochanter-tarsus.

Leptus holgeri sp. n.: 17. Idiosoma, vista dorsal; 18. Idiosoma, vista ventral; 19. Palpotarso; 20. Palpo, vista ventral; 21. Scutum; 22. Pata I, trocànter-tarso; 23. Pata II, trocànter-tarso; 24. Pata III, trocànter-tarso.



Figs. 25-31. *Leptus agenori* n. sp.: 25. Idiosoma, dorsal view; 26. Palptarsus; 27. Idiosoma, ventral view; 28. Scutum; 29. Leg I, trochanter-tarsus; 30. Leg II, trochanter-tarsus; 31. Leg III, trochanter-tarsus.

Leptus agenori sp. n.: 25. Idiosoma, vista dorsal; 26. Palpotarso; 27. Idiosoma, vista ventral; 28. Scutum; 29. Pata I, trocánter-tarso; 30. Pata II, trocánter-tarso; 31. Pata III, trocánter-tarso.

damaged (in holotype); palptarsus with 7 setae; one of them with two short setules and the second with some relatively long setules (1 ω , 2B, 4N) (fig. 26). Palpal setal formula 0,1,1,3,7.

Metric data are given in table 2.

Remarks

L. agenori belongs to the group species mentioned in remarks to *L. holgeri*. It differs from *L. meloidarum* in shorter AW (82-90 to 100-110) and ratio AW/ISD (1.17-1.28 to 1.47-1.56); from *L. addari* by longer AW (82-90 to 62) and Ta I (138-140 to 114).

Etymology

The name of the species has been derived from the name Agenor.

Leptus astrubali n. sp. (figs. 32-39)

Examined material

Holotype larva, Ayutthaya, Thailand, 5 IV 1997, from plants; 1 L paratype, the same data as in holotype; leg. R. Haitlinger; MNHWU.

Description

Larva

Dorsal scutum with anterior border slightly concave. Anterior sensillae sockets somewhat below level of anteroscutalae bases. Cuticular lines arranged as figure 35 placed at posteroscutalae bases. Anterior and posterior sensillae with setules on distal half. Scutalae with distinct setules; AL < PL. Dorsum with ~44 short barbed setae, 36-44 μ m long (fig. 32). Diameter of eyes 9 μ m, holotype, 10 μ m, paratype.

Ventral surface of idiosoma: sternalae 1a and 2a well setulose, 26 μ m, holotype, 30 μ m, paratype and 26, 30, respectively. Four setae between coxae II and III, the first pair is shorter. Barbed setae behind coxae III ~21. Coxalae I-III all setulose; coxalae I the longest 52 μ m (fig. 34).

Leg lengths: I-434 holotype, 414; II-388, 400; III-440, 434. Ip = 1262, 1248.

Leg setal formula

Leg I. Ta-1 ω , 1 ζ , 23B; Ti-2 ϕ , 1 κ , 15B; Ge-1 δ , 8B; Tf-5B; Bf-2B; Tr-1B (fig. 37).

Leg II. Ta-1 ω , 1 ζ , ~22B; Ti-2 ϕ , 15B; Ge-8B; Tf-5B; Bf-2B; Tr 1B (fig. 38).

Leg III. Ta-1 ζ , 21B; Ti-1 ϕ , 14B; Ge-8B; Tf-5B; Bf-1B; Tr-1B (fig. 39).

Length of ω l 28, holotype, 26, paratype; ϕ l (distal) 20, -; ϕ l (proximal) 28, -; *I 28, -.

Gnathosoma short, with nude hypostomalae. Palpfemorala short, distinctly barbed; palpgenuala damaged (fig. 33). Palptarsus with one barbed seta and the remaining nude setae (1T, 1B, 5N)(fig. 36). Palpal setal formula 0,1,1,3(2N,1B),7.

Metric data are given in table 3.

Remarks

L. astrubali n. sp. belongs to the group species with short tibia III (below 110 μ m). All Asiatic species, excluding *L. hozumii*, have TIII longer than 110 μ m. It differs from this in shorter dorsal setae (36-44 to 46-53) and TaI (84-86 to 113).

Etymology

The name of the species has been derived from the name Astrubal.

Leptus addari n. sp. (figs. 40-47)

Examined material

Holotype larva, Bangkok, Thailand, 2 IV 1997, from plants; leg. R. Haitlinger. MNHWU.

Description

Larva

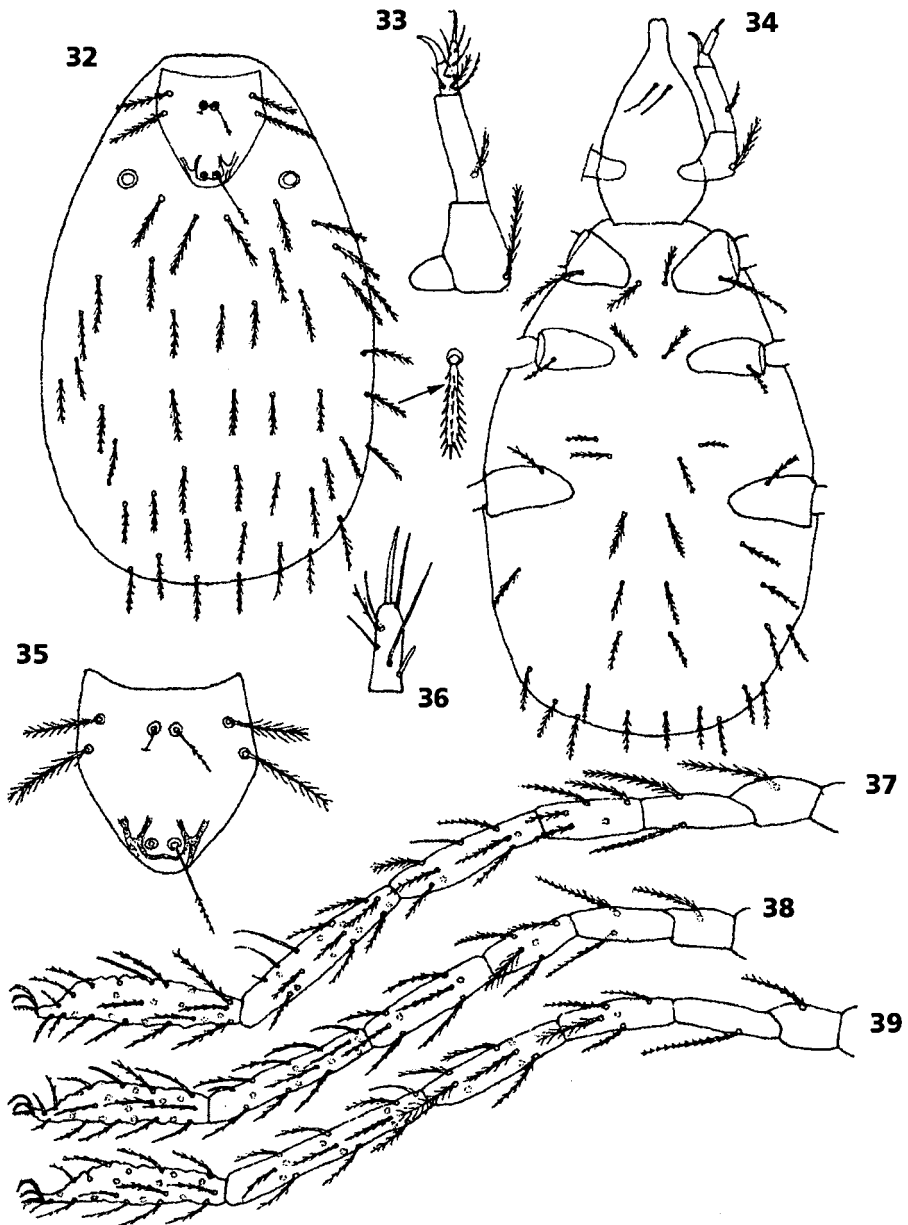
Dorsal scutum with anterior border distinctly concave; anterolateral borders convex and posterolateral borders concave. Anterior sensillae sockets somewhat above level of posteroscutalae bases. All sensillae with setules on distal half. Oval cuticular line at posterior sensillae sockets. Scutalae AL and PL all with distinctly setules. AL > PL (fig. 43). Dorsum with ~39 distinctly barbed setae, 46-56 μ m long (fig. 40). Diameter of eyes 14 μ m.

Ventral surface of idiosoma: sternalae 1a and 2a well setulose, subequal in length. Between coxae II and III four setae, the first pair shorter. Behind coxae III 26 barbed setae. Coxalae I-III barbed; coxalae I relatively long (72 μ m) (fig. 42).

Leg lengths: I-620; II-592; III-702. Ip = 1914.

Leg setal formula

Leg I. Ta-1 ω , 1 ζ , 20B; Ti-2 ϕ , 1 κ , 15B; Ge-1 δ ,



Figs. 32-39. *Leptus astrubali* n. sp.: 32. Idiosoma, dorsal view; 33. Palp, dorsal view; 34. Idiosoma, ventral view; 35. Scutum; 36. Palptarsus; 37. Leg I, trochanter-tarsus; 38. Leg II, trochanter-tarsus; 39. Leg III, trochanter-tarsus.

Leptus astrubali sp. n.: 32. Idiosoma, vista dorsal; 33. Palpo, vista dorsal; 34. Idiosoma, vista ventral; 35. Scutum; 36. Palpotarso; 37. Pata I, trocánter-tarso; 38. Pata II, trocánter-tarso; 39. Pata III, trocánter-tarso.

Table 3. Metric data for larvae of: 1. *L. astrubali* n. sp.; 2. *L. addari* n. sp. (All measurements are given in μm .) (For abbreviations see Material and methods.)
 Valores métricos de las larvas de: 1. *L. astrubali* sp. n.; 2. *L. addari* sp. n. (Todas las medidas en μm .) (Para las abreviaturas ver Material y métodos.)

	1		2		1		2
	H	P	H		H	P	H
IL	374	937	451	Tal	86	84	114
IW	241	667	324	Til	80	84	156
AW	60	50	62	Gel	72	70	106
PW	70	60	68	Tfl	46	46	70
AA	10	10	8	Bfl	52	46	82
SB	10	12	12	Trl	42	34	42
ISD	44	44	44	Cxl	56	50	50
L	84	82	80	Tall	76	80	102
W	80	-	76	Till	70	74	140
AP	14	14	12	Gell	58	62	92
AL	36	32	64	Tfll	44	42	72
PL	46	46	60	Bfll	38	44	70
AM	26	32	32	Trll	38	42	42
S	48	52	56	Cxll	64	56	74
DS	36-42	38-44	46-56	Talll	78	80	116
GL	140	136	144	Tilll	98	102	194
pgl	50	46	48	Gelll	60	66	108
Oc	9	10	14	Tflll	48	50	92
1b	52	52	72	Bflll	50	44	82
2b	24	20	30	Trlll	38	36	42
3b	34	34	44	Cxlll	62	56	68
1a	26	30	40	L/W	1.05	-	1.05
2a	26	30	36	Til/AW	1.33	1.68	2.52
PaScFed	42	38	60	AW/AL	1.67	1.56	0.97
PaScGed	-	-	44	AL/PL	0.78	0.69	1.07
				AW/ISD	1.36	1.14	1.17

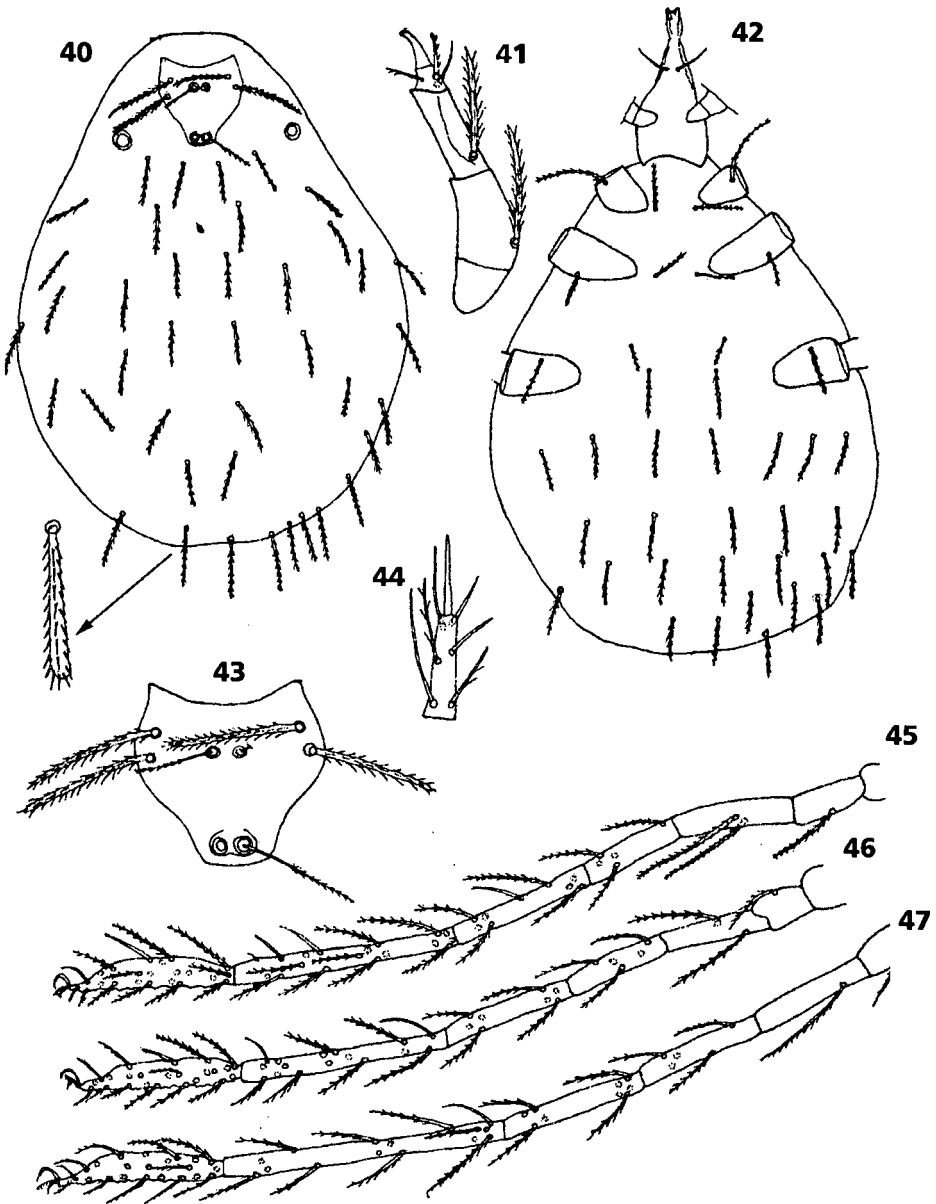
8B; Tf-5B; Bf-2B; Tr-1B (fig. 45).

Leg II. Ta-1 ω , 1 ζ , 21B; Ti-2 ϕ , 14B; Ge-8B; Tf-5B; Bf-2B; Tr-1B (fig. 46).

Leg III. Ta-1 ζ , 21B; Ti 1 ϕ , 14B; Ge-8B; Tf-5B; Bf-1B; Tr-1B (fig. 47).

Length of ω l 34, ϕ l (distal) 24, ϕ l (proximal) 34, δ l 34.

Gnathosoma short, with nude hypostomatae. Palpgenualae and palpfemoralae with distinct setules (fig. 41). Palptarsus with 7 setae;



Figs. 40-47. *Leptus addari* n. sp.: 40. Idiosoma, dorsal view; 41. Palp, dorsal view; 42. Idiosoma, ventral view; 43. Scutum; 44. Palpotarsus; 45. Leg I, trochanter-tarsus; 46. Leg II, trochanter-tarsus; 47. Leg III, trochanter-tarsus.

Leptus addari sp. n.: 40. Idiosoma, vista dorsal; 41. Palpo, vista dorsal; 42. Idiosoma, vista ventral; 43. Scutum; 44. Palpotarso; 45. Pata I, trocánter-tarso; 46. Pata II, trocánter-tarso; 47. Pata III, trocánter-tarso.

two beingae slightly barbed (fig. 44). Palpal setal formula: 0,1,1,3,7.

Metric data are given in table 3.

Remarks

L. addari n. sp. belongs to the group species with short tarsus I (<120 µm). *L. gifuensis* Kawashima and *L. hozumii* Shiba belong to this group in Asia. It differs from *L.*

gifuensis in shorter W (76 to 95), longer AL (64 to 46) and PL (60 to 49); from *L. hozumii* in smaller number of dorsal setae (<50 to >50) and length of legs: I (620 to 463), II (592 to 405) and III (702 to 443).

Etymology

The name of the species has been derived from the name Addar.

Key to the larvae of *Leptus* from Asia and New Guinea. (Two species have been omitted: *L. debeauforti* Oudemans from West Irian and *L. terebrans* Vitzthum from Sumatra. These species were inadequately described.)

Clave para las larvas de Leptus de Asia y Nueva Guinea. (Se han omitido dos especies: L. debeauforti Oudemans del oeste de Irán y L. terebrans Vitzthum de Sumatra. Estas especies estan mal descritas.)

1	Palpgenu with two setae	2
	Palpgenu with one seta	6
2	Tal > 170 µm, TIII > 280 µm	<i>L. guus</i> Haitlinger, 1990; Turkmenia
	Tal < 170 µm, TIII < 250 µm	3
3	TIII > 210 µm, TIII > 140 µm	<i>L. auliacus</i> Haitlinger, 1998; Kazakhstan
	TIII < 180 µm, TIII < 140 µm	4
4	TIII/AL > 3.80, TIII/PW > 1.50	<i>L. horiacus</i> Haitlinger, 1994; Syria
	TIII/AL < 3.80, TIII/PW < 1.50	5
5	GL < 190 µm, Pgl < 60, TII/AW < 1.50	<i>L. batoricus</i> Haitlinger, 1998; Mongolia
	GL > 200 µm, Pgl > 60, TII/AW > 1.50	<i>L. tammuzi</i> Haitlinger, 1994; Syria, Israel, Saudi Arabia
6	Genu III with one solenidion	<i>L. tetrigiis</i> Southcott, 1988; Sri Lanka
	Genu III without solenidia	7
7	Cheliceral basis longitudinally ridged	<i>L. phuketicus</i> Southcott, 1994; Thailand
	Cheliceral basis not longitudinally ridged	8
8	Dorsal scutum longitudinally striate	<i>L. cameronensis</i> Shiba, 1976; Malaysia
	Dorsal scutum not longitudinally striate	9
9	Sensillae ASE and PSE whole ciliated	10
	Sensillae ASE and PSE partly ciliated	13
10	Scutum punctate, except area at PL and AL	<i>L. sulciscutus</i> Zheng, 1996; China
	Scutum not punctate	11
11	Tal < 170 µm	<i>L. shimenensis</i> Zheng, 1996; China
	Tal > 180 µm	12
12	Genu I with two solenidia	<i>L. dolichopodos</i> Zheng, 1996; China
	Genu I with one solenidion	<i>L. asahinai</i> Kawashima, 1958; Japan
13	W > 126 µm	14
	W < 126 µm	17

14 PL > 100 μm	<i>L. kuroshimaensis</i> Kato & Kitahara, 1958; Japan
PL < 95	15
15 T _{III} < 200 μm .	<i>L. meloidarum</i> Beron, 1975; Bulgaria, Italy, Kirghistan
T _{III} > 200 μm	16
16 Setae between coxae II-III placed on the same level, Tal < 195 μm	<i>L. admeti</i> Haitlinger, 1998; Sumatra
Setae between coxae II-III on different level, Tal > 195 μm	<i>L. bogghoranus</i> Haitlinger, 1990; New Guinea
17 Tal < 152 μm	18
Tal > 152 μm	22
18 Tal > 130 μm , W > 105 μm	19
Tal < 130 μm , W < 105 μm	20
19 AL < 60 μm , L < W, DS > 65 μm	<i>L. brachypodos</i> Zheng, 1996; China
AL > 65 μm , L > W, DS < 65 μm	<i>L. agenori</i> n. sp.; Malaysia, Thailand
20 AW > 75 μm	<i>L. gifuensis</i> Kawashima, 1958; Japan
AW < 75 μm	21
21 Tal and Til > 100 μm , AL > 40 μm	<i>L. hozumii</i> Shiba, 1976; Malaysia
Tal and Til < 100 μm , AL < 40 μm	<i>L. astrubali</i> n. sp.; Thailand
22 Til > 280 μm	23
Til < 280 μm	24
23 Til < 330 μm , DS to 53 μm	<i>L. draco</i> Southcott, 1984; New Guinea
Til > 330 μm , DS to 79 μm	<i>L. calidus</i> Shiba, 1976; Malaysia
24 AL distinctly longer than PL, ratio L/W < 0.80	<i>L. siemsseni</i> Oudemans, 1910; China
AL usually shorter or equal to PL (rarely somewhat longer), ratio L/W > 0.80	25
25 PW < 80 μm	26
PW > 80 μm	27
26 Til > 200 μm	<i>L. gagrellae</i> Oudemans, 1910; Java
Til < 180 μm	<i>L. addari</i> n. sp.; Thailand
27 PW < 98 μm	28
PW > 98 μm	32
28 T _{III} > 300 μm	<i>L. hidakai</i> Kawashima, 1958; Japan
T _{III} < 300 μm	29
29 T _{III} < 248 μm	<i>L. saigusai</i> Kawashima, 1958; Japan
T _{III} > 248 μm	30
30 Tal < 170 μm , AL < 70 μm , PL < 75 μm	<i>L. augusti</i> n. sp.; Laos
Tal > 175 μm , AL > 75 μm , PL > 78 μm	31
31 AL > PL, W < 110 μm	<i>L. zhangii</i> Saboori & Atamehr; Iran
AL < PL, W > 110 μm	<i>L. japonicus</i> Kawashima; Japan
32 Tal/PW > 1.70	<i>L. hupingshanicus</i> Zheng, 1996; China
Tal/PW < 1.70	33
33 PW/AL < 1.36	<i>L. zhutingensis</i> Zheng, 1996; China
PW/AL > 1.36	34

34 PW < 106	35
PW > 106	36
35 AW/ISD > 1.20, Til < 200 µm	<i>L. managarus</i> Haitlinger, 1990; Java
AW/ISD < 1.20, Til > 200 µm	<i>L. alkmenae</i> Haitlinger, 1998; India
36. Tal < 162 µm, AL < 76 µm	<i>L. holgeri</i> n. sp.; Laos
Tal > 162 µm, AL > 76 µm	37
37. Tal with κ, posterior border and posterolateral borders of scutum very slightly concave, hypostomalae slightly barbed	<i>L. ilzae</i> n. sp.; Laos
Tal without κ, posterior border and posterolateral borders of scutum distinctly concave, hypostomalae nude	<i>L. kyushuensis</i> Ishii, 1953; Japan

Resumen

Seis nuevas especies de *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) del sudeste asiático

Se describen seis nuevas larvas de *Leptus*: *L. ilzae* sp. n. (figs. 1-8) y *L. augusti* sp. n. (figs. 9-16) ambas procedentes de *Hypomeces equamosus* Herbst (Curculionidae); *L. holgeri* sp. n. (figs. 17-24) procedente de Orthoptera indeterminados, todos de Laos; *L. agenori* sp. n. (figs. 25-31) de plantas de Malasia; *L. astrubali* sp. n. (figs. 32-39) y *L. addari* sp. n. (figs. 40-47), ambos procedentes de plantas de Tailandia. Se dan también los valores métricos de todas ellas (tablas 1-3). Se presenta la clave para las larvas de *Leptus* de Asia y Nueva Guinea.

Acknowledgements

I wish to thank Dr. J. Kania for determining *Hypomeces equamosus* Herbst (Curculionidae) from Laos.

References

- BAKER, A. & SELDEN, P. A., 1997. New morphological and host data for the ectoparasitic larva of *Leptus hidakai* Kawashima (Acari, Acariformes, Erythraeidae). *Systematic Parasitology*, 36: 183-191.
- HAILINGER, R., 1990. Four new species of *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) from insects of Australia, New Guinea and Asia. *Wiadomości parazytologiczne*, 36: 47-53.
- 1994. Two new species of *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) associated with Tenebrionidae (Insecta, Coleoptera). *Israel Journal of Entomology*, 28: 139-149.
- 1998. Five new species of *Leptus* Latreille, 1796 (Acari, Prostigmata, Erythraeidae) from Asia and Africa. *Bonner zoologische Beiträge*, 48: 97-110.
- HAILINGER, R. & SABOORI, A., 1996. Seven new larval mites (Acari, Prostigmata, Erythraeidae) from Iran. *Misc. Zool.*, 19: 117-131.
- ISHII, I., 1953. A new species of *Leptus* from Kyushu (Acarina: Erythraeidae). *Igaku Kenkyu (Acta Medica)*, 23: 160-163.
- KATO, Y. & KITAHARA, K., 1958. A new species of Erythraeidae infesting horse-fly from Kuroshima. *Japanese Journal of Sanitary Zoology*, 9: 171-174.
- KAWASHIMA, K., 1958. Studies on larval erythraeid mites parasitic on arthropods from Japan (Acarina: Erythraeidae). *Kyushu Journal of Medical Science*, 9: 190-211.
- OUDEMANS, A. C., 1912. Die bis jetzt bekannten Larven von Thrombidiidae und Erythraeidae mit besonderer Berücksichtigung der für den Menschen schädlichen Arten. *Zoologischer Jahrbücher, Supplement*, 14: 1-230.
- SABOORI, A. & ATAMEHR, A., 1999. A new larval *Leptus* Latreille (Acari: Erythraeidae) from Iran. *Systematic & Applied Acarology* 4: 159-163.

- SHIBA, M., 1976. Taxonomic investigation on free-living Prostigmata from the Malay Peninsula. *Nature and Life of Southeast Asia*, 7: 83-229.
- SOUTHCOTT, R. V., 1988. Two new larval ectoparasitic mites (Acarina: Erythraeidae) from Sri Lankan tetrigidgrasshoppers. *Entomologica scandinavica*, Supplement, 30: 153-161.
- 1994. Two new larval Erythraeidae (Acarina) from Thailand, with keys to the larvae of *Leptus* for Asia and New Guinea, and world larvae of *Hauptmannia*. *Steenstrupia*, 20: 165-176.
- WELBOURN, W. C. & YOUNG, O. P., 1987. New genus and species of Erythraeinae (Acari: Erythraeidae) from Mississippi with a key to the genera of North American Erythraeidae. *Annals of the Entomological Society of America*, 80: 230-242.
- ZHENG, B., 1996a. Two new larval mites of the Erythraeidae from China. *Acta zootaxonomica sinica*, 21: 62-68.
- 1996b. Five new species of the genus *Leptus* Latreille from Mt. Hupingshan of Hunan, China. *Entomologia sinica*, 3: 229-242.
-