

**TWO NEW SPECIES OF PODAPOLIPIDAE (ACARI),
ECTOPARASITES OF GRASSHOPPERS
(ORTHOPTERA : ACRIDIDAE) IN TAIWAN**

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Paul Kang-Chen Lo (1992) Two new species of Podapolipidae (Acari), ectoparasites of grasshoppers (Orthoptera : Acrididae) in Taiwan. *Bull. Inst. Zool., Academia Sinica* 31(1): 65-72. Two new species of podapolipids are described: *Podapolipus transversus* from *Atractomorpha ambigua* Bol.; *Podapolipoides acridae* from *Acrida chinensis* (Westw.). All hosts are Acrididae (Orthoptera).

Key words: Podapolipidae, *Podapolipus transversus* n. sp., *Podapolipoides acridae* n. sp., Acrididae.

The genus *Podapolipus* is presently comprised of 16 species of parasitic mites found on insects of the orders Coleoptera, Orthoptera and Blattoptera (Naudo, 1967; Regenfuss, 1968; Feldman-Muhsam and Havivi, 1972; Husband, 1980, 1984, 1986). No species of *Podapolipus* have been recorded in Taiwan. *Podapolipus* may be defined briefly by the following characteristics: male with aedeagus anterior, extending to, but not beyond the anterior quarter of the gnathosoma, and setae C_2 shorter than the length of the prodorsum; adult female with one pair of legs, femur I setae present, hooklike seta on tarsus I, and, if anterior lobes are present, they are not bifurcated; larval female with seta C_2 less than one-half the width of the gnathosoma, two claws on pretarsus I, one seta on genu III, no tibial spine, no solenidion tarsus II, seta h_1 absent or vestigial, seta f less than one-half the width of plate EF , tibia I solenidion without an adjacent seta of equal length

and width, tarsus I solenidion length three or more times the width of solenidion.

The genus *Podapolipoides* was proposed by Regenfuss (1968). *Podapolipoides* is presently comprised of 14 species of parasitic mites found on Acrididae (Feldman-Muhsam and Havivi, 1973; Husband, 1972, 1990); only one species has been described in Taiwan (Lo, 1990). *Podapolipoides* may be briefly defined by the following characteristics: male with aedeagus anterior extending to middorsal, but not beyond one-half of prodorsal shield, and seta C_2 as long as or longer than the length of the prodorsum; adult female with 1 pair of legs, femur I setae present, hooklike seta on tarsus I and difurcated anterior lobes; larval female with seta C_2 shorter than one-half the width of the gnathosoma, two claws on pretarsus I, no tibial spine, no solenidion on tarsus II, seta h_1 as long as the distance between setae h_1 ; seta f less than one-half the width of plate EF ,

tarsus I solenidion length three or more times the width of solenidion. After careful review of the genus *Podapolipoides*, it is my opinion that *Locustipolipus* is a synonym of *Podapolipoides* (Lo, 1990).

In this paper, two new species of podapolipids are described from Acrididae.

MATERIALS AND METHODS

Mite specimens were collected from Wu-feng, Taichung, on *Atractomorpha ambigua* Bol. and *Acrida chinensis* (Westw.). The mite specimens were mounted in Hoyer's medium. All type specimens were deposited at the Taiwan Agricultural Research Institute's Museum.

Terminology follows that of Husband (1989). Mites were examined, drawn, and measured with the aid of a Wild Leitz

Aristoplan phase contrast microscope with drawing attachment and stage micrometer. Measurements were based on the best-mounted specimens, with ranges given in most cases. All measurements are in microns (μ).

DESCRIPTION

Podapolipus transversus Lo, new species

Female (Fig. 1): Gnathosoma longer than wide; length 80, width 42, palp length 14. Cheliceral stylets slender, length 40. Pharynx length 50, width 26.

Idiosoma: Transverse oval, no anterior lobe processes, length 296-880, width 524-3,280; sclerotized prodorsal shield, length 80-130, width 96-152. Stigmata on stalks extending from under anteriolateral margin of prodorsal shield. Internal postero-ventral structure not very clear.

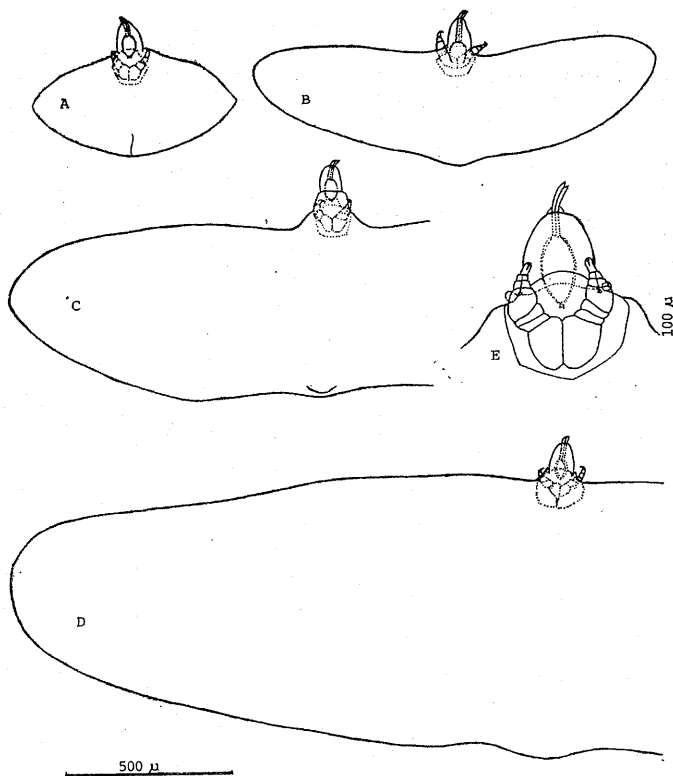


Fig. 1. *Podapolipus transversus*, n. sp.—Female adult, dorsal aspect of different ages of female adult: A, B, C, D from young to old; E, ventral aspect of gnathosoma.

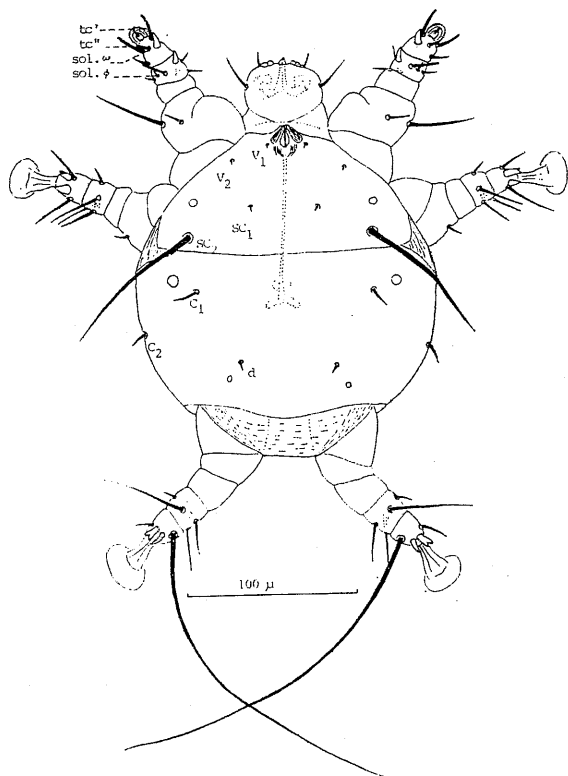


Fig. 2a. *Podapolipus transversus*, n. sp.—Male, dorsal aspect.



Fig. 2b. *Podapolipus transversus*, n. sp.—Male, ventral aspect.

No distinct oval postero-ventral plates.

Legs: Tarsus I with a terminal claw, no dorsal terminal spine or lateroterminal spine. Femoral setae 22.

Male (Fig. 2): Gnathosoma length 36, width 41; dorsal setae 23, ventral setae 14; palps reduced. Cheliceral stylets 30, more than one-half the width of gnathosoma.

Idiosoma: Length 195, width 178.

Dorsum: Prodorsal shield narrowing anteriorly, setae V_1 2, V_2 2, SC_2 84. Shields C and D separate; setae C_1 12, C_2 13, d 7. Aedeagus dorsal near posteromedial border of gnathosoma; the male internal organ is identical to a butterfly's, and is located in the central body.

Venter: Sclerotized apodemes 1 and 2 meeting medially at sternal apodeme. Coxae III fused; coxal I setae 8, coxal II setae 8, coxal III setae 12.

Legs: Ambulacrum I with a terminal claw in a suker-like pad. Tarsus I with one ventral spinelike setae, solenidion ω 7, Tibial I solenidion ϕ 5, seta d 6, seta v 22. Femur I seta d 14. Tibia II with no spine. Tibial III seta d 230; tarsus III with two spines, length of longer spine 10. Ambulacra II, III 30, without claw.

Larval female (Fig. 3): Gnathosoma length 54, width 56; dorsal setae 26, ventral setae 14; palps in two segments, palpal setae 11. Cheliceral stylets smooth and slender, length 44.

Idiosoma: Length 180, width 150.

Dorsum: Prodorsal shield 64, width 144; seta V_1 12, V_2 14, SC_2 100. Shield C surrounding shield D anteriolaterally; setae C_1 18, C_2 15, d 12, f 4. Shield D width 80, shield EF 70. Shield H obtuse triangular shape, length 8, width 10. Distance between setae d 40, setae h_2

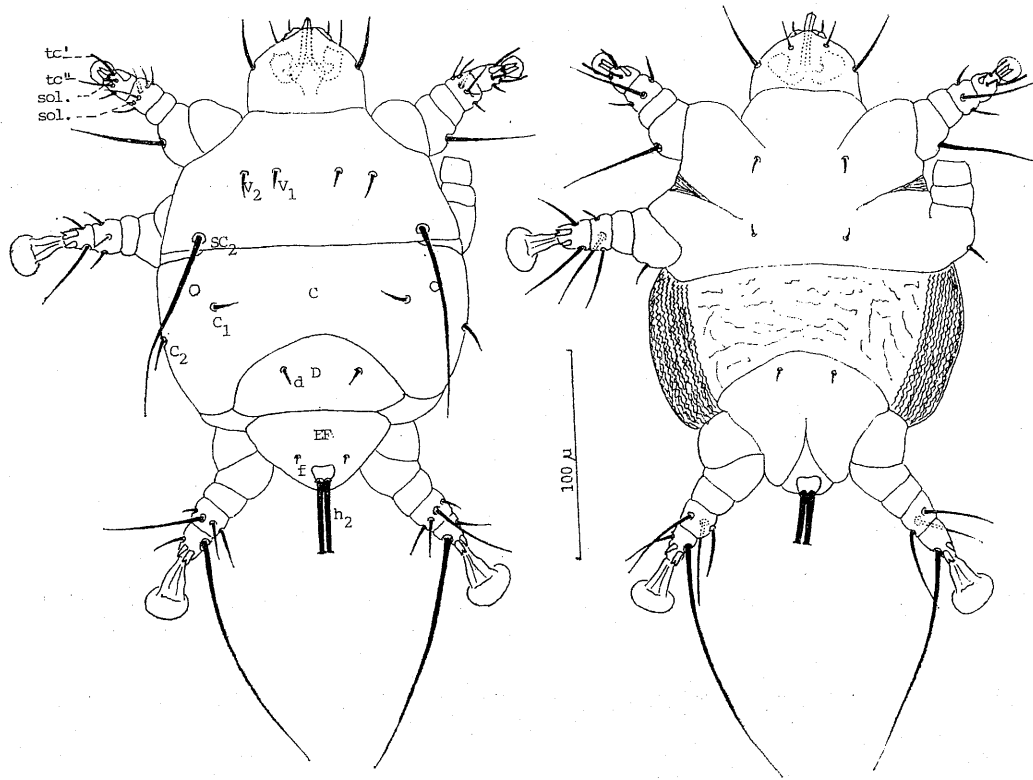


Fig. 3. *Podapolipus transversus*, n. sp.—Larval female, dorsal aspect (left), ventral aspect (right).

length 390.

Venter: Apodemes 1 and 2 meeting at anterior sternal apodeme. Coxae III separated from each other and from coxae I and II. Coxal I setae 9, coxal II setae 6, coxal III setae 7.

Legs: Ambulacrum I with two terminal claws, fused at base; solenidion 6, seta *tc'* 14, seta *tc''* 16, spine-like *p'* seta 7, solenidion ϕ on tibia I 3. Tarsi II and III each with two spines, one of them bifurcated; longest seta on tarsus II 40, longest seta on tibia III 50; longest seta on tarsus III 130. Ambulacra II, III 30, without claw.

Etymology: The species is so named as the female adult parasitizes the host's hind wing veins, growing transversely; viviparous.

Holotype: Male, Wu-feng, Taichung, Taiwan, 25-IX-90, from *Atractomorpha ambigua* Bol. (Acrididae: Orthoptera),

P.K.C. Lo. Deposited in the Museum of the Taiwan Agricultural Research Institute, Taichung, Taiwan, Republic of China.

Paratypes: I female, same data as holotype; 1 larval female; 1 female; 1 female; 1 female; 1 female; 1 female, 1 larval female; 1 male, 2 larval females; 2 females, 1 larval female; 2 females; Wu-feng, Taichung, Taiwan, 1-X-90; 19-X-90; 27-X-90; 7-XI-90; 9-XI-90; 10-XI-90; 13-XI-90, from *A. lata*, P.K.C. Lo. They are deposited in the Museum of Taiwan Agricultural Research Institute, Taichung, Taiwan, Republic of China. One female, 1 male, and 1 larval female with the same data as the holotype are deposited in the Biology Department, Adrian College, Adrian, Michigan 49221, USA.

Diagnosis: This new species is different from *P. libratus* with no spine on

the tibial II of the male, only a normal seta as a substitute; in addition, the setae V_1 are posteriolateral to the aedeagal opening, not lateral as on *P. libuatus*. The larval setae C_2 of *P. libuatus* is shorter than setae C_1 , while on this new species $C_1 = C_2$.

Distribution: Wu-feng, Taichung, Taiwan.

***Podapolipoides acridae* Lo, new species**

Female (Fig. 4): Gnathosoma longer than wide; length 80, width 59. Cheliceral stylets smooth, length 28. Pharynx length 56, width 32.

Idiosoma: Oval, smooth, one pair of anterior bilobed processes; length 704, width 544. Lightly sclerotized prodorsal shield, length 28, width 88. Stigmata on stalks, extending from under anterio-later margin of prodorsal shield. Lightly sclerotized, internal posteroventral plate, length 64, width 120.

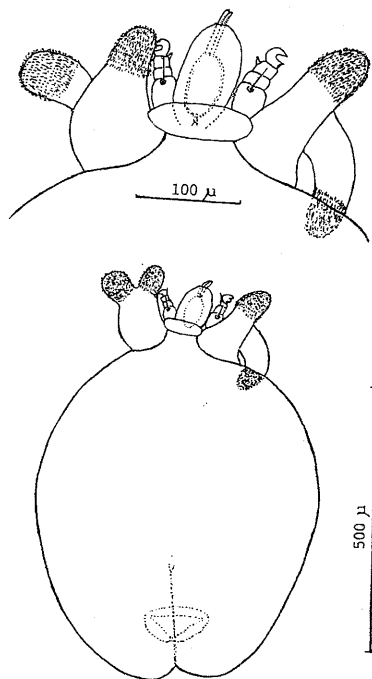


Fig. 4. *Podapolipoides acridae*, n. sp.—Female, dorsal aspect and enlargement of gnathosoma.

Legs: Tarsus I with a terminal claw and lateral spine which appears to have a hooked structure. Femoral setae 37.

Male (Fig. 5): Gnathosoma length 32, width 34; dorsal setae 10, ventral setae 2. Palpal setae not evident. Cheliceral stylets 20.

Idiosoma: Length 180, width 142.

Dorsum: Prodorsal shield narrowing anteriorly; setae V_1 6, V_2 8, SC_2 66. Shield *C* divided medially by aedeagus and shield; setae C_2 140. Aedeagus opening extending to one-half of prodorsal shield; aedeagal width at midcapsule 14.

Venter: Lightly sclerotized apodemes 1 and 2 meeting medially at sternal apodeme. Coxae III fused; no coxal I setae, coxal II setae 6, coxal III setae 20.

Legs: Ambulacrum I with a terminal stout claw in a suker-like pad. Tarsus I with two ventral spines, solenidion ω 9. Tibial seta *K* 6, seta *d* 5, seta *v* 14. Femur I seta 8. Longest tibia II spine 14. Tibial III seta *d* 102, tarsus III seta *d* 110; three tibial III and tarsal III spines, longest spine 20. Ambulacra II, III 40, without claw.

Larval female (Fig. 6): Gnathosoma length 44, width 48; dorsal setae 18, ventral setae 5, palps in two segments, palpal setae 8. Cheliceral stylets smooth, slender, length 64.

Idiosoma: Length 156, width 116.

Dorsum: Prodorsal shield length 60, width 110; setae V_1 8, V_2 10, SC_2 90. Shield *C* surrounding shield *D* anteriolaterally; setae C_2 12, *d* 20. Shield *EF* as wide as plate *D*; setae *f* 15. Shield *H* triangular, width 14; setae h_1 15, setae h_2 360. Distance between setae *d* 50.

Venter: Apodemes 1 and 2 meeting medially at anterior sternal apodeme. Coxae III separated from each other and from coxae I and II; Coxal I setae 3, coxal II setae 4, coxal III setae 5.

Legs: Ambulacrum I with two parallel terminal claws, fused at base; solenidion

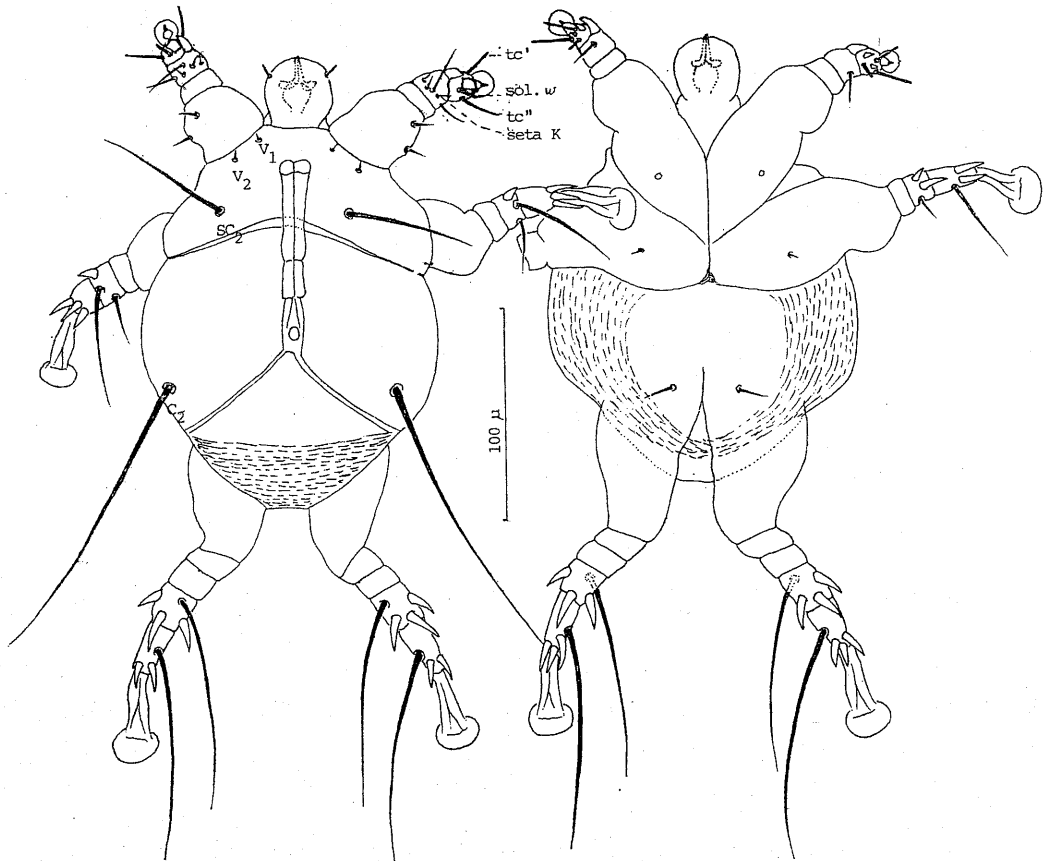


Fig. 5. *Podapolipoides acridae*, n. sp.—Male, dorsal aspect (left), ventral aspect (right).

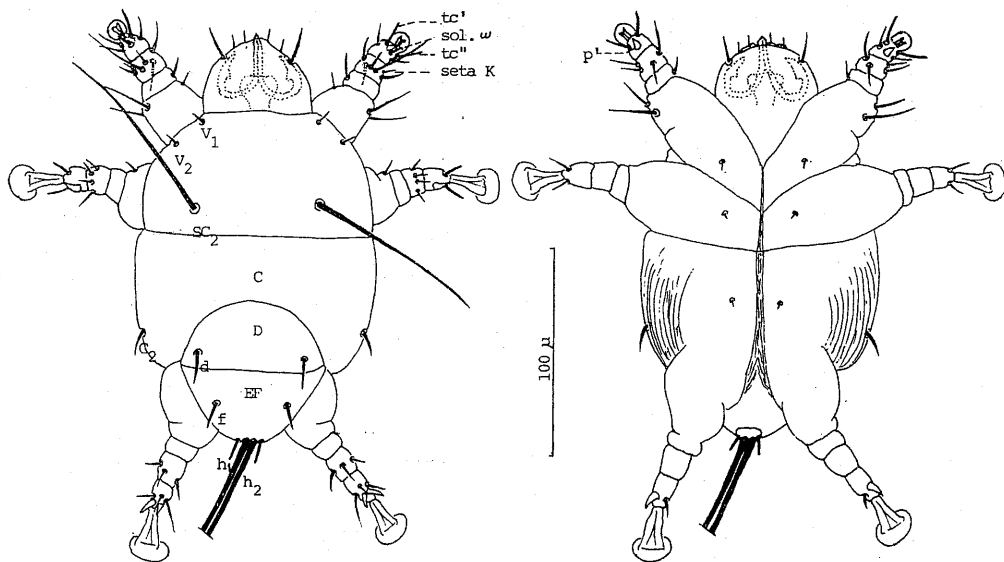


Fig. 6. *Podapolipoides acridae*, n. sp.—Larval female, dorsal aspect (left), ventral aspect (right).

ω 7, setae tc' 12, setae tc'' 14, spine-like p' seta 4. Tibial seta K (slender) 9. Ambulacra II, III 26, without claw.

Etymology: The species is named for the host genus.

Holotype: Male, Wu-feng, Taichung, Taiwan, 26-IX-90, from *Acrida chinensis* (Westw.), P.K.C. Lo. Deposited in the Museum of the Taiwan Agricultural Research Institute, Taichung, Taiwan, Republic of China.

Paratypes: Three males, 4 females, 3 larval females, same data as holotype. Deposited in the Museum of the Taiwan Agricultural Research Institute, Taichung, Taiwan, Republic of China. One female, 1 male, and 1 larval female with the same data as the holotype are deposited in the Biology Department, Adrian College, Adrian, Michigan 49221, USA.

Diagnosis: This new species is different from *Podapolipoides patangae* (Lo), as the aedeagus extends to one-half of the prodorsal shield, and setae C_2 is much longer than the length of the prodorsum.

Distribution: Wu-feng, Taichung, Taiwan.

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臺灣外寄生於蝗蟲之兩種新囊蟎 (Acari : Podapolipidae)

羅 幹 成

本文描述兩囊蟎新種：外寄生於擬短額負蝗 (*Atractomorpha ambigua*) 之後翅者，名之為橫生囊蟎 (*Podapolipus transversus* n. sp.)；外寄生於中華蚱蜢 (*Acrida chinensis*) 中後胸及前後翅者，為蚱蜢囊蟎 (*Podapolipoides acridae* n. sp.)。