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One New Species of Zerconidae and One New Recorded Species of Blattisocidae from Taiwan (Acari: Mesostigmata)【Research report】

臺灣虫穴 蟎科一新種和裂胸蟎科一新紀錄種 (蜱蟎亞綱：中氣門目)【研究報告】

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Abstract

One new species of Zerconidae Canestrini, 1891, Zerconella (Metazercon) biconcava sp. nov. and a new record of Blattisocidae Garman, 1948, Cheiroseius fenghuangensis Bei, Zhou et Chen, 2010, are reported from Taiwan. New distribution data of Parazercon (Formosella) mirabilis Ujvári, 2011 and Mesozercon plumatus (Aoki, 1966) in Taiwan are also provided, as well as a key to the zerconid species in Taiwan.

摘要

本文記錄在台灣發現之虫穴 蟎科一新種--雙竇小虫穴 蟎Zerconella (Metazercon) biconcava sp. nov. 及裂胸蟎科一新記錄種 -- 鳳凰手綏蟎Cheiroseius fenghuangensis Bei, Xue et Chen, 2010；並提供華美副虫穴 蟎Parazercon (Formosella) mirabilis Ujvári, 2011及羽狀中虫穴 蟎Mesozercon plumatus (Aoki, 1966) 在台灣之新分佈資料。文中亦編撰台灣虫穴 蟎類之檢索表。

Key words: Mesostigmata, Zerconella, Cheiroseius, new species, new record
關鍵詞: 中氣門亞目、小虫穴 蟎屬、手綏蟎屬、新種、新記錄。

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One New Species of Zerconidae and One New Recorded Species of Blattisocidae from Taiwan (Acari: Mesostigmata)

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ABSTRACT

One new species of Zerconidae Canestrini, 1891, *Zerconella* (*Metazercon*) *biconcava* sp. nov. and a new record of Blattisocidae Garman, 1948, *Cheiroseius fenghuangensis* Bei, Zhou *et* Chen, 2010, are reported from Taiwan. New distribution data of *Parazercon* (*Formosella*) *mirabilis* Ujvári, 2011 and *Mesozercon plumatus* (Aoki, 1966) in Taiwan are also provided, as well as a key to the zerconid species in Taiwan.

Key words: Mesostigmata, *Zerconella*, *Cheiroseius*, new species, new record

Zerconidae is a less studied family, and currently includes 36 genera and over 350 species. The majority of the studies on zerconid mites have been from the Holarctic region. Knowledge of Zerconidae fauna from East and Southeast Asia is rare. Six species of zerconid mites were recorded from Japan (Aoki, 1964, 1966; Ishikawa, 1969, 1972; Blaszak, 1977, 1979), 23 species from the Korean Peninsula (Błlaszak, 1976a, b, 1979; Lim and Lee, 2001), 18 species from China (Petrova and Taskaeva, 1968; Ma and Yin, 1999; Ma, 2002, 2003a, b; Bei *et al*., 2002; Chen *et al*., 2008), 9 species from Mongolia (Błaszak, 1978a), and eight species from India (Błaszak, 1978b, 1979). The Zerconidae fauna of the Korean Peninsula can be considered as well studied, but not the Zerconidae fauna of the other countries in East and Southeast Asia.

The Zerconidae was not recorded from Taiwan, until the Taiwanese-Hungarian collaborated expedition collected five species, *Parazercon* (*Formosella*) *mirabilis* Ujvári, 2011 (華美副蚠蟎), *Rotundozercon shuriken* Ujvári, 2011 (飛鏢圓拱蚠蟎), *Zercon tsoi* Ujvári, 2011 (卓氏蚠蟎), *Mesozercon plumatus* (Aoki, 1966) (羽狀中蚠蟎) and *Zerconella* (*Metazercon*) *lobata* Ujvári, 2010 from Hualien, Taitung, and Nantou Counties (Ujvári, 2010, 2011). During the survey of the mites in the soil and litter of the montane areas, we also collected zerconid mites. Three species were identified from our specimens. One

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species of them is new to science and is described in this article. The other two species have been reported by Ujvári (2011). However, the collection data are listed to add information on their distribution in Taiwan.

Blattisocidae from Taiwan have been reported by Tjying (1971) and Tseng (1978, 1982). In our collection, a species of Blattisocidae was found to be new to Taiwan and is also recorded in the present article.

For the new species, dorsal setae are nominated in accordance with Lindquist and Evans (1965) with modifications given by Lindquist and Moraza (1988). The notation of dermal gland pores follows the system of Johnston and Moraza (1991).

Zerconidae Canestrini, 1891

Zerconella (*Metazercon*) ***biconcava*** sp. nov. (雙竇小蚣蝴) (Fig. 1-2)

Diagnose:

Dorsal and ventrianal setae mostly finely pilose, all slender. Setae j2 much longer than j1, z3 and z4 longer than other podonotal setae, s5 extend lightly over idiosomal margin. Opisthonotal setae longer than podonotal setae, longer posteriorly, S5 longest, J1 and Z1 similar in length, J3, J4 in a transverse row. Podonotum reticulated, except posterior-medial area punctuated. Opisthonotum punctuated, except lateral marginal area with some reticulations. With one pair of dorsal cavities only, dorsum between cavities inclined down to caudal margin of idiosoma.

Description: Female. Idiosoma length 309-317 μm, width 226-228 μm (n = 2).

Dorsum: podonotum length 162-167 μm, width 209-219 μm, reticulated except posteromedial area punctured, with 22 pairs of finely pilose, slender setae (j1-6, z2-6, s1-6, r1-5), z1 absent, j1 shorter than j2, r1 and r3 on peritrematal shields. Dermal gland openings gdj2 postero-laterad to s1. Opisthonotum length 151-156 μm, width 226-228 μm; irregularly punctured with reticulation in lateral margin, with 20 pairs of finely pilose, slender setae (J1-4, Z1-5, S1-5, R1-6), J5 absent, J4 mediate to and approximately in same level as J3, all setae long, slender and smooth, posterior setae longer. Length and distance between setae in same row in Table 1. Posterior area of opisthonotum with one pair of heavily sclerotized dorsal cavities, opisthonotum between cavities inclined down to caudal edge. Tectum with two pairs of serrate central points, medial pair longer, and one pair of small lateral points, may with some small lateral dents. Cheliceral chela short, both of fixed digit and movable digit with small teeth.

Venter: All ventral setae slender and smooth. Sternal, genital and ventrianal shields reticulated, sternal shield and genital shield weakly sclerotized. Sternal shield with 3 pairs of sternal setae, metasternal setae on cuticular membrane. Genital shield relatively small, with one pair of genital setae. Adgenital platelets small, gv2 with two openings. One pair of faint post-genital platelets. Ventrianal shield heavily sclerotized, large and wide, length 108 μm, width 161-172 μm, anterior margin concaved, fused with opisthonotum posteriorly, with eight pairs of setae in addition to circum-anal setae (JV1-4, ZV1-4), JV5 on caudal margin between Z5 and R6; adanal at the level of middle of anus, longer than anus. Ventri-anal pores postero-latrad to adanal setae. Peritrematal shields wide, reticulated, fused with exopodal shields, truncate posteriorly between level of S1 and R1, peritremes broad and quite short, gp present.

Setae formula of femur, genu, tibia of leg I: 2 2/2 2/2 2, 2 3/2 3/1 2, 2 3/2 3/2 2; leg II: 1 3/1 2/1 1, 2 3/1 2/1 2, 2 2/1 2/1 2; leg III: 1 2/0 2/0 0, 2 2/1 2/1 2, 1 1/1 2/1 2; leg IV: 1 2/1 2/0 0, 1 2/1 2/1 1, 2 1/1 2/1 1.

Material examined

Holotype ♀, TAICHUNG: Hoping, Wuling Recreation Area (武陵園區), Taoshan trail (桃山步道), E121°18'36.53401", N24°24' 27.67267", 2003 m a.s.l., 2007-III-12, C. C.

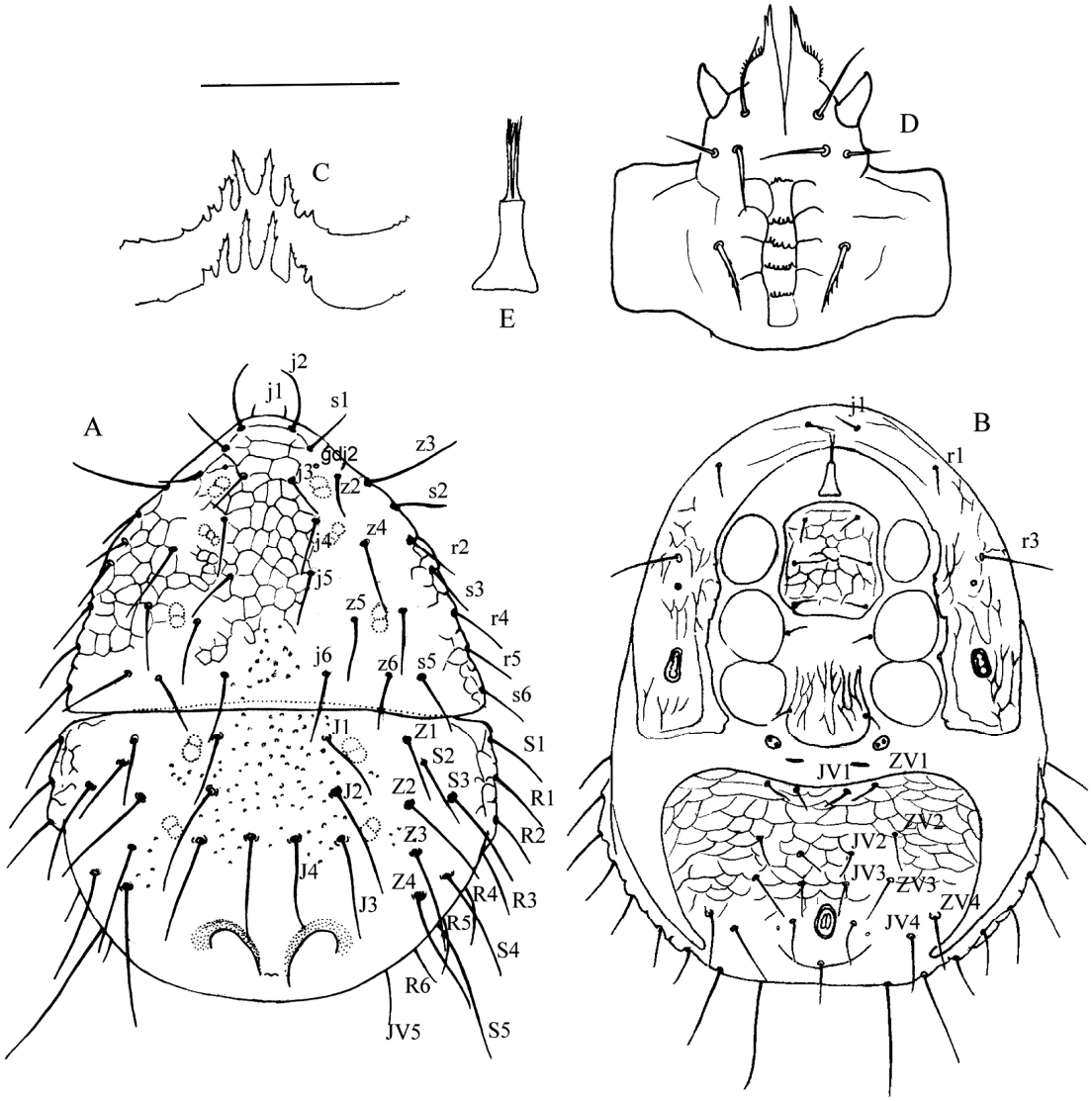

Fig. 1. *Zerconella* (*Metazercon*) *biconcava* sp. nov. female: A. dorsal view. B. ventral view. C. tectum. D. subcapitulum. E. tritosternum. Bar equals 100 μ for A, B, and 40 μ for C, D, E.

Ho, ex soil under deciduous trees. Paratype ♀, NANTOU: Hsinyi (信義), Tatajia (塔塔加), Nansi forest road (楠溪林道), E120°54' 27.24049", N23°27'44.23238", 2089 m a.s.l., 2005-VI-06, C. C. Ho, ex soil under *Yushania niitakayamensis* (玉山箭竹). Type specimens will be deposited in the National Museum of Natural Science, Taichung, Taiwan.

Remarks

With the ornamentation on dorsal shield and the elevation of dorsal cavity area, this new species belongs to subgenus *Zerconella* (*Mestzercon*) Blaszak, 1975 (Ujvári 2010), and is close to *Zerconella* (*Metazercon*) *lobata* Ujvári, 2010 in that the body shape and idiosomal chaetotaxy

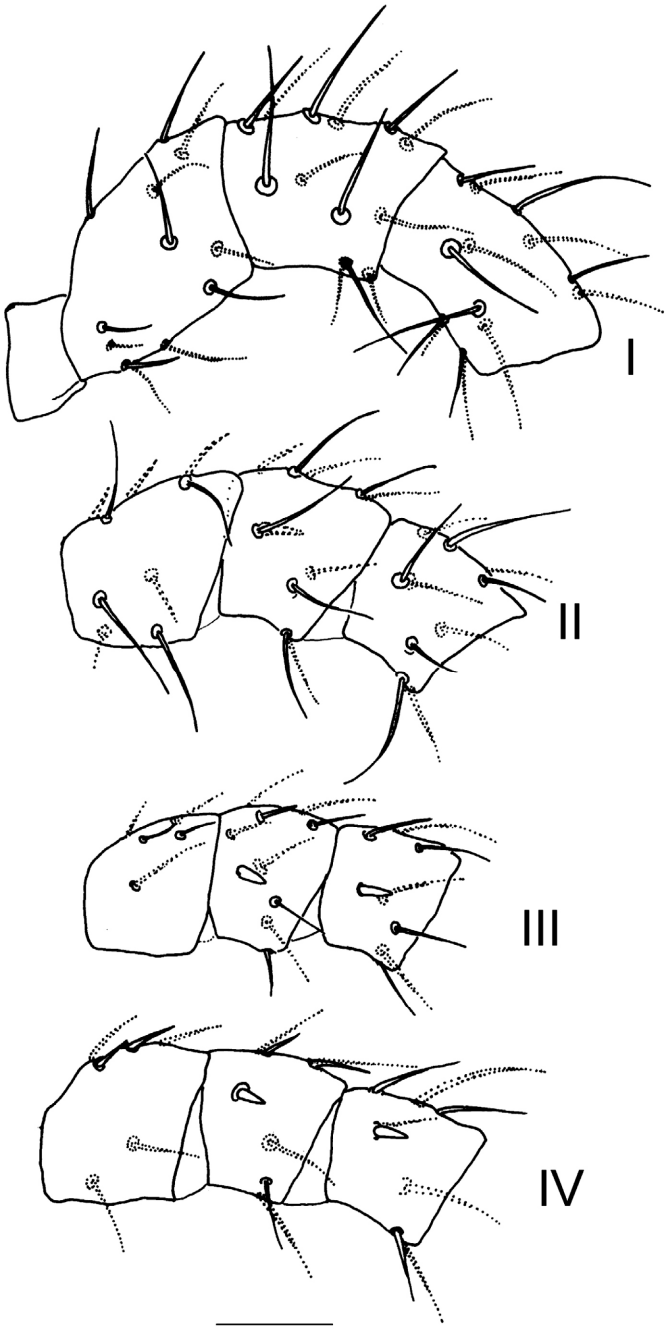

Fig. 2. *Zerconella* (*Metazercon*) *biconcava* sp. nov. female: femur, genu and tibia of leg I-IV. Bar equals 40 μ.

are similar, only has two dorsal cavities, setae J3 and J4 are approximately on the same level, adgenital platelets with two openings of gland gv2, with one pair of post genital platelets; also in that the dorsal setae are finely pilose, all shields

Table 1. Length (μm) of opisthonotal setae and distance between setal bases within longitudinal rows in *Zerconella* (*Metazercon*) *biconcava* sp. nov.

Setae	Length	Setae	Length	Setae	Length
J1	35.1	Z1	33.4	S1	31.3
J1-J2	29.2	Z1-Z2	32.9	S1-S2	36.3
J2	57.8	Z2	59.3	S2	38.4
J2-J3	24.3	Z2-Z3	25.9	S2-S3	23.6
J3	55.2	Z3	62.5	S3	57.0
J3-J4	25.7	Z3-Z4	22.3	S3-S4	38.8
J4	45.4	Z4	63.6	S4	57.1
		Z4-Z5	76.3	S4-S5	32.4
		Z5	58.9	S5	82.5

are reticulated, and the distribution of punctures on podonotum and opisthonotum are similar. However, the new species is larger, length 309-317 μm, width 226-228 μm; the setae j2 is over 2 times as long as j1, the z3 setae is longer than r3, s5 only has a small portion extended over idiosomal margin, without posterior lobe-like structures covering dorsal cavities. Whereas *Z.* (*M.*) *lobata* is smaller, length 265-285 μm and width 175-195 μm; has the setae j2 slightly longer than j1, the setae r3 longer than z3, over half of s5 extends beyond idiosomal margin, dorsal cavities are covered with lobe-like structures.

Both the drawing and SEM photo of *Z.* (*M.*) *lobata* shows a hollow area between the two dorsal cavities (Ujvári, 2010). In this area of *Z.* (*M.*) *biconcava* the opisthonotum slopes down between the two dorsal cavities to the caudal end of idiosoma, forms a wide ridge separating the two cavities.

Only one pair of gland openings, gdj2, is observable on this new species. The gdJ4 of *Zerconella* (*Metazercon*) *lobata* is not found on *Z.* (*M.*) *biconcave*. However, one pair of lyrifissures were noted at the middle of the anterior front of the cavity area.

In this new species, the length of Z1 is similar to J1, different from *Z.* (*M.*) *lobata* which has Z1 much shorter than J1 (Ujvári, 2010). However, in the SEM photo of Ujvári (2010) Z1 and J1 are similar in length. The relative length of these two setae is therefore not used to distinguish these two species.

Etymology

The new species is named after there being only two dorsal cavities.

There are two other species, *Parazercon* (*Formosella*) *mirabilis* and *Mesozercon plumatus* in our specimens. They have been reported by Ujvári (2011). Their collection data is listed in Table 2 in order to provide information on their distribution and habitat in Taiwan as our specimens were collected from places different from those of Ujvári (2011).

Key to the species of Zerconidae from Taiwan

1. Peritrematal shield truncate behind coxae IV, z1 absent 2
-. Peritrematal shield extends posterolaterally to the level of R3, z1 present or absent..... 5
2. Peritrematal setae r1 and r3 short, smooth, needle-like, peritremes hook-shaped, gv2 with 2 openings ..... ***Rotundozercon shuriken*** Ujvári, 2011
-. Peritrematal setae r1 and r3 slender, not needle-like 3
3. Peritremes hook-shaped, extends to the level of anterior margin of coxae III, peritrematal separated widely with

podonotum, gv2 with 3 openings, J5 present, with two pairs of dorsal cavities.....***Zercon tsoi*** Ujvári, 2011

-. Peritremes short, straight, extend only to the level of posterior margin of coxae III, peritrematal separate narrowly with podonotum, gv2 with two openings, J5 absent, with one pair of dorsal cavities..... 4

4. Setae j2 slightly longer than j1, dorsal cavities covered with lobe-like structures, s5 extends with over one half length beyond lateral idiosomal margin ..... ***Zerconella*** (*Metazercon*) *lobata* Ujvári, 2010.

-. Setae j2 over two times as long as j1, posterior part of opisthonotum without lobe-like structures, s5 not as above..... ***Zerconella*** (*Metazercon*) ***biconcava*** sp. nov.

5. Setae z1 present, with 3 peritrematal setae, r1-3, all short, smooth, pointed, postgenital sclerites present..... ***Parazercon*** **(*Formosella*)** ***mirabilis*** Ujvári, 2011

-. Setae z1 absent, with 2 peritrematal setae, r1 and r3 short and smooth, postgenital sclerites absent ....***Mesozercon plumatus*** (Aoki, 1966)

Blattisocidae Garman, 1948

Cheiroseius fenghuangensis Bei, Zhou *et* Chen, 2010 (鳳凰手綏蟎)

Type locality: Fenghuang Mountain, (40° 03' N, 1230 32' E), Fengcheng City, Liaoning Province, China.

Material examined

TAICHUNG: Hoping, Shaoshueshan Trail (小雪山步道) 247604/2682280/2057 m, 1 ♀, 08-XI-2005, C. C. Ho, litter.

Remarks

This species is recorded from Taiwan for the first time.

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Table 2. Collection data of *Parazercon* (*Formosella*) *mirabilis* and *Mesozercon plumatus*.

Species	Collection data
P. (*F.*) *mirabilis*	ILAN：Tatung (大同), Taipingshan (太平山), Shanmaoju trail (山毛欅步道), E121°36:47.92531, N24°30:21.65209", 1907 m a.s.l., ex moss on trunk of *Chamaecyparis formosensis* (紅檜).
M. plumatus	TAICHUNG: 1. Hoping, Shaoshueshan Trail (小雪山步道), E120°58'52.46380", N24°14'55.06681", 2161 m a.s.l., litter. 2. Wuling Recreation Area 1). Taoshan Trail, E121°18'36.53401, N24°24'27.67267", 2003 m a.s.l., soil under deciduous trees. 2). Chihyushan trail (池有山步道), E121°18'04.18609, N24°24'37.97684", 2402 m a.s.l., litter and soil at root system of deciduous trees. 3). Shueishan trail (雪山步道) 1.3K, E121°17'51.59048", N24°23'09.55733", 2405 m a.s.l., litter under mixed pine and cypress. ILAN, Tatung (大同), Taipingshan (太平山) 1). Maoshing (茂興) E121°32'08.33620", N24°28'43.45091", 1941 m a.s.l., soil; N24°28'39.94123", 1923 m a.s.l., soil. 2). Shanmaoju trail (山毛欅步道), E121°36'58.85732", N24°30'19.81990", 1908 m a.s.l., soil.

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臺灣蚊蟎科一新種和裂胸蟎科一新紀錄種 (蜱蟎亞綱：中氣門目)

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摘　要

本文記錄在台灣發現之蚊蟎科一新種--雙竇小蚊蟎 *Zerconella* (*Metazercon*) *biconcava* sp. nov. 及裂胸蟎科一新記錄種--鳳凰手綏蟎 *Cheiroseius fenghuangensis* Bei, Xue *et* Chen, 2010；並提供華美副蚊蟎 *Parazercon* (*Formosella*) *mirabilis* Ujvári, 2011 及羽狀中蚊蟎 *Mesozercon plumatus* (Aoki, 1966) 在台灣之新分佈資料。文中亦編撰台灣蚊蟎類之檢索表。

關鍵詞：中氣門亞目、小蚊蟎屬、手綏蟎屬、新種、新記錄。

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