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【Research report】

臺灣產庫蠓(雙翅目：蠓科)四新種【研究報告】

陳錦生

*通訊作者E-mail :

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Abstract

摘要

本文記述臺灣產庫蠓四新種，其學名分別為：阿里庫蠓 (*Culicoides dlishanensis* n. sp.)、呂氏庫蠓 (*C. lulianchengi* n. sp.)、大禹庫蠓 (*C. tayulingensis* n. sp.)、天祥庫蠓 (*C. tienhsiangensis* n. sp.)。並描記雌蟲之詳細形態特徵，分佈及相近種之比較。

Key words:

關鍵詞:

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DESCRIPTIONS OF FOUR NEW SPECIES OF *CULICOIDES* (DIPTERA, CERATOPOGONIDAE) FROM TAIWAN

Chin-Seng Chen

Department of Biology
Tunghai University
Taichung, Taiwan, R. O. C.

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ABSTRACT

Four new species, *Culicoides alishanensis* n. sp., *C. lulianchengi* n. sp., *C. tayulingensis* n. sp. and *C. tienhsiangensis* n. sp. (Diptera, Ceratopogonidae) from Taiwan are described and illustrated. Their morphological features, wing markings and measurements of various appendages are compared with those of allied species on the island.

INTRODUCTION

The blood-sucking midges of the genus *Culicoides* affect man by their severe and irritating bites, and by transmitting human and animal diseases. Some species are responsible for a serious disease in chicken, leucocytozoonosis, and bovine ephemeral fever in Taiwan. The *Culicoides* fauna of this island was investigated actively during the period 1960-1980 (Wirth and Hubert, 1961; McDonald and Lu, 1972; Chen and Chung, 1977; Chen, 1979). A total of 37 species was recorded but most of these described species were based on female only. The recent taxonomic studies on Taiwan *Culicoides* by Kitaoka and Tanaka (1985) added 7 new species, and the total number in this area is now 44.

This paper presents the descriptions of four new species of *Culicoides* on this island. The holotypes of the new species are deposited in the Taiwan Provincial Institute of Infectious Diseases, and the paratypes are deposited in the Department of Biology, Tunghai University, Taichung, Taiwan.

MATERIALS AND METHODS

The materials studied were collected by light traps and preserved in 75% alcohol. In preparing those specimens for microscopic examination, the specimens were treated with 5% KOH, through changes in 70% and 95% alcohol, creosote-xylene mixture and then mounted in Canada balsam. All measurements were taken using an ocular micrometer in a microscope, and illustrations were made with a projector attached to the microscope.

DESCRIPTIONS

Culicoides alishanensis n. sp., (Fig. 1, 5a)

Female: Medium-sized, brown.

Head: Width 0.35 mm, height 0.21 mm, proboscis 0.23 mm in length, P/H ratio (proboscis length/head height) 1.10; eyes separated by a width 21 microns, bare. Antenna

with flagellar segments in proportion of 12: 8: 8: 8: 8: 8: 8: 10: 20: 18: 18: 19: 25, AR (antennal ratio=length of segments 11-15/length of segments 3-10) 1.43, RS (ratio segment=length of segment 11/length of segment 10) 2.0, sensory pits on segments 3, and 11-15; palpal segments 2-5 in proportion of 28: 17: 7: 6; PR (palpal ratio=length of segment 3/breadth of segment 3) 2.8; third segment with a sensory pit which contains numerous sensilla; mandible with 16 teeth, lacinia with about 23 teeth.

Thorax: Scutum brown; wing 1.16 mm long by 0.54 mm wide with a prominent pattern as figured; CR (costal ratio=costal length/wing length) 0.63; wing markings faint; a moderately dark spot over radial cells; a transverse pale spot over r-m crossvein extending to costal margin; transverse poststigmatic pale spot not extending to vein M1; cell R5 with a round pale spot at extreme tip of cell; cell M1 with a round pale spot at distal margin; cell M2 with a pale area at base, a pale spot of moderate size behind median fork, and distal one meeting wing margin; cell M4 with a pale spot meeting wing margin; anal cell with a pale area at base, two confluent pale spots in distal portion of the cell. Halteres pale. Legs brown, fore and mid femora with subapical and all tibiae with subbasal pale rings; hind tibial comb with 4 spines, 1st and 2nd spines longer than the others, TR (tarsal ratio=length of first segment of hind tarsus/length of second segment of hind tarsus) 2.04.

Abdomen: Light brown; spermathecae 2 in number, subequal in size, spherical, with necks, each measuring 42 by 38 μ and 42 by 42 μ , the rudimentary one and ring present.

Male: Unknown.

Holotype: 1 ♀, Alishan (阿里山), Chiayi, 7 X 1976, C. L. Chung.

Paratype: 1 ♀, Shihchuo (石桌), Chiayi, 8 X II 1977, Y. N. Lin and C. L. Chung; 1 ♀, Alishan (阿里山), Chiayi, 17 VII 1979, C. S. Chen and Y. Wada.

Discussion: This species appears to be near *Culicoides liukueiensis* Kitaoka and Tanaka, 1985, however, there are several significant differences in wing markings and feature of the second palpal segment; from *C. liukueiensis* it can be distinguished by the presence of a basal spot in cell M1 and the length of second palpal segment which is almost equal to the total length of segments 3-5.

Remarks: This species is named after the type locality.

Culicoides lulianchengi n. sp. (Fig. 2, 5b)

Female: Medium-sized, brown.

Head: Width 0.32 mm, height 0.19 mm, proboscis 0.15 mm in length, P/H ratio 0.76; eyes separated by a width of 8 mm, bare. Antenna with flagellar segments in proportion of 8: 7: 7: 8: 8: 9: 9: 9: 14: 14: 16: 17: 23, AR 1.29, RS 1.5, sensory pits on segments 3-5 and 11-15; palpal segments 2-5 in proportion of 15: 16: 6: 7; PR 2.1; third segment with a sensory pit which contains numerous sensilla; mandible with 16 teeth, lacinia with about 19 teeth.

Thorax: Scutum brown; wing 1.00 mm long by 0.49 mm wide as figured without prominent marking; a small faint pale spot over r-m crossvein, another small faint pale spot near cell R2 but not covering it, macrotrachia distributed on distal 1/4 of wing, CR 0.62. Halteres pale. Legs pale brown, without any pale area, hind tibial comb with 4 spines, first one longest, TR 1.8.

Abdomen: Light brown; spermathecae 2 in number, without neck, each measuring 76 by 63 μ and 63 by 50 μ , the rudimentary one present, ring or internal sclerites not present.

Male: Unknown,

Holotype: 1 ♀, Sun-Moon Lake (日月潭), Nantou, 24 VIII 1971, L. C. Lu.

Paratype: 1 ♀, same data as for holotype.

Discussion: This species is closely related to *C. kusaiensis* Tokunaga, 1940, but the latter can be easily distinguished in having unspotted wings.

Remarks: This species is named in honour of Mr. Lu Lian-cheng for having collected the specimens.

***Culicoides tayulingensis* n. sp.** (Fig. 3, 5c)

Female: Large, brown.

Head: Width 0.44 mm, height 0.33 mm, proboscis 0.29 mm in length. P/H ratio 0.88. Eyes contiguous for about 2 facets, bare. Antenna with flagellar segments in proportion of 17: 14: 15: 15: 14: 14: 14: 14: 20: 20: 22: 24: 35, AR 1.03; RS 1.43; sensory pits on segments 3, 11-15; palpal segments 2-5 in proportion of 26: 27: 10: 12; PR 3.0, third segment slightly swollen at mid-portion with scattered sensilla on distal half; mandible with 20 teeth, lacinia with about 23 teeth.

Thorax: Scutum brown; wing 1.91 mm long by 0.98 mm wide; with a prominent pattern as figured; CR 0.69; a large pale area at base extending across base of anal cell, a broad pale area over r-m crossvein, pale spot over radial cell broad, extending to vein M1, third anterior dark spot narrow, a large pale spot straddling midportion of vein M2, distal pale spots in cell M1 and M2 attaining wing margin, cell M4 with a large pale spot over distal 2/3, anal cell with irregular pale areas in distal and basal portion. Halteres pale. Legs entirely pale except for a dark brown area at hind tibial knees, hind tibial comb with 6 spines, the first one from the spur longest; TR 1.91.

Abdomen: Spermathecae 2 in number, with necks, each measuring 50 μ by 50 μ and 63 by 50 μ , the rudimentary one and ring present.

Male: Unknown.

Holotype: 1 ♀, Tayuling (大禹嶺), Hualien, 20 VII 1971, L. C. Lu.

Paratype: 3 ♀ ♀, same data as for holotype; 5 ♀ ♀, 1 VIII 1971; 6 ♀ ♀, Alishan (阿里山), Chiayi, 20 VII 1971, 1 ♀ Chungtashan (中大山), Nantou, 1 ♀, VIII 1971, L. C. Lu; 2 ♀ ♀, 12 VIII 1981, C. S. Chen.

Discussion: This species is closely related to *C. liui* Wirth and Hubert, 1961 in wing markings; from *C. liui* it can be distinguished by the presence of a basal pale area in cell M4, and a sensory pit on third palpal segment.

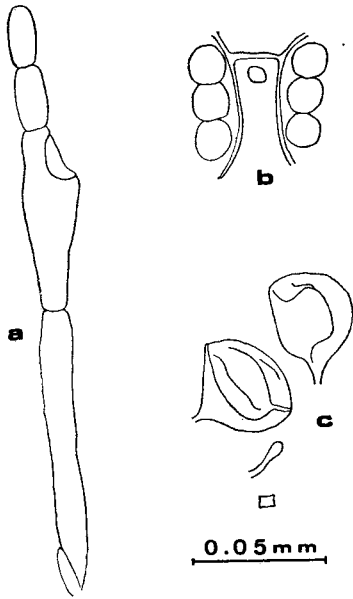
Remarks: This species is named after the type locality.

***Culicoides tienhsiangensis* n. sp.** (Fig. 4, 5d)

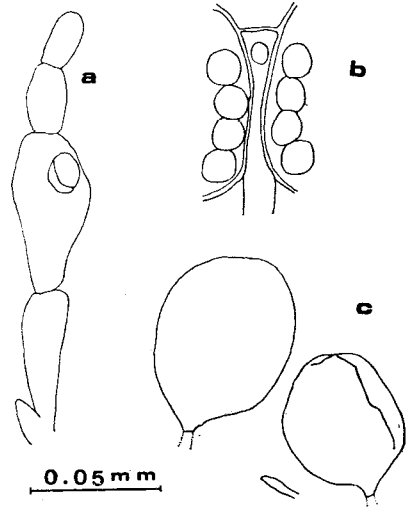
Female: Large size, brown.

Head: width 0.39 mm, height 0.25 mm, proboscis 0.25 mm in length. P/H ratio 0.98; eyes contiguous for about 2 facets, bare. Antenna with flagellar segments in proportion of 12: 12: 12: 12: 12: 12: 13: 13: 18: 17: 20: 22: 31, AR 1.10, RS 1.38; sensory pits on segments 3 and 11-15; palpal segments 2-5 in proportion of 19: 25: 10: 11, PR 3.13, third segment slightly swollen near distal portion with scattered sensilla on distal half; mandible with 17 teeth, lacinia with 18 teeth.

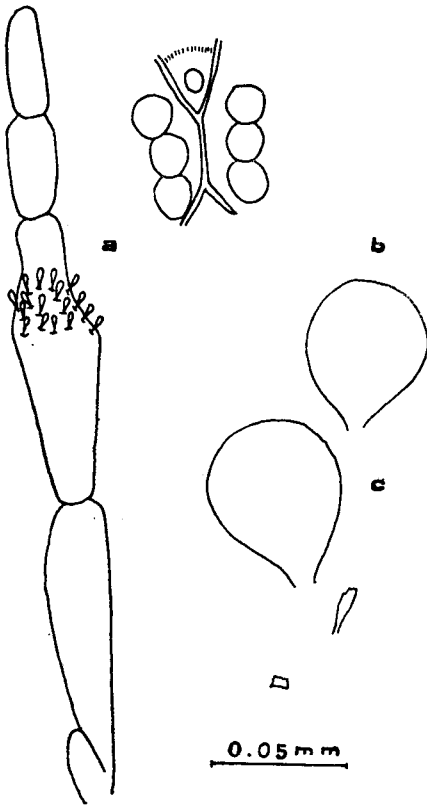
Thorax: Scutum dark brown; wing 1.74 mm long by 0.81 mm wide with a prominent pattern as figured; CR 0.53; a large pale area at base extending across base of anal cell, a broad pale area over r-m crossvein, wider at costal margin; a pale spot over radial cell broad; third anterior dark spot narrow; a large pale spot straddling midportion of vein M2, distal pale spots in cell M1 and M2 attaining wing margin; a large pale area between medial and mediocubital forks extending from the portion proximal to basal pale area of wing in cell M2 to level of the base of vein M 3+4; cell M4 with a large pale spot at distal half; anal cell with an irregular faint pale area. Halteres pale. Legs brown, all femora with a sub-basal pale rings; hind tibia with a sub-apical pale ring and a dark knee, and with 6 spines, the second one from the spur longest; TR 1.73.



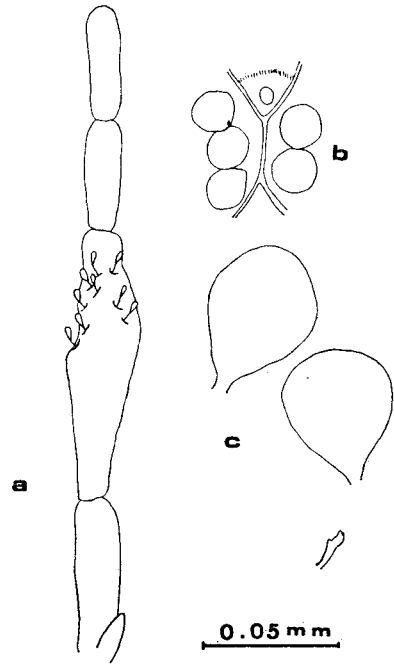
a: palpus b: eyes c: spermathecae
 Fig. 1. *C. alishanensis*



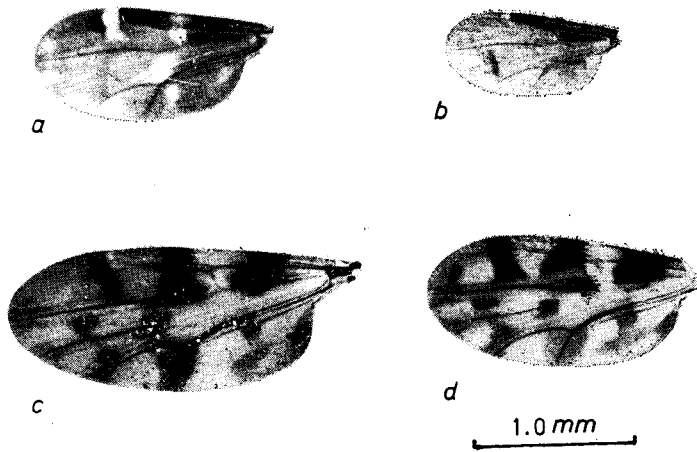
a: palpus b: eyes c: spermathecae
 Fig. 2. *C. lulianchengi*



a: palpus b: eyes c: spermathecae
 Fig. 3. *C. tayulingensis*



a: palpus b: eyes c: spermathecae
 Fig. 4. *C. tienhsiangensis*



a: *alishanensis* b: *lulianchengi* c: *tayulingensis* d: *tienhsiangensis*

Fig. 5. Wing patterns of *Culicoides*.

Abdomen: light brown; spermathecae 2 in number, subequal in size, with necks, each measuring 50 by 44 μ and 50 by 46 μ , the rudimentary one and ring present.

Male: Unknown.

Holotype: 1 ♀, Tienhsiang (天祥), Hualien, 24 X 1970, L. C. Lu.

Paratype: 1 ♀, same data as for holotype; 3 ♀ ♀, Tayuling (大禹嶺), Hualien, 12 VIII 1971; 2 ♀ ♀, Chiayang (佳陽), Nantou, 21 VII 1971; 6 ♀ ♀, Chuntashan (中大山), Nantou, 1 III 1971 1 ♀, Alishan (阿里山), Chiayi, 15 III 1972; 5 ♀ ♀, Alishan, 20 VII 1971 (all collected by L. C. Lu); 4 ♀ ♀, Sanlinshi (杉林溪), Nantou, 28 IX 1968, C. S. Chen.

Discussion: Both this species and *C. tayulingensis* are common in montane area, The wing patterns of the two species are very similar, but they differ in body size. The latter can be distinguished by the larger size and wider pale spots of wing,

Remarks: This species is named after the type locality.

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臺灣產庫蠓（雙翅目，蠓科）四新種

陳 錦 生

東海大學生物系

本文記述臺灣產庫蠓四新種，其學名分別爲：阿里庫蠓 (*Culicoides alishanensis* n. sp.)、呂氏庫蠓 (*C. lulianchengi* n. sp.)、大禹庫蠓 (*C. tayulingensis* n. sp.)、天祥庫蠓 (*C. tienhsiangensis* n. sp.)。並描記雌蟲之詳細形態特徵，分佈及相近種之比較。