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Eriophyoid Mites of Taiwan: Description of Thirteen Species of Nothopodinae from Hueysuen (Acari: Eriophyoidea) 【Research report】

臺灣產節蟬：描述十三種惠蓀林場偽足節蟬亞科（蟬蟬亞綱：節蟬總科）【研究報告】

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Abstract

In this work, the authors describe and illustrate four genera and 13 species, including ten new species and one new combination and give additional descriptions of two known species, of the Nothopodinae from Hueysuen Experimental Forest, Nantou County, central Taiwan. They are: *Colopodacus insulanaus* sp. nov. (infesting *Bridelia insulanaus*), *Colopodacus obovatus* sp. nov. (infesting *Stauntonia obovata* and *Ficus irisana*), *Anothopoda zuihoenae* sp. nov. (infesting *Machilus zuihoensis*), *Floracarus syzygiae* sp. nov. (infesting *Syzygium formosanum*), *Floracarus hypophaeae* sp. nov. (infesting *Litsea hypophaea*), *Floracarus neolitsea* nov. comb. (Huang, 1992) (infesting *Neolitsea acuminatissima*), *Cosella viburniae* sp. nov. (infesting *Viburnum luzonicum*), *Cosella formosana* sp. nov. (infesting *Helicia formosana*), *Cosella macrocarpae* sp. nov. (infesting *Mucuna macrocarpa*), *Cosella castanopiae* sp. nov. (infesting *Castanopsis kawakamii*), *Cosella hancei* sp. nov. (infesting *Lithocarpus hancei*), *Cosella fleschneri* (Keifer, 1959) (infesting *Schima superba* var. *superba*), and *Cosella championi* Huang, 2001 (infesting *Bauhinia championii*). A key to the genera and species of Nothopodinae of Hueysuen is provided.

摘要

本文以文字及繪圖描述4屬13種採於惠蓀林場偽足節蟬亞科，其中包含10新種、1新組合及2舊有種。分別為：*Colopodacus obovatus* sp. nov. 為害圓葉野木瓜 (*Stauntonia obovata*)及澀葉榕 (*Ficus irisana*)，*Colopodacus insulanaus* sp. nov. 為害刺杜蜜 (*Bridelia insulana*)，*Anothopoda zuihoenae* sp. nov. 為害香楠 (*Machilus zuihoensis*)，*Floracarus syzygiae* sp. nov. 為害臺灣赤楠 (*Syzygium formosanum*)，*Floracarus neolitsea* nov. comb. (Huang, 1992) 為害漸尖葉新木樺子 (*Neolitsea acuminatissima*)，*Floracarus hypophaeae* sp. nov. 為害黃肉樹 (*Litsea hypophaea*)，*Cosella formosana* sp. nov. 為害山龍眼 (*Helicia formosana*)，*Cosella macrocarpae* sp. nov. 為害血藤 (*Mucuna macrocarpa*)，*Cosella hancei* sp. nov. 為害三斗石櫟 (*Lithocarpus hancei*)，*Cosella championi* Huang, 2001 為害菊花木 (*Bauhinia championi*)，*Cosella fleschneri* (Keifer, 1959) 為害木荷 (*Schima superba* var. *superba*)，*Cosella viburniae* sp. nov. 為害呂宋莢迷 (*Viburnum luzonicum*) 及 *Cosella castanopiae* sp. nov. 為害川上氏槲 (*infesting Castanopsis kawakamii*)。本文並對惠蓀林場產偽足節蟬亞科、族、屬及種做一檢索表。

Key words: Nothopodinae, Hueysuen, Taiwan

關鍵詞: 偽足節蟬亞科、惠蓀、臺灣。

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Eriophyoid Mites of Taiwan: Description of Thirteen Species of Nothopodinae from Hueysuen (Acari: Eriophyoidea)

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ABSTRACT

In this work, the authors describe and illustrate four genera and 13 species, including ten new species and one new combination and give additional descriptions of two known species, of the Nothopodinae from Hueysuen Experimental Forest, Nantou County, central Taiwan. They are: *Colopodacus insulanaus* sp. nov. (infesting *Bridelia insulanaus*), *Colopodacus obovataus* sp. nov. (infesting *Stauntonia obovata* and *Ficus irisana*), *Anothopoda zuihoenae* sp. nov. (infesting *Machilus zuihoensis*), *Floracarus syzygiae* sp. nov. (infesting *Syzygium formosanm*), *Floracarus hypophae* sp. nov. (infesting *Litsea hypophaea*), *Floracarus neolitseaus* nov. comb. (Huang, 1992) (infesting *Neolitsea acuminatissima*), *Cosella viburniae* sp. nov. (infesting *Viburnum luzonicum*), *Cosella formosana* sp. nov. (infesting *Helicia formosana*), *Cosella macrocarpa* sp. nov. (infesting *Mucuna macrocarpa*), *Cosella castanopiae* sp. nov. (infesting *Castanopsis kawakamii*), *Cosella hancei* sp. nov. (infesting *Lithocarpus hancei*), *Cosella fleschneri* (Keifer, 1959) (infesting *Schima superba* var. *superba*), and *Cosella championi* Huang, 2001 (infesting *Bauhinia championii*). A key to the genera and species of Nothopodinae of Hueysuen is provided.

Key words: Nothopodinae, Hueysuen, Taiwan

Introduction

Hueysuen Forest Recreation (800~2400 m elev.) is located in central Taiwan, and belongs to National Chung Hsing University. The climate and flora are subtropical types. During 1990 to 1996, the authors went to Hueysuen five times to collect eriophyoid mites as a part of preparing their doctoral and master's

theses. We collected about 75 species of eriophyoid mites. The average elevation of the collection points was about 1000 m, and the climate there is warm and wet.

In this study, we report on 13 species of Nothopodinae as the 1st series of eriophyoid mites from Hueysuen. The mites belong to two tribes and four genera. Among them, two species belong to *Colopodacus*, one species to the

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Anothopoda, three species to the *Floracarus*, and seven species to *Cosella*.

Most species of Nothopodinae occur in subtropical and tropical areas. There were six known species of *Colopodacus* from Taiwan before this report. Thus the total number of *Colopodacus* species known from Taiwan has increased to eight species, and its ratio to the world total is 50% (8/16). Including this paper, there is one species of *Anothopoda* from Taiwan, and its ratio to the world total is 16.7% (1/6). There are seven species of *Floracarus* from Taiwan, including one new combination produced by a misidentification in a previous paper. *Floracarus neolitseaus* with tibiae fused with tarsi was misidentified as *Neometaculus* in 1992. The ratio of *Floracarus* of Taiwan to the world total is 35% (7/20). There are 13 species of *Cosella* from Taiwan, including 12 species known only from Taiwan, and its ratio to the world total is 68.4% (13/19).

Specimens are deposited in the National Museum of Natural Science (NMNS). All measurement units are in micrometers (μ m). The terminology and abbreviations in the diagrams follow those of Lindquist (1996) and Huang (1999).

In the text, the measurement of the oblique distance between tubercles is indicated by a back slash (\), and that of the straight distance between tubercles is indicated by a dash (—).

Key to species of Nothopodinae of Hueysuen, Taiwan (modified from Amrine, 1996)

1. Coxa I with seta 1b present; coxae of legs I usually weakly divided; scapular seta ahead of rear shield margin, directed upwards and centrad; tibia of legs I completely fused with tarsus - Colopodacini ... 2
 - . Coxa I without seta 1b; coxae of legs I either separate or fused across
 - midline; scapular seta and tibia of legs I variable-----Nothopodini ... 3
 - 2. Shield design with an "X" marked at apical 1/3-----
 - Colopodacus obovataus* sp. nov.
 - . Shield design reticulated-----
 - Colopodacus insulanaus* sp. nov.
 - 3. Scapular seta absent; 2nd ventral seta absent -----
 - Anothopoda zuihoenae* sp. nov.
 - . Scapular seta present; 2nd ventral seta present ----- 4
 - 4. Scapular seta near rear shield margin, directed to rear and divergent, with cylindrical tubercles; fore coxae fused across center line; fore tibia fused with tarsi ----- 5
 - . Scapular seta set ahead of rear shield margin, usually directed upwards, tubercles plicate; fore coxae fused or with sternal line present; fore tibia slightly discernible on leg underside----- 7
 - 5. Shield design median line present--- 6
 - . Shield design median line absent-----
 - Floracarus syzygiae* sp. nov.
 - 6. Shield design with network, coverflap with granules-----
 - Floracarus neolitseaus* comb. nov.
 - . Shield design with Y-shaped median line; coverflap with cross ridges -----
 - Floracarus hypophae* sp. nov.
 - 7. Shield design median line absent-----
 - Cosella formosana* sp. nov.
 - . Shield design with median line----- 8
 - 8. Empodium 3 rayed ----- 9
 - . Empodium 4 rayed -----11
 - 9. Dorsal opisthosoma with microtubercles -----
 - Cosella macrocarpae* sp. nov.
 - . Dorsal opisthosoma smooth-----10.
 - 10. 1st transverse line between median and admedian lines with 2 forked lines extending to lateral sides -----
 - Cosella hancei* sp. nov.
 - . 1st transverse line between median and admedian lines with 3 forked lines at each side-----
 - Cosella championi* Huang, 2001
 - 11. 1st transverse line between median

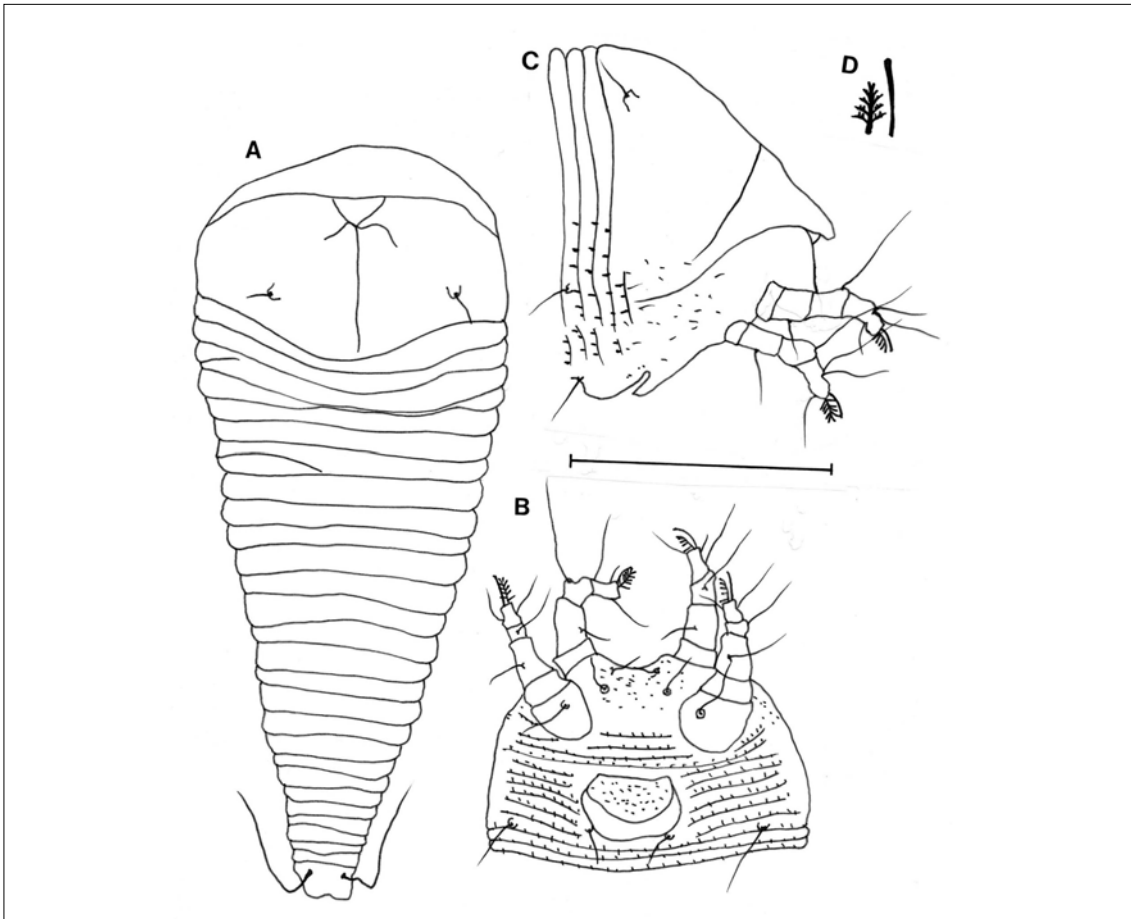


Fig. 1. *Colopodacus obovatus* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

- and admedian lines not extending to lateral sides-----
 -----*Cosella fleschneri* (Keifer, 1959)
 -. 1st transverse line between median and admedian lines extending to lateral sides-----12
 12. 1st transverse line with 2 forked lines at each side -----
 -----*Cosella viburniae* sp. nov.
 -. 1st transverse line without forked line-----*Cosella castanopiae* sp. nov.

***Colopodacus obovatus* sp. nov.**
(Fig. 1)

Female: Body spindle shaped, 152 long, shield 42 long, 62 wide, shield lobe present; shield design with a transverse line across apical 1/4, median line from base to apical 1/4, with an X-like fork at apical 1/3, admedian line and submedian line absent; scapular tubercles set ahead of rear shield margin, scapular seta 7 long, directed to rear and upwards, Dt-Dt 37 apart. Legs: tibiae fused with tarsi; fore coxal area with granules; 1st coxal seta 4 long, Ct1-Ct1 9 apart, 2nd coxal seta 7 long, Ct2-Ct2 13 apart, 3rd coxal seta 11 long, Ct3-Ct3 27 apart, Ct1\Ct2 11, Ct1-Ct2 11, Ct2\Ct3 20, Ct2-Ct3 8;

solenidion ending as knob; empodium simple, 5 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 27 rings, 1st 3 dorsal annuli 9 long; ventral annuli with 56 microtuberculate rings; lateral seta 17 long, Lt-Lt 49 apart, Lt\Vt1 51, Lt-Vt1 30; 1st ventral seta 23 long, Vt1-Vt1 35 apart, Vt1\Vt2 40, Vt1-Vt2 32; 2nd ventral seta 6 long, Vt2-Vt2 15 apart, Vt2\Vt3 40, Vt2-Vt3 36; 3rd ventral seta 14 long, Vt3-Vt3 19 apart; accessory seta absent. Coverflap: 20 wide, 12 long, covered with granules, genital seta 7 long, Gt-Gt 16 apart.

Male: Not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Stauntonia obovata* Hemsl (Larizabalaceae). (deposited at NMNS).

Paratypes, 2 ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Ficus irisana* Elm. (Moraceae).

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. toddalius* Huang, 2001 but differs in shield design having a median line from the base to the apical 1/4 and an "X-like" fork at the apical 1/4.

Colopodacus insulanaus sp. nov. (Fig. 2)

Female: Body spindle shaped, 188 long, shield 38 long, 57 wide, shield lobe present; shield design with median line and admedian lines from basal 1/5 to basal 4/5, with 3 transverse lines, 1 each at the basal 1/3, 2/3, and 3/4, transverse line at 3/4 diverging to lateral margin, transverse line at 2/3 with forked lines diverging to lateral sides, submedian lines from basal 1/4 to 2/3, with 2 forked lines at 1/2, one connecting to admedian line, the other diverging to lateral margin; scapular tubercles set ahead of rear shield margin, scapular seta 12 long, directed to rear, Dt-Dt 35 apart. Legs:

tibiae fused with tarsi; coxal area with granules; 1st coxal seta 9 long, Ct1-Ct1 8 apart, 2nd coxal seta 15 long, Ct2-Ct2 13 apart, 3rd coxal seta 18 long, Ct3-Ct3 29 apart, Ct1\Ct2 11, Ct1-Ct2 4, Ct2\Ct3 21, Ct2-Ct3 9; solenidion ending as knob; empodium simple, 7 rayed.

Opisthosoma: dorsum arched, dorsal annuli with 48 microtuberculate rings, 1st 3 dorsal annuli 7 long; ventral annuli with 67 microtuberculate rings; lateral seta 24 long, Lt-Lt 50 apart, Lt\Vt1 61, Lt-Vt1 37; 1st ventral seta 35 long, Vt1-Vt1 45 apart, Vt1\Vt2 53, Vt1-Vt2 41; 2nd ventral seta 20 long, Vt2-Vt2 23 apart, Vt2\Vt3 51, Vt2-Vt3 47; 3rd ventral seta 20 long, Vt3-Vt3 17 apart; accessory seta absent.

Coverflap: 21 wide, 14 long, covered with granules, genital seta 12 long, Gt-Gt 16 apart.

Male: Not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Bridelia insulana* Hance (Euphorbiaceae). (deposited at NMNS). **Paratypes**, 2 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. africanus* Keifer, 1960 but differs in shield design having admedian lines from the base to the basal 1/5, coverflap having granules at the base, and the 7-rayed empodium.

Anothopoda zuihoenae sp. nov. (Fig. 3)

Female: Body fusiform, 154 long, shield 34 long, 51 wide, shield lobe absent; shield design with median line from base to basal 1/4, admedian lines complete, with 3 transverse lines connected to median line, 1 each at basal 1/3, middle, and 3/4, transverse line at 3/4 diverging to lateral margin, with 1 forked line directed to anterior margin, middle one diverging to lateral margin, submedian

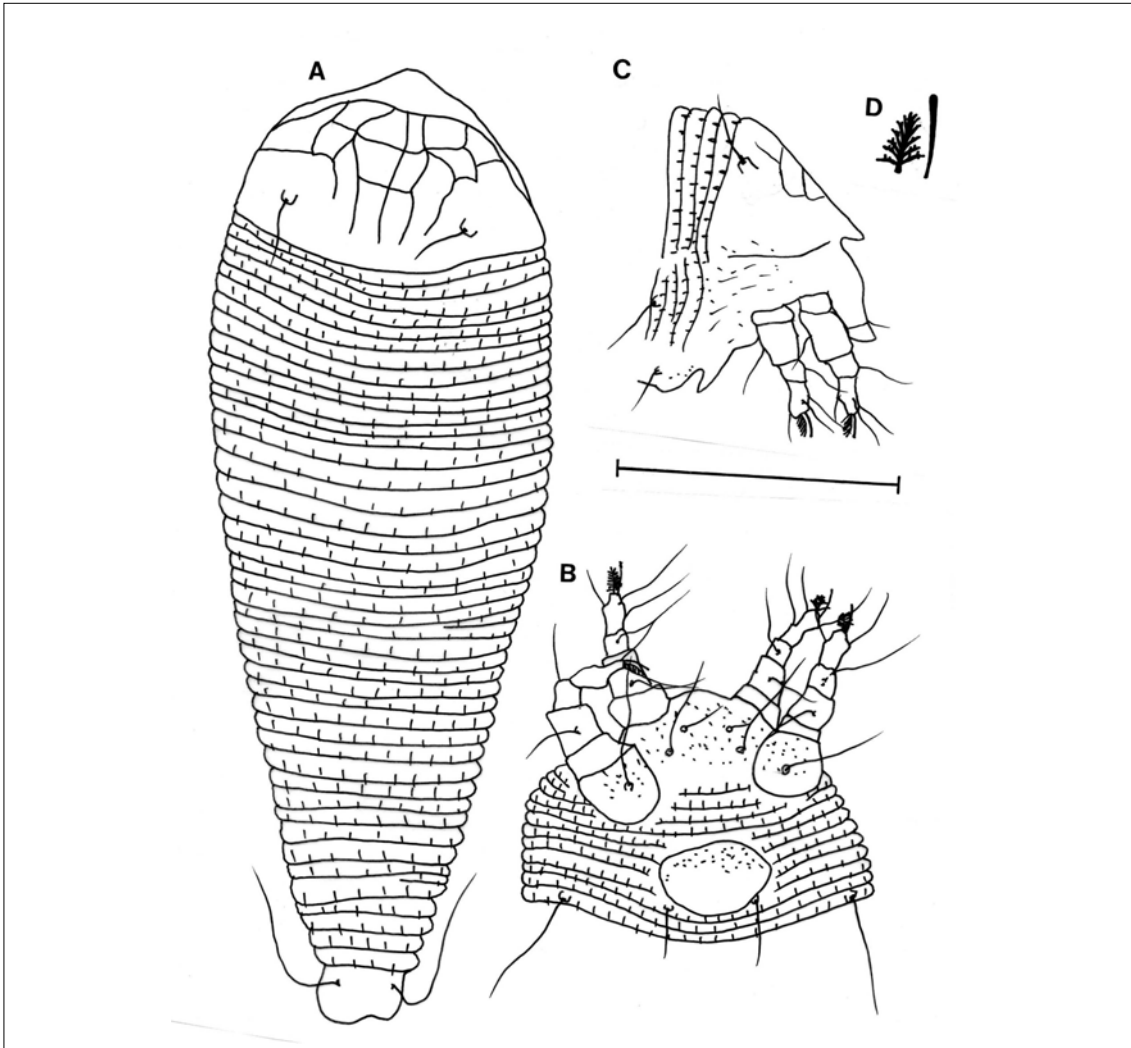


Fig. 2. *Colopodacus insulanaus* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

lines bifurcate in basal 1/3, one connecting to admedian line, the other with 4 forked lines; scapular tubercles and seta absent. Legs: coxal area with granules; 1st coxal tubercles and seta absent, 2nd coxal seta 6 long, Ct2-Ct2 9 apart, 3rd coxal seta 8 long, Ct3-Ct3 25 apart, Ct2\Ct3 17, Ct2-Ct3 10; solenidion ending as knob; empodium simple, 4 rayed.

Opisthosoma: dorsum arched, dorsal and

ventral annuli with about 51 spine-like microtuberculate rings, 1st 3 annuli 8 long; lateral seta 28 long, Lt-Lt 45 apart, Lt\Vt1 43, Lt-Vt1 20; 1st ventral seta 40 long, Vt1-Vt1 33 apart; 2nd ventral tubercles and seta absent; 3rd ventral seta 25 long, Vt3-Vt3 20 apart; accessory seta absent.

Coverflap: 22 wide, 14 long, with granules, genital seta 6 long, Gt-Gt 13 apart.

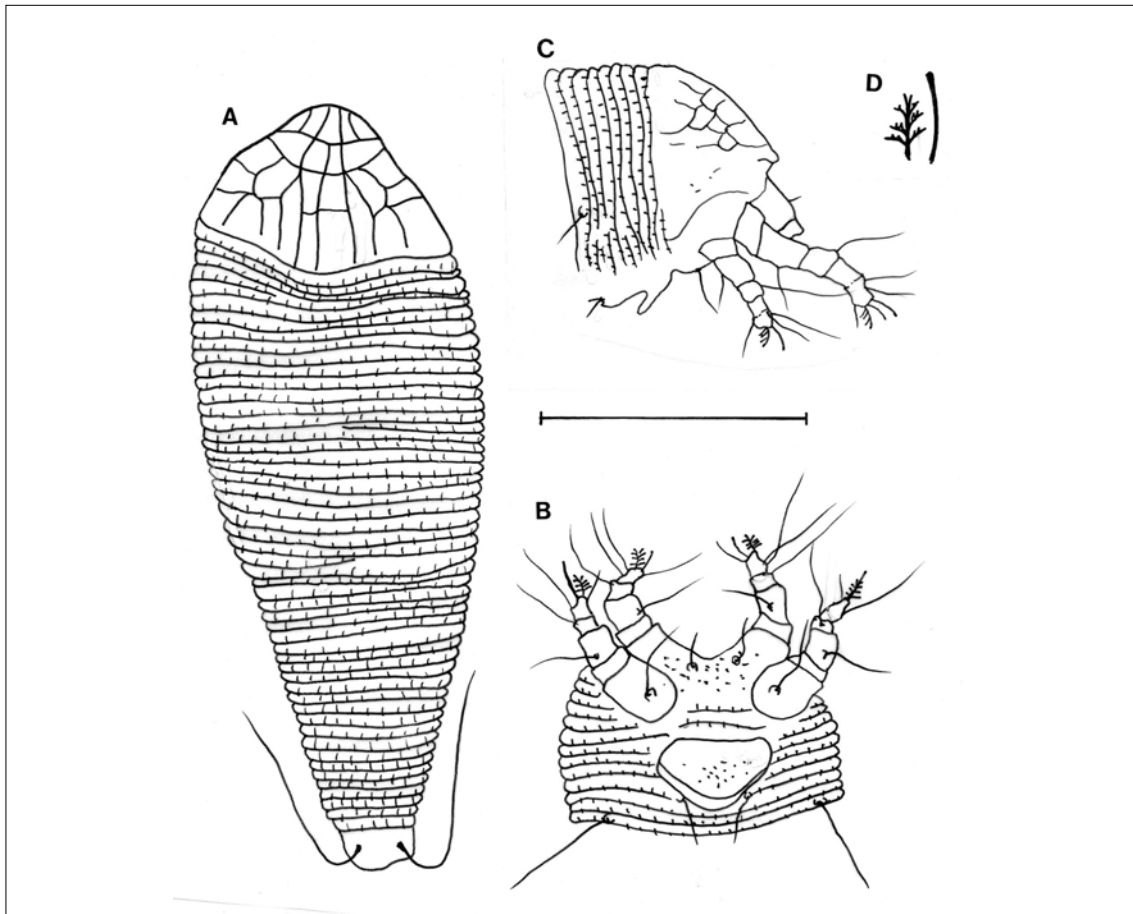


Fig. 3. *Anothopoda zuihoenae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

Male: not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 9-Sept.-1992, K. W. Huang & C. F. Wang; ex *Machilus zuihoensis* Hay. var. *zuihoensis* (Lauraceae). (deposited at NMNS). **Paratypes**, 2 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *A. cinnamomi* Kuang & Feng, 1989 but differs in the shield design with 3 transverse lines between the median and admedian lines, coverflap with granules,

and the dorsal opisthosoma with microtubercles.

***Floracarus syzygiae* sp. nov. (Fig. 4)**

Female: Body fusiform, 167 long, shield 37 long, 56 wide, shield lobe present, shield design without median line, admedian lines from base to basal 1/5, converging to base, a transverse line at basal one-fifth, submedian line absent; scapular tubercles set at rear margin, scapular seta 12 long, directed to rear and divergent, Dt-Dt 42 apart; 1st coxal tubercles and seta absent, 2nd coxal seta

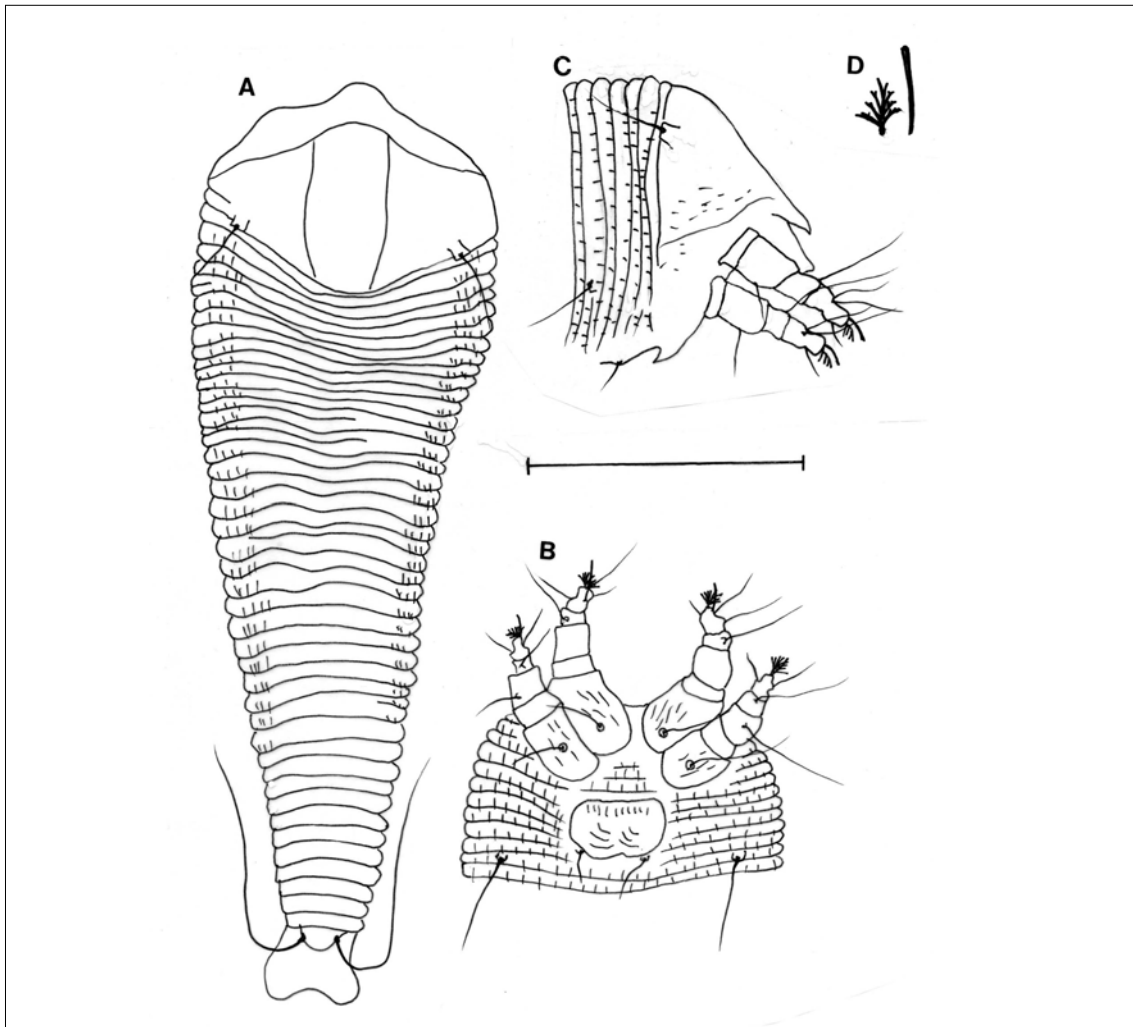


Fig. 4. *Floracarus syzygiae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

83 long, Ct2-Ct2 12 apart, 3rd coxal seta 10 long, Ct3-Ct3 25 apart, Ct2\Ct3 19, Ct2-Ct3 8, coxal area with short longitudinal lines; claw ending as knob; empodium simple, 4 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with about 51 rings, with microtuberculations at each lateral side, 1st 3 rings 4 long; ventral annuli with about 51 microtuberculate rings; lateral seta 17 long, Lt-Lt 42 apart, Lt\Vt1 41, Lt-Vt1 26; 1st ventral seta 27 long,

Vt1-Vt1 26 apart, Vt1\Vt2 37, Vt1-Vt2 31; 2nd ventral seta 26 long, Vt2-Vt2 15 apart, Vt2\Vt3 48, Vt2-Vt3 45; 3rd ventral seta 15 long, Vt3-Vt3 16 apart; accessory seta absent.

Coverflap: 17 wide, 10 long, with about 11 short longitudinal ridges at base, with 4 transverse lines in 2 rows at middle, genital seta 8 long, Gt-Gt 14 apart.

Male: not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang;

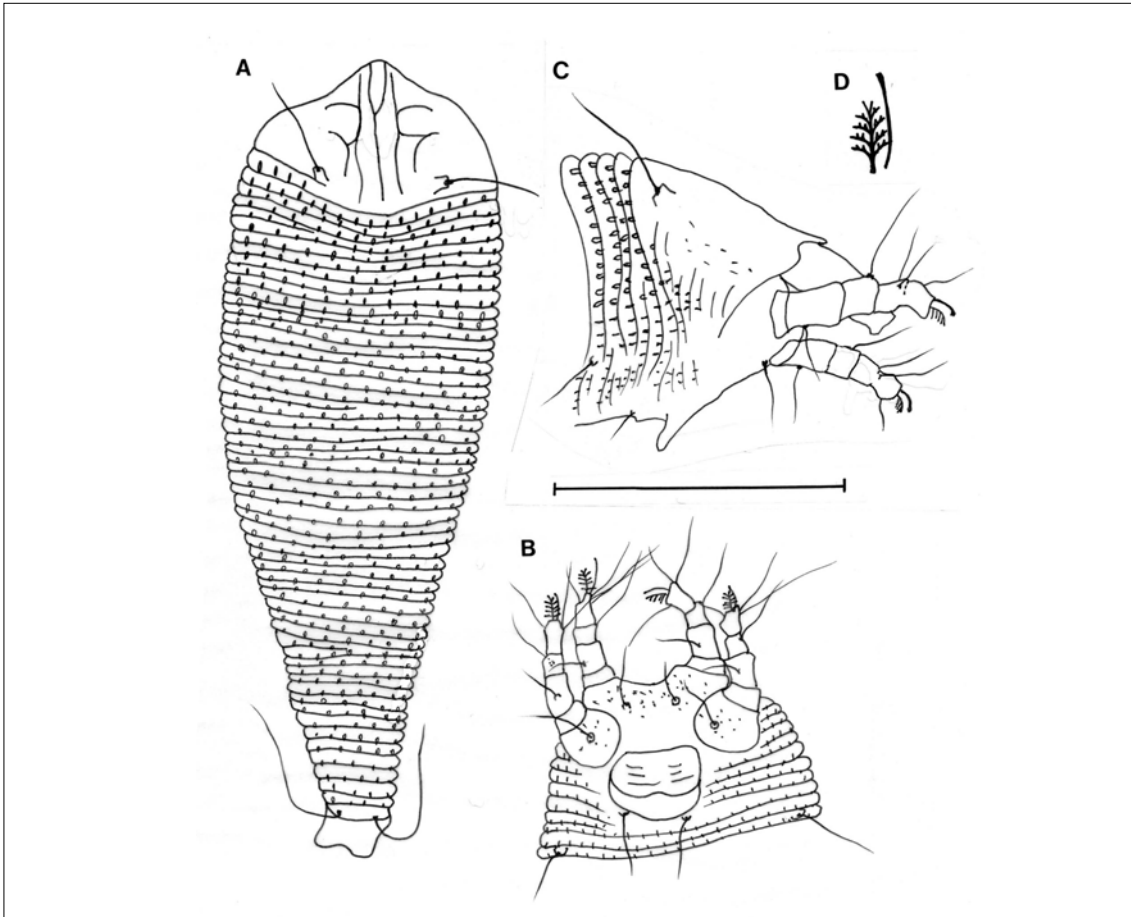


Fig. 5. *Floracarus hypophae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

ex *Syzygium formosanum* (Hay.) Mori (Myrtaceae). (deposited at NMNS). **Paratypes**, 3 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species differs from others species of *Floracarus* Keifer, 1953 by the absence of a shield design median and the admedian lines which are subparallel and complete.

***Floracarus neolitseus* comb. nov.**

Neometaculus neolitseae Huang, 1992

Specimens examined: 3 ♀, NANTOU: Renai Township, 2-Nov.-1990, K. W. Huang; ex *Neolitsea acuminatissima* (Hay.) Kaneh. et Sasaki (Lauraceae).

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This species was misidentified as *Neometaculus* Mohanasundaram, 1983 by the 1st author in 1992. This species is close to *F. biserratae* Huang, 2001 but differs in the opisthosomal dorsal annuli without microtubercles and in the 3-rayed empodium.

Floracarus hypophae sp. nov. (Fig. 5)

Female: Body fusiform, 148 long, shield 27 long, 42 wide, shield lobe present, shield design with complete median line and admedian lines, subparallel, median line with forked lines at basal 3/4, forming Y-like, admedian lines with forked lines at about 1/2, directed laterad, submedian line absent; scapular tubercles set at rear margin, scapular seta 15 long, directed forward and divergent, Dt-Dt 22 apart; coxal area with granules, 1st coxal tubercles and seta absent, 2nd coxal seta 7 long, Ct2-Ct2 8 apart, 3rd coxal seta 10 long, Ct3-Ct3 21 apart, Ct2\Ct3 15, Ct2-Ct3 8; claw ending as knob; empodium simple, 5 rayed.

Opisthosoma: dorsum arched, dorsal annuli with about 53 microtuberculate rings, 1st 3 rings 7 long; ventral annuli with about 56 microtuberculate rings; lateral seta 20 long, Lt-Lt 22 apart, Lt\Vt1 39, Lt-Vt1 22; 1st ventral seta 22 long, Vt1-Vt1 28 apart, Vt1\Vt2 41, Vt1-Vt2 34; 2nd ventral seta 24 long, Vt2-Vt2 17 apart, Vt2\Vt3 39, Vt2-Vt3 35; 3rd ventral seta 11 long, Vt3-Vt3 13 apart; accessory seta absent.

Coverflap: 18 wide, 10 long, with about 3 transverse lines in 2 rows, genital seta 12 long, Gt-Gt 10 apart.

Male: not seen.

Type data: Holotype ♀, NANTOU: Renai Township, 8-Sept.-1992, K. W. Huang & C. F. Wang; ex *Litsea hypophaea* Hayata (Lauraceae). (deposited at NMNS).

Paratypes, 3 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species differs from others species of *Floracarus* Keifer, 1953 by the shield design with the Y-like median line and admedian lines from 1/2 to the apical 1/3.

Cosella formosana sp. nov. (Fig. 6)

Female: Body spindle shaped, 152 long, shield 35 long, 67 wide, shield lobe absent, shield design median line absent, admedian lines complete, sinuous, diverging to base, with transverse lines at basal 1/4, along shield margin, submedian line absent; scapular tubercles set ahead of rear shield margin, Dt-Sr 11 long, scapular seta 10 long, directed to rear, Dt-Dt 38 apart; leg segment tibiae fused with tarsi; fore coxal area with granules; 1st coxal tubercle absent, 2nd coxal seta 9 long, Ct2-Ct2 9 apart, 3rd coxal seta 19 long, Ct3-Ct3 30 apart, Ct2\Ct3 22, Ct2-Ct3 15; claw ending as knob; empodium simple, 5 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 44 rings, 1st 3 dorsal annuli 8 long; ventral annuli with 57 microtuberculate rings; lateral seta 16 long, Lt-Lt 48 apart, Lt\Vt1 49, Lt-Vt1 28; 1st ventral seta 23 long, Vt1-Vt1 33 apart, Vt1\Vt2 38, Vt1-Vt2 31; 2nd ventral seta 14 long, Vt2-Vt2 14 apart, Vt2\Vt3 37, Vt2-Vt3 35; 3rd ventral seta 14 long, Vt3-Vt3 14 apart; accessory seta absent.

Coverflap: 22 wide, 13 long, with granules at base, genital seta 6 long, Gt-Gt 17 apart.

Male: not seen.

Type data: Holotype ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Helicia formosana* Hemsl. (Proteaceae). (deposited at NMNS). **Paratypes**, 2 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species differs from others species of *Cosella* Newkirk & Keifer, 1975 by the absence of the median line of the shield design and the sinuous admedian lines along the shield margin.

Cosella macrocarpae sp. nov. (Fig. 7)

Female: Body spindle shaped, 198 long,

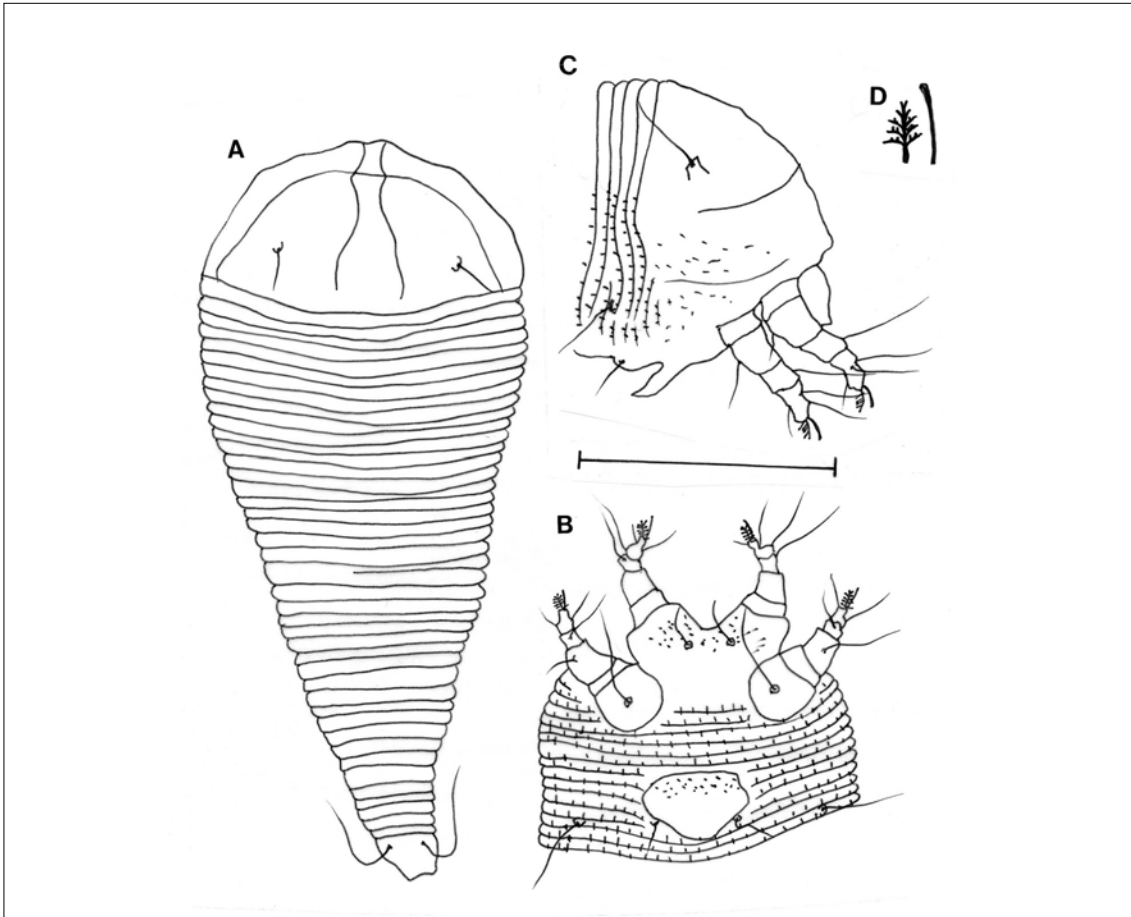


Fig. 6. *Cosella formosana* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

shield 45 long, 81 wide, shield lobe present, shield design with complete median line and admedian lines, with transverse lines at basal 1/4, 1/2, and 3/4, 1st transverse line at basal 3/4 extending to lateral margin, 2nd transverse line extending to lateral sides, with forked line directed to anterior, submedian line from 1/2 to apex, connecting to 2nd transverse line, with forked line directed to lateral side; scapular tubercles set ahead of rear shield margin, Dt-Sr 12 long, scapular seta 10 long, directed upwards and to rear, Dt-Dt 33 apart; leg segment tibiae fused with tarsi; fore coxal

area with granules; 1st coxal tubercle absent, 2nd coxal seta 11 long, Ct2-Ct2 11 apart, 3rd coxal seta 11 long, Ct3-Ct3 34 apart, Ct2\Ct3 24, Ct2-Ct3 13; claw ending as knob; empodium simple, 3 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 52 microtuberculate rings, 1st 3 dorsal annuli 8 long; ventral annuli with 66 microtuberculate rings; lateral seta 16 long, Lt-Lt 60 apart, Lt\Vt1 61, Lt-Vt1 37; 1st ventral seta 21 long, Vt1-Vt1 39 apart, Vt1\Vt2 49, Vt1-Vt2 40; 2nd ventral seta 7 long, Vt2-Vt2 18 apart, Vt2\Vt3 52, Vt2-Vt3 47; 3rd

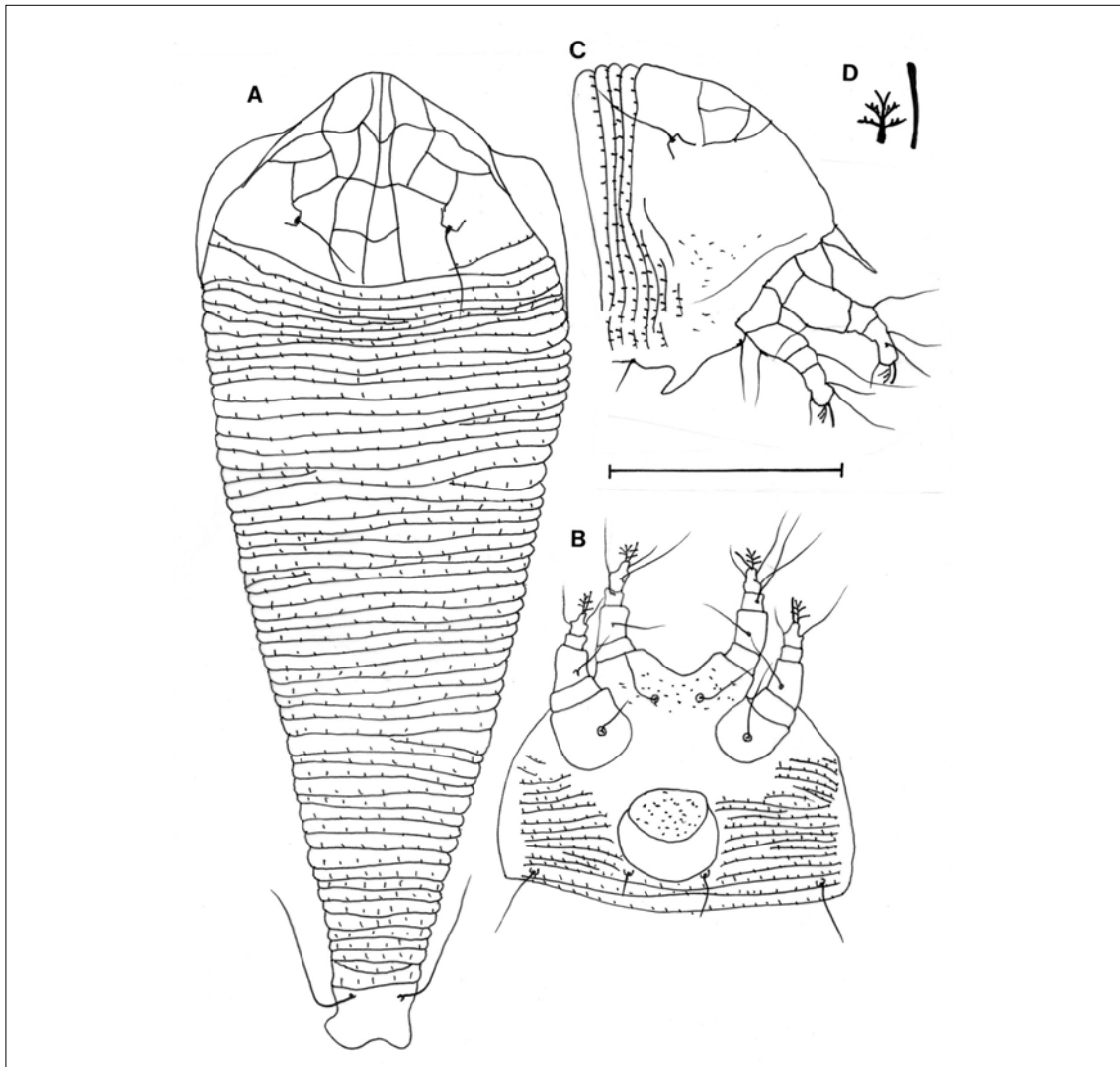


Fig. 7. *Cosella macrocarpae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

ventral seta 21 long, Vt3-Vt3 24 apart; accessory seta absent.

Coverflap: 22 wide, 18 long, with granules, genital seta 18 long, Gt-Gt 17 apart.

Male: not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Mucuna macrocarpa* Wall. (Fabaceae). (deposited at NMNS). **Paratypes**, 4 ♀,

data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. latiscuta* Flechtmann, 1998 but differs in the shield design with submedian lines being a forked line directed to the lateral side and by the 3-rayed empodium.

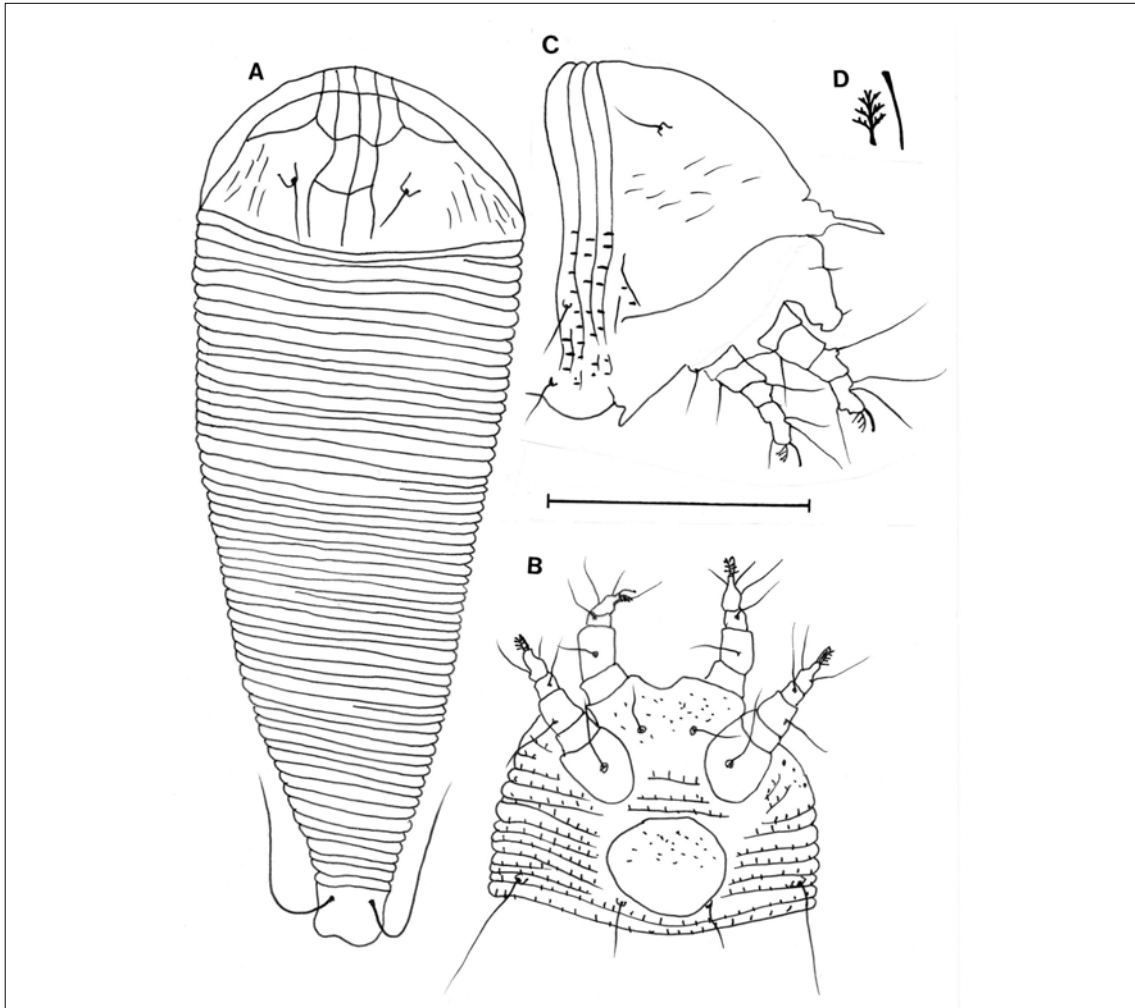


Fig. 8. *Cosella viburniae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

***Cosella hancei* sp. nov. (Fig. 8)**

Female: Body spindle shaped, 170 long, shield 37 long, 63 wide, shield lobe present, shield design with complete median line and admedian lines, admedian lines converging to apex, with transverse lines at basal 1/4, 1/2, and 3/4, 1st transverse line at basal 3/4, extending to lateral margin, with 2 forked lines at each side, 2nd transverse line with 2 forked lines at each side, the

upper one connected to 1st transverse line, submedian line absent; scapular tubercles set ahead of rear shield margin, Dt-Sr 9 long, scapular seta 10 long, directed to rear and converging, Dt-Dt 29 apart; leg segment tibiae fused with tarsi; coxal area with granules; 1st coxal tubercle absent, 2nd coxal seta 9 long, Ct2-Ct2 10 apart, 3rd coxal seta 13 long, Ct3-Ct3 27 apart, Ct2\Ct3 19, Ct2-Ct3 9; claw ending as knob; empodium simple, 3 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 34 rings, 1st 3 dorsal annuli 9 long; ventral annuli with 62 microtuberculate rings; lateral seta 16 long, Lt-Lt 53 apart, Lt\Vt1 50, Lt-Vt1 23; 1st ventral seta 31 long, Vt1-Vt1 37 apart, Vt1\Vt2 39, Vt1-Vt2 29; 2nd ventral seta 10 long, Vt2-Vt2 18 apart, Vt2\Vt3 40, Vt2-Vt3 36; 3rd ventral seta 17 long, Vt3-Vt3 20 apart; accessory seta absent. Coverflap: 23 wide, 17 long, with granules, genital seta 8 long, Gt-Gt 19 apart.

Male: Body 120 long, shield 31 long, 53 wide, scapular seta 8 long, Dt-Dt 24 apart; genital 19 wide, 6 long, seta 8 long, Gt-Gt 13 apart.

Type data: **Holotype** ♀, NANTOU: Renai Township, 8-Sept.-1992, K. W. Huang & C. F. Wang; ex *Lithocarpus hancei* (Benth.) Rehd. (Fagaceae). (deposited at NMNS). **Paratypes**, 2 ♀, 1 ♂ data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. championi* Huang, 2001 but differs in the 1st transverse line of the shield design being 2 forked lines which diverge to the lateral margin, and the fore and hind coxal area with granules.

Cosella championi Huang, 2001

Cosella championi Huang, 2001

Specimens examined: 3 ♀, NANTOU: Renai Township, 2-Nov.-1990, K. W. Huang, ex *Bauhinia championii* Benth. (Caesalpinaceae).

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Distribution: Taiwan.

Cosella fleschneri (Keifer, 1959)

Floracarus fleschneri Keifer, 1959

Cosella fleschneri Keifer, 1975

- : Huang, 2001

Male: Body 154 long, shield 41 long, 42 wide, scapular seta 10 long, Dt-Dt 23 apart; genital 13 long, 8 wide, genital seta 5 long, Gt-Gt 12 apart.

Specimen examined: 2 ♂, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Schima superba* Gard. et Champ. var. *superba* (Thaceae).

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Distribution: India, Taiwan.

Cosella viburniae sp. nov. (Fig. 9)

Female: Body spindle shaped, 192 long, shield 40 long, 65 wide, shield lobe present, shield design with complete median line and admedian lines, parallel, with transverse lines at basal 1/4, 1/2, and 3/4, 1st transverse line at basal 3/4 along shield margin, 2nd transverse line with 2 forked lines at each side, the upper one directed to anterior margin, the other connected to 1st transverse line, submedian line absent; scapular tubercles set ahead of rear shield margin, Dt-Sr 12 long, scapular seta 9 long, directed to rear and converging, Dt-Dt 25 apart; leg segment tibiae fused with tarsi; fore coxal area with granules; 1st coxal tubercle absent, 2nd coxal seta 8 long, Ct2-Ct2 11 apart, 3rd coxal seta 13 long, Ct3-Ct3 26 apart, Ct2\Ct3 19, Ct2-Ct3 9; claw ending as knob; empodium simple, 4 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 56 rings, 1st 3 dorsal annuli 9 long; ventral annuli with 57 microtuberculate rings; lateral seta 24 long, Lt-Lt 55 apart, Lt\Vt1 55, Lt-Vt1 33; 1st ventral seta 25 long, Vt1-Vt1 35 apart, Vt1\Vt2 50, Vt1-Vt2 43; 2nd ventral seta 8 long, Vt2-Vt2 17 apart, Vt2\Vt3 47, Vt2-Vt3 43; 3rd ventral seta 20 long, Vt3-Vt3 19 apart; accessory seta absent.

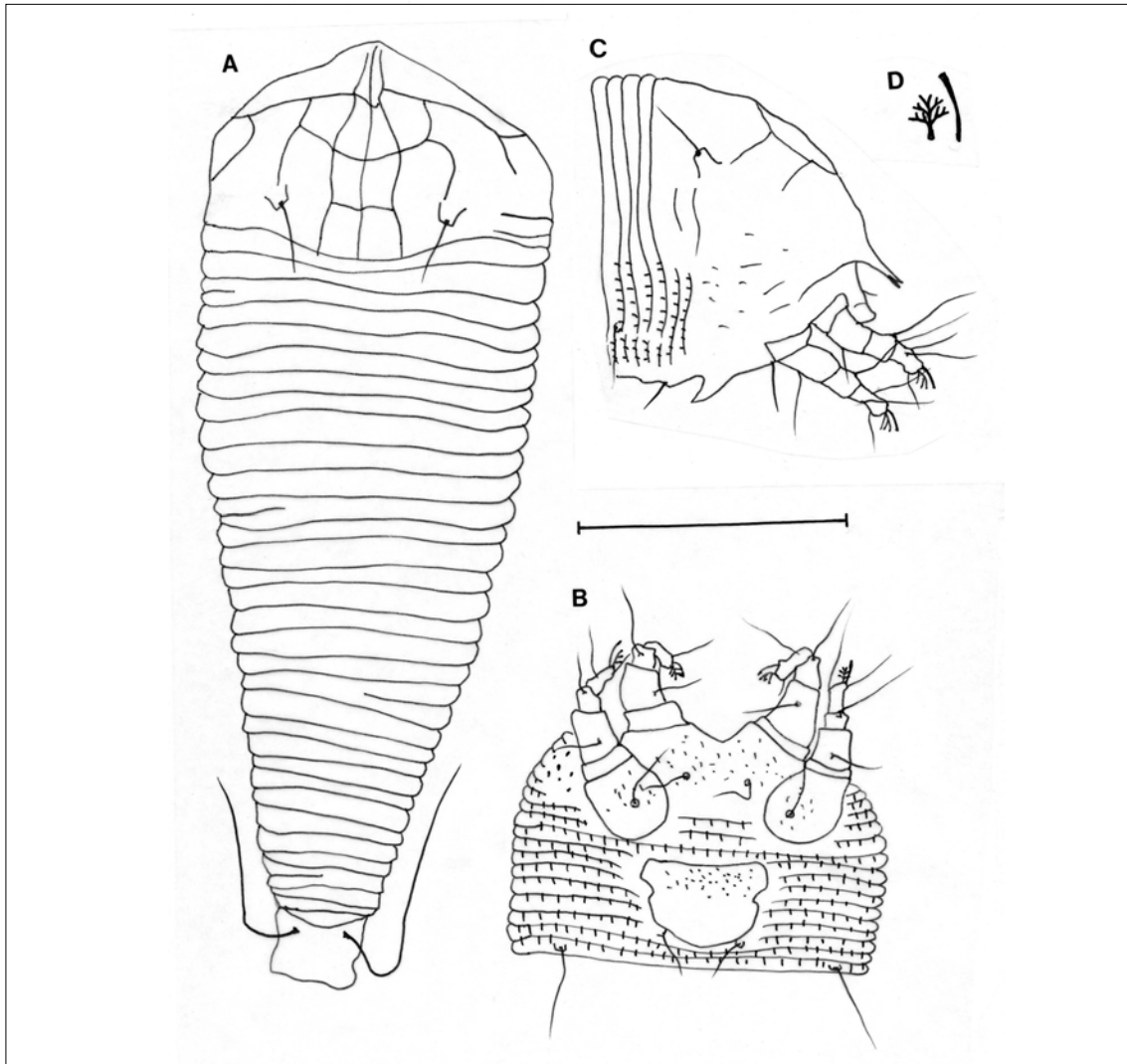


Fig. 9. *Cosella hancei* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

Coverflap: 24 wide, 17 long, with granules, genital seta 8 long, Gt-Gt 18 apart.

Male: Body 157 long, shield 39 long, 44 wide, scapular seta 9 long, Dt-Dt 18 apart; genital 14 wide, 7 long, seta 7 long, Gt-Gt 13 apart.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Viburnum luzonicum* Rolfe (Caprifoli-

aceae). (deposited at NMNS). **Paratypes**, 8 ♀, 2 ♂, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. championi* Huang, 2001 but differs in the 1st transverse line of the shield design not being forked, and by the 4-rayed empodium.

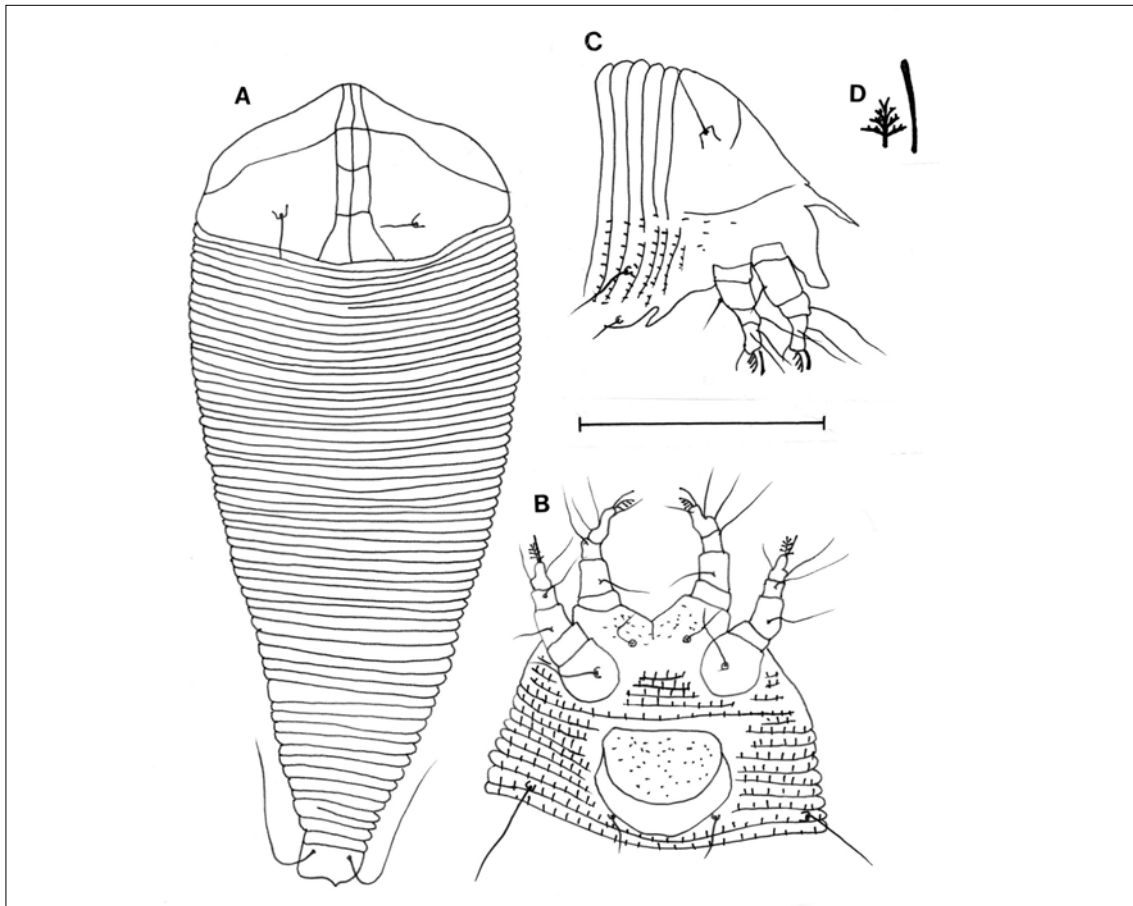


Fig. 10. *Cosella castanopiae* (♀) sp. nov. A, Dorsal view; B, legs and genital region, ventral view; C, anterior area, lateral view; D, empodium. (scale A, B = 50 μ m; C = 40 μ m; D = 15 μ m)

***Cosella castanopiae* sp. nov. (Fig. 10)**

Female: Body spindle shaped, 164 long, shield 39 long, 63 wide, shield lobe present, shield design with complete median line and admedian lines, diverging to rear, with transverse lines at basal 1/4, 1/2 and 3/4, the transverse line at basal 1/4 along with shield margin, submedian line absent; scapular tubercles set ahead of rear shield margin, Dt-Sr 10 long, scapular seta 10 long, directed to rear, Dt-Dt 27 apart; leg segment tibiae fused with tarsi; fore coxal

area with granules; 1st coxal tubercle absent, 2nd coxal seta 8 long, Ct2-Ct2 11 apart, 3rd coxal seta 10 long, Ct3-Ct3 25 apart, Ct2\Ct3 19, Ct2-Ct3 9; claw ending as knob; empodium simple, 4 rayed.

Opisthosoma: dorsum flattened, dorsal annuli with 61 rings, 1st 3 dorsal annuli 5 long; ventral annuli with 63 microtuberculate rings; lateral 22 long, Lt-Lt 49 apart, Lt\Vt1 54, Lt-Vt1 30; 1st ventral seta 22 long, Vt1-Vt1 38 apart, Vt1\Vt2 41, Vt1-Vt2 31; 2nd ventral seta 6 long, Vt2-Vt2 19 apart, Vt2\Vt3 41, Vt2-Vt3 37; 3rd ventral seta 19 long,

Vt3-Vt3 21 apart; accessory seta absent. Coverflap: 27 wide, 17 long, with granules, genital seta 8 long, Gt-Gt 20 apart.

Male: not seen.

Type data: **Holotype** ♀, NANTOU: Renai Township, 6-Oct.-1994, C. F. Wang; ex *Castanopsis kawakamii* Hay. (Fagaceae). (deposited at NMNS). **Paratypes**, 2 ♀, data same as for holotype.

Relation to host: A vagrant on the lower leaf surface. No apparent damage was observed.

Note: This new species resembles *C. fleschneri* (Keifer, 1959) but differs in shield design by the 3 transverse lines between the median and admedian lines, and by the 1st transverse line along the shield margin.

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臺灣產節蟬：描述十三種惠蓀林場偽足節蟬亞科（蟬蟬亞綱：節蟬總科）

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摘 要

本文以文字及繪圖描述 4 屬 13 種採於惠蓀林場偽足節蟬亞科，其中包含 10 新種、1 新組合及 2 舊有種。分別為：*Colopodacus obovatus* sp. nov. 為害圓葉野木瓜 (*Stauntonia obovata*)及澀葉榕 (*Ficus irisana*), *Colopodacus insulanaus* sp. nov. 為害刺杜蜜(*Bridelia insulana*), *Anothopoda zuihoenae* sp. nov. 為害香楠 (*Machilus zuihoensis*), *Floracarus syzygiae* sp. nov. 為害臺灣赤楠 (*Syzygium formosanum*), *Floracarus neolitseaus* nov. comb. (Huang, 1992) 為害漸尖葉新木樫子(*Neolitsea acuminatissima*), *Floracarus hypophae* sp. nov. 為害黃肉樹 (*Litsea hypophaea*), *Cosella formosana* sp. nov. 為害山龍眼(*Helicia formosana*), *Cosella macrocarpae* sp. nov. 為害血藤 (*Mucuna macrocarpa*), *Cosella hancei* sp. nov. 為害三斗石櫟 (*Lithocarpus hancei*), *Cosella chiampion* Huang, 2001 為害菊花木(*Bauhinia championi*), *Cosella fleschneri* (Keifer, 1959) 為害木荷 (*Schima superba* var. *superba*), *Cosella viburniae* sp. nov. 為害呂宋莢迷 (*Viburnum luzonicum*) 及 *Cosella castanopiae* sp. nov. 為害川上氏櫟 (infesting *Castanopsis kawakamii*)。本文並對惠蓀林場產偽足節蟬亞科、族、屬及種做一檢索表。

關鍵詞：偽足節蟬亞科、惠蓀、臺灣