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Mites of the genus *Summersiella* Gonzalez (Acari: Stigmaeidae)

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Abstract

The systematic status of the genus *Summersiella* Gonzalez is reviewed and a revised definition is proposed. A new species, *Summersiella camphorae*, from the leaves of camphor tree (*Cinnamomum camphora*) in Fujian Province of China, is described and illustrated. This new species is distinguished from the only known species, *Summersiella coprosmae* (Wood), by having an apparently sclerotized hexagonal central hysterosomal shield with five pairs of setae; by having much shorter dorsal setae (*ve* not exceeding base of *sci)*; by the following ratios: *vi/vi-vi* = 0.7, *ve/ve-sci* = 1.0; and by the length of solenidion ω on tarsus I (19-21 μm).

Key words: Acari, Stigmaeidae, *Summersiella*, revision, new species.

Introduction

The little known stigmaeid genus *Summersiella* was erected by Gonzalez (1967), based on *Summersiella ancydactyla* Gonzalez, 1967 from New Zealand. Two years later Meyer (1969) considered *Summersiella* a synonym of *Pseudostigmaeus* because the characters used by Gonzalez (1967) for separating *Summersiella* from related genera (i.e. palptarsus bending mesad at its basal third and the basis of capitulum being broad) were not of generic value, and because the genus was monotypic. However, Wood (1971) confirmed its generic status after detailed studies on the palptarsus, dorsal shields, setation of coxae and leg empodia of *S. coprosmae*, which he first placed in *Stigmaeus*, but later considered to be a senior synonym of *Summersiella ancydactyla* Gonzalez, 1967. So far, this is the only known species of *Summersiella* and it is distributed only in New Zealand. A new species, *Summersiella camphorae*, from the leaves of camphor tree [(*Cinnamomum camphora* (L.)] in Fujian Province of China, is described and illustrated in this paper. Due to the discovery of this second species, a revised definition of the genus is provided and the taxonomic position of *Summersiella* is discussed.

In the description of species, the terminology of palp and leg chaetotaxy follows that of Grandjean (1944, 1946) and the terminology of idiosomal chaetotaxy follows Kethley (1990).

Genus *Summersiella* Gonzalez

Summersiella Gonzalez, 1967: 236. Type species: *Stigmaeus coprosmae* Wood, 1967 (= *Summersiella ancydactyla* Gonzalez 1967); by monotypy.

Pseudostigmaeus, Meyer, 1969: 245; in part.

Description (Figs. 1-26)

Female. Idiosoma oval in dorsoventral view. Chelicerae separate. Palpi relatively robust; tibial claw subequal in length to palptarsus; accessory claw developed, spiniform. Palptarsus basally angled; basal seta *bp* well developed, spinelike; terminal eupathidia basally fused and halfway separated to three long prongs. Fundamental setation from palptrochanter to palptarsus on adult: 0, 3, 2, 2 +1 claw+1 accessary claw, 3 + 1 spinelike seta + 1ω + 1 subterminal spinelike eupathidium + 3 basally fused eupathidia. Subcapitulum with two pairs of setae (*m* and *n*), both posterolaterad of pharynx. Propodosoma covered with a triangular shield, which bears one pair of eyes, one pair of feebly developed postocular bodies and four pairs of setae (*vi*, *ve*, *sci*, *sce*); *sci* posteromediad of *sce*. Hysterosomal shield weakly or well sclerotised. Humeral shields vestigial, each with one seta (c_2). Intercalary shield plateletlike, each with one seta (f_1). Suranal shield (H) integral, bearing two pairs of setae (h_1 and h_2). Endopodal shields absent. Idiosomal venter with three pairs of ventral setae (*1a*, *3a* and *4a*), and three pairs of aggenital setae (ag_1, ag_2 and ag_3). Genital and anal openings contiguous, with one pair of genital setae (g_1) and three pairs of pseudanal setae (ps_3, ps_2 and ps_1) on adult female. Leg tarsal claw well developed and basally enclosed with a membranous arolium. Empodium rodlike, arising from arolium and bearing three Y-shaped tenent hairs. Fundamental setation of legs I-IV on adult female: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 1; femora 6, 4, 3, 2; genua 3 + 1κ , 2, 0, 1; tibiae 5 + 1pφ, 5 + 1φp, 5 + 1φp, 5 + 1φp; tarsi 13 + 1ω, 9 + 1ω, 7 + 1ω, 7 + 1ω.

Male. Unknown.

Taxonomic position

The basally angled palptarsus with the well developed spinelike *bp* of *Summersiella* is quite unusual and different from other genera in the family Stigmaeidae. The close relationship between *Summersiella* and *Stigmaeus* is indicated by such characters as the palpgenu bearing two setae, terminal eupathidia on palptarsus basally fused and halfway separated to three long prongs, widths between *n-n* and *m-m* subequal, setae *sce* present, and coxa II as well as trochanter III with two setae. However, *Summersiella* also shares some characters with *Agistemus*, such as the absence of endopodal shields, the presence of a tarsal arolium (smaller in *Agistemus*), the minute solenidion κ on genu I and the absence of κ on genu II.

Remarks

Adult females of *Summersiella* are readily distinguished by having basally angled palptarsi with the spine-like *bp*. Other useful characters for identifying the genus are the leg tarsal claws basally enclosed with a membranous arolium, two setae on coxa II.

Key to adult females of *Summersiella*

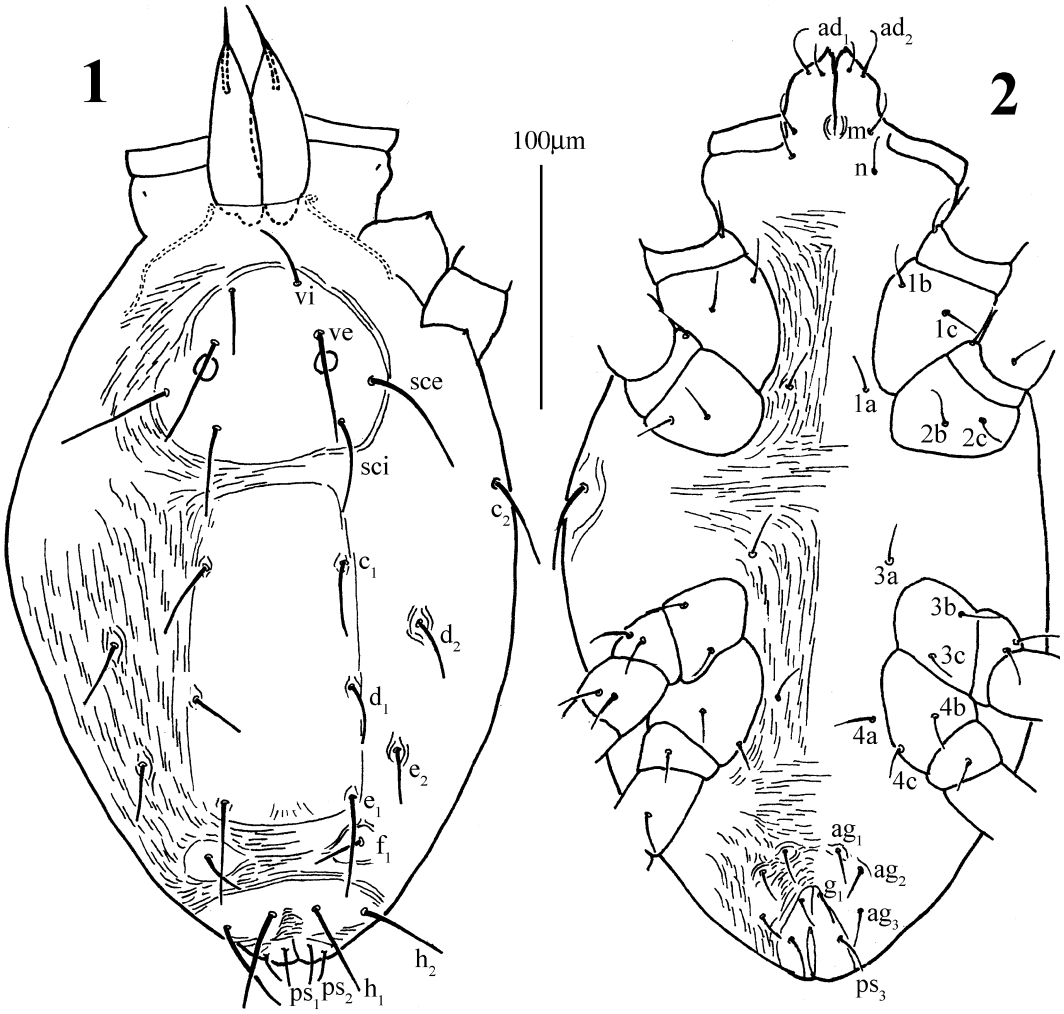
1 Central hysterosomal shield faintly sclerotized, bearing three pairs of setae; *vi/vi-vi* >1.0, *ve/ve-sci* > 1.3; length of solenidion ω on tarsus I 26-27 μm..... *S. coprosmae* (Wood)

\- Central hysterosomal shield apparently sclerotized, bearing five pairs of setae; *vi/vi-vi* = 0.7, *ve/ve-sci* = 1.0; length of solenidion ω on tarsus I 19-21 μm..... *S. camphorae* **sp. nov.**

***Summersiella coprosmae* (Wood) (Figs. 1-14)**

Stigmaeus coprosmae Wood, 1967: 101.
Summersiella ancydactyla Gonzalez, 1967: 237; synonymy by Wood, 1971: 407.

Pseudostigmaeus ancydactyla, Meyer, 1969: 245
Summersiella comprosmae, Wood, 1971: 407.



FIGURES 1-2. *Summersiella coprosmae* (Wood). (adult female). 1, dorsal view of gnathosoma and idiosoma; 2, ventral view gnathosoma and idiosoma.

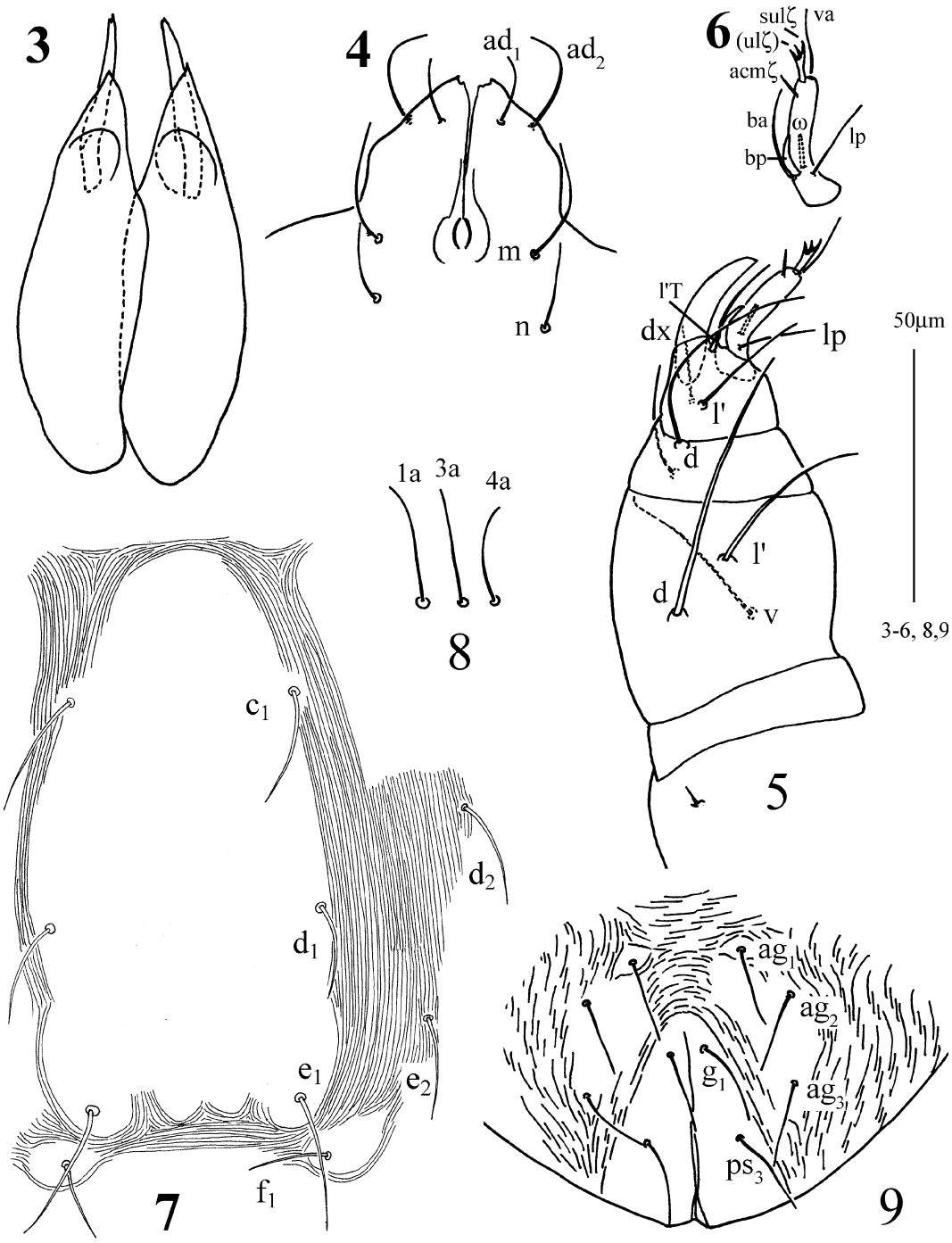
Type specimens

Holotype female, ex leaf cavities of *Coprosma australis*, Riwaka River, Nelson, New Zealand, 15.i.1965, E. Collyer. Nine paratype females, same data as holotype. Deposited in the New Zealand Arthropod Collection, Landcare Research, Mt Albert, Auckland, NEW ZEALAND. Paratype females, same data as holotype.

Other material examined

One female, ex leave of Coprosma, Waitakeres Range near AK, NEW ZEALAND, 22.ii.1959, E. Collyer (labeled by R.H. Gonzalez as paratype of *S. ancydactyla* Gonzalez). Seven females, ex leaf cavities of *Coprosma australis*, Whangamoa Saddle, Nelson, NEW ZEALAND, 2.iii.1965, E. Collyer; one female, ex *Coprosma australis*, Manahau, north-west Nelson, NEW ZEALAND,

23.ix.1965; several females, ex *Coprosma australis*, Eve's Bush, NN, NEW ZEALAND, E. Collyer 3.xi.1965, 3.ix1.1968. All specimens in the New Zealand Arthropod Collection, Landcare Research, Mt Albert, Auckland, NEW ZEALAND.



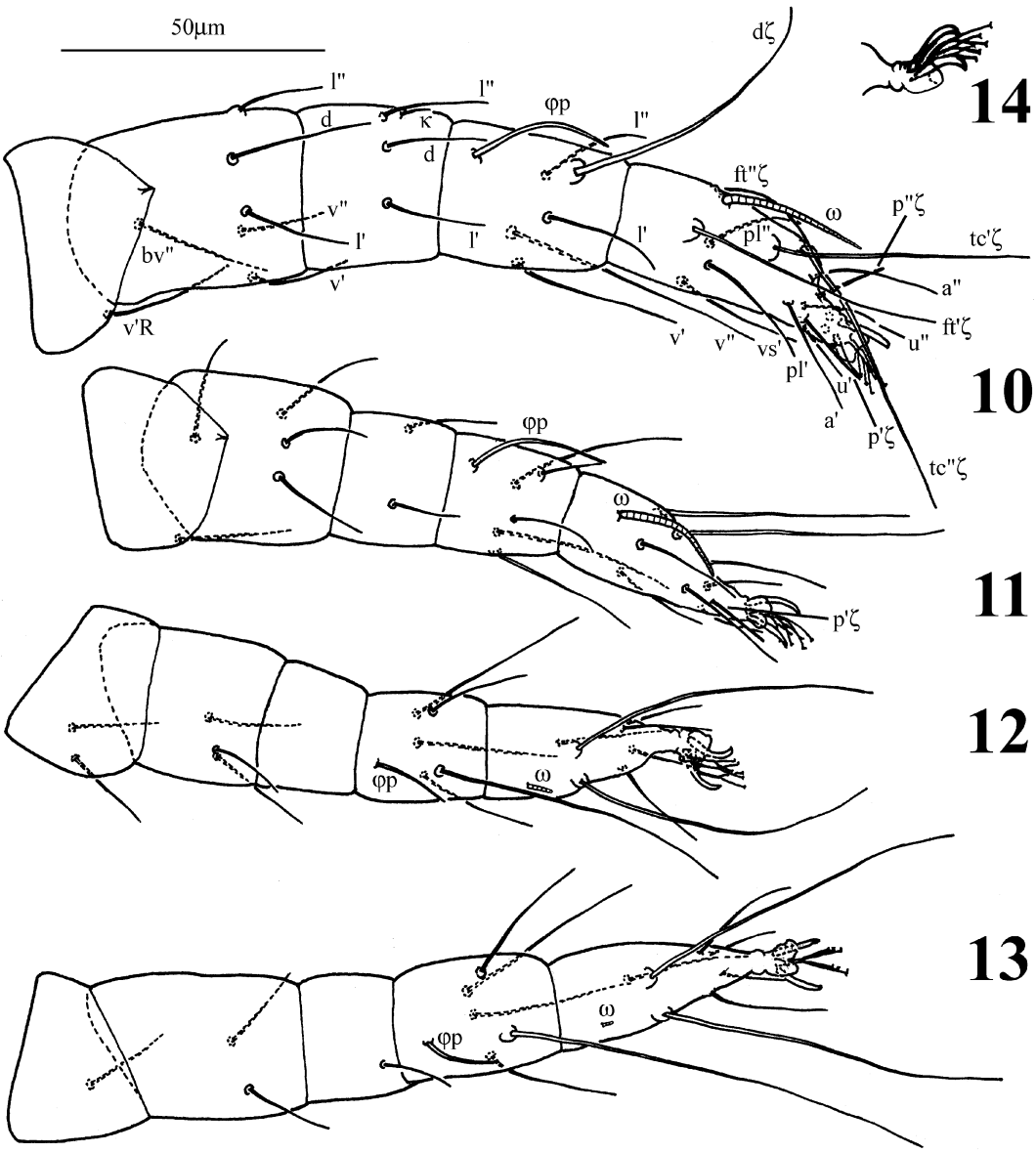
FIGURES 3-8. *Summersiella coprosmae* (Wood). (adult female). 3, chelicerae; 4, ventral view of subcapitulum; 5, left palp; 6, left palptarsus; 7, central hysterosomal shield; 8, ventral setae; 9, genitoanal area.

Diagnosis

Females of *S. coprosmae* are recognized by having the central hysterosomal shield faintly sclerotized; by having longer dorsal setae, *ve* exceeds base of *sci*; by setae ratio: *vi/vi-vi* > 1.0, *ve/ve-sci* > 1.3; and by the length of solenidion ω on tarsus I (26-27 μm).

Description

Gonzalez (1967) and Wood (1967) gave good descriptions of adult females. We herein provide new illustrations (Figs 1-14) giving more details, with particular reference to the chaetotaxy according to Grandjean (1944, 1946) and Kethley (1990).



FIGURES 10-14. *Summersiella coprosmae* (Wood). (adult female). 10, left leg I; 11, left leg II; 12, left leg III; 13, left leg IV; 14, right pretarsus I.

Habitat and distribution

Leaves or leaf cavities (acarodomatia) on *Coprosma australis* in Riwaka River, Pelorus River, Manahau, and Whangamoa Saddle, NN, NEW ZEALAND (Wood 1967; this study); Palmer's Bush, Waimea Plain and Totaranui, Golden Bay, NN, NEW ZEALAND (Wood 1971).

Leaf cavities of *Coprosma* sp. in the Waitakeres and Hunua, Auckland, (Gonzalez 1967) and in Te Morepu Bush near Orere, Firth of Thames, AK, NEW ZEALAND (Wood 1971).

Leaves of *Metrosideros* sp. in Astrolabe, Abel Tasman National Park, NN, NEW ZEALAND (Wood 1971).

Leaves of *Phyllocladus trichomanoides* in Chateau Tongariro, Tongariro National Park, TK, NEW ZEALAND (Wood 1971).

Coprosma australis, Eve's Bush, NN, NEW ZEALAND (this study).

Remarks

Lengths of dorsal body setae, *vi*, *sci*, h_1 and h_2 in Gonzalez's description (1965), and *vi*, *ve*, *sce*, d_2, e_2, f_1, h_1 and h_2 in Wood's description (1967) seem longer than those in the specimens examined (Figs. 1-12). Gonzalez (1967) miscounted the number of setae on tarsus II as 9 [it is 9+1ω (=10)]. Wood (1967) overlooked the single seta on genu IV.

***Summersiella camphorae* sp. nov. (Figs. 15-26)**

Material examined

Holotype. Female, ex *Cinnamomum camphora* (L.), Dehua, Fujian Province, 20.xi.1996, J.Z. Lin.

Paratypes. Three females, same data as holotype.

Diagnosis

Summersiella camphorae **sp. nov.** is readily distinguished from the only known species, *S. coprosmae* (Wood) by having an apparently sclerotized hexagonal central hysterosomal shield with five pairs of setae; by having much shorter dorsal setae (*ve* not reaching base of *sci*); by the following ratios: *vi/vi-vi* = 0.7, *ve/ve-sci* = 1.0; and by the length of solenidion ω on tarsus I (19-21 μm).

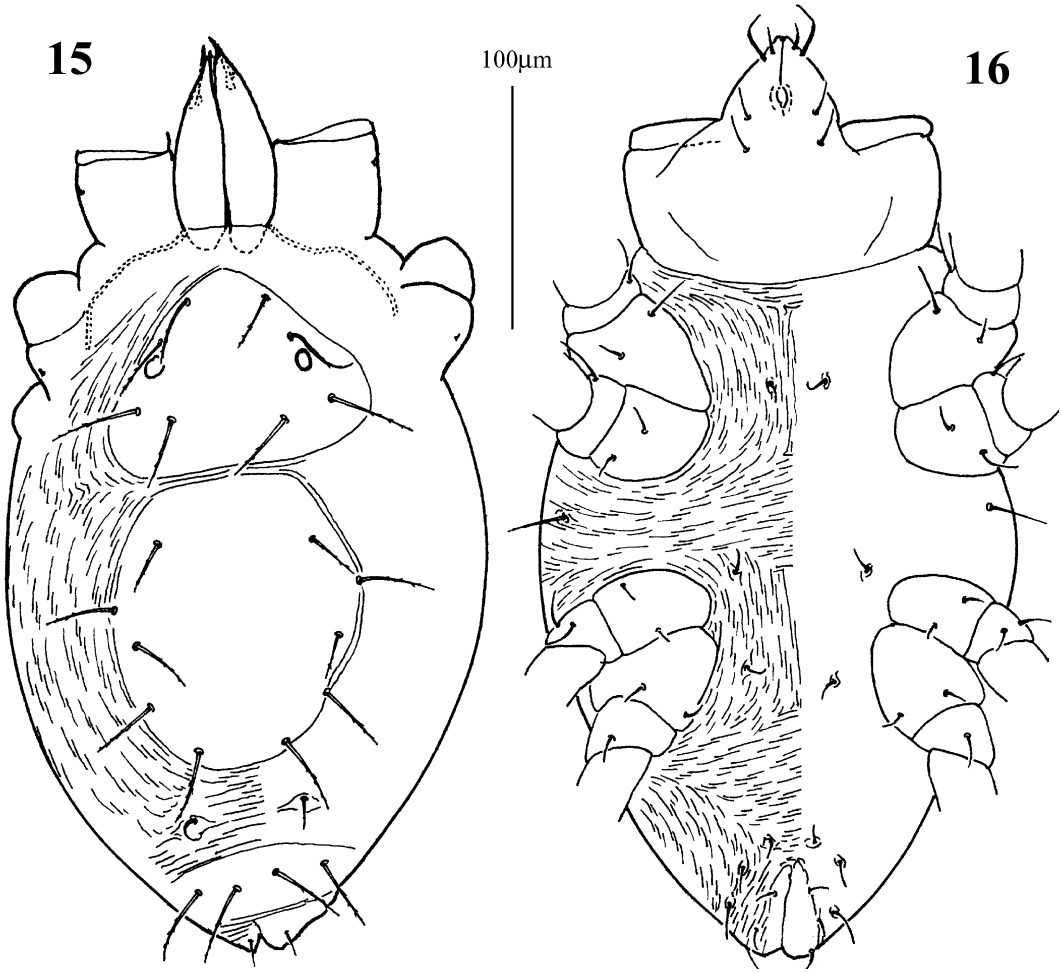
Description

FEMALE (n = 4)

Gnathosoma. Chelicerae conical (91-103 μm); movable digits (36-38 μm) slightly longer than one-third length of chelicerae. Palp robust (89-95 μm); tibial claw extending beyond tip of palptarsus; accessory claw slender, about half length of palpal seta *bp*. Seta *bp* well developed, about half length of tibial claw. Counts of setae, solenidia and claws on palp (from trochanter to tarsus): 0, 3, 2, 2 + 1 spinlike accessory claw + 1 claw, 3 + 1 basal claw + 1 ω + 1 subterminal eupathidium + 3 basally fused eupathidia. Subcapitulum plain, without clear punctation; subcapitular setae *m* (25-26 μm) longer than *n* (20-21 μm); distance between *m-m* equals *n-n* (28-30 μm) and about twice distance between *m-n* (15-16 μm).

Idiosoma. Oval in shape (267-286 μm long, 173-212 μm wide). All dorsal body setae with minute barbs but not set on clear tubercles. Propodosomal setae *vi* (22-26 μm) no more than two thirds distance between *vi-vi* (34-38 μm); *ve* (29-34 μm) subequal distance between *ve-sci* (32-34 μm); *sci* (34-40 μm) reaching anterior edge of central hysterosomal shield. Postocular body hardly observable. Hysterosoma with a developed central shield, which bears five pairs of setae, c_1 (25-26 μm), d_1 (19-26 μm), d_2 (29-31 μm), e_1 (32-34 μm) and e_2 (29-30 μm); e_1 passes base of f_1; ratio c_1/

c_1-c_1 = 0.4, c_1-c_1/e_1-e_1 = 1.8 (1.7-1.8); distances between setae, c_1-c_1 = 69 (65-72 µm), c_1-d_1 = 46 (43-50 µm), d_1-d_1 = 89 (84-96 µm), d_1-d_2 = 25 (19-31 µm), d_1-e_1 = 35 (25-50 µm), e_1-e_1 = 38 (36-41 µm), e_1-e_2 = 30 (28-32 µm). Humeral setae c_2 (20-24 µm) situated on membrane. Intercalary setae f_1 (14-16 µm) on small platelets, ratio f_1-f_1/e_1-e_1 = 1.4 (1.3-1.4). Suranal shield integral, with two pairs of setae (h_1 and h_2), subequal in length (32-34 µm) and approximately 1.3 times length of dorsal seta (*d*) on femur I. Distances between setae, e_1-f_1 = 24 (19-28 µm), f_1-f_1 = 52 (49-57 µm), h_1-h_1 = 19 (18-19 µm), h_1-h_2 = 18 (16-19 µm). Ventral setae three pairs (*1a*, *3a* and *4a*), *3a* (13-15 µm) slightly longer than other two pairs (11-13 µm). Three pairs of aggenital setae (ag_1, ag_2 and ag_3) arise from individual platelets; ag_3 (20-21 µm) longer than ag_2 (15-17 µm) and ag_1 (13-15 µm). One pair of genital setae present (g_1 14-15 µm), not reaching base of ps_3; three pair of pseudanal setae (ps_3, ps_2 and ps_1) subequal in length (13-15 µm).

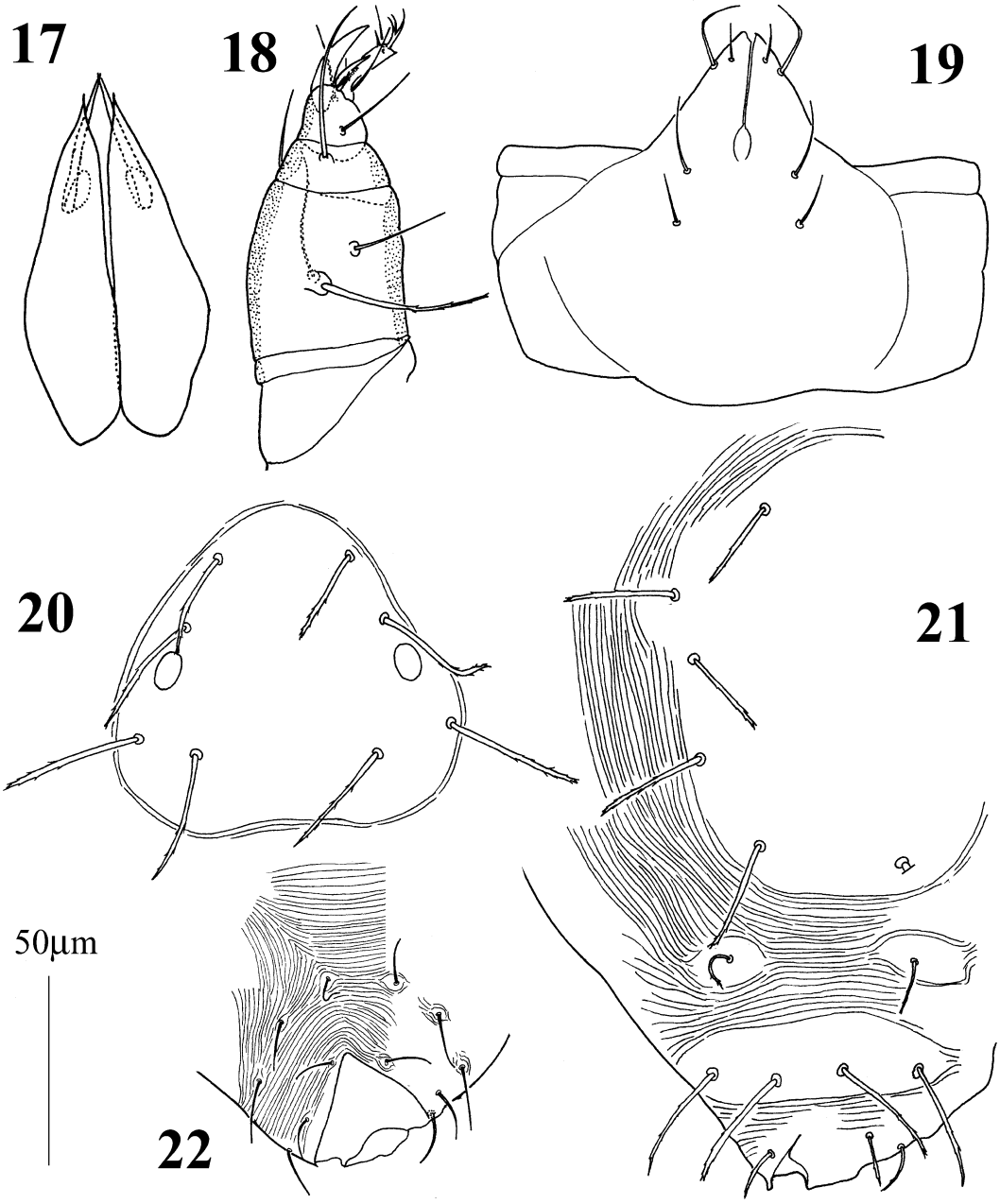


FIGURES 15-16. *Summersiella camphorae* **sp. nov.** (adult female). 15, dorsal view of gnathosoma and idiosoma; 16, ventral view gnathosoma and idiosoma.

Legs. Length (from base of trochanter to tip of tarsus): leg I = 159 (149-169 µm), leg II = 136 (129-142 µm), leg III = 132 (130-133 µm), leg IV = 144 (137-150 µm). Setae *d* on femora I-IV, on genua I, II and IV all bearing minute teeth and similar to dorsal body setae. Tarsi I-IV each bearing

one solenidion (ω). Dorsal seta (*d*) on femur I (25-26 μm) longer than two-thirds of dorsal seta h_1. Length of solenidia on tarsi, Iω = 20 (19-21 μm), IIω = 18 (17-20 μm), IIIω = 4 μm, IVω = 3 μm. Counts of setae and solenidia on legs I-IV: coxae 2, 2, 2, 2; trochanters 1, 2, 1, 1; femora 6, 4, 3, 2; genua 3 + 1κ, 2, 0, 1; tibiae 5 + 1φp, 5 + 1φp, 5 + 1φp, 5 + 1φp; tarsi 13 + 1ω, 9 + 1ω, 7 + 1ω, 7 + 1ω.

MALE. Unknown.



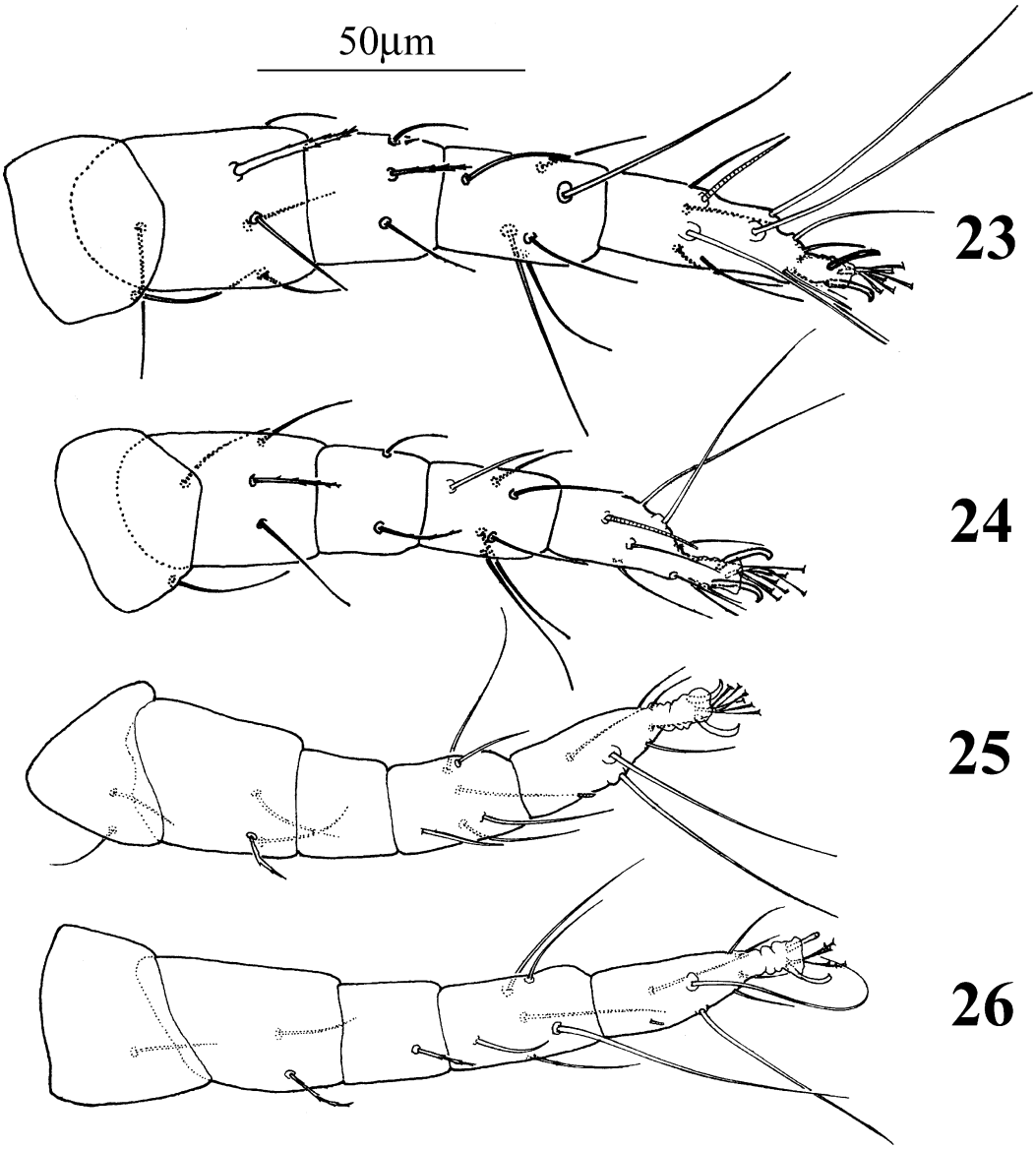
FIGURES 17-22. *Summersiella camphorae* **sp. nov.** (adult female). 17, chelicerae; 18, left palp; 19, ventral view of subcapitulum; 20, detailed view of propodosomal shield; 21, detailed view of hysterosoma; 22, genito-anal area.

Location of holotype

Department of Plant Protection, Fujian Agricultural and Forestry University, Fuzhou, Fujian, CHINA.

Etymology

The specific name, *camphorae*, is from its host plant, *Cinnamomum camphora*.



FIGURES 23-26. *Summersiella camphorae* **sp. nov.** (adult female). 23, left leg I; 24, left leg II; 25, left leg III; 26, left leg IV.

Remarks

It seems that the most important characters for distinguishing species of *Summersiella* are lengths of dorsal body setae and tarsal solenidia. The character of the central hysterosomal shield is only somewhat useful because it is not always clearly sclerotized in all species.

The ornamentation and arrangements of dorsal body shields are considered to be the key characters for separating genera of the Stigmaeidae. Though *Summersiella camphorae* sp. nov. is different from *S. coprosmae* (Wood) in the forms of dorsal shields, we think that it is better to place the new species in *Summersiella* in order to avoid erecting another monobasic genus.

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