Eight phytoseiid mites from the Matsu Islands

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ABSTRACT

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A survey of phytoseiid mites from the Matsu Islands found 8 species, including *Amblyseius eharai* Amitai and Swirski, *A. herbicolus* (Chant), *A. okinawanus* Ehara, *A. ovalis* (Evans), *A. womersleyi* Schicha, *Okiseius subtropicus* Ehara, *Phytoseius crinitus* Swirski and Shechter, and *P. sonunensis* Ryu and Ehara. *Amblyseius eharai*, *P. crinitus*, and *P. sonunensis* have not previously been recorded from Taiwan or the Penghu Archipelago, and these mites are illustrated with drawings. In addition, 3 nymphs that were collected without associated adults are suspected of being *P. silvaticus* Wu and Li. These are all new records for Matsu.

(Key words: Phytoseiidae, *Amblyseius*, *Phytoseius*, *Okiseius*, Matsu Islands)

INTRODUCTION

The Matsu Islands are comprised of Hsijiu, Tungjiu, Nangan, Beigan, Gaudeng, Dachiu, Hsiaochiu, Liangdau, Shiyin, Tungyin, and a few small islets located near Minjian, Lianjian, and Luoyuan Wan, Fujian Province, China. Mites from the Matsu Islands have not previously been studied. In 5 field trips made in 2000-2002, the authors collected mites from the 6 main islands, Beigan, Nangan, Tungyin, Shiyin, Tungjiu, and Hsijiu. Eight phytoseiid mites were identified from those collections and are reported in this paper. Three of them have not been recorded from Taiwan or the Penghu Archipelago, and these are illustrated herein with drawings. Phytoseiid mites of Matsu have not been reported

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before. These 8 phytoseiid mites are, therefore, new records for Matsu.

MATERIALS AND METHODS

Crops and plants of the islands of Nangan, Beigan, Tungyin, Shiyin, Tungjiu, and Shijiu were examined with the naked eye or a hand lens. Leaves with phytoseiids or those suspected of containing phytoseiids were placed in plastic bags, sealed tightly, and brought back to the laboratory. A piece of paper towel was put in each plastic bag to absorb the water evaporating from the leaves. These leaves were examined for phytoseiid mites using a binocular microscope in the laboratory. All phytoseiid mites found were made into slide specimens using Hoyer's medium. After inspection, leaves were dipped in 75% alcohol to kill any possible remaining pests. All slide specimens are deposited in the mite collection of this laboratory.

Phytoseiidae Berlese, 1916

Key to the phytoseiid mites of the Matsu Islands

1. Dorsal shield with 4 prolateral setae (j3, z2, z4, s4), r3 on membrane 2
   Dorsal shield with 6 prolateral setae (j3, z2, z3, z4, s4, s6), r3 on dorsal shield ..... *Phytoseius* Ribaga 7
2. R1 on dorsal shield, and dorsal shield prominently concave near R1 ..... *Okiseius* Ehara --- *O. subtropicus* Ehara
   R1 not on dorsal shield ..... *Amblyseius* Berlese 3
3. Some dorsal setae obviously longer than other setae 4
   Dorsal setae of similar length, setal length longer than distance between setal base and base of next seta ..... *A. womersleyi* Schicha
4. Dorsal setae j3, s4, Z4, and Z5 much longer than other setae, Z5 whip-like 5
   Dorsal setae j3 and s4 short, Z5 not whip-like 6
5. Spermatheca flared distally ..... *A. eharai* Amitai and Swirski
   Spermatheca wider distally ..... *A. herbicolus* (Chant)
6. Z4 and Z5 longer than other setae, Z5 longest ..... *A. okinawanus* Ehara
   Z4 short, Z5 much longer than other setae ..... *A. ovalis* (Evans)
7. s4 and s6 equal or subequal in length 8
   s6 longer than s4 ..... *P. crinitus* Swirski and Shechter
8. j3 longer than z3, macroseta on basitarsus IV short, much shorter than that on tibia IV ..... *P. sonunensis* Ryu and Ehara
   j3 shorter than z3, macroseta on basitarsus IV long ..... *P. silvaticus* Wu and Li

Amblyseius eharai Amitai and Swirski (Figs. 1, 2)

Amblyseius eharai Amitai and Swirski, 1981: 60-65[(1)].

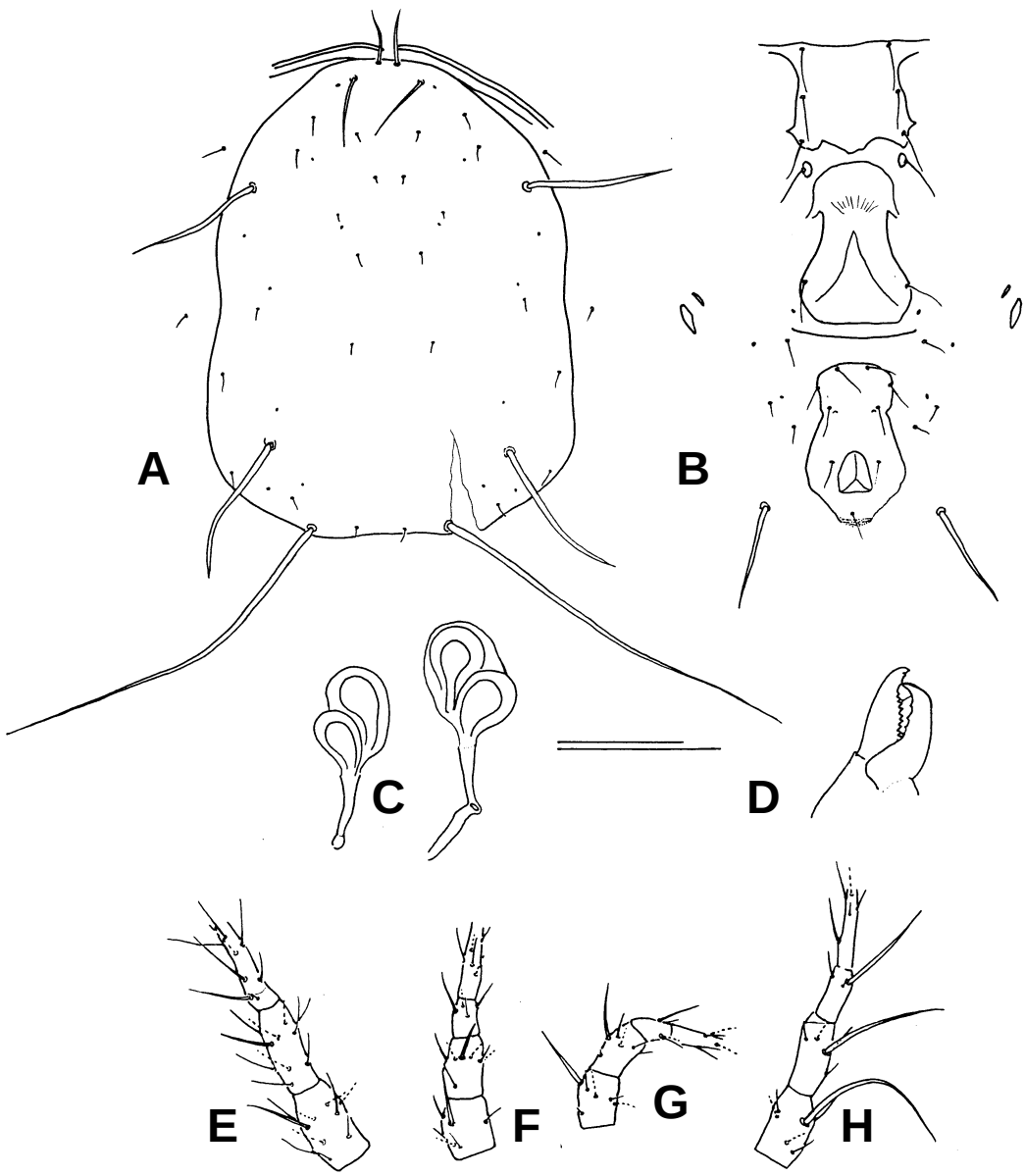

Fig. 1. *Amblyseius eharai* female. A. Dorsal view; B. ventral view; C. spermatheca; D. cheliceral digits; E-H. genu, tibia, and basitarsus of legs I-IV. The shorter bar represents 100μm for A, B and E-H, and the longer bar represents 50μm for C and D.

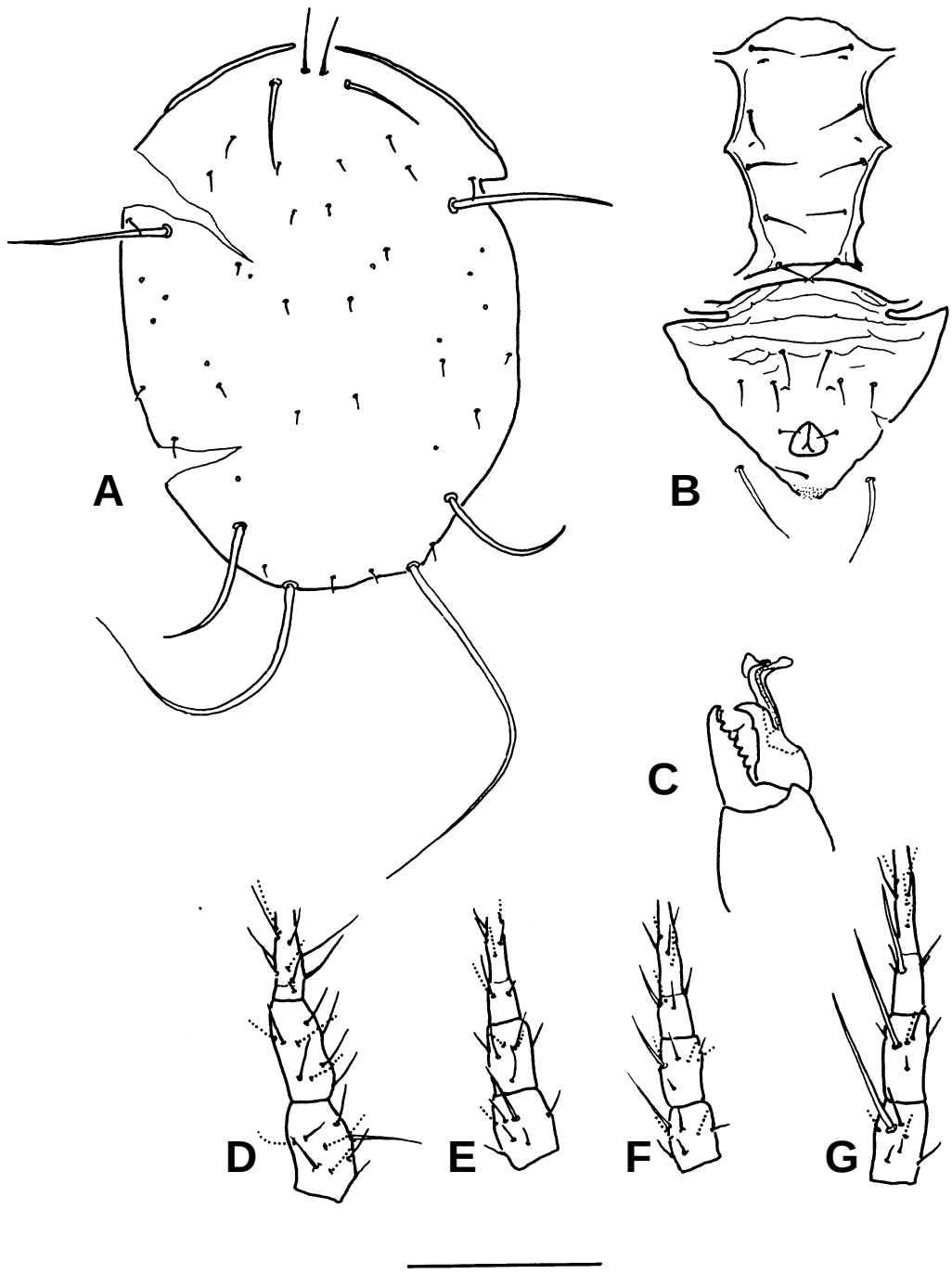

Fig. 2. *Amblyseius eharai* male. A. Dorsal view; B. ventral view; C. cheliceral digits; D-G. genu, tibia, and basitarsus of legs I-IV. The shorter bar represents 100μm for A, B and D-G, and the longer bar represents 50μm for C.

Specimens examined

Tungyin: Yienshiu, *Ricinus communis* L., 4 ♀♀, 1 ♂, 4-vi-2002, C. C. Ho; Nangan: Fuau, *Eriobtrya japonica* Lindley, 1 ♀, 4-vi-2002, C. C. Ho; unknown plant, 1 ♀, 14-ix-2000, C. C. Ho; Sanloun, *Lagenaria siceraria* (Mol.) Standl., 1 ♀, 25-vii-2001, C. C. Ho; Fushing, soil, 2♀♀, 5-vi-2002, C. C. Ho; Beigan: Sauntsun, *Melia azedarach* L, 2 ♀♀, 1 ♂, 26-vii-2001, C. C. Ho; Chiaotzi, *Bidens bipinnata* L., 1 ♀, 14-ix-2000, W. H. Chen; Beesan, *Achyranthes aspera* L. var. *indica* L., 1 ♀, 15-ix-2000, W. H. Chen.

Distribution

China (Jiangsu, Zhejiang, Jiangxi, Hubei, Hunan, Fujian, Guangdong, Guangxi, Hainan, and Hong Kong), Taiwan, Matsu Islands (new record), Korea, and Japan (Honshu, Shikoku, Kyushu, and Okinawa).

Amblyseius herbicolus (Chant)

Typhlodromus (Amblyseius) herbicolus Chant, 1959: 84[(2)].
Amblyseius deleoni Muma and Denmark, 1971: 68-69[(8)].
Amblyseius herbicolus Daneshvar and Denmark, 1982: 5[(4)].

Specimens examined

Beigan: Sauntsun, *Melia azedarach* L., 2 ♀♀, 26-vii-2001, C. C. Ho; Chiaotzi, *Solanum nigrum* L., 1 ♀, 6-xi-2001, C. F. Chen; Hsijiu: Chinfan, citrus groove soil, 1 ♀, 5-vi-2002, C. C. Ho.

Distribution

China (Liaoning, Gansu, Hunan, Fujian, Guangdong, Hainan, Guangxi, Sichuan, Guizhou, and Yunnan), Korea, Taiwan, Matsu Islands (new record), Thailand, Indonesia, India, Papua New Guinea, Australia, New Caledonia, Iran, Angola (Cuanza Norte, Cuanza Sul, Luanda), South Africa, Madagascar, Costa Rica, Puerto Rico, British Virgin Islands (Tortola Island), Honduras, Guatemala, El Salvador, Colombia, and Brazil.

Amblyseius okinawanus Ehara

Amblyseius okinawanus Ehara, 1967: 72-73[(5)].

Specimens examined

Nangan: Matsu High School, watermelon, 1 ♀, 24-vii-2001, C. C. Ho.

Distribution

Russia, China (Jiangsu, Hunan, Fujian, Guangdong, Guangxi, Hainan, Guizhou, Yunnan, and Hong Kong), Korea, Japan (Honshu, Kyushu, and Okinawa), Taiwan, Matsu Islands (new record), Thailand, and Papua New Guinea.

Amblyseius ovalis (Evans)

Typhlodromus ovalis Evans, 1953: 458-461[6].
Typhlodromus (Amblyseius) ovalis Chant, 1959: 68[2].
Amblyseius (Typhlodromus) ovalis Muma, 1961: 288[7].
Amblyseius ovalis Collyer, 1964: 634[3].

Specimens examined

Nangan: Fushing, unknown plant, 1 ♀, 15-ix-2000, C. C. Ho; Beigan: Chiaotzi, *Ricinus communis* L., 1 ♀, 14-ix-2000, W. H. Chen.

Distribution

China (Fujian, Guangdong, Guangxi, Jiangsu, Sichuan, Yunnan, and Hong Kong), Japan (Okinawa), Taiwan, Matsu Islands (new record), Philippines (Laguna and Luzon Island), Malaysia (Kuala Lumpur and Selangor), India (Andaman Islands, Andhra Pradesh, Gujarat, Karnataka, Narayanan, Maharashtra, Kerala, Manipur, Meghalaya, Nicobar Islands, Pondicherry, Tamil Nadu, Tripura, and West Bengal), New Zealand (Auckland and Wellington), Papua New Guinea, Cook Islands, Fiji, Hawaii, Mauritius, and Mexico.

Amblyseius womersleyi Schicha

Amblyseius womersleyi Schicha, 1975: 101-103[10].

Specimens examined

Nangan: Lianchiang, eggplant, 2 ♀♀, 20-viii-2001, C. C. Ho; *Tagetes erecta* L., 3 ♀♀, 1 ♂, 6-ix-2001, C. C. Ho; Fushing, *Diocorea alata* L., 5 ♀♀, 2 ♂♂, 3 nymphs, 25-ix-2001, C. C. Ho; Zulo, soil, 3 ♀♀, 4-vi-2002, C. C. Ho; Newgiao, watermelon, 7 ♀♀, 24-vii-2002, C. C. Ho.

Distribution

Russia, China, Japan (Hokkaido, Kundshiri, Honshu, Shikoku, Kyushu, Amami-oshima Island, and Okinawa), Korea, Taiwan, Matsu Islands (new record), Philippines, Australia, and New Zealand.

Remarks: China has a very similar species, *A. pseudlongispinosus* Xin, Liang and Ke, that is considered a synonym of *A. womersleyi* by Tseng[13]. The distribution of *A. womersleyi* in China needs more work.

Okiseius subtropicus Ehara

Okiseius subtropicus Ehara, 1967: 77-78[5].
Platyseiella (Noeledius) subtropicus Tseng, 1976: 102-104[12].

Specimens examined

Tungyin: Yienshiu, *Ricinus communis* L., 1 ♀, 1 ♂, 4-vi-2002, C. C. Ho.

Distribution

China (Jiangsu, Fujian, Guangdong, and Guangxi), Japan (Honshu, Okinawa), Taiwan, and Matsu Islands (new record).

Phytoseius crinitus Swirski and Shechter (Fig. 3)

Phytoseius crinitus Swirski and Shechter, 1961: 102-104 [(11)].

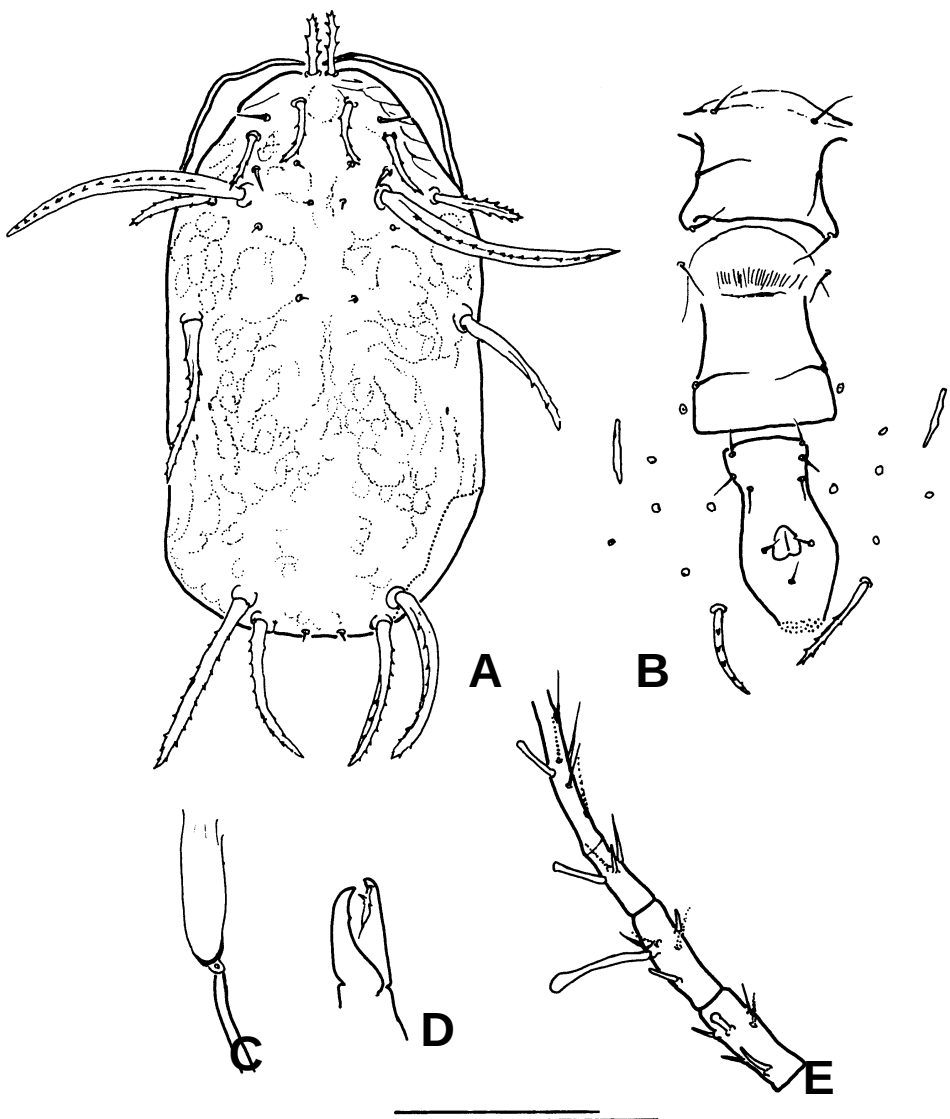

Fig. 3. *Phytoseius crinitus* female. A. Dorsal view; B. ventral view; C. spermatheca; D. cheliceral digits; E. genu, tibia, and basitarsus of leg IV. The shorter bar represents 100μm for A, B and E, and the longer bar represents 50μm for C and D.

Specimens examined

Nangan: Fushing, soil, 1 ♀, 5-vi-2002, C. C. Ho.

Distribution

Hong Kong, Matsu Islands (new record), Japan (Okinawa), Indonesia (Java), and Madagascar (Tamatave).

Phytoseius sonunensis Ryu and Ehara (Figs. 4, 5)

Phytoseius sonunensis Ryu and Ehara, 1993: 16-17[9].

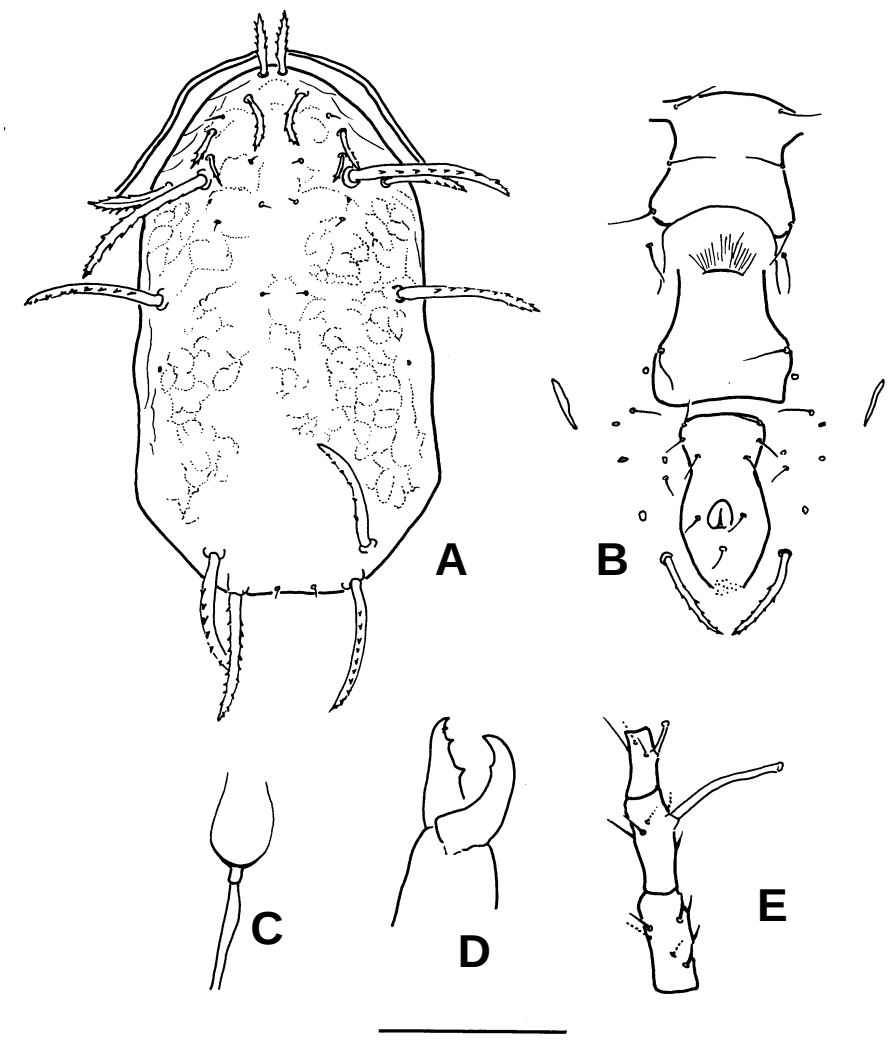

Fig. 4. *Phytoseius sonunensis* female. A. Dorsal view; B. ventral view; C. spermatheca; D. cheliceral digits; E. genu, tibia, and basitarsus of leg IV. The shorter bar represents 100μm for A, B and E, and the longer bar represents 50μm for C and D.

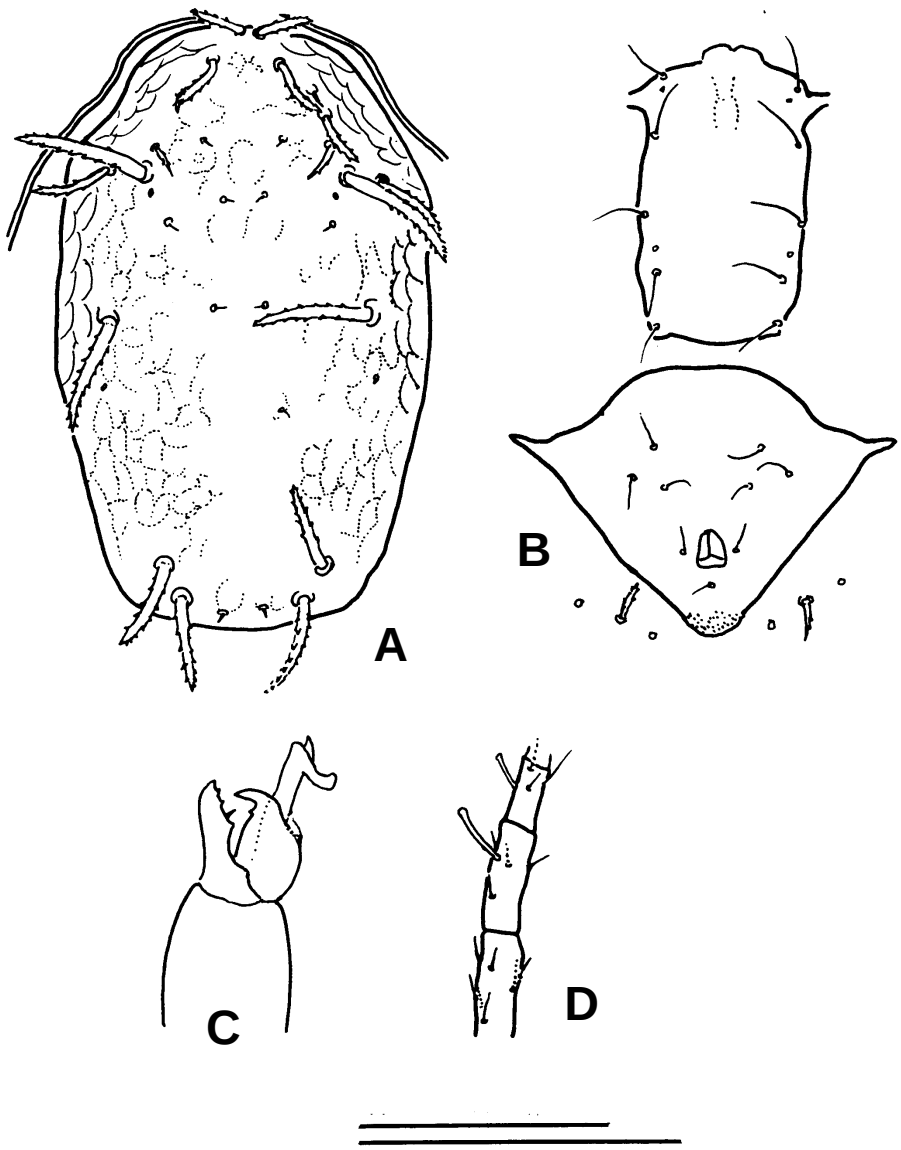

Fig. 5. *Phytoseius sonunensis* male. A. Dorsal view; B. ventral view; C. cheliceral digits and spermatodactyl; D. genu, tibia, and basitarsus of leg IV. The shorter bar represents 100μm for A, B and D, and the longer bar represents 50μm for C.

Specimens examined

Tungyin: Chungliu, *Pueraria lobata* (Willd.) Ohwi, 1 ♀, 2 ♂♂, 6-vi-2002, C. C. Ho; Nangan: Fushing, soil, 2 ♀♀, 1 ♂, 1 nymph, 6-vi-2002, C. C. Ho.

Distribution
Korea and, Matsu Islands (new record).

Three deutonymphs were collected without an adult. Based on the dorsal setae and the macrosetae on genu IV and tibia IV, they were suspected of being *P. silvaticus* Wu and Li.

Phytoseius silvaticus Wu and Li
Phytoseius silvaticus Wu and Li, 1984: 458-459[14].

Tungyin: Chungliu, *Pueraria lobata* (Willd.) Ohwi, 3 nymphs, 6-vi-2002, C. C. Ho.

Distribution: China (Hubei) and Matsu Islands (new record).

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摘 要

何琦琛*、石憲宗、陳文華 2003 烏祖列島的八種捕植 植保會刊 45：143-154 (台中縣霧峰鄉 行政院農業委員會農業試驗所應用動物組)

本文報告烏祖列島採得 8 種捕植蟎，包括 *Amblyseius eharai* Amitai and Swirski、*A. herbicolus* (Chant)、*A. okinawanus* Ehara、*A. ovalis* (Evans)、*A. womersleyi* Schicha、*Okiseius subtropicus* Ehara、*Phytoseius crinitus* Swirski and Shechter 及 *P. sonunensis* Ryu and Ehara。其中，*A. eharai*、*P. crinitus* 及 *P. sonunensis* 未曾記錄於台澎地區，均予以繪圖描述。此外，另採得 3 隻疑爲 *P. silvaticus* Wu and Li 之雌蟎（尚未採得成蟎）。對烏祖列島而言，這些種類都是新記錄。

(關鍵詞：捕植蟎、*Amblyseius*、*Phytoseius*、*Okiseius*、烏祖)

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