Eight phytoseiid mites from the Matsu Islands

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(Accepted for publication: Apr. 29, 2003)

ABSTRACT


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, Shiyn, 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, Shiyn, 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, Shiyan, 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. herbiculus (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

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

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

Specimens examined

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

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

Distribution
Russia, China, Japan (Hokkaido, Kushiro, 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** Ebara

*Okiseius subtropicus* Ebara, 1967: 77-78\(^{(5)}\).

*Platyseiella (Noeledius) subtropicus* Tseng, 1976: 102-104\(^{(12)}\).

Specimens examined

**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\(^{(11)}\).

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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

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
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 \textit{P. silvaticus} Wu and Li.

\textit{Phytoseius silvaticus} Wu and Li
\textit{Phytoseius silvaticus} Wu and Li, 1984: 458-459\textsuperscript{(14)}.


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

\section*{ACKNOWLEDGMENTS}

This work was mainly supported by a grant from the Bureau of Animal and Plant Health Inspection and Quarantine, Council of Agriculture, Taiwan. We thank C. F. Chen, S. J. Lay, T. T. Wang, and H. K. Tsai of the Agricultural Improvement Station of Lienchiang County for their help during field trips.

\section*{LITERATURE CITED}


研究内容

研究在南投八掌溪流域的八种捕食螨，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 於台湾诚品，

研究於南投八掌溪流域的八种捕食螨，包括Amblyseius、A. okinawanus、A. ovalis、A. womersleyi、Okiseius subtropicus、Phytoseius crinitus、Phytoseius sonunensis 和 P. silvaticus Wu and Li。