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A New and Two Unrecorded Species of Phytoseiid Mites (Acari, Phytoseiidae) from Korea

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Abstract *Typhlodromus wonkooi* RYU et EHARA, sp. nov. is described from Korea. *Phytoseius* (*Phytoseius*) *mori* XIN, LIANG et KE and *Amblyseius rademacheri* DOSSE, previously unrecorded from this country, are redescribed based on Korean specimens.

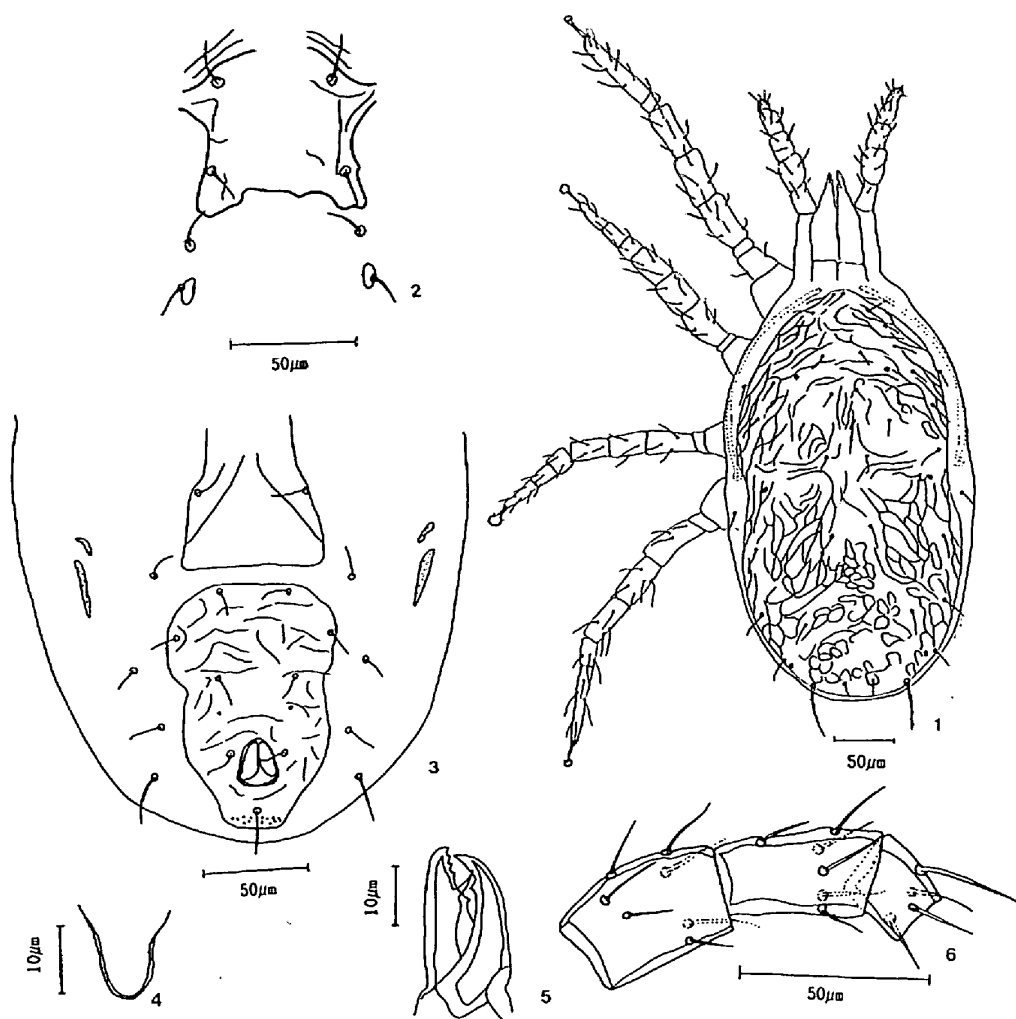
Key words: Taxonomy; *Typhlodromus*; Phytoseiidae; new species; Korea.

This is the third report of the phytoseiid mites of Korea by the authors (see RYU & EHARA, 1990, 1991). In the present paper a new species of *Typhlodromus* SCHEUTEN is described from this country, and two unrecorded Korean species of phytoseiids are redescribed. The setal nomenclature follows that of ROWELL *et al.* (1978). All measurements are given in micrometers. The type series of the new species is deposited in the Department of Biology, College of Natural Sciences, Chonbuk National University.

Typhlodromus wonkooi RYU et EHARA, sp. nov.

(Figs. 1–6)

Female. Idiosoma 399 long, 273 wide at level of R1; dorsal shield 366 long, 173 wide at level of waist. Dorsal shield reticulate, with three pairs of distinct pores: the first between setae j4 and z4, the second posterior to s6, and the third near S5. Setae on dorsal shield: Z5 the longest, barbed; the remaining setae much shorter, smooth. Setae r3 and R1 on interscutal membrane, smooth. Peritreme extending beyond the level of seta j3; peritrematal shield fused anteriorly with dorsal shield. Sternal shield with two pairs of setae, ST1 and ST2; third pair, ST3, free on interscutal membrane; metasternal platelets much longer than wide. Ventrianal shield much longer than wide, wider than genital shield, with lateral margins concave. Three pairs of preanal setae on ventrianal shield; a pair of pores behind



Figs. 1–6. *Typhlodromus wonkooi* sp. nov. (♀). — 1, Dorsum; 2, sternal shield; 3, posterior ventral surface; 4, spermatheca; 5, chelicera; 6, genu, tibia, and basitarsus of leg IV.

and very slightly mesad of seta JV2. Seta JV5 smooth. Two pairs of slender metapodal platelets, the posterior pair much larger. Spermatheca with bell-shaped cervix. Fixed digit with four teeth and pilus dentilis; the movable digit unidentate. Chaetotaxic formula: genu II, 2–2/0, 2/0–1; genu III, 1–2/1, 2/0–1. Leg IV with a tapering macroseta on basitarsus. Lengths of setae¹⁾ (n=9): j1 17.8 ± 0.2 , j3 18.9 ± 0.3 , j4 13.4 ± 0.5 , j5 14.7 ± 0.4 , j6 16.4 ± 0.4 , J2 18.7 ± 0.4 , J5 10.6 ± 0.2 , z2 13.9 ± 0.3 , z3 18.7 ± 0.2 , z4 17.6 ± 0.4 , z5 14.8 ± 0.5 , Z4 23.4 ± 0.6 , Z5 41.1 ± 0.8 , s4 19.2 ± 0.4 , s6 21.3 ± 0.4 , S2 21.8 ± 0.5 , S4 24.2 ± 0.5 , S5 (n=8) 19.4 ± 0.6 , r3 20.1 ± 0.4 , R1 20.0 ± 0.5 , JV5 24.3 ± 0.3 , macroseta on basitarsus IV 28.0 ± 0.3 .

Male. Not known.

Type series. Holotype: ♀, Mujuguchondong, Muju, Chonbuk, 6-X-1991

1) Mean $\pm$ S.E.

(M.-O. RYU leg.), on *Abies koreana*. Paratypes: 5 ♀♀, data the same as for holotype; 3 ♀♀, Mujuguchondong, Muju, Chonbuk, 7-VIII-1988 (M.-O. R.), on *Abies koreana*.

Found together with individuals of a spider mite, *Oligonychus ununguis* (JACOBI).

Remarks. The female of *Typhlodromus wonkooi* resembles that of *T. algonquinensis* CHANT, HANSELL et YOSHIDA, 1974 (Canada), but differs from the latter in having four instead of two teeth on the cheliceral fixed digit, and in having the serrate Z5 setae (*T. algonquinensis* has smooth Z5 setae). Moreover, the female of *T. wonkooi* is similar to that of *T. gilvus* (WAINSTEIN, 1975) (Russia), but differs from the latter in the relative lengths of the dorsal idiosomal setae. This new species is named in honor of Dr. LEE, Won Koo, Chonbuk National University.

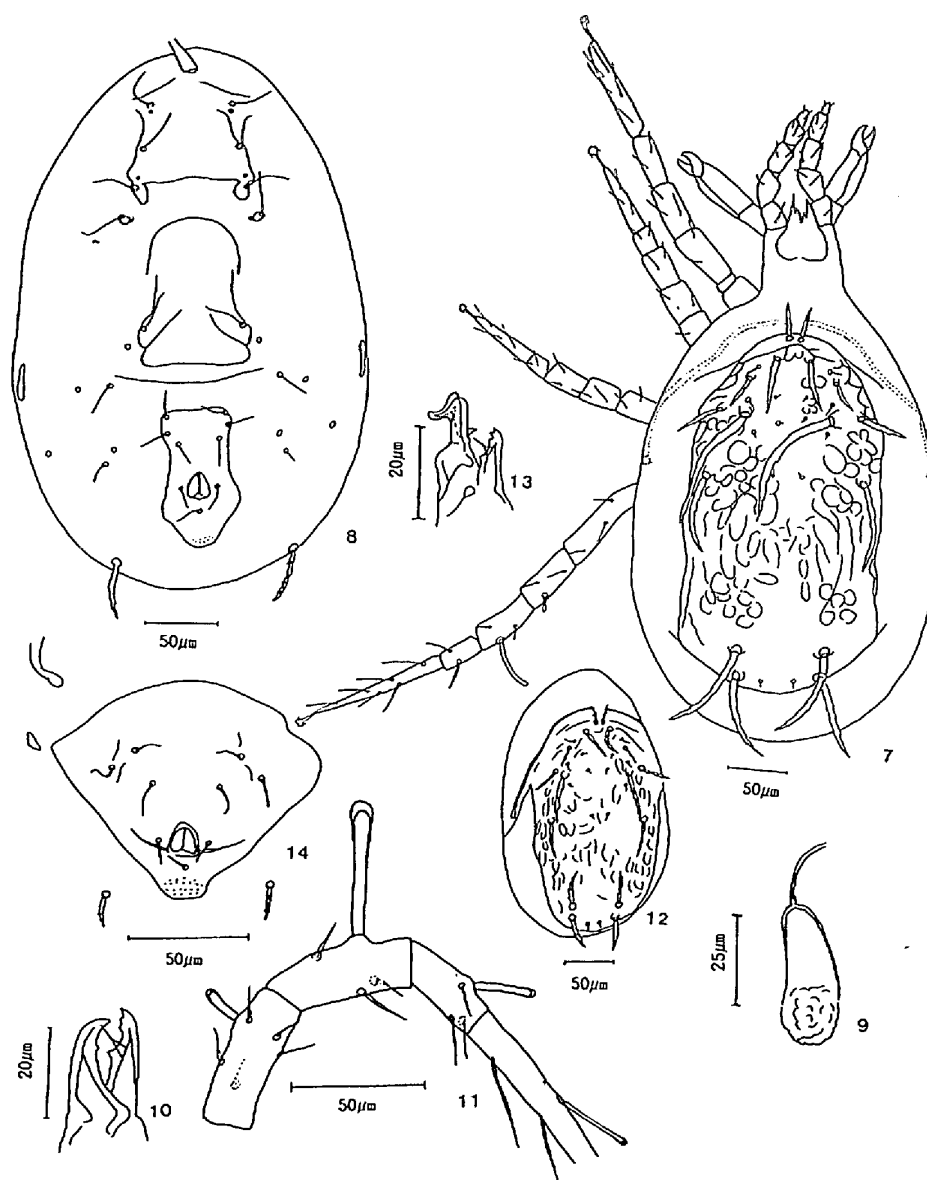
***Phytoseius (Phytoseius) mori* XIN, LIANG et KE**

(Figs. 7-14)

Phytoseius (Phytoseius) mori XIN, LIANG et KE, 1983, p. 47, figs. 13-18.

Female. Idiosoma 346 long, 243 wide at level of waist; dorsal shield 300 long, 149 wide at level of waist. Dorsal shield rugose. Setae on dorsal shield: j1, j3, z3, Z4, Z5, s4, s6, and r3 stout, strongly serrate, set on tubercles; the remaining setae short, smooth; s4 the longest; j1 slightly longer than z3; j3 about as long as r3. Peritreme extending to seta j1; peritrematal shield fused anteriorly with dorsal shield. Sternal shield with posterolateral projections, with three pairs of setae; metasternal platelets variable in shape. Ventrianal shield slender, narrower than genital shield, concave laterally, with three pairs of preanal setae; no preanal pores. Seta JV5 stout, strongly serrate. A pair of very slender metapodal platelets. Spermatheca with cervix much taller than wide. Fixed digit of chelicera with two subapical teeth, one middle tooth, and pilus dentilis; the movable digit unidentate. Chaetotaxic formula: genu II, 2-2/0, 2/0-1; genu III, 1-2/0, 2/0-1. Leg IV with four spatulate macrosetae; tip of each macroseta with a hyaline envelope. Lengths of setae (n=10): j1 31.7 ± 0.8 , j3 43.5 ± 0.6 , j4 4.7 ± 0.2 , j5 4.7 ± 0.2 , j6 4.8 ± 0.1 , J5 5.7 ± 0.2 , z2 11.9 ± 0.6 , z3 27.9 ± 0.6 , z4 10.7 ± 0.4 , z5 4.7 ± 0.2 , Z4 76.7 ± 2.3 , Z5 69.6 ± 1.6 , s4 107.9 ± 2.9 , s5 68.9 ± 1.7 , r3 42.8 ± 0.8 , JV5 40.3 ± 0.9 , macrosetae on leg IV: genu 15.7 ± 0.3 , tibia 46.5 ± 1.1 , basitarsus 24.1 ± 0.4 , telotarsus 25.7 ± 0.4 .

Male. Idiosoma 243 long, 164 wide at level of waist. Peritreme extending to seta j1. Ventrianal shield not fused with peritrematal shield, with three pairs of preanal setae. Fixed digit of chelicera with two subapical teeth, one middle tooth, and pilus dentilis; the movable digit unidentate. Spermatodactyl as figured. Chaetotaxic formula of genera II and III the same as in female. Leg IV with four spatulate macrosetae; tip of each macroseta with a hyaline envelope. Lengths of setae (n=10): j1 24.2 ± 0.6 , j3 33.9 ± 0.8 , j4 4.5 ± 0.2 , j5 4.2 ± 0.2 , j6 4.2 ± 0.2 , J5 5.0 ± 0.3 , z2 9.1 ± 0.2 , z3 22.6 ± 0.6 , z4 9.4 ± 0.3 , z5 4.6 ± 0.2 , Z4 41.9 ± 0.9 , Z5



Figs. 7–14. *Phytoseius mori*. — 7, Dorsum (♀); 8, venter of idiosoma (♀); 9, spermatheca; 10, chelicera (♀); 11, genu, tibia, and tarsus of leg IV (♀); 12, dorsum of idiosoma (♂); 13, chelicera (♂); 14, ventrianal shield (♂).

38.3±0.7, s4 61.8±1.1, s6 43.4±0.6, r3 32.7±0.7, JV5 16.3±0.4, macrosetae on leg IV: genu 12.2±0.5, tibia 16.7±0.3, basitarsus 22.7±0.4, telotarsus 24.2±0.4.

Specimens examined. Twenty-one ♀♀ & 5 ♂♂, Tongsandong, Chonju, Chonbuk, 5–VI–1988 (M.-O. Ryu leg.), on *Cudrania tricuspidata*; 4 ♀♀, Chonbuk University campus, Chonju, Chonbuk, 16–X–1987 (M.-O. R.), on *Firmiana simplex*; 2 ♀♀ & 2 ♂♂, Iri, Chonbuk, 14–VII–1988 (M.-O. R.), on *Prunus sargentii*; 16 ♀♀ & 1 ♂, Soyang, Wanju, Chonbuk, 22–VII–1989 (M.-O. R.), on *Lindera obtusiloba*;

9 ♀♀ & 8 ♂♂, Mt. Chiri, Namwon, Chonbuk, 22-VII-1990 (M.-O. R.), on *Ulmus davidiana* var. *japonica*; 1 ♀, Chungju, Chungbuk, 7-VIII-1989 (M.-O. R.), on *Celtis koraiensis*; 4 ♀♀, Mt. Chiak, Wonju, Kangwon, 11-VIII-1989 (M.-O. R.), on *Cornus officinalis*; 1 ♀, Chunchon, Kangwon, 12-VIII-1989 (M.-O. R.), on *Koelreuteria paniculata*; 22 ♀♀ & 2 ♂♂, Sansong park, Kongju, Chungnam, 22-IX-1989 (M.-O. R.), on *Broussonetia papyrifera*; 2 ♀♀, Milyang, Kyongnam, 2-X-1989 (M.-O. R.), on *Ailanthus altissima*; 1 ♀, Whayanggugok, Chungbuk, 20-VII-1990 (M.-O. R.), on *Diospyros lotus*; 17 ♀♀ & 4 ♂♂, Tanyang, Chungbuk, 21-VII-1990 (M.-O. R.), on *Ulmus davidiana* var. *japonica*; 3 ♀♀, Mt. Naejang, Chongup, Chonbuk, 1-VIII-1990 (M.-O. R.), on *Diospyros kaki*.

Remarks. Previously *Phytoseius mori* was recorded only from China (Shanghai).

Amblyseius rademacheri DOSSE

(Figs. 15-23)

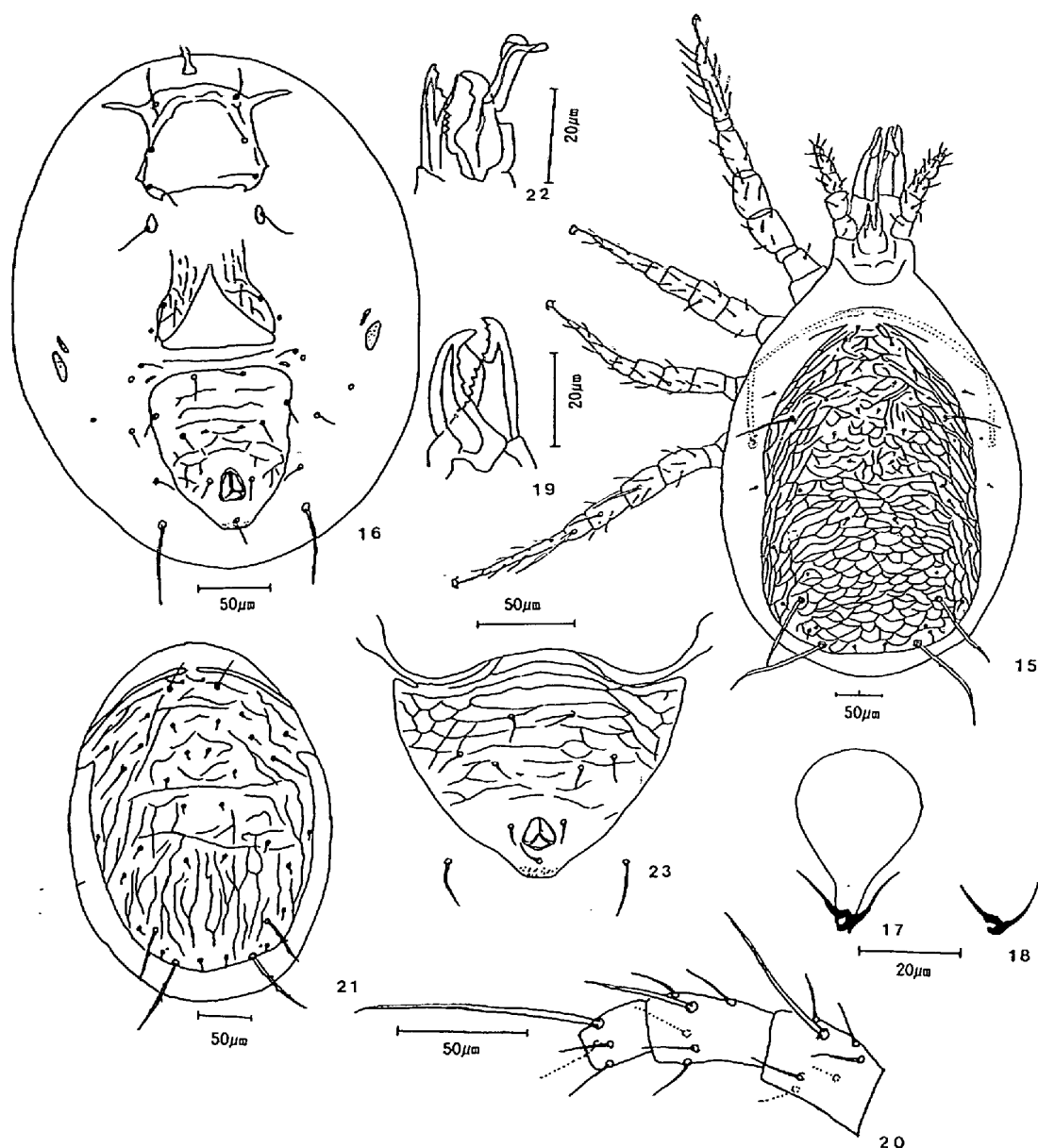
Amblyseius rademacheri DOSSE, 1958, p. 44, figs. 1-5; EHARA, 1959, p. 288, figs. 6-11.

Amblyseius (Amblyseius) rademacheri: EHARA, 1966, p. 23; EHARA, 1977, p. 37; EHARA, 1980, p. 65, fig. 20-D.

Typhlodromips rademacheri: MORAES *et al.*, 1986, p. 145.

Female. Idiosoma 466 long, 351 wide at level of R1; dorsal shield 376 long, 239 wide at level of waist. Dorsal shield reticulate, with at least six pairs of small pores. Setae on dorsal shield: Z5 the longest, barbed; Z4 long, barbed; s4 long, practically smooth; the remaining setae much shorter, smooth. Setae r3 and R1 on interscutal membrane, smooth. Peritreme extending to between setae j1; peritrematal shield fused anteriorly with dorsal shield. Sternal shield with three pairs of setae; metasternal platelets much longer than wide. Ventrianal shield longer than wide, wider than genital shield, with lateral margins slightly concave or straight; three pairs of preanal setae; a pair of crescentic pores in a transverse line with setae JV2. Seta JV5 smooth. Two pairs of slender metapodal platelets, the posterior pair much larger. Spermatheca as figured. Fixed digit of chelicera multidentate, with pilus dentilis; the movable digit with two teeth. Chaetotaxic formula: genu II, 2-2/0, 2/0-1; genu III, 1-2/1, 2/0-1. Leg IV with three tapering macrosetae; genua II and III each with a macroseta. Lengths of setae (n=10): j1 25.0 ± 0.5 , j3 35.1 ± 0.8 , j4 7.4 ± 0.3 , j5 6.4 ± 0.2 , j6 8.2 ± 0.4 , J2 9.3 ± 0.2 , J5 9.0 ± 0.2 , z2 15.3 ± 0.3 , z4 12.8 ± 0.5 , z5 7.0 ± 0.3 , Z1 10.1 ± 0.3 , Z4 90.6 ± 0.8 , Z5 118.9 ± 1.8 , s4 64.4 ± 1.3 , S2 13.7 ± 0.5 , S4 11.5 ± 0.5 , S5 10.6 ± 0.6 , r3 16.7 ± 0.3 , R1 8.4 ± 0.2 , JV5 49.8 ± 1.9 , macrosetae on leg IV: genu 60.9 ± 0.8 , tibia 46.3 ± 0.9 , basitarsus 94.7 ± 1.1 .

Male. Idiosoma 337 long, 239 wide at level of R1. Setae r3 and R1 on dorsal shield. Peritreme extending to between setae j1. Ventrianal shield reticulate, fused with peritrematal shield; three pairs of preanal setae; a pair of pores



Figs. 15–23. *Amblyseius rademacheri*. — 15, Dorsum (♀); 16, venter of idiosoma (♀); 17–18, spermatheca; 19, chelicera (♀); 20, basitarsus, tibia, and genu of leg IV (♀); 21, dorsum of idiosoma (♂); 22, chelicera (♂); 23, ventrianal shield (♂).

between and slightly behind setae JV2. Chelicera with six teeth and pilus dentilis on fixed digit; the movable digit unidentate. Spermatheca as figured. Chaetotaxic formula of genua II and III the same as in female. Leg IV with three tapering macrosetae. Lengths of setae ($n=3$, mean): j1 21.3, j3 31.3, j4 6.3, j5 5.3, j6 7.0, J2 7.3, J5 7.0, z2 10.7, z4 10.0, z5 6.3, Z1 7.7, Z4 56.3, Z5 77.0, s4 39.3, S2 12.7, S4 10.0, S5 9.3, r3 15.3, R1 8.3, JV5 30.3, macrosetae on leg IV: genu 44.7, tibia

35.7, basitarsus 80.7.

Specimens examined. Twenty-six ♀♀ & 3 ♂♂, Yonchon, Kyonggi, 16-IX-1989 (M.-O. RYU leg.), on *Ambrosia trifida*; 2 ♀♀, Yonchon, Kyonggi, 16-IX-1989 (M.-O. R.) on *Rubus crataegifolius*; 1 ♀, Yonchon, Kyonggi, 16-IX-1989 (M.-O. R.) on *Castanea crenata*.

Remarks. This species was previously recorded from Europe, Japan, and the former U. S. S. R.

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