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Study on the Tarsonemid Mites (Acari: Tarsonemidae) from Korea. II. Four unrecorded species of *Tarsonemus*

韓國産 먼지응애류에 관한 硏究. II. *Tarsonemus*屬 4未記錄種

Myoung Rae Cho, Yong Ho Kwak and Won Koo Lee[1]
조명래 · 곽용호 · 이원구[1]

ABSTRACT In a survey of Tarsonemid mites associated with ornamental trees, four *Tarsonemus* species unrecorded in Korea were identified in 1993. They are *Tarsonemus bilobatus* Suski, 1965, *T. evodiae* Ito, 1964, *T. smithi* Ewing, 1939, and *T. takaoensis* Ito, 1964. Morphological characteristics of these 4 species are reported herein.

KEY WORDS Ornamental tree, Tarsonemidae, *Tarsonemus*, Taxonomy.

초 록 花木類 및 觀賞樹에 寄生하는 먼지응애류에 대한 1993年度 調査 中 國內未記錄 *Tarsonemus*屬 4種이 同定되었다 *Tarsonemus bilobatus* Suski, 1965. *T. evodiae* Ito, 1964, *T. smithi* Ewing, 1939, *T. takaoensis* Ito, 1964 等 4種의 形態的 特徵에 대하여 報告한다.

검 색 어 觀賞樹, 먼지응애科, 먼지응애屬, 分類

Tarsonemid mites are widespread in a great variety of habitats including soil, litter, in decaying wood, bracket fungi, in stored grain and good products, laboratory cultures, and on all sorts of woody and herbaceous plants including conifers (Lindquist 1987).

Tarsonemus species are generally thought to be primarily fungivores. Some species of Tarsonemus appear to be beneficially important in their association with fungi in decomposition of soil litter (Santos & Whitford 1981). A few species of *Tarsonemus*, such as *T. waitei* Banks, *T bakeri* Ewing, and *T smithi* Ewing, may be facultatively or transitionally phytophagous, sometimes on hosts of agricultural importance is discussed by Karl (1965) and Lindquist (1978).

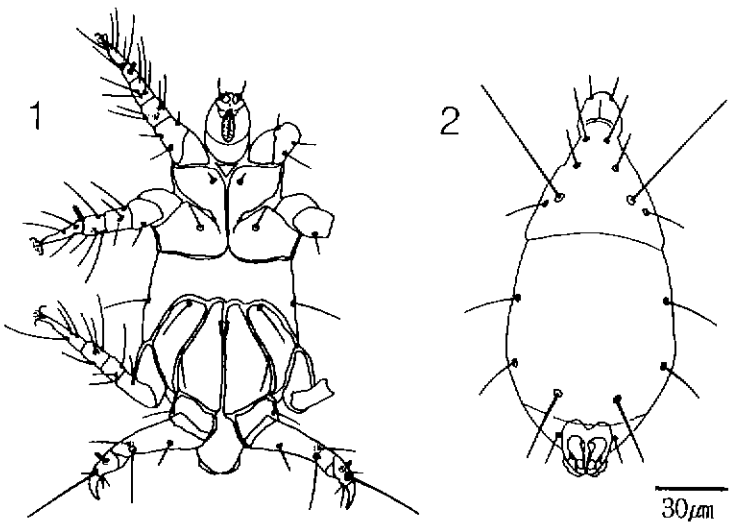
On Tarsonemid mites in Korea, Lee (1965) firstly reported on the broad mite, *Polyphagotarsonemus latus*, occuring in fruit trees. Taxonomy, damages on agricultural crops, and occurence of the broad mite and the cyclamen mite, *Phytonemus pallidus*, were reported recently (Lee *et al.* 1992, Cho 1993, Cho *et al.* 1993). On the species of *Tarsonemus*, Goo & Cho (1989) reported *T. floricolus* and *T. fusari* found from hospital laboratory. Lee & Yu (1988) reported associations of *Tarsonemus* spp. with apple fruits. And five species of Tarsonemus associated with ornamental trees were recorded (Cho *et al.* 1994).

In a survey of Tarsonemid mites associated with ornamental trees in 1993, four unrecorded *Tarsonemus* species were newly identified. Morphologic characteristics of the species are reported herein.

MATERIALS AND METHODS

Tree samples were taken from ornamental trees planted in experimental fields of Forest Environment

Division of Horticultural Environment, National Horticultural Research Institute, RDA, Suwon (원예연구소 원예환경과)
[1]Department of Biology, College of Natural Science, Chunbuk National University, Chŏnju (전북대학교 자연과학대학 생물학과)



Figs. 1-2. *Tarsonemus bilobatus* male, ventral and dorsal view.

Research Institutes of 4 provinces, Chungbuk, Chungnam, Chunnam, and Chunbuk, in 1993. Twigs of trees showing discoloration and abnormal growth were cut by scissors and transported to laboratory in white plastic bags. Leaves of deciduous trees were directly examined under stereomicroscope. Mites were picked up by fine plastic needle and fixed in 80% alcohol solution. Twigs of conifers were held by hand on white paper and mites were shaken off by wood stick. Mites dropped on the paper were collected and fixed.

Permanent slides were prepared using Hoyer's mounting solution (50 g distilled water, 30 g gum arabic, 200 g chloral hydrate, 20 g glycerin) and examined under Differential Interference Contrast microscope. Drawings were done using drawing tube.

Following descriptions are based on males of each species. Morphological characteristics of apodemes III and IV, and 4th legs of males are important keys in identifying *Tarsonemus* species. Measurements are in μm.

RESULTS

The present materials collected from ornamental trees have been determined to comprise four species as follows.

Taxonomic position of *Tarsonemus* species

Family Tarsonemidae Canestrini & Fanzago, 1877. 먼지응애科

Subfamily Tarsoneminae Canestrini & Fanzago, 1877. 먼지응애亞科

Tribe Tarsonemini Canestrini & Fanzago, 1877. 먼지응애族

Genus *Tarsonemus* Canestrini & Fanzago, 1877. 먼지응애屬

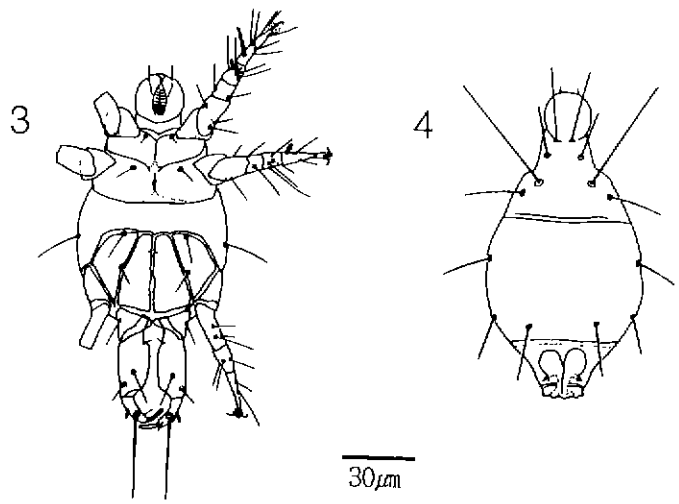
1. *Tarsonemus bilobatus* Suski, 1965. 갈색먼지응애 (新稱)
2. *T. evodiae* Ito, 1964. 알통다리먼지응애 (新稱)
3. *T. smithi* Ewing, 1939. 긴다리먼지응애 (新稱)
4. *T. takaoensis* Ito, 1964. 일본먼지응애 (新稱)

DESCRIPTIONS

1. *Tarsonemus bilobatus* Suski, 1965 갈색먼지응애 (新稱) (Figs. 1-2)

Materials examined. 2♀, *Thuja occidentalis* L. (서양측백), Aug. 26, 1993, Naju.

Male. Body length 164 (102-165), body width 88 (84-91), leg I 68 (67-68), leg II 64 (64-64), leg III 66 (65-67), leg IV; coxa width 22 (21-22), coxa length 14 (13-14).width at base of femur 18 (18-18), femur length 39 (37-40), femur to claw end 23 (23-23), inner femoral seta 25 (24-25), tactile



Figs. 3-4. *Tarsonemus evodiae* male, ventral and dorsal view.

seta 35 (34-35).

Body elongate and yellow to brown in color. Apodemes III and IV well developed to the anterior extremities. Coxisternal plate IV abruptly getting narrow at the anterior half. Other morphological characteristics are same as described by Suski (1965).

2. *Tarsonemus evodiae* Ito, 1964
알통다리먼지응애 (新稱) (Figs. 3-4)

Materials examined. 1♀, *Ilex serrata* Thunb. (낙상홍), Aug. 26, 1993, Chungju. 1♀, *Camellia japonica* L. (동백), Aug. 24, 1993, Naju.

Male. Body length 134 (132-135), body width 73 (72-73), leg I 60 (59-60), leg II 55 (54-56), leg III 51 (51-51), leg IV; coxa width 14 (14-14), coxa length 15 (14-16), width at baseof femur II (11-11), femur length 28 (27-29). femur to claw end 23 (21-24), inner femoral seta 14 (14-14), tactile seta 35 (29-35).

Body oval and whitish yellow in color. Tarsus I with a dorsal, clavate, annulated sensal seta, about two thirds as long as the segment. Apodemes III and IV well developed and connected each other. Femur IV well developed, distal two thirds of inner margin expanded, distal third of inner margin creased. Tibia IV slender and concave. Claw IV strong, distal end rounded. Other characteristics same as described by Ito (1964)

3. *Tarsonemus smithi* Ewing, 1939
긴다리먼지응애 (新稱) (Figs. 5-6)

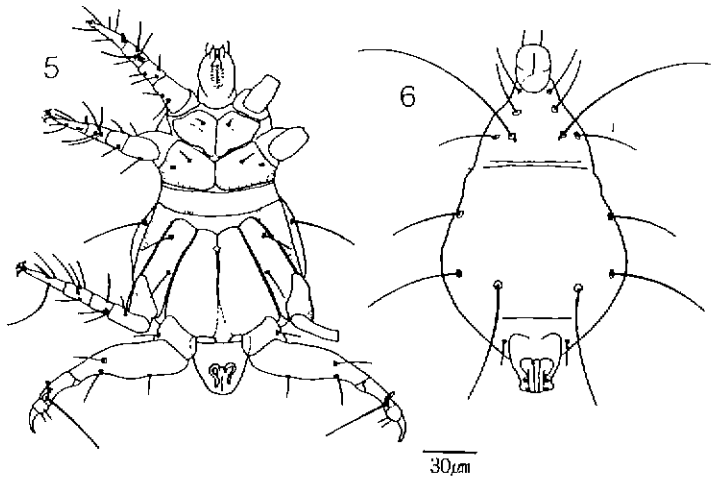
Materials examined. 1♀, *Fraxinus rhyncophylla* Hance (물푸레나무), Aug. 25, 1993, Chunju.

Male : Body length 200, body width 103, leg I 75, leg II 72, leg III 83, leg IV; coxa width 25, coxa length 19, width at base of femur 21, femur length 56, femur to claw end 40, inner femoral seta 19, tactile seta 40.

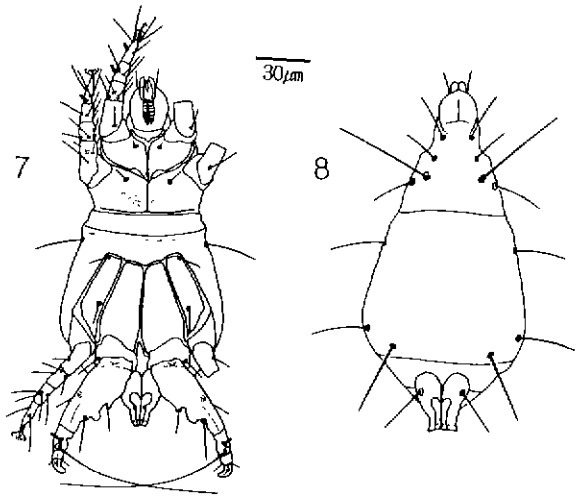
Body elongate rather long, whitish yellow or brown in color. Apodemes III and IV well developed. Anterior extremities of apodemes IV extending further than apodemes IV. Apodemes II, ventral plate, and coxa III dotted. Coxa IV not triangular. Femur IV well developed, anterior two third expanded. Tibia IV longer than broad, inner margin strongly incurved. Tarsal claw long, strongly curved, acuminate at apex. Other characteristics same as the description of Ewing (1939) and Ito (1964).

4. *Tarsonemus takaoensis* Ito, 1964
일본먼지응애 (新稱) (Figs. 7-8)

Materials examined. 1♀, *Pinus densiflora* Sieb. et Zucc. (소나무), Aug. 26, 1993, Taejun. 4♀♀,



Figs. 5-6. *Tarsonemus smithi* male, ventral and dorsal view.



Figs. 7-8. *Tarsonemus takaoensis* male, ventral and dorsal view

Rhododendron schlippenbachii Maxim. (철쭉), Aug. 24, 1993, Naju, Aug. 26, 1993. Taejun. 1♀, *Magnolia denudata* Desr. (백목련), Aug. 24, 1993. Naju. 1♀, *Camellia japonica* L. (동백), Aug. 24, 1993, Naju.

Male. Body length 202 (196-207), body width 100 (94-103), leg I 72 (72-73), leg II 73 (72-76), leg III 67 (62-72), leg IV; coxa width 26 (24-29), coxa length 20 (19-21), width at base of femur 21 (19-22), femur length 54 (49-57), femur to claw end 28 (24-32), inner femoral seta 24 (22-27), tactile seta 96 (92-100).

Body elongate, rather large, yellow to greenish brown in color. Apodemes III and IV well developed, connected each other. Apodemes III extending anteriorly further than apodemes IV. Femur IV anterior half expanded, with hillock-like projection at base of proximal seta, and expanded between proximal and distal setae, forming a lobe-shaped projection. Tibia IV with long tactile seta. Tarsal claw strongly developed, apex rounded. Other characteristics same as described by Ito (1964).

DISCUSSIONS

Including the four species described in this paper, total of 11 *Tarsonemus* species were recorded in Korea. Among them, *T. floricolus* and *T. fusari* were reported from hospital laboratory, and other 9 species were all associated with ornamental trees (Goo & Cho 1989, Cho et al. 1994). *T. smithi*, and *T. waitei* are known as facultative or transitional phytophagous mites (Lindquist 1986). *T. occidentalis* was associated with dwarf of *Camellia japonica* (Cho *et al.* 1994). Therefore, closer examinations and research are needed to understand the role of these mites in our ecosystem.

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