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Subscriptions: Year 2021 (Volume 61): 450 €
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Previous volumes (2010-2020): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

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TWO NEW SPECIES OF THE SUBGENUS *PHYTOSEIUS* RIBAGA
(*PHYTOSEIUS*: PHYTOSEIIDAE: ACARINA)
FROM HILLY AREAS OF PAKISTAN

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(Accepted November 2005)

**Summary:** Some hilly areas of Pakistan were surveyed for the collection of species of sub-genus *Phytoseius* which resulted in the collection of two new species viz., *Phytoseius (Phytoseius) kallion* and *Phytoseius (Phytoseius) deima* have been recorded and described.

**Résumé:** Le sous genre *Phytoseius* a été récolté lors du suivi des régions montagneuse du Pakistan. Deux nouvelles espèces qui sont décrites ici ont été récoltées : *P. (P.) kallion* et *P. (P.) deima*.

**Introduction**

The genus *Phytoseius* an important predatory genus of the family Phytoseiidae was erected by Ribaga in 1904 with *Gamasus plumifer* Canestrini & Fanzago, 1876 as its type species. The species of this genus are world wide in distribution and feed on phytophagous mites and small insects (Evans, 1992). A good deal of taxonomic work on these mites have been carried out in the world by Muma & Denmark (1968, 1970), Gupt (1977), McMurtry and Moraes (1991), Walter (1992) and Yoshida-Shaul & Chant (1995). From Pakistan, Chaudhri (1973) and Chaudhri et al. (1979) described 4 and 1 new species in this subgenus respectively. Whereas Shahid et al. (1982), Khan et al., (1990) and Afzal et al. (2000) described two new species each in it. The authors have now described 2 new species in this genus thus making a total of 13 species in it, from Pakistan. Previously the Garman System (Garman, 1948) of setal nomenclature was being followed but recently it has been changed to Lindquist-Evans System (Rowell et al., 1978). The authors have followed this system in the present paper.

*Phytoseius (Phytoseius) kallion*, new species
(Figs. 1 A-F)

**Female: Dorsum.** — Dorsal shield 290 μm long, 147 μm wide, with irregular broken striation, concave near seta s6, with 2 pairs pores and 15 pairs setae (Fig. 1-A). Chelicera 20 μm long, movable digit with 1 tooth, fixed digit with 3 teeth (Fig. 1-B). Dorsal and sublateral setae measuring: j1 25 μm, j3 70 μm, j4 = j5 = j6 5 μm, J5 8 μm; z2 15 μm, z3 33 μm, z4 28 μm, z5 minute, Z4 120 μm, Z5 73 μm; s4 140 μm, s6 50 μm; r3 50 μm; j3 > j3 - z2, z2 > z2 - z3, z3 > z3 - z4, Z4 > Z4 - Z5. All dorsal setae serrate except j4, j5, j6, J5, z2, and z5 being simple. Peritreme reaching upto seta j1 (Fig. 1-A).

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Venter. — Sternal shield with 3 pair simple setae, seta $St1 < St1-St2$, $St2 < St2-St3$. Metasternal setae 1 pair on separate platelets. Genital shield 70 $\mu$m wide, wider than ventrianal shield, with 1 pair simple setae. Ventrianal shield longer than wide, 95 $\mu$m long, 53 $\mu$m wide, 23 $\mu$m apart from genital shield, a membranous fold present between genital and ventrianal shields. Ventrianal shield with 3 pairs pre-anal setae almost in a vertical row, 1 pair para anal and 1 post anal seta, all simple, no pore on the shield. Seta $JV5$ thick, barbed 60 $\mu$m long. Metapodal platelets 1 pair, i.e., primary 25 $\mu$m long (Fig. 1-C). Spermatheca bell-shaped, atrium nodulated, major duct long (Fig. 1-D).

Legs. — Macrosetae present on leg IV, tibia, basitarsus and distitarsus measuring 73 $\mu$m, 28 $\mu$m and 28 $\mu$m in length, respectively. Setae on tibia and basitarsus with minute bulbous tip (Fig. 1-F).

Male: Not came in collection.

Type: Holotype female collected Chattar (3500 ft) from ‘fig’ (Ficus carica) on 17.x.1996 (AFZAL), para-types 4 females, same collection data. All deposited in the Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad, Pakistan.

Remarks: Phytoseius (Phytoseius) kallion, new species comes closer to Phytoseius (Phytoseius) nipponicus Ehara on the basis of dorsal shield pattern, simple seta $z2$ and shape of ventrianal shield but differs from it on the basis of the following characters:

1. — Notocephalic pore absent in nipponicus but present in this new species.
2. — Membrane surrounding ventrianal shield with pores in nipponicus but pores no in this new species.

This species can also be distinguished from Phytoseius deima, new species on the basis of following points:

1. — Dorsal shield with 3 pairs pores (1 notocephalic, 2 rounded) in deima as against 2 pairs pores (1 notocephalic, 1 elliptical) in this new species.
2. — Dorsal shield thickly reticulated posterior to seta $j6$ in deima but only a few reticulate elements in this new species.
3. — Shape of spermatheca differs in both the species.
4. — Metasternal setae on membrane in deima but on separate platelets in this new species.
5. — Sternal setae $St1=St1-St2$, $St2=St2-St3$, in deima but $St1<St1-St2$, $St2<St2-St3$ in this new species.

This new species can also be distinguished from Phytoseius (Phytoseius) mixtus Chaudhri on the basis of the following points.

1. — Dorsal shield with 1 pair notocephalic pores in mixtus whereas 1 simple and 1 notocephalic pairs pores present in this new species.
2. — Seta $z2$ serrate in mixtus but simple in this new species.
3. — Membrane surrounding the ventrianal shield with 4 pairs pores in mixtus but no pores present in this new species.

Phytoseius (Phytoseius) deima, new species (Figs. 2 A-J)

Female: Dorsum. — Dorsal shield with almost parallel sides, 280 $\mu$m long, 163 $\mu$m wide, with reticulate elements posterior to seta $j6$, with 3 pairs pores and 15 pairs setae (Fig. 2-A). Chelicera 20 $\mu$m long,
movable digit with 1 tooth, fixed digit with 3 teeth (Fig. 2-B). Dorsal and sublateral setae measuring: j1 30 μm j3 60 μm, j4 = j5 = j6 minute, J5 minute; z2 13 μm, z3 33 μm, z4 25 μm, z5 minute, Z4 103 μm, Z5 75 μm; s4 128 μm, s6 80 μm, r3 33 μm; j3 > j3 - z2, z2 > z2 - z3, z3 > z3 - z4, Z4 > Z4 - Z5. All dorsal setae serrate except j4, j5, j6, J5, z2, z4 and z5 being simple. Peritreme reaches up to seta j1 (Fig. 2-A). Peritremal shield recurved, base pointed (Fig. 2-E).

**LEGS.** Macrosetae present on leg IV, tibia, basitarsus and distitarsus measuring 53 μm, 25 μm and 25 μm in length, respectively. Setae on tibia and basitarsus with rounded tip (Fig. 2-F).

**MALE.** Dorsal shield 213 μm long, 120 μm wide, with very few scattered striations 15 pairs setae. Dorsal setae measuring: j1 23 μm, j3 40 μm, j4=j5=j6 5 μm; J5 6 μm; z2 13 μm, z3 23 μm, z4 18 μm, z5 minute, Z4 43 μm Z5 35 μm; s4 55 μm, s6 48 μm; r3 30 μm. All dorsal setae serrate except j4, j5, j6, J5, z2, z3, z4, and z5 being simple. Peritreme reaching up to seta j1 (Fig. 2-G). Sterno-genital shield smooth, 118 μm long and 68 μm wide with 5 pairs setae (Fig. 2-I). Ventrianal shield 68 μm long, 110 μm wide; preanal setae 3 pairs, 1 pair para-anal and 1 postanal seta; wider than sternogenital shield in width (Fig. 2-I). Chelicerae movable digit with spermatodactyl. Spermatodactyl foot 5 μm long with 3 μm long toe; shaft 10 μm long, heel slightly pointed (Fig. 2-H). Macrosetae on leg IV tibia, basitarsus and distitarsus measuring 25 μm, 18 μm and 18 μm in length respectively. Macrosetae baccilate on tibia and setaceous on basitarsus and distitarsus (Fig. 2-J).

**TYPE.** Holotype female collected Bagh (6000 ft) from 'papaya' (Carica papaya) on 24.x.1996 (Afzal), paratypes 2 females, allotype one male collected Bagh (6000 ft), same collection data. All deposited in the Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad, Pakistan.

**REMARKS.** Phytoseius (Phytoseius) deima, new species can be separated from Phytoseius (Phytoseius) kallion, new species on the basis of following points.

1. Dorsal shield with 2 pairs pores (1 notocephalic, 1 elliptical) in kallion as against 3 pairs pores (1 notocephalic, 2 rounded) in this new species.
2. Dorsal shield having a few reticulate elements posterior to seta j6 in kallion but thickly reticulated in this new species.
3. Shape of spermatheca differs in both the species.
4. Metasternal setae on a separate platelet in kallion but on membrane in this new species.
5. Sternal setae S1≠S1-S2, S2≠S2-S3, in kallion but S1=S1-S2, S2=S2-S3 in this new species.
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