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

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**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), Gope (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; r4 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 µm wide, wider than ventrianal shield, with 1 pair simple setae. Ventrianal shield longer than wide, 95 µm long, 53 µm wide, 23 µm 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 µm long. Metapodal platelets 1 pair, i.e., primary 25 µm 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 µm, 28 µm and 28 µm 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 µm long, 163 µm wide, with reticulate elements posterior to seta j6, with 3 pairs pores and 15 pairs setae (Fig. 2-A). Chelicera 20 µm 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).

**Fig. 2.** — *Phytoseius (Phytoseius) deima*, n.sp.; A. — dorsal shield; B. — chelicera; C. — sternal, genital and ventrianal shields; D. — spermatheca; E. — peritremal shield; F. — leg IV; G. — dorsal shield (male); H. — spermatodactyl; I. — sternogenital shield.

**Venter.** — Sternal shield with 3 pairs simple setae, seta St1 = St1-St2, St2 = St2-St3. Metasternal setae 1 pair on membrane. Genital shield 75 µm wide, wider than ventrianal shield, with 1 pair simple setae. Ventrianal shield longer than wide, 95 µm long, 55 µm wide, 20 µm 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 58 µm long. Metapodal platelets 1 pair, primary 28 µm long (Fig. 2-C). Spermatheca bell-shaped, atrium nodulated (Fig. 2-D).

**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). Sternogenital 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 paraanal and 1 postanal seta; wider than sternogenital 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 baccilae 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 pores notocephalic, 1 elliptical in *kallion* as against 3 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 St1<St1-St2, St2<St2-St3, in *kallion* but St1=St1-St2, St2=St2-St3 in this new species.
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