

SPECIES OF THE SUBGENERA *PARAPHYTOSEIUS* AND *ASPEROSEIUS* FROM INDIA, WITH DESCRIPTION OF A NEW SPECIES OF *PARAPHYTOSEIUS*

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ABSTRACT

The two subgenera, *Paraphytoseius* and *Asperoseius* are diagonalised. One new species under former subgenus is described. *Amblyseius* (*P.*) *multidentatus* Swirski & Shechter is reported as new from India. Keys to all the Indian species under both subgenera are given.

INTRODUCTION

Swirski and Shechter (1961) erected the genus *Paraphytoseius* with *Paraphytoseius multidentatus* Swirski and Shechter as its type. But Chant (1965) synonymised it with *Amblyseius* Berlese, as like *Amblyseius*, the species of *Paraphytoseius* also possess four pairs of prolateral setae. However, Gupta (1979) re-established *Paraphytoseius* on the ground that the species of this genus exhibits some unique characters like : 1. dorsal shield leaves some portion of dorsum uncovered, 2. usually deep notch present at the level of s4, 3. a conspicuous pore present associated with z5 and 4. setae j1, j3, Z4, Z5 normally long, thick and serrate. These characters are not universally met with in the species of the genus *Amblyseius*. He recognised under the genus *Paraphytoseius* two subgenera, viz. *Paraphytoseius s. str.* having setae z2 and z4 smooth and S2 absent, while the subgenus *Tropicoseius*, which he proposed as new, having setae z2 and z4 serrate and S2 present. The latter subgenus was proposed to accommodate a species *P. (T.) nucifera* which was described as new. However, he was unaware of *Aspe-*

roseius used as subgenus by Ehara and Bhandhufalck (1977) having similar characters as shown in *Tropicoseius* and therefore, realising the mistake he transferred *nucifera* from *Paraphytoseius (Tropicoseius)* to *Amblyseius (Asperoseius)* in one of his later papers (Gupta, 1979a). In that paper he stressed the need to follow the generic concepts of Chant (1965) as that gives the idea that mites of the family Phytoseiidae are of generalised characters which is in contrary to the idea of another school of thoughts who considered the generalised forms as supra generic categories and favoured to divide the family into a number of genera basing upon trivial minor characters. However, to make it easier to key out the species, he favoured to divide the genera into subgenera basing upon those characters which the other school of thoughts considered to be of generic importance. Accordingly, he recognised 9 subgenera under *Amblyseius* which included the subgenera *Paraphytoseius* and *Asperoseius*.

Now, it may be noted that the two subgenera are separated by two characters, viz. 1. setae z2 and z4 being serrate in *Aspero-*

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seius (smooth in *Paraphytoseius*) and seta S2 present in *Asperoseius* (absent in *Paraphytoseius*). But the first mentioned character does not appear to be a stable one as in one of the species, which is described here as new under subgenus *Paraphytoseius*, possesses z2 and z4 serrate. Though at this stage it is not wise to merge the two subgenera because of inadequacy of our knowledge but in the long run it may be required to do so when more species under these two subgenera will be studied.

So far from India, 4 species under subgenus *Paraphytoseius* and 1 under subgenus *Asperoseius* are in record. All those species are treated in this paper giving their brief descriptions and illustrations to help the future workers in easy identifications. One of the 4 species under *Paraphytoseius* is indicated here as misidentification. Besides, one more species of subgenus *Paraphytoseius* is described here as new and another is recorded here for the first time from India. With these, the total number of species from India under the two subgenera comes to 5 under *Paraphytoseius* and 1 under *Asperoseius*. Key to subgenera and to all the known species under the two subgenera is given.

Type of the new species is deposited in the collection of the Zoological Survey of India, Calcutta. Setal nomenclature as of Rowell *et al.*, (1978) is followed here. The measurements in text are in microns.

Key to the subgenera and species of *Paraphytoseius* and *Asperoseius*.

1. Dorsal shield with 13 or 14 pairs of setae, z2 and z4 normally smooth (except in the new species described here), S2 absent, metapodal plates single paired.....Subgenus : *Paraphytoseius* 2
- Dorsal shield with 14 pairs of setae, z2 and z4 serrate, S2 always present, metapodal plates 2 paired.....Subgenus *Asperoseius* (*A.*) *nucifera*

2. Dorsal shield deeply notched at the level of s4..... 4
- Dorsal shield not notched at the level of s4..... 3
3. Ventrianal shield constricted at the level of 3rd pair of preanal setae..... *A. (Paraphytoseius) nicobarensis*
- Ventrianal shield not constricted as above..... *A. (P.) nayayanani*
4. z5 present..... 5
- S5 absent..... *A. (P.) bhadrakaliensis*
5. z2 and z4 serrate..... *A. (P.) scleroticus* sp. nov.
- z2 and z4 smooth..... *A. (P.) multidentatus*

Amblyseius (Paraphytoseius) scleroticus

sp. nov. (Fig. 1)

Female : Dorsal shield reticulate, 260 long, 135 wide, with 14 pairs of setae. Setae j1, j3, z4, Z4, Z5, r3 being long, thick and serrate, setae z2 and R1 also serrate ; 4 pairs of pores present on dorsal shield, of those, the pair associated with z5 being largest. Measurements of setae : j1-25, j4-j6-8 each, J5-4, j3-56, z2-11, z4-20, s4-69, Z1-9, S5-11, Z5-69, z5-7, Z4-45, r3-20, R1-16. Sternal shield smooth, 90 long, 72 wide, with 3 pairs of long sternal setae. Genital shield 69 wide. Ventrianal shield 90 long, 50 wide with 3 pairs of preanal setae on one side and with 2 pairs on another side, para and post anal setae present as usual ; 4 pairs of setae present around ventrianal shield, JV5 56 long. Metapodal plates single paired. Chelicera not possible to examine because of position of the specimen. Spermatheca as figured. Macrosetae on long IV : genu-15, tibia-29, basitarsus-34 and distitarsus-34—all being with knobbed tip.

Male : Unknown.

Material : Holotype ♀, (ZSI Reg. No. 3176/17) INDIA : Uttar Pradesh, Barkot, 3. ix. 1979, ex undetermined host (coll. S. K. Gupta).

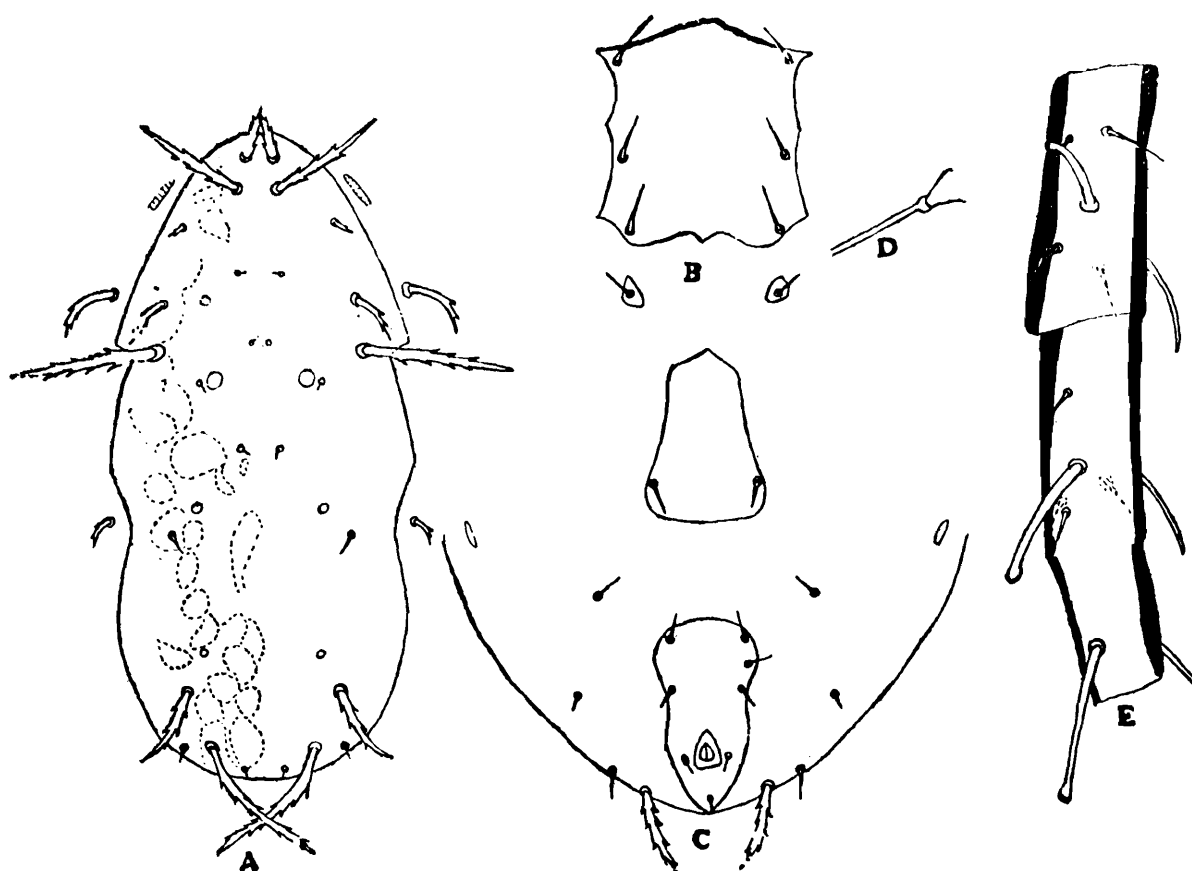


Fig. 1 (A—E) : *Amblyseius (Paraphytoseius) scleroticus* sp. nov. (♀) ; A—dorsal shield, B—sternal shield, C—posterior ventral surface, D— spermatheca, E—leg IV.

Remarks : This species is easily separated from other related species by having setae z2 and z4 serrate, by relative length of Z4 and Z5 and by shape of ventrianal shield and spermatheca.

Amblyseius (Paraphytoseius) multidentatus
Swirski and Schechter (Fig. 2)

Paraphytoseius multidentatus Swirski and Shechter,
1961, *Israel J. agric. Res.* 11 : 114—116

Female : Dorsal shield smooth, elongate, deeply notched at the level of s4, 300 long, 150 wide with 14 pairs of setae. Setae j1, j3, s4, Z5, Z4 being long, thick and serrate measuring respectively, 30, 88. 120, 130, and 70. Seta S5-7 long. Sternal shield 90 long, 78 wide with 3 pairs of long sternal setae.

Genital shield 90 wide. Ventrianal shield 90 long, 55 wide with 3 pairs of preanal setae, a pair of paraanal and a postanal seta also present., 4 pairs of setae present around ventrianal shield, JV5-24 long. Peritreme extends anteriorly upto j1. Spermatheca as figured. Fixed digit of chelicera multidentate and a strong pilus dentilis, movable with 3 teeth. Macrosetae on leg IV : genu 22, tibia 35, basitarsus-45 and distitarsus-50 long. Leg

chaetotactic formula : genu II 2—2, tibia II 2 1
0 0

1 2 2 2 1 2
1— —1, genu III 1— —0, tibia III 1— —0
2 0 1 1 2 0

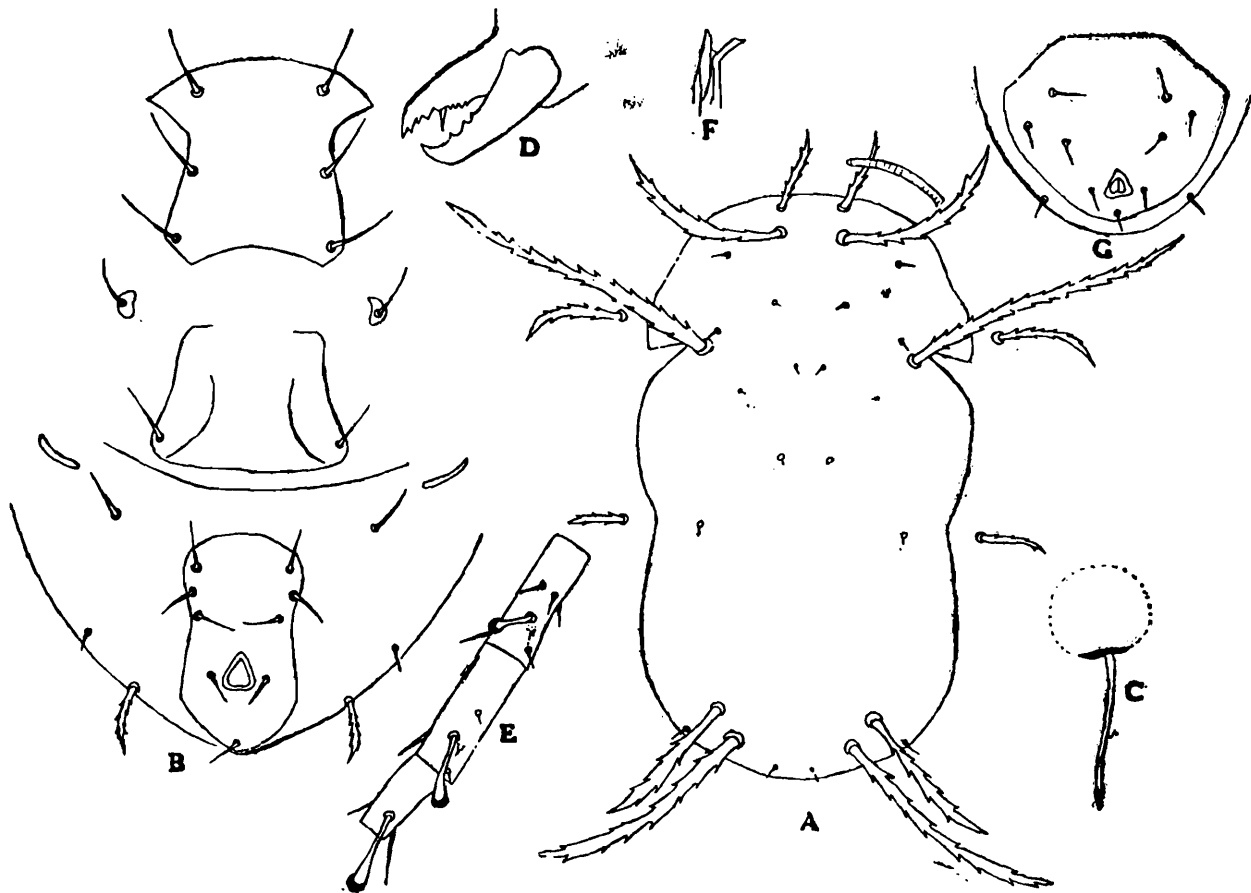


Fig. 2 (A—E): *Amblyseius (Paraphytoseius) multidentatus* Swirski and Shechter (♀); A—dorsal shield, B—ventral surface, C—spermatheca, D—chelicera, E—leg IV. (F—G): A (*P. multidentatus* (♂)); F—spermatophoral process, G—ventrianal shield.

Male : Spermatophoral process and ventrianal shield as figured.

Material : 2 ♀♀, 1 ♂, Tripura, Fatikray, 18. x. 1979, ex *Eupatorium odoratum* (Coll. S. Ray). (ZSI Reg. No. 3179/17)

Remarks : This species is known from Hong-Kong and Malagasy (Ehara and Bhandhufalck, 1977). It agrees well with the original description of Swirski and Shechter (1961) but differs in respect of JV5 which is relatively smaller and Z5 longer in these specimens. This species was hitherto unrecorded from India.

Amblyseius (Paraphytoseius) narayanani
Ehara and Ghai (Fig. 3, A—B)

Typhlodromus (Amblyseius) orientalis Narayanan, Kaur and Ghai, 1960, *Proc. natn. Inst. Sci. India.*, 26 (B) : 304.

Amblyseius (Paraphytoseius) narayanani. Ehara and Ghai, *Mushi*, 40(6) : 77.

Female : Dorsal shield with 13 pairs of setae of those, j1, j3, s4, Z5, Z4 being long, thick and serrate measuring respectively, 35, 107, 143, 118 and 78 ; other setae being minute. A large pore present associated with z5. Notch absent at the level of s4. Ventrianal shield elongated, triangular with 3 pairs of preanal setae. Fixed digit of chelicera multidentate, movable digit with 2 teeth. Spermatheca as figured. Leg IV with macrosetae on genu, tibia and basitarsus—all being spatulate.

Male : Spermatophoral process as figured.

Distribution : India : Maharastra.

Amblyseius (Paraphytoseius) bhadrakaliensis
Gupta (Fig. 3, C—D)

Amblyseius bhadrakaliensis Gupta, 1969. *Bull. Ent.*
10 (2) : 127-128.

Female : Dorsal shield with 13 pairs of setae, notched at the level of s4, Setae j1, j3, s4, Z5, Z4, being long, thick and serrate measuring 34, 90, 117, 105, and 76, respectively ; other setae being small. Ventrianal shield 94 long, 68 wide with 3 pairs of preanal setae, JV5-80 long. Fixed digit of chelicera multidentate, movable digit with 2 teeth. Spermatheca as figured. Leg IV with macrosetae on genu-22, tibia-31, basitarsus-36 and distitarsus-40. Leg chaetatactic formula :

2 1	2 2
genu II 2— —1,	genu III 1— —1,
0 0	1 0
1 2	1 2
tibia II 1— —1,	tibia III 1— —1.
1 1	1 1

Male : Spermatophoral process as figured.

Distribution : India : West Bengal, Tamil Nadu, Karnatakea, Andhra Pradesh, Tripura (new record), Punjab, Andaman Isl., Jammu and Kashmir, Bihar.

The report of *Amblyseius horrifera*. Pritchard and Baker (Gupta, 1970) appears to be a case of misidentification and the species is same as *A (P.) bhadrakaliensis* Gupta.

Amblyseius (Paraphytoseius) nicobarensis
Gupta (Fig. 3, E—F)

Amblyseius nicobarensis Gupta, 1977, *Oriental Ins.*
11 (4) : 631-632.

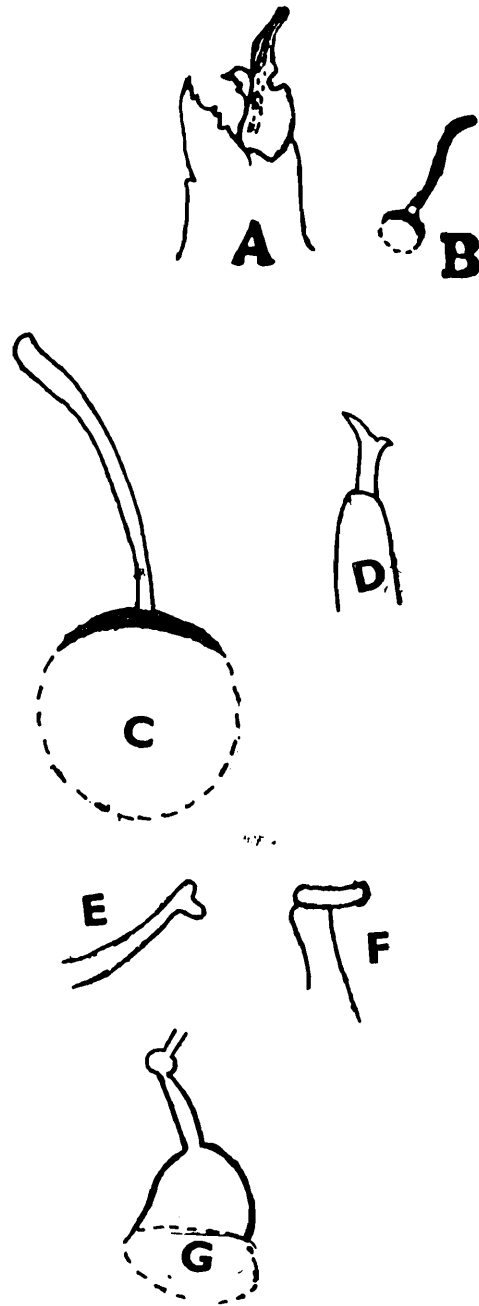


Fig. 3 (A—B) : *Amblyseius (Paraphytoseius) narayanani* Ehara and Ghai : A—spermatheca., B—spermatophoral process :
(C—D) : *Amblyseius (Paraphytoseius) bhadrakaliensis* Gupta : C—spermatheca, D—spermatophoral process.
(E—F) : *Amblyseius (Paraphytoseius) nicobarensis* Gupta : E—spermatheca, F—spermatophoral Process.
(G) : *Amblyseius (Asperoseius) nucifera* (Gupta). G—spermatheca.

Female : Dorsal shield 282 long, 184 wide with 13 pairs of setae. Setae j1, j3, s4, Z5, Z5, Z1 and r3 long, thick and weakly serrate and situated on protuberance, other setae being small. Measurements of setae : j1-32, j3-80, s4-100, Z5-85, Z4-60, Z1-32, r3-32. Ventrianal shield 84 long, 56 wide, 3 pairs of setae present around ventrianal shield, JV5 56 long. Spermatheca as figured. Fixed digit of chelicera multidentate, movable digit tridentate, Macrosetae on leg IV : genu-26, tibia-36, and basitarsus-42, all being spatulate.

Male : Spermatophoral process as figured.

Distribution : India : Car Nicobar.

Amblyseius (Asperoseius) nucifera (Gupta)

(Fig. 3, G)

Paraphytoseius (Tropicoseius) nucifera Gupta, 1979.
Bull. zool. Surv. India, 2 (1) : 80-81.

Female : Dorsal shield 305 long, 165 wide, deeply notched at the level of s4. Measurements of setae : j1-28, j3-68, z2-16, z4-32, s4-80, Z5-76, Z4-68, S2-40, r3-56, R1-28. Sternal shield as long as wide (80), metasternal plate triangular with seta. Genital shield wider than greatest width of ventrianal shield. Ventrianal shield smooth, 80 long, 60 wide with 3 pairs of preanal setae, 3 pairs of setae present around ventrianal shield, JV5-28 long, 2 pairs of metapodal plates present. Fixed digit of chelicera multidentate. Spermatheca as figured. Macrosetae on leg IV : genu-44, tibia-36, basitarsus-64 and distitarsus-40.

Male : unknown.

Distribution : India : Kerala.

Remarks : This species was originally put under the genus *Paraphytoseius*.

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