NEW SPECIES OF THE GENUS *EUSEIUS* (ACARINA: PHYTOSEIIDAE) FROM NORTHERN AREAS OF PAKISTAN

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The members of the genus *Euseius* Wainstein are very potential predators of phytophagous mites. Northern areas of Pakistan were never explored for these mites. So these areas were surveyed as a result of which 3 new species viz., *Euseius gestatus*; *Euseius plenus* and *Euseius vividus* have been identified and described.
Keywords: *Euseius*, phytoseiidae, northern areas.

INTRODUCTION

Phytoseiid mites are considered to be important bio-control agents of phytophagous mites. Many scientists surveyed many areas of their countries to improve the knowledge of their systematic. The genus *Euseius* of the family Phytoseiidae has been recognized as a predatory genus of harmful mites. The members of this genus are economically important. McMurtry *et al.* (1992) recorded *Euseius stipulatus* (Athias-Henriot) as a good predator of *Panonychus citri* in California. Chaudhri and Akbar (1985) observed that *Euseius relictus* Chaudhri a very effective predator of *Bryobia praetiosa* Koch on apple in Pakistan. Predatory mite fauna of Pakistan is very rich but very little attention has been paid to explore this fauna.

The genus *Euseius* was erected by Wainstein in 1962 with *Seiulus finlandicus* Oudemans as it's type species. DeLeon (1966), Denmark and Muma (1970, 1975, 1978), McMurtry (1983), Congdon and McMurtry (1985), McMurtry and Moraes (1991), Tuovinen (1993), Aponte and McMurtry (1997) have made important contributions. Whereas from Pakistan 19 species have been described by Chaudhri *et al.* (1979), Ahmed *et al.* (1987), Khan and Chaudhri (1991), Khan *et al.* (1992), Qayyum *et al.* (2000, 2001, 2002). The terminology and abbreviation used are those of Rowell *et al.* (1978).

1. *EUSEIUS GESTATUS*, NEW SPECIES (Fig. 1A-F)

FEMALE

DORSUM: Dorsal shield smooth, deeply concave near *R1*; 310 µm long, 213 µm wide with 17 pairs setae and 6 pairs elliptical pores (Fig. 1-A). Chelicera 25 µm long; movable digit with 1 tooth, fixed digit with 3 subapical teeth (Fig. 1-B). All dorsal shield setae smooth except *Z5* weakly serrate, setae measuring: *j1* 33 µm, *j3* 38 µm, *j4* 15 µm, *j5* 18 µm, *j6* 28 µm, *J2* 30 µm, *J5* 5 µm; *Z2* 30 µm, *z4* 40 µm, *z5* 18 µm, *Z1* 23µm, *Z4* 33 µm, *Z5* 65 µm; *s4* 54 µm, *S2* 28 µm, *S4* 23 µm, *S5* 30 µm; *r3* 18 µm and *R1* 10 µm in length (both on membrane). Seta *j3>j3 – z2, z2>z2-z4, z4>z4-s4, S5>S5-Z5*; seta *Z4* anterior to seta *S4*, 30 µm and 38 µm apart form *S4* and *S5*, respectively (Fig. 1-A). Peritreme blunt ended, crosses seta z2; Peritremal shield base 50 µm long, ribbon-like with a process on inner side (Fig. 1-E).

VENTER: Sternal shield 75 µm long, 87 µm wide, 3 pairs setae, 2 pairs visible pores; seta *St1<St1-St2, St2>St2-St3*. Metasternal setae 1 pair, each seta on a separate platelet. Genital shield smooth, 115 µm wide, wider than ventrianal shield width, setae 1 pair. Ventrianal shield smooth, vase-shaped, 73 µm long, 58 µm wide, 3 pairs preanal setae, 1 pair elliptical pores (Fig. 1-C). Four pairs setae including JV5 38 µm, smooth on membrane surrounding ventrianal shield. Genital and ventrianal shields 33 µm apart, membranous fold present between them. Metapodal platelets 1 pair on each side; primary, elongate, bluntly pointed posteriorly, broadly rounded anteriorly, 23 µm long; secondary, 4 µm long (Fig. 1-C). Spermatheca cervix tubular, elongated, slightly buldging out posteriorly, 38 µm long; atrium nodular, major duct thread-like; vesicle oblong (Fig. 1-D).

LEGS: Leg IV with 1 macroseta each on genu, tibia and basitarsus, measuring 45 µm, 35 µm and 70 µm in length, respectively, all setae pointed, simple (Fig. 1-F).

MALE: Unknown

TYPE: Holotype female, collected Gilgit (4800) on 8.vi.1995 (Shahbaz) from "Persimon" (*Diospyros kaki*), paratypes 6 females same collection data, 5 females, collected form unidentified host plant No. 2/95. All deposited in the Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad – Pakistan.

REMARKS: *Euseius gestatus*, new species is similar to *Euseius saltus* Denmark and Mathysse but following characters separate them from one another:

1. Seta *j3 < j3-z2* in *saltus* but reverse is the case in this new species.
2. Seta *z2 <z2-z4* in *saltus* but seta *z2 > z2-z4* in this new species.
3. Seta *z4 < z4-s4* in *saltus* but reverse is the case in this new species.
4. Seta *Z5* smooth in *saltus* but serrate in this new species.
5. Shape of spermatheca differs in both the species.

2. *EUSEIUS PLENUS*, NEW SPECIES (Fig. 2A-F)

FEMALE:

DORSUM: Dorsal shield reticulated, concave near *R1*; 350 µm long, 250 µm wide with 17 pairs setae and 7 pairs elliptical pores (Fig. 2-A). Chelicera 25 µm long; movable digit with 1 tooth, fixed digit with 3 subapical teeth (Fig. 2-B). All dorsal shield setae smooth except *Z5* weakly serrate, setae measuring: *j1* 33 µm, *j3* 38 µm, *j4* 13 µm, *j5* 15 µm, *j6* = *J2* = 18 µm, *J5* 8 µm; *z2* = *z4* = 35 µm, *z5* 13 µm, *Z1* 15µm, *Z4* 23 µm, *Z5* 53 µm; *s4* 43 µm, *S2* 25 µm, *S4* 28 µm, *S5* 30 µm; *r3* = *R1* = 18 µm in length (both on membrane). Seta *j3<j3 – z2, z2<z2-z4, z4<z4-s4, S5>S5-Z5*; seta *Z4* anterior to seta *S4*, 45 µm and 48 µm apart form *S4* and *S5*, respectively (Fig. 2-A). Peritreme blunt ended, reaching between seta *z2* and *j3*; peritremal shield base 48 µm long, sharply pointed anteriorly (Fig. 2-E).

VENTER: Sternal shield 98 µm long, 93 µm wide, very slightly convex anteriorly, 3 pairs setae, 1 pair visible pores; seta *St1* = *St1-St2*, *St2<St2-St3*. Metasternal setae 1 pair, on membrane. Genital shield smooth, 98 µm wide, wider than ventrianal shield width, setae 1 pair. Ventrianal shield smooth, vase-shaped, 100 µm long, 83 µm wide, 3 pairs preanal setae, 1 pair elliptical pores (Fig. 2-C). Four pairs setae including *JV5* 48 µm, smooth on membrane surrounding ventrianal shield. Genital and ventrianal shields 38 µm apart, membranous fold absent between them. Metapodal platelets 1 pair on each side; primary, elongate, rounded anteriorly, pointed posteriorly, 23 µm long; secondary, 5 µm long (Fig. 2-C). Spermatheca cervix tubular slightly buldges out posteriorly, 10 µm long, atrium and major duct undifferentiated; vesicle much elongated, 3 chambered (Fig. 2-D).

LEGS: Leg IV with 1 macroseta, seta each on genu, tibia and basitarsus, measuring 43 µm, 38 µm and 63 µm in length, respectively, all setae pointed, simple (Fig 2-F).

MALE: Unknown

TYPE: Holotype female, collected Kalash 7500 (Chitral valley) on 27.x.1995 (Shahbaz) from unidentified host plant No. 5/95, paratypes 5 females, same collection data, 2 females, collected Hunza (8000) on 6.vi.1995 from "Apricot" (*Prunus armeniaca*). All deposited in the Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad – Pakistan.

REMARKS: *Euseius plenus*, new species is closely related to *Euseius ricinus* Moraes, Denmark and Guerrero due to reticulated dorsal shield, absence of membranous fold between genital and ventrianal shields and serrate seta *Z5* but following characters separate these two species from each other:

1. Metapodal platelets absent in *ricinus* but 2 pairs present in this new species.
2. Shape of peritremal shield base differs in both the species.
3. Leg IV with macrosetae knobbed in *ricinus* but pointed in this new species.
4. Shape of spermatheca differs in both the species.

3. *EUSEIUS VIVIDUS*, NEW SPECIES (Fig. 3A-F)

FEMALE:

DORSUM: Dorsal shield reticulated, deeply concave near *R1*; 330 µm long, 215 µm wide with 17 pairs setae and 5 pairs elliptical pores (4 pairs elliptical, 1 pair rounded) (Fig. 3-A). Chelicera 25 µm long, movable digit without teeth, fixed digit with 2 subapical teeth (Fig. 3-B). All dorsal shield setae smooth except *Z5* weakly serrate, setae measuring: *j1* = *j3* = 40 µm, *j4* = *j5* = 15 µm, *j6* 18 µm, *J2* 20 µm, *J5* 5 µm; *z2* 28 µm, *z4* 33 µm, *z5* 13 µm, *Z1* 20 µm, *Z4* 23 µm, *Z5* 60 µm; *s4* 43 µm, *S2* = *S4* = 23 µm, *S5* 30 µm; *r3* 18 µm and *R1* 20 µm in length (both on membrane). Seta *j3<j3 – z2, z2<z2-z4, z4<z4-s4, S5>S5-Z5*; seta *Z4* anterior to seta *S4*, 37 µm and 35 µm apart form *S4* and *S5*, respectively (Fig. 3-A). Peritreme blunt ended, reaching between setae z2 and j3; peritremal shield base ribbon-like, 58 µm long, base with pointed ends, a well developed process on inner side (Fig. 3-E).

VENTER: Sternal shield margins not clear. Genital shield smooth, 93 µm wide, wider than vnetrianal shield width, setae 1 pair. Ventrianal shield smooth, pentagonal, 98 µm long, 65 µm wide, 3 pairs preanal setae, 1 pair elliptical pores (Fig. 3-C). Four pairs setae including *JV5* 40 µm, smooth on membrane surrounding ventrianal shield. Genital and ventrianal shields 38 µm apart, no membranous between them. Metapodal platelets 1 pair on each side, primary, elongate, pointed at both ends, 20 µm long; secondary, 5 µm long (Fig. 3-C). Spermatheca cervix tubular, 13 µm long; atrium undifferentiated; major duct tubular; vesicle bell-shaped (Fig. 3-D).

LEGS: Leg IV with 1 macroseta each on genu, tibia and basitarsus, measuring 40 µm, 35 µm and 63 µm in length, respectively, all setae pointed, simple (Fig. 3-F).

MALE: Unknown

TYPE: Holotype female, collected 1 Km. N. Chitral (4000) on 10.vii.1996 (Shahbaz) from "Chanar" (*Platanus orientalis*), paratypes 3 females, same collection data, 2 females, collected Mustug (6000) no. 15.vi.95 from "Apple" (*Pyrus mallus*). All deposited in the Acarology Research Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad – Pakistan.

REMARKS: *Euseius vividus*, new species comes closer to *Euseius decorus* Zia, however these can be separated due to the following characters.

1. Cheliceral movable digit with 1 tooth in *decorus* but it is without teeth in this new species.

2. Seta *j3>j3-z2* but reverse is the case in this new species.
3. Seta *z4>z4-s4* but reverse is the case in this new species.
4. Shape of peritremal shield base differs in both the species.
5. Shape of spermetheca differ in both the species.

The following morphological characters separate *Euseius vividus*, new species from *Euseius vitrum* Ahmed *et al.*

1. Cheliceral movable digit with 1 tooth and fixed digit with 4 subpical teeth in *vitrum* but movable digit without tooth and fixed digit with 2 subapical teeth in this new species.
2. Peritreme reaching beyond seta *j3* in *vitrum* but reaching between setae *z2* and *j3* in this new species.
3. Six pair pores present on membrane surrounding ventrianal shield in *vitrum* but 5 pairs pores present in this new species.
4. Membranous fold present between genital and ventrianal shields in *vitrum* but absent in this new species.
5. Shape of peritremal shield base differs in both the species.
6. Spermatheca vesicle ballon shaped in *vitrum* but bell-shaped in this new species.

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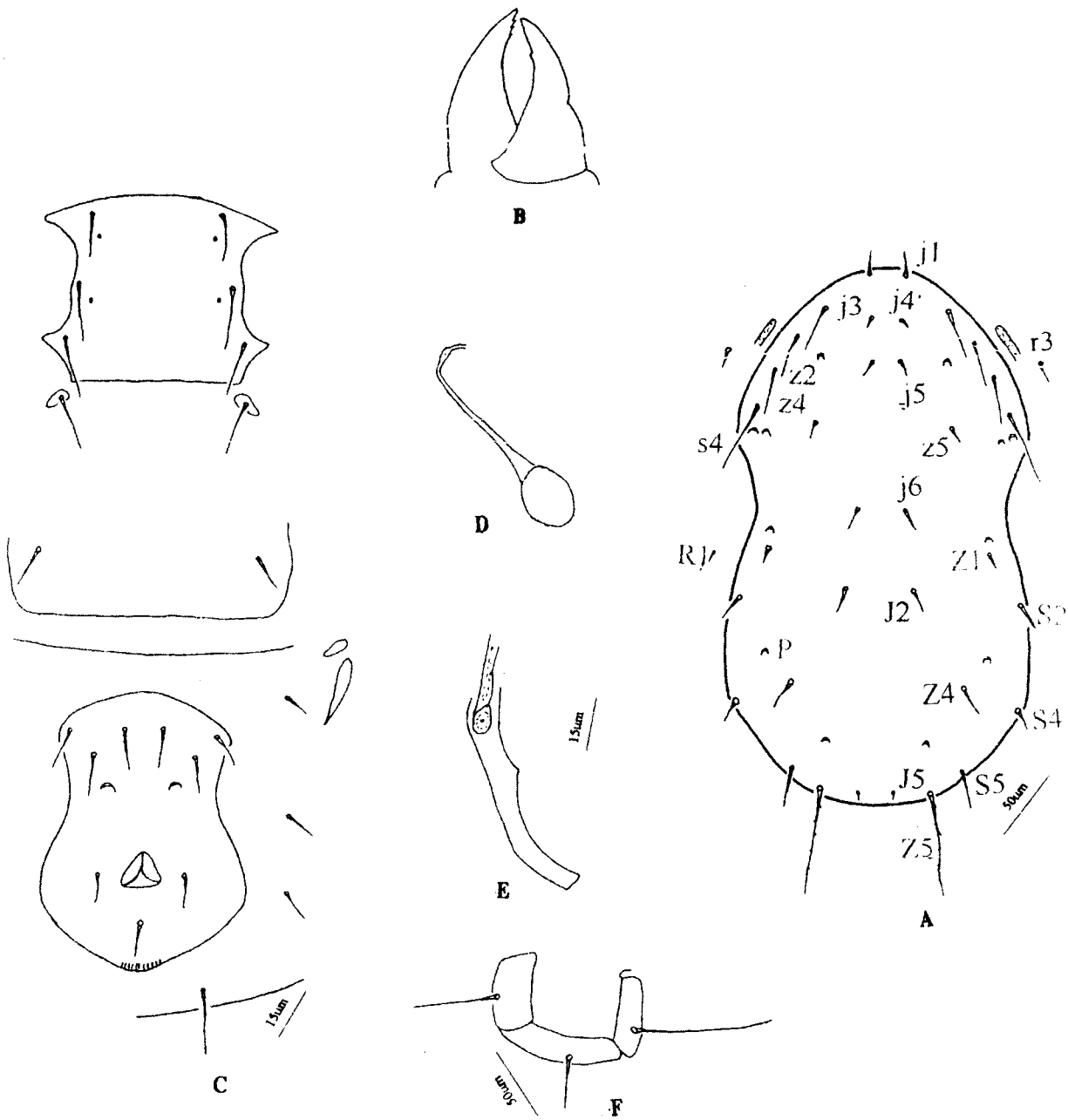

Fig. 1. *Euseius gestatus*, n.sp. A-Dorsal side; B-Chelicera; C-Sternal, Genital and Ventrianal Shields; D-Spermatheca; E-Peritremal shield; F-Leg IV.

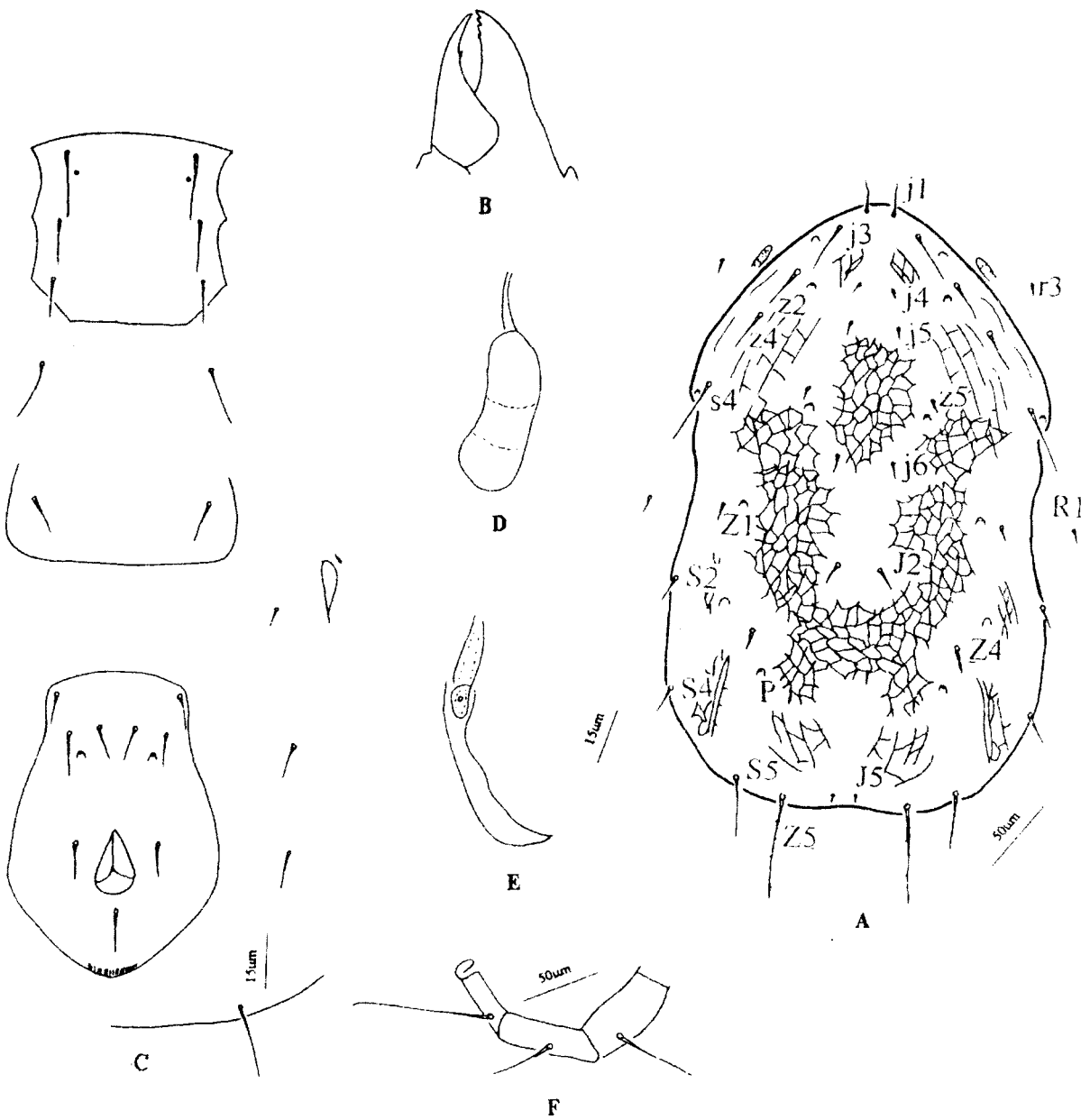

Fig. 2. *Euseius plenus*, n.sp. A-Dorsal side; B-Chelicera; C-Sternal, Genital and Ventrianal Shields; D-Spermatheca; E-Peritermal shield; F-Leg IV.