

FOUR NEW PREDATORY MITES OF THE GENUS *EUSEIUS* WAINSTEIN (ACARINA : PHYTOSEIIDAE) FROM PAKISTAN

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Four new predatory mites of the genus *Euseius*, *E. plazo*, *E. vitrum*, *E. terenos* and *E. semotus* have been collected and described from Pakistan. A comprehensive key for 7 Pakistani species of mites of this genus along with similarity matrix and phenogram are given by the authors.

INTRODUCTION

The genus *Euseius* was erected by Wainstein in 1962 and he designated *Seiulus finlandicus* Oudemans as the type species. The genus is world-wide in distribution and its species inhabit trees and shrubs. The species of this genus are partially predators and primarily pollen-phagous (Muma and Denmark, 1970). Research work on mites of this genus done by DeLeon (1966), Denmark and Muma (1970, 1973), Muma and Denmark (1970), Gupta (1978), Mathysse and Denmark (1981), Moraes, Denmark and Gurrers** (1982), Moraes and McMurtry (1983) is worth mentioning who described new mite species from their respective areas.

Chaudhri (1979) described 3 new species from Pakistan. The authors have described 4 new species, making a total of 7 species from Pakistan. A comprehensive key for these species along with similarity matrix and phenogram are given in the following pages.

KEY TO PAKISTANI SPECIES OF GENUS *EUSEIUS*

(Females)

1. Dorsal shield reticulated 2
Dorsal shield smooth 4
2. Dorsal shield with pores; genital shield
wider than ventrianal shield..... 3
Dorsal shield without pores; genital shield
wider than ventrianal shield..... *E. relictus* Chaudhri
* Matthysse
** Guerrero

3. Dorsal shield with 4 pairs visible pores; seta *M3* anterior to seta *L6*; membrane surrounding ventrianal shield with 1 pair pores..... *E. plazo*, n. sp.
- Dorsal shield with 6 pairs visible pores; seta *M3* posterior to seta *L6*; membrane surrounding ventrianal shield with 2 pairs pores and 1 pair minute platelets..... *E. vitrum*, n. sp.
4. Dorsal shield setae smooth..... 5
- Dorsal shield setae smooth but *L8* serrate seta..... 6
5. Dorsal shield with pores; cheliceral fixed digit with 2 teeth; shape of ventrianal shield and spermatheca..... *E. terenos*, n. sp.
- Dorsal shield without pores; cheliceral fixed digit with 3 teeth; shape of ventrianal shield and spermatheca..... *E. semotus*, n. sp.
6. Dorsal shield with 5 pairs pores; seta *L3* longer than *L3-L4*; macroseta on leg I genu present..... *E. septicus*, Chaudhri
- Dorsal shield with 7 pairs pores; seta *L3* = *L3-L4*; macroseta on leg I genu absent..... *E. mediocris* Chaudhri

1. *Euseius plazo*, new species

(Fig. 1)

FEMALE: Dorsal shield completely reticulated, deeply concave near *S2*, 364 μ long, 271 μ wide, 4 pairs visible pores, 17 pairs setae (Fig. 1 A). Chelicera 26 μ long, movable digit with 1 and fixed digit with 3 subapical teeth (Fig. 1 B). Peritremal shield setae smooth except *L8*, serrate; all setae shorter than distance to seta next in line. Dorsal shield setae: *V* 31 μ ; *D1* = *D2* = 13 μ , *D3* 18 μ , *D4* 21 μ ; *C1* 8 μ ; *L1* 31 μ , *L2* 29 μ , *L3* 26 μ , *L4* 39 μ , *L5* 23 μ , *L6* 21 μ , *L7* 29 μ , *L8* 57 μ ; *M1* 13 μ , *M2* 16 μ , *M3* 18 μ ; *S1* 16 μ , *S2* 18 μ (Fig. 1 A).

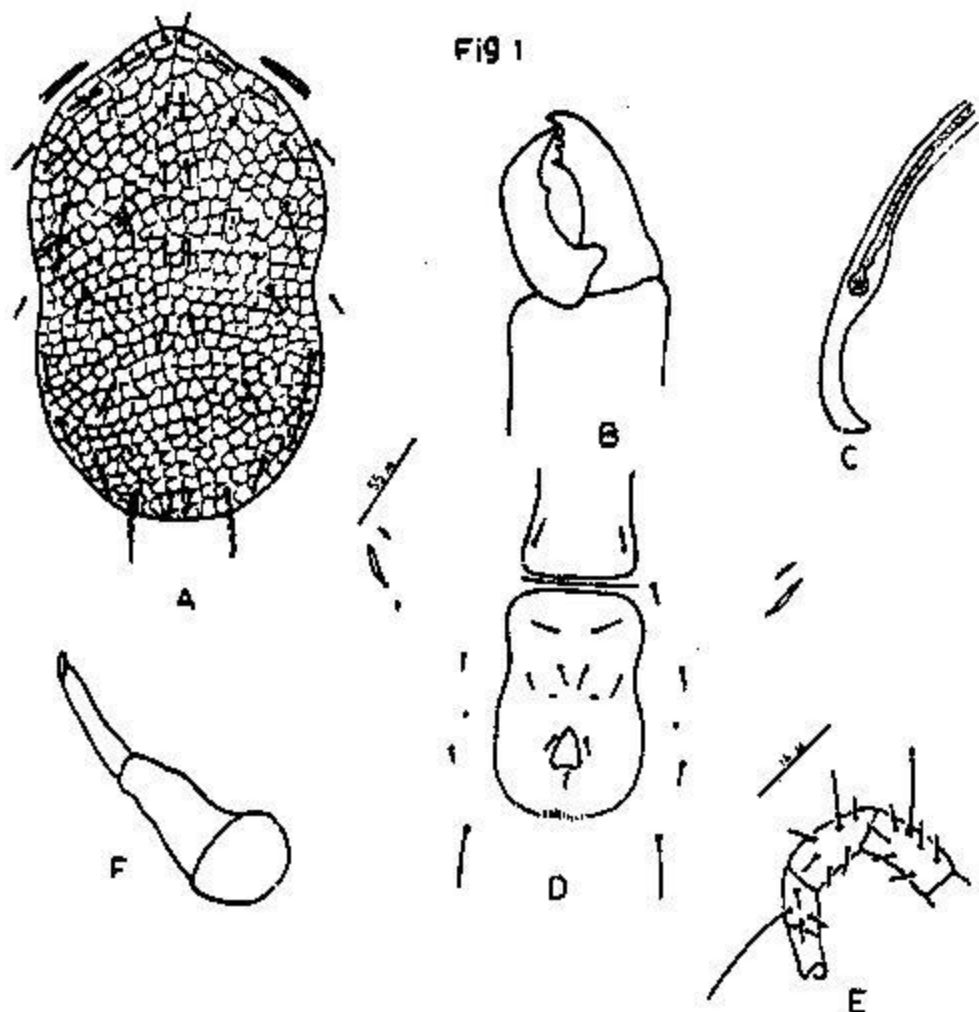


Fig. 1. *Euselus plazo*, n. sp.; A. dorsal shield; B. chelicera; C. peritremal shield; D. genital and ventrianal shields; E. leg IV; F. spermatheca.

Peritremal shield as shown in figure 1C. Peritreme extending inbetween *L2* and *L1* setae. Metasternal setae 1 pair, each seta on a separate platelet. Genital shield not wider than ventrianal shield width, 1 pair genital setae. Genital and ventrianal shields $8\ \mu$ apart with a membranous fold inbetween. Ventrianal shield smooth, $94\ \mu$ long, $65\ \mu$ wide, 3 pairs preanal setae and a pair of pores (Fig. 1 D). Four pairs setae and a pair of pores on membrane

surrounding ventrianal shield, seta *VLI* smooth, 39 μ long. Metapodal platelets 2 pairs, primary 1 pair, 16 μ , secondary 1 pair, 10 μ long (Fig. 1 D). Leg IV genu, tibia and basitarsus each with a macroseta, measuring 39 μ , 28 μ and 57 μ in length, respectively (Fig. 1 E.) Spermatheca as shown in figure 1 F.

MALE: Not known.

TYPE: Holotype female, collected Charrapani, 3500' (Murree Hills), 19. vi. 1984 (Manzoor *et al.*) from *Andrachne* sp. and deposited in Acarology Research Laboratory, Department of Entomology, U. A. F.

REMARKS: This new species is closely related to *Euselus vitrum*, n. sp. due to many body characters but can be separated on the basis of the following points.

1. Dorsal shield with 6 pairs visible pores in *vitrum*, n. sp. but 4 pairs visible pores in this new species.

2. Seta *M3* posterior to seta *L6* in *vitrum*, n. sp. but anterior in position to seta *L6* in this new species.

3. Ventrianal shield reticulated in *vitrum*, n. sp. but smooth in this new species.

4. Membrane surrounding ventrianal shield with 2 pairs pores and a pair of minute platelets in *vitrum*, n. sp. as against only 1 pair pores in this new species.

5. Shape of spermatheca differs in both the species.

2. *Euselus vitrum*, new species

(Fig. 2)

FEMALE: Dorsal shield completely reticulated, 395 μ long, 281 μ wide, deeply concave near *S2*, 6 pairs visible pores (1 pair each near seta *M2*), 17 pairs setae (Fig. 2 A). Chelicera 24 μ long, movable digit with 1 and fixed digit with 4 subapical teeth (Fig. 2B). All dorsal shield setae smooth except *L8* serrate, *M3* posterior in position to seta *L6*. Dorsal shield setae: *V* 18 μ ; *D1* 13 μ , *D2* 13 μ , *D3* = *D4* = 16 μ ; *C1* 9 μ ; *L1* 21 μ , *L2* 18 μ , *L3* 18 μ , *L4* 21 μ , *L5* 18 μ , *L6* 17 μ , *L7* 10 μ , *L8* 57 μ ; *M1* 13 μ , *M2* 18 μ , *M3* 18 μ ; *S1* = *S2* = 62 μ (Fig. 2 A). Peritremal shield as shown in figure 2 C. Peritreme extending up to seta *L1* base. Sternal shield with 3 pairs sternal setae. Metasternal setae, 1 pair, each seta on a separate platelet. Genital shield not wider than ventrianal shield width,

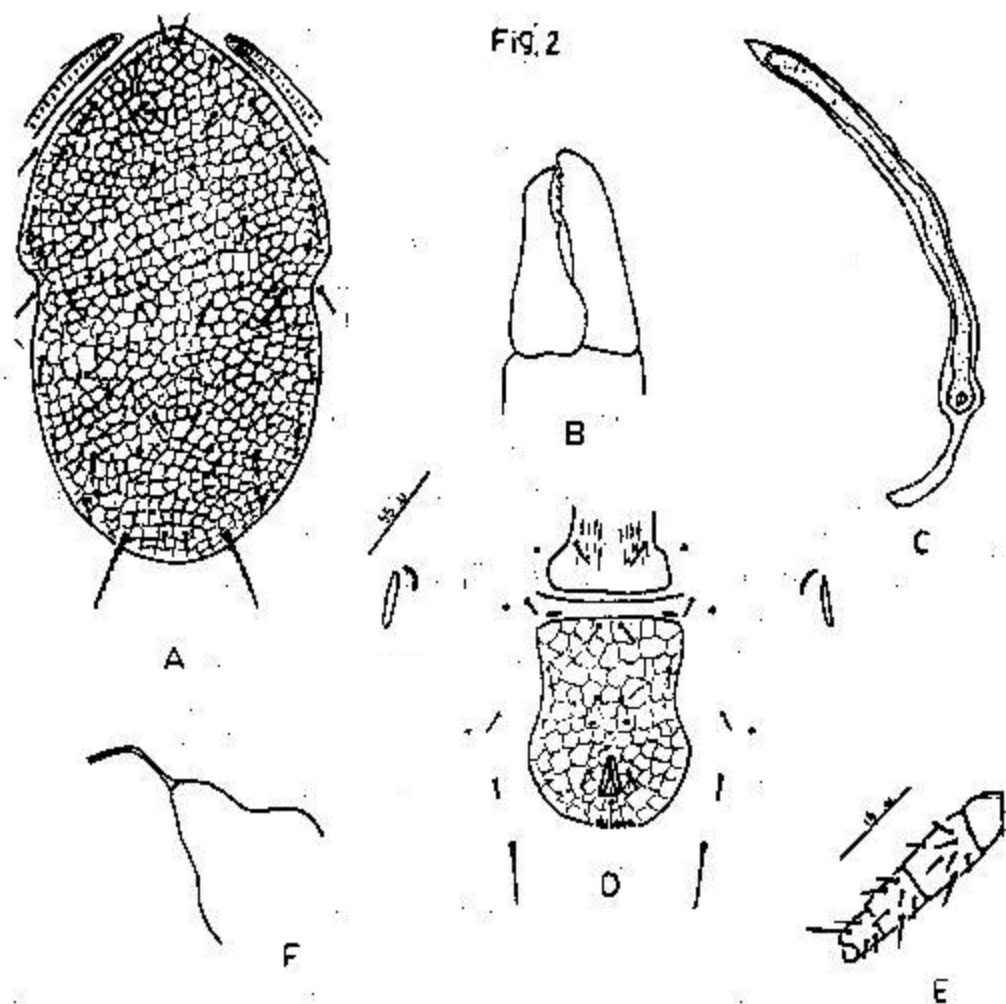


Fig. 2. *Euseius vitrum*, n. sp.: A. dorsal shield; B. chelicera; C. peritremal shield; D. genital and ventrianal shields; E. leg IV; F. spermatheca.

1 pair genital setae, 1 pair pores on membrane. Genital and ventrianal shields $16\ \mu$ apart with a membranous fold inbetween. Ventrianal shield reticulated, $107\ \mu$ long, $88\ \mu$ wide, 3 pairs preanal setae and a pair of pores (Fig. 2D). Four pairs setae, 2 pairs pores and a pair of minute platelets on membrane surrounding ventrianal shield, seta *VLI* $16\ \mu$ long, smooth (Fig. 2D). Metapodal platelets 2 pairs, primary 1 pair, $37\ \mu$ long, secondary 1 pair, $14\ \mu$ long (Fig. 2D). Leg IV macrosetae each on genu, tibia and basitarsus measuring 10 μ ,

10 μ and 13 μ in length respectively (Fig. 2E). Spermatheca as shown in figure 2F.

MALE: Not known.

TYPE: Holotype female, collected Chinari, 6000' (Azad Kashmir), 20.v.1984 (Manzoor *et. al.*) from undet. host plant No. 24/84 and deposited in Acarology Research Laboratory, Department of Entomology, U. A. F.

REMARKS: This new species is closely related to *Euseius plazo*, n. sp. due to many body characters but the following points separate them.

1. Dorsal shield with 4 pairs visible pores in *plazo*, n. sp. as against 6 pairs visible pores in this new species (1 pair each near seta *M2*).
2. Seta *M3* anterior in position in *plazo*, n. sp. but posterior in position in this new species.
3. Ventrianal shield smooth in *plazo*, n. sp. but reticulated in this new species.
4. Membrane surrounding ventrianal shield with 1 pair pores in *plazo*, n. sp. but 2 pairs pores and 1 pair minute platelets in this new species.
5. Shape of spermatheca differs in both the species.

3. *Euseius terenos*, new species
(Fig. 3)

FEMALE: Dorsal shield smooth, sole-shaped, deeply and broadly concave near *S2*, 312 μ long, 187 μ wide, 17 pairs setae and 3 pairs visible pores (Fig. 3A). Chelicera 26 μ long, movable digit with 1 and fixed digit with 2 subapical teeth (Fig. 3B). All dorsal shield setae smooth, shorter than distance to seta next in line. Dorsal shield setae: *V2* 1 μ ; *D1* 15 μ , *D2* 10 μ , *D3* 18 μ , *D4* 21 μ ; *C1* 10 μ ; *L1* 23 μ , *L2* 29 μ , *L3* 29 μ , *L4* 34 μ , *L5* 28 μ , *L6* 26 μ , *L7* 24 μ , *L8* 42 μ ; *M1* 18 μ , *M2* 26 μ , *M3* 29 μ ; *S1* = *S2* = 16 μ (Fig. 3 A). Peritremal shield as shown figure 3C. Peritreme reaching near seta *L2* (Fig. 3A). Sternal shield with 3 pairs sternal setae. Metasternal setae 1 pair, each seta on a separate platelet. Genital shield 16 μ apart from ventrianal shield with a membranous fold inbetween. Ventrianal shield with wavy anterior margin, smooth, 104 μ long 68 μ wide, 3 pairs preanal setae and a pair of pores (Fig. 3D). Four pairs setae and a pair of pores on membrane surrounding ventrianal shield, seta *VLI* 21 μ

long (Fig. 3D). Metapodal platelets 2 pairs, primary 1 pair, $26\ \mu$ long, secondary 1 pair, $10\ \mu$ long (Fig. 3D). Macrosetae on leg IV each on genu, tibia and basitarsus measuring $13\ \mu$, $13\ \mu$, $29\ \mu$ in length, respectively (Fig. 3E).

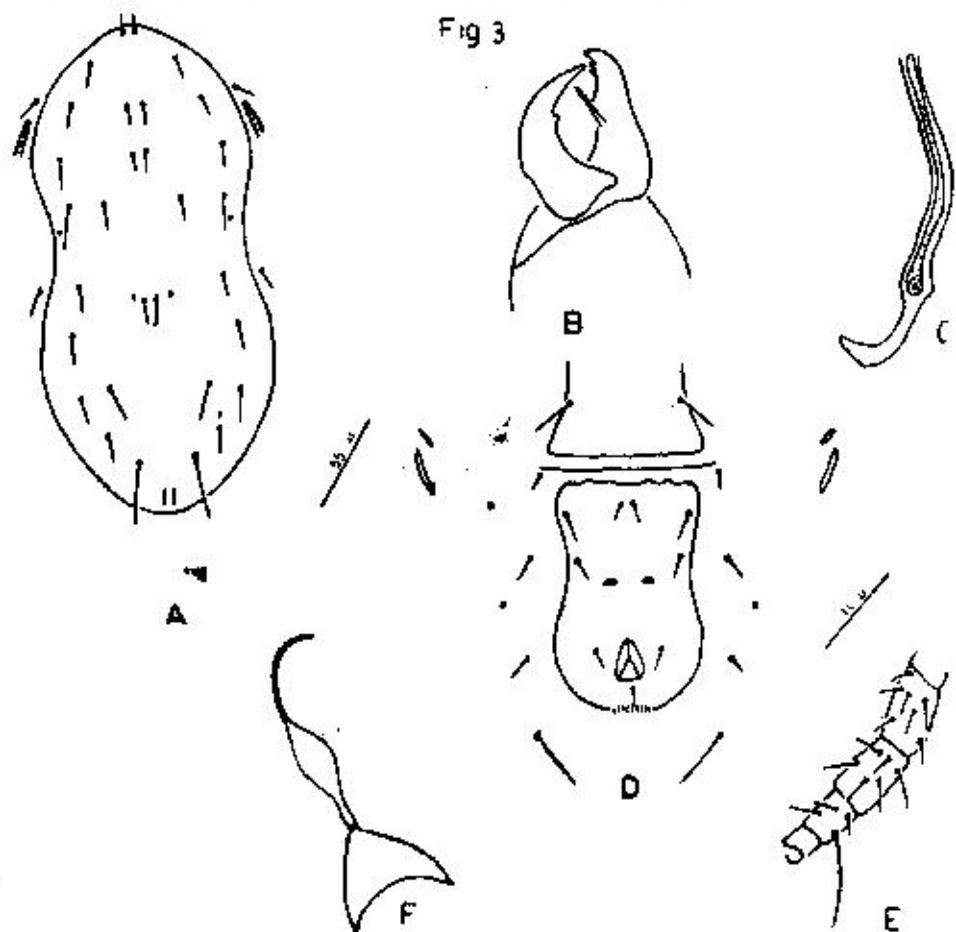


Fig. 3. *Euselus terenos*, n. sp.; A. dorsal shield; B. chelicera; C. peritremal shield; D. genital and ventrianal shields; E. leg IV; F. spermatheca.

MALE: Not known.

TYPE: Holotype female, collected 2 mi. N. Havelian, 29.X.1983. (Manzoor *et al.*) from undet. host plant No. 6/83 and deposited in Acarology Research Laboratory, Department of Entomology, U. A. F.

REMARKS: This new species is closely related to *Euseius semotus*, new species due to many body characters but the following points separate them from each other.

1. Cheliceral fixed digit with 3 teeth in *semotus*, n. sp. as against 2 subapical teeth in this new species.
2. Dorsal shield without pores in *semotus*, n. sp. but 3 pairs visible pores in this new species.
3. Ventrianal shield with convex anterior margin in *semotus*, n. sp. as against wavy anterior margin in this new species.
4. Shape of spermatheca differs in both the species.

4. *Euseius semotus*, new species
(Fig. 4)

FEMALE: Dorsal shield smooth, deeply concave near S2, broadly pointed anterior end, 343 μ long, 270 μ wide, 17 pairs setae (Fig. 4A). Chelicera 27 μ long, movable digit with 1 and fixed digit with 3 subapical teeth (Fig. 4B). All dorsal shield setae smooth, short of distance to seta next in line. Dorsal shield setae: V 31 μ , D1 = D2 = 8 μ , D3 10 μ , D4 12 μ ; C1 8 μ ; L1 42 μ , L2 10 μ , L3 13 μ , L4 26 μ , L5 14 μ , L6 16 μ , L7 16 μ , L8 42 μ ; M1 = M2 = 11 μ , M3 14 μ , S1 11 μ , S2 13 μ (Fig. 4A). Peritremal shield as shown in figure 4C. Peritreme reaching base of seta L2. Sternal shield with 3 pairs sternal setae. Metasternal setae 1 pair, each seta on a separate platelet. Genital shield 18 μ apart from ventrianal shield with a membranous fold inbetween. Venterianal shield smooth convex anterior margin, 109 μ long, 81 μ wide, 3 pairs preanal setae and a pair of pores (Fig. 4D). Four pairs setae on membrane surrounding ventrianal shield, seta VLI smooth, 26 μ long. Metapodal platelets 2 pairs, primary 1 pair, 29 μ , secondary 1 pair, 14 μ long (Fig. 4D). Leg IV macrosetae each on genu, tibia basitarsus measuring 55 μ , 39 μ , and 71 μ in length, respectively (Fig. 4E). Spermatheca as shown in figure 4F.

MALE: Not known.

TYPE: Holotype female, collected, 2 mi. N, Balloki Head, 14.ii.1984 (Manzoor *et al.*) from loquat (*Eriobotrya japonica*) and deposited in Acarology Research Laboratory, Department of Entomology, U. A. F.

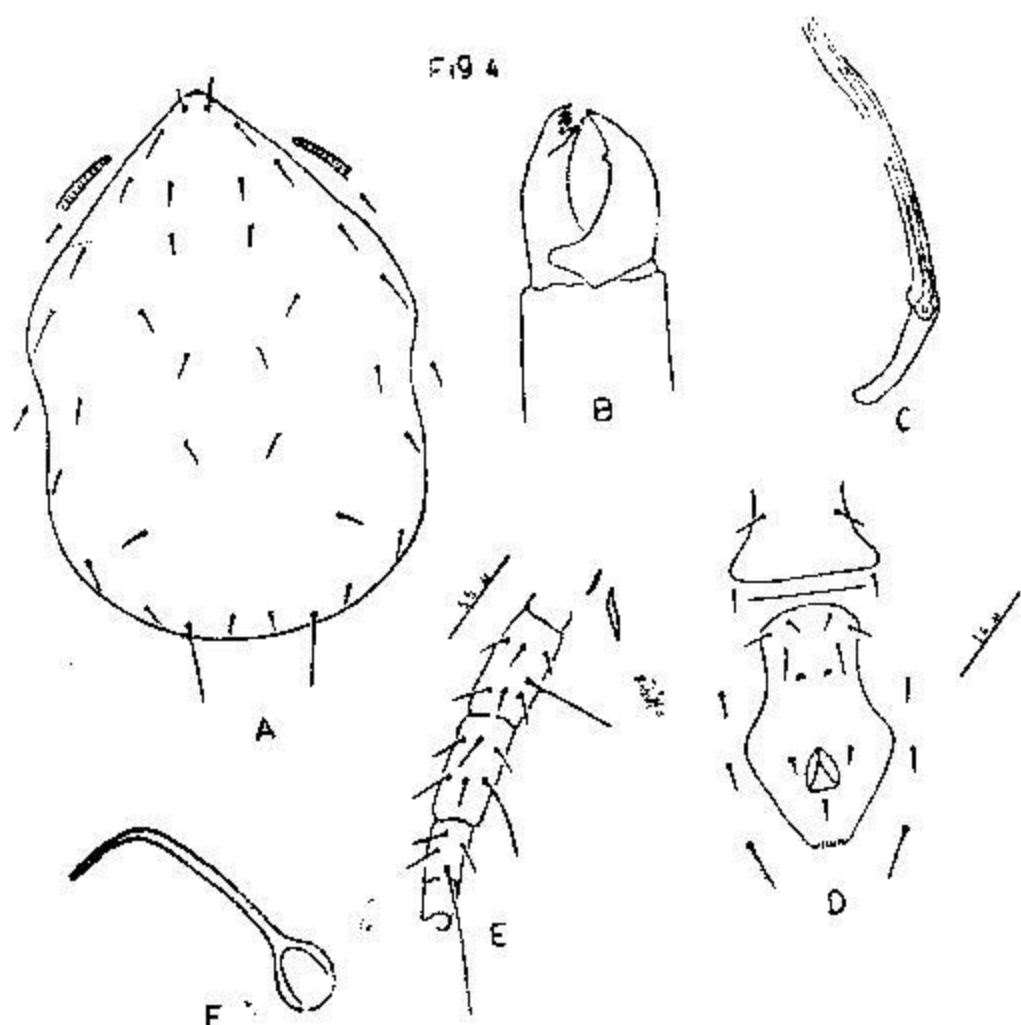


Fig. 4. *Euseius semotus*, n. sp.; A dorsal shield; B. chelicera; C. peritremal shield; D. genital and ventrianal shields; E. leg IV; F. spermatheca.

REMARKS : This new species is closely related to *Euseius terenos*, n. sp. The following characters separate them from each other.

1. Cheliceral fixed digit with 2 teeth in *terenos*, n.sp. as against 3 subapical teeth in this new species.

2. Dorsal shield with 3 pairs pores in *terenos*, n. sp. but pores absent in this new species.

3. Ventrianal shield with wavy anterior margin in *terenos*, n. sp. but convex anterior margin in this new species.

4. Shape of spermatheca differs in both the species.

DISCUSSION

Genus *Euseius* is one of the close relatives of the genus *Amblyseius*. Uptill now 7 species belonging to this genus have been collected from Pakistan. Phenogram (Fig. A) pertaining to the species has been prepared and their relationship has been presented in Tables I and II. The phenogram depicts the highest percentage (85%) of affinity between the species *plazo* and *vitrum*, both inhabiting the northern high altitude mountains, thus their similarity could well be attributed to similar ecological zone they inhabit. The species *terenos* and *semotus* though collected from varied singular localities, yet show a high (80%) affinity. Both of these pairs are linked to each other at 67.5% similar characters. The next cluster involves species *septicus* and *medlocris* showing a long range of habitats, exhibits an affinity of 75% and species *relictus* joining this pair at 62.5% level and ultimately both the groups being linked at 54.58% similar characters.

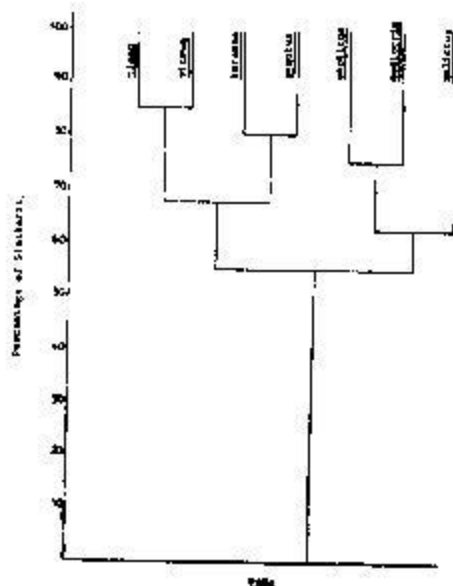


Fig. A. Phenogram of species of genus *Euseius* Vitzthum

Table I : Comparison of characters in Pakistani species of genus *Euseius* Wainstein

Characters	<i>relic- tus</i>	<i>septi- cus</i>	<i>medi- ocris</i>	<i>plazo</i>	<i>vit- rum</i>	<i>tere- nos</i>	<i>semo- tus</i>
Dorsal shield reticulated	+	—	—	+	+	—	—
Dorsal shield deeply concave near S2	—	+	+	+	+	+	+
Dorsal shield with 7 pairs pores	—	—	+	—	—	—	—
Peritreme up to seta L2	+	+	+	—	—	—	+
Seta L1=L1—L2	+	+	+	—	—	—	—
Seta L2=L2—L3	—	+	+	—	—	—	—
Seta L3 longer than L3—L4	—	+	—	—	—	—	—
Seta L7 longer than L7—L8	—	+	—	—	—	—	—
Seta M3 anterior to L6	+	+	+	+	—	+	+
Seta L8 serrate	+	+	+	+	+	—	—
Genital shield wider than ventrianal shield width	+	+	+	—	—	+	+
Ventrianal shield preanals not in a transverse line	—	+	+	+	+	+	+
Ventrianal shield smooth	+	+	+	+	—	+	+
Ventrianal shield anterior margin wavy	—	—	—	—	—	+	—
Metapodal platelets 2 pairs	—	+	+	+	+	+	+
Membrane surrounding ventrianal shield with platelets	+	—	—	—	+	—	—
Spermatheca with long cervix	—	+	+	—	—	—	+
Membrane surrounding ventrianal shield with pores	—	—	—	+	+	+	—
Macroseta on leg I genu present	—	—	+	—	—	—	—
Macroseta on leg II genu present	—	—	+	—	—	—	—

In spite of the fact that the species of this genus have been collected from discrete localities and are dwellers of diverse ecological habitats, yet show a high degree of phylogenetic affinity with each other, thus indicating that the affinity could be the attribute of common ancestral source and the taxa, despite this, have a greater adaptive amplitude to diverse ecological habitats.

Table II. Matrix showing percentage of similarity in Pakistani species of genus *Euseius* Wainstein.

	<i>relictus</i>	<i>septicus</i>	<i>mediocris</i>	<i>plazo</i>	<i>vitrum</i>	<i>terenos</i>	<i>semotus</i>
<i>relictus</i>	XX						
<i>septicus</i>	55	XX					
<i>mediocris</i>	50	75	XX				
<i>plazo</i>	60	55	50	XX			
<i>vitrum</i>	55	40	35	85	XX		
<i>terenos</i>	50	55	50	80	65	XX	
<i>semotus</i>	60	75	70	70	55	80	XX

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