

SIX NEW SPECIES OF MITES OF THE GENUS AMBLYSEIUS
(PHYTOSEIIDAE) FROM PAKISTAN

BY

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Mites of the family Phytoseiidae are very important since they are known to act as predators of the phytophagous mites particularly Tetranychidae, Eriophyidae, Tarsonemidae and Tenuipalpidae. They have also been recorded to prey upon aphids, scale insects, thrips and the other small arthropods.

The author has collected six new species belonging to the genus *Amblyseius* from different parts of West Pakistan. They have been described in this paper.

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KEY TO FEMALES (PAKISTAN COLLECTION).

1. Dorsal plate with 17 pairs of setae ; seta D₅ present..... 2
Dorsal plate with 16 pairs of setae ; seta D₅ absent..... *beatus* n. sp.
2. Peritreme not recurved near vertical seta ; only L₉ or L₉ and M₂ both serrate.... 3
Peritreme recurved near vertical seta ; L₉, M₂ setae not serrate.... *impactus* n. sp.
3. Peritreme short ; only L₉ serrate ; preanal setae arranged in a transverse row ; II and III preanal setae may or may not reach anterior side of anal plate..... 4
Peritreme long ; L₉ and M₂ both serrate ; preanal setae not arranged in a transverse row ; II and III preanal setae never reach anterior side of anal plate..... 5
4. Seta L₂ = L₃ ; L₅ = L₆ = L₇ ; no metapodal platelets ; ventrianal plate 78 μ \times 78 μ ; macroseta on genu IV = macroseta on tibia IV but shorter than macroseta on tarsus IV.
notatus n. sp.
Seta L₂ = L₃ ; L₅ = L₆ = L₇ ; 1 pair of metapodal platelets ; ventrianal plate much longer than wide ; macrosetae on leg IV genu, tibia and tarsus unequal.....
*finlandicus*¹ (Ouds.)

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1. Note de la rédaction : Le groupe Finlandicus est connu pour avoir une diversité spécifique

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5. Ventrianal plate striated ; macroseta only on tarsus IV..... 6
Ventrianal plate not striated ; 3 macrosetae on leg IV (genu, tibia, tarsus).....
 perfectus n. sp.
6. Fixed digit of chelicera with 5 teeth and movable digit with 1 tooth ; shape of ventrianal plate as shown (Fig. 28)..... **stolidus** n. sp.
Fixed digit of chelicera with 4 teeth and movable digit with 1 tooth ; shape of ventrianal plate as shown (Fig. 34)..... **venustus** n. sp.

I. **Amblyseius beatus** n. sp.
(Figs. 1-6).

Female : Chelicera 31 μ long, fixed digit with three subapical teeth near the anterior end and a pilus dentilis ; one tooth on movable digit (Fig. 2). Dorsal shield 367 μ long and 270 μ wide, almost oval in shape, extends outwardly gradually from anterior to posterior side, maximum width beyond leg IV : with sixteen pairs of setae and three pairs of small pores (Fig. 1). Verticals 26 μ ; dorsocentrals I-II 8 μ , III 16 μ , IV missing ; prolaterals I 42 μ , II 38 μ , III 62 μ , IV 78 μ ; postlaterals I 29 μ , II 36 μ , III 31 μ , IV 26 μ , V 78 μ ; promedolateral 8 μ ; postmediolateral 75 μ ; sublaterals I and II 16 μ ; clunals 13 μ . All dorsal setae simple except postlateral V and postmediolateral which are weakly serrate. Peritreme extending to base of vertical seta. Ventrianal plate reticulated, triangular with convex lateral margins ; three pairs of preanal setae and a pair of pores (Fig. 6). Four pairs of setae on membrane surrounding ventrianal plate. Two pairs of metapodal plates : primary platelet 23 μ long, secondary platelet 13 μ long (Fig. 4). Genital plate 109 μ broad and not wider than the width of ventrianal plate. Spermatheca as in figure 5. Leg IV with macrosetae one each on genu, tibia and tarsus measuring 36 μ , 23 μ and 81 μ long respectively (Fig. 3).

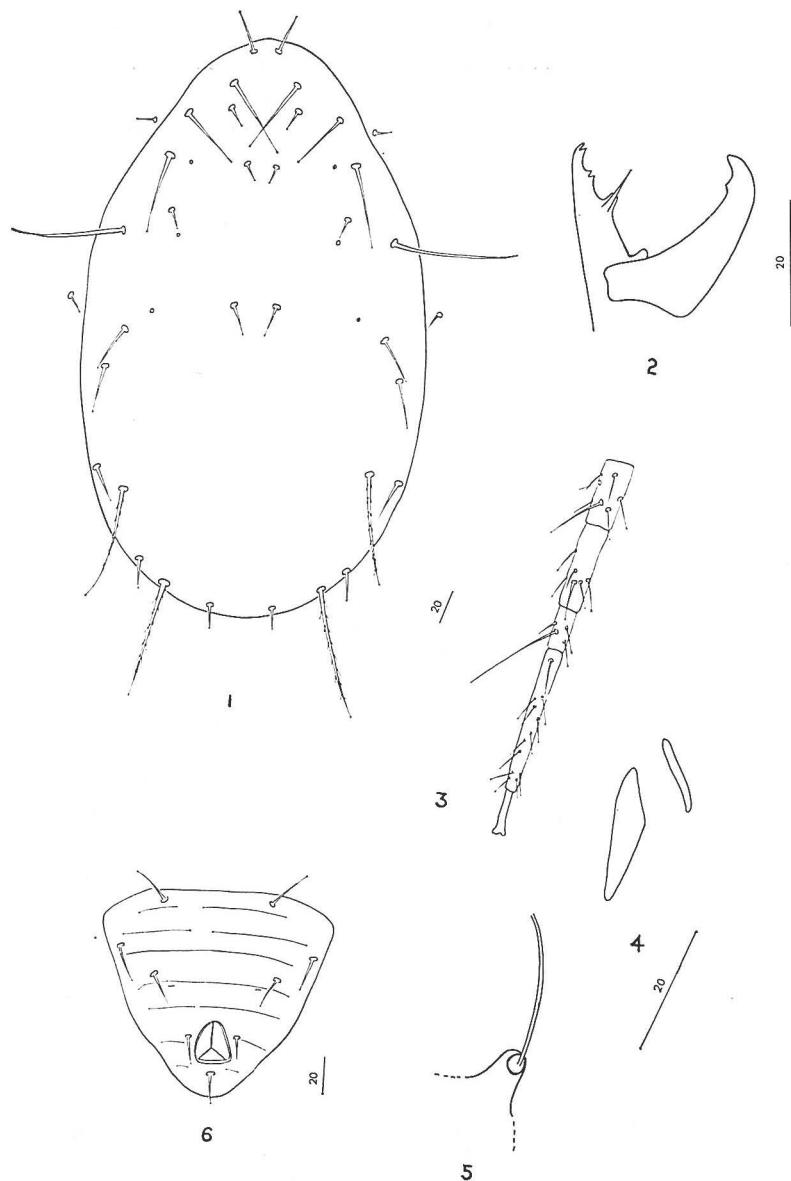
Type : Holotype female, collected from wheat straw (*Triticum aestivum*) ; W.P.A.U., Campus, July 16, 1965, deposited in the Department of Entomology, Lyallpur, Pakistan ; one female collected from grass (*Cynodon dactylon* Pers.) July 24, 1965 ; one female collected from debris, September 2, 1965 deposited in United States National Museum, U.S.A. and British Museum (Natural History) London.

This species¹ is closely related to *Typhlodromus (Amblyseius) okanagensis*, but the following points separate the two species :

- i) Prolateral setae III and IV 31 μ and 20 μ long in this species. These are minute in *okanagensis*.

maximale en zone tropicale et subtropicale australe (Afrique Centrale et Australe, région néotropicale, Madagascar). La diversification et l'endémisme se font sentir jusqu'au pourtour méditerranéen (cf. ATHIAS et SWIRSKI). *A. finlandicus* demeurerait l'espèce septentrionale du groupe jusqu'à présent.

1. I have already compared my specimen with *A. levis* Wainstein. The species collected from Pakistan is quite different.



FIGS. 1-6 : *Amblyseius beatus* n. sp.

1. — Dorsal plate. 2. — Cheliceral digits. 3. — Leg IV. — 4. Metapodal platelets.
5. — Spermatheca. 6. — Ventrianal plate.

- 2) Dorsocentral seta III is $16\ \mu$ long in this species. It is minute in *okanagensis*.
- 3) Shape of spermatheca (Fig. 5) in this species differs from that of *okanagensis*.
- 4) This species has three teeth on fixed digit and one tooth on movable digit but this is not the case in *okanagensis*.

2. **Amblyseius impactus** n. sp.

(Figs. 7-12).

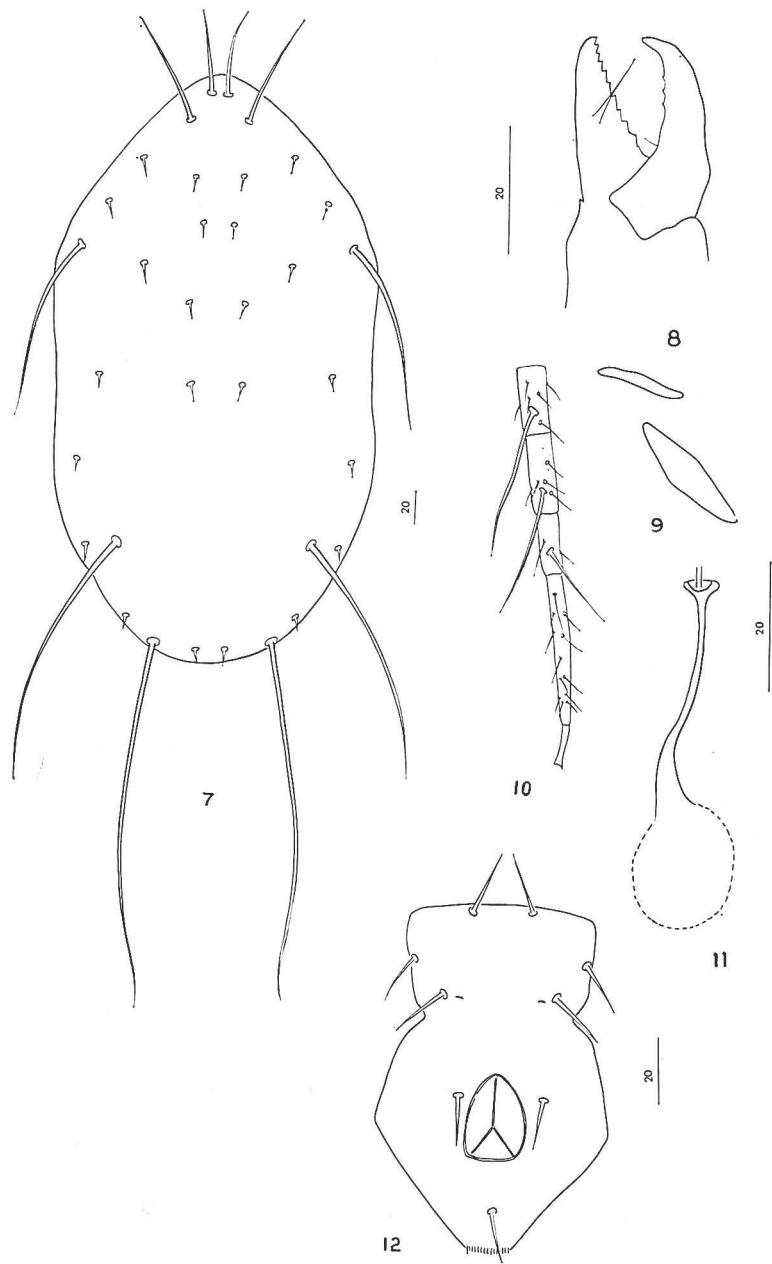
Female : Chelicera $34\ \mu$ long, with nine subapical teeth and a pilus dentilis on fixed digit, three subapical teeth on movable digit (Fig. 8). Dorsal shield with seventeen pairs of setae, none is serrate; some very long (Fig. 7). Verticals $34\ \mu$; dorsocentrals I-IV minute; prolaterals I $51\ \mu$, II-III minute each $7\ \mu$ long, IV $107\ \mu$; postlaterals I, II, III, IV minute $10\ \mu$, $14\ \mu$, $14\ \mu$, and $10\ \mu$ long respectively, V longest, $239\ \mu$ long; promedolateral I minute, $5\ \mu$ long; postmediolateral $120\ \mu$ long, about $20\ \mu$ and $30\ \mu$ distant from postlaterals III and IV respectively; sublateral I $10\ \mu$, II $14\ \mu$; clunal minute, $10\ \mu$. All setae simple, prolateral IV, post-lateral V and postmediolateral long and whiplike. Peritreme extending to base of vertical. Ventrianal plate $131\ \mu$ long, $78\ \mu$ wide, with a deep notch just below third pair of preanal setae (Fig. 12) : three pairs of preanal setae and a pair of pores. Four pairs of setae on membrane surrounding ventrianal plate. VL4, $75\ \mu$ long; four pairs of small visible pores scattered in between ventrolateral setae I and II. Two pairs of metapodal platelets : primary platelet $24\ \mu$ long, secondary platelet $14\ \mu$ long (Fig. 9). Genital plate $75\ \mu$ wide, wider than anterior part of ventrianal plate ($62\ \mu$). Cervix of spermatheca $26\ \mu$ long, thin, atrium appearing as a distal knob (Fig. 11); Leg IV with macroseta on basitarsus $56\ \mu$, tibia $78\ \mu$, genu $119\ \mu$ (whiplike) (Fig. 10). Macroseta on genu I, II and III each $51\ \mu$, $37\ \mu$ and $50\ \mu$ long respectively.

Type : Holotype female, collected from the leaves of loquat (*Eriobotrya japonica* Landl), 4 mi. North of Skeikhupura, West Pakistan, April 1, 1965 and deposited in the Department of Entomology, W.P.A.U., Lyallpur, Pakistan.

This species is closely related to *Amblyseius largoensis* Muma¹ but the following characters separate it :

- 1) This species has nine teeth on fixed digit and three teeth on movable digit of chelicera as against eight to nine teeth on fixed digit and absent on movable digit in *largoensis*.
- 2) Four pairs of pores scattered in between I and II ventro-lateral setae in this species. These are absent in *largoensis*.

1. Geographical distribution of *A. largoensis* : Japan, Hongkong, Israel, U.S.A., Mexico, Costa Rica, Guatemala, Honduras, Puerto Rico, New Zealand.



FIGS. 7-12 : *Amblyseius impactus* n. sp.
7. — Dorsal plate. 8. — Cheliceral digits. 9. — Metapodal platelets. 10. — Spermatheca.
11. — Leg IV. 12. — Ventrianal plate.

- 3) A deep notch towards antero-lateral sides of ventrianal plate just near III preana setae whereas it is not present in *largoensis*.
- 4) The shape of the mesal end of peritremal plate is different in this species as compared to *largoensis*.

3. **Amblyseius notatus** n. sp.

(Figs. 13-16).

Female : Chelicera 23 μ long. Dorsal shield 347 μ long and 219 μ wide, reticulated, with 17 pairs of simple dorsal setae (Fig. 14). Verticals 34 μ ; dorsocentrals I 16 μ , II 18 μ , III 21 μ , IV 23 μ ; prolaterals I 39 μ , II-III 34 μ , IV 47 μ ; postlaterals I-III 26 μ , IV 31 μ , V 60 μ ; promediolateral 18 μ ; postmediolateral 26 μ ; sublateral I 18 μ , II 17 μ ; clunals 8 μ . All setae simple except postlateral V which is weakly serrate. Peritreme extending to base of prolateral II. Ventrianal plate approximately oval/rounded, 78 μ \times 78 μ , with three pairs of preanal setae, II and III pairs arranged in a transverse row whereas the first pair is near anterior margin of ventrianal plate and with one pair of pores (Fig. 16). Four pairs of setae on membrane surrounding ventrianal plate. Genital plate and ventrianal plate surrounded by distinct striations. Metapodal platelets absent. Genital plate 90 μ wide. Spermatheca (cervix and atrium) 26 μ long, cervix 8 μ long, a narrow tube whereas atrium is bell-shaped (Fig. 15). Leg IV with macrosetae one on each genu, tibia and basitarsus 39 μ , 36 μ and 54 μ long respectively (Fig. 13).

Type : Holotype female, collected from the leaves of wild strawberry (*Fragaria vesca* Linn.), 4 miles South of Murree Hills (7500 ft.), June 24, 1965 deposited in the Department of Entomology, W.P.A.U., Lyallpur, Pakistan.

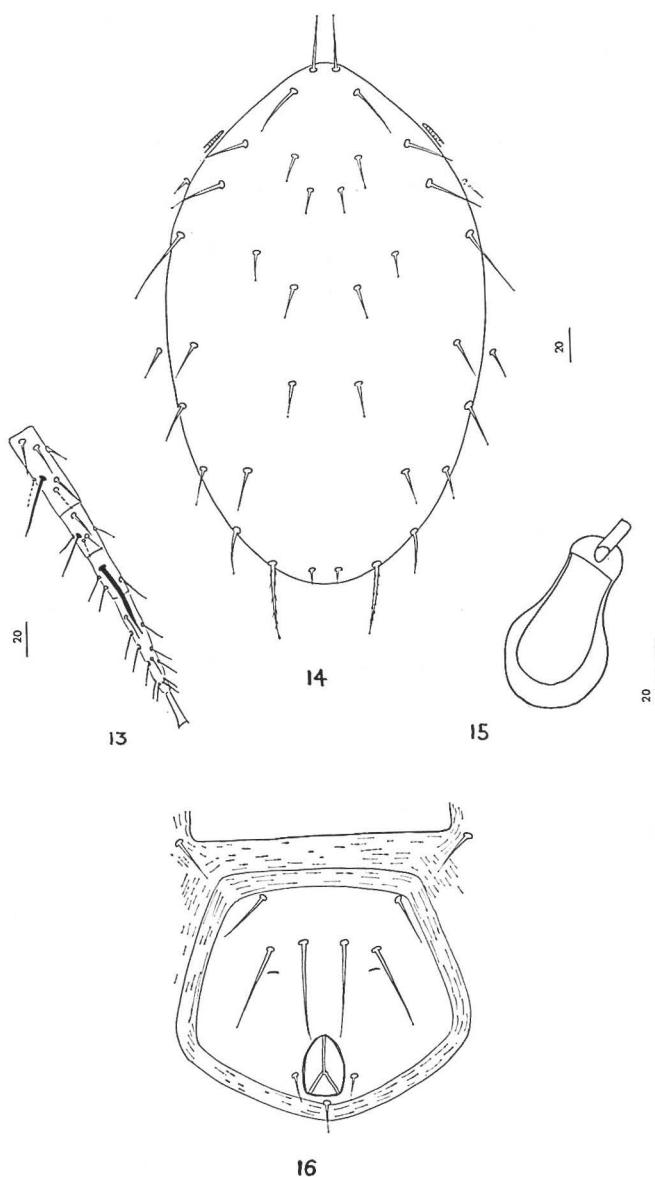
This species belongs to the *finlandicus* group. The following characters differentiate it from other species of this group.

- 1) L₁ longer than L₃
- 2) Shape of spermatheca is quite distinctive (Fig. 15).
- 3) L₂ = L₃.
- 4) Shape of ventrianal plate different from the corresponding plate in other species of this group.

4. **Amblyseius perfectus** n. sp.

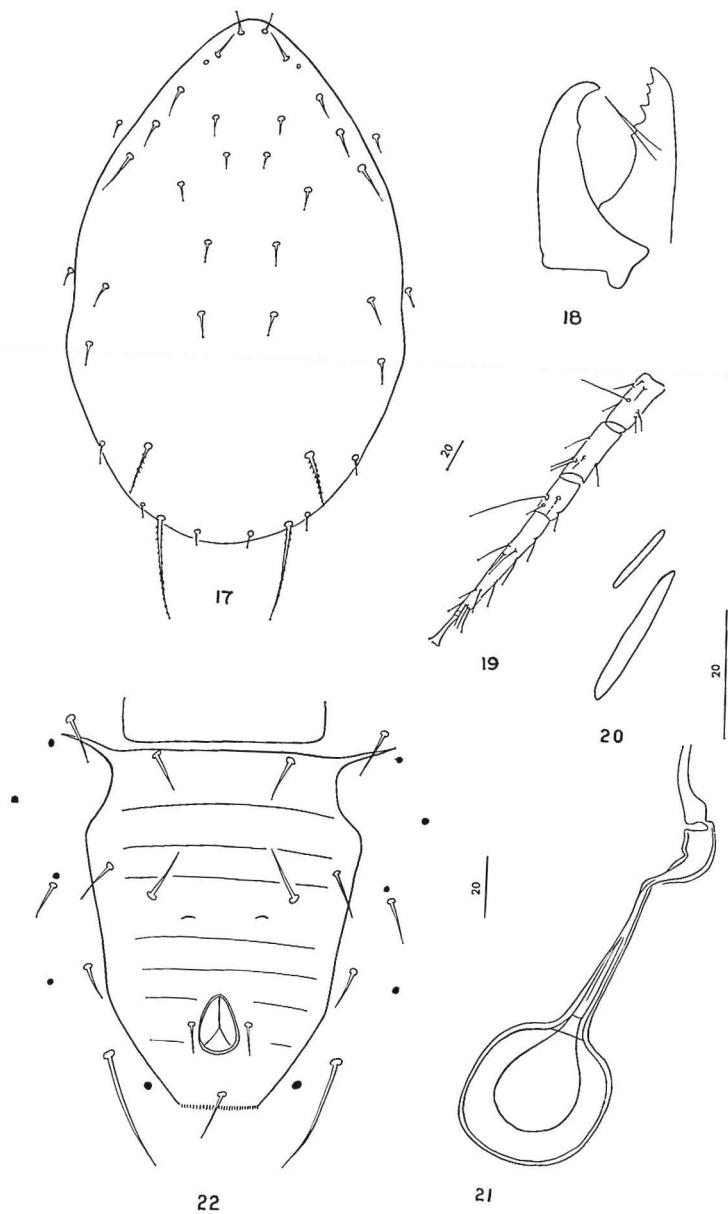
(Figs. 17-22).

Female : Chelicera 31 μ long with five subapical teeth on fixed digit and one small subapical tooth on movable digit (Fig. 18). Dorsal shield 333 μ long and 186 μ wide with 17 pairs of setae (Figs. 17). Verticals 13 μ ; dorsocentrals I, II 10 μ , III 14 μ , IV 15 μ ; prolaterals I 23 μ , II-III 18 μ , IV 26 μ ; postlaterals



FIGS. 13-16 : *Amblyseius notatus* n. sp.

13. — Leg IV. 14. — Dorsal plate. 15. — Spermatheca. 16. — Ventrianal plate.



FIGS. 17-22 : *Amblyseius perfectus* n. sp.

17. — Dorsal plate. 18. — Cheliceral digits. 19. — Leg IV. 20. — Metapodal platelets.
21. — Spermatheca. 22. — Genital and ventrianal plates.

I 17 μ , II 20 μ , III-IV 14 μ , V 58 μ ; promediolateral 12 μ ; postmediolateral 39 μ ; sublaterals I 18 μ , II 16 μ ; clunals 8 μ . All the setae simple except postlateral V and postmediolateral which are weakly serrate. Peritreme extending to base of vertical seta. Ventrianal plate rectangular, concave near the anterior margin, 117 μ long and 88 μ wide, with three pairs of setae and a pair of elliptical pores (Fig. 22), having weak transverse striations; wider than the width of genital plate. Four pairs of setae on membrane surrounding ventrianal plate, with five pairs of visible pores scattered on membrane. Two pairs of metapodal platelets; primary platelet 24 μ long and secondary platelet 12 μ long (Fig. 20). Genital plate 65 μ wide. Spermatheca long, length of cervix and atrium 48 μ ; atrium thick, cervix long, narrow towards anterior side and bulges out towards posterior side (Fig. 21). Leg IV with macrosetae on genu, tibia and basitarsus each measuring 41 μ , 17 μ and 61 μ long respectively (Fig. 19).

Type : Holotype female, collected from loquat leaves (*Eriobotrya japonica*), 4 miles North of Sheikhupura, West Pakistan, April 1, 1965 and deposited in the Department of Entomology, W.P.A.U., Lyallpur, Pakistan; one female, 6 miles South of Sheikhupura from paddy, March 29, 1965.

The following characters separate this species¹ from *Amblyseius aurescens* :

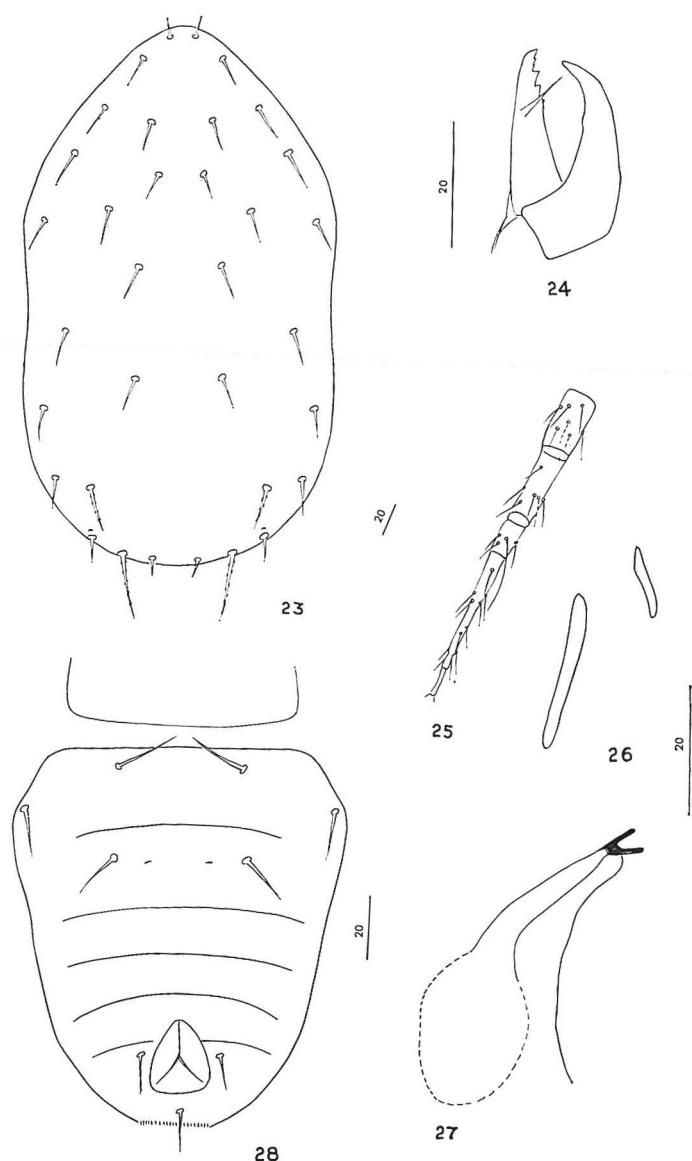
- 1) Fixed digit with five subapical teeth in this species; two subapical teeth on fixed digit in *aurescens*.
- 2) Setae Lg and M₂ serrate in this species, simple in *aurescens*.
- 3) Shape of spermatheca differs from that of *aurescens*.
- 4) Shape of ventrianal plate (Fig. 22) is different in the two species.
- 5) Three macrosetae on leg IV one on genu, tibia and basitarsus in this species as against only one macroseta on basitarsus of leg IV in *aurescens*.

5. *Amblyseius stolidus* n. sp.

(Figs. 23-28).

Female : Chelicera 33 μ long with five subapical teeth and a pilus dentilis on fixed digit and one tooth on movable digit (Fig. 24). Dorsal shield 347 μ long and 182 μ wide with 17 pairs of setae (Fig. 23). Verticals 18 μ ; dorsocentrals I-II 17 μ , III 19 μ , IV 25 μ ; prolaterals I-II 24 μ , III 25 μ , IV 26 μ ; postlaterals I-II-III 25 μ ; IV 24 μ , V 53 μ ; promediolateral 20 μ ; postmediolateral 40 μ ; sublateral I 25 μ , II 20 μ ; clunals 14 μ . All the setae simple except postmediolateral and postlateral V which are weakly serrate. Peritreme extending to base of verticals. Ventrianal plate rectangular, slightly concave near the anterior part, three pairs of preanal setae and a pair of elliptical pores (Fig. 28); with weak transverse striations;

1. This differs from *A. harrowi* on the basis of the shape of dorsal plate, ventrianal plate and spermatheca, and the number of teeth on fixed and movable digits.



FIGS. 23-28 : *Amblyseius stolidus* n. sp.

23. — Dorsal plate. 24. — Cheliceral digits. 25. — Leg IV. 26. — Metapodal platelets.
27. — Spermatheca. 28. — Genital and ventrianal plates.

wider than genital plate. Four pairs of setae on membrane surrounding ventrianal plate and a number of pores on it. Two pairs of metapodal platelets ; primary platelet 25μ long, secondary platelet 14μ long (Fig. 26). Genital plate 73μ wide. Spermatheca (atrium and cervix) 25μ long (Fig. 27). Cervix four times as long as its maximum width. Leg IV with macroseta on basitarsus 60μ long (Fig. 25).

Type : Holotype female, from paddy (*Oryza sativa L.*) 6 miles South of Sheikhpura, March 30, 1965 deposited in the Department of Entomology, W.P.A.U., Lyallpur ; four females same collection ; other females collected from the leaves of sweet potato (*Ipomoea batatas Poir.*), brinjal (*Solanum melongena L.*), citrus (*Citrus medica L.* var. *Cedrata Risso*), mulberry (*Morus alba L.*) and lucerne (*Medicago sativa L.*) at Lyallpur and Sheikhpura, deposited in United States National Museum and British Museum (Natural History), London.

This species¹, is closely related to but distinguishable from *Amblyseius venustus* according to these characters :

- 1) Fixed digit with five teeth in this species as against four teeth on the fixed digit in *venustus*.
- 2) Ventrianal plates are different in the two species.

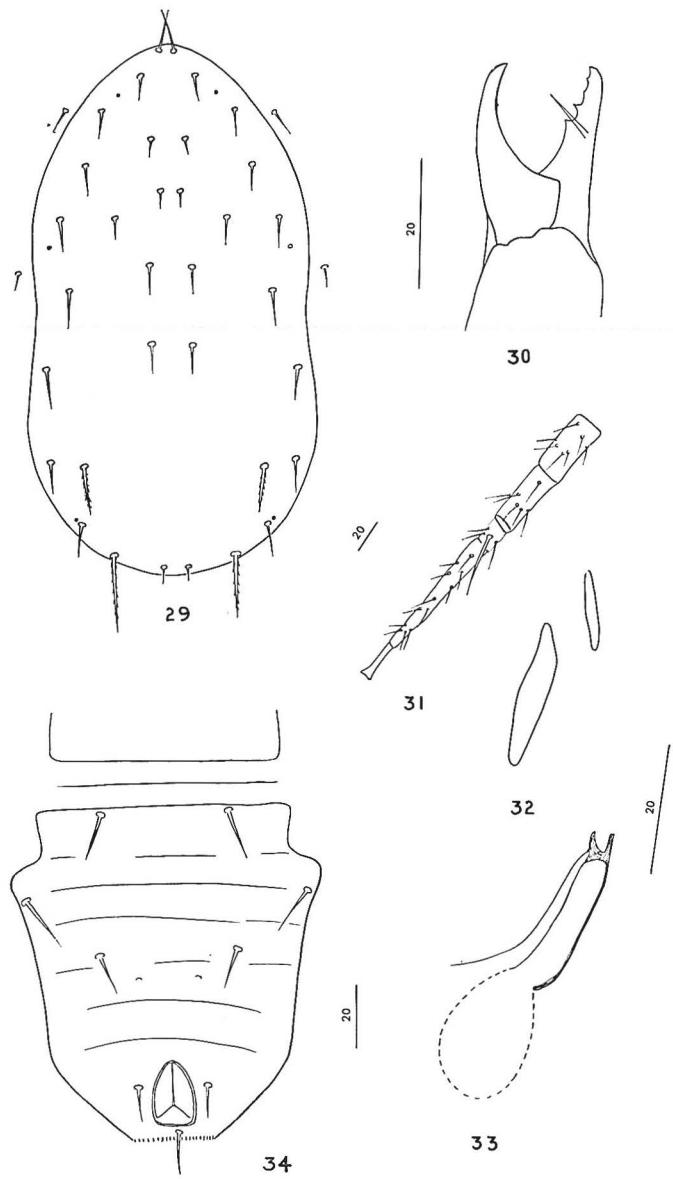
6. *Amblyseius venustus* n. sp.

(Figs. 29-34).

Female : Chelicera 34μ with four subapical teeth and a pilus dentilis on the fixed digit (Fig. 30). Dorsal shield with 17 pairs of setae and three pairs of visible pores ; 340μ long and 170μ wide (Fig. 29). Verticals 17μ ; dorsocentrals I-II 15μ , III 18μ , IV 21μ ; prolaterals I 20μ , II 19μ , III 22μ , IV 24μ , approximately half as long as distance between their bases ; postlaterals I 24μ , II 26μ , III 21μ , IV 20μ , V 54μ ; prome diolateral 17μ ; postmediolateral 34μ , longer than distance between its base and that of postlateral V ; sublateral I 15μ , II 17μ ; clunals 12μ . All the setae simple except postlateral V and postmediolateral which are weakly serrate. Peritreme extending to base of vertical seta. Ventrianal plate 117μ long and 97μ wide, triangular, sharp inward curve near the antero-lateral side, with three pairs of preanal setae and a pair of pores ; plate finely reticulated (Fig. 34). Four pairs of setae and three pairs of visible pores on membrane surrounding ventrianal plate. Two pairs of metapodal platelets ; primary platelet 25μ long, secondary platelet 10μ long (Fig. 32). Genital plate 72μ wide, shorter than the width of ventrianal plate. Atrium with minor duct and cervix of spermatheca 28μ long (Fig. 33). Leg IV with macroseta on basitarsus 73μ long (Fig. 31).

Type : Holotype female, collected from grass (*Cynodon dactylon*) 4 miles North of Sheikhpura, April 17, 1965 ; one female collected from paddy (*Oryza sativa L.*),

1. *A. stolidus* differs from *A. barkeri* in the following points : fixed digit of Chelicera with 3 teeth in *barkeri*, 5 in *stolidus*.



FIGS. 29-34 : *Amblyseius venustus* n. sp.

29. — Dorsal plate. 30. — Cheliceral digits. 31. — Leg IV. 32. — Metapodal platelets.
33. — Spermatheca. 34. — Ventrianal plate.

same collection ; one female collected from fig (*Ficus carica* L.), Insectary, W.P.A.U., Lyallpur ; deposited in the Departement of Entomology, United States National Museum, U.S.A. and British Museum (Natural History) London.

This new species closely resembles *Amblyseius aurescens* and *Amblyseius perfectus* but the following characters separate it from the other two species.

- 1) This species has four subapical teeth on the fixed digit as against five and two teeth on the fixed digit of *perfectus* and *aurescens* respectively.
- 2) Shapes of spermatheca and ventrianal plates differ in all three species.

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