

RESEARCH NOTES

Introduction of Twelve Species of Brachypyline Oribatid Mites (Acari: Oribatida: Brachypyline) New Records for the Fauna of Iran

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ABSTRACT

During 1999-2002, in the course of a faunistic survey of oribatid mites of Iran, twelve species of higher or brachypyline oribatid mites (Brachypyline) belonging to eleven genera and seven families from various localities of Iran were collected: *Aleurodamaeus* setosus* (Aleurodamaeidae*); *Licnobelba* alestensis* (Licnobelbidae*); *Licnodamaeus fissuratus*, *L. pulcherrimus* (Licnodamaeidae); *Damaeus* sp.*, *Subbelba* sp.*, *Belba* cf. minuta* (Damaeidae); *Damaeolus* cf. ornatissimus*, *Fosseremus quadripertitus* (Damaeolidae); *Berlesezetes aegypticus* (Microzetidae); *Galumna tarsipennata*, *Pilogalumna boevi* (Galumnidae). All the species, six genera and two families, that are the first recorded from Iran are marked by an asterisk.

Keywords: Acari, Brachypyline, Iran, New record, Oribatida.

INTRODUCTION

Oribatid mites are one of the numerically dominant arthropod groups in the organic horizons of most soils (Norton, 1990). The role of oribatid mites in decomposition, nutrient cycling and soil formation is important (Behan-Pelletier, 1997). Some oribatid mites act as intermediate hosts of tapeworms of the Anoplocephalidae (Denegri, 1993). Furthermore, their role as bioindicators in ecotoxicological experiments and assessing the quality of air and soils (Lebrun and Straalen, 1995; Behan-Pelletier, 1999) are some other important characteristics they have.

Only a little information is available on the oribatid mite fauna of Iran and faunal lists containing new records and descriptions of several new species have been published by Bayartogtokh and Akrami (2000 a,b), Mahunka and Akrami (2001), Akrami and

Saboori (2001), Haddad Irani-Nejad (2003) and Haddad Irani-Nejad *et al.* (2000, 2002, 2003).

In the course of this investigation on the species biodiversity of oribatid mites in different localities of Iran, some species of brachypyline oribatid mites were collected. Among them, twelve new records for the mite fauna of Iran are reported in this paper and it serves to lay the foundation for further more extensive taxonomical investigations.

MATERIALS AND METHODS

Soil and litter samples were taken from different localities of Iran at various times during 1999 to 2002. Each sample contains 2-4 trowels taken from the surface to a soil depth of 15 cm of fruit and forest trees, crop plants and weeds. Samples were transferred to the Acarological Laboratory of the De-

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partment of Plant Protection, College of Agriculture, Tehran University. Then, the mites in the soil samples were extracted using a Berlese funnel. Mites were collected and preserved in 75% ethanol and cleared in lactophenol. Selected mite specimens were mounted in Hoyer's medium on glass microscopic slides for identification. The slides were placed in an oven at 45°C for one week. The specimens were sorted into possible levels and then sent to the specialist of this group for confirmation. Figures of mites were made by using a drawing tube attached to a microscope. All specimens are deposited in the Department of Plant Protection, Tehran University, Iran.

RESULTS AND DISCUSSION

The present study has revealed new records of twelve species of brachypylinae oribatid mites belonging to eleven genera and seven families with a short description of the species. The new families and genera for Iran are marked by an asterisk:

Aleurodamaeidae* Paschoal and Johnston, 1984

***Aleurodamaeus* setosus* (Berlese, 1883) (Figure 1a, b)**

Measurements: Body length 594 µm, width 366 µm.

Apterogasterine or pycnonotic oribatid mites: i.e. notogaster without pteromorphae, porose areae or sacculi; notogaster more or less flattened; adult with exuviae; body and legs covered by a thick cerotegument layer; lamellar (*le*) and rostral (*ro*) setae long and close together, interlamellar (*in*) setae small and spiniform; sensillus (*ss*) setiform, without spinules; 8 pairs of posteromarginal setae on notogaster; large genital and anal plates and occupying almost the whole length of the ventral plate; ano-genital setal formula: 7-1-2-2; epimeral setal formula: 3-

1-3-3; pedotecta I-II auriculiform; pedotectal tooth absent and legs tridactylous.

Material examined: Two specimens, Isfahan, soil under fruit trees, 15. XII. 2001, M. Jalaeian leg.

Licnobelbidae* Grandjean, 1965

***Licnobelba* alestensis* Grandjean, 1931 (Figure 1c, d, e)**

Measurements: Body length 287 µm, width 158 µm.

Notogaster pycnonotic; adults with exuviae; sensillus large and auriculate; genital plates with 6 pairs of setae; notogasteral fissurae very small; cuticle smooth and shiny; 4 pairs of posteromarginal setae on notogaster present; ano-genital setal formula: 6-1-2-3; epimeral setal formula: 3-1-3-3 and legs tridactylous.

Material examined: One specimen (specimen broken), Azadshahr, Golestan Province, litter of forest trees, 15.III. 2000, M. A. Akrami leg.

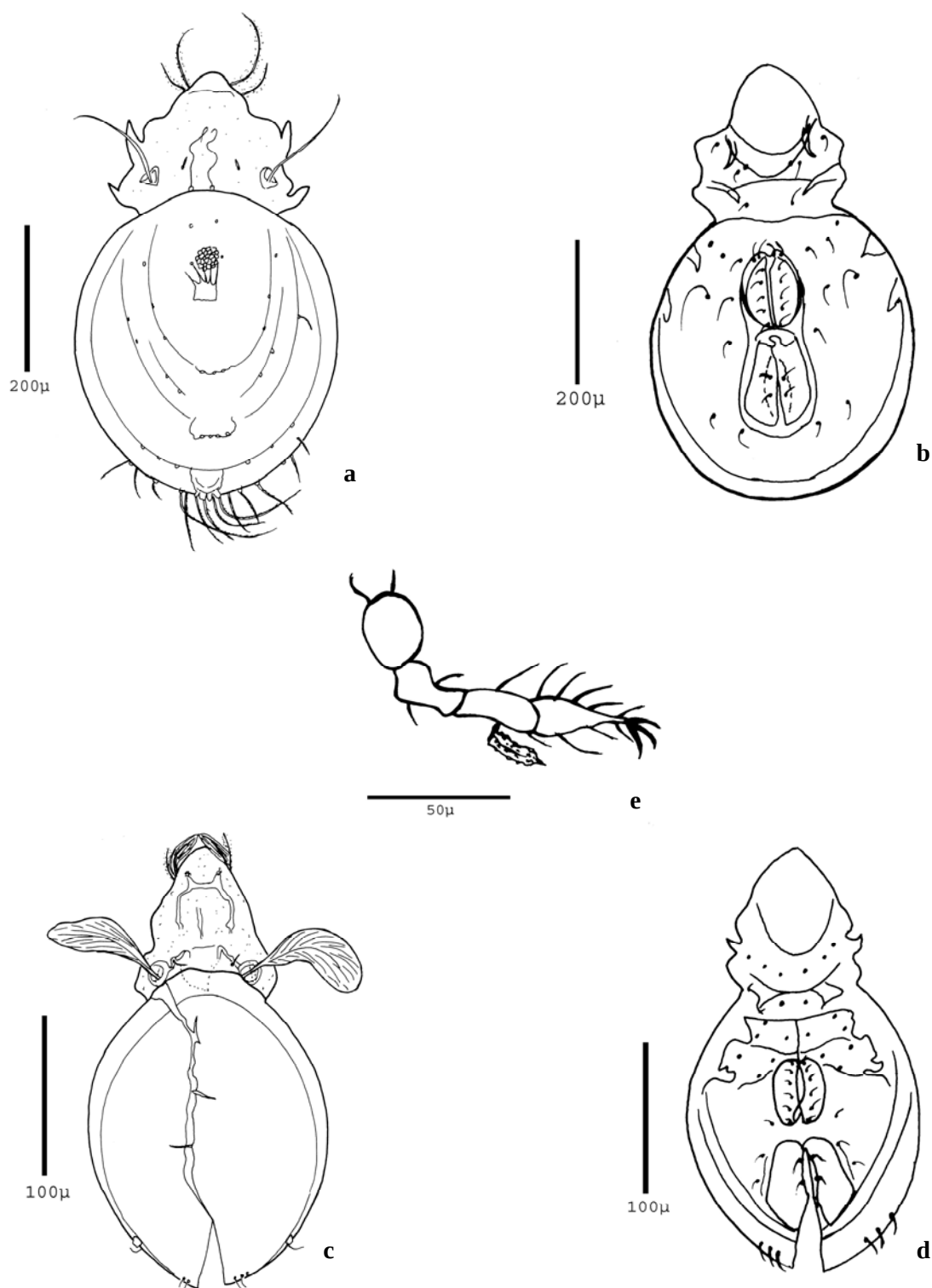
Licnodamaeidae Grandjean, (1954)

***Licnodamaeus fissuratus* (Balogh and Mahunka, 1965). (Figure 2 a, b)**

Measurements: Body length 297 µm, width 129µm.

Notogaster pycnonotic; adults without exuviae; sensillus fusiform with small spines; genital plates with 5 pairs of setae; notogasteral fissurae large, lyrifissures *im* and *ip* distinctly visible; body densely granulate with cerotegument; notogaster marginate with 6 pairs of posteromarginal setae; ano-genital setal formula: 5-1-2-0; epimeral setal formula: 3-1-3-3; genu, tibia and tarsus articulated and legs tridactylous.

Material examined: Two specimens, Karaj, Tehran Province, soil under wormwood (*Artemisia* sp.), I. XI. 2000, N. Arzanian leg.



Figures 1: a) *Aleurodamaeus setosus*, b) *A. setosus* (ventral view), c) *Licnobelba alestensis*, d) *L. alestensis* (ventral view), e) *L. alestensis* (leg IV) .

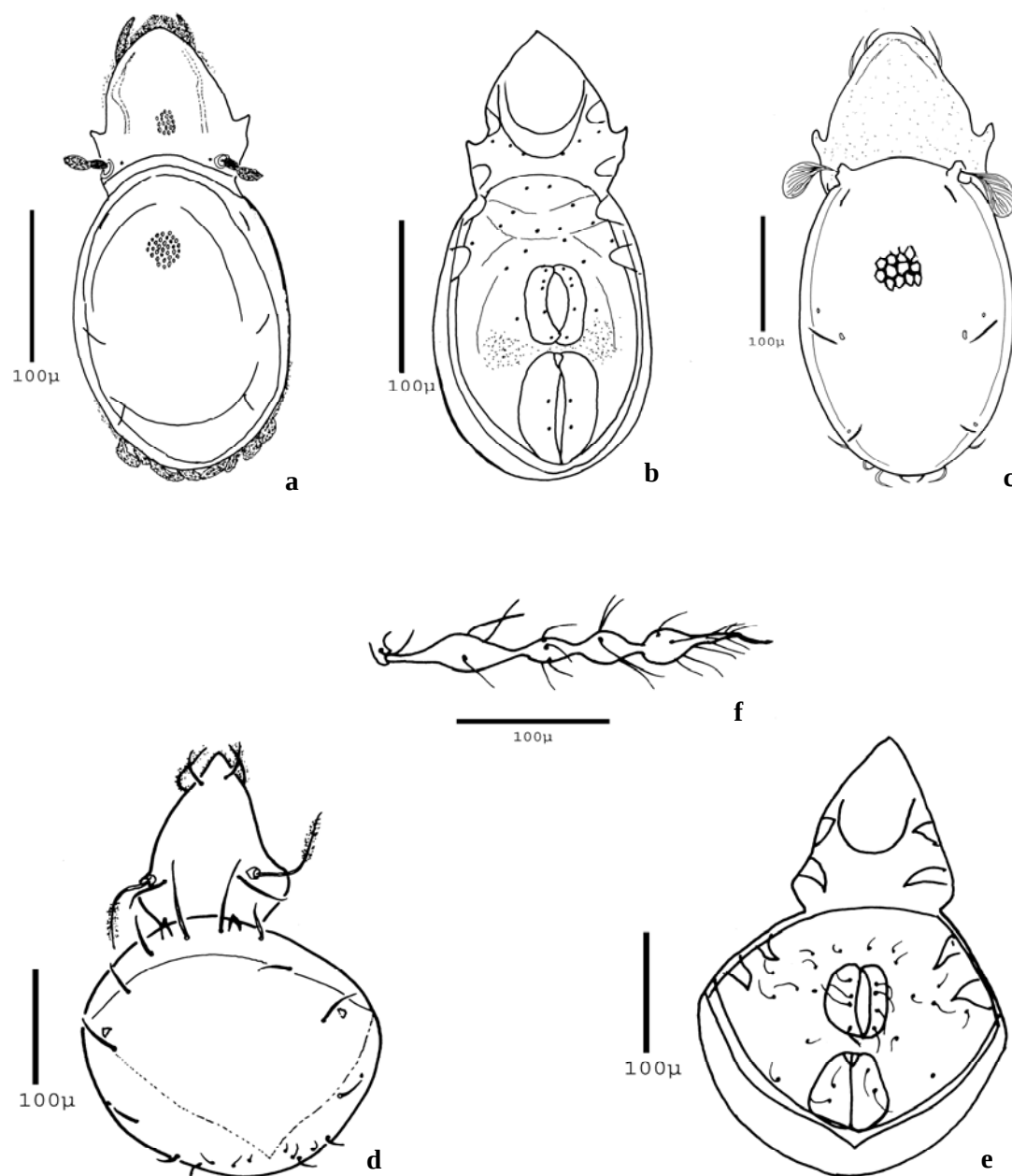


Figure 2: a) *Licnodamaeus fissuratus*, b) *L. fissuratus* (ventral view), c) *L. pulcherrimus*, d) *Damaeus* sp., e) *Damaeus* sp. (ventral view), f) *Damaeus* sp. (leg I).

***Licnodamaeus pulcherrimus* (Paoli, 1908)
(Figure 2c)**

Measurements: Body length 376 µm, width 168 µm.

Notogaster pycnonotic; adults without exuviae; sensillus auriculate; interlamellar setae not visible; genital plates with 5 pairs of setae; notogasteral fissurae large; prodorsum granulate; notogaster with rough polygonal structure and legs tridactylous.

Material examined: Two specimens, Karaj, Tehran Province, soil under wormwood (*Artemisia* sp.), I. XI. 2000, N. Arzanian leg.

Damaeidae Berlese, 1896***Damaeus** sp. (Figure 2 d, e, f)**

Measurements: Body length 386 µm, width 238µm.

Notogaster pycnonotic and hemispheric shape, with 11 pairs of setae, 8 pairs in a longitudinal row and three pairs in postero-marginal position; legs moniliform; tibia and genu I-IV without associated seta (= seta *d*); spinae adnatae present; setal formula of genu I-IV: 4-4-3-3; setal formula of trochanter I-IV: 1-1-2-1 and legs monodactylous.

Material examined: Two specimens, Azadshahr, Golestan Province, litter of forest trees, 15. III. 2000, M. A. Akrami leg.

***Subbelba** sp. (Figure 3 a, b, c)**

Measurements: Body length 455 µm, width 277 µm.

Notogaster pycnonotic; notogasteral setae spiniform; associated setal formula of tibia I-IV: 0-1-1-0; setal formula of trochanter I-IV: 1-1-3-3; spinae adnatae absent; associated setal formula of genu I-IV: 1-1-1-0; setal formula of genu I-IV: 4-4-4-4 and legs monodactylous.

Material examined: Three specimens, Masooleh, Guilan Province, litter of forest trees, 16.V. 2000, M. A. Akrami leg.

***Belba** cf. *minuta* Bulanova-Zachvatkina, 1962. (Figure 3d, e, f, g)**

Measurements: Body length 584 µm, width 356 µm.

Notogaster pycnonotic; notogasteral setae spiniform; interlamellar setae long; setiform and similar to sensillus; associated setal formula of tibia I-IV: 0-1-1-1; setal formula of trochanter I-IV: 1-1-2-1; setal formula of genu I-IV: 4-4-3-3 and associated setal formula of genu I-IV: 1-1-1-0; spinae adnatae absent and legs monodactylous.

Material examined: Three specimens, Karaj, Tehran Province, soil, 11.X.2001, M. Latifi leg.; Isfahan, soil under fruit trees, 15. XII.2001, M. Jalaeian leg.; Kamyaran, Kordestan Province, soil under strawberry (*Fragaria vesca*), 17. IIX. 2002, M. M. Ghazi leg.

Damaeolidae Grandjean, 1965***Damaeolus** cf. *ornatissimus* Csiszar, 1962. (Figure 4 a, b, c)**

Measurements: Body length 287 µm, width 148 µm.

Notogaster pycnonotic with 11 pairs of setae, 8 pairs spiniform and 3 pairs dilated; notogaster in dorsal and ventral view densely granulated; lamellar setae near rostral setae; sensillus flagelliform; ventral neotrichy present: i.e. 3 pairs of aggenital setae present; anogenital setal formula: 6-3-2-3; notogaster without 4 semicircular depressions and legs monodactylous.

Material examined: One specimen, Azadshahr, Golestan Province, litter of forest trees, 15. III. 2000, M. A. Akrami leg.

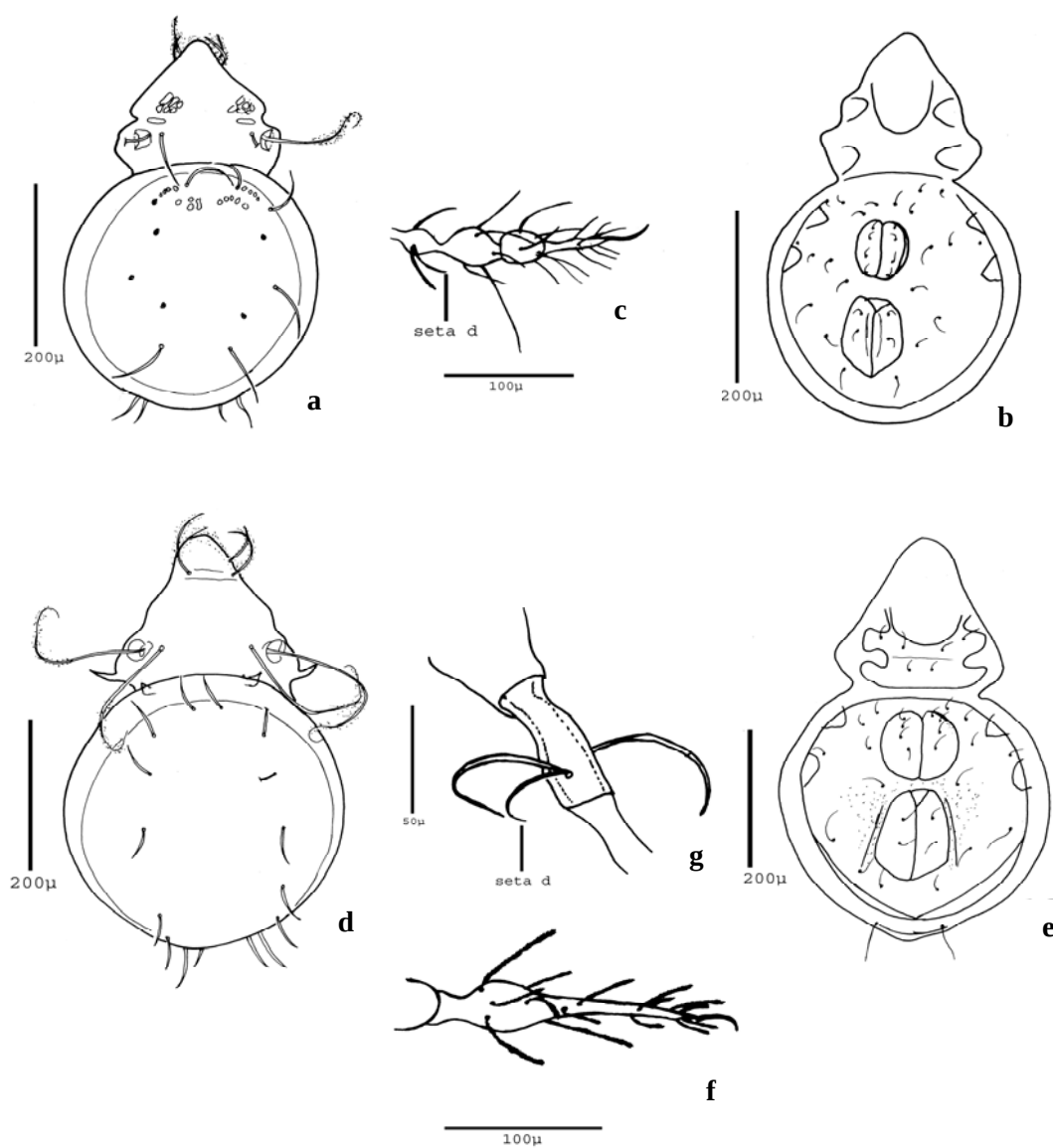


Figure3: a) *Subbelba* sp., b) *Subbelba* sp. (ventral view), c) *Subbelba* sp. (leg I with associated seta of genu), d) *Belba* cf. *minuta*, e) *B. cf. minuta* (ventral view), f) *B. cf. minuta* (tarsus I), g) *B. cf. minuta* (associated seta of genu III).

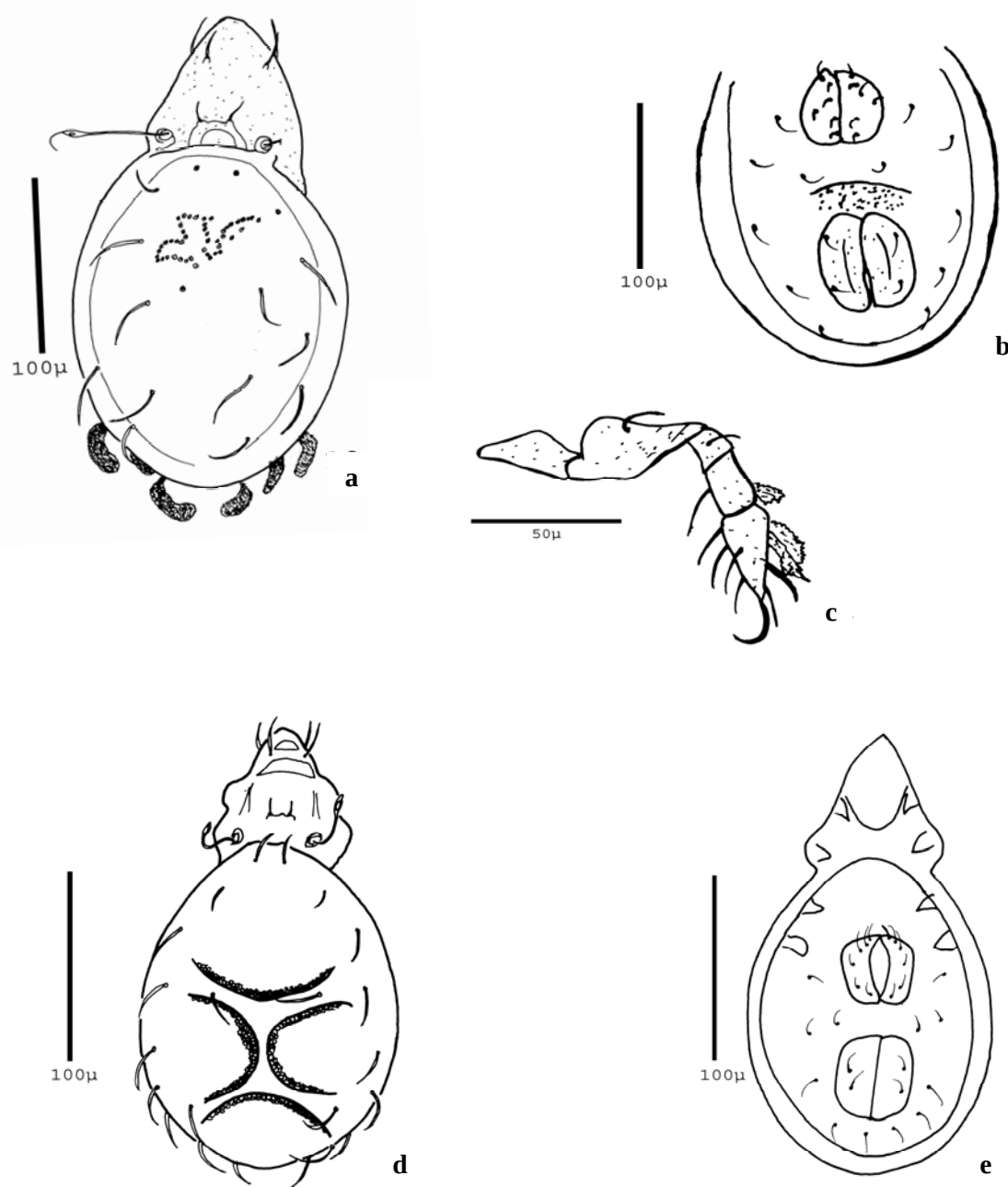


Figure 4: a) *Damaeolus* cf. *ornatissimus*, b) *D.* cf. *ornatissimus* (ventral view), c) *D.* cf. *ornatissimus* (leg IV), d) *Fosseremus quadripertitus*, e) *F.* *quadripertitus* (ventral view).

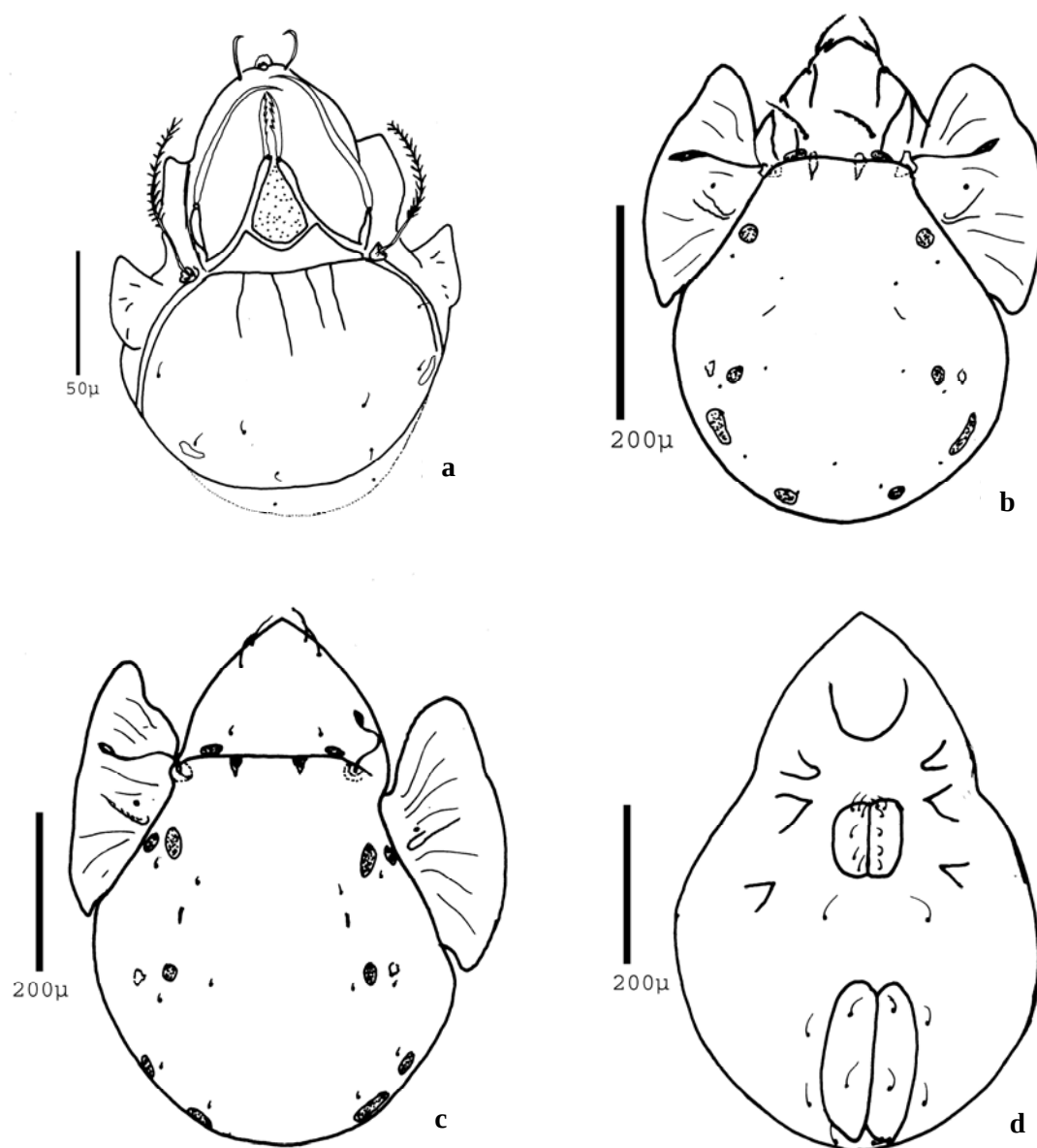


Figure 5: a) *Berlesezetes aegypticus*, b) *Galumna tarsipennata*, c) *Pilogalumna boevi*, d) *P. boevi* (ventral view).

***Fosseremus quadripertitus* Grandjean, 1965 (Figure 4d, e)**

Measurements: Body length 238 µm, width 129 µm.

Notogaster pycnonotic with 11 pairs of spiniform setae; ventral neotrichy present, 3 pairs of aggenital setae present; anogenital

setal formula: 6-3-2-3; lamellar setae near rostral setae; sensillus with dilated head; notogaster with 4 semicircular depressions and legs monodactylous.

Material examined: Three specimens, Isfahan, soil under fruit trees, 15. XII. 2001, M. Jalaeian leg.; Fooladshahr, Isfahan Province, litter of vegetables, 16. XI. 2002, A. Mirshekar leg.

Microzetidae Grandjean, 1936***Berlesezetes aegypticus* (Bayoumi, 1977)
(Figure 5a)**

Measurements: Body length 194 μm , width 155 μm .

Very small pterogasterine or poronotic oribatid mites; pteromorphae immovable; apodemata IV thickened; cuspis obliquely truncate, its outer apex pointed; lamellae very large; medial margin of lamellae U-shaped; lamellar apophysis present in the interlamellar region; lamellar setae with long ciliae, emerging at inner apex of cuspis; interlamellar setae long; areae porosae absent; sensillus directed forward, with long ciliae; anterior part of notogaster with 4 longitudinal lines and legs monodactylous.

Material examined: One specimen, Abarkouh, Yazd Province, soil under bermuda grass (*Cynodon dactylon* L.), 4. IV. 2000, M.A. Akrami leg.

Galumnidae Jacot, 1925***Galumna tarsipennata* Oudemans, 1913
(Figure 5b)**

Measurements: Body length 456 μm , width 271 μm .

Notogaster poronotic; pteromorphae umbellate and ornamented by some ribs; lamellar line (line *L*) and sublamellar line (line *S*) well developed; lamellar setae originate between lines *L* and *S*; lamellar, interlamellar and rostral setae long and ciliate; sensillus long, with gradually dilated head; a distinct dorsosejugal suture present, slightly concave medially; porose areas A_a , A_1 and A_3 rounded, nearly equal in length and shape, but A_2 elongated, porose areas A_1 and A_2 are near to each other and A_3 removed far posteriorly; notogastral setae represented only by their alveoli and legs tridactylous.

Material examined: Two specimens, Abarkouh, Yazd Province, soil under *so lanum* spp., 9. IV. 1999, M. A. Akrami leg.

***Pilogalumna boevi* (Krivolutskaya, 1952)
(Figure 5c, d)**

Measurements: Body length 650 μm , width 485 μm .

Notogaster poronotic; lamellar lines (line *L*) absent; rostrum simple, rounded in dorsal view; lamellar and rostral setae simple, long and equal in length; interlamellar setae much shorter; sensillus long, curved medially, with dilated head; a distinct dorsosejugal suture present; pteromorphae ornamented by some ribs; notogastral setae visible; four pairs of porose areas on notogaster present, among them A_a much larger than the others; anogenital setal formula: 6-1-2-3; legs tridactylous.

Material examined: Two specimens, Abarkouh, Yazd Province, soil under many plants, 1999 (various times), M.A. Akrami leg.

Up to now, about 95 species of brachypyline oribatid mites have been reported from various localities of Iran, and, with regard to the fact that these species are restricted to a few places of Iran, it can be expected that there is a rich fauna of this mite group in Iran and this needs more extensive research and further taxonomical surveys in other regions of Iran.

ACKNOWLEDGEMENTS

I would like to express my sincere thanks to Dr. Badamdorj Bayartogtokh, Department of Zoology, Faculty of Biology, National University of Mongolia, Ulaanbaatar, for confirming the specimens. Also I am grateful to Dr. Alireza Saboori, Department of Plant Protection, University of Tehran for his guidance.

REFERENCES

1. Akrami, M. A. and Saboori. A. 2001. Introduction of Three Families on Oribatid Mites, New Records to the Acari Fauna of Iran. Iranian J. Agric. Sci., 32(4): 807-813 (in Persian).



2. Bayartogtokh, B. and Akrami, M. A. 2000a. Oribatid Mites (Acari: Oribatida) from Iran, with Descriptions of Two New Species. J. Acrol. Soc. Jpn., 9(2):129-145.
3. Bayartogtokh, B. and Akrami, M. A. 2000b. Poronotic Oribatid Mites (Acari: Oribatida: Poronota) from Iran. J. Acrol. Soc. Jpn., 9(2):159-172.
4. Behan-Pelletier, V. M. 1997. Oribatid Mites (Acari: Oribatida) of the Yukon. In: "Insects of the Yukon." (Eds.) Danks, H. V. and Downes, J. A. Biological Survey of Canada (Terrestrial Arthropods), Ottawa. pp.115-149.
5. Behan-Pelletier, V. M. 1999. Oribatid Mite Biodiversity in Agroecosystems: Role for Bioindication. Agric. Ecosyst. Environ., 74: 411-423.
6. Denegri, G. M. 1993. Review of Oribatid Mites as Intermediate Hosts of Tapeworms of the Anoplocephalidae. Exp. Appl. Acarol., 17: 567-580.
7. Haddad Irani-Nejad, K. 2003. Identifying of the Soil Mites of Tabriz University Campus, 2- Oribatida. J. Agric. Sci., 13(1): 11-29 (in Persian).
8. Haddad Irani-Nejad, K., Kamali K. and Maleki Milani. H. 2000. Some Pycnonotic Brachypyline Oribatid Mites of Cotton Fields in Moghan Plain. Iranian J. Agric. Sci., 31(4): 737-751 (in Persian).
9. Haddad Irani-Nejad, K., Kamali K. and Maleki Milani. H. 2002. Poronotic Brachypyline Oribatid Mite Species of Cotton Fields in Moghan Plain. Appl. Entomol. Phytopathol., 69 (2): 17- 47 (in Persian).
10. Haddad Irani-Nejad, K., Hajiqaanbar H. R. and Talebi Chaichi. P. 2003. Oribatid Mites of the Sugarbeet Fields in Miandoab Plain. J. Agric. Sci., 14(1): 55-67 (in Persian).
11. Lebrun, P. and Van Straalen, N. M. 1995. Oribatid Mites: Prospects for their Use in Ecotoxicology. Exp. Appl. Acarol., 19: 361-379.
12. Mahunka, S. and Akrami, M. A. 2001. Galumnatid Mites from Iran (Acari: Oribatida). Ann. hist. -nat. Mus. natn. hung., 93: 231-237.
13. Norton, R. A. 1990. Acarina: Oribatida. In: "Soil Biology Guide". (Ed.): Dindal, D. L. John Wiley and Sons, New York. 779-803.

گزارش جدید دوازده گونه از کنه‌های اریباتید عالی

(Acari: Oribatida: Brachypyline) برای فون ایران

م.ع.اکرمی

چکیده

در ضمن بررسی فون کنه‌های اریباتید مناطق مختلف ایران که در سالهای ۱۳۷۸ تا ۱۳۸۱ صورت گرفت، دوازده گونه از کنه‌های اریباتید عالی (Oribatida: Brachypyline) متعلق به یازده جنس و هفت خانواده جمع‌آوری شدند که عبارتند از: *Aleurodamaeus* setosus* (Aleurodamaeidae*); *Licnobelba* alestensis* (Licnobelbidae*); *Licnodamaeus fissuratus*, *L. pulcherrimus* (Licnodamaeidae); *Damaeus* sp.*, *Subbelba* sp.*, *Belba* cf. minuta* (Damaeidae); *Damaeolus* cf. ornatissimus*, *Fosseremus quadripertitus* (Damaeolidae); *Berlesezetes aegypticus* (Microzetidae); *Galumna tarsipennata*, *Pilogalumna boevi* (Galumnidae). همه گونه‌ها، شش جنس و دو خانواده برای اولین بار از ایران گزارش می‌شوند که با علامت ستاره مشخص شده‌اند.