Order Araneae, family Linyphiidae

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INTRODUCTION

The Arabian Peninsula is the largest in Asia, yet this huge area remains a real 'terra incognita' as regards the linyphiid spider fauna. Only one linyphiid species, i.e. *Prinerigone vagans arabica* (Jocqué, 1981), described from Wadi Khumra, ar-Riyād, Saudi Arabia (Jocqué, 1981), is known from this territory. Even though a rich dwarf-spider fauna can hardly be expected to be supported by such an arid territory like Saudi Arabia, the diversity must certainly be higher. To prove this, this contribution deals with a total of seven species from five genera.

Linyphiid spiders have been collected in the United Arab Emirates using various sampling techniques during five years. Of the seven species revealed, three are new to science while the remaining four, all widespread, are here reported from the UAE for the first time.

MATERIALS AND METHODS

This paper deals with a collection of linyphiids made during 2005–2009 in different localities of the United Arab Emirates. The following collecting methods were used: Sifting of leaf litter; light, water, pitfall and Malaise traps; sweep-net and hand-collecting. If not otherwise stated, the specimens were collected by A. van Harten.

All holotypes are deposited in the collection of the Muséum d'histoire naturelle de Genève (MHNG), Switzerland. Paratypes and other specimens are divided between the MHNG, the United Arab Emirates Invertebrate Collection (UAEIC), the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU), and the Musée Royal de l'Afrique Centrale in Tervuren, Belgium (MRAC).

The chaetotaxy of Erigoninae is given in a formula (e.g., 2.2.1.1) which refers to the number of dorsal spines on tibiae I–IV. In Micronetinae, the chaetotaxy is given in a different formula, e.g., Ti I: 2-1-1-2(1), which means that tibia I has two dorsal, one pro-, one retrolateral spine, and two or one ventral spine (the apical spines are disregarded). The sequence of leg segment measurements is as follows: Femur + patella + tibia + metatarsus + tarsus. All measurements are given in mm. Scale lines in the figures are 0.1 mm unless otherwise indicated.

The terminology of the genitalic structures in Micronetinae follows that of Saaristo & Tanasevitch (1996). The terminology of the palpal structures in Erigoninae follows that of Hormiga (2000).

Abbreviations used in the text and figures: ARP - anterior radical process, DP - dorsal plate, DPS - distal part of scape, DSA - distal suprategular apophysis, E - embolus, ED - embolic division, EG - entrance groove, EP - embolus proper, Fe - femur, L - lamella characteristica, LT - light trap, MPS - middle part of scape, Mt - metatarsus, MT- Malaise trap, P - proscape, PA - patellar apophysis, PMP - posterior median plate, PT - pitfall trap; R - radix, TA - terminal apophysis, Th - thumb, Ti - tibia, WT - water trap.

SYSTEMATIC ACCOUNT

Subfamily **Erigoninae** Emerton, 1882

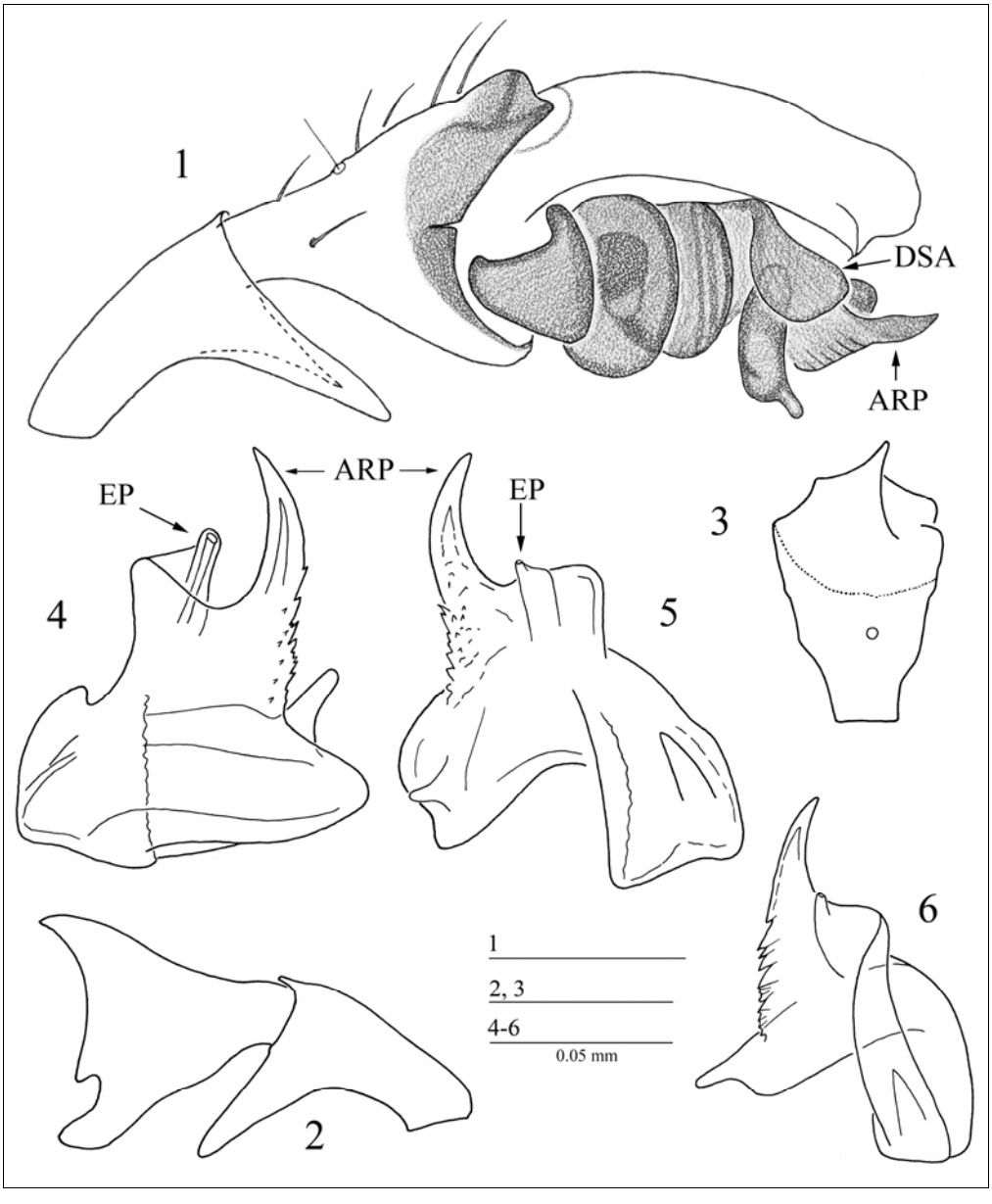
Genus ***Erigone*** Audouin, 1826
Type species: *Linyphia longipalpis* Sundevall, 1830.

Erigone autumnalis Emerton, 1882 Figures 1–11
Specimens examined: Al-Ajban, 1♂, 26.ii–2.iv.2006, MT; 1♀, 10.iii.2007, leaf litter, margin of grass field. Sharjah, 4♂, 8♀, in leaf litter from garden, 12.iii.2007.
Description: Male. Total length 1.40. Carapace 0.63 long, 0.45 wide, unmodified (Fig. 7), lateral edge toothless, pale brown to yellow. Chelicerae as in Figure 8, 0.28 long. Legs yellow. Leg I 1.77 long (0.48+0.13+0.53+0.33+0.30), IV 1.63 long (0.45+0.15+0.45+0.33+ 0.25). Chaetotaxy: 2.2.1.1; spines about as long as diameter of tibia. TmI - 0.42. Metatarsi IV without trichobothrium. Palpal tibia with only one ventral wart near base. Palp (Figs 1–6): Patella a bit shorter than tibia. Patellar apophysis almost as long as patella. Tibia pointed apically. Distal suprategular apophysis relatively long, wide and rounded. Embolic division with a long, sharp, basally serrated process directed forward. Abdomen 0.60 long, 0.53 wide, grey to dark grey.
Female. Total length, 1.28. Carapace 0.60 long, 0.40 wide, unmodified. Chelicerae 0.28 long, unmodified. Leg I 1.48 long (0.40+0.15+0.40+0.28+0.25), IV 1.53 long (0.45+0.15+0.40 +0.30+0.23). TmI - 0.43. Abdomen 0.58 long, 0.50 wide. Epigyne and vulvae as in Figures 9–11. Body and leg colouration, as well as chaetotaxy as in male.
Remarks: This species can easily be recognized by the very small size, by the unusual chaetotaxy pattern (2.2.1.1 as compared with 2.2.2.1), the unarmed edge around an unmodified male carapace, the absence of an anterolateral row of teeth on the chelicerae in both sexes, as well as by the peculiar shape of the embolic division and vulvae.
Distribution: *E. autumnalis* is widespread in the Nearctic and in the northern part of the Neotropics; introduced (?) to Europe: Switzerland (Pantini & Isaia, 2008), Italy (Isaia et al., 2007), Azores (Borges & Wunderlich, 2008), and now found in the UAE. A dead male of this species was trapped in aerial nets at Marble Point, Antarctica (Forster, 1971).

Erigone prominens Bösenberg & Strand, 1906
Specimens examined: Fujairah, 3♀, 28.ii–1.iv.2006, LT. Ghalilah, 1♂, 8.iii.2005, hand-collecting. Near al-Hayer, 1♂, 1♀, 2.iii.2005, hand-collecting. Khor al-Khwair, 1♀, 22.ii–1.iii.2007, LT; 1♂, 1♀, 1–8.iii.2007, LT; 3♀, 8–14.iii.2007, LT; 1♀, 15–22.iii.2007, LT. Sharjah, 1♂, 2♀, 2 juv., 12.iii.2007, in leaf litter from garden. Sharjah Desert Park, 3♂, 1♀, 25.ii–25.iii.2006, LT. Wadi Bih dam, 3♂, 3♀, 22.ii-1.iii.2007, LT; 3♂, 3♀, 15–22.iii.2007, LT; 1♂, 22–26.iii.2009, WT. Wadi Shawkah, 1♀, 1–7.iv.2007, WT; 1♂, 1♀, 30.i–18.ii.2008, WT.
Remarks: This species shows great variability in the somatic and genitalic characters well illustrated by numerous authors (see Platnick, 2009).
Distribution: St. Helena Island, Afrotropical realm, including Madagascar and Comoro Islands (Scharff, 1990), Korea (Paik & Namkung, 1979), China, Tibet, Taiwan (Song & Li, 2008), Vietnam (Tu & Li, 2004), Nepal (Wunderlich, 1983, as *E.* cf. *ourania* Crosby & Bishop, 1928), introduced to New Zealand (Millidge, 1988), Micronesia & Polynesia (Beatty et al., 1991).

Genus ***Mermessus*** O. Pickard-Cambridge, 1899
Type species: *Mermessus dentiger* O. Pickard-Cambridge, 1899.

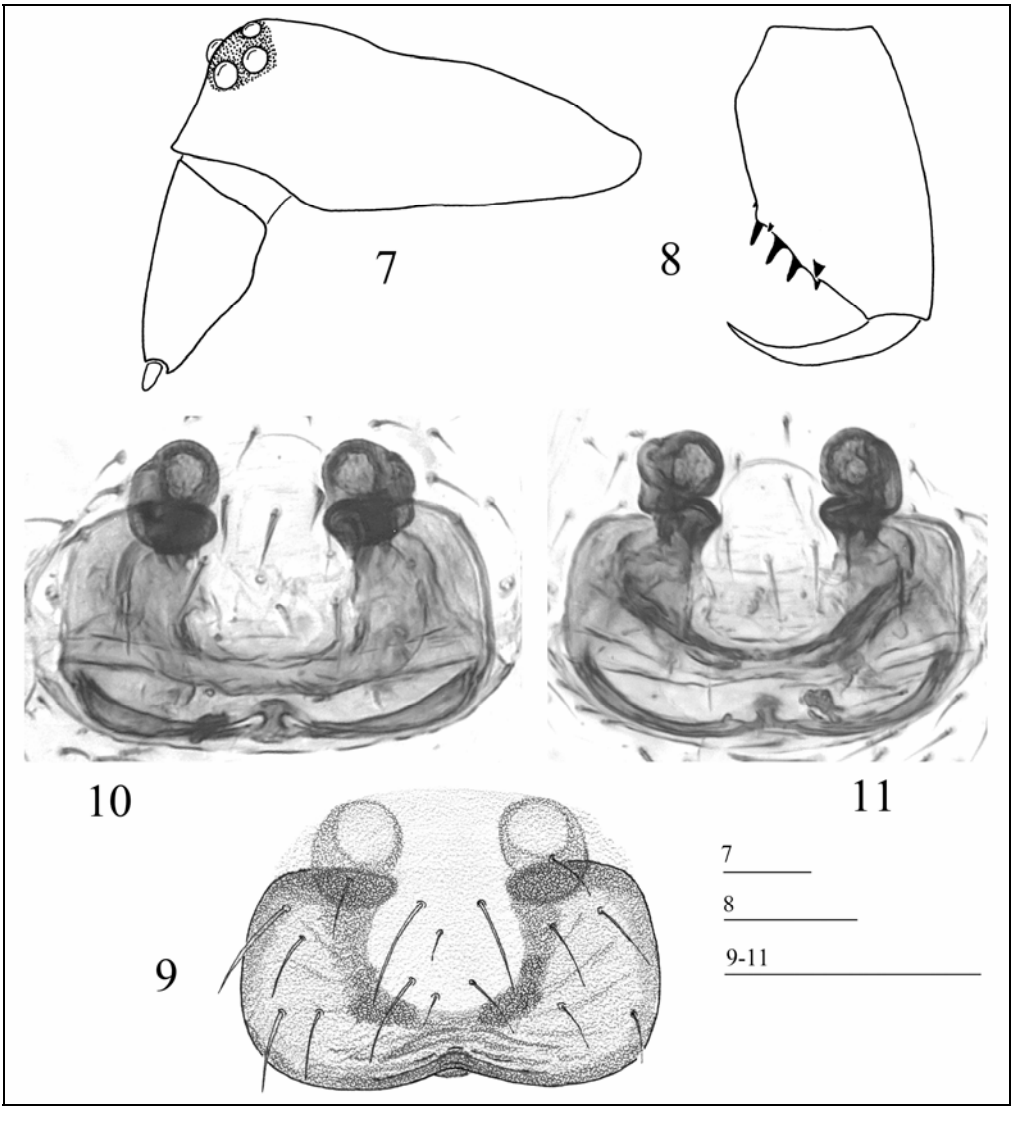
Mermessus fradeorum (Berland, 1932) Figures 12–19
Specimens examined: Al-Ain, 1♂, 1♀, 13.iii.2005, hand-collecting. Al-Ajban, 1♂, 28.xii.2005–29.i.2006,



Figures 1–6. *Erigone autumnalis* Emerton, 1882, male. 1: Right palp, dotted line - variation in patellar process; 2: Palpal patella and tibia, retrolateral view; 3: Palpal tibia; 4–6: Embolic division, various aspects.

MT & LT; 5♂, 26.ii–2.iv.2006, MT; 1♀, 9–16.iv.2006, MT. Dubai, Mushrif Park, 1♀, 6.iii.2005, hand-collecting. Sharjah Desert Park, 1♀, 28.v–4.vi.2007, LT.

Remarks: This species was earlier listed under *Eperigone* Crosby & Bishop, 1928, synonymized by Miller (2007).

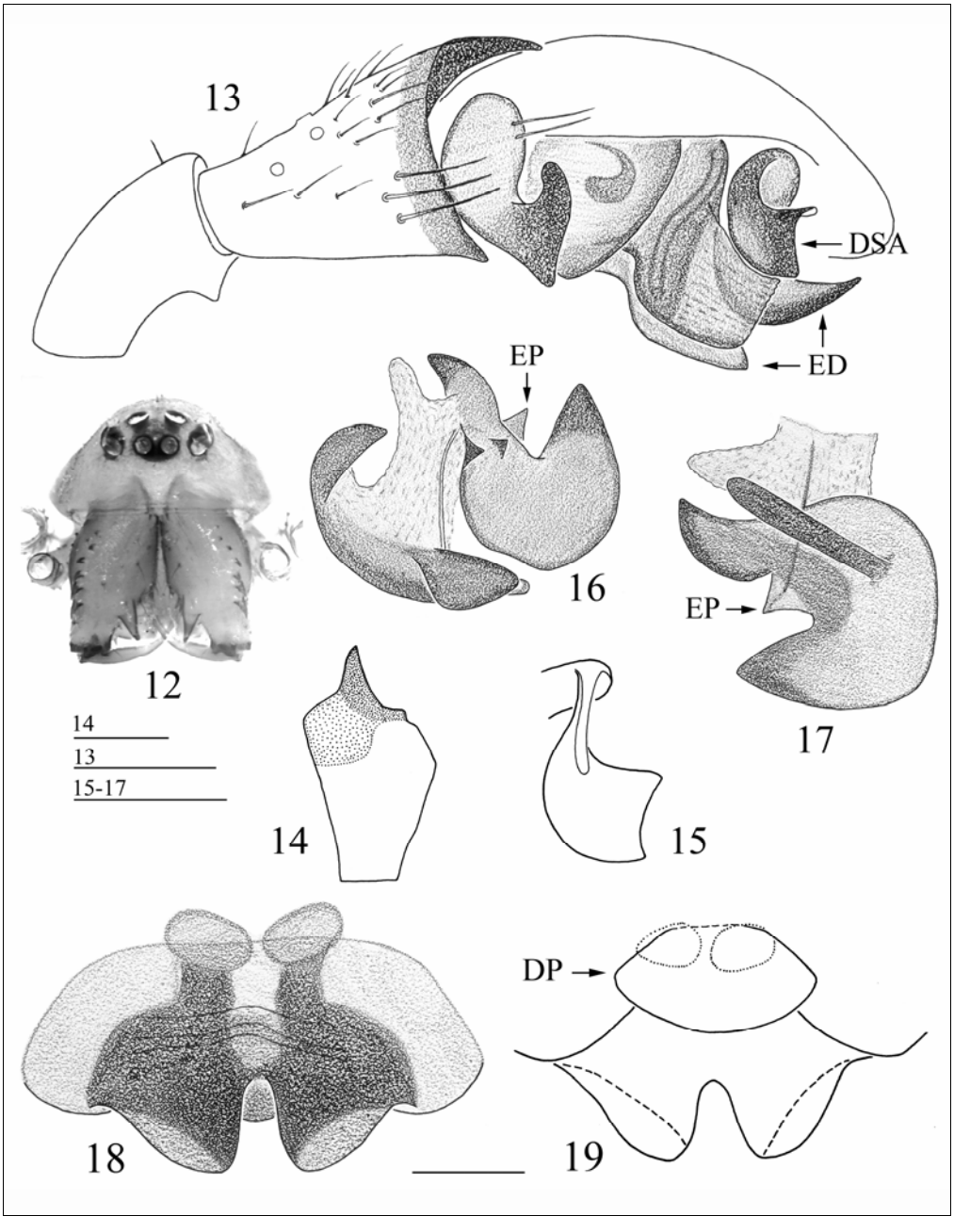


Figures 7–11. 7: *Erigone autumnalis* Emerton, 1882: Male, carapace; 8: Male, chelicera; 9: Female, epigyne, ventral view; 10, 11: Female, vulva, ventral and dorsal views, respectively.

Distribution: Nearctic, Azores, South Africa (Millidge, 1987), China (Gao et al., 1994) introduced to New Zealand and Polynesia (Beatty et al., 1991).

Subfamily **Micronetinae** Hull, 1920

Genus ***Agyneta*** Hull, 1911



Figures 12–19. *Mermessus fradeorum* (Berland, 1932). 12–17: Male. 12: Carapace, frontal view; 13: Right palp; 14: Palpal tibia; 15: Suprategular apophysis; 16, 17: Embolic division, various aspects; 18–19: Female, epigyne, 18: Ventral view, 19: Dorsal view.

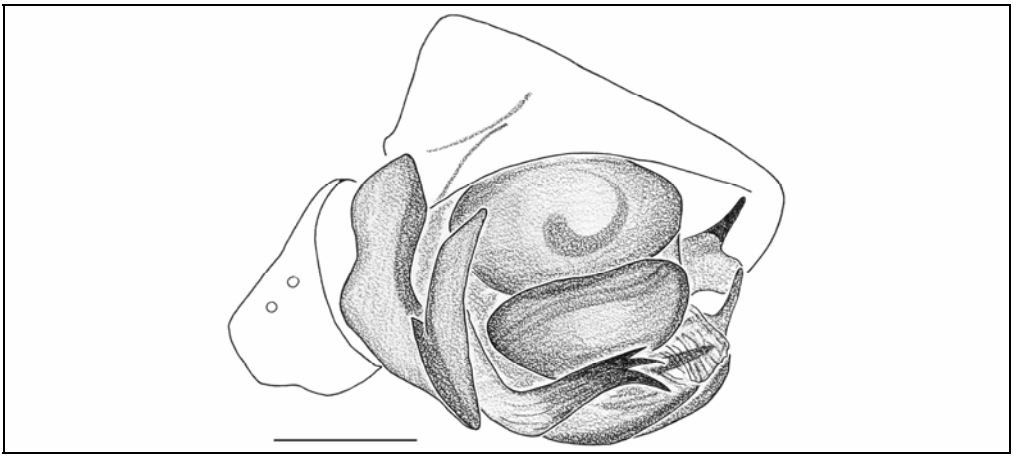


Figure 20. *Agyneta fuscipalpa* (C.L. Koch, 1836), male palp.

Type species: *Neriene decora* O. Pickard-Cambridge, 1871.

Agyneta fuscipalpa (C.L. Koch, 1836) Figure 20

Specimens examined: Fujairah, 1♂, 8–29.iv.2006, LT.

Distribution. Widespread in the southern Palaearctic from Europe and North Africa in the West to China in the East.

Agyneta paraprosecta Tanasevitch **nov. spec.** Figures 21–27

Specimens examined: Holotype: ♂, United Arab Emirates, Wadi Shawkah (25°08'N, 56°01'E), 1–7.iv.2007, water traps, leg. A. van Harten.

Diagnosis: The new species is diagnosed but the peculiar shape of the lamella characteristica.

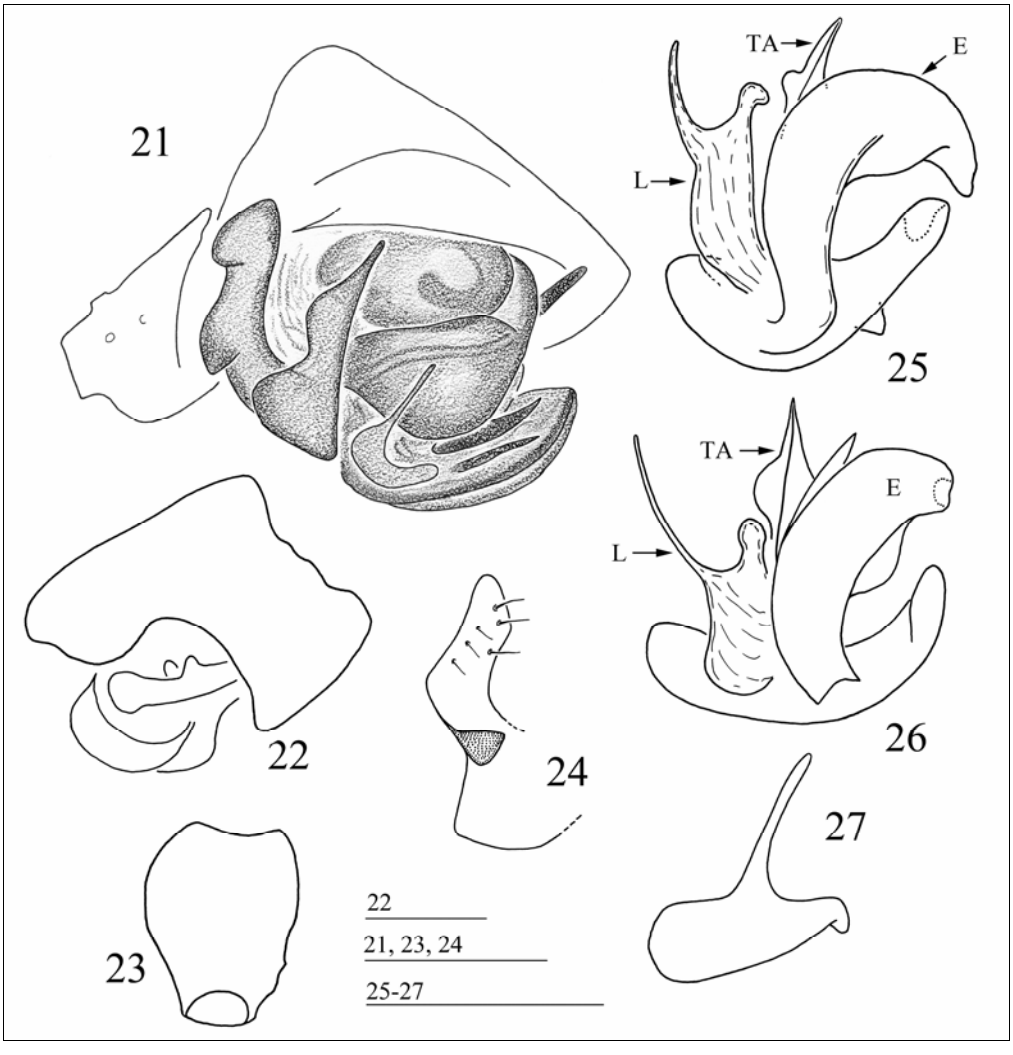
Description: Male. Total length 1.75. Carapace 0.75 long, 0.55 wide, grayish brown. Chelicerae 0.38 long, laterally with a row of small teeth. Legs yellow. Leg I 2.83 long (0.75+0.20+0.75+0.65+0.48), IV 2.66 long (0.75+0.15+0.65+0.68+0.43). Chaetotaxy: TiI-IV: 2-0-0-0; MtI-IV: 0-0-0-0. TmI - 0.39. Metatarsi IV without trichobothrium. Palp as in Figures 21–27. Abdomen 1.03 long, 0.95 wide, grey.

Female. Unknown.

Comparative material examined:

Agyneta prosectes (as *Meioneta*): SUDAN: Darfur Prov., Golol, west slope of Djibel Mauva (13°00’N 25°00’E), 1340 m a.s.l., 1♂ (RMCA #127525), xi.1964, leg. J.L. Cloudsley-Thompson. MALI: Lutana, 2♂ (RMCA #136838), viii-ix.1969, leg. G. Pierrard. KENIA: Mt. Kenya (00°10'S 37°20'E), 3150 m a.s.l., 1♂ (RMCA #150214), 31.vii.1975, leg. R. Bosmans; Mt. Kenya (00°10'S 37°20'E), 2650 m a.s.l., 2♂, 1♀ (RMCA #150216), 31.viii.1975, leg. R. Bosmans; SENEGAL: S of Richard Toll (16°20'N 15°30'W), savanna, 2♀ (RMCA #170672), 15.ix.1989, leg. J. Everts; same, 1♂ (RMCA #170673), 2.ix.1989, leg. J. Everts. NIGERIA: Ibadan, I.I.T.A. (07°14'N 03°30'E), cultivated plots, 8♂, 10♀ (RMCA #177476), 11-16.iv.1973, leg. A. Russell-Smith. ETHIOPIA: Addis Ababa, Shola, ILCA compound (09°02'N 38°42'E), in long grass in field, 2400 m a.s.l., 2♂ (RMCA #224455), 1.x.1980, leg. A. Russell-Smith.

Agyneta prosectoides (as *Meioneta*), CAMEROON: Mt. Manengouba (05°00'N 09°50'E), litter of solitary tree in grassland, 2000 m a.s.l., 1♂ (RMCA #163140), 24.iii.1983, leg. R. Bosmans; Bamboutos (05°44'N 10°04'E), pitfall, 2180 m a.s.l., 1♂ (RMCA #163141), 17.i.1983, leg. J. van Stalle.



Figures 21–27. *Agyneta paraprosecta* Tanasevitch nov. spec., male. 21, 22: Right palp, retrolateral and prolateral views, respectively; 23: Palpal tibia; 24: Paracymbium, distal part removed; 25, 26: Embolic division.

Taxonomic remarks: The new species is very similar to both Afrotropical *A. prosectes* occurs in Angola, Kenya, Sudan, South Africa, Cameroon, Ivory Coast, Mali and St. Helena Island, and *A. prosectoides* recorded from Nigeria and Cameroon (see Scharff, 1990), but differs well by the absence of a tooth on a base of the embolus and a shorter lower branch of the lamella characteristica.

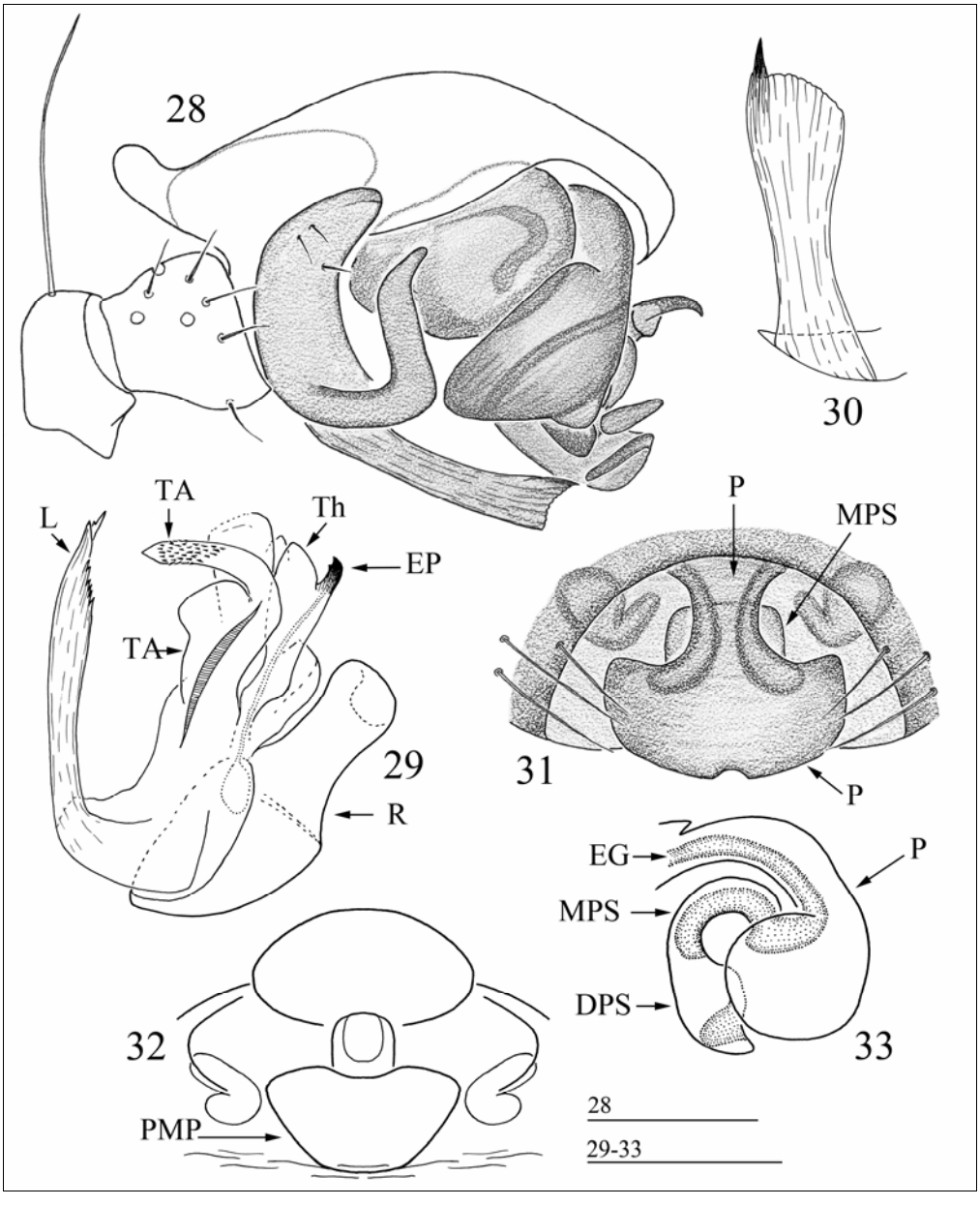
Etymology: The species name *paraprosecta* emphasizing that the new species is closely related to both *Agyneta prosectes* (Locket, 1968) and *A. prosectoides* (Locket & Russell-Smith, 1980); adjective.

Genus ***Mughiphantes*** Saaristo & Tanasevitch, 1999
Type species: *Linyphia mughi* Fickert, 1875.

Mughiphantes edentulus Tanasevitch **nov. spec.** Figures 28–33
Specimens examined: Holotype: ♂, United Arab Emirates, Wadi Maidaq (25°18'N 56°07'E), in yellow & white water traps, 7–14.iii.2006, leg. A. van Harten. Paratypes: 1♂, Wadi Maidaq, together with holotype; 1♀, 29.iii–10.iv.2006, WT.
Description. Male. Total length 1.75. Carapace 0.75 long, 0.65 wide, brown. Chelicerae 0.38 long. Legs pale yellow. Leg I 3.64 long (0.95+0.23+0.95+0.93+0.58), IV 3.29 long (0.88+0.20+0.83+0.88+0.50). Chaetotaxy: TiI: 2-1-1-0, II: 2-0-1-0, III-IV: 2-0-0-0; MtI-III: 1-0-0-0. TmI – 0.17. Metatarsi IV without trichobothrium. Palp (Figs 28–30): Cymbium with a posterodorsal, upwards slightly curved outgrowth. Paracymbium toothless. Lamella characteristica wide, slightly narrowed medially. Terminal apophysis large, complex, distally with a narrow and serrate outgrowth directed orthogonally to sclerite's main axis. Embolus with a large thumb. Fickert's gland oval. Abdomen 1.00 long, 0.70 wide, dorsal pattern present, but unclear as a result of damaged integuments in both males.
Female. Total length, 2.00. Carapace 0.78 long, 0.60 wide, pale brown. Chelicerae 0.31 long. Legs pale brown. Leg I 3.52 long (0.93+0.25+0.88+0.88+0.58), IV 2.41 long (0.75+0.20+0.45+0.58+0.43). Chaetotaxy as in male. TmI - 0.21. Abdomen partly damaged, 1.38 long, dorsally pale grey, with median stripe widened backward. Epigyne (Figs 31–33): Proscape anchor-shaped, middle part of scape half as narrow as distal part of proscape; lateral lobes reduced, stretcher short and wide.
Taxonomic remarks. The new species shows some similarities to *Lepthyphantes nigropictus* Bosmans, 1979, from Kenya, in male palp and epigyne conformation, but differs well by the shape of the lamella caracteristica and terminal apophysis.
Etymology: The specific name is derived from the toothless paracymbium; adjective.

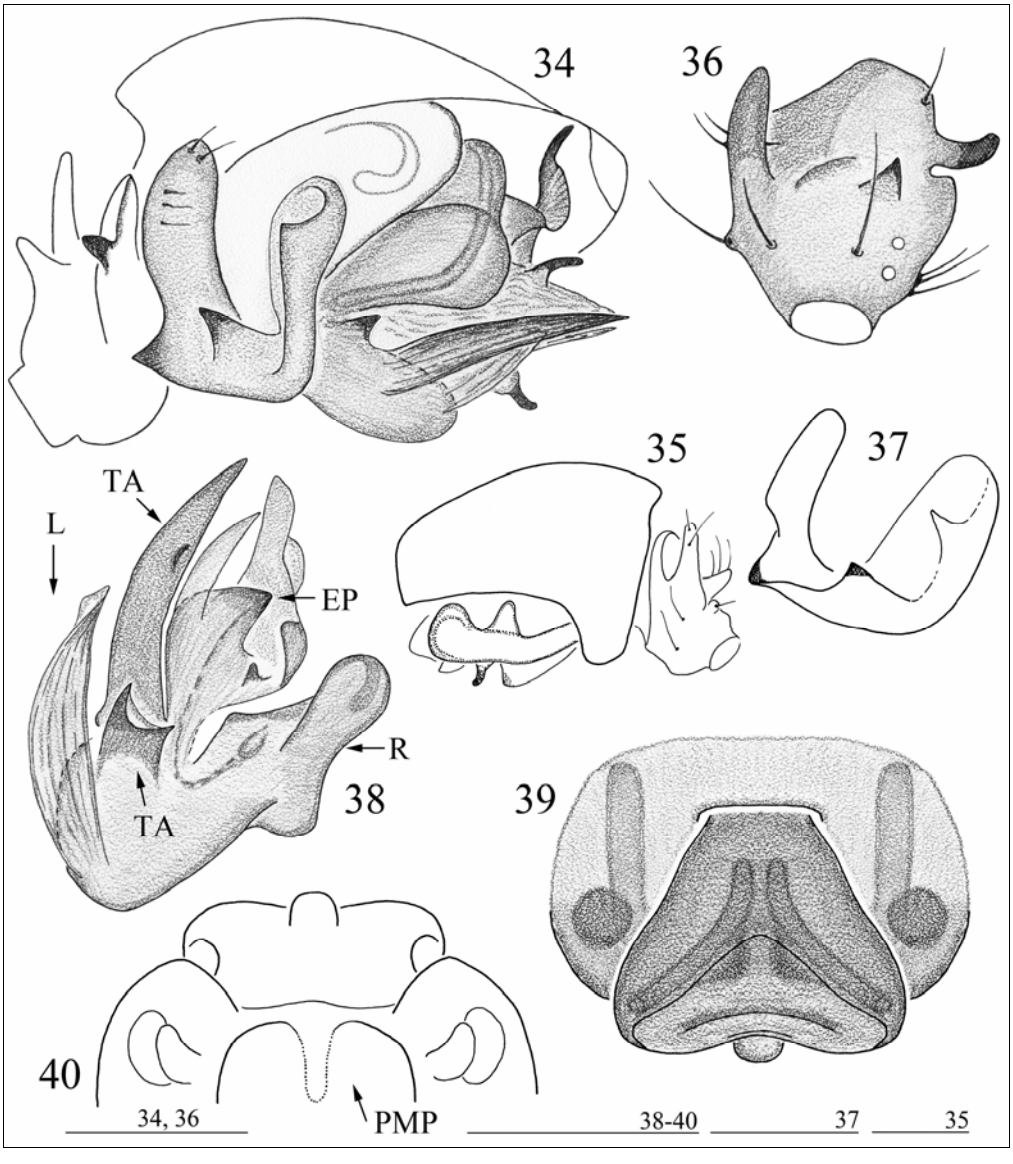
Genus ***Nesioneta*** Millidge, 1991
Type species: *Nesioneta lepida* Millidge, 1991.

Nesioneta arabica Tanasevitch **nov. spec.** Figures 34–40
Specimens examined: Holotype: ♂, United Arab Emirates, Hatta (24°49'N 56°07'E), 4–11.iv.2006, in light-trap, leg. A. van Harten. Paratypes: 1♂, 1♀, together with holotype. 1♂, al-Ajban, 9.xi–7.xii.2005, LT & MT. 1♂, Bithnah, 31.xii.2005–2.ii.2006, LT. 1♀, Fujairah, 20–27.v.2006, LT. 1♂, 4♀, Hatta, 19–28.iii.2006, LT; 4♀, 8–26.iv.2006, LT; 3♂, 1♀, 24–30.v.2006, LT. 1♂, Khor al-Khwair, 8–14.iii.2007, LT; 1♀, 15–22.iii.2007, LT. 1♂, Sharjah Desert Park, 25.ii–25.iii.2006, LT; 1♂, 21.i–17.ii.2008, PT. 2♀, 1♂, 2♀, Sharjah-Khor Kalba, near tunnel, 16–31.i.2006, LT. 1♂, Wadi Bih dam, 22.ii–1.iii.2007, LT; 1♂, 2♀, 15–22.iii.2007, LT; 1♂, 29.iii.2007, sweep-net, leg. F. Menzel; 1♂, 1♀, 2–4.iv.2009, WT. 2♀, Wadi Maidaq, 21.xii.2005–2.ii.2006, LT; 1♂, 2–16.ii.2006, LT; 1♀, 29.iii–10.iv.2006, LT; 2♂, 1♀, 27.iv–4.v.2006, LT. 1♀, Wadi Shawkah, 19–22.v.2007, WT. 2♂, 1♀, Wadi Wurayah farm, 17–24.iii.2009, MT; 2♂, 15–30.iii.2009, LT; 2♂, 2♀, 24–30.iii.2009, MT.
Diagnosis: The new species can be distinguished from other congeners by the peculiar shape of the male palpal tibia and lamella characteristics, as well as by the conformation of the vulva.
Description: Male. Total length 1.73. Carapace 0.75 long, 0.50 wide, unmodified brownish yellow. Chelicerae 0.35. long. Legs yellow. Leg I 2.76 long (0.73+0.18+0.75+0.65+0.45), IV 2.59 long (0.70+0.15+0.68+0.63+0.43). Chaetotaxy: TiI–IV: 2-0-0-0; all metatarsi unarmed. Metatarsi I–III each with a trichobothrium. TmI - 0.30. Palp (Figs 34–38): Palpal tibia with two long and one short process, latter pointed in dorsal view. Paracymbium with two tooth-like outgrowths, one on proximal, the other in middle part. Lamella caracteristica relatively



Figures 28–33. *Mughiphantes edentulus* Tanasevitch nov. spec. 28–30: Male. 28: Right palp; 29: Embolic division; 30: Lamella characteristica; 31–33: Female. 31, 32: Epigyne, ventral and dorsal views, respectively; 33: Scapus.

long, gradually narrowing distad. Embolus large and complex. Abdomen 0.93 long, 0.53, dorsally grey with a wide, white, transverse stripe and a pale area before spinnerets. In melanic samples, abdomen almost black, pale areas poorly visible.



Figures 34–40. *Nesioneta arabica* nov. spec. 34–38: Male. 34, 35: Right palp, retrolateral and prolateral views, respectively; 36: Palpal tibia; 37: Paracymbium; 38: Embolic division; 39–40: Female, epigyne, ventral and dorsal view, respectively.

Female. Total length 1.88. Carapace 0.75 long, 0.53 wide. Chelicerae 0.30 long. Leg I 2.51 long (0.70+0.20+0.63+0.55+0.43), IV 2.56 long (0.73+0.20+0.63+0.60+0.40). TmI - 0.26. Abdomen 1.15 long, 0.78 wide. Epigyne (Figs 39, 40): Proscape trapezoid. Body and leg colouration, as well as chaetotaxy as in male.

Variability: Abdominal pattern variable from pale to almost black in both sexes; epigyne colouration from yellow to dark brown.

Taxonomic remarks: The new species differs well from the other congeners by the long processes on the palpal tibia, as well as by the trapezoid proscape. The epigyne shows similarities to that of *Nesioneta muriensis* (Wunderlich, 1973) **comb. nov.** ex of *Agyneta* Hull, 1911, described from the female from Nepal by Wunderlich (1973).
Etymology: The species name is derived from the area whence it has been found; adjective.

CONCLUSION

At present, the linyphiid fauna of the United Arab Emirates is known to contain seven species. The country is located near or even at the border some authors draw between the Palaearctic and Oriental regions (e.g. Wallace, 1876), and some others between the Palaearctic and Afrotropical realms (e.g. Heptner, 1936). This fauna is indeed as if intermediate between these of the above three biogeographical regions: Palaearctic and Oriental relations are supported by one species each: *Agyneta fuscipalpa* and *Nesioneta arabica* nov. spec, respectively; Afrotropical relations are demonstrated by two species: *Mughiphantes edentulus* nov. spec. and *Agyneta paraprosecta* nov. spec.

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