

The first Record of the Family Menthidae Chamberlin (Arachnida: Pseudoscorpiones) from Iran

Mahrad Nassirkhani^{1,3}, Reza Vafai Shoushtari²

^{1,2} Entomology Department, Faculty of Agriculture and Natural Resources,
Islamic Azad University, Arak branch, Arak
greenartificialturfgrass@gmail.com

Abstract: *New locality record is presented for Paramenthus nanus Mahnert, 2007. Also, the features of P. nanus e.g. the pedipalp, the legs I and IV, the chelicera, the carapace and the internal male genitalia are illustrated for the first time based on a male from Iran.*

Keywords: *new fauna, taxonomy, faunistic, distribution, Iran, the Middle East.*

1. INTRODUCTION

A total of eleven pseudoscorpion families have been previously reported from Iran [1,2,3]. *Paramenthus nanus* Mahnert [4] belonging to the family Menthidae Chamberlin [5] which was originally described from Yemen on the basis of four female types by Mahnert [4] is a new country record of the family from Iran.

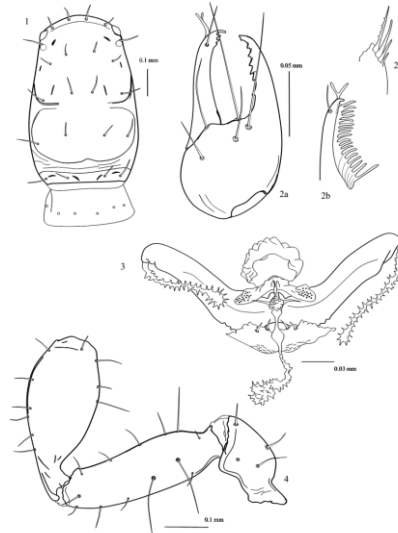
The family Menthidae which is one of the smallest pseudoscorpion families is commonly found in xeric habitats and contains five genera, only two of which, *Paramenthus* Beier [6] and *Pseudomenthus* Mahnert [4] occur in Asia especially in the Middle East and Socotra [1]. The presence of a specialized articulation between coxae II and III (Fig. 6), the absence of a venom apparatus in the movable chelal finger (Fig. 5a) and the presence of 10 or 11 trichobothria on the chelal hand and fixed chelal finger of adults (e.g. Fig. 5a) are the key characters used to recognize the family [7].

Most genera of the family Menthidae have the rallum with four blades, two pairs of eyes, long arolia, and the same trichobothrial pattern, e.g. the trichobothrium *c* is located close to *d* [4]. The genus *Paramenthus* Beier [6] which contains only two species can be characterized by the length of the arolia which are slightly longer or approximately equally in size with claws, the trichobothrial pattern e.g. the position of trichobothrium *it* situated slightly proximal to *est*, and the loss of spine-like setae on all metatarsi and tarsi [4,6]. The present study was designed to describe a male of *P. nanus* for the first time, and also provide well-illustrations of the species.

2. MATERIALS AND METHODS

Only one male specimen belonging to the family Menthidae was extracted from *Platanus* leaf litter that had accumulated on a mountain ledge by sieving. The specimen was preserved in 75% Ethanol, cleared by 60% lactic acid, and mounted permanently in Swan's fluid on a glass microscope slide covered with a coverslip. The specimen was studied by an Olympus BH-2 compound microscope, measured with an ocular graticule and illustrated by a drawing tube attached to the microscope. Chamberlin [8], Harvey [7], Judson [9], and Harvey et al. [10] have been followed for terminology and mensuration in this case report. The examined specimen is lodged in the collection of the Acarology Laboratory, Islamic Azad University of Arak (IAUA), Iran.

The following trichobothrial abbreviations were employed: *eb* = external basal; *esb* = external sub-basal; *est* = external sub-terminal; *et* = external terminal; *ib* = internal basal; *isb* = internal sub-basal; *ist* = internal sub-terminal; *it* = internal terminal; *t* = terminal; *st* = sub-terminal; *sb* = sub-basal; *b* = basal. In addition, the following abbreviations are used in the text: L = length; W = width; D = depth.



Figures 1-4. *Paramenthus nanus* Mahnert 2007, ♂: 1. carapace and tergite I, dorsal view; 2a. chelicera (serrula omitted), dorsal view; 2b. serrula exterior, retrolateral dorsal view; 2c. rallum; 3. genitalia; 4. basal segments of pedipalp, dorsal view

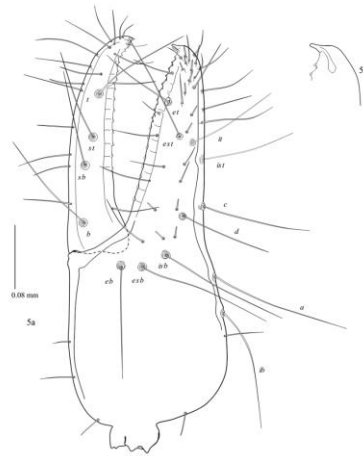
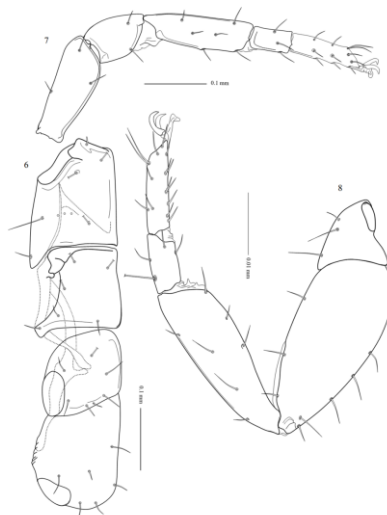


Figure 5. *Paramenthus nanus* Mahnert 2007, ♂: 5a. left chela, lateral view; 5b. tip of fixed chelal finger (showing position of nodus ramosus), lateral view



Figures 6-8. *Paramenthus nanus* Mahnert 2007, ♂: 6. right coxae (showing chaetotaxy and specialized articulation); 7. leg I (trochanter omitted); 8. leg IV (trochanter omitted)

Family Menthidae Chamberlin [5]

Genus *Paramenthus* Beier [6]

Paramenthus nanus Mahnert [4]

Paramenthus nanus Mahnert, 2007: 302-303, figs 85-88.

3. MATERIAL EXAMINED

Iran: Fars Province: 1♂, Stahban [29°12'66"N, 54°04'22"E, altitude 1760 m], *Platanus* leaf litter, mountain ledge, July 7 2014, M. Nassirkhani (IAUA)

4. DESCRIPTION

Male (Figs 1-8)

Body: long (1.75 mm) and slender, abdomen slightly wider than carapace.

Carapace: sub-rectangular; reddish brown, lateral sides, peripheral margins of anterior eyes and sclerotized portion of posterior margin darker in color than anterior margin; entirely smooth; clearly longer than width, L/W 1.62; with 2 pair eyes, anterior corneate eyes large and close to anterior margin, posterior eyes small, spot-like weakly corneate (fig. 1); transverse furrows present, anterior furrow less distinct than posterior one, posterior furrow straight (Fig. 1); chaetotaxy 4:2:4:4:4:4; setae simple and acute; with 10 lyrifissures, anterior lyrifissures located between eyes, one pair situated in distal third of carapace, one pair located medially and 2 posterior pairs located laterally and medially in dark portion of posterior margin.

Tergites: lightly sclerotized and not granulate; yellowish brown, lighter in color than carapace; X and XI darker than anterior tergites; without median suture line; setae simple, thin and acute; chaetotaxy: 6:6:6:6:6:6:6:6:1T1T2T1T1:T1TT1T:2.

Sternites: poorly sclerotized, smooth and without median suture line; whitish yellow; genitalia shown in Fig. 3; setae simple, acute and uniseriate; sternite X with four long tactile setae arranged as 1T1T2T1T1; anterior trachea stouter than posterior trachea, anterior trachea normally expanded; chaetotaxy: 10:(0)8(0):(1)8(1):8:8:8:8:8:1T1T2T1T1:T1T2T1T:2.

Pleural membrane: longitudinally striate.

Chelicera: brown, distinctly lighter in color than carapace; galeal seta short and situated near tip of finger; galea with 2 long apical rami (Figs 2a, 2b); hand with 5 setae, all acuminate (Fig. 2a); rallum with 4 blades, distal blade longest and widest with short lateral denticulations (Fig.2c); serrula exterior with 18 blades (Fig. 2b); fixed finger with 7 teeth, terminal teeth short and acute, others larger and elongate; movable finger with one curved apical tooth and 3 subapical teeth (Fig. 2a).

Pedipalps: trochanter, femur and patella brown, chela reddish brown; entirely smooth; setae simple, acute and long; trochanter without dorsal tubercle; femur with 2 long setae without enlarged alveoli situated on retrolateral face of basal half (Fig. 4); a long seta without enlarged alveolus situated basally on prolateral face of femur (Fig. 4); femur with distinct pedicel, L/W 3.10; patella with distinctly curved and short pedicel, prolateral margin with a long seta without enlarge alveolus, with 5 lyrifissures (Fig. 4), L/W 2.30; chela with distinct pedicel; chela (with pedicel) L/W 2.56; chela (without pedicel) L/W 2.45; hand (with pedicel) L/W 1.30; movable finger longer than hand (with pedicel); movable finger 1.11 times longer than hand (with pedicel); fixed finger with 11 and movable finger with 4 trichobothria (Fig. 5a); fixed finger with trichobothrium *et* situated on distal third of finger, *est* slightly distal to *it*, *isb* situated on retrolateral face of finger, *it* and *ist* situated submedially, *c* situated at approximately same level as *d*, *isb* closer to *esb* than to *d*, *a* distinctly closer to *ib* than to *c*, *ib* situated medially on hand; movable finger with trichobothrium *t* situated in distal half of finger, *sb* clearly closer to *st* than to *b* and slightly closer to *b* than to *t*; retrolateral face of fixed finger with 13 lanceolates, 7 situated distal to *et*; fixed finger with 17 teeth, movable finger with 13 spaced teeth (Fig. 5a); venom duct presents in fixed finger, clearly short and nodusramosus situated very close to tip of finger (Fig. 5b); movable finger without venom apparatus.

Legs: yellowish brown; clearly lighter in color than carapace; coxal setae arranged: 5 (+1microseta situated apically, and 3 alveoli of the setae which fallen):6:6:6; junction between femur and patella I not broad and is apparently mobile (Fig. 7); femur I distinctly longer than patella I; all segments not granulate and entirely smooth; all setae simple and acute; claws symmetrical, smooth and short; arolia

simple and approximately with the same length as claws; Leg I: femur L/D 2.33; patella L/D 1.50; femur L/ patella L 1.55; tibia L/D 3.75; metatarsus distinctly shorter than tarsus, L/D 1.66; tarsus L/D 5.00; Leg IV: femur L/D 1.22; patella L/D 2.27; femur + patella L/D 2.90; tibia L/D 3.43; metatarsus shorter than tarsus, with one tactile seta situated basally (Fig. 8), L/D 2.00; tarsus with 2 rows of thick setae (not spiniform), L/D 4.33.

Dimensions (L/W, in mm): *Carapace*: 0.47/0.29. *Pedipalp*: trochanter 0.19/0.09; femur 0.31/0.10; patella 0.31/0.13; chela (with pedicel) 0.53/0.20; chela (without pedicel) L. 0.49; hand (with pedicel) L.0.26; movable finger L. 0.29. (L/D, in mm): *Leg I*: trochanter 0.07/0.06; femur 0.14/0.06; patella 0.09/0.06; tibia 0.15/0.04; metatarsus 0.05/0.03; tarsus 0.10/0.025. *Leg IV*: trochanter 0.10/0.07; femur 0.11/0.09; patella 0.25/0.11; femur + patella 0.32; tibia 0.24/0.07; metatarsus 0.08/0.04; tarsus 0.13/0.03

5. RESULTS AND DISCUSSION

The female types of *Paramenthus nanus* Mahnert [4] were collected from Socotra Island, from a Wadi with *Ficus* pasture. The newly collected specimen from Iran was found in *Platanus* litter. The only discordant morphometric character is the length of the movable chelal finger, which is 0.24-0.25 mm for the female types and 0.29 mm for the male from Iran. Also, the lateral sides of the carapace of the types are indistinctly granulated [4], while it is entirely smooth in the newly collected specimen from Iran. The tergal and sternal chaetotaxy is the other difference between the types and the specimen from Iran, e.g. there are two tactile setae on the tergite and sternite XI of the types [4]. The tactile setal numbers are four on each for the male from Iran. The trichobothrial pattern is the most obvious difference between the materials. For example, the trichobothrium *est* is situated closer to *et* than to *it* in the fixed chelal finger and trichobothrium *sb* is located in the halfway between *b* and *t* in the movable chelal finger of the types. On the fixed chelal finger of the newly collected specimen from Iran, the trichobothrium *est* is located clearly closer to *it* than to *et*. Also, in the movable chelal finger, the trichobothrium *sb* is located slightly closer to *b* than to *t*. These differences are considered to be insufficient for recognizing a new species. Therefore, the specimen is attributed to *Paramenthus nanus*.

Paramenthus shulovi Beier [6] which was originally described from Israel by Beier [6] can be easily separated from *Paramenthus nanus* by the combination of the following characters: the absence of the anterior furrow; the presence of three blades in the rallum and the morphometric characters, e.g. the length of the chelal hand (without pedicel) is 0.28 mm and the chelal (with pedicel) ratio is 3.00x for the female type [4,6].

6. CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interest and have not a financial relationship with the organization that sponsored the research.

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