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SOME MORPHOLOGICAL ASPECTS OF THE SPECIES *MEROPOECUS MEROPIS* (DENNY, 1842) (PHTHIRAPTERA: ISCHNOCERA)

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Abstract. Several morphological aspects of the male and female of *Meropoecus meropis* (Denny, 1842) are presented, as the general habitus, morphometrical data, as well the detailed morphology of the following structures: preantennal region of the head, anterior dorsal cephalic plate (clypeal signature), abdominal pleural plates, posterior extremity of the abdomen, copulatory organ and female genital region. All these morphological aspects have a taxonomical importance for establishing the position of this species within the genus, as well the genus phylogenetic relations.

Résumé. On présente plusieurs aspects morphologiques chez le mâle et la femelle de *Meropoecus meropis* (Denny, 1842): l'habitus général, des données morphométriques, ainsi que la morphologie détaillée des structures suivantes: la région préantennale de la tête, la plaque céphalique dorsale antérieure (signature clypéale), les plaques pleurales abdominales, l'extrémité postérieure de l'abdomen, l'appareil copulateur et la région génitale de la femelle. Tous ces aspects morphologiques ont une importance taxonomique pour établir la position de cette espèce dans le genre, ainsi que les relations phylogénétiques du genre.

Key words: Phthiraptera, Ischnocera, *Meropoecus meropis*, morphology, morphometry.

INTRODUCTION

Since Denny (1842) described this species, a few references were made on the morphology and morphometry of this species: Eichler (1940), Conci (1941) and Emerson & Elbel (1956).

In fact, firstly, this species was described as *Docophorus bifrons* by Nitzsch, before 1837, but it was published posthumously not before 1866. In 1842, after Nitzsch's description and independently, Denny also described this species and named it *Docophorus meropis*. The name given by Denny is validated (Hopkins & Clay, 1952; Price et al., 2003) because he succeeded to publish it before Nitsch. Both authors mention *Merops apiaster* as the typical host for this species. Their morphological descriptions deal more with the general habitus of the male and female body.

In 1940, Eichler described the genus *Meropoecus*, assuming as a basis the description of *Docophorus meropis* Denny, 1842 as a type species. This genus was validated (Hopkins & Clay, op. cit.; Price et al., op. cit.), now the accepted name of this species, studied here, being *Meropoecus meropis*. From 1940 till now, other 6 species of the genus *Meropoecus* were described, for the time being a total of 7 species (Price et al., op. cit.) being described and validated, all parasites of Meropidae.

English translation by Mihaela Barcan Achim.

Typical host of this species is *Merops apiaster*, but it was also mentioned on other Meropidae species, as it follows: Blagoveshtchensky (1951) recorded this species on *Merops persicus persicus*, and Price et al. (2003) mentioned *Merops superciliosus* among the host of this species.

Eichler (1941) included this genus among genera *Strigiphilus*, *Craspedorrhynchus*, *Aegypoecus* and *Cuculoecus* of the subfamily Strigiphilinae (Family Philopteridae) but without explaining clearly the criteria he used in this classification. For this reason systematical studies on these genera have to made. Smith (2001) made a minute cladistic study on the systematics of the suborder Ischnocera, but, from the above-mentioned genera, he studies only *Strigiphilus* and *Craspedorrhynchus*. The results of his study really confirmed the strong phylogenetic relationship between these two genera.

All morphological and morphometrical aspects, pointed out in this paper, have a taxonomical importance in establishing both the position of this species within the genus, and the relations of the genus *Meropoecus* with other related genera (*Strigiphilus*, *Craspedorrhynchus*, *Aegypoecus* and *Cuculoecus*).

MATERIAL AND METHOD

The biological material which lay at the bottom of our study was collected by Dr. Angela Petrescu, ornithologist of "Grigore Antipa" National Museum of Natural History (Bucharest), in the month of June of the years 1998 and 1999, from 47 adults of *Merops apiaster,* caught in the outskirts of the localities Poiana, Ciuperceni (Teleorman County) and Furnica (Constanța County) (Adam, 2003). 194 chewing louse specimens were collected and identified by me as belonging to the species *Meropoecus meropis*. From the 194 specimens, 70 are females, 94 males and 30 nymphs. For the identification, I mounted a part of the material in Canada balm, following the classical technics. The rest of the material is preserved in 80% alcohol.

For the identification of the species I used the papers signed by Bechet (1962), Złotorzycka (1977) and Séguy (1944). The scientifical name of this species is according to the list of the chewing lice published by Price et al. (op. cit.).

The morphological studies which I made deal with only the adults of this species.

The drawings were made using the "Olympus" microscope with a projection system of the images by superposition, with a 6.7X ocular and 4X, 10X and 20X objectives. For these drawings I used a part of the material mounted in Canada balm: an adult male (dimension: 1.85 mm) and an adult female (dimension: 2.34 mm). Later on, the features illustrated by these drawings were also verified in other specimens.

RESULTS AND DISCUSSIONS

After the measurements made in the studied specimens I can assert that *Meropoecus meropis* is a species with dimensions between 2.02-2.34 mm in females and 1.7-1.85 in males. As regards the general habitus of the body it can be observed in figure 1 (A, B) that it is widened and oval-shaped. Making a ratio beween the length and the width of the body, it can be remarked that the male has a narrower body than in female (in female, the body length/body width = 2.09, while in male, this ratio is of 2.27).

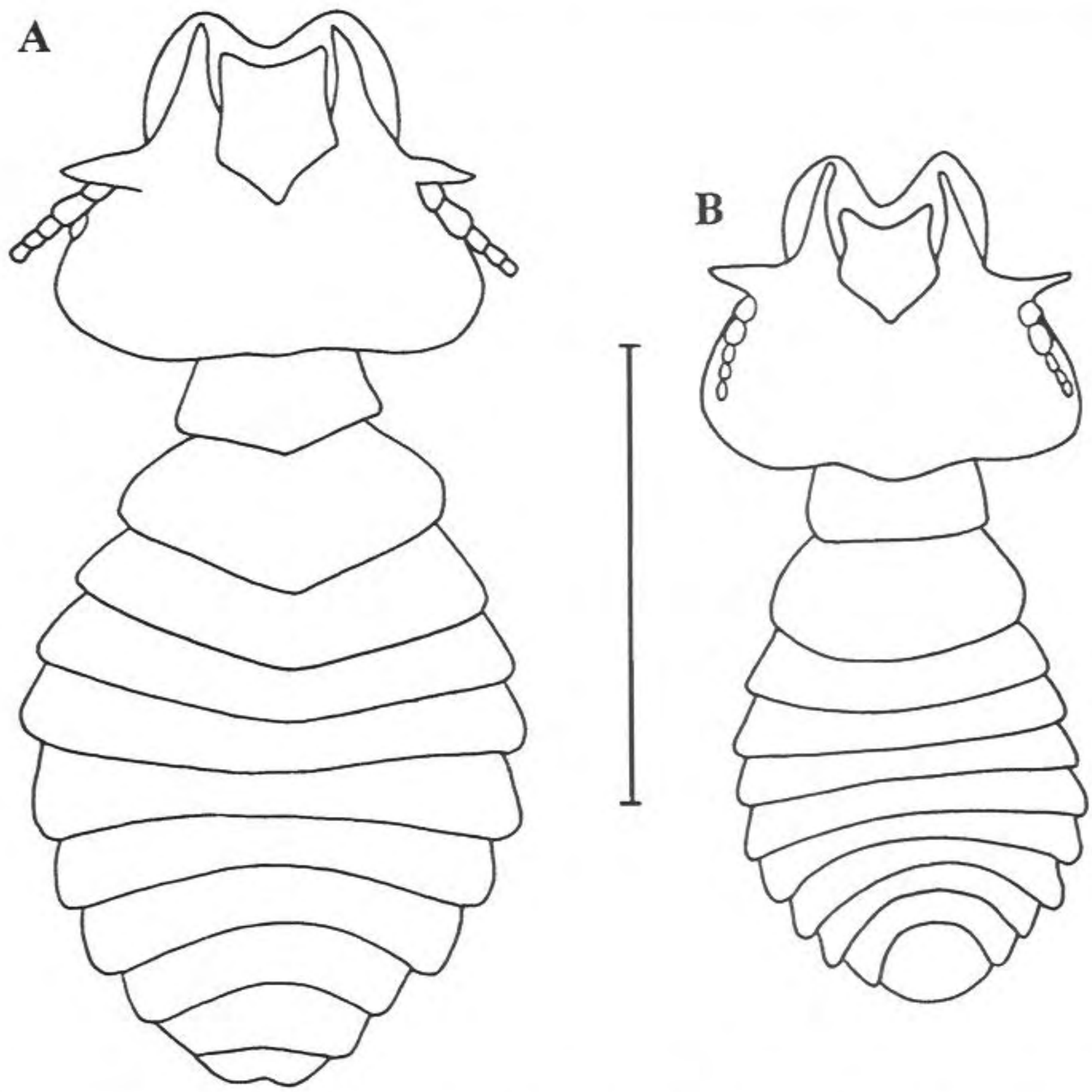

Fig. 1 – *Meropoecus meropis* (Denny, 1842). General habitus of the body (dorsal view): A, female; B, male. Scale: 1 mm.

Head is quadrangular, trapezoidal shaped. The head width is larger than its length both in male and in female, but more obvious in female (in female, head width/head length = 1.24, while in male this ratio is of 1.14).

Preantennal region (Fig. 2). Anterior margin of the head is concave, the two antero-lateral angles of the head being rounded. Hyaline margin is well pointed out and anteriorly widened, also extending till near the conus in the antero-lateral sides. Marginal carina is medianly interrupted, but laterally it is continuous like a band, parallel with the hyaline margin, ending near the antennal socket by a thickening named preantennal nodus. Latero-ventrally the marginal carina is like a band well pigmented and sclerotized, fusing with the ventral carina at this level. Dorsal anterior plate (Fig. 3 A) is well developed, extending till the antennal sockets and it is relatively pentagonal shaped with all sides concave. This aspect is more obvious in the anterior side. Dorsal preantennal suture is well underlined along the sides of the dorsal anterior plate and the inner side of the marginal carina. As regards the chetotaxy of the preantennal region I used Clay's terminology (1951). Dorsally, a short and posteriorly recurved anterior seta is present on each side of the head, at the

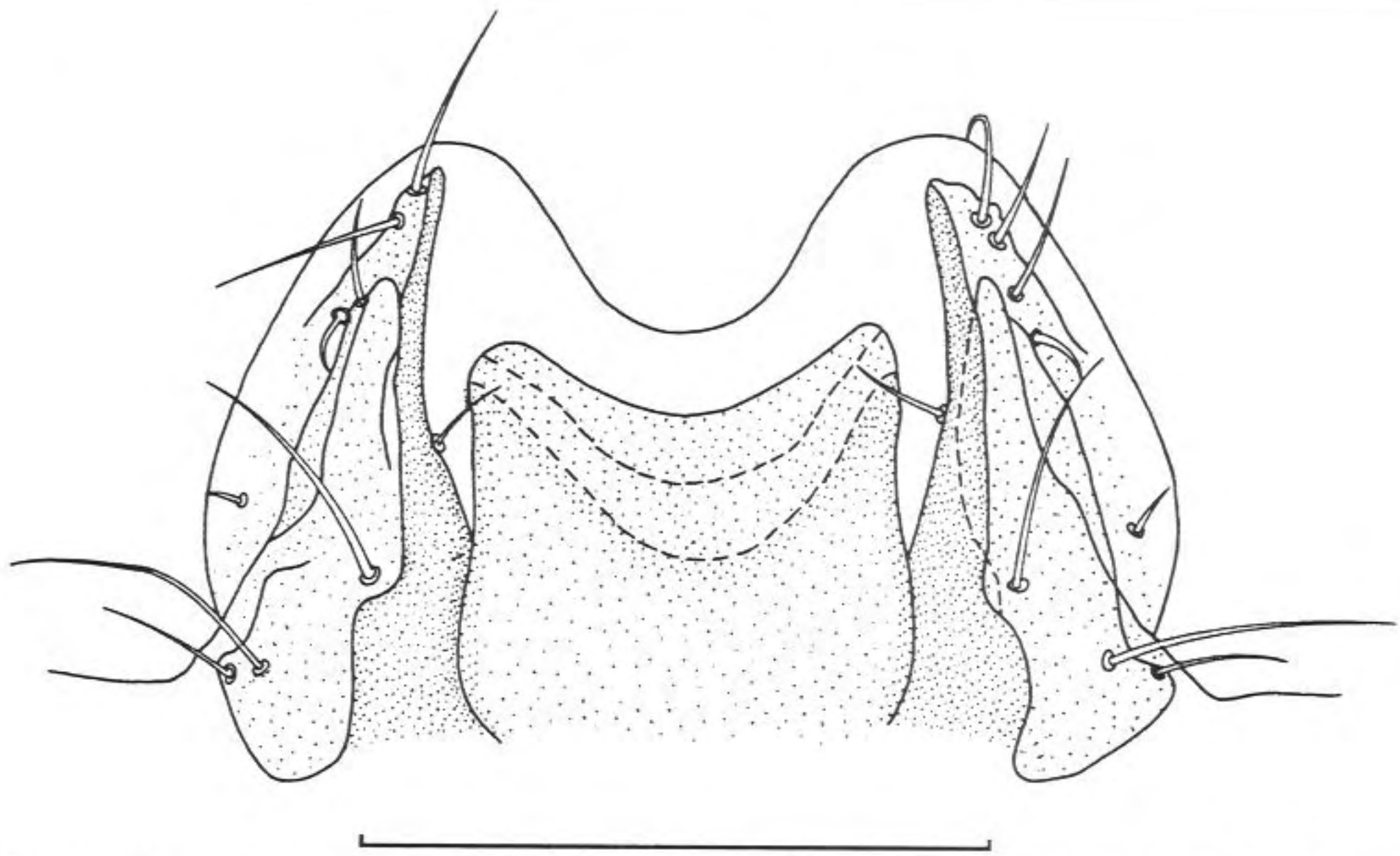

Fig. 2 – *Meropoecus meropis* (Denny, 1842). Preantennal region of the head in male. Scale: 0.3 mm.

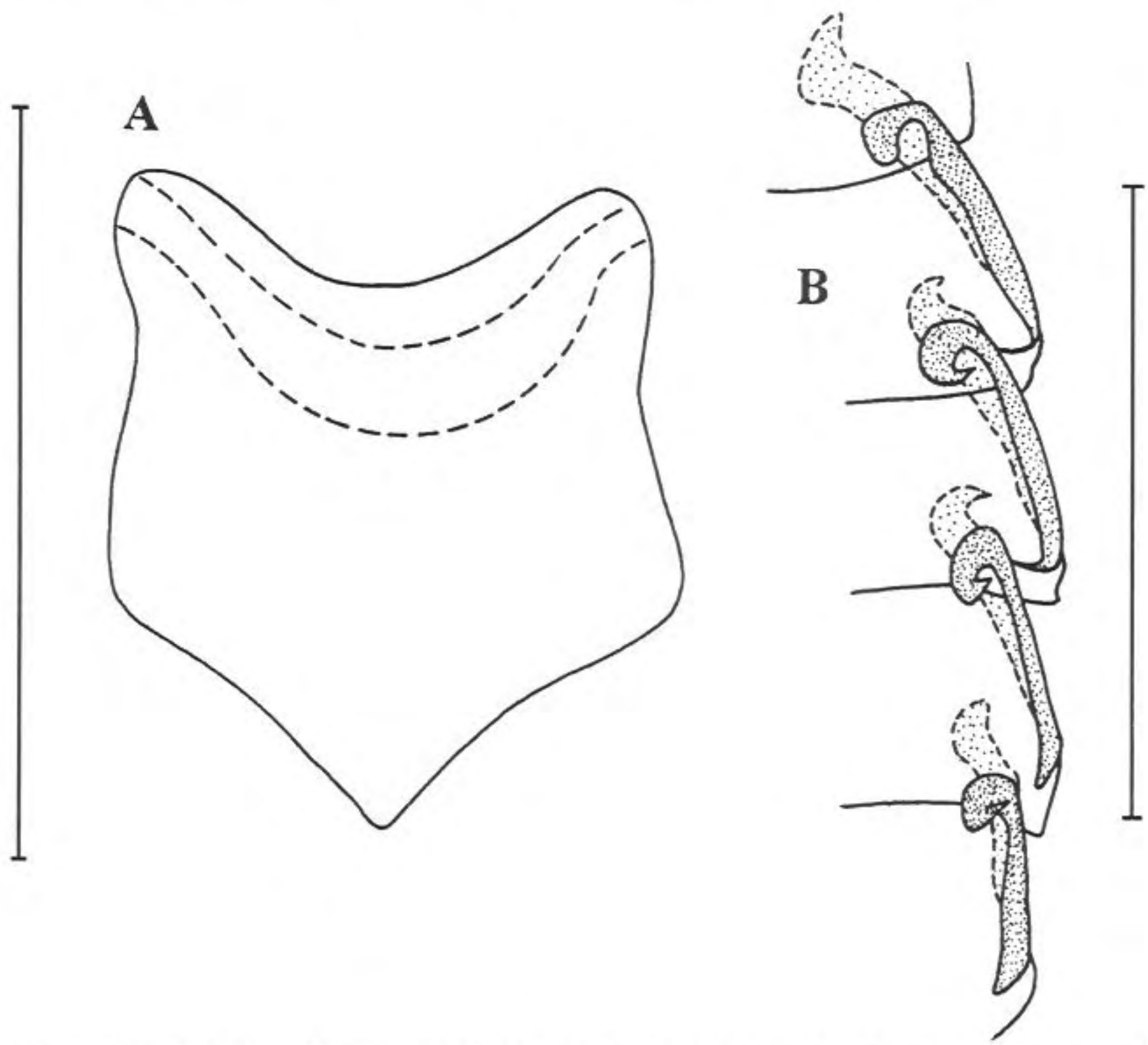

Fig. 3 – *Meropoecus meropis* (Denny, 1842). A, anterior dorsal cephalic plate in male (Scale: 0.3 mm); B, pleural abdominal plates (III-VI) in female (Scale: 0.5 mm).

level of the marginal carina. Ventrally, on each side of the head, also at the level of the marginal carina there are 3 anterior setae, 2 of them longer and placed in the antero-lateral angles, and the 3rd one, short and laterally inserted near the conus. Also ventrally, there are 2 submarginal ventral setae, shorter and anteriorly displayed, as well 3 anterior ventral setae, 2 of them longer and 1 short, near the conus. Conus is much elongated both in female and in male, exceeding the length of the first antennal article. Antennae are filiform, short and do not display sexual dimorphism (Fig. 1 A, B). The pedicel is longer than the scape and the flagellomeres. The 3 flagellomeres are short and equal in size.

Postantennal region. Temples are rounded, and the temporal-posterior margin is straight, with a slightly median evagination, more obvious in male (Fig. 1 A, B). Eyes are present, well visible, convex and with a short ocular seta each. The bands of the temporal carina are less developed than in other related genera, yet visible. They begin from the median side of the posterior temporal margin and go divergently to the preantennal nodus. Ventrally there is the gular plate, in the median area, near the posterior occipital margin, well pointed out and rhomboidal. Five temporal marginal setae are present, four of them short and one, long.

Thorax. Both in female and in male prothorax is twice narrower than the head, the ratio head width/prothorax width being of the value 2. In male, prothorax is rectangular, with a straight posterior margin, and in female it is pentagonal (Fig. 1 A, B). Pterothorax is wider than the prothorax, both in male and female. In male, pterothorax is quadrilateral and with convex lateral and posterior margins, and in female, it is pentagonal, with rounded postero-lateral angles (Fig. 1 A, B). On the posterior margin of the pterothorax, both in male and in female, numerous long and dense setae are inserted. The legs are short and equal in size.

Abdomen. It is oval, in male being longer than wide (abdomen length/ abdomen width = 1.13), while in female the length is almost equal with the width (abdomen length/abdomen width = 1.09) (Fig. 1 A, B). Posterior dorsal margin of the first distinct abdominal segment, which in fact is the abdominal segment II (Smith, 2001), is slightly convex in male, while in female it is strongly convex, getting even an angular aspect, and the formed angle in the medio-dorsal side penetrates the antero-dorsal side of the abdominal segment III. In female, the same aspect can be observed in the postero-dorsal margin of the abdominal segment III. The latero-posterior angles of the abdominal segments are prominent and give a scalariform aspect. On the postero-dorsal margin of each abdominal segment numerous long and dense setae are inserted. Abdominal pleurites are strongly pigmented (brown-reddish) and sclerotized, penetrating in the anterior segments (Fig. 3 B). Tergopleurites II-VIII have a triangular form and they are not fused medianly. Their pigmentation is weaker than that of the pleurites. In male, tergopleurites are extended more towards the median area of the abdominal segments than in female. The 8th visible abdominal segment represents, in fact, the fused segments IX and X (Smith, op. cit.). Tergopleurites from the level of this segment are completely medianly fused. Sternites II-VI are well-developed and distinct, and sternites VII, VIII and IX+X are fused, forming the genital plate.

Genital segments (IX+X, XI) (Figs 4, 5). Both in female and male the delimitation between the segments IX+X and XI can be easily observed dorsally. On the posterior dorsal margin of the segment IX+X, 7 pairs of setae are inserted in female (2 shorter and 5 longer) with a symetrical displaying in comparison with the median line (Fig. 4 A). Ventrally, the delimitation between the segments IX+X and

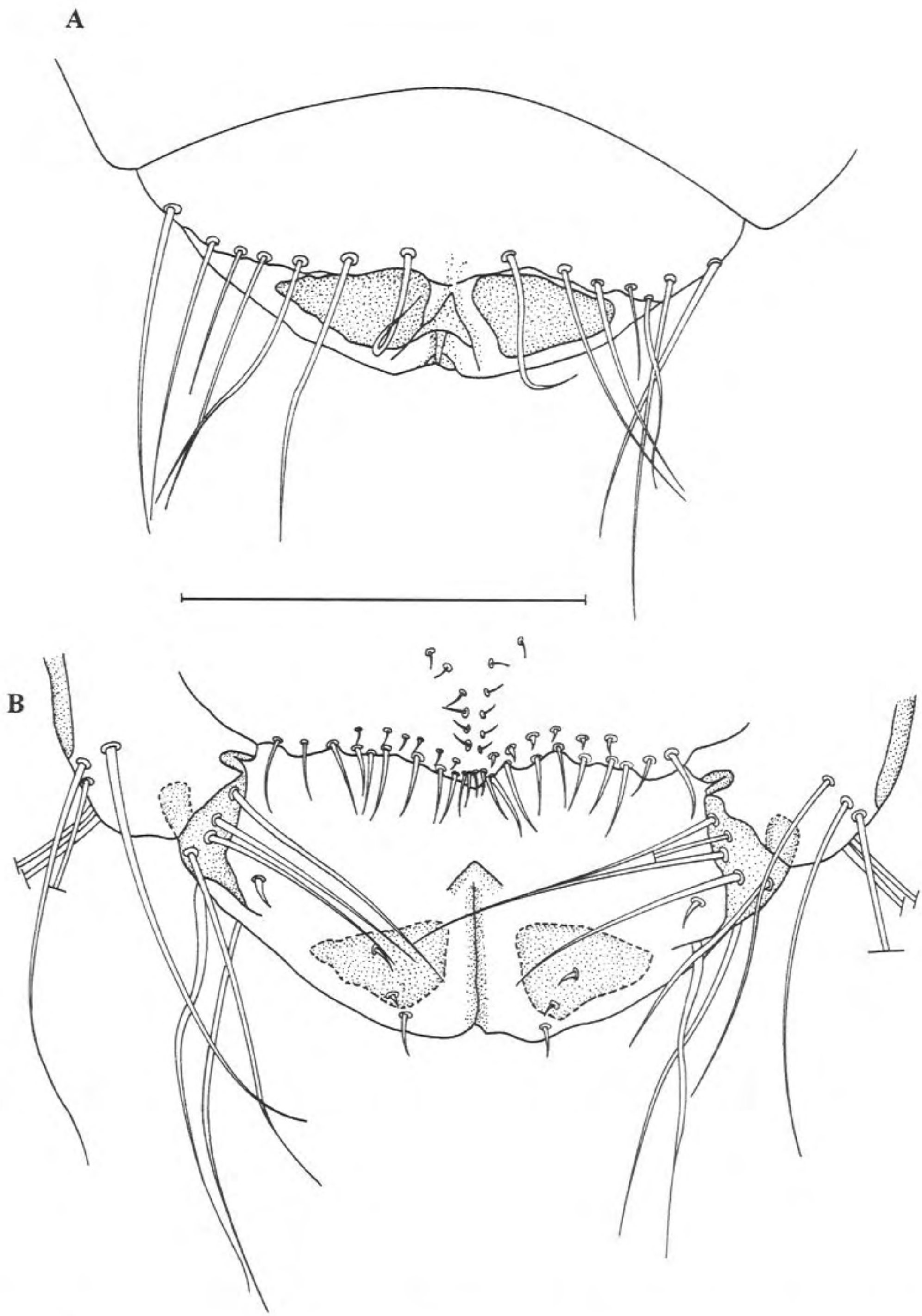

Fig. 4 – *Meropoecus meropis* (Denny, 1842). Posterior extremity of the abdomen in female: A, dorsal view; B, ventral view. Scale: 0.3 mm.

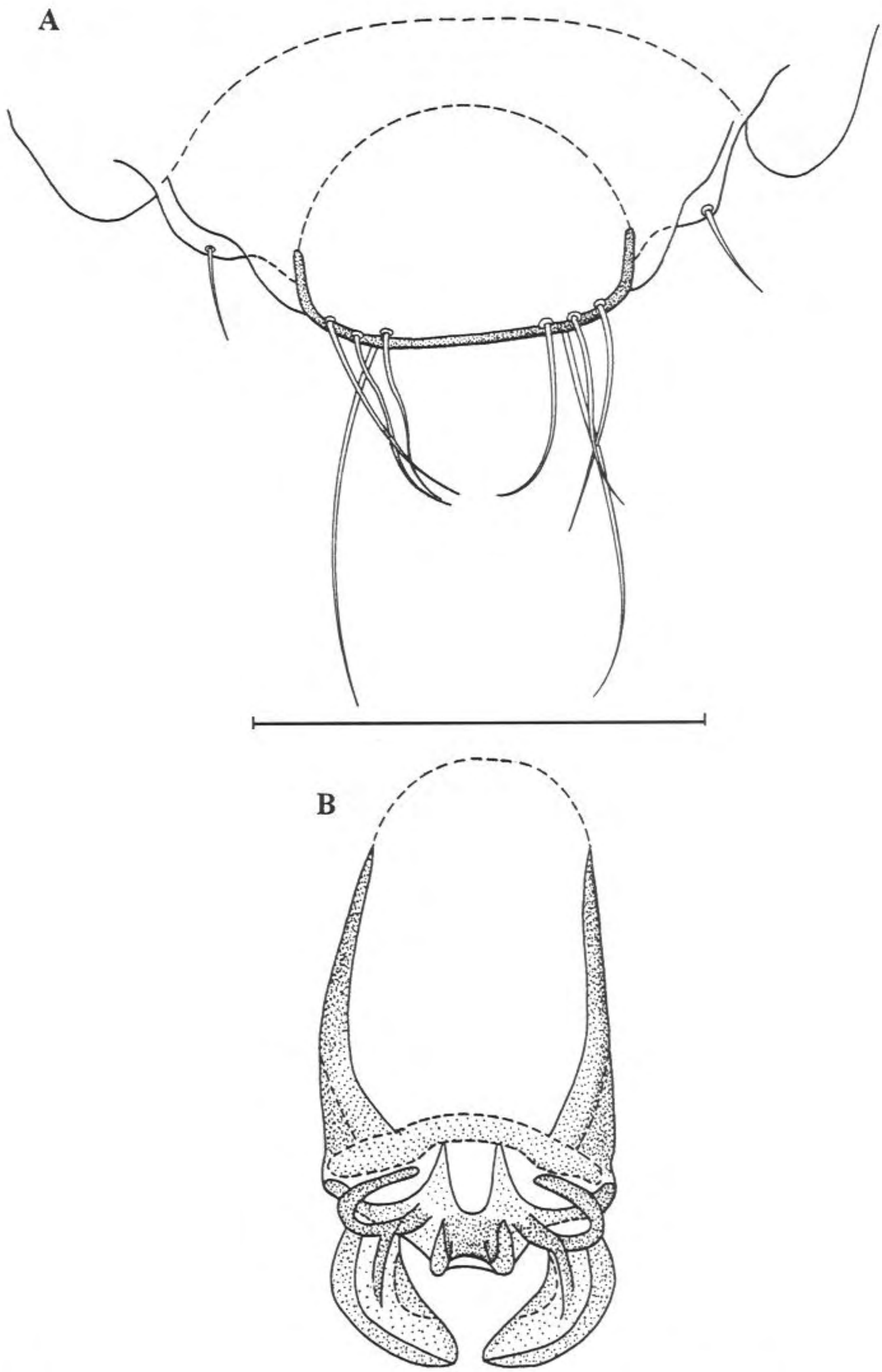

Fig. 5 – *Meropoecus meropis* (Denny, 1842). A, posterior extremity of the abdomen in male (ventral view); B, copulatory organ. Scale: 0.3 mm.

XI is obvious only in male, in female being unclear (Figs 4 B, 5 A). In female, segment IX+X has a tubercle latero-ventrally, where usually 3 long setae, by way of exception 4, are inserted. These setae are always directed to the median-longitudinal line of the segment (Fig. 4 B). Also in female, at the level of the ventral side of this segment, there is a short spiniform seta near the postero-lateral angles. Dorsally, at the level of the segment XI of the female the tergal plates, much reduced than those from the level of the anterior segments, can be remarked (Fig. 4 A). They are relatively triangular and are totally medianly separated. Medianly, between these two tergal plates, the upside down V-shaped anal opening can be observed. Also, at the level of this segment in female, ventrally and near the posterior margin, there is a pair of short setae, symetrically displayed in comparison with the median line. Anteriorly the median line also there are 2 pairs of spiniform setae, shorter and with a similar displaying (Fig. 4 B). Posterior margin of the last abdominal segment (XI) of the female has a weak invagination medianly (Fig. 4 B). In male, the posterior margin of the last abdominal segment (XI) has no invagination and it is sclerotized, being like a dark-brown thickened band (Fig. 5 A). In male, also at the level of this last abdominal segment, in each postero-lateral angle 3 short setae are inserted, and dorsally a longer seta (Fig. 5 A). Female genital opening is placed ventrally at the border between the abdominal segments VIII and IX+X (Fig. 4 B). Vulva has a waved margin and bordered with a row of 10 pairs of short setae and with another parallel row of 7 pairs of very short spiniform setae (Fig. 4 B). Also, in the median side of the vulva several very short spiniform setae are inserted (Fig. 4 B). In male, the copulatory organ (Fig. 5 B) is twice longer than wide and extends along the abdominal segments VI, VII, VIII, IX+X and XI. The ratio between the width of the last abdominal segments and the width of the copulatory organ is 2. Basal plate is rounded, and the parameres are thickened and sclerified, and in the distal extremity are strongly innerly curved. The endomeres are also present, slightly developed and displayed along the inner side of the parameres. Penis is short and widened, distal end being flat.

In conclusion, I can say that by this paper I tried to point out those morphological features and morphometrical data with taxonomical importance for the studied species. I want this paper to be the first from a series of several papers which meant to deal with the morphology and morphometry of the genera of "Strigiphilinae" group (*Meropoecus*, *Strigiphilus*, *Craspedorrhynchus*, *Aegypoecus* şi *Cuculoecus*), as well with the phylogeny problems of this group.

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CÂTEVA ASPECTE MORFOLOGICE LA SPECIA *MEROPOECUS MEROPIS* (DENNY, 1842) (PHTHIRAPTERA: ISCHNOCERA)

REZUMAT

Sunt prezentate mai multe aspecte morfologice la masculul şi femela de *Meropoecus meropis* (Denny, 1842), cum ar fi habitusul general, date morfometrice, precum şi morfologia detaliată a următoarelor structuri: regiunea preantenală a capului, placa cefalică dorsal-anterioară (signatura clypeală), plăcile pleurale abdominale, extremitatea posterioară a abdomenului, aparatul copulator şi regiunea genitală femelă. Toate aceste aspecte morfologice au importanţă taxonomică pentru specia

luată în studiu. Această lucrare dorim să fie prima dintr-o serie de mai multe lucrări care să abordeze morfologia şi morfometria genurilor din grupul "Strigiphilinae" (*Meropoecus*, *Strigiphilus*, *Craspedorrhynchus*, *Aegypoecus* şi *Cuculoecus*), precum şi probleme de filogenie ale acestui grup.

LITERATURE CITED

ADAM, C., 2003 - Chewing lice (Phthiraptera: Amblycera, Ischnocera) collected on some bird species of Romania. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa", 45: 159-172.

BECHET, I., 1962 - Cercetări asupra malofagelor din Republica Populară Română. Teză de doctorat. Universitatea din Bucureşti, 492 pp. + 81 figs. (Unpublished Ph.D. thesis) (in Romanian)

BLAGOVESHTCHENSKY, D. I., 1951 - Mallophaga Tadjikistana. Parazitologiceskii Sbornik, Zoologiceskogo Instituta Akademii Nauk SSSR, 13: 272-327. (in Russian)

CLAY, T., 1951 – An introduction to a classification of the avian Ischnocera (Mallophaga): Part I. Transactions of the Royal Entomological Society of London, 102: 171-195.

CONCI, C., 1941 - Due nuovi generi e tre nuove specie di Mallofagi dei *Meropes*. Bolletino della Societa entomologica italiana, Genova, 73: 99-107.

DENNY, H., 1842 - Monographia anoplurorum Britanniae. Henry G. Bohn, London. xxvi+262.

EICHLER, W., 1940 - Notulae Mallophagologicae. IV. Neue Gattungen und höhere Einheiten von Kletterfederlingen. Zoologischer Anzeiger, 130: 97-103.

EICHLER, W., 1941 - Zur Klassifikation der Lauskerfe (Phthiraptera Haeckel: Rhynchophthirina, Mallophaga und Anoplura). Archiv für Naturgesch (Leipzig), Neue Folge, 10: 345-398.

EMERSON, K. C., R. E. ELBEL, 1956 - A new mallophagan from southeast Asia. Entomological News, 67: 117-120.

HOPKINS, G. H. E., T. CLAY, 1952 - A check list of the genera & species of Mallophaga. The British Museum (Natural History), London. 362 pp.

NITZSCH, C. L., 1866 - Die Federlinge der Sing-, Schrei-, Kletter- und Taubenvögel. Zeitschrift für gesamt Naturwiss, 27: 115-122.

PRICE, R., R. HELLENTHAL, R. PALMA, K. JOHNSON, D. CLAYTON, 2003 – The Chewing Lice: World Checklist and Biological Overview. Illinois Natural History Survey Special Publication 24. x + 501 pp.

SÉGUY, E., 1944 - Insectes ectoparasites (Mallophages, Anoplures, Siphonaptéres). Faune de France. Paris, 43: 1-684.

SMITH, V. S., 2001 - Avian louse phylogeny (Phthiraptera: Ischnocera): a cladistic study based on morphology. Zoological Journal of the Linnean Society, 132: 81-144.

ZŁOTORZYCKA, J., 1977 - Klucze do oznaczania owadów Polski. Czêœæ XV. Zesz. 4. Nadrodzina Philopteroidea: rodzina Philopteridae. PWN Warszawa. 124 pp. (in Polish)

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