

A FRESHWATER SPECIES OF *PONTARACHNA*, (ACARI, PONTARACHNIDAE) FROM SOUTH AFRICA, WITH A DISCUSSION OF GENITAL ACETABULA IN THE FAMILY

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RESUMEN

La familia Pontarachnidae se consideraba hasta hace poco un grupo exclusivamente marino. Sin embargo, Cook (1986) describió una especie de *Litarachna* de un arroyo en Tasmania, Australia. En este artículo se describe una especie nueva de *Pontarachna* de un río en la Provincia Oriental del Cabo, Sudáfrica. No obstante que las diagnósis previas de esta familia indican la carencia de acetábula genital, estas estructuras o sus equivalentes sí parecen estar presentes.

Palabras clave: Acari, Pontarachnidae, especie nueva, agua dulce, *Pontarachna*, Sudáfrica

ABSTRACT

Until recently the family Pontarachnidae was thought to be a strictly marine group. However, Cook (1986) described a species of *Litarachna* from a stream in Tasmania, Australia and this paper describes a species of *Pontarachna* from a river in the Eastern Cape Province, South Africa. Although the family has previously been diagnosed as lacking genital acetabula, these structures or their homologs do seem to be present.

Key words: Acari, Pontarachnidae, new species, freshwater, *Pontarachna*, South Africa.

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INTRODUCTION

The family Pontarachnidae contains two genera with wide spread distributions around the world. They occur primarily in marine littoral habitats, with members of the genus *Pontarachna* described from Japan, Formosa, Russia, South Africa, South Australia, USA (California), the Mediterranean, Red and Black Seas. The other genus, *Litarachna*, has members in the waters of the West Indies, Greenland, Japan, West Australia and the Mediterranean and Red Seas. Recently, new species of both genera have been taken in fresh waters: *Litarachna amnicola* described by Cook (1986) from a stream in Tasmania and a new species of *Pontarachna* from South Africa to be described in this paper.

Almost nothing is known of the life history of members of this family. The deutonymph is known for several species but the larva (if it exists as a free living stage) and its host (if any) are unknown. The wide distribution of members of the family could be accounted for without their having a strong dispersal stage if, as seems to be the case in many water groups, their origin dates back to Pangaeon times. However, I recall a short report of a member of the family being collected in Hawaii. With no description and no illustrations the record must be regarded as tentative but, if true, the relatively recent origin of the Hawaiian littoral zone and the great expanse of deep oceans separating these islands from other land masses would suggest they do have an efficient dispersal stage.

Members of the family Pontarachnidae have previously been described as lacking genital acetabula and they certainly do not possess acetabula with pore plates of the type found in other hydrachnid families. However, the fact that they can exist in fresh waters suggests they must have some type of osmoregulatory system. Very possible candidates for osmoregulation are small areas of integument surrounded by narrow bands of sclerotization and with what appear under a light microscope to be radiating spokes (Figs. 5, 6). In the past these structures have been described variously as glands or even confused with setal bases, the pair associated with the postgenital sclerite in *Pontarachna* often illustrated with setae emerging from them. These structures which I will refer to in quotation marks as "acetabula" are present in various combinations within the family Pontarachnidae.

Unfortunately, many of the described species are either poorly or inaccurately illustrated making comparisons among them difficult, and the following discussion is based on only some of the species. Three pairs of "acetabula", possibly the ancestral condition as in so many hydrachnid families, seems most common. In females of *Pontarachna* there is a pair of "acetabula" incorporated into the postgenital sclerite (although in the western North American species, *P. cruciata* Hall, this pair has secondarily divided into five pairs). In males of *Pontarachna* and in both sexes of *Litarachna* no "acetabula" are associated with the genital sclerites. Females of *Pontarachna* most commonly have the other two pairs of "acetabula" on a small common platelet on their respective sides (Fig. 2, arrow). However, there are variations on this plan. Sokolow (1936) illustrates *P. anellata* with four larger wheel-

like "acetabula" which are widely separated from each other in a row at the level of the two posterior pairs in the present species. Walter (1925) illustrates the female of *P. punctulum* Philippi with "acetabula" as shown in Figure 2 but with what appear to be an additional pair of the larger wheel-like "acetabula" laterally.

From an examination of illustrations of males of *Pontarachna*, they have two pairs of smaller "acetabula" as shown in Figure 2, arrow, but with a pair of larger wheel-like "acetabula". The latter are variable in position, being lateral in some species and posterior in others. In *Litarachna* the "acetabula" of both sexes are located well posterior to the genital sclerites. The illustrations in the literature are too incomplete to permit a meaningful description of the "acetabula" types and arrangements, but it appears that both large and small wheel-like types are most common.

Since members of the family are found in both fresh and marine waters the question is where did the group likely evolve. If the fresh water forms are remnants of the ancestral group it seems highly likely they would have retained the typical pore plates of other fresh water hydrachnids and their presumed ancestors. Also, the fresh water species appear to have a very limited distribution and have only been taken from streams in close proximity to the sea, suggesting a more recent reinvasion of fresh water. *Litarachna amnicola* Cook was taken in interstitial deposits of the George River in northwest Tasmania, less than 15 miles from the sea and the new species is from a site less than five miles from the sea. Both these collection localities were well above sea level and definitely not estuarine. However, an estuarine habitat seems the most likely situation in which the family originally evolved. One unanswered question is why acetabula would be retained once members of the Pontarachnidae became completely marine, at least if osmoregulation was their only function. Interestingly, some members of the non parasitengonid family Halacaridae also have genital acetabula. Also of interest is the apparent structure of the epimeral pores of *Copidognathus* as illustrated by Newell (1947). In the two species in which he illustrates this structure in detail, it has at least the superficial appearance of the "acetabulum" in figure 5 in this paper.

Although the Pontarachnidae likely belong to the superfamily Hygrobatoida there is no extant sister group to aid in its placement.

For the present the suggested homology of the pore plate acetabula of most hydrachnids with the spoke-like structures of the Pontarachnidae is mere speculation. What is needed is to determine the structure of the latter under scanning EM. With only two specimens each of the two fresh water species, I did not want to sacrifice one for that purpose. As the "acetabula" of both marine and fresh water members of the Pontarachnidae seem to be similar in structure, at least under a light microscope, specimens of the more numerous marine species could be used for the study. Hopefully, someone with both access to specimens and scanning EM equipment will provide the answer.

Measurements are given in micrometers (μ), with those of the paratype in parentheses. Holotype deposited in the Field Museum of Natural History (Chicago), paratype in Canadian National Collection (Ottawa).

Pontarachna hoffmannae sp. nov.
(Figs. 1-6)

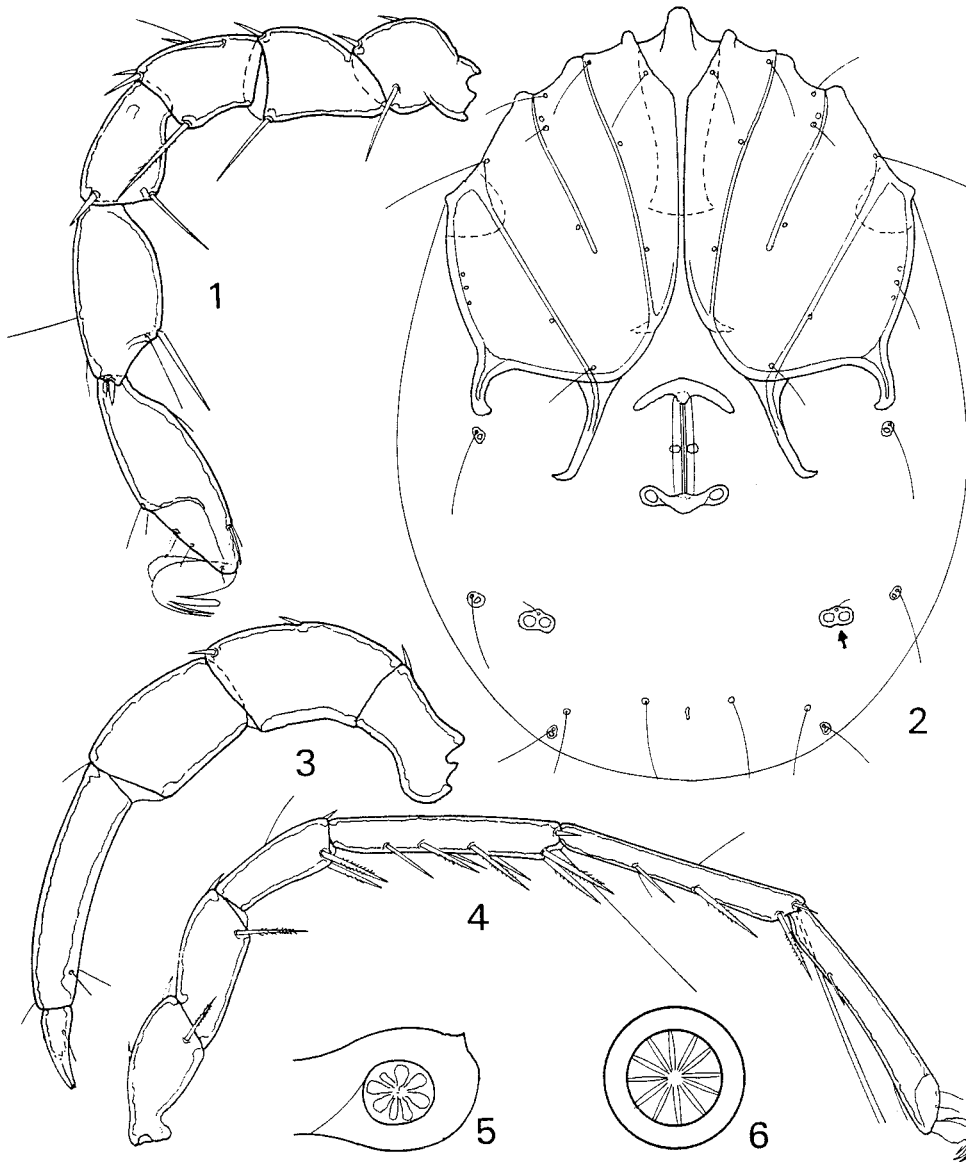
Female: Integument soft, dorsum without dorsalia; body 333 (350) in length; coxal area, including posterior apodemes, 207 (218) in length; coxae fused on their respective sides, but separated medially; suture lines between second and third coxae incomplete; suture lines between third and fourth coxae extending onto narrow apodemes which extend posteriorly nearly in line with the postgenital sclerite; shorter apodemes extend posteriorly from the posterolateral corners of the fourth coxae; gland opening of coxoglandularia 1 small; genital field 66 (76) in length; pregenital sclerite 52 (50) in width; postgenital sclerite 44 (46) in width; postgenital sclerite bearing a pair of "acetabula" whose structure is indicated in Figure 5; these "acetabula" approximately 5 microns in diameter; two additional pairs of small "acetabula" located posteriorly, these on a common platelet on their respective sides; width of these platelets 17 (18); excretory pore is a small opening without associated sclerotization; Figure 2 illustrates a ventral view; dorsal lengths of the pedipalpal segments: P-I 22 (24), P-II 55 (55), P-III 48 (45), P-IV 72 (69), P-V 24 (23); pedipalpal chaetotaxy simple, structure of pedipalp better illustrated (Fig. 3) than described; gnathosoma 95 (99) in length; dorsal lengths of the distal segments of the first leg: I-Leg-4 48 (48), I-Leg-5 67 (65), I-Leg-6 85 (83); claws with three clawlets; Figure 1 illustrates the proportions and chaetotaxy of the first leg; second leg with approximately the same proportions as the first leg; dorsal lengths of the distal segments of the fourth leg: IV-Leg-4 114 (114), IV-Leg-5 121 (121), IV-Leg-6, 116 (118); Figure 4 shows the proportions and chaetotaxy of the fourth leg; on both the third and fourth legs the fourth segment bears one stiff swimming seta, the fifth segment bears two stiff setae.

Male: Unknown.

Types. Holotype female, 1 paratype female, from the Groot River on Route 2 at Natures Valley, near the western edge of Tsitsikama National Park, Eastern Cape Province, South Africa, 7 June 1984. This is one of the streams with deeply stained waters characteristic of this region, temperature 10 degrees C.

Etymology. Named for Dra. Anita Hoffmann, in honor of her outstanding contributions to the field of Acarology.

Discussion. In general structure of the venter and pedipalp the present species seems closely related to *P. punctulum* Philippi. However, the latter bears a lateral pair of wheellike "acetabula" of the type indicated in figure 6. *P. capensis* Lohmann, known from marine waters in the Cape Town area, has a similar configuration of the "acetabula" but has much shorter posteromedial apodemes. Also



Figs. 1-6. *Pontarachna hoffmannae*, sp. n. (Female)— 1, medial view of first leg, 2, ventral view, 3, pedipalp, 4, medial view of fourth leg, 5, portion of postgenital sclerite illustrating one of the "acetabula", 6, semidiagrammatic illustration of a wheel-like "acetabulum".

P-III is much higher proximally than distally in *capensis* and is approximately the same height along its length in the present species.

LITERATURE CITED

- COOK, D. R. 1986. Water mites from Australia. *Mem. Am. Entomol., Inst.* 40: 568.
- NEWELL, I. M. 1947. A systematic and ecological study of the Halacaridae of eastern North America. *Bull. Bingham Oceanogr. Collect. Yale Univ.* 10 (3): 1-232.
- SOKOLOV, I. 1936. Über zwei neue *Pontarachna*-Formen aus dem Pazifischen Ozean. *Zool. Anz.* 115: 329-334.
- WALTER, C. 1925. Marine Hygrobatidae. Revision der Wassermilben Genera *Pontarachna* Philippi und *Nautarachna* Moniez. *Int. Rev. Hydrobiol. Hydrogr.* 14 (1/2): 1-54.