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EUPHYSALOZERCONIDAE, A NEW MESOSTIGMATID MITE FAMILY
(ACARI: MESOSTIGMATA: TRIGYNASPIDA: AENICTEQUOIDEA)

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(Accepted October 2007)

SUMMARY: A new family of mesostigmatid mites, Euphysalozerconidae, including Euphysalozercon berlesei gen. et sp. nov. is described from the specimens deposited in the Berlese Acaroteca in Florence, Italy. This new family-group name replaces the currently known monotypic Physalozerconidae, carrying "Physalozercon raffrayi", which was based on an undescribed (unavailable) species name so-called "Antennophorus raffrayi", a provisional name proposed by Erich Wasmann. A diagnosis for the family Euphysalozerconidae and an updated key to families of Aenictequoidea are provided.

INTRODUCTION
The mesostigmatid mite family Physalozerconidae was proposed by Kethley (1977: 135) to accommodate the Physalozercon, a genus-group name mentioned in Berlese (1903a: 246; 1903b: 399). In his contribution of 1903a, Berlese proposed a new genus Physalozercon with a type species "Antennophorus Raffrayi Wasmann", a species name appearing in Wasmann (1902). However, in his article, Wasmann (1902: 73) clearly described the status of this species as following:


In addition, in the p. 282 of the reference article number 11 (i.e., Wasmann, 1901: 282) shown in Wasmann (1902) above, Wasmann added the following...
supplement onto his description of "Antennophorus barbatus n. sp.":


These two paragraphs of Wasmann (1901, 1902) indicate that a mesostigmatid (= gamasid) mite, associated with Plagiolepis (Hymenoptera: Formicidae) discovered by Raffray and Brauns from current South Africa, was sent to A. D. Michael of London by Wasmann in 1896 for description, and although Wasmann proposed a provisional name as "Antennophorus raffrayi", he had no intention to describe it in his articles, and the publication by Michael did not appear by the year of 1902.

Albert Davidson Michael (May 5, 1836-May 29, 1927) published an article on mesostigmatid mites on ants in 1891 (Michael, 1891). However, until his passing in 1927, A. D. Michael did not publish any new species of Antennophorus mite or "Antennophorus raffrayi", and neither did Erich Wasmann (May 29, 1859-February 27, 1931).

It is, therefore, quite interesting to note that, as stated above, Berlese (1903a: 246) raised a new genus Physalozercon based on this undescribed species name "Antennophorus Raffrayi Wasmann" by citing Wasmann's article of 1902 mentioned above hence formed a new combination, "Physalozercon Raffray (Wasmann)" or "Physalozercon raffrayi (Wasmann)" as appeared in Berlese (1903b: 390, 400), Trägårdh (1907: 20), Wheeler (1910: 1), Kethley (1977: 135), and Castagnoli & Pegazzano (1985: 350).

The name Antennophorus raffrayi Wasmann is unfortunately a nomen nudum, and, subsequently, the family name Physalozerconidae Kethley, 1977, which was based on a species name "Physalozercon raffrayi", which was, again, derived from "Antennophorus raffrayi"; a provisional name that was not described, is neither valid nor available. As the family Physalozerconidae is monotypic 2, composed only of a species so-called "Physalozercon raffrayi", it is obvious that the family-group name Physalozerconidae has no ground to stand and I remove the name Physalozerconidae from the current classification of the Mesostigmata (Acari: Parasitiformes).

The specimen that Erich Wasmann sent to A. D. Michael for description is not present in the collections of Michael in the Natural History Museum, London, U.K. (Anne Baker, personal communication) or in the Royal Tunbridge Wells Museum, Kent, U.K. (Matt Colloff, personal communication; also see Baker & Colloff, 2006). In addition, the specimen is not found in the collections of Erich Wasmann (Natuurhistorisch Museum Maastricht, Maastricht, Netherlands; Fokeline Dingemans-Bakels, personal communication), Ivar Trägårdh (Swedish Museum of Natural History, Stockholm, Sweden; Torbjörn Kronestedt, personal communication) or John Kethley (Field Museum, Chicago, USA; Daniel Summers, personal communication).

My recent visit to the Berlese Acaroteca in Florence, Italy, revealed two microscopic slide specimens of Berlese's "Physalozercon raffrayi". One of them (slide no. M1/10: a whole-body mount of female on balsam with dorsal side up) was available, though poor in condition, for examinations, while the other slide (M1/12) showed a broken piece of dorsum and unidentifiable leg fragments. During a month-long visit to the Berlese Acaroteca, I was not able to find any evidence/record indicating that these Berlese's materials were actually from A. D. Michael. Instead, as Berlese (1903b: 400) mentioned, they were sent from Wasmann, collected from Cape of Good Hope, South Africa ("Caput Bonae Spei" or "Cape di Buona Speranza") in the nest of Plagiolepis custodiens 3.

It is therefore assumed that, aside from the specimen sent to A. D. Michael, Erich Wasmann sent another

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2. André (1937: 48) described a species Physalozercon paguroxenus André 1937, associated with pagurid crab, the only species added to this invalid genus-group name since Berlese (1903a). This species, however, was transferred to the cercomegistoid genus Vitzthumnegistus by Kethley (1977: 139).

3. Plagiolepis custodiens is a junior synonym for Anoplolepis custodiens (F. Smith, 1858) (Formicidae: Formicini).
batch of materials to Antonio Berlese between 1902 and 1903, and BERLESE (1903a) treated those materials as a new genus, carrying the type species of an undescribed species by following Wasmann's provisional name. Accordingly, to straighten up this taxonomic chaos, I propose a new family-group name Euphysalozerconidae along with a new genus-group name Euphysalozercon (type genus), carrying the type species Euphysalozercon berlesei sp. nov., based on available descriptive data from the materials (i.e., slides and references) deposited in the Berlese Acaroteca (CASTAGNOLI & PEGAZZANO, 1985: 350). Our knowledge on trigynaspid fauna on formicids in Africa is still quite poor, and with discoveries of more materials that belong to this family, the family definition provided herein could be revised in the future. An updated key to the families of Aenictequoidea, to which the family Euphysalozerconidae belong, is given.

**MATERIALS & METHODS**

Terminologies for idiosoma follow KIM (2004). Zeiss Axioskop2 mot plus model compound microscope with 100X/1.30 (oil) Plan-Neofluar objective lens with differential interference contrast (DIC) was used to examine the specimens. Measurements of the specimens were conducted by AxioVision 3.1 software (Carl Zeiss Vision GmbH, München, Germany) with 10X/0.25 A-Plan and 40X/0.75 Plan-Neofluar objective lenses.

**DESCRIPTION**

**EUPHYSALOZERCONIDAE FAM. NOV.**

**TYPE GENUS:** Euphysalozercon gen. nov.


**EUPHYSALOZERCON GEN. NOV.**

**TYPE SPECIES:** Euphysalozercon berlesei sp. nov.

**DIAGNOSIS:** Same as for family.

**ETYMOLOGY:** The genus name is derived from Physalozereon, an invalid genus-group name of BERLESE (1903a).

**EUPHYSALOZERCON BERLESEI SP. NOV.**

*(nomen novum for "Physalozereon raffrayi" sensu BERLESE, 1903a) (Figs.1-2)*

**DIAGNOSIS:** Same as for genus.

**FEMALE:** Body elliptical (ovoid); idiosoma ca. 1140 μm long, 1280 μm wide at middle. Setae on anterior half of dorsum shorter, more numerous than setae on posterior half of dorsum. Palpcoxal setae simple. Hypostomal setae 1-3 (hs1-hs3) simple.
Fig. 1: *Euphysalozercon berlesei* gen. et sp. nov., female. Dorsum (modified from Berlese, 1903b) (scale bar unit = μm).
Figure 2: Euphysonerecon berlesei gen. et sp. nov., female. Venter (palp coxal and hypostomal setae are omitted; modified from Berlese, 1903b) (scale bar unit = μm)
Chaetotactic formula for coxae I-IV: 2-2-2-1. Femora IV with 8 setae. Genua I with 6 dorsal setae; genua IV with 6 dorsal setae. Setae av4 and pv4 on tarsi I very short, simple. Other descriptions same as for diagnosis.

**MALE:** Unknown.

**IMMATURES:** Unknown.

**ETYMOLOGY:** Specific epithet is given in honor of Antonio Berlese (June 26, 1863–October 24, 1927).

**TYPE SERIES:** A holotype female (M1/10) and a paratype (M1/12) located in the Berlese Acaroteca, Istituto Sperimentale per la Zoologia Agraria (ISZA), Via di Lanciola 12/A, Florence, 50125, Italy.

**TYPE DATA:** SOUTH AFRICA: Cape of Good Hope. ex. Anoplolepis custodiens (F. Smith, 1858) (Hymenoptera: Formicidae).

**REMARKS:** The holotype female examined does not have a “scutum”-like dorsal area as shown in Berlese (1903b: Fig. 105). Due to the poor nature of the type specimens, it was not possible to examine detailed structures of chelicerae and leg chaetotaxy other than those provided above.

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