Acarologia is proudly non-profit, with no page charges and free open access

Please help us maintain this system by encouraging your institutes to subscribe to the print version of the journal and by sending us your high quality research on the Acari.

Subscriptions: Year 2021 (Volume 61): 450 €
http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php
Previous volumes (2010-2020): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

Acarologia is under free license and distributed under the terms of the Creative Commons-BY-NC-ND which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.
Vitzthumegistidae, fam. nov.: trigynaspid mites on terrestrial hermit crabs
(Anactinotrichida: Mesostigmata: Trigynaspida)

Cheol-Min Kim

(Received 06 January 2015; accepted 11 May 2015; published online 30 June 2015)

INTRODUCTION

The psychosemanticist will specialize in the havoc wrought by verbal artillery upon the fortress of reason. Their job will be to cope with the psychic trauma caused by linguistic meaninglessness, to prevent the language from degenerating into gibberish, and to save the sanity of persons threatened by the onset of polysyllabic monstrositis.

— James Thurber (The New Yorker, May 28, 1955 Issue, p.28)

In his article, Kim (2008: 34) took a taxonomic action, invalidating the family name Physalozerconidae sensu Kethley (1977: 135) (Trigynaspida: Antennophoriae) out of the realm of the Mesostigmata. His action was based on the reasoning that the sole genus within the family, Physalozercon sensu Berlese (1903), has no nominal species as the known type species, "P. raffrayi (Wasmann, 1902)".

Based on "Antennophorus raffrayi", a nomen nudum mentioned in Wasmann (1901, 1902). In the endnote #2, Kim (2008: 34) also noted that Physalozercon paguroxenus André, 1937b, the only species added to the Physalozercon since Berlese (1903), was transferred to the Vitzthumegistus sensu Kethley, 1977 (Trigynaspida: Cercomegistiae: Cercomegistidae) by Kethley (1977: 139). While the taxonomic action of Kim (2008) was a bona fide intention to give minimized changes and confusion to the taxonomic and classification system of the Mesostigmata by recognizing the Vitzthumegistus sensu Kethley (1977: 139), the normal course of action could be the recognition of André’s (1937b) P. paguroxenus as the type species for the Physalozercon by subsequent mono-
Krupp C.-M.

typy (ICZN, 1999: Art. 67.2.2; 69.3), and the recognition of this species at a family level. Such action, however, would certainly raise "taxonomic and nomenclatural" confusion regarding the concepts on the Physalozercon since, in a clear and strict sense, the description of Physalozercon paguroxenus André, 1937b was based on a misidentification, and the species cannot belong to the Physalozercon sensu Berlese (1903). In fact, while the Physalozercon of Berlese belongs to the infraorder Antennophoriae, the Physalozercon paguroxenus André, 1937b must belong to the infraorder Cercomegistiae. Accordingly, it is not difficult to note that recognizing the Physalozercon sensu André (1937b) (non Berlese, 1903) for the Vitzthumegistus sensu Kethley (1977) and raising the genus to the cercomegistoid Physalozerconidae fam. nov. (non Physalozerconidae Kethley, 1977) within the Cercomegistiae, which was previously used within the Antennophoriae with completely different family or infraordinal concept, can cause taxonomic, homonymic confusion. A further course of action to fix this problem would therefore be necessary.

When Kethley (1977) raised a new genus so-called Vitzthumegistus within the Cercomegistidae (Trigynaspida: Cercomegistiae) to accommodate three species [i.e., V. paguroxenus (André, 1937b) (= Physalozercon paguroxenus André, 1937b); V. latronis (Vitzthum, 1937) (= Cyclothorax latronis Vitzthum, 1937); and V. andrei sensu Kethley, 1977 (a nomen novum for Cyclothorax carcincola von Frauenfeld, 1868, by Vitzthum (1928), in order to make these names available, to save the names and taxonomy, and to avoid any further confusion. Since André (1937b) did not give the generic description for the Physalozercon, I would consider the Vitzthumegistus a new genus (as with Kethley, 1977) and a new replacement name (nomen novum) for the Physalozercon sensu André (1937b), and the Vitzthumegistus is the type genus for the Vitzthumegistidae fam. nov. (Trigynaspida: Cercomegistiae: Cercomegistoidea) describing herein.

MATERIALS AND METHODS

Notations for idiosomal chaetotaxy follow the Hirschmann (1957) system re-clarified in Karg & Schorlemmer (2011: 5), and terminologies for idiosoma follow Kim (2004). An Olympus model BX51 compound microscope with 100X/1.35 (oil) UPlanApo objective lens with differential interference contrast (DIC) was used to examine the specimens. Lindquist et al. (2009a) treated the non-Linnean category "cohort" as a rank between the ranks of order and family. In this article, however, I
recognize the cohort as a rank between the class and order; and the infraorder as a rank between the suborder and superfamily by following the taxonomic hierarchy shown in the Appendix 10 in Lincoln et al. (1982: 279). This treatment is not de novo, and has been applied to many taxonomic groups of zoology, including, but not limited to, the Crustacea. The infraorders Antennophoriae and Cercomegistiæ used in this article are equivalent to the Antennophorina and Cercomegistina, respectively, as used in Kim (2004) and Lindquist et al. (2009a); and such usage of naming is intended to avoid the use of the suffix -ina, designated for the rank of "subtribe" in zoological nomenclature (ICZN, 1999: Art. 29.2; also see Kim, 2006: 19).

**TAXONOMY**

**Vitzthumegistidae, fam. nov.**

Type genus — *Vitzthumegistus* (genus et nomen novum for *Physalozercon* sensu André, 1937b, non Berlese, 1903)

Diagnosis (based on adult) — Cercomegistoid mesostigmatid mites. Body ellipsoid; yellowish- or dark-brown in color. Dorsum with holodorsal shield (or holodorsal shield with a medial transverse thin line of fusion or medial cleft present). Tritosternum narrow, somewhat conical in shape; about 3/4 length of tritosternal laciniae fused together; distal end of each lacinia bifurcated. Presternal shield absent. Unpaired postanal seta absent. Anterior end of gnathotectum roundish, somewhat shield-shaped, with smooth lateral margin (no serration, or no anterior projections present); gnathotectal ventromedian keel absent. Hypostomal setae hs1 heavily branched (polyramous, hypertrophied), not simple setiform. Corniculi well-sclerotized, horn-like. Paralaciniae absent. Palp genua with six setae. Palp tibiae and tarsi normally articulated, not completely fused. Palptarsal claw (apotele) paraxial, three-tined. Chelicerae robust, digits short with numerous fine denticles. Cheliceral ex crescences on movable digit proximal, or medio-proximal, hyaline, dendritic (not filamentous). Pilus dentilis on fixed cheliceral digit absent. Femora IV with eight setae. Tarsi II-IV each with paired claws with fan-like pulvillus. Tarsi IV with setae av4 and pv4 on ventral intercalary sclerite in circumsegmental fissure between basi- and telotarsus. Female: Sternal shield, neither paired nor fragmented, weakly sclerotized, vestigial, or absent. Metasternal shield, carrying setae st4, absent. Sternogynial shield, carrying sip3, absent. Latigynial shields (Paragynia sensu Vitzthum, 1937) elongate triangular or subrectangular, fused to ventrianal shield posterolaterally. Male genital opening located in area between and around coxae III, with single genital valve; half of valve often fused to hologastric shield posteriorly; eugenial setae on genital valve absent.

**Vitzthumegistus**

(genus et nomen novum for *Physalozercon* sensu André, 1937b; non Berlese, 1903)

Type species — *Vitzthumegistus paguroxenus* (André, 1937b), comb. nov. (= *Physalozercon paguroxenus* André, 1937b)

Diagnosis — same as for family.

Etymology — The name is derived from Hermann Ludwig Wilhelm Graf Vitzthum von Eckstädt (16 January, 1876 – 19 May, 1942); and ‘megistus’, derived from a Latin word of ‘megistanes’, meaning magnate, is a common suffix used in the mesostigmatid genera.

Species — *V. paguroxenus* (André, 1937b), comb. nov.; *V. latronis* (Vitzthum, 1937), comb. nov. (= *Cyclothorax latronis* Vitzthum, 1937); and *V. andrei*, (a nomen novum for *Cyclothorax carcinicola* sensu Vitzthum, 1928, non von Frauenfeld, 1868)

**Vitzthumegistus paguroxenus** (André, 1937b), comb. nov.

(= *Physalozercon paguroxenus* André, 1937b)

Diagnosis — Cercomegistoid vitzthumegistid mite. Anterior end of dorsal shield with a pair of distinctly long i1 (= j1) setae (see André, 1937b: 48).
Kim C.-M.

TABLE 1: Leg chaetotaxy of Vitzthumegistus paguroxenus (André, 1937b), comb. nov.

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxa</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Trochanter</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Femur</td>
<td>10</td>
<td>11</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Genu</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Tibia</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Tarsus</td>
<td>-</td>
<td>19</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>

49, Fig. 1). Female latigynial shield subrectangular in shape. Ventrianal shield somewhat rhombic in shape, not wide, not covering almost entire venter. Fused metapodal-endopodal-exopodal-peritrematal shields element separated from ventrianal shield.

Type series — Syntype: 2 female (slide number: 6D1, 6D4-6D11, 6D16) and 1 male (slide number: 6D2, 6D3, 6D12-6D15) specimens dissected and mounted on 16 microscopic glass slides. ex. Coenobita sp. (Paguroidea: Coenobitidae); Coll. Edgar Aubert de la Rüe (7 October, 1901 – 24 February, 1991). Type specimens (MNHN Register Number Ac246a) located in Marc André collection, Muséum National d’Histoire Naturelle (MNHN), Paris, France.

Type locality — VANUATU: Pentecost Island (Île Pentecôte).

Remarks — Immatures and biology are unknown.

Vitzthumegistus latronis (Vitzthum, 1937), comb. nov.

(= Cyclothorax latronis Vitzthum, 1937)

Diagnosis — Ceromegistoid vitzthumegistid mite. Anterior end of dorsal shield with four distinctly long setae (each paired \(i_1\) and \(z_1\) setae) (see Vitzthum, 1937: 640, Fig. 1); medio-lateral side of dorsum with two distinctly long setae. Dorso-lateral (marginal) setae short, shorter than (ca. \(\leq\) 1/10) length of genua. Female latigynial shield elongated subtriangular in shape. Ventrianal shield somewhat tongue-shaped, not wide, not covering almost entire venter.

Type series — Syntype: 3 females (slide number: V1210, V1231, V1232) and 4 males (slide number: V1230, V1233, V1234, V1235), each mounted on a thin square cover slip (!). ex. Birgus latro (Paguroidea: Coenobitidae; coconut crab); Coll. Harms. Type specimens located in Hermann Graf Vitzthum collection, Zoologische Staatssammlung (ZSM), München, Germany.

Type locality — Undisclosed (presumably Sumatra, Indonesia)

Remarks — Immatures and biology are unknown.

Vitzthumegistus andrei

(a nomen novum for Cyclothorax carcinicola von Frauenfeld, 1868, sensu Vitzthum, 1928)

Diagnosis — Ceromegistoid vitzthumegistid mite. Anterior end of dorsal shield with a pair of distinctly long \(i_1\) (\(=\) \(j_1\)) setae (see Vitzthum, 1928: 195, Fig. 3). Dorso-lateral (marginal) setae long, close to length of genua. Ventrianal shield wide, al-
most covers venter. Fused metapodal-endopodal-exopodal-peritrematal shields element fused with ventrianal shield posteriorly.

Type series — Syntype: Two males (slide number: V1207, V1208; each mounted on a thin square cover slip). ex. *Coenobita* sp. (Paguroidea: Coenobitidae); Coll. Fulmek (Leopold Fulmek, 9 November, 1883 – 17 June, 1969), August, 1925. Type specimens located in Hermann Graf Vitzthum collection, Zoologische Staatssammlung (ZSM), München, Germany.

Type locality — INDONESIA: Northeast coast of Sumatra Island, Beach of Perbaungan.

Remarks — The Vitzthum Collection in Zoologische Staatssammlung (ZSM) has two additional microscope slides (slide number: V1214, V1215), which carry the mite specimens from *Coenobita* sp. collected by Johannes Carolus van der Meer Mohr (1892-1969) in March, 1933 at the same type locality (Beach of Perbaungan) in Sumatra Island. Slide V1214, in poor condition, contains three female specimens mounted together on a thin square cover slip, and slide V1215 carries a single male mounted on a thin square cover slip. Slide V1215 lacks gnathosoma, anterior dorsum, and legs I; and through the V1214, I was able to confirm the presence of three-tined palptarsal claws and polymorphous $hs1$ setae. However, these four specimens in V1214 and V1215 slides were not included in the original description of Vitzthum (1928), and cannot be treated as name-bearing types. For the minimal change of name, I followed the same specific epithet, *andrei*, that Kethley (1977: 139) proposed in honor of Marc André (10 February, 1900 – 28 May, 1966). Immatures and biology are unknown.

**DISCUSSION**

The newly recognized genus *Vitzthumegistus* carries eight setae on femora IV, no postanal seta, long setae $av4$ and $pv4$ on a well-developed ventral intercalary

---

**TABLE 2: Leg chaetotaxy of *Vitzthumegistus latronis* (Vitzthum, 1937), comb. nov. (V1235)**

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxa</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Trochanter</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Femur</td>
<td>12</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Genu</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Tibia</td>
<td>13</td>
<td>10</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Tarsus</td>
<td>-</td>
<td>19</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>

**TABLE 3: Leg chaetotaxy of *Vitzthumegistus andrei*, nomen nov. (V1208)**

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxa</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2/1</td>
</tr>
<tr>
<td>Trochanter</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Femur</td>
<td>10</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Genu</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Tibia</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Tarsus</td>
<td>-</td>
<td>19</td>
<td>19</td>
<td>21</td>
</tr>
</tbody>
</table>
sclerite on a circumsegmental fissure between basi- and telotarsi IV, six setae on palp genua, three-tined palptarsal claw (apotele), dentate chelicerae, dendritic cheliceral excrescences, and almost fused tritosternal laciniae, which collectively display the typical characteristics of the Cercomegistoidea of the Trigynaspida (Kim, 2004). In addition to these characters, the *Vitzthumegistus* carries a holodorsal shield, almost finely dentate cheliceral digits, no free presternal shield, weakly sclerotized entire (i.e., neither paired nor fragmented) sternal shield in the female, smooth anterior and lateral margin of gnathotectum, heavily branched (polyramous) hypostomal setae 1 (hs1), and no claws on tarsi I in the adult. In comparison, the members of Cercomegistidae carry two dorsal shields, paired presternal shields, serrate anterolateral gnathotectal margin (often with anterior projections), and simple or weakly barbed hypostomal setae 1 (hs1).

While Kethley (1977: 139) correctly grouped these species together under a single genus and assigned the genus to the Cercomegistidae, due to the major differences described above, the *Vitzthumegistus* cannot be placed into the Cercomegistidae.

Within the Cercomegistoidea, presence of a holodorsal shield in the adult is found in the Asternoseiidae and Saltiseiidae, but the anterolateral gnathotectal margin in these two families is not smooth, but serrate. The smooth gnathotectal margin is found in the Seiodidae, but seiodids carry two distinct dorsal shields (i.e., podonotal and opisthonotal shields), which are also found in other cercomegistoid families (i.e., Cercomegistidae, Pyrosejidae). In addition, seiodids have tarsi I with claws, and have completely free tritosternal laciniae. In other words, the combination of characters found in the members of *Vitzthumegistus* is not found in any single family in the Cercomegistoidea, and I raise the genus *Vitzthumegistus* to a new family-group within the Cercomegistoidea of the Trigynaspida. In their key to the families of Mesostigmata, Lindquist *et al.* (2009b: 158) treated the *Vitzthumegistus* as a separate unit, different from other known cercomegistids. Within the Trigynaspida, in which the members often display a variety of host associations (see Kim, 2004: 161 for details), the Vitzthumegistidae fam. nov. become a unique group, in which the members exhibit associations with paguroid hermit crabs (Crustacea: Decapoda: Paguroidea) in the Indo-Western Pacific (Oriental) region (i.e., Pentecost Island (Île Pentecôte), Vanuatu; Sumatra, Indonesia). Since immatures have not yet been reported from host hermit crabs, the biology of *Vitzthumegistus* remains an intriguing mystery.

**Key to species of the genus Vitzthumegistus**

*(Based on adult)*

1. Anterior end of dorsal shield with four long setae; Medio-lateral side of dorsum with two distinctly long setae. Dorso-lateral (marginal) setae short, shorter than (ca. ½ or shorter) length of genua. .............................. *latronis*  
   — Anterior end of dorsal shield with two long setae; Medio-lateral side of dorsum without two distinctly long setae. Dorso-lateral (marginal) setae long, close to, or longer than, length of genua. .............................. *andrei*

2. Ventrianal shield wide, almost covers venter. Metapodal, endopodal, exopodal, peritrematal shields fused together; this fused shield element fused with ventrianal shield posteriorly. .............................. *paguroxenus*  
   — Ventrianal shield not wide, does not cover almost entire venter. Metapodal, endopodal, exopodal, peritrematal shields fused together; this fused shield element separated from ventrianal shield. .............................. *paguroxenus*

**Acknowledgments**

This work could not have been conducted without the help of Mark Judson (Muséum National d’Histoire Naturelle, Paris, France); Stefan Friedrich (Zoologische Staatsammlung, München, Germany); Torbjörn Kronestedt (Swedish Museum of Natural History, Stockholm, Sweden) and Nikolaj Scharff (Zoological Museum, University of Copenhagen, Denmark); Anne Baker and Janet Beccaloni (Natural History Museum, London, U.K.); and Jürgen Gruber (Naturhistorisches Museum, Wien, Austria), who kindly allowed me to ex-
amine the specimens of Marc André, Hermann Graf Vitzthum, Ivar Trägårdh, Gwylim O. Evans and Donald Inn, and Georg Ritter von Frauenfeld, respectively. Comments from Bruce Halliday (CSIRO, Canberra, Australia), Thomas Pape (Natural History Museum of Denmark, Copenhagen, Denmark), Neil Evenhuis (Bernice P. Bishop Museum, Honolulu, U.S.A.), Gary Rosenberg (Academy of Natural Sciences, Philadelphia, U.S.A.), Norman Johnson (Ohio State University, Columbus, U.S.A.), David Wagner (University of Connecticut, Storrs, U.S.A.), Lise Roy (Université Paul Valéry Montpellier, Montpellier, France) and two anonymous reviewers helped me improve the manuscript. I hope that this work could be approved by John Bryan Kethley (18 October, 1942 — 29 April, 2004).

ENDNOTE

The contents of this article have been presented at the Mites Associated with Arthropods Symposium in the 12th International Congress of Acarology in Amsterdam on 25 August, 2006.

REFERENCES


André M. 1937b — Description de trois espèces d’Acariens (Gamasoidea) pagurophiles — Bulletin de la Société Zoologique de France 62: 45-68.


Oudemans A.C. 1932 — Eenige twijfelachtige Acari — In: Verslag van de Zeven-en-tachtigste Zomervergadering der Nederlandsche Entomologische Vereeniging — Tijdschrift voor Entomologie 75. LIX-LXVI.

Thurber J. 1955 — The psychosemanticist will see you now, Mr. Thurber — *The New Yorker* May 28, 1955 Issue, p. 28.


COPYRIGHT

Kim C.-M. Acarologia is under free license. This open-access article is distributed under the terms of the Creative Commons-BY-NC-ND which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.