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On the harvestmen species described by Gray in Cuvier's *Animal Kingdom* (Opiliones: Eupnoi, Laniatores)

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Abstract. The English counterpart of Cuvier's *Le Règne Animal*, organized by Edward Griffith in several volumes, contained not only a translation of the French original, but also new material added by invited collaborators. The part on Arachnida, with new material contributed by George R. Gray, contained descriptions of five species of Opiliones, one of them a mite, and two of them new. There are identifications, synonymies and homonymies involved in the taxonomy of these species which are questioned herein. *Gonoleptes spinipes* Gray, [20 July] 1833 is a senior primary homonym of *Gonyleptes spinipes* Perty, [13 December] 1833. This is currently a species inquirenda in Caelopyginae, which is newly considered a subjective synonym of *Metarthrodes triangularis* Roewer, 1931. The latter name should stand in virtue of the senior being invalid by homonymy. *Gonoleptes spinipes* Gray is also a new subjective synonym of *Goniosoma roridum* Perty, 1833, which is in prevailing usage, which makes it a nomen protectum.

Key words: Zoological nomenclature; Arachnida; Caelopyginae; Goniosomatinae.

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Undertaking a project for the compilation of a taxonomic catalogue provided me with a perception that we, modern taxonomists, are truly spoiled by the comfortable modern standards of citations. And when it comes to deciphering classic texts, most of us are rendered clueless for the lack of referenced features. In the older literature, you seldom knew from where information came, not even whether a species or combination was new. In many cases, the illustrations corresponding to the text are to be found elsewhere in the volume, and sometimes not even in the same volume. Sections of some volumes were issued in fascicles, little by little, with their issue sometimes extending for years. This is the case of George R. Gray's treatment of arachnids in the English translation of *Le Règne Animal* of the French biologist Georges Cuvier as discussed below.

The rivalry between English and French zoologists in the beginning of the 19th century was clear in the text of Kirby (1819), who complained about the French taking the lead in describing material from English museums. The seminal work *Le Règne Animal* by Cuvier, which appeared in four volumes in 1816, thus demanded a British counterpart. Edward Griffith's *Animal Kingdom* (1824–1835), published in 44 parts, was a monumental project aiming not only to translate the French scientific epic but also to improve upon it by including new material, especially copious illustrations (Evenhuis 2019).

As explained in detail by Evenhuis (2019), the pattern of authorship was that Griffith and Pidgeon were responsible for the translated portions from French to English. The supplementary information of each volume (including the descriptions of new taxa) was the responsibility of a number of others, rarely Griffith or Pidgeon – and sometimes took the name on the plate when it predates the text. Animal Kingdom's volume 13 (Annelida, Crustacea, Arachnida) covered parts 35 to 37 of the collection, all published in 1833 [accurate date estimates are provided by Evenhuis (2019)]. The Arachnida (which in the French original were only briefly handled by Latreille in volume III) were treated by George R. Gray. In the Opiliones section, seven species are treated by name, and five of them illustrated in plates 20 and 25. In spite of the illustrations being adequate for recognition of the two new species presented by Gray, only one of them was treated by subsequent authors, and the second was engulfed by oblivion. Maybe this was also because the types in the Natural History Museum London (NHM) are long since lost. All the five species of Opiliones treated by Gray the subject of this contribution.

METHODS

In the abbreviated logonymy presented in the Appendix below, only the protonyms, aponyms and chresonyms (*sensu* Dubois 2000) immediately relevant for the present discussion are given. The term "nomen" *sensu* Dubois is used here.

In the main text of *Animal Kingdom*, corresponding to the translation by Griffith and Pidgeon, only two opilionid species are cited by name – *Phalangium opilio* Linnaeus, 1758 and *P. cornutum* Linnaeus, 1767. The new material contributed by Gray contains five other species, all illustrated and cited in the index only. An analysis of the species presented in Gray (1833) and the subsequent treatment of them in the taxonomic literature is given below.

RESULTS

Gray refrained from citing species names in the text, because as in the original by Cuvier, he drew mostly on the genera as operational units for diagnoses and discussion. He made use of the index (Fig. 1A) and the plates for the function of naming the new species.

The two Eupnoi illustrated by Gray (Fig. 1B) do not bear any indication of authorship, subtly indicating that the names were already known. All of them are accompanied by a very brief diagnosis in the index (page 539). There is one parasitiform mite (Fig. 1E) mentioned under the name *Siro crassipes*, which is a combination made previously by Latreille for *Acarus crassipes* Linnaeus, 1758.

The two Laniatores depicted were placed in the genus *Gonoleptes* [which is an incorrect subsequent spelling of *Gonyleptes* Kirby, 1819 created earlier by Latreille (1829)

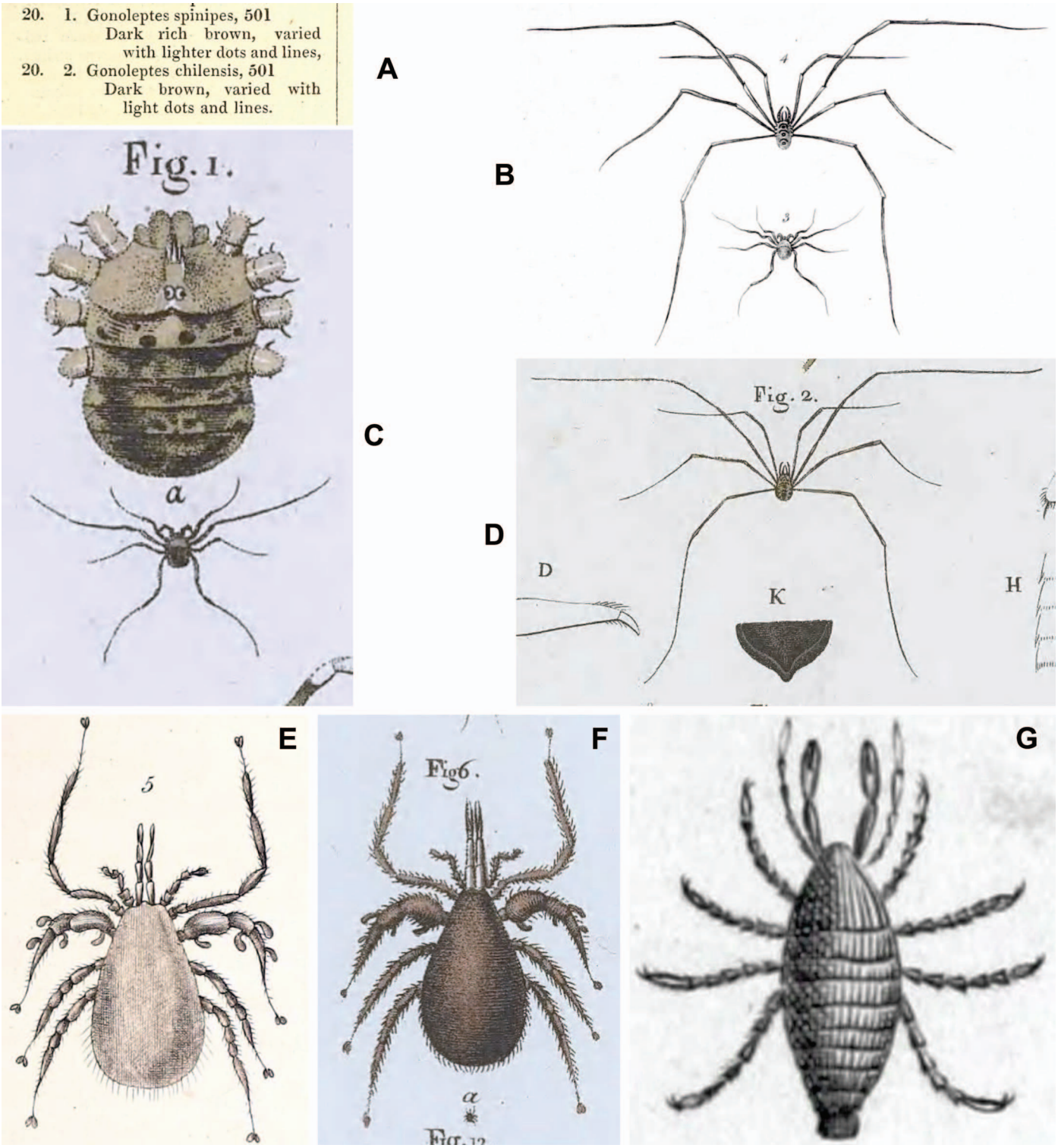

Figure 1.—Comparison of illustrations by Gray and other authors depicting taxa relevant for the present discussion. Cropped images from the Biodiversity Heritage Library: A. Page 539 of *Animal Kingdom*, showing the extremely short descriptions of two new species in the Index; B. Plate 20 of the same, showing *P. annulatum* and *P. spinulosum*; C. Pl. VII of *Mémoire aptérologique*, showing *P. spinulosum*; D. The same, showing *P. annulatum*; E. Pl. 25 of Animal Kingdom, showing the "false" *Siro – S. crassipes*; F. Pl. III of *Mémoire aptérologique*, showing the same; G. Pl. of *Genera Crustaceorum et Insectorum*, showing *Siro rubens*, a "true" *Siro*.

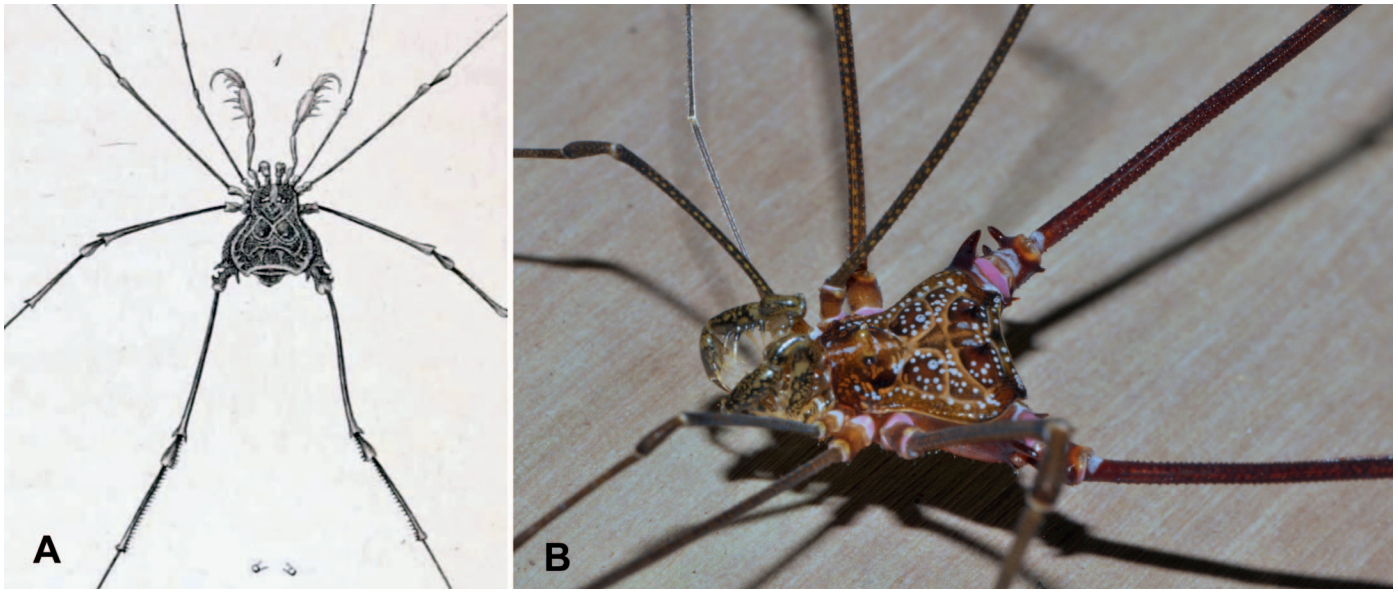

Figure 2.—*Goniosoma roridum* Perty, 1833 nomen protectum: A. Pl. 20 of *Animal Kingdom*, showing Gray's illustration of *Gonoleptes spinipes*; B. Male specimen in vivo, from Nova Iguaçu, RJ (photo taken March 2015, by A.B. Kury).

and repeated several times]. After mentioning that Kirby had created this genus (Gray 1833: 501), Gray compared the pedipalps of *Phalangium* Linnaeus, 1758 with those of *Gonoleptes*. It is noteworthy that, while *Gonoleptes chilensis* was cited later in the literature and is today a well-known species, *Gonoleptes spinipes* was subsequently ignored in the literature.

Phalangium annulatum Olivier, 1791

In plate 25 (facing page 496 in some bound copies), fig. 4, there is a schematic illustration of an Eupnoi with long and thick legs and variegated color pattern (Fig. 1B). The caption reads only "*Ph. annulatum*". The index on page 539 contains the diagnosis: "Red and yellow". In the same way as the species below, this is a citation of a species figured as *Phalangium annulatum* Olivier, 1791 by Hermann (1804: 110, pl. 7, figs. 2, C–I), currently known as *Gyas annulatus* (Fig. 1D).

"*Phalangium spinusolum*" Hermann, 1804

In plate 25 (facing page 496 in some bound copies), fig 3, there is a schematic illustration (Fig. 1B) of a somewhat short-legged Eupnoi. The caption reads "*Phalanginum spinusolum*", revealing at least lack of proof reading. The index on page 539 reads "*Phalangium spinusolum*", with only the species nomen misspelled, and the diagnosis reads only "Reddish", which is regrettably imprecise.

As there is no attribution to Gray in the caption, it is thus implied that this is a previously known species. Gray's illustration is a reworking of fig. 1 in plate 7 by Hermann (1804) depicting *Phalangium spinulosum* Hermann, 1804 (Fig 1C). This species was regarded by Simon (1879:248) as a junior subjective synonym of *Opilio palpinalis* Herbst, 1799 which currently is known as *Lophopilio palpinalis* (Herbst, 1799).

Siro crassipes (Linnaeus, 1758)

Plate 25 (facing page 501 in some bound copies), fig. 5, includes an illustration (Fig. 1E) of a parasitiform mite, which is diagnosed in the index (page 540). It seems that Gray was only one of many to misperceive the flour mites (called "ciron" in French) as belonging to the genus *Siro*. Latreille (1817: 147) commented that the vulgar name "ciron" was applied to the species of *Acarus* of Linnaeus, while he in contrast used the name *Siro* in a specific sense of a "phalangien" as he had established for the species *Siro rubens*. In spite of this clear explanation, Latreille inconsistently proceeded to combine the mite *Acarus crassipes* with *Siro*. *Siro rubens* exemplifies what is currently (and was already) known as Cyphophthalmi [a very early recognition of this by Latreille (1806) is illustrated in Fig. 1G], and is by no means a mite. The illustration given by Gray is a stylized copy of figure 6 of *Acarus crassipes* from Hermann (1804) (Fig. 1F).

Gonoleptes spinipes Gray, 1833

Plate 20 (facing page 501 in some bound copies) displays an illustration of the habitus of the male of the new species *Gonoleptes spinipes* in dorsal view (Fig. 2A). The caption in the plate bears the indication "G.R. Gray" after the species name, denoting that Gray is the author. This species has not been cited subsequently, and it is highly probable that later authors mistook this for the homonym *Gonyleptes spinipes* Perty, 1833 (Fig. 3A). *Gonyleptes spinipes* Perty, 1833 is a junior primary homonym by only five months, with the earliest date of Gray's nomen being 20 July 1833, while Perty's is 13 December 1833.

The latest taxonomic information (Pinto-da-Rocha 2002) places Perty's species in Caelopyginae combined as *Ampheres spinipes* (Perty, 1833), and tagged as a *species inquirenda*. There are no synonyms for this nomen to compete for a replacement name, and that being the case, a new replacement name would have to be created. Nevertheless, some of the

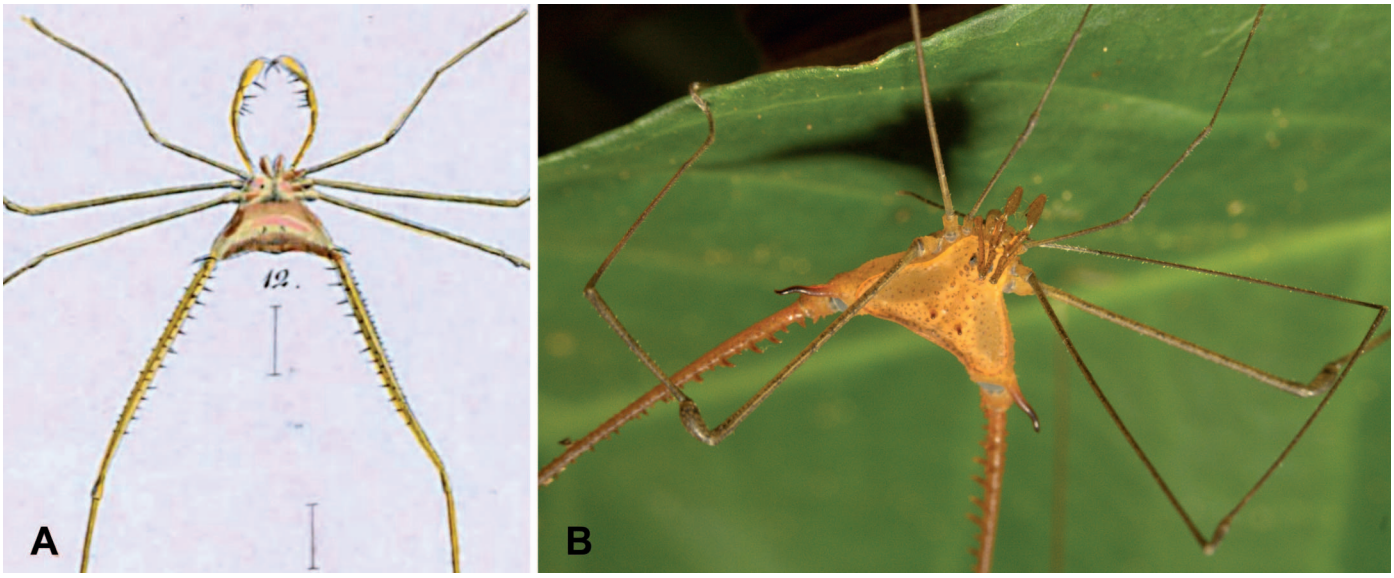

Figure 3.—*Ampheres triangularis* (Roewer, 1931): A. Pl. 39 of *Delectus animalium articulatorum*, showing Perty's illustration of *Gonyleptes spinipes*; B. Male specimen *in vivo*, from Nova Iguaçu, RJ (photo taken November 2018, courtesy S. Cally).

numerous synonymies made in *Ampheres leucopheus* (Mello-Leitão, 1922) by Pinto-da-Rocha (2002) are herein rejected, resulting in the readiness of available names by which to call Perty's species (see Logonymy in Appendix 1, below). The next oldest available synonym is *Metarthrodes triangularis* Roewer, 1931 (Fig. 3B), and there are other two nomina that I hereby remove from the synonymy of *Cœlopygus leucopheus* Mello-Leitão, 1922 to include in the synonym of *M. triangularis* (see below for taxonomic formalization).

Gray never mentioned the type locality of this species. The description of *G. spinipes* Gray, 1833 in the index reads: "Dark rich brown, varied with lighter dots and lines." In spite of the brevity of the diagnosis, this along with the illustration allows the recognition of *G. spinipes* as a valid member of the genus *Goniosoma*, and extremely similar to *G. venustum* C.L. Koch, 1839 and *G. roridum* Perty, 1833 (Fig. 2B), both of which were redescribed by DaSilva & Gnaspini (2010). The latter is a fairly common species of Brazilian Goniosomatinae, and is here considered a synonym of *G. spinipes*, with Gray's name predating Perty's by five months. However, the senior synonym has not been mentioned in the primary literature, and a case is made here for a reversal of precedence (International Code of Zoological Nomenclature, fourth edition, Art. 23.9). The only citation of this species is by Sherborn (1930), in which both this and its homonym are cited in sequence. However, this does not provide endorsement of validity. On the other hand, the nomen *G. roridum* has been extensively cited, and it would be unfortunate for stability to replace it for an unknown nomen.

In summary:

a) *Gonoleptes spinipes* Gray, 1833 has not been used as a valid name after 1899. Sherborn (1930) does not contain any statement of validity, being only a list of available nomina.
b) *Goniosoma roridum* Perty, 1833 has been used as a valid name in at least 25 works, published by at least 10 authors in the immediately preceding 50 years and encompassing a span of not less than 10 years. These include the following papers, official reports and permanent websites using *G. roridum* Perty, 1833 as the valid nomen:

Muñoz-Cuevas (1972:31); Stefanini-Jim (1985, 1995); Gnaspini & Cavalheiro (1998:81); DaSilva (2002: 91); Bragagnolo & Pinto-da-Rocha (2003:4); Kury (2003:118) ; Pinto-da-Rocha et al. (2005:297); Kůrka (2006:online, no page numbers); MMA/IBAMA (2007:2-64); Rodrigues et al (2008:159); Viveiros de Castro (2008:27); DaSilva & Gnaspini (2010:551); Buzatto et al. (2013:147); Souza (2013:64); Buzatto & Machado (2014:table S1, supp. inf.); Instituto Estadual do Ambiente (2014:269); Albín & Toscano-Gadea (2015:6); DaSilva et al. (2015:supp. mat. table S2); Ghazale (2015:40); Ázara (2016:56); Machado et al. (2016, suppl. file: 3); DaSilva et al. (2017:fig. 1); García-Hernández & Machado (2017:table S2, supp. mat.); Taylor (2017:online, no page numbers); Ázara & Ferreira (2018:50); GBIF Secretariat (2019:online, no page numbers); Nogueira et al. (2019a:Appendix S2); Nogueira et al. (2019b:Suppl. Mater., Table S2)

Gonoleptes chilensis Gray, 1833

In plate 20, fig. 2, there is an illustration of the habitus of the male of the new species *Gonoleptes chilensis* in dorsal view (Fig. 4A). The plate caption also bears the indication "G.R. Gray". On page 539 there is a short diagnosis: "dark brown, varied with light dots and lines". As opposed to the preceding species, *G. chilensis* gained traction by being cited early (Sørensen 1884), and then, after being adopted by Roewer (1913), it fell into the mainstream, being a well-known species (Fig. 4B).

DISCUSSION

The 1830s witnessed important works in taxonomy of Brazilian Opiliones, including Perty (1833), Koch (1839), and

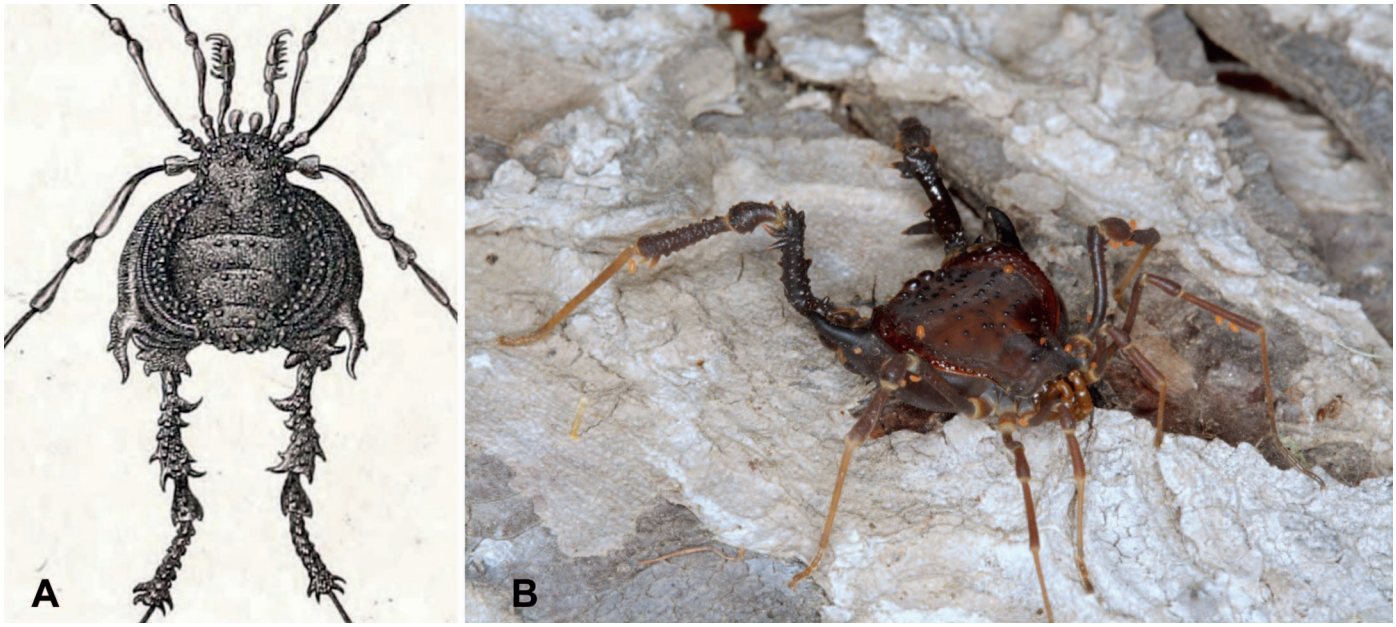

Figure 4.—*Pachylus chilensis* (Gray, 1833): A. Pl. 20 of *Animal Kingdom*, showing Gray's illustration of *Gonoleptes chilensis*; B. Male specimen *in vivo*, from Parque Santiago, Santiago, Chile (photo taken January 2010, courtesy R. Pinto-da-Rocha).

Sundevall (1833), in which the nomina Opiliones and *Mitobates* were first proposed. The work of Gray analyzed here is of only marginal importance.

The illustration of a male of *G. spinipes* by Gray is detailed enough to allow the recognition of the species [after a brief comparison with the potential candidates in the solid review of DaSilva & Gnaspini (2010), which included the redescription of virtually all species of Goniosomatinae]: the invasion of scutal area I by area II, dividing it into two halves; the wide ocularium with short spines; the massive pedipalps; the presence of both prolateral and retrolateral spiniform apophyses on coxa IV barely reaching mid-trochanter IV length; the presence of two prolateral apophyses on trochanter IV, the distalmost longer; the femur IV substraight, all of those point to either *Goniosoma roridum* or *Goniosoma venustum*. The determining difference between these species is the shape of the dry-marks (a term defined by A.B. Kury, in DaSilva & Gnaspini 2010:534). Dry-marks in *G. roridum* are like small circles sprinkled all over the dorsal scutum (hence the aptly-chosen Latin name, meaning "with droplets of dew"), while in *G. venustum* (which bears a more generic Latin name meaning "beautiful") there are nine local patches besides the partial highlight of scutal grooves (DaSilva & Gnaspini 2010:547).

The dry-marks possess the striking feature of being visible only when the specimen is dry (maybe this is why they escaped detection and description for so long), and they can be very useful to complement species descriptions in Gonyleptidae. Gray's material was likely pinned dry, therefore the dry-marks must have been clearly visible and should have made their way into the description. However, Gray's illustration does not carry any evidence of a representation of any dry-mark (swaying neither towards the patterns of *G. roridum* or *G. venustum*), representing a nonspecific laniator "wet" mottling as it can be seen when the animals are observed under alcohol.

That said, the taxonomic decision of which species should be subjectively synonymized with *G. spinipes* is subjective. There was always the lame, "on the fence", alternative of calling Gray's species "*Goniosoma spinipes* (Gray, 1833) a nomen dubium/nomen inquirendum", allowing this now resurrected zombie to plague the checklists as an uncomfortable attachment instead of being buried into synonymy. I have chosen *G. roridum* because: (1) it is by far the commonest species of the two, more probable to have been collected in general expeditions [as it is often the case with recent decisions to designate neotypes as exemplified in Kury & García (2016) and Kury & Medrano (2018)]; (2) it is the oldest nomen; (3) as opposed to *G. venustum*, it can be "saved", maintaining the stability so painfully achieved after DaSilva & Gnaspini's review, because it meets the requirements of ICZN to be conserved by being cited enough (only after duly squeezing the available information for accreditations). That brings me to the ICZN's standard outlined in Art. 23.9 – 25 citations in 50 years is almost an unobtainable achievement for 90% of the species of harvestmen, because their literature is much less abundant than for example, insects or frogs. 100 or 150 years would allow citations of important literature by authors such as Simon, Sørensen and Roewer.

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APPENDIX 1: Abbreviated logonymy of all the harvestmen names in Gray (1833)

Order Parasitiformes Leach, 1815

Parasitidae Oudemans, 1901

Pergamasus crassipes (Linnaeus, 1758)

Acarus crassipes Linnaeus 1758: 616.

Acarus crassipes – Hermann 1804: 80, pl. III, fig. 6, pl. IX, figs Q, R.

Siro crassipes: Latreille 1817: 147.

Siro crassipes – Gray 1833: 540, pl. 25, fig. 5.

Gamasus (*Pergamasus*) *crassipes*: Berlese 1906: 229.

Order Opiliones Sundevall, 1833

Phalangiidae Latreille, 1802

Gyas annulatus (Olivier, 1791)

Phalangium annulatum Olivier 1791: 459 (French vernacular "faucheur annulaire").

Phalangium annulatum – Hermann 1804: 110, pl. 7, figs 2, C–I; Gray 1833: 539, pl. 25, fig. 4.

Gyas annulatus: Simon 1879: 235.

Lophopilio palpinalis (Herbst, 1799)

Opilio palpinalis Herbst 1799: 6, 25, pl. VII, fig. 2.

Lophopilio palpinalis: Šilhavý 1956: 214.

Phalangium spinulosum Hermann 1804: 107, pl. 7, fig 1 (French vernacular "faucheur épineux") [junior subjective synonym of *Opilio palpinalis* Herbst, 1799 by Simon (1879: 248)].

"*Phalangium spinusolum*" Gray 1833: 539, pl. 25, fig. 3. Incorrect subsequent spelling.

Gonyleptidae Sundevall, 1833

Goniosoma roridum Perty, 1833 nomen protectum

Goniosoma roridum Perty [Dec.] 1833: 202.

Gonoleptes spinipes Gray [July] 1833: 539, pl. 20. fig 1 [senior primary homonym of *Gonyleptes spinipes* Perty 1833; senior subjective synonym of *Goniosoma roridum* Perty, 1833, herewith made invalid as a nomen oblitum by reversal of precedence (Art. 23.9)].

Gonoleptes spinipes – Sherborn 1930: 6078.

Pachylus chilensis (Gray, 1833)

Gonoleptes chilensis Gray 1833: 539, pl. 20, fig. 2.

Pachylus chilensis: Sørensen 1884: 639.

Ampheres triangularis (Roewer, 1931) reval., comb. rest.

Gonyleptes spinipes Perty 1833: 205, pl. 39, fig. 12 [junior primary homonym of *Gonoleptes spinipes* Gray, 1833].

Ampheres spinipes: C.L. Koch 1839: 73, pl. 236, fig. 571.

Metarthrodes triangularis Roewer 1931: 132, fig. 12 [junior subjective synonym of *Caelopygus leucopheus* Mello-Leitão, 1922 by Pinto-da-Rocha (2002: 395); synonymy disclaimed here].

Ampheres triangularis: Soares & Soares 1948: 570.

Zalonius punctatus Mello-Leitão 1936: 28, fig. 24 [junior subjective synonym of *Caelopygus leucopheus* Mello-Leitão, 1922 by Pinto-da-Rocha (2002: 395); synonymy disclaimed here]. **Syn. nov.**

Metampheroides serrinus Mello-Leitão 1941: 439 [junior subjective synonym of *Caelopygus leucopheus* Mello-Leitão, 1922 by Pinto-da-Rocha (2002: 395); synonymy disclaimed here]. **Syn. nov.**

Rationale of the synonymies.—as Pinto-da-Rocha (2002) explained, *A. leucopheus* is remarkably widespread for a laniator and depicts a suspiciously wide variation in its color pattern and granulation. However, as I had the chance to observe, the typical *A. leucopheus* bears strong tints of cream over the dark-yellow background of the dorsal scutum, more conspicuous and lighter granulation of dorsal scutum lateral margin, strong chocolate areoles around the tubercles and cherry-red spines on area III. These colorful *A. leucopheus* are consistently distributed in southern São Paulo and northern Paraná states in Brazil. On the other hand, the morphotype that I suggest here to be Perty's species (Fig. 3B) does not have the lateral rows of large acuminate tubercles of dorsal scutum, has a rather uniform caramel background color, with slightly darker areolas around the granules of the dorsal scutum and very small yellow-tipped tubercles on area III. It occurs in central Rio de Janeiro state, precisely where Spix & von Martius' collecting (the source of Perty's material) was undertaken. Now, 18 years past Pinto-da-Rocha's review, when Caelopyginae are much better understood, I discussed the matter with him, and he supports the present taxonomic decision. The original descriptions also match well this interpretation:

Roewer (1931: 133), *M. triangularis*: "Färbung des Körpers einfarbig rostgelb, ohne jegliche weiße Fleckenzeichnung; alle Körnchen und Tuberkeln des Körpers schwarz, doch das Dornenpaar der 3. Area blaßgelb."

Mello-Leitão (1936: 29), *Z. punctatus*: "Areas I a III do escudo dorsal irregularmente granulosas; as areas I e II com dois tubérculos e area III com dois espinhos. Areas laterais com duas filas de granulos. Area IV, tergitos e esternitos livres com uma fila. Corpo amarelo sulfureo; cefalotorax com duas falsas longitudinais denegridas, escudo dorsal com as granulações da parte mesotergal fulvas; pontas dos espinhos avermelhadas; apófise das ancas IV de ponta negra."

Mello-Leitão (1941: 439–440), *M. serrinus*: "Áreas I a III do escudo dorsal irregularmente granulosas, a área III com dois espinhos rombos, baixos, erectos. Colorido geral amarelo queimado uniforme."