

A review of the synonyms of *Myrmarachne* (Araneae: Salticidae), with comments on the availability of each genus name¹

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Abstract. Previous reviews of *Myrmarachne* have not included all known generic names considered to be synonyms of this genus. These names are listed and discussed as to their availability. Similar discussion is provided for related genera in the *Myrmarachne* clade *sensu* Edwards and Benjamin (2009), as their status as valid names may be questionable. For one such case, *Emertonius* Peckham and Peckham 1892, resurrection is rejected due to lack of supportive evidence.

Introduction

Myrmarachne is one of the largest genera of Salticidae, with 217 described species (Platnick 2013). Prószyński (2013) pushes this number even higher, as he includes presumed undescribed taxa for a total of 231 species. Despite the fact that several species groups of *Myrmarachne* have been designated (Prószyński 2003, Edwards and Benjamin 2009), the genus and the lineage it belongs to is still poorly understood. A preliminary phylogeny (Edwards and Benjamin 2009), while supporting the main known species groups, identified a significant unresolved clade that is primarily Southeast Asian in distribution. This clade is apparently the sister group to *Myrmarachne sensu stricto*, and the possibility exists that the species in this clade could be placed in one or more genera besides *Myrmarachne*. *Bocus excelsus* Peckham and Peckham 1892 was among the species associated with this unresolved clade, indicating that at least part of this clade already has a different generic name.

Since a potential need now is evident, this review is made to determine what other generic names are available should *Myrmarachne* need subdivision. As previous reviews and lists of the generic names used for various species of *Myrmarachne* have been incomplete (*e.g.*, Wanless 1978a, Edwards and Benjamin 2009, Platnick 2013, Yamasaki and Ahmad 2013; that of Bonnet 1957 is probably most complete, but still missing a few), it is necessary to rectify this situation in order to have all applicable generic names available. I have included in the review list the Indian genus *Panachraesta* Simon 1900, and the Southeast Asian genera *Bocus* Peckham and Peckham 1892 and *Emertonius* Peckham and Peckham 1892, for which the validity of each genus' status is presently under review (S. Benjamin, in prep.; Edwards, in prep.). *Bocus* and *Panachraesta* have never been synonymized with *Myrmarachne*. *Emertonius* was synonymized by Wanless (1978b), but resurrected by Prószyński and Deeleman-Reinhold (2010). Potentially all three of these genera could be synonyms of *Myrmarachne*. The only other *Myrmarachne* clade member is the African genus *Belippo* Simon 1910, consisting of several species characterized by a distinctive set of synapomorphies of the genital organs (Edwards and Benjamin 2009, Wanless 1978a); including this genus in the present discussion does not seem necessary.

Prior to their transfer, the first species of *Myrmarachne* were described in the late 18th and early 19th century under other pre-existing genera. These are indicated as '(in part)'. The earliest described species that eventually was transferred to *Myrmarachne* is *Aranea formicaria* De Geer 1778, which became embroiled in a debate about the type species of both *Salticus* Latreille 1804 and *Attus* Walckenaer 1805 (Edwards 2011). Subsequently, disagreements about the makeup of certain genera (see historical review in Edwards 2011) led to incorrect placement of new species into other unrelated genera, and somatic differences among species led to the description of new genera (e.g., Peckham and Peckham 1892, Thorell 1894). These new genera were later synonymized by various authors, especially Simon (1901) and Wanless (1978a, b), and misplaced species were transferred to *Myrmarachne*. More recently, Prószyński and Deeleman-Reinhold (2010) resurrected the genus *Emertonius* based only on somatic characters. Somatic characters have not been sufficiently analyzed in the Myrmarachninae to confidently assert that any character states are generic apomorphies. A combination of somatic and genitalic characters, and possibly molecular data, will be needed to make a strong case for resurrecting or maintaining genera that are closely related to *Myrmarachne*.

Taxonomy

ORDER Araneae

FAMILY Salticidae

GENUS *Myrmarachne* MacLeay 1839

Aranea Linnaeus 1758 (in part)

Salticus Latreille 1804 (in part)

Attus Walckenaer 1805 (in part; objective synonym of *Salticus*)

Myrmecia Latreille 1829 (in part)

Entomocephalus Holl 1829 (suppressed)

Pyrophorus C. L. Koch 1837 (preoccupied)

Synemosyna Hentz 1846 (in part)

Janus C. L. Koch 1846 (preoccupied)

Toxeus C. L. Koch 1846

Myrmecarachne Agassiz 1846 (unjustified emendation, objective synonym of *Myrmarachne*)

Oiconistes Gistel 1848 (replacement name for *Pyrophorus*)

Saltica Simon 1864 (objective synonym of *Oiconistes*)

Pyroderes Simon 1868 (unnecessary replacement name for *Pyrophorus*, objective synonym of *Oiconistes*)

Leptorchestes Thorell 1870 (in part)

Janigena Karsch 1880 (replacement name for *Janus*)

Simonella Peckham and Peckham 1885 (in part)

Damoetas Peckham and Peckham 1886 (in part)

Emertonius Peckham and Peckham 1892 (resurrection rejected herein)

Hermosa Peckham and Peckham 1892

Iola Peckham and Peckham 1892

Ascalus Thorell 1894

Herilus Thorell 1894

Pergasus Thorell 1894

Bizone Simon 1903 (preoccupied)

Bizonella Strand 1929 (replacement name for *Bizone*)

Type Species: Myrmarachne melanocephala MacLeay 1839.

Review of generic names

The generic names below are reviewed as to their availability resulting from possible division of *Myrmarachne sensu lato*. An available name as used here is one that could be under consideration for resurrection from *Myrmarachne* as a separate genus for inclusion of species presently placed in *Myrmarachne*, or it could be a different genus into which species presently placed in *Myrmarachne* could be reassigned. From the International Code of Zoological Nomenclature (Fourth Edition, International Commission on Zoological Nomenclature 1999), I give some pertinent articles relating to this discussion:

Article

- 10.6 A name once available remains so irrespective of its invalidity as a junior synonym, a junior homonym, an unjustified emendation, an unnecessary substitute name, or a suppressed name...
- 19.2 A justified emendation replaces the incorrect original spelling and, as a corrected original spelling, retains the authorship and date of the original name.
- 23.3.5 The Principle of Priority requires that if a name in use for a taxon is found to be unavailable or invalid it must be replaced by the next oldest available name from among its synonyms...
- 23.3.6 The Principle of Priority continues to apply to an available name when treated as a junior synonym; it may be used as the valid name of a taxon by an author who considers the synonymy to be erroneous, or if the senior synonym is found to be unavailable...
- 32.3 The correct original spelling of a name is to be preserved unaltered, except where it is mandatory to change the suffix or the gender ending...
- 32.5.1 Incorrect transliteration or latinization, or use of an inappropriate connecting vowel, are not to be considered inadvertent errors.
- 33.2.3 ..."unjustified emendation"; the name thus emended is available and it has its own author and date and is a junior objective synonym of the name in its original spelling; it enters into homonymy and can be used as a substitute name...
- 60.1 A junior homonym [Art. 53] must be rejected and replaced either by an available and potentially valid synonym [Art. 23.3.5] or, for lack of such a name, by a new substitute name [Art. 60.3].
- 61.3.3 If two or more nominal genus-group taxa have the same type species, or type species with different names but based on the same name-bearing type, their names are objective synonyms...

Comments on some of these articles as applied herein. It must be noted that although objective junior synonyms remain technically available according to the Code (*cf.* Article 33.2.3), they are not available for the purposes of this paper, as they cannot be used unless their senior synonyms are unavailable or invalid. Names below are designated as Available or Not Available based directly on their potential applicability to groups of species in the *Myrmarachne* clade (*sensu* Edwards and Benjamin 2009).

The following alphabetical list of genera gives the genus name, author, and year of publication, its present status (sometimes with additional comments), its availability for the purposes of this paper, and its type species:

Aranea Linnaeus 1758 (in part).

Status: Synonym of *Araneus* Clerck 1757, which originally referred to most spiders.

Not Available.

Type species: *Araneus diadematus* Clerck 1757, family Araneidae.

Ascalus Thorell 1894.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Available.

Type species: *Ascalus pygmaeus* Thorell 1894 = *M. pygmaea*.

Attus Walckenaer 1805 (in part).

Status: Objective junior synonym of *Salticus* Latreille 1804 (Bonnet 1955, Edwards 2011).

Not Available.

Type species: *Araneus scenicus* Clerck 1757 = *S. scenicus*.

Bizone Simon 1903 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Wanless 1978a).

Not Available.

Type species: *Bizone longiventris* Simon 1903 = *M. longiventris*.

Bizonella Strand 1929, replacement name for *Bizone* Simon 1903 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Wanless 1978a).

Available.

Type species: *Bizone longiventris* Simon 1903 = *M. longiventris*.

Bocus Peckham and Peckham 1892.

Status: Presently considered a valid genus in the Myrmarachninae (Wanless 1978c), and part of the *Myrmarachne* clade (Edwards and Benjamin 2009).

Available.

Type species: *Bocus excelsus* Peckham and Peckham 1892.

Damoetas Peckham and Peckham 1886 (in part), replacement name for *Scirtetes* L. Koch 1879 (preoccupied).

Status: Presently considered a valid genus in the Myrmarachninae, but in the *Ligonipes* clade, not part of the *Myrmarachne* clade (Edwards and Benjamin 2009).

Two species described in this genus by Prószyński (2001) were transferred to *Myrmarachne* by Edwards and Benjamin (2009). Prószyński (2010) rejected these transfers, apparently without reviewing the character evidence presented by Edwards and Benjamin (2009) in making the transfers, as he simply reiterated his opinion expressed in his earlier paper that these species were 'basal stock' without providing any evidence for such an assertion. In fact, the two species have derived characters that are found only in the *Myrmarachne* clade within the subfamily, e.g., the looped anterior end of the sclerotized part of the spermathecal duct, with J-shaped spermathecae in females. These characters are clearly shown by Yamasaki and Ahmad (2013), in a study of the Bornean fauna of the genus, for *M. mariaelenae* Edwards and Benjamin 2009. What is known for *M. christae* (Prószyński 2001) is similar in overall epigynal structure to *M. mariaelenae*. Yamasaki and Ahmad (2013) accepted the transfer of these two species to *Myrmarachne*.

Not Available.

Type species: *Scirtetes nitidus* L. Koch 1879 = *D. nitidus*.

Emertonius Peckham and Peckham 1892.

Status: Previously considered a synonym of *Myrmarachne* (Wanless 1978b), this genus was recently resurrected by Prószyński and Deeleman-Reinhold (2010) based on somatic characters.

Resurrection Rejected, synonymy restored, reasons discussed below:

The main differences between *E. exasperans* and other *Myrmarachne* species are autapomorphies of color pattern and minor carapace structural differences in *E. exasperans*, which are not by themselves sufficient to support generic status. Male palpal structure indicates that its closest relative is probably *Myrmarachne shelfordi* Peckham and Peckham 1907 from Borneo, a typical *Myrmarachne* species lacking the somatic autapomorphies of *E. exasperans* (personal observation; compare figures in Wanless 1978b with those in Yamasaki and Ahmad 2013). Despite Prószyński and Deeleman-Reinhold's (2010) inference that the Palawan specimen illustrated by Wanless (1978b) is not *E. exasperans*, its palp is essentially identical to the palp of

known specimens of *E. exasperans* from Java, where the species was originally described. Therefore no genitalic evidence exists that the type species is not a typical *Myrmarachne* as the genus is presently understood, although there are a number of species groups in the genus which need further analysis. Resurrection of this genus is therefore rejected due to lack of evidence. This does not eliminate the possibility that future research emphasizing genitalic or molecular analysis could support a lineage within the *Myrmarachne* clade for which this name would be available.

Available.

Type species: Emertonius exasperans Peckham and Peckham 1892.

Entomocephalus Holl 1829

Status: Fossil, type specimen lost, suppressed as senior synonym of *Myrmarachne* MacLeay 1839, by ICZN Opinion 2258, Case 3475 submitted by Dunlop and Penney (2009).

Not Available.

Type species: Entomocephalus formicoides Holl 1829

Herilus Thorell 1894.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Bonnet 1957).

Despite its availability, the type (and only) species in this genus consists of a single juvenile specimen, and it is unlikely to be known with certainty, therefore the name probably cannot be applied with certainty.

Available.

Type species: Herilus radiatus Thorell 1894 = *M. radiata*.

Hermosa Peckham and Peckham 1892.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901, Wanless 1978a).

Available.

Type species: Hermosa volatilis Peckham and Peckham 1892 = *M. volatilis*.

Iola Peckham and Peckham 1892.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901, Wanless 1978a).

Available.

Type species: Iola cowani Peckham and Peckham 1892 = *M. cowani*.

Janus C. L. Koch 1846 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Not Available.

Type species: Janus melanocephalus C. L. Koch 1846 (homonym of *M. melanocephala* MacLeay 1839) = *M. kochi* Reimoser, 1925 (replacement name).

Janigena Karsch 1880, replacement name for *Janus* C. L. Koch 1846 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Available.

Type species: Janus melanocephalus C. L. Koch 1846 (homonym of *M. melanocephala* MacLeay 1839) = *M. kochi* Reimoser, 1925 (replacement name).

Leptorchestes Thorell 1870 (in part).

Status: Valid genus in the Leptorchestidae, unrelated to the Myrmarachninae (Maddison *et al.* 2008).

A few *Myrmarachne* species were misplaced in this genus.

Not Available.

Type species: Salticus berolinensis C. L. Koch 1846 = *L. berolinensis*.

Myrmecarachne Agassiz 1846, emendation for *Myrmarachne* MacLeay 1839.

Status: Objective synonym of *Myrmarachne*.

As explained by Bonnet (1957), a technically correct emendation of the Greek root, but considered an unjustified emendation by Simon (1901), who conserved the original spelling *Myrmarachne*, which has been followed by all modern authors. Simon's argument effectively was that even though it was an incorrect transliteration, it was not inadvertent (Article 32.5.1), making Agassiz's action an unjustified emendation (Article 33.2.3). Article 32.3 therefore would apply, and Article 19.2 would not apply.

Not Available.

Type Species: *Myrmarachne melanocephala* MacLeay 1839.

Myrmecia Latreille 1829 (in part; preoccupied).

Status: Unjustified replacement name for *Myrmecium* Latreille 1824, and itself preoccupied.

Not Available.

Type species: *Myrmecium rufum* Latreille 1824, family Corinnidae.

Oiconistes Gistel 1848, replacement name for *Pyrophorus* C. L. Koch 1837 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Available.

Type species: *Aranea formicaria* De Geer 1778 = *M. formicaria*.

Panachraesta Simon 1900.

Status: Presently considered a valid genus in the Myrmarachninae, original description suggests it is in the *Myrmarachne* clade.

Available.

Type species: *Panachraesta paludosa* Simon 1900.

Pergasus Thorell 1894.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Available.

Type species: *Pergasus formosus* Thorell 1894 = *M. formosa*.

Pyroderes Simon 1868, replacement name for *Pyrophorus* C. L. Koch 1837 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901). Objective junior synonym of *Oiconistes*, an older subjective synonym of *Myrmarachne*.

As a replacement name (*Oiconistes*) had already been proposed for *Pyrophorus*, this is an unnecessary substitute name. It is technically an available name (Article 10.6), but not under the conditions defined for this paper.

Not Available.

Type species: *Aranea formicaria* De Geer 1778 = *M. formicaria*.

Pyrophorus C. L. Koch 1837 (preoccupied).

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901).

Not Available.

Type species: *Pyrophorus semirufus* C. L. Koch 1837 = *M. formicaria* (De Geer 1778).

Saltica Simon 1864.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Bonnet 1958). Objective junior synonym of *Oiconistes*, an older subjective synonym of *Myrmarachne*.

Simon (1864) apparently intended to designate this species as type species for *Salticus* Latreille 1804 (it is one of the two salticid species included with the original description of

Salticus), but he spelled it *Saltica* (which effectively created a new genus). Perhaps Simon was unaware that *S. scenicus* (Clerck 1757) was already designated as type species for *Salticus* (Latreille 1804, 1810). The combination *Salticus scenicus* was first used in print by Hahn (1832).

Not Available.

Type species: Aranea formicaria De Geer 1778 = *M. formicaria*.

Salticus Latreille 1804 (in part).

Status: Valid genus, type genus of family Salticidae (Blackwall 1841), related to the *Philaeus* group, not closely related to the Myrmarachninae (Maddison *et al.* 2008).

Several species of *Myrmarachne* were originally placed in this genus.

Not Available.

Type species: Araneus scenicus Clerck 1757 = *S. scenicus*.

Simonella Peckham and Peckham 1885 (in part).

Status: Considered a synonym of *Synemosyna* Hentz 1846 by Galiano (1966).

Not Available.

Type species: Simonella americana Peckham and Peckham 1885 = *Synemosyna americana*.

Synemosyna Hentz 1846 (in part).

Status: Valid genus in the Synemosyninae, part of the Amycoidea, not related to the Myrmarachninae (Maddison *et al.* 2008).

Several species of *Myrmarachne* mistakenly described in this genus.

Not Available.

Type species: Synemosyna formica Hentz 1846.

Toxeus C. L. Koch 1846.

Status: Synonym of *Myrmarachne* MacLeay 1839 (Simon 1901). Oldest available name after *Myrmarachne*.

Available.

Type species: Toxeus maxillosus C. L. Koch 1846 = *M. maxillosa*.

Discussion

Although this is an extensive review list (27 names), there are relatively few generic names that are realistic candidates for resurrection. Several names were preoccupied, rejected as unnecessary emendations, or suppressed (*Bizone*, *Entomocephalus*, *Janus*, *Myrmecarachne*, *Pyrophorus*), or belong to a different clade within the Myrmarachninae (*Damoetas*). Several names are not available because they are not myrmarachnine salticids, and in some cases are synonyms of other genera (*Attus*, *Leptorchestes*, *Salticus*, *Simonella*, *Synemosyna*), and the remaining names listed as (in part) do not represent salticid spiders at all (*Aranea*, *Myrmecia*).

Oiconistes, *Pyroderes*, and *Saltica* are generic names that have *Aranea formicaria* as the original type species. The latter two are automatically objective synonyms of *Oiconistes*, as it is the oldest name of the three, even if *A. formicaria* were to be removed from *Myrmarachne*. These genera cannot be objective synonyms of *Pyrophorus*, as it has a synonym of *A. formicaria* as its type species, therefore the three other genera would be subjective synonyms of it should it become available. Since this species is part of what I would consider to be *Myrmarachne sensu stricto*, *i.e.*, it is a reasonably close relative of the type species, *M. melanocephala*, these genera will likely remain synonyms of *Myrmarachne*.

Of the other available generic names, *Bizonella*, *Hermosa*, and *Iola* represent the Madagascan fauna, which is much more diverse than presently described (D. Andriamalala, personal communication 2008). An analysis of this fauna will be necessary to resolve the disposition of these names.

Therefore, only *Ascalus*, *Emertonius*, *Herilus* (known only from a juvenile specimen), *Janigena*, *Pergasus*, and *Toxeus* from among the present synonyms of *Myrmarachne* originating from Southeast Asian fauna are potentially applicable. If *Herilus* is discounted due to the likelihood that its type species cannot be identified with certainty, this leaves only five generic names that might be available. Since Edwards and Benjamin (2009) proposed a possible link between parts of the Madagascan and Bornean faunas, the Madagascan names will eventually have to be taken into account as well. Potential resurrection of any of these generic names will depend on the placement of their type species when the species groups are fully resolved and the phylogeny of the entire *Myrmarachne* clade is analyzed.

Additionally, there are two incompletely diagnosed genera, *Bocus* (from Borneo and the Philippines) and *Panachraesta* (from India) which belong to the *Myrmarachne* clade. In the Introduction, I implied that *Bocus* is a genus that might be a possible recipient of species of *Myrmarachne*, or at least be a factor in the phylogenetic analysis of the latter genus. Another alternative, synonymizing *Bocus* with *Myrmarachne*, would make a large genus even larger. Ultimately, what happens will depend on where *Bocus* fits within the *Myrmarachne* clade. An analysis of somatic and genitalic morphological characters to discover which scenario has the best evidence is presently in progress (Edwards, in prep.).

What we know at present, therefore, is that 10 of the 12 available generic names (*Oiconistes* seems certain to remain a synonym of *Myrmarachne*, and *Herilus* probably cannot be diagnosed) are realistic potential recipients of species presently placed in *Myrmarachne*. Whether or not any of them will be needed is the subject of future research.

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