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Systematics and biogeography of the spider genus *Mallinella* Strand, 1906, with descriptions of new species and new genera from Southeast Asia (Araneae, Zodariidae)

PAKAWIN DANKITTIPAKUL[1], RUDY JOCQUÉ[3] & TIPPAWAN SINGTRIPOP[1, 2]

[1]*Department of Biology, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand.*
E–mail: pakawin@gmail.com, scboi020@chiangmai.ac.th
[2]*E–mail: tippawan.si@cmu.ac.th*
[3]*Royal Museum for Central Africa, Department of African Zoology, Leuvensesteenweg 13, 3080 Tervuren, Belgium.*
E–mail: rudy.jocque@africamuseum.be

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PAKAWIN DANKITTIPAKUL, RUDY JOCQUÉ & TIPPAWAN SINGTRIPOP

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Table of contents

Abstract 5
Introduction 6
Material and methods 7
Phylogeny 8
Taxon sampling 9
Character sampling 9
Phylogenetic analyses 12
Reconstruction of phylogenetic tree 12
Phylogeny of *Euryeidon*, *Heradion*, *Heliconilla* gen. nov. and *Workmania* gen. nov. 16
Key to genera of Zodariinae considered in this study 16
Systematics 17
Species-group 28
The *tuberculata*-group 32
Mallinella tuberculata sp. nov. 33
Mallinella atromarginata sp. nov. 39
Mallinella brachiata sp. nov. 41
The *cryptocera*-group 43
Mallinella platycera sp. nov. 43
Mallinella cryptocera sp. nov. 48
Mallinella callicera sp. nov. 50
Mallinella microcera sp. nov. 51
Mallinella vietnamensis Ono, 2003 52
The *hilaris*-group 52
Mallinella hilaris (Thorell, 1890) comb. nov. 52
Mallinella rostrata sp. nov. 54
Mallinella bidenticulata sp. nov. 55
Mallinella acanthoclada sp. nov. 57
Mallinella multicornis sp. nov. 59
Mallinella elongata sp. nov. 67
Mallinella belladonna sp. nov. 69
Mallinella calicoanensis sp. nov. 69
Mallinella linguiformis sp. nov. 71
Mallinella abnormis sp. nov. 71
The *decorata*-group 72
Mallinella decorata (Thorell, 1895) 73
Mallinella filicata sp. nov. 75
Mallinella immaculata Zhang & Zhu, 2009 77
Mallinella innovata sp. nov. 82
Mallinella filifera sp. nov. 83
The *bicolor*-group 87
The *hamata*-group 87
The *advena*-group 90
Mallinella advena sp. nov. 91
The *pectinata*-group 93
Mallinella pectinata sp. nov. 94
The *convolutiva*-group 98
Mallinella convolutiva sp. nov. 98
The *zebra*-group 100
Mallinella zebra (Thorell, 1881) 102
Mallinella beauforti (Kulczyński, 1911) comb. nov. 104
Mallinella vulpina sp. nov. 106
Mallinella vulparia sp. nov. 108
Mallinella axillocrina sp. nov. 109
Mallinella apodysocrina sp. nov. 110
Mallinella mucocrina sp. nov. 112
Mallinella cryptomembrana sp. nov. 114
Mallinella proboscidea sp. nov. 114
The *sciophana*-group 116
Mallinella sciophana (Simon, 1901) comb. nov. 116
Mallinella karubei Ono, 2003 118
Mallinella cuspidatissima sp. nov. 118
Mallinella cuspidata sp. nov. 119

The *sobria*-group 126
Mallinella sobria (Thorell, 1890) comb. nov. 127
Mallinella kritscheri sp. nov. 129
Mallinella clavigera sp. nov. 130
Mallinella caperata sp. nov. 133
Mallinella cirrifera sp. nov. 139
The *fasciata*-group 141
Mallinella fasciata (Kulczyński, 1911) comb. nov. 141
Mallinella vicaria (Kulczyński, 1911) comb. nov. 142
Mallinella allorostrata sp. nov. 143
Mallinella simillima sp. nov. 143
Mallinella apiculata sp. nov. 146
Mallinella concava sp. nov. 150
Mallinella leptoclada sp. nov. 154
Mallinella dolichobilobata sp. nov. 156
Mallinella cordiformis sp. nov. 156
Mallinella brachytheca sp. nov. 158
The *redimita*-group 159
Mallinella redimita (Simon, 1905) comb. nov. 159
Mallinella wiputrai Dankittipakul, Jocqué & Singtripop 2010 163
The *annulipes*-group 163
Mallinella annulipes (Thorell, 1892) nom. nov. 164
Mallinella longipoda sp. nov. 166
Mallinella calilungae (Barrion & Litsinger, 1992) 167
Mallinella shimojanai (Ono & Tanikawa, 1990) 171
Mallinella angustata sp. nov. 172
Mallinella dolichorhyncha sp. nov. 174
The *allantoides*-group 174
Mallinella brachyrhyncha sp. nov. 174
Mallinella scapigera sp. nov. 175
Mallinella angulosa sp. nov. 180
Mallinella brunneofusca sp. nov. 184
The *tricuspida*-group 187
Mallinella tricuspida sp. nov. 187
Mallinella denticulata sp. nov. 191
Mallinella birostrata sp. nov. 191
Mallinella amblyrhyncha sp. nov. 193
Mallinella acroscopica sp. nov. 197
Mallinella angustissima sp. nov. 198
Mallinella robusta sp. nov. 200
Mallinella rolini sp. nov. 201
Mallinella microleuca sp. nov. 203
Mallinella scharffi sp. nov. 203
Mallinella tumidiformis Ono & Hashim, 2008 205
The *thailandica*-group 205
Mallinella thailandica sp. nov. 205
Mallinella sundaica sp. nov. 207
Mallinella galyaniae sp. nov. 211
Mallinella angoonae sp. nov. 213
Mallinella jaegeri sp. nov. 213
Mallinella reinholdae sp. nov. 214
Mallinella onoi sp. nov. 215
Mallinella sumatrana sp. nov. 216
Mallinella murphyorum sp. nov. 217
The *melanognatha*-group 217
Mallinella melanognatha (Van Hasselt, 1882) comb. nov. 217
Mallinella adonis sp. nov. 218
Mallinella elegans sp. nov. 219
Mallinella maruyamai Ono & Hashim, 2008 220
Mallinella superba sp. nov. 220
Mallinella punctata sp. nov. 223
The *klossi*-group 231
Mallinella klossi (Hogg, 1922) 232
Mallinella dambrica Ono, 2004 232

Mallinella oculobella sp. nov. 232
Mallinella insolita sp. nov. 235
Mallinella ampliata sp. nov. 237
The *pecularis*-group 239
Mallinella pecularis sp. nov. 239
The *fronto*-group 242
Mallinella flabellata sp. nov. 242
Mallinella comitata sp. nov. 243
Mallinella flagelliformis sp. nov. 248
Mallinella flabelliformis sp. nov. 249
Mallinella fronto (Thorell, 1887) 249
Mallinella exornata (Thorell, 1887) 251
Mallinella bigemina sp. nov. 254
Mallinella microtheca sp. nov. 255
Mallinella nilgherina (Simon, 1906) comb. nov. 256
Mallinella vittiventris Strand, 1913 258
Mallinella glomerata sp. nov. 258
Mallinella montana sp. nov. 259
Mallinella stenotheca sp. nov. 262
Mallinella silva sp. nov. 264
Mallinella capitulata sp. nov. 265
Mallinella raniformis sp. nov. 271
Mallinella shuqiangi sp. nov. 273
Mallinella alticola sp. nov. 276
Mallinella martensi (Ono, 1983) 279
Mallinella uncinata (Ono, 1983) 280
Mallinella erratica (Ono, 1983) 280
Mallinella nepalensis (Ono, 1983) 280
Mallinella septemmaculata Ono, 2004 281
Mallinella vittata (Thorell, 1890) comb. nov. 283
Mallinella oscari sp. nov. 283
Heliconilla gen. nov. 285
Heliconilla irrorata (Thorell, 1887) comb. nov. 295
Heliconilla thaleri (Dankittipakul & Schwendinger, 2009) comb. nov. 296
Heliconilla cochleata sp. nov. 298
Heliconilla oblonga (Zhang & Zhu) comb. nov. 300
Heliconilla globularis sp. nov. 301
Heliconilla furcata sp. nov. 303
Heliconilla aculeata sp. nov. 305
Heliconilla crassa sp. nov. 306
Heliconilla mesopetala sp. nov. 307
Workmania gen. nov. 309
Workmania botuliformis sp. nov. 311
Workmania juvenca (Workman, 1896) comb. nov. 313
Nomenclatorial remarks 317
Species considered belonging to the genus *Mallinella* 317
Species not considered belonging to the genus *Mallinella* 317
Species not considered belonging to the genus *Storena* 317
Biogeography and paleobiology of the genus *Mallinella* 318
Acknowledgements 322
References 322

Abstract

The systematics status of the spider genus *Mallinella* Strand, 1906 (Araneae, Zodariidae), the phylogenetic relationship of the species within the genus and its relationships to other zodariids were investigated by means of cladistic analysis of morphological data. *Mallinella* is redefined and characterized by a single synapomorphy: the presence of posterior ventral spines situated in front of the spinnerets arranged in a single row. The genus is clearly palaeotropical, occurring in Africa, Indian subcontinent, Indo-Burma, Sundaland, Wallacea and Polynesia-Micronesia.

Two hundred and two (202) *Mallinella* species are treated. One hundred and one (101) species are described as new and placed in twenty-two (22) species-groups, making *Mallinella* the largest zodariid genus. Nineteen (19) species are redescribed, the conspecific sex of seven (7) species is discovered and described for the first time. Fifteen (15) new com-

binations are proposed. Nine (9) *Storena* species are here transferred to *Mallinella*: *M. beauforti* (Kulczyński, 1911) comb. nov., *M. sciophana* (Simon, 1901) comb. nov., *M. sobria* (Thorell, 1890) comb. nov., *M. fasciata* (Kulczyński, 1911) comb. nov., *M. vicaria* (Kulczyński, 1911) comb. nov., *M. redimita* (Simon, 1905) comb. nov., *M. melanognatha* (van Hasselt, 1882) comb. nov., *M. nilgherina* (Simon, 1906) comb. nov., *M. vittata* (Thorell, 1890) comb. nov. Two *Storena* species are transferred to *Asceua*: *A. dispar* (Kulczyński, 1911) comb. nov., *A. quinquestrigata* (Simon, 1905) comb. nov. One *Storena* species is transferred to *Oedignatha* (Liocranidae): *O. aleipata* (Marples, 1955) comb. nov. One *Storena* species is transferred to *Cybaeodamus*: *C. lentiginosus* (Simon, 1905) comb. nov. *Storena tricolor* Simon, 1908 is transferred to the *Asteron* complex of Australia. Three *Storena* and two *Mallinella* species are misplaced; they belong to undescribed genera (*S. kraepelini* Simon, 1905; *S. lesserti* Berland, 1938; *S. parvula* Berland, 1938; *M. khanhoa* Logunov, 2010; *M. rectangulata* Zhang *et al*., 2011). *Mallinella vittata* (Thorell, 1890) comb. nov. is revalidated and removed from the synonymy with *M. zebra* (Thorell, 1881). *Storena vittata* Caporiacco, 1955 is removed from homonym replacement (*S. caporiaccoi* Brignoli, 1983) with *S. vittata* Thorell, 1890 (= *M. vittata* comb. nov.). *Storena annulipes* Thorell, 1892 is removed from its preoccupied name with *S. annulipes* (L. Koch, 1867) in *Storena* and transferred to *Mallinella*; its replacement name *S. cinctipes* Simon, 1893 is suppressed.

Zodarion luzonicum Simon, 1893, *Storena multiguttata* Simon, 1893, *S. semiflava* Simon, 1893 and *S. obnubila* Simon, 1901 are regarded as *nomina dubia*. Six Indian species were misplaced in *Storena*; they belong to one of the following genera: *Mallinella*, *Heliconilla* gen. nov., *Workmania* gen. nov., *Heradion*, or *Euryeidon*. These taxa are S. *arakuensis* Patel & Reddy, 1989, *S. debasrae* Biswas & Biswas, 1992, *S. dibangensis* Biswas & Biswas, 2006, *S. gujaratensis* Tikader & Patel, 1975, *S. indica* Tikader & Patel, 1975 and *S. tikaderi* Patel & Reddy, 1989. They are regarded as species *incertae sedis*.

A new genus, *Heliconilla* gen. nov., is proposed for nine species, six of which are new to science while the other three are transferred from *Mallinella* and *Storena*. These taxa are: *H. irrorata* (Thorell, 1887) comb. nov., *H. oblonga* (Zhang & Zhu, 2009) comb. nov., *H. thaleri* (Dankittipakul & Schwendinger, 2009) comb. nov.

Workmania gen. nov. is established to accommodate two species from Southeast Asia; *W. juvenca* (Workman, 1896) comb. nov. is transferred from *Storena*.

It is unlikely that the origin of *Mallinella* dates back more than 100 MYA. *Mallinella* or its ancestor is believed to have evolved during the Cretaceous, after the separation of South America from Gondwana, and the greater part of its evolution took place during the Tertiary. The Asian-Australian lineages of *Mallinella* could migrate to India via Greater Somalia before or after the K-T extinction (65 MYA), before the Indian subcontinent joined Asia (ca. 45 MYA).The biogeographic history of the genus involves plate tectonics during the Cretaceous and the Cenozoic in combination with climatic changes and alternating climatic cycles which might have led to episodes of range expansion, isolation of populations and allopatric speciation.

Key words: Biodiversity, morphological phylogeny, *Storena*, taxonomy, palaeo-zoogeography

Introduction

The taxonomic history of the spider genus *Mallinella* Strand, 1906 is intertwined with that of *Storena* Walckenaer, 1805. Prior to this revision, the spider genus *Storena* was the largest genus of the Zodariidae, comprising approximately ninety species reported from three different zoogeographical regions: the Oriental, Neotropical and Australian. *Storena* has long been an expedient depository for those zodariids that do not exhibit any remarkable divergent characters. It has recently been proved that *Storena* is a purely Australian genus and its distribution is confined to that continent (Baehr & Jocqué 1994; Jocqué & Baehr 1992). Misplaced species reported from the South Pacific (Berland 1924; Kulczyński 1911b, c; Marples 1955) were examined and are here transferred to *Mallinella*, *Asceua* Thorell and *Oedignatha* Thorell.

Although *Storena* is considered endemic to the Southern Hemisphere, controversial records from other zoogeographical areas have not thoroughly been re-evaluated. Examination of type specimens of '*Storena*' from the Oriental Region revealed that all of these species appear to be incorrectly placed. Early taxonomic works on Southeast Asian Zodariidae contain isolated descriptions of *Storena* species by Simon (1893, 1901, 1905, 1906) and Thorell (1887, 1890, 1895). Two species have been reported from Papua New Guinea (Kulczyński 1911c; Thorell 1881), Java (Kulczyński 1911b), New Hebrides (Berland 1938), and later from Samoa (Marples 1955). Several articles have dealt with species of '*Storena*' from India (Biswas & Biswas 1992, 2006; Gravely 1921; Patel & Reddy 1989; Tikader & Patel 1975), Nepal (Ono 1983) and China (Hu 2001). The most recent '*Storena*' species has been reported from India by Biswas & Biswas in 2006! Four Burmese species were recently transferred to *Mallinella* (Dankittipakul *et al*. 2011)