

**The identity of the Indonesian pseudoscorpions
Lagynochthonius johni (Redikorzev) and
Lagynochthonius roeweri Chamberlin
(Pseudoscorpiones*: Chthoniidae)**

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Summary

Re-examination of the type specimen of *Chthonius johni* Redikorzev (type species of *Lagynochthonius* Beier) from Sumatra confirms the previous identifications of this species from the Philippines and western Java. The holotype is redescribed and the species is newly recorded from Timor, suggesting that it has a wide distribution in the Indonesian region. The type specimens of *Lagynochthonius roeweri* Chamberlin from north-western Java are also redescribed, but no further material has yet been found.

Introduction

The chthoniid genus *Lagynochthonius* Beier is widely distributed in tropical regions of most parts of the world, with the great majority of species occurring in the Asian and Australasian regions; 37 species are currently known (see Harvey, 1991; Muchmore, 1991). The genus has recently been well-defined (Muchmore, 1991), but there have been consistent problems with the identity of the type species, *Chthonius johni* Redikorzev, dating back over 35 years. *Chthonius johni* was described by Redikorzev (1922) from a single male collected by O. John from Siak (now Siak Sri Inderapura), in east-central Sumatra. Beier (1930, 1932) reported an additional two specimens from Batavia (now Jakarta), Java, but Chamberlin (1962) noted significant differences between the descriptions of Redikorzev (1922) and Beier (1930, 1932) and referred the Javanese specimens to a new species, which he named *L. roeweri* Chamberlin. Beier (1966a) reported without comment an additional specimen of *L. johni* from the Philippines, and Harvey (1988) presented a detailed redescription of the species based upon a small collection of new material from western Java. No further specimens of *L. roeweri* have since been reported in the literature, although three additional species of the genus have been described from Java and Sumatra by Harvey (1988), indicating that the Indonesian *Lagynochthonius* fauna is still poorly known.

To clarify the identities of *L. johni* and *L. roeweri*, I here present redescrptions of the type material of both species, deposited in the Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia (ZISP) and the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany (SMF). Further specimens were borrowed from the Museum of Victoria, Melbourne, Victoria, Australia (NMV) and the Bernice P. Bishop Museum, Honolulu, Hawaii, USA (BPBM), Naturhistorisches Museum, Wien, Austria

*The name Pseudoscorpiones is used in preference over Pseudoscorpionida or Chelonethida, based upon a directive from CIDA (Anonymous, 1996).

(NHMW), supplemented by specimens lodged in the Western Australian Museum, Perth, Western Australia, Australia (WAM). Terminology mostly follows Chamberlin (1931) and Harvey (1992), and specimens were examined after clearing in 30 or 50% lactic acid at room temperature.

Genus *Lagynochthonius* Beier

Tyrannochthonius (*Lagynochthonius*) Beier, 1951: 61.

Lagynochthonius Beier: Harvey, 1991: 182 (full synonymy to 1989); Muchmore, 1991: 113.

Type species: Chthonius johni Redikorzev, 1922, by original designation. Beier (1951) nominated *L. johni* as the type species of *Lagynochthonius*, but by that time he had only reported material from Java (Beier, 1930, 1932), and had most likely not seen Redikorzev's holotype of *L. johni*. As noted above, these Javanese specimens of *L. johni* were later attributed to a new species, *L. roeweri* Chamberlin, 1962, and a case could possibly be made that this represents a case of a misidentified type species (Article 70b, International Code of Zoological Nomenclature). Under the new edition of the Code (International Commission on Zoological Nomenclature, 1999), it is no longer necessary to apply to the Commission for a ruling in such cases. To avoid any future confusion, I hereby confirm *Chthonius johni* sensu Redikorzev (1922) as the type species of *Lagynochthonius*.

Diagnosis (after Muchmore, 1991): Chelal hand elongate and constricted distally; condylar apodeme of chelal movable finger enlarged and heavily sclerotised; chelal fingers 1.0–1.5 times longer than hand; spine-like seta on chelal hand small and inconspicuous; males and many females with small sensorium situated slightly distal to *xs* at tip of fixed chelal finger. Carapace with epistome reduced or absent, with closely appressed setae.

Remarks: The diagnosis is taken from Muchmore (1991), who made a detailed comparison between *Lagynochthonius* and *Tyrannochthonius*. Examination of the holotype of the type species *L. johni* reveals that no changes are warranted to this diagnosis. It is of interest to note that all females of *L. johni* and *L. roeweri* reported below clearly possess a distal sensorium on the fixed chelal finger, as in the males. This lends support to the idea of Muchmore (1991) that the sensorium may be more widespread in females of *Lagynochthonius* than previously suspected.

***Lagynochthonius johni* (Redikorzev) (Figs. 1–5)**

Chthonius johni Redikorzev, 1922: 550–554, figs. 5–9.

Lagynochthonius johni (Redikorzev): Harvey, 1991: 184 (full synonymy).

Material examined: Holotype ♂, Siak [now Siak Sri Inderapura, 0°46'N, 102°04'E], Riau, Sumatra, Indonesia, 21 April 1913, O. John (ZISP, no. 176). INDONESIA: *Java*: Jawa Barat: 1 ♂, 2 tritonymphs, Pulau Peucang, Ujung Kulon, 5°45'S, 105°15'E, 19 September 1984 (NMV); *Sumatra*: Sumatera Berta: 1♀, Fort de

Cock [now Bukittinggi, 0°18'S, 100°20'E], 920 m, E. Jacobson, 1926 (NHMW); 1♀, "Sumatra", ex detritus, E. Jacobson (NHMW); *Timor*: 7♂, 4♀, Sui, 9°50'S, 124°29'E, 14 August 1990, D. Agosti (WAM 96/1604–1614). PHILIPPINES: *Negros*: 1♀, Lake Balinasayao [9°22'N, 123°10'E], "ex berlese funnel", 1–7 October 1959, L. Quate and C. Yoshimoto (BPBM).

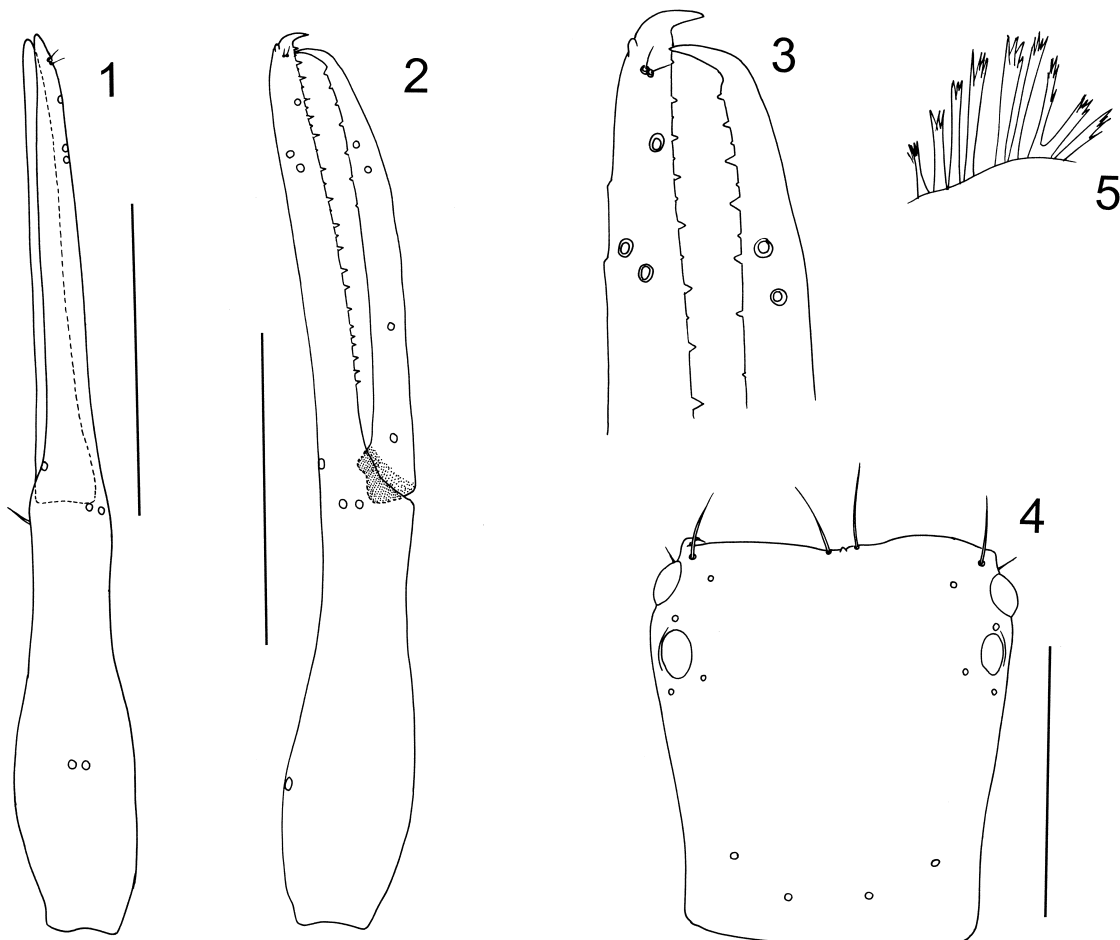
Diagnosis: A combination of chelal length and breadth parameters, as well as the number of chelal teeth, serve to distinguish this species from all others in the genus: chela length 0.670–0.730 (♂), 0.770–0.895 (♀) mm, width 0.100 (♂), 0.135–0.150 (♀) mm, and 6.70–7.30 (♂), 5.70–6.22 (♀) times longer than broad. Chela with 18–20 (♂,♀) main teeth on the fixed finger and 7–9 (♂,♀) teeth on the movable finger, intercalary teeth present, usually prominent.

Description: Holotype ♂: Colour pale brown. Pedipalp: femur 6.00, patella 2.11 and chela 7.30 times longer than broad; chelal hand elongate and constricted distally (Figs. 1–2), 3.55 times longer than broad; chelal fingers long and slender, 1.07 times longer than hand; fixed chelal finger with 19 widely spaced, erect teeth, plus 6 or 7 extremely small intercalary teeth (Fig. 3); movable chelal finger with 7 teeth, plus 3 extremely small intercalary teeth; tip of fixed finger with small distal sensorium situated slightly distal to *xs*; fixed chelal finger and hand with 8 trichobothria, movable chelal finger with 4 trichobothria; *ib* and *isb* on dorsum of hand, *st* close to

t; hand with small, medial, acuminate spine-like seta posterior to level of *ist*; venom apparatus absent; movable chelal finger with strong basal apodeme. Chelicera with 5 setae on hand and 1 medial seta on movable finger; fixed finger with 4 small teeth, most distal tooth largest; flagellum consisting of 7 blades. Carapace (Fig. 4) with 4 large eyes; epistome consisting of an extremely small rounded prominence with two closely appressed setae; with 16 major setae plus 2 microsetae (*m*) situated in front of anterior eyes, arranged m4m: 4: 4: 2: 2. Tergites and sternites undivided; tergite I with 4 setae, remainder not observable; sternal chaetotaxy not observable. Pleural membrane papillo-striate. Genitalia not observable. Coxal chaetotaxy: 2: 3+9cs: 3: 4; coxa I with small triangular apical projection; coxa II with 9 distally incised spines set in oblique row (Fig. 5). Intercoxal tubercle absent. Legs heterotarsate; arolium slightly shorter than claws, claws simple.

Dimensions (mm): Body length *c.* 1.28. Pedipalps: femur 0.510/0.085, patella 0.190/0.090, chela 0.730/0.100, hand length 0.355, finger length 0.380. Chelicera 0.290/0.145, movable finger length 0.155. Carapace 0.365/0.335.

Remarks: The holotype is in poor condition with the abdomen split longitudinally to the carapace, and with the left chela, right chelicera, left legs III and IV and the tips of some other legs missing. During this study it was cleared at room temperature in 30% lactic acid which



Figs. 1–5: *Lagynochthonius johni* (Redikorzev), holotype ♂. **1** Right chela, dorsal; **2** Right chela, lateral; **3** Detail of tip of fingers; **4** Carapace; **5** Coxal spines of left coxa II. Scale lines=0.25 mm (1, 2, 4).

made some structures visible, but details of some characters, such as the genitalia and abdominal chaetotaxy, remained obscured. Despite some apparent minor morphological differences, it seems reasonable to assume that the specimens from Java (Harvey, 1988), Philippines (Beier, 1966a) and Timor are conspecific with the type from Sumatra. The only significant difference between the holotype and the remaining specimens is the reduced size and number of intercalary teeth in the holotype of *L. johni* (Figs. 2, 3). The intercalary teeth of all other specimens examined for this study are prominent (Harvey, 1988: figs. 25, 26), and it seems reasonable to suggest that the holotype is somewhat anomalous. Harvey (1988) suggested that the preocular microseta was absent on the carapace of *L. johni*, but re-examination of some of the Javanese material confirms that they are in fact present, as in all other specimens of *L. johni*.

The new specimens from Sumatra and Timor reported above conform to the diagnosis presented by Harvey (1988) and are clearly conspecific with the holotype. The largest females, collected by Jacobson from Sumatra, possess a chela of 0.895/0.145–0.150 mm and 6.03–6.22 times longer than broad, which is slightly longer and thinner than the female reported by Harvey (1988).

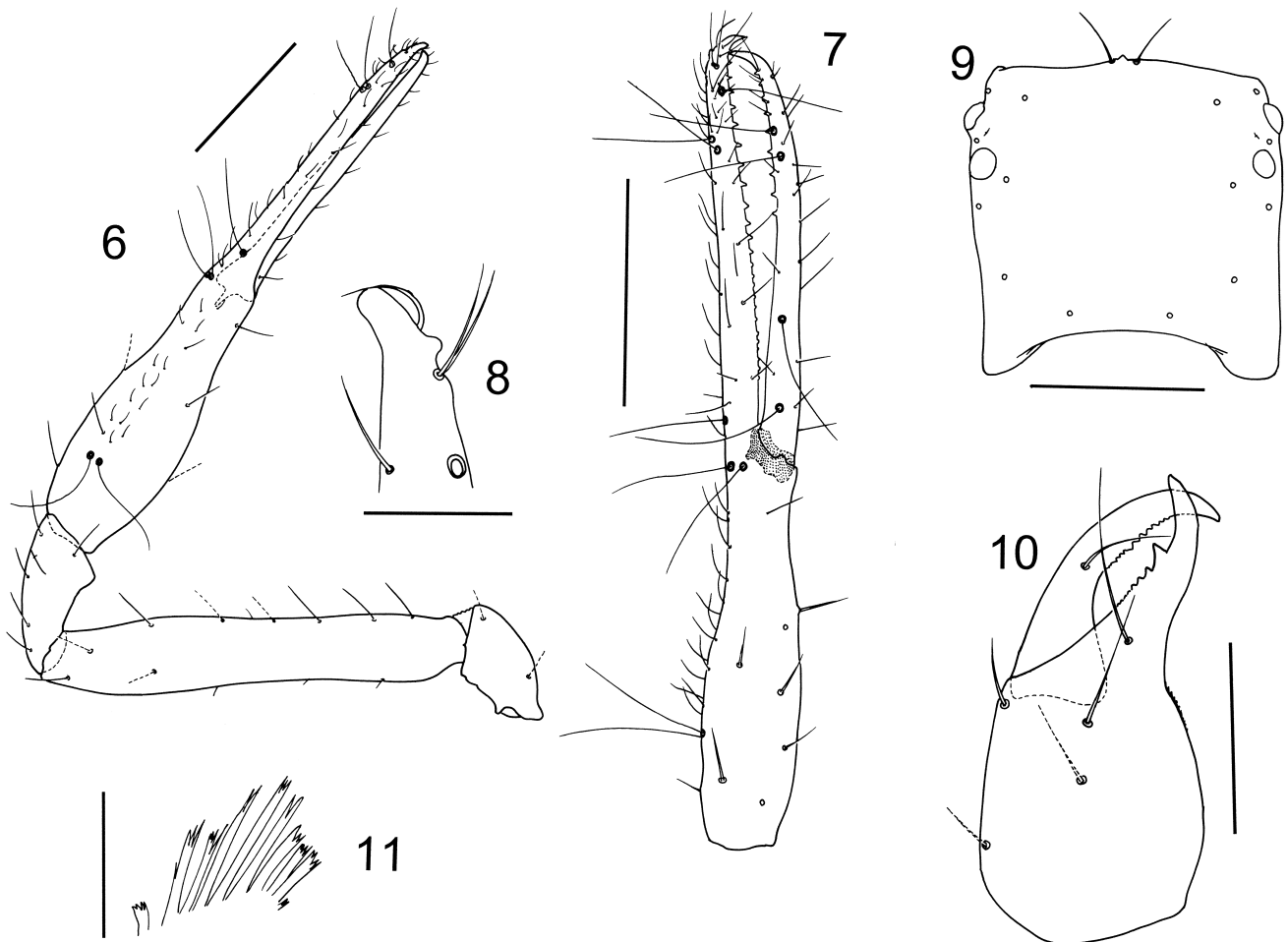
Lagynochthonius roeweri Chamberlin (Figs. 6–11)

Lagynochthonius roeweri Chamberlin, 1962: 316–317; Harvey, 1991: 185 (full synonymy).

Material examined: Lectotype ♀ (present designation), Batavia [now Jakarta, 6°08'S, 106°45'E], Jawa Barat, Java, Indonesia (SMF, 1949/31); 2 paralectotype ♂, same data (SMF, 1951/33).

Diagnosis: *L. roeweri* is one of the largest known species of the genus and, with a pedipalpal femur length of 0.725 (♂), 0.715 (♀) mm and a chela length of 0.880–1.030 (♂), 1.030 (♀) mm, is only approached or bettered in size by *L. salomonensis* (Beier) from the Solomon Islands which has a pedipalpal femur length of 0.68 mm and a chela length of 0.95 mm (Beier, 1966b) and by *L. paucedentatus* (Beier) from Malaysia which has a chela length of 1.14 mm (Beier, 1955). *L. roeweri* differs from *L. salomonensis* by the presence of more teeth on the fixed chelal finger and from *L. paucedentatus* by the presence of more teeth on the movable chelal finger.

Description: Adults: Colour pale brown. Setae acuminate. Pedipalp: trochanter 1.96–2.17 (♂), 2.00 (♀), femur 6.68–7.25 (♂), 5.96 (♀), patella 2.52–2.71 (♂), 2.04 (♀), chela 7.92–8.38 (♂), 5.72 (♀) times longer than broad, chelal hand elongate and strongly constricted distally



Figs. 6–11: *Lagynochthonius roeweri* Chamberlin, lectotype ♀ and paralectotype ♂. **6** Left pedipalp, dorsal, ♀; **7** Right chela, lateral, ♂; **8** Detail of tip of fixed finger, ♀; **9** Carapace, ♀; **10** Left chelicera, dorsal, ♂; **11** Coxal spines of left coxa II, ♀. Scale lines=0.25 mm (6, 7, 9, 10), 0.05 mm (8, 11).

(Fig. 6), with several thin, curved setae in addition to thick, straight setae, 3.54–3.95 (♂), 2.75 (♀), times longer than broad; chelal fingers long and slender, 1.10–1.17 (♂), 1.02 (♀) times longer than hand; fixed chelal finger with 25–26 (♂), 23 (♀) widely spaced, erect teeth, with no intercalary teeth (Fig. 7); movable chelal finger with 9–11 (♂), 9 (♀) teeth, with no intercalary teeth; tip of fixed finger with small distal sensorium situated slightly distal to *xs* in both ♂ and ♀ (Fig. 8); fixed chelal finger and hand with 8 trichobothria, movable chelal finger with 4 trichobothria; *ib* and *isb* on dorsum of hand, *st* close to *t*; hand with small, medial, acuminate spine-like seta posterior to level of *ist*; venom apparatus absent; movable chelal finger with strong basal apodeme. Chelicera (Fig. 10) with 5 setae on hand and 1 medial seta on movable finger; fixed finger with 8 teeth, most distal tooth largest, movable finger with 12 small teeth, mostly subequal in size; flagellum consisting of 7 blades. Carapace (Fig. 9) with 4 large, corneate eyes, anterior pair bulging from carapacial surface, posterior pair lying flat; epistome consisting of a small triangular rounded prominence with two closely appressed setae; with 16 major setae plus 2 microsetae (*m*) situated in front of anterior eyes, arranged m4m: 4: 2: 2. Pleural membrane papillo-striate. Tergites and sternites undivided; tergal chaetotaxy: ♂, 4: 4: 4: 4: 4: 4: 4–5: 5: 5: 4: 4: 0; ♀, 4: 4: 4: 4: 4: 4: 5: 5: 5: 4: 4: 0; sternal chaetotaxy: ♂, 10: (2)34–36[8](2): (3)4–6(3): 10–12: 10–11: 10: 9–11: 9–10: 9: 0: 2; ♀, 10: (3)10(3): (3)8(3): 10: 10: 10: 10: 9: 9: 0: 2. Male genitalia with large ejaculatory atrium; lateral apodemes meeting in mid-line; lateral margin of thickened roof of median diverticulum only slightly undulate; female genitalia with incomplete lateral apodeme frame; lateral diverticulum elongate, evenly covered with cribriform plates. Coxal chaetotaxy: ♂, 3: 4–5+11–12 cs: 5: 5; ♀, 3: 4+9 or 10 cs: 5: 5; coxa I with long rounded apical projection; coxa II with 9–12 distally incised spines set in oblique row (Fig. 11). Intercostal tubercle absent. Legs heterotarsate; arolium slightly shorter than claws, claws simple.

Dimensions (mm), ♂ (♀): Body length 1.35–1.58 (1.57). Pedipalps: trochanter 0.195–0.235/0.090–0.120 (0.220/0.112), femur 0.635–0.725/0.095–0.100 (0.715/0.120), patella 0.230–0.265/0.085–0.105 (0.245/0.120), chela 0.880–1.030/0.105–0.130 (1.030/0.180), hand length 0.415–0.460 (0.495), movable finger length 0.455–0.540 (0.505). Chelicera 0.340–0.395/0.160–0.180 (absent), movable finger length 0.200–0.220 (absent). Carapace 0.370–0.425/0.390–0.450 (0.400/0.450), anterior eye 0.055–0.060 (0.050), posterior eye 0.050–0.070 (0.040).

Remarks: Examination of the type series of *L. roeweri* confirms Chamberlin's (1962) decision to erect a new species to accommodate the specimens identified by Beier (1930, 1932) as *T. johni*. As noted by Chamberlin (1962), this species differs from *L. johni* primarily by its larger size, e.g. chela 0.880–1.030 (♂), 1.030 (♀) mm in length for *L. roeweri*, and 0.670–0.730 (♂), 0.770–0.795 (♀) mm for *L. johni*, but also differs in details of the chelal teeth.

Although Beier (1930) listed only two specimens amongst the material which he examined, there are in

fact three specimens in the two vials containing the types: 2 males (SMF 1951/33) and a female (SMF 1949/31). Rather than attempt to decide which of the two males to exclude from the type series as listed by Chamberlin (1962), it is more prudent to treat all three specimens as syntypes. I hereby select the female as lectotype, and the males as paralectotypes. The two males differ somewhat in size, but no other features could be found by which to regard them as different species, and they are here deemed to be conspecific. Although Beier (1930) records "Batavia" as the provenance of the material, the labels only specify "Java".

Despite recent additions to the *Lagynochthonius* fauna of western Java and adjacent areas (Harvey, 1988), *L. roeweri* is still only known from the type collection from Jakarta in north-western Java.

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References

- ANONYMOUS 1996: Report of the Nomenclature Committee. *Arachnologia* **13**: 5.
- BEIER, M. 1930: Die Pseudoscorpione der Sammlung Roewer. *Zool. Anz.* **91**: 284–300.
- BEIER, M. 1932: Pseudoscorpionidea I. Subord. Chthoniinea et Neobisiinea. *Tierreich* **57**: i–xx, 1–258.
- BEIER, M. 1951: Die Pseudoscorpione Indochinas. *Mém. Mus. natn. Hist. nat., Paris* (n.s.) **1**: 47–123.
- BEIER, M. 1955: A second collection of Pseudoscorpionidea from Malaya. *Bull. Raffles Mus.* **25**: 38–46.
- BEIER, M. 1966a: Über Pseudoscorpione von den Philippinen. *Pacif. Insects* **8**: 340–348.
- BEIER, M. 1966b: Die Pseudoscorpioniden der Salomon-Inseln. *Annl. naturh. Mus. Wien* **69**: 133–159.
- CHAMBERLIN, J. C. 1931: The arachnid order Chelonethida. *Stanf. Univ. Pubs. (Biol. Sci.)* **7**(1): 1–284.
- CHAMBERLIN, J. C. 1962: New and little-known false scorpions, principally from caves, belonging to the families Chthoniidae and Neobisiidae (Arachnida, Chelonethida). *Bull. Am. Mus. nat. Hist.* **123**: 303–352.
- HARVEY, M. S. 1988: Pseudoscorpions from the Krakatau Islands and adjacent regions, Indonesia (Chelicerata: Pseudoscorpionida). *Mem. Mus. Vict.* **49**: 309–353.
- HARVEY, M. S. 1991: *Catalogue of the Pseudoscorpionida*. Manchester University Press, Manchester, New York. vi+726 pp.
- HARVEY, M. S. 1992: The phylogeny and classification of the Pseudoscorpionida (Chelicerata: Arachnida). *Invertebr. Taxon.* **6**: 1373–1435.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE 1999: *International Code of Zoological Nomenclature* (4th edition). International Trust for Zoological Nomenclature, London.
- MUCHMORE, W. B. 1991: Pseudoscorpions from Florida and the Caribbean area. 14. New species of *Tyrannochthonius* and *Lagynochthonius* from caves in Jamaica, with discussion of the genera (Chthoniidae). *Fla. Ent.* **74**: 110–121.
- REDIKORZEV, V. 1922: Two new species of pseudoscorpion from Sumatra. *Ezhg. zool. Muz.* **23**: 545–554.