

Out of Sarawak, Further Records Red-blue big-jawed spider *Leucauge sarawakensis* (Arachnida: Araneae) in Southeast Asia

NUR RACHMAN¹, MUHAMMAD SAYIDINA ALI¹, SURIANTO EFFENDI¹ &
MUHAMMAD IQBAL^{1,2*}


¹*Daemeter Consulting, Jalan Tangkuban Perahu No. 1, Bogor, West Java 16128, Indonesia*

E-mail: ornithologi95@gmail.com;  <https://orcid.org/0000-0002-9482-1103>

E-mail: sayidina.ali@daemeter.org;  <https://orcid.org/0009-0004-1093-5456>

E-mail: surianto.effendi@daemeter.org;  <https://orcid.org/0000-0001-6577-4654>

²*Department of Biology, Universitas Indo Global Mandiri, Jalan Jend. Sudirman No. 629,
Palembang 30129, Sumatera Selatan, Indonesia.*

**Corresponding Author. E-mail: miqbal@uigm.ac.id;  <https://orcid.org/0000-0002-6657-0183>*

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Abstract

Red-blue big-jawed spider *Leucauge sarawakensis* is a spider species described in 2015 from specimens collected in Sarawak, Malaysian Borneo. Since 2015, there are many records of *L. sarawakensis* reported by citizen science platform. To update recent distribution of *L. sarawakensis*, we compile distribution of the species from confirmed reports and our observations. This study suggest *L. sarawakensis* recorded far away out c. 1.000 km distance from Sarawak, and distribution of this species range from Vietnam, Thailand, Malaysia, Singapore, Brunei and Indonesia (Sumatra and Kalimantan).

Keywords: Borneo, tetragnathidae, range, *Opadometa sarawakensis*, Red-blue opadometa.

Introduction

As a class of certain taxon, Arachnids or Arachnida are found throughout the world (Beccaloni 2009). Arachnids are joint-legged invertebrate animals with six pairs of appendages, lack of antennae, incapable of flight, body divided into two parts, book lungs and simple eyes (Venkataraman 2010). They possess a hard external covering called the exoskeleton (integument) that constructed of various layers, like pasta sheets in a lasagne (Beccaloni 2009). Spiders (Order Araneae) are the largest order of arachnids, approximate 32.000 described species, and this probably represent only a portion of the actual number (Ruppert & Barnes 1994).

The Order Araneae is usually divided into three suborders, and of all belong more than 90% to the Areneomorphae or Labidognatha (Foelix 1996). One family of suborder Areneomorphae is Family Tetragnathidae, a group of spider with large chelicerae, giving their common name of big-jawed spiders (Venkataraman 2010). This family sometimes included in the Family Araneidae, but have sufficient structural peculiarities for them to be in their own family (Preston-Mafham & Preston-Mafham 1984).

As a biodiversity hotspot in Oriental region, Southeast Asia is home for at least 3.617 species of spiders in 69 families (Murphy & Murphy 2001). Red-blue big-jawed spider *Leucauge sarawakensis* is a species of spider only found in Southeast Asia. Described from Sarawak in 2015 as *Opadometa sarawakensis*, *Leucauge sarawakensis* was previously known from Brunei and Malaysian Borneo (Koh & Ming 2014; Dzulhelmi *et al.* 2015). The female of *L. sarawakensis* has distinct features, and make this species relatively easy to identified (Koh & Ming 2014; Koh *et al.* 2022). Here, we summarize further records of *L. sarawakensis* from our observations and confirmed citizen science reports. This paper suggest *L. sarawakensis* widely distributed in Southeast Asia, range from Vietnam, Thailand, Peninsular Malaysia, Sumatra and Borneo (Brunei, Malaysian Borneo and Kalimantan).

Methods

We compiled all unpublished and published reports on *L. sarawakensis*. The sites where the species reported are put on the map (Fig. 1). From June 2021 to March 2023, we have opportunities for conducting biodiversity surveys in Sumatra and Kalimantan. During the surveys, we have some observations and documentations of *L. sarawakensis* in the field. Most of the documentations are taken coincidentally, without some specific certain methods being assigned. All the sightings of *L. sarawakensis* are discovered during daylight, ranging between 08.00 a.m. to 05.00 p.m.

Records of *L. sarawakensis* were obtained from published papers and internet supported with photographs or other evidence (e. g. location, habitat type, morphology and description from citizen science reports). All informations presented herein were verified; and ambiguous or unconfirmed records were rejected. iNaturalist as a largest online platform of public sharing biodiversity information is a major source to help data collection on *L. sarawakensis* (iNaturalistGT 2024).

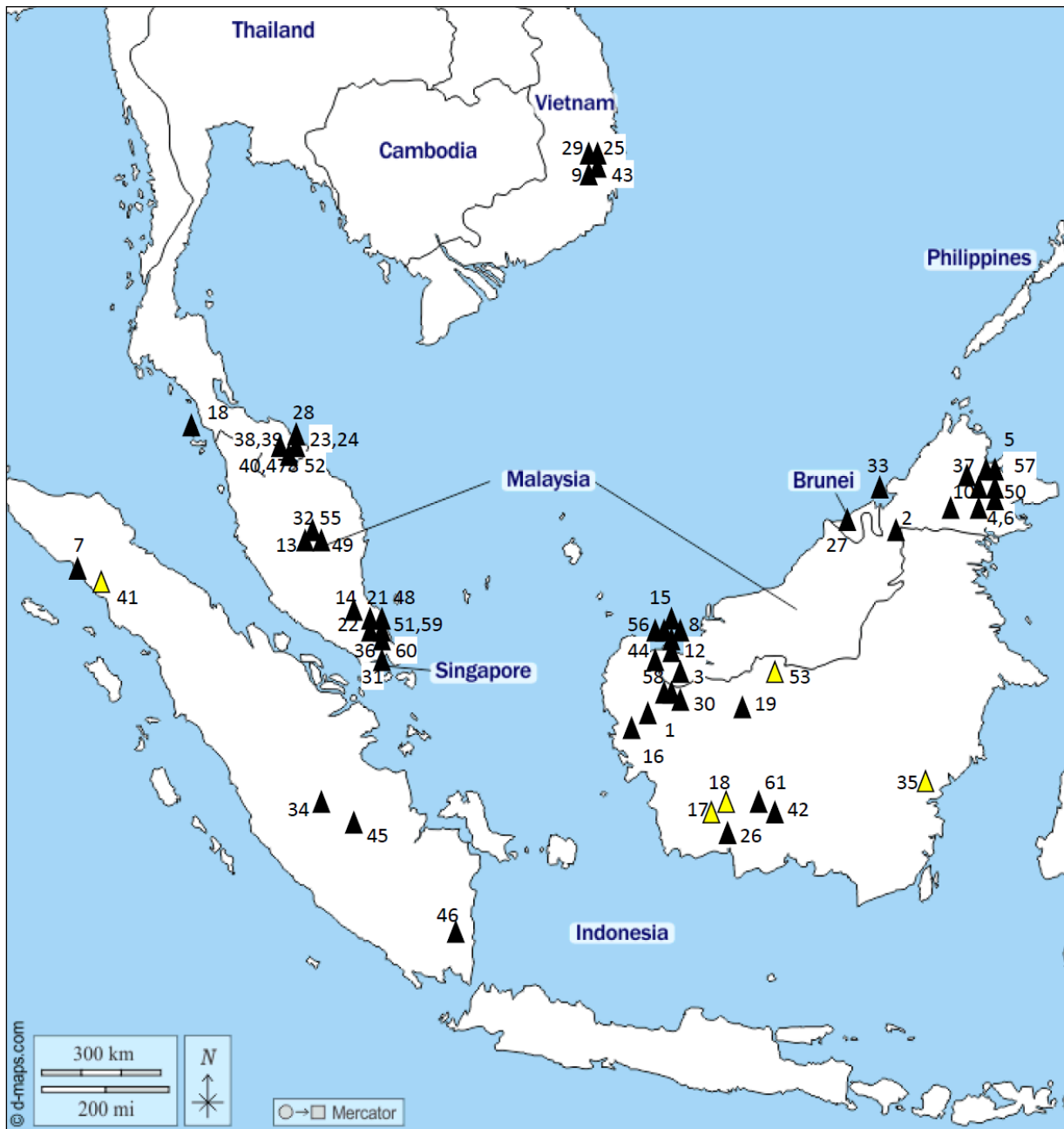


Figure 1. Map of known records of *L. sarawakensis*, solid triangles are previously known from various confirm reports and yellow triangles are our field records in Sumatra and Kalimantan.

Results and Discussion

The spiders were identified as *L. sarawakensis* by the distinct following features of the female: pear-shaped abdomen overhanging the cephalothorax with strikingly coloured in metallic blue and red, each tibia IV is armed with thick brush of black spines and there is an additional brush on tibia I. The male has an orange circular spot on the venter and two orange spots on the sides of the abdomen. The male is smaller, and usually overlooked in the field (Fig. 2-4). The historical records of *L. sarawakensis* are summarize in Table 1.

Table 1. The known records of red-blue big-jawed spider *Leucauge sarawakensis* based our observation and various confirmed sources. Note: NR (Nur Rachman), MSA (Muhammad Sayidina Ali), SE (Surianto Effendi), MI (Muhammad Iqbal).

Date	Location	Sources/Observers	Number in the map (Fig. 1)
16 Mar 2007	West Kalimantan, Indonesia	iNaturalistGT 2024	1
27 Jul 2008	Sarawak, Malaysia	iNaturalistGT 2024	2
26 April 2013	Sarawak, Malaysia	Dzulhelmi <i>et al.</i> 2015	3
2 Mar, 8 May 2014	Sabah, Malaysia	iNaturalistGT 2024	4
29 Jan 2015	Sabah, Malaysia	iNaturalistGT 2024	5
27 Nov 2015	Sabah, Malaysia	iNaturalistGT 2024	6
Oct 2016 (undated)	Aceh Selatan, Indonesia	iNaturalistGT 2024	7
7 Mar 2017	Sarawak, Malaysia	iNaturalistGT 2024	8
14 May 2017	K'Bang, Vietnam	iNaturalistGT 2024	9
1 Jul 2017	Sabah, Malaysia	iNaturalistGT 2024	10
Feb 2018(undated)	Sabah, Malaysia	Miller <i>et al.</i> 2018	11
24 Feb 2018	Sarawak, Malaysia	iNaturalistGT 2024	12
1 Mar 2018	Pahang, Malaysia	iNaturalistGT 2024	13
19 Aug 2018	Johor, Malaysia	iNaturalistGT 2024	14
17 Jan 2020	Sarawak, Malaysia	iNaturalistGT 2024	15
12 Mar 2021	West Kalimantan, Indonesia	iNaturalistGT 2024	16
10 Jun 2021	West Kalimantan, Indonesia	NR, MSA, SE, MI	17
16 Jun 2021	Central Kalimantan, Indonesia	NR, MSA, SE, MI	18
21 Jan 2022	Mueang Satun, Thailand	iNaturalistGT 2024	19
29 Apr 2022	West Kalimantan, Indonesia	iNaturalistGT 2024	20
May 2022 (undated)	Johor, Malaysia	iNaturalistGT 2024	21
12 Jun 2022	Johor, Malaysia	iNaturalistGT 2024	22
5 Aug 2022	Sungai Kolok, Thailand	iNaturalistGT 2024	23
9 Aug 2022	Waeng, Thailand	iNaturalistGT 2024	24
15 Aug 2022	K'Bang, Vietnam	iNaturalistGT 2024	25
7 Nov 2022	Central Kalimantan, Indonesia	iNaturalistGT 2024	26
19 Nov 2022	Lumapas, Brunei	iNaturalistGT 2024	27
Nov 2022 (undated)	Sungai Padi, Thailand	iNaturalistGT 2024	28
28 Nov 2022	K'Bang, Vietnam	iNaturalistGT 2024	29
29 Dec 2022	West Kalimantan, Indonesia	iNaturalistGT 2024	30
2022 (undated)	Singapore	Koh <i>et al.</i> 2022	31
15 Jan 2023	Pahang, Malaysia	iNaturalistGT 2024	32
17 Jan 2023	Sabah, Malaysia	iNaturalistGT 2024	33
18 Jan 2023	Jambi, Indonesia	iNaturalistGT 2024	34
2 Feb 2023	East Kalimantan	NR, MSA, SE, MI	35
20 Feb 2023	Johor, Malaysia	iNaturalistGT 2024	36
24 Feb 2023	Sabah, Malaysia	iNaturalistGT 2024	37
1 Mar 2023	Sungai Kolok, Thailand	iNaturalistGT 2024	38

5 Mar 2023	Ayutthaya, Thailand	iNaturalistGT 2024	39
5 Mar 2023	Waeng, Thailand	iNaturalistGT 2024	40
14 Mar 2023	Aceh Singkil, Indonesia	NR, MSA, SE, MI	41
17 Apr 2023	Central Kalimantan, Indonesia	iNaturalistGT 2024	42
6 Jun 2023	K'Bang, Vietnam	iNaturalistGT 2024	43
18 Jun 2023	Sarawak, Malaysia	iNaturalistGT 2024	44
18 Jul 2023	Jambi, Indonesia	iNaturalistGT 2024	45
25 Jul 2023	Lampung, Indonesia	iNaturalistGT 2024	46
4 Aug 2023	Sukhirin, Thailand	iNaturalistGT 2024	47
6 Aug 2023	Johor, Malaysia	iNaturalistGT 2024	48
19 Aug 2003	Pahang, Malaysia	iNaturalistGT 2024	49
11 Sep 2023	Sabah, Malaysia	iNaturalistGT 2024	50
17 Sep 2023	Johor, Malaysia	iNaturalistGT 2024	51
24 Sep 2023	Sukhirin District, Thailand	iNaturalistGT 2024	52
18 Nov 2023	West Kalimantan, Indonesia	MI	53
11 Dec 2023	Central Kalimantan, Indonesia	iNaturalistGT 2024	54
17 Dec 2023	Pahang, Malaysia	iNaturalistGT 2024	55
Feb 2024 (undated)	Sarawak, Malaysia	iNaturalistGT 2024	56
23 Feb 2024	Sabah, Malaysia	iNaturalistGT 2024	57
11 Mar 2024	Sarawak, Malaysia	iNaturalistGT 2024	58
18 Mar 2024	Johor, Malaysia	iNaturalistGT 2024	59
26 Apr 2024	Johor, Malaysia	iNaturalistGT 2024	60
11 Dec 2022	Central Kalimantan, Indonesia	iNaturalistGT 2024	61

We determined the spider as *L. sarawakensis* as the characteristics agreed with the illustrations of appropriate references (Koh & Ming 2014; Dzulhelmi *et al.* 2015; Koh & Bay 2018; Miller *et al.* 2018; Koh *et al.* 2022). The body length of male is 3 mm (from the cephalothorax or head to the tip of abdomen of mature specimens, exclude the legs, as well as any protruding chelicerae or jaws) and the female is 9 mm. The smaller size between male and female make the male frequently overlooked in the field. The first descriptions of *L. sarawakensis* in 2015 are based from female specimens without male specimens (Dzulhelmi *et al.* 2015).



Figure 2. Female *L. sarawakensis* on 14 March 2023 in Aceh Singkil, Aceh, Sumatra (Photograph by Suriyanto Effendi).



Figure 2. Female *L. sarawakensis* on 18 November 2023 in peatswamp forest of Seluan River, Putussibau, West Kalimantan Province, Indonesia (Photograph by Muhammad Iqbal).

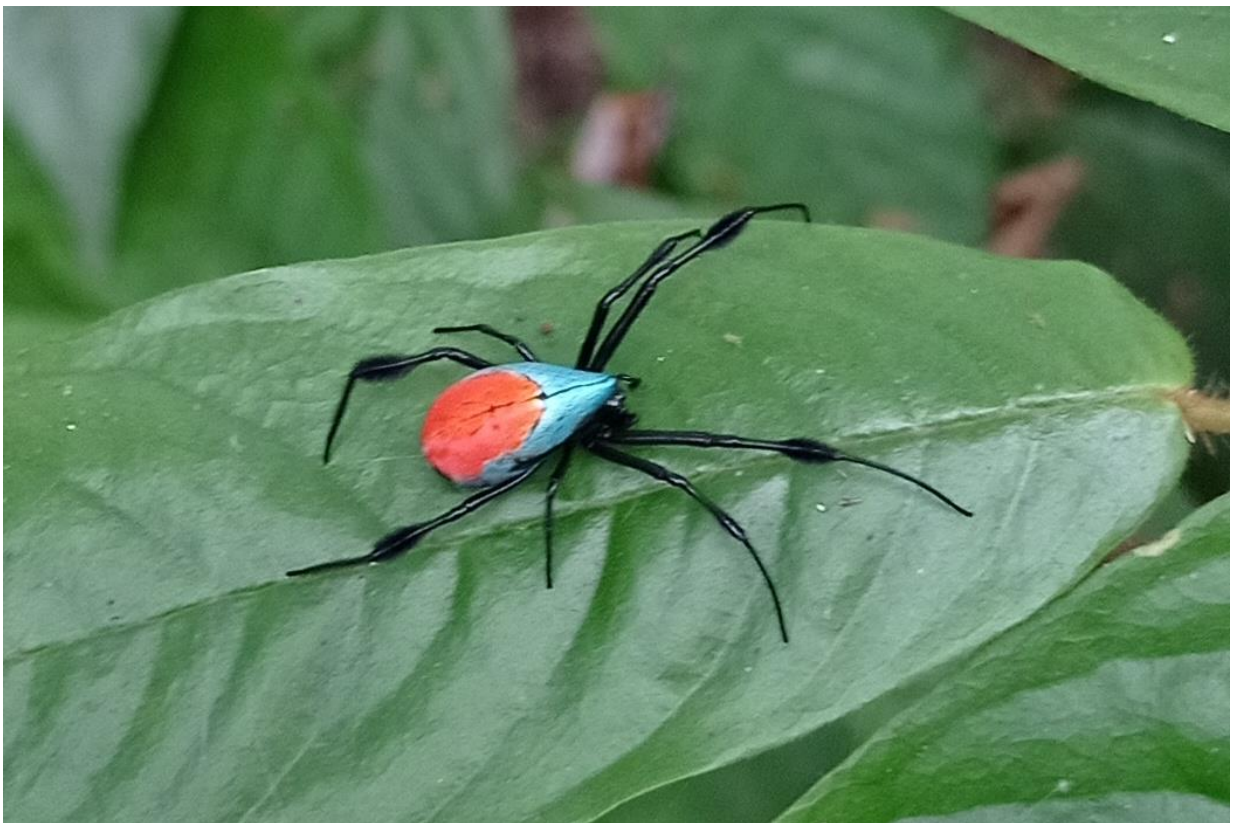


Figure 3. Female *L. sarawakensis* on 17 November 2023 in Sangkulirang, Kutai Timur District, East Kalimantan Province, Indonesia (Photograph by Suriyanto Effendi).



Figure 4. Female *L. sarawakensis* on 18 November 2023 in Mempawah, West Kalimantan Province, Indonesia (Photograph by Muhammad Iqbal).

Dzulhelmi *et al.* (2015) reported *L. sarawakensis* is first new species of spiders based on the specimen collections from Bako National Park, Sarawak, Malaysian Borneo. The presence of this species has been reported by Koh & Ming (2014) from Brunei. The record of this species out from Sarawak and Borneo is reported in October 2016 from photo documentation from Aceh, Sumatra, Indonesia (iNaturalistGT 2024). On 1 March 2018, the species was reported for first time from Pahang, Malay Peninsula (iNaturalistGT 2024). On 21 January 2022, this spider was documented first time in Thailand, from Mueang Satun region (iNaturalistGT 2024). On 6 June 2023, the *L. sarawakensis* reported presence in Vietnam from photo documentation in K'Bang District (iNaturalistGT 2024). The record from Aceh (Sumatra) and K'Bang District (Vietnam) are far away *c.* 1.000 km from Bako National Park, Sarawak (location of female holotype collection).

The records of *L. sarawakensis* outside from Sarawak and Borneo Island indicate this species has wide range in Southeast Asia. The most probable argumentation why *L. sarawakensis* has only been discovered in Vietnam, Thailand, Singapore and Indonesian Borneo because spiders are little explored. The field guide for spiders in Southeast Asia is very limited, particularly a guide with local language. Furthermore, the lack of local spider experts in Southeast Asian countries drive the species being overlooked by biologists. The records of *L. sarawakensis* in Vietnam, Thailand, Malaysia, Singapore, Brunei and Indonesia (Sumatra and Kalimantan) suggest the range of the species is endemic to Southeast Asia.

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