Spiders from Laos with forty-three new records and first results from the provinces Bolikhamsay and Champasak (Arachnida: Araneae).

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Abstract — Results from two recent expeditions to Laos in 2009 and 2010 are provided. The provinces Bolikhamsay and Champasak were investigated in terms of their spider fauna for the first time. The female of Mesida yini Zhu, Song & Zhang 2003 is described for the first time, the internal duct system of Argiope danae Jäger & Praxaysombath 2009 is illustrated for the first time, as is the variation of its epigyne. The following 43 species are recorded for the first time for Laos: Selenocosmia junji Zhu & Zhang 2008, Oecobius concinnus Simon 1893, Argyrodes fissifrons O. Pickard-Cambridge 1869, Argyrodes flavescens O. Pickard-Cambridge 1880, Ariannes cylindrogaster Simon 1889, Chrysso pulcherrima (Mello-Leitão 1917), Coleosoma blandum O. Pickard-Cambridge 1882, Coleosoma floridanum Banks 1900, Dipoena hainanensis Zhu 1998, Dipoena turriceps (Schenkel 1936), Dipoenura cyclosoides (Simon 1895), Faiditus xiphias (Thorell 1887), Metopia picturata Simon 1895, Molione triacantha Thorell 1892, Moneta mirabilis (Bösenberg & Strand 1906), Parasteatoda celsabdomina (Zhu 1998), Parasteatoda daliensis (Zhu 1998), Parasteatoda japonica (Bösenberg & Strand 1906), Parasteatoda oculiprominens (Saito 1939), Rhombphae labiata (Zhu & Song 1991), Stemmops forcipus Zhu 1998, Stemmops nigroabdomen Zhu 1998, Patu shihueni Lin & Li 2009 (new family record for Laos), Guizygiella melanocrania (Thorell 1887), Leucage celebesiana (Walckenaer 1842), Leucage decorata (Blackwall 1864), Leucage xinying Zhu, Song & Zhang 2003, Leucage eizzhong Zhu, Song & Zhang 2003, Mesida yini Zhu, Song & Zhang 2003, Opadometra grata (Guérin 1838), Tetragnatha praedonia L. Koch 1878, Tylorida tianlin Zhu, Song & Zhang 2003, Nephila clavata L. Koch 1878, Argiope aemula (Walckenaer 1842), Argoipe catenulata (Doleschall 1859), Cyrtophora beccari (Thorell 1878), Hippasa lycosina Pocock 1900, Hygropoda yunnan Zhang, Zhu & Song 2004, Hahnia flagellifera Zhu, Shen & Sha 1989 (new family record for Laos), Carrotius vidius (C. L. Koch 1846), Harmochirus zabai Logunov 2001, Phintella assimica Proszynski 1992, and Siler semiglaucus (Simon 1901). Altogether 150 species are now known from Laos. The distribution range of Nephila pilipes (Fabricius 1793) is larger than indicated in the World Spider Catalog. It seems to be the most abundant species of this genus in Southeast Asia. Parasteatoda celsabdomina and Eurychoera banna are recorded for the first time from Thailand, Hygropoda yunnan for the first time from Trat Province in Thailand.

Key words — Spider fauna, faunal elements, first description of female, Mesida yini

Introduction

The present paper is the third in a series dealing with spiders from Laos. The first two papers (Jäger 2007, Jäger & Praxaysombath 2009) provided descriptions of nine new species, first description of unknown sexes, new records and an initial for a check-list of Laotian spiders. Since the second paper two more expeditions were conducted by the first author: in November 2009 (with Steffen Bayer, Senckenberg Frankfurt) and March 2010 (with Jochen Martens, University Mainz). The provinces Bolikhamsay and Champasak were visited the first time. Additional material was collected in cave surveys by Helmut Steiner. The present paper continues compiling knowledge about the Laotian spider fauna. 43 new records for Laos could be identified. Currently 150 spider species are known from Laos.

However, some families or genera were collected, which were not revised yet or on which presently no specialist works, e.g., Ulloboridae, Anapidae, Mysmenidae, Mimetidae, parts of Salticidae, Lycosidae, Dolichognatha, Polytida, etc. All this material is available from Senckenberg collections.

Materials and methods

Material was examined and was preserved in 70% ethanol. Epigynes and internal duct systems were partly treated with 96% lactic acid. Leg measurements are given as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimetres. As in Sparassidae (Jäger 2005:
slit sense organs close to the epigyne are illustrated if present.

Deposition of material: If not stated otherwise material is deposited in the Senckenberg Research Institute, Frankfurt am Main, Germany (SMF) and can be traced in the collection database SeSam (online at http://sesam.senckenberg.de). Material was deposited also in: IBSP — Instituto Butantan, São Paulo, Brazil. MHNG — Muséum d’Histoire Naturelle, Geneva, Switzerland. MNHN — Museum national d’histoire naturelle, Paris, France. NSMT — National Science Museum, Tokyo, Japan.

Publications used for identification are cited in the text. Moreover the following revisions were used: Deeleman-Reindhold (2001), Harvey et al. (2007: Nephila), Kuntner (2005: Herennia, 2007: Nephilengys), Levi (1983: Argiope), Murphy & Murphy (2000: all groups), Ono (2009: all groups), Song et al. (1999: all groups), Yin et al. (1997: Araneidae), Zhang et al. (2004: Pisauridae), Zhu et al. (2003: Tetragnathidae). If not stated otherwise material was determined by the senior author. Material is sorted in the material lists by provinces and from North to South and from West to East.

Abbreviations used in the text: AME — anterior median eyes, ALE — anterior lateral eyes, OL — length of opisthosoma, OW — width of opisthosoma, PJ — subsequent number of Sparassidae, examined by Peter Jäger, PME — posterior median eyes, PL — length of dorsal shield of prosoma, PLE — posterior lateral eyes, PW — width of dorsal shield of prosoma, SD — subsequent number of Sparassidae with tissue sample for DNA-analysis, I—IV — leg I—IV.

Localities (Figs. 1—7)

Laotian localities where spiders were collected are listed here from North to South and from West to East in order of the particular provinces (L1—36, bright grey in Fig. 1, with details listed in Jäger 2007; numbers L37—L78, dark grey in Fig. 1, with details in Jäger & Prayaxesombath 2009; numbers 79—103, black, listed below, starting in the North and going southwards. L-numbers are referred to in the “material examined” section of each species. Names of villages, streams and cliffs are partly according to the geographical maps of the Laotian “Service Geographique d’Etat” (1:100000).

Lao terms: Ban = village, Houay = stream, Keng = rapid, Nam = river, Pha = cliff, Phou = hill, Tham = cave, That = waterfall.

Oudomxai Province

L79 Chom Ong Cave system, 23 air km W of Oudomxai, (F47–120–001), N 20°43′6.3″, E 101°45′52.3″, 750 m altitude, in cave, by hand, H. Steiner leg. 19.1.2009.

Houaphan Province

L80 Vieng Thong, Muang Kout, Ban Deunbin, 71 air km WSW of Sam Neua, Tham Mue (F48–135–010), N 20°16′54.7″, E 103°22′18.4″, 1200 m altitude, in cave, by hand, H. Steiner leg. 15.1.2009.

L81 Vieng Thong, Muang Kout, Ban Deunbin, 70.3 air km WSW of Sam Neua, Tham Nam Lot (F48–135–004), N 20°14′56.2″, E 103°23′47″, 1017 m altitude, in cave, by hand, H. Steiner leg. 13.1.2009.

Luang Prabang Province

L82 Muang Phou Khoun, Tham Seua, N 19°26′35.8″, E 102°26′19.1″, 1240 m altitude, in cave, vegetation along trail, on ground, ground vegetation layer, bushes, bamboo, trees, by hand, day and night, P. Jäger & S. Bayer leg. 13.XI.2009 (Fig. 4).

Bolikhamsay Province

L83 S slopes of Sayphou Loyang, Muang Khamkeut, various caves, 24 air km W of Lak Sao, N 18°13′38.20″, E 104°46′47.70″ and N 18°13′30.37″, E 104°46′53.67″, 500 m altitude, limestone forest, vegetation along stream, by hand and sieving litter, by day, P. Jäger & J. Martens leg. 16.I.2009.

L84 S slopes of Sayphou Loyang, Nam Khiao, 20.5 air km W of Lak Sao, between N 18°13′28.00″, E 104°46′47.70″ and N 18°13′30.37″, E 104°46′53.67″, 500 m altitude, limestone forest, vegetation along stream, by hand and sieving litter, by day, P. Jäger & J. Martens leg. 5.III.2010 (Fig. 3).

L85 S slopes of Sayphou Loyang, Ban Khousaoung, Tham Mankon (= Mangkone), tourist cave with electric light, 17 air km W of Lak Sao, N 18°13′16.10″, E 104°48′45.90″, 518 m altitude, in cave, in front of cave, by day, P. Jäger & S. Bayer leg. 9.XI.2009, P. Jäger & J. Martens leg. 3.III.2010.

L86 S slopes of Sayphou Loyang, Ban Pounang, Nam Khiao Bridge 3, 15 air km W of Lak Sao, N 18°12′47.80″, E 104°49′51.50″, 500 m altitude, stream in arable land, bamboo, bushes, by hand, sieving litter, Winkler, by day, P. Jäger & J. Martens leg. 3.III.2010.

L87 S slopes of Sayphou Loyang, 14 air km W of Lak Sao, N 18°12′41.60″, E 104°50′26.60″, 570 m altitude, shady and cool valley, dry stream bed between rocks, vegetation, by hand, sieving litter, by day, P. Jäger & S. Bayer leg. 10.XI.2009, P. Jäger & J. Martens leg. 3.III.2010.

L88 S of Sayphou Loyang, Ban Na Deua (= Ban Nadua), northern slopes of Phou Samkeng, 7.9 air km WSW of Lak Sao, N 18°11′9.00″ E 104°53′55.00″, 520 m altitude, limestone forest, vegetation at forest margin, small caves, by hand, by sweepnet, P. Jäger & S. Bayer leg. 8. + 10.XI.2009, P. Jäger & J. Martens leg. 6.III.2010 (Fig. 2).

L89 S slopes of Sayphou Loyang, Ban Houay-O, monastery, N 18°11′17.72″, E 104°56′25.69″, 520 m altitude, steep slope of limestone forest, small caves, vegetation, by hand, P. Jäger & S. Bayer leg.
Fig. 1. Collecting sites in Laos (with main rivers). Black numbers (L79–103) are referred to in the “Material and Methods” paragraph, bright grey numbers (L1–30) in Jäger (2007), dark grey numbers (L37–78) in Jäger & Praxaysombath (2009). L16 (Muong You, material from MNHN) not mapped.

8.XI.2009.
L90 E end of Sayphou Loyang, Lak Sao, between N 18°11′49.87″, E 104°57′36.36″, and N 18°11′47.85″, E 104°58′18.51″, 530 m altitude, town with arable fields, bushes, trees, by hand, P. Jäger & S. Bayer leg. 8.–10.XI.2009 (town), P. Jäger & J. Martens leg. 2.–8.III.2010 (town and fields).
L91 E end of Sayphou Loyang, W slopes of Pha Hua, N...
Figs. 2-7. Habitats in Laos in November 2009 and March 2010, start and end of dry season respectively. 2 Rice fields in front of Phou Samkeng (left) with Sayphou Loyang (right, background) (L88). 3 Limestone-walk at southern slopes of Sayphou Loyang (L84). 4 Mix of forest and cultivated land in front of Tham Seua (L82). 5 That Fané waterfalls (L95) with northern part of Dong Hua Sao National Protected Area in the background. 6 That Itou at Houay Champee with a band of forest along the river (L93). 7 Tha Hou rock, project above lowland forest of Xe Pian National Protected Area, with large areas of seasonal wetlands, Steffen Bayer, Jerry Duckitt (standing) (cf. Fig. 65).


**Champassak Province**

L92 Muang Bachiang (＝Ban Bachieng), That Paxuam, 22 air km NNE of Pakse, N 15°16’35.50″, E 105°5

5°22.00″, 190 m altitude, secondary forest, vegetation, by hand, by day, P. Jäger & S. Bayer leg. 25.XI.2009.

L93 Bolaven plateau, Ban Lak 35 (=Ban Itou), road 16 E, Houay Champee, That Itou (=E-Tou), 33.5 air km ENE of Pakse, N 15°11’37.70″, E 106°6’6.30″, 900 m altitude, secondary forest, plantation, vegetation, by hand, sieving litter, Winkler, by day and
night, P. Jäger & S. Bayer leg. 25. + 26.XI.2009, P. Jäger & J. Martens leg. 17.III.2010 (Fig. 6).

L.94 Bolaven plateau, Ban Lak 38, road 16 E, Houay Champee, That Champee (= Champi), 36 air km ENE of Pakse, N 15°11’55.79′, E 106°7’36.47′, 960 m altitude, secondary forest, rocks behind waterfall, vegetation, by hand, by day, P. Jäger & J. Martens leg. 19.III.2010.

L.95 Bolaven plateau, Ban Lak 38, road 16 E, That Fane, 36 air km ENE of Pakse, Dong Hua Sao National Protected Area N 15°11’3.00′, E 106°7’36.90′, 960 m altitude, primary and secondary forest, coffee plantation, vegetation, ground, by hand, sieving litter, Winkler, by day and night, P. Jäger & S. Bayer leg. 27.XI.2009, P. Jäger & J. Martens leg. 11.–20. III.2010 (Fig. 5).

L.96 Bolaven plateau, road 16 E, Pak Song (= Pakxong), 47.7 air km ENE of Pakse, N 15°10’46.02′, 106°14’23.66′, 1288 m altitude, pine plantation, vegetation, ground, by hand and sweep-net, sieving litter, by day, P. Jäger & S. Bayer leg. 27.XI.2009.

L.97 Phou Bachiang, 10 air km NE of Pakse, N 15°10’50.40′, E 105°52’1.20′, 190 m altitude, secondary forest, vegetation, by hand, by day, P. Jäger leg. 23.XI.2009.


L.100 Ban Khan Gngeng, Phou Salao, 2 km S of Pakse, N 15°5’38.17′, E 105°48’34.60′, 170 m altitude, secondary forest, vegetation, rocks, by hand, by day and night, P. Jäger & S. Bayer leg. 23.–24.XI.2009, P. Jäger & J. Martens leg. 10.III.2010.

L.101 Ban Nonghoy, N slopes of Phou Malong, 7.5 km SSE of Pakse, N 15°3’14.00′, E 105°49’7.10′, 100–220 m altitude, disturbed secondary forest, arable land, rocks, vegetation, by hand, by day, P. Jäger leg. 23.XI.2009.


L.103 Ban Thangbeng, Tha Hou, 1.8 air km S of Ban Thahou, Xe Pian National Protected Area, N 14°46’9.60′, E 105°59’34.50′, 130 m altitude, rocks, vegetation, forest, by hand, by day, P. Jäger & S. Bayer leg. 22.XI.2009 (Fig. 7).

Results

Theraphosidae Thorell 1869

Selenocosmia jiafu Zhu & Zhang 2008

Material examined. 1 female (SMF 59824), L3, by hand, by night, P. Jäger & V. Vedel leg. 06.XI.2004, V. von Wirth det. 2009.

The female from Muang Sing (L3) was identified by von Wirth with the description of Zhu & Zhang (2008: 436, fig. 6).

First record for Laos.

Sicariidae Keyserling 1880

Loxosceles rufescens (Dufour 1820)

Material examined. 1 female (SMF 60308), L9, cave, by hand, P. Jäger & S. Bayer leg. 15.XI.2009.

This is the only poisonous spider known from Laos. Its known distribution is restricted to two caves close to Luang Prabang. So far, no bite accidents with spiders are known from Laos.

Mimetidae Simon 1881

Few samples were collected and identified by Danilo Harms (in litt.) to genus level. From the records it appears that the genera Phobetinus Simon 1895 and Australomimetus Heimer 1986 from the subfamily Mimetiniae Simon 1881 are widely distributed and relatively species-rich in Laos.

Oecobiidae Blackwall 1862

Oecobius marathaus Tikader 1962

Material examined. 1 male (SMF 60734), L24, Vientiane, city, wall beside street, by day, by hand. P. Jäger & J. Martens leg. 22.III.2010.

Oecobius concinnus Simon 1893

Figs. 8–10

Material examined. 12 males, 14 females (SMF 60378), L24, Vientiane, city, wall, by day, by hand, P. Jäger & J. Martens leg. 22.III.2010.

Material examined for comparison. 2 females (SMF 9906310 = RII 6310), Brazil, Recife. 1 female (SMF 18077, ex RII 7480), Brazil, Recife, ex Coll. Roewer, E. Kritschler det. 1966 sub O. annulipes.

Male copulatory organs were found as illustrated by Shear (1970) and Santos & Gonzaga (2003). The female from Trinidad shown by Shear (1970) had a completely different epigyne than those drawn by Santos & Gonzaga (2003) and Baum (1972). Baum illustrated an unidentified species from Recife, Brazil, which was identified by Santos & Gonzaga (2003) as O. concinnus. Epigynes and vulvae of the present series are slightly differing and are illustrated herein. Diagnostic characters seem to be: 1. The sclerotised arch from which copulatory ducts arise (Figs. 8–9), 2. Two pairs of ducts running to and from the lateral membranous spermathecae (Fig. 10, arrows in Fig. 8). Differences, e.g. shape of arch, course of copulatory ducts, are interpreted here as intraspecific variation.

First record for Laos.

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Theridiidae Sundevall 1833

Argyrodes fissifrons O. Pickard-Cambridge 1869

Material examined. 1 male, 3 subadult males, 1 subadult female (epigyne recognisable under cuticle)
(SMF 60361), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009. 1 male (SMF 60756), L88, by day, in cave, by hand, P. Jäger & J. Martens leg. 6.III.2010. 1 male (SMF 60281), L90, by hand, at night, P. Jäger & J. Martens leg. 2.III.2010. 1 male (SMF 60286), L95, coffee plantation, by day, by hand, P. Jäger & J. Martens leg. 11.III.2010. 3 males (SMF 60421), L103, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2010.

First record for Laos.

Argyrodes flavescens O. Pickard-Cambridge 1880

Material examined. 1 female, 1 subadult female (SMF 60397), L7, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 16.XI.2009. 1 male (SMF 60320), L82, shady slope, by night, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 1 female, 1 subadult male (SMF 60374), L70, at hut in front of cave, by day, by hand, P. Jäger leg. 15.III.2008. 2 females (SMF 60299), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 1 male (MHNG), L93, by night, by hand, P. Jäger & S. Bayer leg. 26.XI.2009. 1 male, 1 female, 1 subadult female (SMF 60285), L95, coffee plantation, by day, by hand, P. Jäger & J. Martens leg. 11.III.2010. 1 male (SMF 60271), L95, primary forest and resort, by day, by hand, P. Jäger & J. Martens leg. 17.III.2010. 2 males, 1 subadult male, 1 juvenile (SMF 60274), L95, resort, vegetation and at ground, at night, by hand, P. Jäger & J. Martens leg. 17.III.2010.

All spiders collected at That Fan in 2009 were found in webs of Nephilengys malabarensis.

First record for Laos.

Ariamnes cylindrogaster Simon 1889

Material examined. 1 juvenile (SMF 60351), L100, by night, by hand, P. Jäger & S. Bayer leg. 24.XI.2009.

First record for Laos.

Chrysso pulcherrima (Mello-Leitão 1917)

Material examined. 1 male (SMF 60260), L95, at night, by hand, P. Jäger & J. Martens leg. 12.III.2010.

The present male exhibits scaled setae at the posterior end of the opisthosoma, which in combination with the humped opisthosoma could be considered as evidence for a congenerity with Meotipa spp. (as proposed by Yoshida 2009). I follow Platnick (2010) and list the species under Chrysso.

First record for Laos.

Colesosoma blandum O. Pickard-Cambridge 1882

Material examined. 1 female (SMF 60372), L15, river banks, shrubs, rocks, by hand, P. Jäger leg. 25.II.2008.

First record for Laos.

Colesosoma floridanum Banks 1900

Material examined. 1 male (SMF 60379), L24, Vientiane, city, wall, by day, by hand, P. Jäger & J. Martens leg. 22.III.2010.

First record for Laos.

Dipoea hainanensis Zhu 1998

Material examined. 1 male (SMF 60266), L95, leaf litter & vegetation, by night, by hand, P. Jäger & J. Martens leg. 16.III.2010.

First record for Laos.

Dipoea turciceps (Schenkel 1936)

Material examined. 2 males (SMF 60307), L82, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009.

First record for Laos.

Dipoenura cyclosoides (Simon 1895)

Material examined. 1 female (SMF 60263), L95, coffee plantation, leaf litter and vegetation, at night, by hand, P.

Figs. 8-10. Oecobius concinnus Simon 1893, females from Vientiane city (L24) — 8-9, epigyne, ventral (arrows pointing to afferent and abducen duct); 10, vulva, dorsal (membranous spermathecae omitted).
Jäger & J. Martens leg. 15.III.2010.
First record for Laos.

*Faiditus xiphas* (Thorell 1887)


Specimens could be identified with illustrations of Yoshida (1993).

First record for Laos.

*Meotipa picturata* Simon 1895

**Material examined.** 1 female (SMF 60755), L100, by night, by hand, P. Jäger & S. Bayer leg. 24.XI.2009.

First record for Laos.

*Molione triacantha* Thorell 1892

**Material examined.** 1 female (SMF 60741), L91, by night, by hand, P. Jäger & J. Martens leg. 4.III.2010.

**Additional material examined for comparison.** 1 male, 2 females, 1 juvenile female. (SMF 40918), Malaysia, Pahang, Kuatan, secondary forest, beaten from bushes, J. Wunderlich leg. VIII, Wunderlich det.

Five species of *Molione* have been described, two of which are known to exhibit three sclerotised protuberances on the dorsal opisthosoma: *M. triacantha* and *M. trispinosa* (O. Pickard-Cambridge 1873). The latter is known from Sri Lanka and has a completely different arrangement than the present specimens: the two anterior protuberances are distinctly separated and the posterior single spine is situated on a socket (Pickard-Cambridge 1873: pl. 14, fig. 9a). Wunderlich (1995: 569) doubted that the specimens from Taiwan identified by Yoshida (1982: 39, figs. 5–8) are conspecific with *M. triacantha*, without giving reasons. Illustrations of the vulva have been published by Levi & Levi (1962) and by Zhu (1998; the latter repeated in Song et al. 1999). Although Levi & Levi (1962: fig. 137) made only a small illustration, the main characteristic features are recognisable: copulatory openings inconspicuous and situated laterally from the small protuberance of the epigyne; thin intromittent ducts running almost straight to anterior of spermathecae, turning and running posterior, coiling irregularly, before entering spermathecae. The female shown by Zhu (1998: 13C) could be conspecific with *M. triacantha* according to the vulva (if the specimen was illustrated from a more anterior view). However, the spermathecae are distinctly larger than those shown by Levi & Levi (1962) and the present specimen. A similar internal duct system has been shown by Yoshida (2003: fig. 16) for *M. kinabalu* Yoshida 2003. In the present specimens the opisthosomal spines are more conical than shown in Wunderlich (1995: figs. 43–44). In Levi & Levi (1962) these are narrower at their bases. Inspite these differences the female from Laos is considered belonging to *M. triacantha*.

First record for Laos.

*Moneta mirabilis* (Bösenberg & Strand 1906)

**Material examined.** 1 male (SMF 60367), L91, plantation, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. First record for Laos.

*Parasteatoda celsabdomina* (Zhu 1998)

Figs. 11–20, 32–38

**Material examined.** 3 females (SMF 60382), L91, plantation, rock cliff, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 2 females (SMF 60740), L91, vegetation, by hand, by night, P. Jäger & J. Martens leg. 4.III.2010. 1 female (SMF 60375), L33, Tham En, in front of cave, by hand, by day, P. Jäger leg. 28.II.2003. 1 female, 5 juveniles (SMF 60390), L92, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 1 male (both embolus tips present), 1 female (SMF 60391), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 1 male (left embolus tip broken) (SMF 60392), L93, by night, by hand, P. Jäger & S. Bayer leg. 26.XI.2009. 1 female (SMF 60736), L93, by night, by hand, P. Jäger & S. Bayer leg. 26.XI.2009. 1 female (SMF 60380), L95, coffee plantation, resort and primary forest, leaf litter, vegetation, by day and night, by hand, P. Jäger & J. Martens leg. 12–13.III.2010. 1 female (SMF 60742), L95, leaf litter & vegetation, by night, by hand, P. Jäger & J. Martens leg. 16.III.2010. 2 males (both embolus tips present in one male, left embolus broken in the other male), 1 female (SMF 60381), L95, resort, vegetation and at ground, at night, by hand, P. Jäger & J. Martens leg. 17.III.2010. 2 females, 1 subadult male (SMF 60389), L100, by night, by hand, P. Jäger & S. Bayer leg. 24.XI.2009. 2 females, 1 immature female (SMF 60388), L101, by hand, by day, P. Jäger leg. 23.XI.2009. 1 female (SMF 60393), L102, by hand, by day, P. Jäger & S. Bayer leg. 28.XI.2009.

**Material examined for comparison.** THAILAND: 1 female (SMF 60455), Thailand, Gulf of Thailand, Trat Province, Ko Chang, 3 air km S. of Hat Sai Kao, 37 m altitude, N 12°04’46.2”, E 102°16’48.2”, partly empty riverbed, secondary forest, by hand, at night, P. Jäger & S. Bayer leg., 2.XI.2009.

Males from That Itou could be readily identified with illustrations of Zhu (1998). Differences are found in the embolus, which has in Zhu (1998) a broad (fig. 45D) or a narrow pointed tip (fig. 45E). In the present specimen the embolus tip is rather broad and additionally exhibits a pre-determined breaking point (Figs. 19–20: arrow), as known for *P. tepidariorum* (C. L. Koch 1841) (Knoflach 2004: 181, fig. 60 g; Jäger, unpubl. observations: SMF 26768, 40909). In the latter case only a small part of the embolus is lost which most likely is not sufficient as functional mating plug (Knoflach 2004: 181). In two of four males of *P. celsabdomina* the tip of the left embolus is missing. Females show slight variation (median bulge of posterior epigynal rim — as in Zhu 1998: fig. 45B — absent in present...
Figs. 11–20. *Parasteatoda celsabdomina* (Zhu 1998), females from That Itou, L93 (11–12), Thailand, Ko Chang (13–14), Lak Sao, L90 (15–16) and from Phou Malong, L101 (17) showing variation; male from That Fane, L95 (18–20) — 11, 13, 15, 17, epigyne, ventral (17 not treated with lactic acid); 12, 14, 16, vulva, dorsal; 18 left male palp, retrolateral; 19, tip of embolus, distal; 20, tip of embolus and conductor, retrolateral (arrows pointing to predetermined breaking point of embolus).
Figs. 21–31. Parasteatoda sp. cf. ozymaculata (Zhu 1998), females from That Itou, L93, showing variation — 21, 24, 27–28, 30–31, epigyne, ventral (27, 30–31, not treated with lactic acid); 22, 25, 29, vulva, dorsal, 23, 26, schematic course of internal duct system.
specimens). In general, a quite strong intraspecific variation is observed in the shape and course of the internal duct system (Figs. 11–17). This may be due to the asymmetrical conformation of the intromittent ducts. PL of males: 1.1–1.3 mm, thus slightly longer than that of the types from Hainan (1.10 mm). PL of females: 1.6–2.4 mm (holotype: 1.7 mm). At That Itou and That Fane males and females occurred syntopically.

First record for Laos and Thailand.

*Parasteatoda* sp. cf. *oxymaculata* (Zhu 1998)

Figs. 21–31, 39–42

**Material examined.** 3 females (SMF 64037), L93, by night, by hand, P. Jäger & S. Bayer leg. 26.XI.2009.

The six females of this species could not be unambiguously identified. They belong to a group of species— together with P. celsabdomina, P. kaindi (Levi, Lubin & Robinson 1982), P. decorata (L. Koch 1867), P. jinghongensis (Zhu 1998), P. oxymaculata and P. subvexa (Zhu 1998)—characterised by a sclerotised posterior margin of the epigynal pit and broad and coiled intromittent ducts (Chrysanthus 1963, Levi et al. 1982, Zhu 1998, this paper). In P. celsabdomina and present specimens a unique asymmetric conformation of intromittent ducts is exhibited. In the present form intromittent ducts reach the anterior half of spermathecae. Moreover white lines on dorsal opisthosoma are not as narrow as in P. celsabdomina, and the dorsal prosoma of females shows a uniform colouration (Figs. 41–42), whereas those of P. celsabdomina are distinctly brighter in the posterior half (Fig. 34). According to the humped opisthosoma and its colouration as well as from the outline of the posterior epigynal pit margin it may belong to P. oxymaculata from Hainan and Guangxi. Only after conspecific males are found definite statements about species identity can be made.

Parasteatoda daliensis (Zhu 1998)

Material examined. 1 female (SMF 60412), L91, plantation, rock cliff, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female (SMF 60334), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009.

All characters given in Zhu (1998) are identical with those exhibited in the present females including course and shape of the internal duct system and lateral view of epigynal lip. The prosoma is slightly longer (1.2 mm) than that of the holotype (1.05 mm).

First record for Laos.

Parasteatoda japonica (Bösenberg & Strand 1906)

Material examined. 1 female (SMF 60385), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 2 females (SMF 60384), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 female (SMF 60735), L91, plantation, rock cliff, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female (SMF 60386), L103, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2010.

Additional material examined for comparison. 1 male, 2 females, 2 juveniles, syntypes (SMF 3030), Japan, Yunohamaberge, W. Dönitz leg. 1881.

Females of this species are similar to those of P. mundula (L. Koch 1872) (Zhu 1998, Saaristo 2006). As the colouration of the opisthosoma of the present specimen is congruent to that of the syntypes (two distinctive round patches medially in the middle and at the end of dorsal opisthosoma) and the black median bar between spinnerets and epigastic furrow in the present specimens is not mentioned in the specimens examined by L. Koch (1872: 263) and missing in illustrations of Saaristo (2006: fig. 58B), the female is considered being conspecific with the syntypes of P. japonica. More evidence is given by the course of the intromittent ducts whose lateral outlines are straight as illustrated for P. japonica in Zhu (1998: fig. 51C) and not convex as shown for P. mundula by Zhu (1998: fig. 59C). Male copulatory organs, especially the course of the embolus and the humped outline of the conductor, as illustrated in Zhu (1998: figs. 51D–E) are congruent with those of the male syntype examined. It should be mentioned that material from Oudomxai shows variation in colouration and intromittent ducts are laterally slightly convex. However, the detection of a possible synonymy of P. mundula with P. japonica including a revision of Parasteatoda in SE Asia is beyond the scope of this paper.

First record for Laos.

Parasteatoda oculiprominens (Saito 1939)

Fig. 43

Material examined. 1 male (SMF 60383), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009.

The male has a different colour pattern than shown for the female of this species in Yoshida (2003: fig. 533): prosoma is yellowish brown as in all legs, opisthosoma is entirely dark grey to black without pattern except for a crescent pale grey patch on anterior and lateral opisthosoma (Fig. 43). There are also differences in the shape of gnathocoxae in comparison to the original illustrations in Saito (1939: fig. 5e, 1959). Moreover, with a body length of 1.5 mm it is smaller than data suggested for Japanese (Yoshida 2003, 2009: 1.7–2.7 mm) and Chinese specimens (Zhu 1998: 1.72–2.18). Since the male copulatory organ conforms in all details to those shown for the Chinese specimens, it is considered conspecific with P. oculiprominens. Since for China the species was found exclusively in the South (Sichuan, Guangxi, Hainan) (Zhu 1998) and original material from Japan was not examined, a re-examination of the type material including conspecific females from the type locality would be necessary to clear the final specific status of the Chinese and Lao populations.

First record for Laos.

Rhomphaea labiata (Zhu & Song 1991)


In the present male the base of the embolus is much wider than according to illustrations in Zhu (1998) and Yoshida (2009). Moreover the distal appendage shown in

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Zhu (1998) and not in Yoshida (2009) is present. Nevertheless the male is considered conspecific with the females found.

First record for Laos.

*Steatoda cingulata* (Thorell 1890)

**Material examined.** 1 female (SMF 60301), L91, slope beside road without vegetation, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009.

*Stemnopus forcipus* Zhu 1998

**Material examined.** 1 female (SMF 60249), L43, by day, sieving, P. Jäger & S. Bayer leg. 18.XI.2009. 1 female (SMF 60250), L87, by day, sieving, P. Jäger & S. Bayer leg. 10.XI.2009. 1 female (SMF 60282), L86, by day, sieving, P. Jäger & J. Martens leg. 4.III.2010. 2 males, 3 females (SMF 60256), L93, leaf litter, by day, sieving, P. Jäger & S. Bayer leg. 26.XI.2009. 1 female (SMF 60259), L95, primary forest, leaf litter, sieving, P. Jäger & J. Martens leg. 27.XI.2009. 1 male (SMF 60267), L95, primary forest, leaf litter, sieving, by day, P. Jäger & J. Martens leg. 16.III.2010. 2 females (SMF 60275), L95, primary forest, leaf litter, sieving, by day, P. Jäger & J. Martens leg. 17.III.2010.

All specimens were exclusively collected by sieving leaf litter.

First record for Laos.

*Stemnopus nigrabdomen*us Zhu 1998

**Material examined.** 1 male (SMF 60251), L91, plantation, rock cliff, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009.

The specimen could clearly identified by the illustrations of Zhu (1998).

First record for Laos.

**Symphytognathidae** Hickman 1931

*Patu shiluensis* Lin & Li 2009

Fig. 44

**Material examined.** 1 female (SMF 60258), L95, vegetation, leaf litter, sieving, P. Jäger & S. Bayer leg. 27.XI.2009.

According to its colouration (Fig. 44), body size and female copulatory organ the species is clearly identifiable with illustrations of Lin & Li (2009).

First record of the species and of the entire family for Laos.

**Tetragnathidae** Menge 1866

*Guzygiella guangxiensis* (Zhu & Zhang 1993)

**Material examined.** 1 male, 4 females (SMF 60317), L41, P. Jäger leg. 7.III.2008. 1 male, 4 females (SMF 60373), L5, P. Jäger leg. 2.III.2008. 1 male (SMF 60376), L6, valley with stream, by hand, by day, P. Jäger & V. Vedel leg. 9.XI.2004. 2 females (SMF 60401), L6, vegetation close to stream, by hand, by night, P. Jäger & S. Bayer leg. 18.XI.2009. 3 males, 7 females (SMF 60327), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 female (SMF 60371), L18, P. Jäger & V. Vedel leg. at night, by hand, 17.XII.2004. 1 female (SMF 60291), L22, vegetation, by hand, P. Jäger & S. Bayer leg. 12.XI.2009. 1 female (SMF 60296), L100, by night, by hand, P. Jäger & S. Bayer leg. 24.XI.2009. 7 females (SMF 60340), L99, boat at Mekong, by night, by hand, P. Jäger leg. 28.XI.2009. 2 females (SMF 60252), L103, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2010.

Two females (from L54 and L99) out of 25 females have a scapus (cf. Jäger 2007: figs. 8–9). One of them is a freshly moulted pale specimen.

*Guzygiella melanocrania* (Thorell 1887)

**Material examined.** 1 male (SMF 60350), L43, at night, by hand, P. Jäger & S. Bayer leg. 18.XI.2009

First record for Laos.

*Guzygiella nadleri* (Heimer 1984)

**Material examined.** 11 females (SMF 60328), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009.

**Leucage celebesiana** (Walckenaer 1842)

**Material examined.** 2 females (SMF 60247), between L37 and L38, by day, by hand, P. Jäger & S. Bayer leg. 19.XI.2010. 1 female (SMF 60344), L82, in front of cave, by night and day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 10 males, 15 females, 1 subadult female (SMF 60357), L96, by day, sweep net, P. Jäger & S. Bayer leg. 27.XI.2009. 1 male, 1 female (SMF 60333), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 2 males, 1 female (SMF 60246), L93, by night, by hand, P. Jäger & S. Bayer leg. 26.XI.2009.

Additional material examined for comparison. 1 male, 1 female (SMF 9907564=RII 7564), Sumatra, Coll. Roever 1938.

First record for Laos.

*Leucage decorata* (Blackwall 1864)

**Material examined.** 1 female (SMF 60364), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009

First record for Laos.

*Leucage tessellata* (Thorell 1887)

**Material examined.** 1 male (SMF 60404), L43, by night, by hand, P. Jäger & S. Bayer leg. 18.XI.2009. 3 females (SMF 60324), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 male (SMF 60346), L82, in front of cave, by night and day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 2 females (SMF 60318), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female (SMF 60289), L87, by day, by hand, P. Jäger & S. Bayer leg. 10.XI.2009. 1 male (SMF 60356), L96, by day, sweep net, P. Jäger & S. Bayer leg. 27.XI.2009. 2 males, 3 females (SMF 60332),
L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009.  

Leucage xinling Zhu, Song & Zhang 2003

Material examined. 2 females (SMF 60765), L7, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 16.XI.2009. 1 female (SMF 60766), L102, by hand, by day, P. Jäger & S. Bayer leg. 28.XI.2009.

Epigyne shows slight variation (Fig. 45) in comparison of Zhu et al. (2003: 142 I). Body measurements (PL 1.3, OL 2.5–2.6) are similar to those of the holotype (PL 1.62, OL 2.34). Characteristic colouration coincides with that shown in Zhu et al. (2003: 142 A–B).

First record for Laos.

Leucage zizhong Zhu, Song & Zhang 2003

Material examined. 1 female (SMF 60355), L96, by day, sweep net, P. Jäger & S. Bayer leg. 27.XI.2009.

First record for Laos.

Mesida yini Zhu, Song & Zhang 2003

Fig. 46–52

Material examined. 1 male, 1 female, 1 subadult female (SMF 60276), L82, S Luang Prabang Province, Muang Phou Khoun, in front of cave, by day and night, by hand, P. Jäger & S. Bayer leg. 13.XI.2009.

Extended diagnosis. Female epigyne is most similar to that of M. yangbi Zhu, Song & Zhang 2003 and M. wilsoni Chrysanthus 1975 (Fig. 48; see Chrysanthus 1975, Zhu et al. 2003). M. yini may be distinguished by the long and anteriorly narrow median septum and by its shorter and broader intromittent ducts from M. yangbi, and by its long transverse anterior epigynal pocket from M. wilsoni.

Note. Colouration differences are not to be considered of high diagnostic value as shown, e.g., for Leucage tessellata and L. subtessellata (Jäger 2007, Yoshida 2009 contra Zhu et al. 2003). Zhu et al. (2003) mentioned a bright patch in the centre of the ventral opisthosoma as being diagnostic for M. yini. This patch is distinctly developed in the subadult female, rather weakly expressed in the female and absent in the male (Fig. 50–52).

Redescription of male. Total length 2.7, PL 1.2, OL
1.5. The present specimen is slightly larger than both type specimens (total length: 2.45–2.48). The “earthy yellow patch near the center” as listed in the diagnosis for this species by Zhu et al. (2003) is missing. There are slight differences in the course of the sperm duct of the male palp in comparison with the original drawings of Zhu et al. (2003) (Figs. 46–47). The four black patches, as described for the holotype by Zhu et al. (2003) are very indistinct in the present specimen (Fig. 50–52).

**First description of female.** Total length 3.7, PL 1.3, PW 0.9, OL 2.7, OW 1.7. Eye diameters: ALE 0.075, PME 0.08, PME 0.08, PLE 0.07. Eye interdistant: AME–AME 0.04, AME–ALE 0.09, PME–PME 0.055, PME–PLE 0.095, AME–PME 0.06, ALE–PLE 0.01, clypeus AME 0.065 clypeus ALE 0.07. Chelicera length 0.59, 3 anterior and 4 posterior teeth. Leg and pedipalpal measurements: pedipalpus 1.26 (0.40, 0.15, 0.22, , 0.49); I 6.34 (1.84, 0.52, 1.55, 1.72, 0.71); II 5.21 (1.55, 0.47, 1.23, 1.40, 0.56); III 2.61 (0.81, 0.29, 0.51, 0.64, 0.36); IV 3.98 (1.34, 0.32, 0.87, 1.04, 0.41). Femur IV with 10 plumose trichobothria in basal half in two rows.

Epigyne with posterior part of median septum three times wider than anterior part. Right side with 2 slit sense organs, left side with a single one. Transverse pocket wider than epigyne long (Fig. 48). Intromittent ducts short, bent at a right angle before running into membranous sacs (Fig. 49).

**Colour in ethanol.** Yellowish brown with legs becoming darker distally. Sternum with narrow dark margin. Dorsal and dorso-lateral opisthosoma with silvery patches except for median band in the middle and hind part. Ventral opisthosoma with few small silvery spots. Posterior hump of opisthosoma with unpaired black patch, one pair of black patches close to spinnerets. 1–2 pairs of very indistinct grey dorsal patches in front of hump. These patches more distinct in subadult female.

**Distribution.** Known from the type locality, China, Guangxi Province, Tianlin County, and from Laos, Luang Prabang Province, Muang Phou Khoun.

First record for Laos.

**Opadometa grata** (Guérin 1838)

**Material examined.** 1 female (SMF 60279), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009. 1 male (SMF 60330), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 3 females, 1 subadult female (SMF 60253), L101, by hand, by day, P. Jäger leg. 23.XI.2009.

The male could be unambiguously identified. Females show apparently more variation in their copulatory organs than males.

First record for Laos.

**Orsimone vethi** (Hasselt 1882)

**Material examined.** 7 males, 4 females (SMF 60245), between L37 and L38, by day, by hand, P. Jäger & S. Bayer leg. 23.XI.2009.
leg. 19.XI.2010. 2 males, 2 females (SMF 60303), L18, vegetation, at night, by hand, P. Jäger & S. Bayer leg. 12.XI.2009. 1 male, 2 females, 1 subadult male (SMF 60352), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009.

_Tetragnatha geniculata_ Karsch 1891

**Material examined.** 1 male, 1 female (SMF 60353), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009.

_Tetragnatha lauta_ Yaginuma, 1959

**Material examined.** 1 female (SMF 60331), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009.

_Tetragnatha mandibulata_ Walckenaer 1842


_Tetragonatha praedonia_ L. Koch 1878

**Material examined.** 1 male (SMF 60354), L96, by day, sweep net, P. Jäger & S. Bayer leg. 27.XI.2009.

First record for Laos.

_Tylorida striata_ (Thorell 1877)

**Material examined.** 1 female (SMF 60399), L6, vegetation close to stream, by hand, by night, P. Jäger & S. Bayer leg. 18.XI.2009. 2 females (SMF 60403), L43, by night, by hand, P. Jäger & S. Bayer leg. 18.XI.2009. 1 female (SMF 60342), L22, vegetation close to river, by hand, by night, P. Jäger & S. Bayer leg. 12.XI.2009.

_Tylorida tianlin_ Zhu, Song & Zhang 2003

**Material examined.** 2 females (SMF 60248), between L37 and L38, by day, by hand, P. Jäger & S. Bayer leg. 19.XI.2010. 4 females, 1 juvenile female (SMF 60341), L79, H. Stein er leg. 19.01.2009. 1 male, 3 females, 2 subadult males, 9 juveniles (SMF 60363), L88, by day, by hand, P. Jäger & S. Bayer leg. 8.XI.2009.

See discussion in Jäger (2007) and Jäger & Praxayombath (2009) on _T. sp. cf. mengla_ and _T. tianlin_. The present series can be identified as _T. tianlin_, although differences are present e.g., in the distance of copulatory ducts in dorsal view. It might be true, that _T. mengla_ is a synonym of _T. tianlin_ and illustrations in Zhu et al. (2003) show intraspecific variability.

First record for Laos.

_Tylorida ventralis_ (Thorell 1877)

Figs 18, 24–37


_Nephilidae_ Simon 1894

_Heremia multipuncta_ (Doleschall 1859)

**Material examined.** 1 male, 2 females (SMF 60321), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 female (SMF 60359), L88, beside agricultural fields, on tree trunk, by hand, by day, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female (SMF 60255), L93, by hand, by day, P. Jäger & S. Bayer leg. 25.XI.2009. 1 female (SMF 60283), L95, coffee plantation, by day, by hand, P. Jäger & J. Martens leg. 11.III.2010. 1 female (SMF 60270), L95, resort, vegetation and at ground, at night, by hand, P. Jäger & J. Martens leg. 17.III.2010.

_Nephila antipodiana_ (Walckenaer 1842)

**Material examined.** 1 female (SMF 60312), L100, by night, by hand, P. Jäger leg. 24.XI.2009.

The present female is dark red brown. This kind of colour dimorphism is also known from _N. pilipes_ (Harvey et al. 2007: figs 1–2, 2–5; one female, SMF 60771, from Thailand, Ko Chang represents also a colour variety, for photos see under: http://sesam.senckenberg.de/). It could be readily identified by characters of its copulatory organ (Harvey et al. 2007).

_Nephila clavata_ L. Koch 1878

**Material examined.** 1 male, 4 females (SMF 60413), L82, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009.

First record for Laos.

_Nephila pilipes_ (Fabricius 1793)

**Material examined.** 1 male, 1 juvenile female (SMF 60416), L10, vegetation, by hand, by night, P. Jäger & S. Bayer leg. 14.XI.2009. 1 juvenile female (SMF 60360), L88, by hand, by day, P. Jäger & S. Bayer leg. 8.XI.2009. 1 male (SMF 60366), L91, plantation, by hand, by night, P.

Material examined for comparison. ASIA: India: 2 females (SMF 60795, RI 4399), Malabarcoast. Sri Lanka: 1 male (SMF 60784, RI 5218), Kandy. 4 females, 3 juvenile females (SMF 60803), Kandy, Lady Herton’s drive, J. Mastbaum leg. 13.IV.1914-14.IV.1914. 3 females, 8 subadult females (SMF 60802), Halgamar [not found, but Halagama is a town in the Central Province], J. Mastbaum leg. 05.III.1914. 1 female (SMF 60800), A. Hansen leg 1912.

10 females (SMF 60747), Ceylon. 4 females (SMF 60746), Redemann leg. 1914. 16 females (SMF 60745), Jordan leg. 1893. Myanmar: 1 female (SMF 60759, RI 8009), Mt. Victoria [=Namatang]. Thailand: 2 males, 1 female (SMF 60771), Pratong Khiri Khan, Khao Sam Roi Yot Nationalpark, Laem Sala Beach, in Phrya Nakhon Cave, G. Hantke & F. Brand leg. 22.VII.2006. 2 females, 2 juveniles (SMF 60773), Chumphon, Ri Beach, 5 km south of Pak Nam Chumphon estuary, National Park Nature Educations Centre, Khao Chao Muang Nature Trail, G. Hantke & F. Brand leg. 28.VII.2006.

Malaysia: 1 female (SMF 60791), Selangor, primeval forest, Klingel leg. 05.V.1961. 1 female, 1 male (SMF 60787), Selangor, primeval forest, Klingel leg. 12.V.1961.

1 male, 1 female (SMF 60790), Selangor, Klingel leg. VI.1961. 1 male, 1 female (SMF 60774), Selangor, Ulu Gombak Field Studies Centre, W. Dorow leg. 06.II.1987.

1 male (SMF 57780), Selangor, close to Kuala Lumpur, Ulu Gombak Field Studies Centre, rainforest, L. Mlynek leg. 15.IX.2007. Indonesia: Sumatra: 1 female (SMF 60798, RI 5477), Sumatera Utara, Soekaranda. 1 female, 12 juveniles (SMF 60785, RI 7281), Sumatera Utara, Soekaranda. 4 juveniles (SMF 60750, RI 7282), Sumatera Utara, Soekaranda. 1 female (SMF 60762, RI 13654), Sumatera Barat, Fort de Kock [=Bukittinggi]. 1 juvenile female (SMF 60763, RI 4481), Riau, Doerian, Riuw Arch. [=Durian Besah, Riau Archipelago]. 1 female (SMF 60777, RI 7280), Sumatera Barat, Padang. 6 juveniles (SMF 60778, RI 7279), Sumatera Barat, Fort de Kock [=Bukittinggi]. 5 females (SMF 60743), Sumatera Barat, W. Sumatra, Bungar-Bondar, Schütz leg. 14.IV.1914. Java: 1 female (SMF 60798, RI 5477), Java Barat, Buitenzorg [=Bogor]. 1 female (SMF 60769, RI 4400), Idjen-Geb. [=Gunung Ijen, East Java]. 8°3.417′ S 114°14.633′ E. Philippines: 8 males (SMF 60793, ex RI 4465), Lucena, Luzon, Mt. Makiling, Baker leg. 8 males (SMF 60786, RI 4462), Lucena, Luzon, Mt. Makiling, Baker leg. 68 juveniles (SMF 60782, RI 4516), Lucena, Luzon, Mt. Makiling, Baker leg. 3 juveniles (SMF 60783, RI 4446), Lucena, Luzon, Mt. Makiling, Baker leg. Papua New Guinea: 1 female (SMF 60804), Neu-Pommern [=Neu Britannien] Pitzner-Sprottzau leg. 27.X.1913. 1 female (SMF 60784), Bougainville, W-Coast, Toboroi, Reise L. C. 1908. 3 females, 1 subadult female (SMF 60768), Western Highlands, Nondugl Wahgi-Valley, VI [1959]. 1 female (SMF 60781), East Sepik, West of Wewak, E. Reisser des. X. 1960. AUSTRALIA: 1 female (SMF 60752), H. Felten. 1 female (SMF 60753), Queensland, Bramston Beach, 20 m N of Innisfail, H. Felten leg. 01.V.1957. 1 female (SMF 60757), Queensland, Innisfail, H. Felten leg. 30.IV.1957.

1 male, 1 female (60720), Northern Territory, Alice Springs, J. Wunderlich leg. VIII.[year unknown].

Platnick (2010) lists “China, Philippines to Australia”, although Tikader and other authors referring to India and further countries (sub N. maculata) are listed under the synonyms. From a revision of the material deposited in the Senckenberg collection as well as from collections made by the first author in the past seven years in Laos and Thailand, N. pilipes seems to be the most abundant Nephila species in Southeast Asia. Although colour morphs do exist, the species can readily be identified by their genitalia. Considering the characteristic shape of epignye (Harvey et al. 2007) and according to drawings in Tikader (1982), N. kuhllii (Doleschall 1859) and N. robusta Tikader 1962 may be junior synonyms of N. pilipes. From the known distribution range it is doubted that the species occur in Madagascar, thus the subspecies N. pilipes malagassae Strand 1907 (types in Stuttgart, destroyed in 2nd World War, Renner 1988) should belong to a different species than N. pilipes.

Nephelesyngys malabarensis (Walckenaer 1842)

Material examined. 1 juvenile female (SMF 60319), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 male, 1 female (SMF 60309), L7, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 16.XI.2009. 1 juvenile female (SMF 60304), L82, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 2 males, 1 female, 1 subadult female, 1 juvenile female (SMF 60347), L82, in front of cave, by night and day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 1 juvenile male (SMF 60396), L7, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 1.XI.2009. 1 juvenile (SMF 60300), L91, rock surface close to plantation, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 1 subadult male (SMF 60302), L88, by hand, by day, P. Jäger & S. Bayer leg. 10.XI.2009. 1 subadult male, 1 subadult female (SMF 60261), L95, by day and night, by hand, P. Jäger & J. Martens leg. 12.- 13. III.2010. 1 female, 1 juvenile (SMF 60269), L95, resort, vegetation and at ground, at night, by hand, P. Jäger & J. Martens leg. 17.III.2010.

1 subadult male, 1 juvenile
female (SMF 60339), L102, by hand, by day, P. Jäger & S. Bayer leg. 28.XI.2009.

Material examined for comparison. ASIA: Sri Lanka: 4 males, 1 female, 1 subadult female (SMF 60801), Polonnaruwa, M. Grasshoff leg. 15.03.1970. Thailand: 1 male, 1 subadult male, 1 female, 1 subadult female (SMF 60435), Trat Province, Gulf of Thailand, Ko Chang, Hat Sai Kao, N 12°6.778′, E 102°16.253′, 48 m altitude, underpass, bater, forest with stream, at nightby hand, P. Jäger & S. Bayer leg. 02.11.2009. 3 females (SMF 58163), Prachuap Khiri Khan, Khao Sam Roi Yot national park, Laem Sala Beach in Phrya Nakhon Cave, G. Hanke & F. Brand leg. 22.07.2006. Malaysia: 1 male, 1 subadult female (SMF 60761), Kuala Lumpur, Kepong, outside at door, in web, W. Dorow leg. 06.01.1987. 1 male (SMF 58664), Selangor, Darul Ehsan, near Kuala Lumpur, Ulu Gombak Field Studies Centre, N 3°19.533′, E 101°45.267′, 250 m altitude, W. Dorow leg. 31.01.1988. Philippines: 1 male, 1 subadult male (SMF 60792), Lucena, Luzon, Mt. Makiling, Baker leg.

In the same way as N. pilipes, the present species is widely spread in Southeast Asia (Kuntner 2007) and very abundant occurring in natural as well as man-made habitats.

Argiope aemula (Walekenaar 1842)

Material examined. 1 male (SMF), L90, plantation, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female (SMF), L88, by hand, by day, P. Jäger & S. Bayer leg. 10.XI.2009.

First record for Laos.

Argiope catenulata (Doleschall 1859)

Material examined. 1 male (SMF), L24, Vientiane, wall, by hand, by day, P. Jäger leg. 30.XI.2009.

First record for Laos.

Argiope danga Jäger & Praxaysombath 2009

Figs. 53–56

Material examined. 1 female, 1 immature female (SMF 60916), L22, vegetation close to river, by hand, by night, P. Jäger & S. Bayer leg. 12.XI.2009. 1 female (SMF 60915), L102, by hand, by day, P. Jäger & S. Bayer leg. 28.XI.2009.

This species was recollected from the type locality and recorded for the first time from Champasak Province (Wat Phou, L102). Epigynes show a slight variation in their lateral and posterior views: 1. inner margins in posterior view vary from slightly undulated (Fig. 56) to continuously diverging (Fig. 54), 2. distal margin in posterior may be more pointed (Figs. 54, 65) or more blunt (Jäger & Praxaysombath 2009: figs. 42–43), 3. bulge outline close to distal lip in lateral view can be steep (Fig. 55, Jäger & Praxaysombath 2009: figs. 41) or flattened (Fig. 53). No trend according to the geographical distribution and the characters listed above is recognisable. The internal duct system is firstly illustrated for this species. Spermathecae are ovoid in lateral view (Figs. 53, 55). The present females are distinctly smaller than the paratypes (SMF 58758): PL 3.4–3.8, PW 3.1–3.3, OL 5.8, OW 3.1–3.6, resulting in a total length of less than 10 mm (paratypes: 13–14 mm).

Argiope pulchella Thorell 1881

Material examined. 1 female, 1 subadult female, 2 male embolus’ tips in epigyne (one separated in microvial) (SMF 60322), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 female, 2 male embolus’ tips in epigyne (SMF 60414), L82, shady slope, by night, by hand, P. Jäger
& S. Bayer leg. 13.XI.2009. 1 female, 2 male embolus’ tips in epigyne (SMF 60358), L91, plantation, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009. 1 female, 2 male embolus’ tips in epigyne (SMF 60315), L95, garden of resort, by day, by hand, P. Jäger & S. Bayer leg. 27.XI.2009. 1 female (SMF 60272), L95, primary forest and resort, vegetation, by day, by hand, P. Jäger & J. Martens leg. 17.III.2010. 1 male, 1 female, 2 male embolus’ tips in epigyne (SMF 60410), L103, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2010.

In the female from That Fane (L95) two emboli are found on the right side of the epigyne. One male was sitting and waiting in the female’s web in Tha Hou (L103), although the female had already its epigyne plugged with two emboli.

*Cyrtophora beccarii* (Thorell 1878)
Figs. 57–65

Material examined. 1 juvenile (SMF 60268), L95, leaf litter & vegetation, by night, by hand, P. Jäger & J. Martens leg. 16.III.2010. 10 females, 5 juveniles (SMF 60420),

Posterior end of opisthosoma has two tiny humps (Figs. 58–62) in contrast to drawing of Chrysanthus (1960) and Koh (1991). Humps of juveniles are more pronounced. Colouration of males may vary from white to dark grey (Figs. 64–65) and known from Champasak Prov. (L101) and Bolikhamsay Prov. (L 86). The latter locality is representing the northernmost record for this species.

First record for Laos.

_Cyrtophora unicolor_ (Doleschall 1857)

_Material examined. 1 female (SMF 60326), L54, by hand, by night, P. Jäger & S. Bayer leg. 17.XI.2009. 1 female (SMF 60417), L9, in front of cave, temple garden, in tree, by hand, P. Jäger & S. Bayer leg. 15.XI.2009. 1 female (SMF 60377), L14, along stream, by hand, by day, P. Jäger & J. Allmann leg. 6.III.2006. 1 subadult female (SMF 60733), L31, cave and surroundings, by hand, P. Jäger & V. Vedel leg. 29.X.2004. 1 female (SMF 60723), L95, resort, vegetation and at ground, at night, by hand, P. Jäger & J. Martens leg. 17.III.2010._

_Gasteracantha hasselti_ C.L. Koch 1837


_Gasteracantha kuhli_ C.L. Koch 1837

_Material examined. 1 female (MHNG), L10, vegetation, by hand, by night, P. Jäger & S. Bayer leg. 15.XI.2009. 1 female (SMF 60313), L95, vegetation, by hand, P. Jäger & S. Bayer leg. 27.XI.2009. 2 juveniles (SMF 60394), L82, in front of cave, by night and day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 1 female (SMF 60283), L95, coffee plantation, by hand, by day, P. Jäger & J. Martens leg. 11.III.2010._

One male specimen was collected from Lak Sao, which may belong to this species. Since there are differences recognised between the palp of the present male and illustrations in Yin et al. (1997) and Tanikawa (2009), it is not listed here.

_Gasteracantha sturi_ (Doleschall 1857)

_Material examined. 1 female (SMF 60295), L7, by hand, by day, P. Jäger & S. Bayer leg. 16.XI.2009. 1 juvenile female (SMF 60305), L82, in front of cave, by day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 1 juvenile (SMF 60395), L82, in front of cave, by night and day, by hand, P. Jäger & S. Bayer leg. 13.XI.2009. 1 female, 1 subadult female (SMF 60335), L93, by day, by hand, P. Jäger & S. Bayer leg. 25.XI.2009. 1 juvenile female (SMF 60314), L95, vegetation, by hand, P. Jäger & S. Bayer leg. 27.XI.2009. 1 (subadult) female (SMF 60262), L95, by day and night, by hand, P. Jäger & J. Martens leg. 12.–13.III.2010._

The immature specimens were compared with females and a juvenile identified by Nicolaj Scharff (in Jäger 2007: SMF 56710–56714, 56326).

_Macracantha arcuata_ (Fabricius 1793)

_Material examined. 1 female, 1 juvenile female (SMF 60294), L7, by hand, by day, P. Jäger & S. Bayer leg. 16.XI.2009. 1 female (SMF 60362), L88, beside agricultural fields, on tree trunk, by hand, by day, P. Jäger & S. Bayer leg. 8.XI.2009._

_Parawixia dehaani_ (Doleschall 1859)

_Material examined. 1 subadult female (SMF 60400), L6, vegetation close to stream, by hand, by night, P. Jäger & S. Bayer leg. 18.XI.2009. 1 juvenile (SMF 60349), L43, at night, by hand, P. Jäger & S. Bayer leg. 18.XI.2009. 1 female (SMF 60325), L54, by night, by hand, P. Jäger & S. Bayer leg. 17.XI.2009. 1 juvenile female (SMF 60298), L100, by night, by hand, P. Jäger leg. 24.XI.2009._

_Lycosidae Sundevall 1833

_Hippasa lycosina_ Pocock 1900


First record for Laos.

_Pisauridae Simon 1890

Two undescribed species of the genus _Dendrolycosa_ Doleschall 1859 were discovered from Champasak Province, which will be treated in a separate paper revising the genus.

_Eurychoera banna_ Zhang, Zhu & Song 2004

_Material examined. 1 female (SMF 60407), between L37 and L38, by day, by hand, P. Jäger & S. Bayer leg. 19.XI.2010. 3 females, 2 subadult females (SMF 60408), Xe Pian NPA, Tha Hou, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2010._

_Material examined for comparison. Thailand: 2 males, 3 females, 1 subadult female, 4 juveniles (SMF 60445), Klong Phlu School, empty stream bed, by hand, by

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day, P. Jäger & S. Bayer leg. 1.XI.2009. 1 male, 2 females, 1 subadult female (SMF 60446), Klong Phlu School, empty stream bed, by hand, by night, P. Jäger & S. Bayer leg. 1.XI.2009.

All three females from Tha Hou have each two broken emboli in their epigynes, the one from Nam Ha NPA (L37–38) one embolus. Specimens from Thailand show a strong size dimorphism (PL males: 1.4–1.6, PL females: 2.8, 3.0) and copulatory organs are congruent with those shown in Jäger (2007). Epigynes of four Thai females are plugged with each one embolus on both sides. One Thai female which appears pale and freshly moulted has no plugs.

First record for Thailand.

**Hygroponda yunnan** Zhang, Zhu & Song, 2004


*Material examined for comparison. Thailand: 1 female with egg-sac in rolled leaf* (SMF 60427), Hat Sai Kao, at stream in forest, by hand, by night, P. Jäger & S. Bayer leg. 30.X.2009. 2 females (SMF 60436), Hat Sai Kao, at stream in forest, by hand, by night, P. Jäger & S. Bayer leg. 31.X.2009. 1 female (SMF 60451), 3km S Hat Sai Kao, at stream bed in forest, by hand, by night, P. Jäger & S. Bayer leg. 2.XI.2009. 6 females (SMF 60447), Klong Phlu School, empty stream bed, by hand, by night, P. Jäger & S. Bayer leg. 1.XI.2009.

The egg sac was built in a rolled leaf and contained 120 eggs. The species was reported from Northern Thailand (Chiang Mai Prov., Mae Hong Son Prov.) by Dankittipakul et al. (2008). It was recorded from Trat Province (Koh Chang) for the first time. A range of body length from 8 to over 11 mm is covered by the two females from Hat Sai Kao (SMF 60436). Six females from Klong Phlu School have PL: 4.0–5.8.

First record for Laos.

**Oxyopidae** Thorell 1870

**Oxyopes birmanicus** Thorell 1887


**Pschorridae** Simon 1890

**Pschorrus** Thorell 1878

Bayer & Jäger (2010) described three new species from Laos: *Pschorrus steineri* Bayer & Jäger 2010 (L78), *P. antarces* Bayer & Jäger 2010 (L20, L71), and *P. ancoralis* Bayer & Jäger 2010 (L39, L40, L41, L44, L48, L7). New records of *P. huangpabang* Jäger 2007 were also published: L39, L40, L41, L15, L60, L64, and L18. Further material of this family including the genus *Fecenia* Simon 1887 will be treated by Steffen Bayer in his doctoral study.

**Hahnidae** Bertkau 1878

**Hahnia flagellifera** Zhu, Shen & Sha 1989

*Material examined. 1 female* (SMF 61001), L91, plantation, rock cliff, by hand, by night, P. Jäger & S. Bayer leg. 8.XI.2009.

The female could unambiguously identified with illustrations by Zhang et al. (2011).

First records for Laos.

**Tityanoecidae** Lehtinen 1967

*Anuvinda escheri* (Reimoser 1934)

Fig. 66

*Material examined. 2 females, 15 juv.* (SMF), L58 Ban Khon Why, 24.III.2007. 3 females, 7 juv. (SMF), L61, Ban Thin, 23.III.2007.

Almeida-Silva et al. (2009) reported the species for the first time from Laos. Individuals were collected at gravel banks of the Nam Khan in the dry season. Spiders were sitting under stones, the web was built between stones and sometimes vegetation structures. Basal parts of webs were rather irregular in shape and 3-dimensional sheets, whereas in some cases an upper part was consisting of few threads in one plain and connecting cribellate capture threads (Fig. 66)

**Clubionidae** Wagner 1887

unicum" Bösenberg & Strand 1906, Clubiona abnormis Dankittpakul 2008, Clubiona flicata O. Pickard-Cambridge 1874, and Clubiona melanotele Thorell 1895 for the first time from Laos.

Sparassidae Bertka 1872

Heteropoda maxima Jäger 2001

Material examined. 1 male (SMF 60815), L32, by hand, P. Jäger & S. Bayer leg. 6.XI.2009, PJ 3223.

Since this species was imported to Germany by pet dealers it was investigated whether collecting in the caves could have an impact on natural populations. Indeed, in easily accessible caves only few juvenile specimens of H. maxima were found. In a hidden cave several adult spiders could be observed. Additionally, the single observation published by Bayer & Jäger (2009) that one specimen “was recorded from the surface of a rock cliff at night-time, but it was ambushing close to crevices leading into the rock massif” could be confirmed: two males and three females were sitting at night at the rock surface, one female was sitting under an overhanging cliff on sandy ground. Males lifted their impressively long second pair of legs waiting for a female ready to start with courtship behaviour. All spiders were in close range of the limestone caves and disappeared within seconds in crevices and holes when disturbed. Therefore, this species is still considered troglophilic.

Heteropoda venatoria (Linnaeus 1767)

Material examined. 1 female (SMF 60419), Tha Hou, small cave, by day, by hand, P. Jäger & S. Bayer leg. 22.XI.2009, PJ 3238, SD779.

Salticidae Blackwall 1841

Material was identified by Dmitri Logunov (Manchester). The subfamily Spartaeinae including material collected in 2009 and 2010 will be treated in a separate paper by Logunov.

Carrhotus vidius (C. L. Koch 1846)

Material examined. 1 male (SMF 60582), L90, P. Jäger & J. Martens leg. 2.III.2010, D.V. Logunov det. 2010.

First record for Laos.

Harmochirus zabkai Logunov 2001


First record for Laos.

Phintella assamica Proszyński 1992

Material examined. 1 female (SMF 60583), L95, 16.III.2010, D.V. Logunov det. 2010.

First record for Laos.

Plexippus petersi (Karsch 1878)

Material examined. 1 male (SMF 60580), L95, 12.–13.


Siler semiglaucus (Simon 1901)

Material examined. 1 male (SMF 60581), L90, 2.III.2010, D.V. Logunov det. 2010.

First record for Laos.

Discussion

Before Jäger (2001) described Heteropoda maxima the Lao spider fauna was neglected. Also no recent collections have been made in Laos. Jäger performed seven expeditions together with German colleagues and counterparts in Laos from 2003 to 2010 to investigate the spider fauna. Material from eight provinces is treated in three papers (Jäger 2007, Jäger & Praxaysombath 2009, this paper) covering roughly 900 km in latitude and about 460 km in longitude. Although only 150 spider species could be identified, some preliminary zoogeographical conclusions can be drawn. There are different groups of faunal elements recognisable (with distribution in parentheses, according to Platnick 2010 and this paper):

1. Tropical elements: A) S + SE Asian to Australian distribution — Nephiila pilipes (SE Asia, Australia; see notes on the distribution above), Nephilengys malabarensis (India to China, Philippines, Japan, Ambon; see notes on the distribution above), and Macracantha arcuata (India, China to Borneo). Some of these elements are reaching the northern border of their distribution range in Laos, e.g. Cyrtophora beccarii. B) Pantropical or cosmopolitan distribution — Some species occur in man-made habitats and are most likely introduced by human activities from their origin to various places, e.g. Oecobius marathaus, O. concinnus, Heteropoda venatoria (all pantropical), Smenopus pallidus, Physochromus globosus, Crossoprista lymi (all cosmopolitan). For H. venatoria it seems to be likely that its origin is somewhere in SE Asia.

2. Elements occurring in northern parts of Laos: can be represented by true northern elements like palaeartic Coelotinae with the genus Draconarius and five species occurring in Luang Namtha Province in altitudes between 500 and 1100 m (Wang & Jäger 2008), or by the otherwise tropical distributed genus Nephiila with the species N. clavata, occurring in China to Japan (Platnick 2010), in Pakistan, India (Darjeeling, West Bengal; Shillong, Meghalaya; Gazing, Sikkim; Andaman and Nicobar Islands, Laccadive Island), Bhutan, Burma, Thailand, Japan, China and Taiwan (Tikader 1982). N. clavata was found in Muang Phou Khoun in 1240 m altitude.

3. Elements typically recorded between Southern China (Yunnan) in the North and Thailand in the South. Characteristic examples are Hygropoda yunnan and Eurypholoha bainan (Yunnan, Laos, Thailand). Distribution range of the genus Khorata Huber 2005 spans from Northern Thailand and Laos to Central Laos and Bangkok.
The genus *Notiocolotes* was described for Coelotinae distributed in Hainan, Vietnam, Laos and Thailand (Wang et al. 2008), *Patu shihluesis* was described from Hainan and recorded from Laos. Other possible member of this group could be *Argiope dang* (Laos), *Laoponia saetosa* (Laos, Vietnam), *Guizygiella guangxiensis*, *G. nadleri*, *Leucogae xiyung*, *L. zhong*, *Mesida yini* (all China and Laos).

4. Endemic species mostly tied to caves or other subepigean habitats are: *Heteropoda maxima*, *H. aemulans*, *Psechrus steineri*, *P. antraeus* and *P. khammouan* (Jäger 2001, 2007, Bayer & Jäger 2010).

Ecology of Laotian spiders is only superficially known. Therefore no statements about possible so-called indicator-species can be made. One possible candidate is *Hipposa lycosina*, building its webs close to the ground (see comparison with similar webs of *Agelena limbata* in Jäger & Prayxsombath 2009) in open habitats. Sun exposition seems to be essential for this species. Therefore webs are found along roads and jungle trails, in agricultural fields and close to human settlements. It was not found in primary or secondary forests with an intact canopy, but present in teak wood plantations without any understorey and only little canopy cover. From these observations it can be considered an indicator for disturbances of originally dense forests. Indicator species could also be interesting especially for river dynamics, as recently many dams are built at Lao rivers. As known from European species, e.g. *Aercta cinerea* (Fabricius 1777), *Pardosa morosa* (L. Koch 1870), *P. wagleri* (Hahn 1822), and *P. torrentum* Simon 1876, spiders can be used successfully in ecological evaluations (Kompsch 2000, 2003, 2009, in litt., Unfer et al. 2004).

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