

# Comparative study of the invertebrate cave faunas of Southeast Asia and New Guinea

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**Abstract:** An attempt is made to compare the available data on the cave fauna of SE Asia with the cave fauna of New Guinea and the Bismarck Archipelago. The information is very uneven, with many hundreds of caves and cave animals known from SE Asia and almost the only results on the cave fauna of New Guinea obtained during the British Expedition to PNG in 1975.

The present analysis outlines the existence of more than 209 troglobites and 42 stygobites in the caves of SE Asia and 18 troglobites and 10 stygobites in the caves of New Guinea and New Ireland. Many of these species are to some extent "troglomorphes", but their belonging to the categories of troglobites or stygobites is disputable, as nothing is known in details concerning their biology. The richest groups in troglobites are Isopoda Oniscidea (13 sp. in SE Asia, 1 in New Guinea), Araneae (46 sp. in SE Asia, unfinished study of PNG collection), Pseudoscorpiones (11 sp. in SE Asia, 1 in New Guinea), Diplopoda (30 sp. in SE Asia, 1 in New Guinea), Collembola (28 sp. in SE Asia, 4 in New Guinea), Coleoptera Carabidae (56 sp. in SE Asia, 3 in New Guinea and New Ireland).

Particularly interesting is the discovery of a rich cave fauna in the highlands of New Guinea (above 2200 m), where the air temperature in the caves is ca. 13 °C, comparable to the temperature in the South European caves. Another interesting fact from the expedition in PNG in 1975 was the discovery of several marine relicts (Nereididae worms, Hydrobiidae Gastropods, Anthuridae Isopods) high in the mountains and very far from the nearest sea. Another marine relict, *Theosbaena cambodjana* Cals et Boutin, was described from Cambodia.

**Key words:** Cave fauna, SE Asia, New Guinea, comparative study, marine relicts

*"S'il existe dans les contrées tropicales des cavernicoles aquatiques qui sont de très anciens fossiles vivants, on chercherait en vain, parmi les terrestres, une seule espèce qui puisse être cataloguée comme troglobie, même récent. Les grottes tropicales sont peuplées de troglaxènes et de troglaphiles; il en est où la population des guanobies prend un développement prodigieux, mais aucune n'abrite de véritable troglobies."*

R. Jeannel, 1959

"Situation géographique et peuplement des cavernes".

## Introduction

There was a time when the problems of the troglobiomorphy and the genesis of cave faunas seemed solved and quite clear. The mighty spirit of founding fathers like R. Jeannel and A. Vandel has postulated that: 1. The paucity of terrestrial troglobites in tropical caves is to be explained by the lack of factors which could force the preadapted animals in the leaf litter to enter the caves. 2. The most important factor in the formation of temperate cave communities are the Pleistocene glaciations. 3. Most troglobites are relicts from Tertiary or other very old faunas and have no relatives in the actual surface fauna (living fossils). These conclusions were the result of the few and scarce collecting in some tropical caves (Shimoni in Kenya, Kulumuzi in Tanganyika, Siju Caves in India, Batu Caves in Malaya, some caves in Congo, Cuba, Mexico, Java and other areas). Here should be mentioned the names of some pioneers of the biospeleological study in the tropics of the Old World (until 1960): L. Fea, N. Annandale,

F.H. Gravelly, H.N. Ridley, S. Kemp, B.N. Chopra, C. Dover, P. Remy, M. Colani, N. Leleup, R. Jeannel, A. Vandel and others.

This apparent clarity came to its end by the middle of the 1960s with the publishing of the "Biospéologie" of VANDEL (1964) and of one of the last papers of JEANNEL, "La genèse du peuplement des milieux souterrains" (1965). The theories until then have been aptly reviewed by BARR (1968).

MITCHELL (1969) noted an important thing: it is necessary to distinguish between the fauna of lowland and high altitude tropical regions. We proved this beyond doubt in 1975 by studying the fauna of Papuan caves. In the 1970s, intensive studies of tropical caves and of their fauna started simultaneously in various parts of the world. In the Western Hemisphere important contributions were made by the Cuban-Romanian expeditions in Cuba since 1969, the research of P. Strinati, C. Bordon, O. Linares and the Romanians V. Decu and T. Orghidan in Venezuela and other countries of South America, the campaign of the Americans (J. Reddell, R. Mitchell and others) and Italians (V. Sbordoni, R. Argano and V. Parisi) in Mexico, Guatemala and Belize, the study of Galapagos, Jamaica, Barbados and Puerto Rico by S. Peck and others. VILLIERS (1971) compiled a review of the cave fauna of West and Central Africa, LELEUP (1956, 1965, 1971) – of Central Africa, REMILLET (1973) – of Madagascar. Some of the most surprising discoveries took place in the lava tubes of Hawaii, where F. Howard has found unexpected creatures in a young volcanic island. Many cave animals have been described also from Australia (HOWARD, 1988, HUMPHREYS, 1993 and many others).

Besides the scattered visits of caves and SE Asia and publications on the animals collected, the most important studies were made in the Dark Cave and the other Batu Caves near Kuala Lumpur. They resulted in the comprehensive papers of RIDLEY (1899), DOVER (1929), McCLURE et al. (1967) and others.

During the last 40 years I had the chance to collect and observe cave fauna in many tropical caves (Mexico, Cuba, Puerto Rico, Peru, Bolivia, Ecuador, Nigeria, Kenya, Tanzania, South China, Vietnam, Cambodia, Thailand, Malaysia, Indonesia, Papua New Guinea, etc.). In the same time other explorers contributed greatly to the study of the caves and cave fauna in these areas, and particularly in South East Asia and New Guinea. Most important have been the British expeditions (collectors of fauna Philip Chapman, P. Beron and N. Plumley), the Australian expedition in Muller Range of 1978 (G.B. Smith) and the French expeditions of the Association

Pyrenéenne de Spéléologie (L. Deharveng, F. Brouquisse, A. Bedos, Ph. Leclerc, B. Lebreton). Ph. Chapman studied the caves of New Guinea and of Mulu and wrote valuable theoretical papers on the fauna of both fascinating areas. The French researchers from Toulouse explored for many years the caves and cave fauna of Thailand, Sulawesi (Maros), Halmahera, the Philippines, Vietnam, China, Papua. One should mention the collecting and papers of J.D. Bourne (New Ireland), R. Emery (New Ireland), A. Clark (China), P. Stoev (Philippines).

In the recent years one should notice especially the very remarkable research campaigns of the German cavers (M. Laumanns, J. Dreybrodt and others) in Laos, Cambodia and Vietnam, with biospeological collecting and contributions by H. Steiner, and of French expeditions in Laos and China (biological studies mainly by J. Lips). Important results were obtained by two recent Sino-Bulgarian caving expeditions in Yunnan (biologist B. Petrov). Chinese researchers have visited also many caves in their country and described spiders, beetles and other animals from them.

#### The area of study

On one hand, these are the countries of South-East Asia East from India and South from Yang-tse River: Burma (Myanmar), Thailand, Cambodia, Laos, Vietnam, South China, Taiwan, Hainan, the Ryu-Kyu Island, the Philippines, Indonesia, Malaysia, Brunei (Sundaland). On the other are New Guinea and the Bismarck Islands (Sahul). My personal experience in these countries consists in:

- Participation to the British Speleological Expedition to Papua New Guinea in 1975. Collecting and observations in many caves in New Guinea, New Britain and New Ireland (partly together with Ph. Chapman).

- Visit to Thailand and Burma in 1984. Studies in Tham Chiang Dao and other caves (together with St. Andreev).

- Visits of caves in India, Sri Lanka and Nepal in 1981 and 1984.

- Bulgarian caving expedition to Vietnam in 1988. The first biospeleological collecting in this country (in 32 caves) (together with D. Kozhuharov). During another visit to Vietnam in 2008 I visited again two caves in Halong Bay.

- Visit in Cambodia (the cave in the monastery Kampong Trash)

- Sino-Bulgarian caving expedition to Yunnan in 1989. Collecting in several caves.

- Expeditions in Indonesia (collecting in caves of Sumatra, Nias, Siberut, Java, Bali, Nusa Penida,

Flores, Timor, Sulawesi) and Malaysia in 1994 (together with V. Beshkov) and 1995.

- Visit of Gua Tempurung and Perak Tong in Malaysia in 2009 (together with Alexi Popov).

#### Notes on various groups

**Turbellaria.** Ref.: BALL (1970), KAWAKATSU (1972), KAWAKATSU & CHAPMAN (1983), KAWAKATSU & MITCHELL (1989a, b, c, 1995)

Cave Turbellaria have been recorded from Malaya (*Dugesia batuensis* Ball) and Sarawak (*Mitchellia sarawakana* Kawakatsu et Chapman), also from Sulawesi and Thailand (KAWAKATSU & MITCHELL, 1989a, 1989b, 1989c, 1995).

**Hirudinea.** Ref.: VAN DER LANDE (1994a, 1994b), RICHARDSON (1974)

From New Guinea has been described the cave leach *Leiobdella jawarerenis* (RICHARDSON, 1974). The leaches brought by us have been studied by VAN DER LANDE (1994a, 1994b). They are blood-sucking (from bats), without skin pigmentation, but retain pigmented eyes.

**Polychaeta.** Ref.: HARTMANN-SCHRÖDER & MARINOV (1977)

The finding of polychaet worms in the small accumulations of water in a cave in New Guinea (1700 m alt., more than 1000 km from the sea) was really amazing. It was expected that this marine relict will belong to a new genus, but *Namanereis beroni* belongs to a marine genus, known also from Black Sea.

**Mollusca, Gastropoda.** Ref.: BERNASCONI (1995), GHOSH (1929), SAUL (1966), VAN BENTHEM JUTTING (1966)

The most interesting discovery among the small Hydrobiidae Gastropods seems to be the new genus and species *Selmistomia beroni* Bernasconi, 1995, a marine relict found by us in the cave Selminum Tem, 2300 m altitude. From the genus *Georissa* (Hydrocaenidae) one species (*G. papuana* Bernasconi) was collected by me on the wet walls of a cave on Mt. Fugilil, at 3100 m altitude and distant more than 1000 km from the nearest sea. Some species are known from SE Asia (Sarawak, Sabah).

#### Crustacea

**Bathynellacea.** Ref.: SARS (1929)

Only *Parabathynella malaya* Sars was recorded from Malaya.

**Therosbaenacea.** Ref.: CALS & BOUTIN (1985), DEHARVENG & LECLERC (1989)

The relict *Theosbaena cambodjana* Cals et Boutin has been described from Cambodia and unidentified Therosbaenacea have been recorded from Thailand.

**Amphipoda.** Ref.: BOTOSANEANU & NOTENBOOM (1988), BOTOSANEANU & STOCK (1989), KARAMAN & SKET (1990), STOCK (1983), KARAMAN & SKET (1990), UENO (1934).

Five species of cave Amphipoda have been described from Thailand, Sarawak and China, including the endemic genera *Aequigidiella* and *Sinogammarus*.

#### Isopoda

**Flabellifera.** Ref.: BRUCE & ILIFFE (1992), JAUME & QUEINNEC (2007)

Only two species are known from the cave waters of the Philippines and Vanuatu.

**Asellota.** Ref.: BOUTIN & MAGNIEZ (1985), MAGNIEZ (1982a, 1982b, 1987, 1993, 2001, 2002)

According to MAGNIEZ (2001, 2002, etc.), 14 species of Stenasellidae (all of them belonging to genus *Stenasellus*) have been recorded from the underground waters of SE Asia, including six from the continent (Cambodia, Thailand) and eight from the islands Sumatra (6), Borneo (1) and Phuket (1). A mesogeid distribution is suggested.

**Anthuridae.** Ref.: ANDREEV (1982a, 1982b), BOTOSANEANU & HENRY (1986), BOTOSANEANU & SKET (1999), WAEGELE, COLEMAN et HOSSE (1987)

Four species of *Cyathura* have been described from New Guinea, New Britain, the Philippines and Sarawak.

**Oniscidea.** Ref.: DALENS (1985, 1986, 1987, 1989, 1990, 1992), GREEN (1963), SCHULTZ (1982, 1985, 1995), TAITI & FERRARA (1986, 1988, 1991), TAITI, FERRARA & DO (1992), VANDEL (1964, 1970, 1972, 1973a, 1973b, 1973c, 1977), TAITI & XUE (2012),

From caves in SE Asia have been recorded almost 40 species of Isopoda Oniscidea (families Styloniscidae, Philosciidae, Trachelipidae, Armadillidae). Only few of them could be considered troglobites (*Thailandoniscus* and five sp. of *Trogloniscus* from Styloniscidae, *Exalloniscus* from Oniscidae, *Tenebrioscia* from Philosciidae, *Dryadillo* from Armadillidae). Interesting fact is the finding of three aquatic species (two *Trogloniscus* from China and the endemic genus and species *Thailandoniscus annae* Dalens from Thailand).

Very few cave Oniscidea have been recorded from New Guinea, among them *Papuaphiloscia parkeri* Vandel is considered troglobite. My important collection has been sent to Toulouse (Vandel, Dalens), but has been returned after many years mostly unpublished. It is still in Sofia and we are looking for a specialist to handle it.

**Decapoda.** Ref.: BALETE & HOLTHUIS (1992), GUINOT (1986, 1987, 1988), GUINOT & GEOFFROY

(1987), GUO, CHOY & GUI (1996), HOLTHUIS (1964, 1978, 1979, 1980, 1982), IHLE (1912), NG (1987, 1988, 1988a, 1988b, 1989a, 1989b, 1990, 1991a, 1991b, 1992), NG & TRONTELJ (1996), TAKEDA (1995), YEO & NG (1999)

#### **Natantia**

Some Atyidae (*Edoneus*, *Caridina*, *Typhlocaridina*) and Palaemonidae (*Macrobrachium*) are known from the cave waters of SE Asia (Philippines, China, Sarawak, Java) and are considered stygobites.

Two new species (*Macrobrachium*, *Caridina*), found by me in a cave in New Ireland have been published by Holthuis (1978). They are also considered stygobites.

#### **Reptantia**

Many underground living crabs have been described from the described area (Potamidae, Gecarcinucidae, Hymenosomatidae, Sundatelphusidae, Goneplacidae), but only three species from Sarawak and three other species from New Guinea and New Britain could be considered stygobites.

#### **Arachnida**

**Palpigradi.** Ref.: CONDÉ (1984, 1985, 1988, 1992a, 1992b, 1994)

Condé published from caves in Thailand and Sulawesi five new species of Palpigradi.

**Scorpiones.** Ref.: LOURENÇO & FRANCKE (1985), VACHON & LOURENÇO (1985), LOURENÇO (2007), LOURENÇO & DINH-SAC PHAM (2010), LOURENÇO & DUHEM (2010),

Scorpions of three families are known from the caves of SE Asia. Some Chaerilidae (*Chaerilus* sp.) are considered troglobites, but the real hit was the discovery in Laos and Vietnam of two new genera and species of troglobitic representatives of the rare relict family Pseudochactidae (*Troglokhammouanus* and *Vietbokap*), family known earlier from the soil of Central Asia. *Isometrus deharvengi* (Buthidae) has been described from a cave in southern Vietnam (LOURENÇO & DUHEM, 2010).

**Schizomida.** Ref.: BERON (in prep.), BRIGNOLI (1974), COKENDOLFER (1988), ROEWER (1962), YAMASAKI & SHIMOJANA (1974), COKENDOLFER & REDDEL (1986), GRAVELY (1912, 1925), PECK (1983), REDDELL & COKENDOLFER (1995), SHIMOJANA (1972, 1973, 1981, 1982)

Five species of the family Schizomidae have been recorded from caves in Ryukyu Is., Taiwan and Malaya. In my collection in Sofia there are Schizomida also from caves in Sumatra, other SE Asian countries and New Ireland. They certainly do

not live in the cooler high positioned caves of New Guinea.

**Amblypygi.** Ref.: BOUTIN (1969), GRAVELY (1915a), HARVEY (2002), RAHMADI et al. (2010), ROEWER (1928, 1962), SIMON (1892, 1901), SPEIJER (1936), STEINER (2011), STRINATI & AELLEN (1983), THORELL (1889)

Several species of Amblypygi have been described over the years from the caves of Malaya, Kalimantan, Flores, Burma and Thailand (Charinidae, Phrynichidae, Phrynidae, Charontidae). I have in my collection in Sofia also Amblypygi from caves in several SE Asian countries. The most striking discovery was to find a representative of *Phrynus* (from the American family of Phrynidae) in a cave of Flores (HARVEY, 2002).

No Amblypygi are recorded from the caves of New Guinea, and I have not seen them in the caves of the highlands (above 1700 m).

**Uropygi.** Ref.: HAUPT (2004)

One species (*Typopeltis magnificus*) was described from Laos cave. Another Uropygid was found by me in the cave Kanemiraborunda in New Ireland.

**Pseudoscorpiones.** Ref.: BEIER (1954, 1963, 1965, 1977, 1982), MAHNERT (1988, 2003, 2009)

Several species of the genera *Tyrannochthonius*, *Atemnus*, *Paratemnoides*, *Cryptocheiridium*, *Pseudochiridium* and *Xenopium* have been described from the Philippines, Vietnam, Malaya, Sumatra, South China and Sarawak. Troglobites have been recorded from the genera *Lagynochthonius* and *Tyrannochthonius* (Chthoniidae), *Parobisium* (Neobisiidae), *Cryptocheiridium* (Cheiridiidae), *Nudochernes* (Chernetidae), *Stygiochelifer* (Cheliferidae), altogether 11 species. In New Guinean caves we found one species of *Afrosterphorus* (Sternophoridae), which could be accepted as troglobite.

**Opiliones.** Ref.: MARTENS & SCHWENDINGER (1998), POCOCK (1903), ROEWER (1924, 1927), SCHWENDINGER & GIRIBET (2005), SCHWENDINGER, GIRIBET & STEINER (2004), RAMBLA (1991, 1994), RAMBLA & JUBERTHIE (1994), SHEAR (1993a, 1993b), SMITH (1980), SUZUKI (1964, 1971, 1973), SUZUKI & STONE (1986), ŠILHAVY (1973, 1974), TSURUSAKI (1995), TURK (1945)

In the caves of SE Asia are represented Cyphophthalmi (Stylocellidae – the genera *Fangensis* and *Stylocellus*) and Laniatores (Oncopodidae – *Gnomulus* and Phalangodidae – *Kilungius*, *Pseudobiantes*, *Sungotia* and *Tokunosia*). Most of the Laniatores are known from the Ryukyu Isl. As

troglobites are accepted two *Stylocellus* from Malaya and Sarawak and *Sungsotia uenoi* Tsurusaki from Vietnam. These results are due mostly to the inadequate studies – many other cave Opilions will be discovered.

Nothing is known concerning the Opilions in the caves of New Guinea. Our collection from Papua New Guinea was entrusted to Dr Vladimir Šilhavy, he started working and wrote me that it contains several new taxa. Unfortunately, Dr Šilhavy died before finishing the work and I travelled to the Czech Republic to collect the material back. Than I entrusted this important collection to Prof. J. Martens and it is still with him. Nothing was published.

**Araneae.** Ref.: ABRAHAM (1923, 1924), BAYER & JÄGER (2009, 2010), BENJAMIN (2004), BOURNE (1980), BRIGNOLI (1972, 1973, 1979, 1980a, 1980b, 1981), BRISTOWE (1952), CHEN et al. (2009), CHEN & ZHU (2004, 2005, 2008, 2009), CHEN et al. (2000), CHEN, SHEN & GAO (1984), CHEN et al. (1978, 1986), CHEN & ZHANG (1993), DEELEMANN-REINHOLD (1986, 1989, 1993, 1995, in lit.), FAGE (1912, 1924, 1929, 1946), GEORGESCO (1977), HUANG (2002), HUBERT (1972), JAEGER (=JÄGER) (2001, 2004, 2005, 2007), JÄGER & ONO (2000), JÄGER & PRAXAYSOMBATH (2009), KOMATSU (1968, 1972, 1974), LECLERC (1986), LIN & LI (2010a, 2010b), LIU & LI (2008, 2009), LIU et al. (2008), MILLER & RAHMADI (2012), NISHIKAWA (1999), ONO (1995), PLATNICK & SEDGWICK (1984), PLATNICK, SCHWENDINGER & STEINER (1997), REIMOSER (1927), SEDGWICK & SCHWENDINGER (1990), SHIMOJANA (1973, 1977, 1982), SHIMOYANA & NISHIHARA (2000), ROEWER (1962), SIMON (1892, 1896), SMITH (1980), SONG & ZHU (1994), STEINER (1998), TONG & LI (2006, 2008a, 2008b, 2009), WANG & RAN (1998, 2002), WANG, RAN & CHEN (1999), XIN & JING (1998, 2004), XU & LI (2006, 2007, 2008) YAGINUMA (1962, 1970, 1979), YIN et al. (2010), ZHU & CHEN (2002)

Until recently the knowledge on the Southasian cave spiders has been rather limited (older papers of Simon, Abraham, Fage, Bristowe, Roewer, with very few recorded species). In the last three decades many important publications appeared (see the list), the Chinese arachnologists joined European workers like Brignoli, Deeleman-Reinhold and many others. Important collecting activities of Deharveng, Steiner and Jäger increased greatly the information on the rich fauna of these equatorial, tropical and subtropical caves.

From the list available we can see that in the caves of SE Asia are represented at least 90 known spe-

cies of 17 families. As troglobites have been indicated 46 representatives of the following genera:

- Heptathelidae – no
  - Ctenizidae – *Damarchus* (on sp. from Malaysia)
  - Dipluridae – *Masteria* (one sp. from the Philippines)
  - Liphistiidae – *Liphistius* (two species from Thailand and Malaysia).
  - Amaurobiidae – *Coelotes* (one sp. from Ryukyu Is.), *Draconarius* (three sp. from China), many others from *Draconarius* and *Platocoelotes*, but troglomphiles)
  - Clubionidae – no
  - Leptonetidae – *Leptoneta* (four sp. from China)
  - Nesticidae – *Nesticella* (one sp. from Sumba, Indonesia)
  - Ochyroceratidae – *Psilodermes* (one sp. from the Philippines), *Speocera* (one sp. from Sulawesi), *Spermophora* (two sp. from Halmahera and Sulawesi)
  - Oonopidae – *Camptoscaphiella* (one sp. from China)
  - Psechridae – no
  - Scytodidae – no
  - Sparassidae – *Heteropoda* (7 sp. from Laos, Sulawesi and Thailand), *Sinopoda* (6 sp. from China)
  - Telemidae – *Telema* (13 sp. from China)
  - Tetrablemmidae – *Bacilemma* (one sp. from Thailand)
  - Ctenidae – *Amauropelma* (one sp. from Java)
- Concerning New Guinea and the Bismarck Archipelago, for a long time nothing was known on the cave spiders. Two new troglomphile *Nesticus* have been described by BOURNE (1980), but the main information came from our collecting in 1975 in New Guinea, New Ireland and New Britain. This collection (43 species from 16 families) was analyzed in a preliminary article of BRIGNOLI (1981), but the untimely death of Prof. Brignoli did not allow to this prominent specialist to describe the new taxa and more details on the spiders from our New Guinean work. In the article of BRIGNOLI (1981) some interesting conclusion took place, and they will be repeated here.
- Dipluridae – a juvenile *Masteria* from New Guinea, another species from New Britain
  - Oonopidae – three blind or microphthalmic species, all from New Guinea (*Ischnothyreus* and *Opopaea*)
  - Pholcidae – eight species of four genera; in Bismarck Archipelago *Pholcus ancoralis* (L. Koch,

1865) and *Uthina* sp. In New Guinea: three sp. each from the genera *Spermophora* and *Trichocyclus* (?)

Araneidae – two closely related species, presumably trogliphiles.

Metidae – two closely related species in many caves.

Linyphiidae – two species found from this family, rarely found in New Guinea.

Theridiosomatidae – a species related to the Australian *Theridiosoma braunsi* (Wunderlich, 1976).

Mimetidae – two closely related species from New Guinea, of a possibly undescribed genus.

Nesticidae – three species from Bismarck Archipelago and three from New Guinea, all of genus *Nesticella*.

Theridiidae – four species of the genera *Argyrodes*, *Achaearanea* and *Theridion* were collected.

Gnaphosidae – two species from New Guinea, one of a possibly undescribed of the Prodidomidae. These species are probably no true troglobites.

Eusparassidae – no troglobites of this family are known.

Agelenidae – a single specimen from a New Guinea, belonging apparently to *Orepukia*, believed endemic of New Zealand.

Stiphidiidae – large *Cambridgea* from New Ireland (a genus known until then only from New Zealand and New Caledonia).

Desidae – three species, probably of *Badumna* from New Guinea and New Ireland.

Uloboridae – three species of three (?) genera from New Guinea and New Ireland; one belongs to a typically Austral genus (*Daramulunia*).

Most of the species seem both to fit in already described genera (not endemic) and to be new to science (probably endemic). This points to an ancient territorial connection with the Oriental region and with Australia and to a successive, comparatively recent separation.

Very remarkable is the finding in Papua New Guinea of some species related to groups believed “typical” of New Zealand.

It is probably possible to accept the limited value of Wallace’s and Weber’s lines for spiders, Brignoli does not see definite border between the two new regions proposed by Lehtinen (1980) – Indo-Pacific and South Gondwanian Region.

No cave spider of New Guinea, with a possible exception of the blind *Spermophora*, is similar to the classical Holarctic troglobites. Concerning the tropical troglobites, according to Brignoli, “The equation

“blind=troglobite” has a limited value. Metabolic changes may be more important than blindness”.

**Acari.** Ref.: LECLERC (1989), MAKOL & GABRYŚ (2005), WILSON (1964)

The most interesting discovery among the Acari in Southasian caves was published by LECLERC (1989) – two new genera of Opilioacarida (*Siamacarus* and *Vanderhammenacarus*) and three new species. These are the first troglobitic Opilioacarids. *Siamacarus dalgeri* is completely lacking eyes and pigment of the tegument.

Another interesting blind species (*Caecothrombium deharvengi* Makol et Gabryś, 2005) has been published from a cave in Vietnam, together with a new subfamily (Caecothrombiinae, Eutrombidiidae).

### Myriapoda

**Diplopoda.** Ref.: HOFFMAN (1977a, 1977b, 1978), LOKSA (1960), MAURIÈS (1970, 1977, 1983), MENG & ZHANG (1993), MURAKAMI (1975), ZHANG & WANG (1993), ZHANG (1993, 1997), GOLOVATCH (1995), GOLOVATCH et al. (2005, 2006, 2006a, 2006b, 2007, 2009, 2009a, 2009b, 2010a,b, 2011, 2012a,b, 2014), GOLOVATCH & STOEV (2014), STOEV & GEOFFROY (2004, 2014), STOEV & ENGHOFF (2005, 2011), STOEV et al. (2007)

Many authors, but most of all S. Golovatch and his co-authors contributed greatly to the study of the rich Diplopodan fauna of SE Asia (China, Laos, Vietnam, Malaysia, Ryukyu Island, Thailand, Vietnam, Indonesia, the Philippines). At least 86 species have been described, among them 30 troglobites, but almost all with (?), as their ecology is not known enough. The troglobites belong to the genera *Hyleoglomeris* (Glomerida, Glomeridae), *Desmoxytes* (Polydesmida, Paradoxosomatidae), *Glenniea* (Polydesmida, Polydesmidae), *Doratodesmus*, *Eutrichodesmus* (Polydesmida, Haplodesmidae), *Glyphiulus* (Iulida, Glyphiulidae), *Lipseuma* (Chordeumatida, Kashmireumatidae), *Nepalella* (Chordeumatida, Megalotyliidae), *Guizhousoma* (Chordeumatida, Guizhousomatidae), *Paracortina* (Callipodida, Paracortinidae) and *Bollmania* (Callipodida, Caspiopetalidae).

Concerning Papua New Guinea, the only information comes from our collection of 1975. It has been entrusted to Prof. Hoffman, who described several new genera and species, but returned the rest of the collection in Sofia. Fortunately, S. Golovatch and P. Stoev started a project for identifying this material and already several papers have been published with many new species, but mostly collected outside the caves. Among the new taxa the most

remarkable is *Selminosoma chapmani* Hoffman (Paradoxosomatidae), collected by us on the walls of the waterfalls, in the falling water. The species is undoubtedly a troglobite.

**Chilopoda.** Ref.: LOKSA (1960), DEHARVENG (1989)

Very few centipedes live in caves in both areas. *Lithobius tetraphthalmus* Loksa (Lithobiomorpha, Lithobiidae) was recorded from China, *Ethmostigmus platycephalus* (Newport, 1845) (Scolopendromorpha, Scolopendridae) was found in a cave on Halmahera (DEHARVENG, 1989). In the caves of Vietnam and other countries on the walls we observed the hugh *Thereuopoda longicornis* (Fabricius, 1793) (Scutigromorpha).

### Insecta

**Collembola.** Ref.: CARPENTER (1933), DEHARVENG (1981, 1983, 1986, 1987a, 1987b, 1988, 1990, 2009), DEHARVENG & BEDOS (1995), JANTARIT, SATASOOK & DEHARVENG (2014), YOSII (1971), ZHANG & DEHARVENG (2009), ZHANG, DEHARVENG & CHEN (2009)

DEHARVENG (1987a) outlines the main results of the intensive study of Collembola in the caves of SE Asia in the last decades. Eight main lines of cave-restricted species have been recognized. Troglobiomophy is most advanced in the species of *Troglopedetes* (Paronellidae) in Thailand, but such patterns are present also in the species of *Pseudosinella*, *Sinella* and *Oncopodura*. Deharveng concludes that in SE Asia live true troglobitic Collembola, "morphologically cave-adapted in the same way as temperate troglobites". We should note also the opinion of MASSOUD & THIBAUD (1977, p.141-157), that it is useless to apply the notion of "trogloxene" for characterising a spring-tail, taking into account that all Collembola are able to reproduce both in caves and outside them.

The genera *Acherontella*, *Pseudosinella*, *Sinella*, *Oncopodura*, and *Arrhopalites* are found also in other parts of the world. It seems that no relictual forms have been discovered. From Vietnam DEHARVENG & BEDOS (1995b) described *Lepidonella lecongkieti* (Paronellidae), a troglobite. After Jantarit et al. (2014), members of the genus *Cyphoderus* (Cyphoderidae) are a major component in the collembolan cave fauna of Thailand.

From New Guinea DEHARVENG (1983) described the endemic genus *Coecoloba* (*C. plumleyi*, Neanuridae), discovered by the British Expedition in 1978.

**Diplura.** Ref.: CONDÉ (1982, 1989, 1992b, 1993a, 1993b)

The genus *Lepidocampa* contains troglobitic species both in New Guinea (*L. chapmani*) and Sulawesi (*L. hypogaea*). Another troglobite (*Plusiocampa* (*Didymocampa*) *lipsae* Condé, 1993) has been described from South China.

**Thysanura.** Ref.: PACLT (1982)

Based on the collections of P. Beron (1975, Chimbu Prov. of PNG, New Ireland and New Britain) and Ph. Chapman (1978, Sarawak), Paclt (1988) published four species of the genera *Subnicoletia* and *Trinemura*, including *Trinemura subarmata*, considered by him as troglobite.

**Orthoptera.** Ref.: CHOPARD (1915, 1916, 1919, 1921, 1924, 1929a, 1929b, 1954, 1959), KIRBY (1908), LEROY (1967), YAMASAKI (1978), RAMPINI & DI RUSSO (2002), RAMPINI et al. (2008), GOROCHOV et al. (2006)

From the results mainly of Chopard and Gorochov, Rampini and Di-Russo we have now good idea of the rich Orthopteran fauna of SE Asia. Represented are the families Rhaphidophoridae of Gryllacridodea (*Diestrammena*, *Raphidophora*, *Eutachycines*, *Tachycines*) and Phasgonuridae of Gryllodea (*Arachnomimus*, *Parendacustes*). *Eutachycines cassani* (Chopard) is considered troglobitic, many other species are trogliphiles with reduced eyes and other adaptations to life mainly in caves. A considerable series of cave Orthoptera from SE Asia was entrusted to Dr Gorochov in St. Petersburg.

**Dictyoptera (Blattaria).** Ref.: ASAHINA (1974), BOLIVAR (1892, 1897), GRANDCOLAS & DEHARVENG (2007), ROTH (1980, 1988), ROTH & MCGAVIN (1994)

In the tropical caves Blattids are numerous. In SE Asia nine species of the genera *Nocticola*, *Spelaeoblatta* (Nocticolidae), *Neostylopyga*, *Neotrogloblattella*, *Symploce* (Blatellidae) have been recorded by Asahina, Bolivar et Roth in Sarawak, Philippines, Burma and Ryukyu Islands. From caves of New Britain is known *Spelaeoblatta* sp., from the caves of Borneo – the hugh troglobitic *Miroblatta baai* Grandcolas, 2007 (Blaberidae).

**Psocoptera.** Ref.: DEHARVENG et al. (1986), DEHARVENG & LECLERC (1989), McCLURE et al. (1967), THORNTON (1962)

Three species (*Psyllipsocus*, *Parasoa*) have been described from caves in Malaya, no troglobites.

**Dermaptera.** Ref.: BRINDLE (1980, 1982), MEDWAY (1958), BRINDLE & OROMI (1994), COLANI (1952), START (1974), WELLS & LABANG (1974)

Two species have been recorded from Sarawak, but only *Nala ornata* Borelli, 1932 (Labiduridae) is considered troglobite.

**Coleoptera.** Ref.: BESUCHET (1981, 1986), BLAIR (1924, 1929), CAMERON (1947), CASALE (1982), DARLINGTON (1971), DEUVE (1986, 1987a, 1987b, 1987c, 1988a, 1988b, 1993, 1996a, 1996b, 1999, 2000, 2001, 2002a, 2002b, 2003, 2004, 2012, 2013, 2014), DEUVE & TIAN (2008, 2009, 2010, 2011), DEUVE et al. (1999), EMBERSON & MOORE (1982), FAILLE (2010), FERRER (2004, 2006), GUÉORGUIEV (1978), GUÉORGUIEV & ROCCHI (1992), GUÉORGUIEV (2013, 2014), JARRIGE (1969), LEEFMANS (1930), LOURENÇO (1995), MAGRINI et al. (1999), MOORE (1978), NOMURA & FUXING (1991), PANG & TIAN (2014), PECK (1981, 1983, 1985), PERREAU (1993), RAFFRAY 1892), ROSSI (1978), SEN GUPTA (1979), SMITH (1980), SPANGLER (1988, 1996, 1998), SZYMCZAKOWSKI (1972), TIAN (2011, 2013), UÉNO (1980, 1995, 1997, 1998a, 1998b, 1998c, 1999a, 1999b, 1999c, 2000a, 2000b, 2000c, 2002a, 2002b, 2003, 2005a, 2005b, 2005c, 2006), UÉNO & CLARKE (2007), UENO & KISHIMOTO (2001, 2002), UÉNO & RAN (1998, 2001), UENO & WANG (1991), VIGNA TAGLIANTI (1995, 1996, 1997), ZOIA (1991)

For a long time (until 1978) no troglobite beetle has been recorded from the caves of SE Asia and Melanesia. MITCHELL (1969) affirms that "Troglobitic beetles are unknown in tropical caves". The situation changed drastically in the last 40 years. The boom in the knowledge on troglobitic Carabidae happened in South China (mainly Guizhou, Guangxi, Hunan, Hubei, Chongqing, and Sichuan), Vietnam, Thailand and Laos. In several years have been published many new species from the peculiar new genera *Guizhaphaenops*, *Dongodytes*, *Cathaiaphaenops*, *Giraffaphaenops*, *Gotoblemus*, *Thaumastaphaenops*, *Jiangxiaphaenops*, *Laosaphaenops*, *Satotrechus*, *Minimaphaenops*, *Oodinotrechus*, *Uenotrechus*, *Toshiaphaenops*, *Trechiamiotis*, *Superbotrechus*, *Shuaphaenops*, *Sinotroglodytes*, *Sinaphaenops*, *Qianotrechus*, *Qianaphaenops*, *Langxangaphaenops*, *Tonkinaphaenops*, *Plesioaphaenops* (Trechinae), *Morimotoidius* (Platynini), *Guidytes* (Clivinini), and *Jujiroa* and *Mateuius* (Pterostichinae).

From Papua New Guinea have been recorded three more genera of troglobitic Carabidae: *Speagonum* Moore, 1978 (high New Guinea, at 13 °C temperature), *Troglagonum* Casale, 1982 and *Gastragonum* Darlington, 1952 (New Ireland), from Pterostichinae (Agonini).

Following the discussion of DEUVE (2012), we have to notice that longtime the "typical" troglobites of Trechinae (*Sinaphaenops*, *Dongodytes*, *Giraffaphaenops*, etc.) have been recently described from the subtropical parts of South China. The tropi-

cal areas were populated by other lines of Carabidae (Paussinae, Scaritinae, Brachininae or Harpalinae s. lato). This regularity, however, is not complete as in the tropical caves of Vietnam and Laos have been found by L. Deharveng and A. Bedos such remarkable representatives of Trechinae as *Laosaphaenops* and *Langxangaphaenops*. Are they relicts, as pointed by DEHARVENG (2004)?

Concerning the water beetles appeared the papers of GUÉORGUIEV (1978), GUÉORGUIEV & ROCCHI (1992), describing our material from Papua New Guinea (including the troglobite *Platynectes (Gueorguievtes) beroni*). SPANGLER (1996) described three more troglobites from Thailand and Sulawesi (*Siamoporus deharvengi* and *Sinodytes hubbardi* – Dytiscidae and *Speonoterus bedosae* – Noteridae).

Troglobitic Tenebrionidae from Vietnam have been described by FERRER (2004, 2006).

**Hymenoptera.** Ref.: ROHWER (1924), RONCIN & DEHARVENG (2003), WHEELER (1924)

A review of the cave ants, together with a description of the first genus and species of presumably troglobitic ants (*Leptogenys khammouanensis* from Laos) was made by RONCIN & DEHARVENG (2003).

**Diptera.** Ref.: ALEXANDER (1961), BRUNETTI (1924), COLLESS (1962), LAMB (1924), LENG (1987), LEWIS & LANE (1976), MAA (1962, 1980), PAPP (1978, 1982, 1984), QUATE (1962, 1965), WILSON (1979), WIRTH (1980), YANG & ZHANG (1995)

Three species of *Phlebotomus* (Psychodidae), described by QUATE (1965) from the caves of the Philippines, are considered troglobites. Many other Diptera have been recorded in South Asian caves as troglaphiles, troglloxenes or bat parasites.

**Trichoptera.** Ref.: KUMANSKI (1979)

According to JUBERTHIE & DECU (2001), the only troglobitic Trichoptera in the studied area is *Chimarra hienghene* Malicky from New Caledonia. Some stone flies have been found in caves occasionally, incl. by myself, in Papua New Guinea (KUMANSKI, 1979).

**Lepidoptera.** Ref.: BRADLEY (1973), MEYRICK (1908, 1929), ROBINSON (1980)

Many species of moths (mostly Microlepidoptera) have been found in tropical caves (ROBINSON, 1980). Some representatives of the genus *Tinea* are known to spend all their life cycle underground in Malaysia, but even they are not considered troglobitic. Exceptions are *Tinea microphthalma* Robinson from the Philippines and may be *T. atricola* Meyrick from Batu Caves (JUBERTHIE & DECU, 2001; DECU et al., 2001).



### **Paleogeography of Sunda and Sahul landmasses and South China**

Ref.: THOMPSON, 1967; RAVEN & AXELROD (1972), HAMILTON (1979), HALL (1997, 1998, 2001, 2002), HALL & HALLOWAY (eds.) (1998), LEE & LAWVER (1995), AUDLEY-CHARLES (1984), GOLONKA et al. (2006), STAUFFER (1974), STAUFFER & GOBBETS (1972), HUANG & ZHANG (2003),

Many reconstructions of the development of SE Asia have been attempted over the years and now we can see with high degree of accuracy how land and sea evolved in the Sunda-Sahul area. Following mostly the models of Hall (loc.cit.), we can observe the following patterns in these connections since the end of Oligocene (- 25 MY).

For us is interesting to understand how New Guinea developed, at least for the last 10 Ma. With all marine relicts above 2000 m in the Central Highlands, very far from the sea, it is clear that these animals have been "uplifted", together with the whole mountain range.

In the Lower Miocene eastern Papua emerged orogenically. Early in the Pliocene the eastern Papuan Island was linked to the central highland orogenic island area, which was linked to the Australian mainland. New Guinea was assuming roughly its present shape (THOMPSON, 1967). According to HALL (2002), "Much of the uplift in New Guinea is very young, and most of the fission track ages record rapid uplift since 10 Ma, and in many areas since 5 Ma".

The analysis of MOSS & WILSON (1998) concerning the biogeographic implications of the Tertiary paleogeographic evolution of Sulawesi and Borneo are worth quoting. Wallacea, according to them, is a biogeographic region, situated between areas with Asiatic and Australian floras and faunas, where organisms show a high degree of endemism. A land connection between Borneo and mainland SE Asia may have existed throughout much of the Tertiary and would have allowed migration of terrestrial biota. Western Sulawesi had been connected to eastern Borneo by the late Cretaceous and by the early Eocene with possibilities of dispersal of fauna between Borneo and western Sulawesi. The East Sulawesi ophiolite was accreted onto Sulawesi during or after the late Oligocene and resulted in the formation of more extensive land areas of Sulawesi. "Microcontinental fragments accreted onto eastern Sulawesi in the Miocene to Pleistocene may have been emergent as they drifted towards Sulawesi and allowed island hopping or rafting for biota of Australian affinity. Island hopping routes for the

dispersal of organisms between Borneo-Sulawesi and the Philippines may have existed along volcanic arcs, such as the long-lived North Sulawesi arc, the Sulu and Sangihe arcs, and the Cagayan arc" (MOSS & WILSON, 1998).

If we analyse the paleogeographical maps of Australasia in HALL (1998), we can make several observations. If we quote this article: "The period 30-0 Ma is of most interest to biogeographers; before then the separation between Asia and Australia was greater and the tectonic reconstructions are also more uncertain". More realistic and of importance for the recent fauna is the time of the last 20 Ma.

**20 Ma (Early Miocene)** Continent including most of Borneo. Only small parts of Sumatra, Java and Sulawesi were dry land as islands. Australia and New Guinea interconnected. Eastern New Guinea and Taiwan under water, Hainan part of the continent. Makassar Strait existed.

**15 Ma (Middle Miocene)** Similar situation. The Barisan of Sumatra cut into several islands, the remaining Sumatra, Java, Bali and Lombok under water, as well as Taiwan. Torres and Makassar Straits existing. Borneo part of continent, Sulawesi isolated.

**10 Ma (Late Miocene)** The Sumatran Barisan, Java, Timor, Sulawesi and the central part of New Guinea land. Strait between the larger Australia and central New Guinea existing. Continent largely connected with Borneo and very narrowly connected with Sumatra. Hainan part of the continent, Taiwan under water.

**5 Ma (Early Pliocene)** – in Continental Southeast Asia the land mass is almost as present, but is connected with Borneo and Sumatra. The shape of Borneo, Java and Sumatra is almost as it is now, the northern coast of Sumatra is covered by shallow sea between Sumatra and Malacca. In New Guinea only the northern part is land, Northern Australia reaches more to the north, but between northern New Guinea and the enlarged land on the present day Carpentaria Bay there was a large strait, much wider than the Torres Strait. Hainan was under shallow water, Taiwan was connected with mainland China.

**Origin of the cave fauna in South East Asia and Papua New Guinea – Relictual and non-relictual cave animals. Parapatric speciation.**

Ref.: VANDEL (1964), MITCHELL (1969), STONE (1992), CHAPMAN (1986), PECK & FINSTON (1993), JUBERTHIE (1984, 1989), HOWARTH (1972, 1973, 1980, 1981, 1987, 1988), HOLSINGER (1988), CALS & BOUTIN (1985),

“A geological understanding of the region is likely to be of value to understanding its biogeography, but should be seen more as the essential background to a complex geological, physiographic, climatic and biotic evolution rather than as the explanation of the patterns observed at the present day”.

R. Hall, 2001

**What is parapatric speciation?** Definition in Wikipedia: A speciation in which the zones of two diverging populations are only partially separated that the species may still come in contact or cross the barrier from time to time, until selection for specific behaviours or certain isolating mechanisms will eventually prevent them from interbreeding.

**Zoogeographical status of the described area.**

Even since the time of Sclater and Wallace there is no congruence among the zoogeographers concerning the subdivision of the described area, especially of New Guinea. SE Asia and the Papuan area are placed not only in different regions, but even in different Realms or Kingdoms.

UDVARDY (1975) includes SE Asia in the Indomalayan Realm and New Guinea (Papuan Province) in the Oceanian Realm. Most of South China (the richest provinces in troglobites like Guizhou) belongs to the Palaearctic Realm.

According to DARLINGTON (1957) New Guinea

belongs to the Australian Region of the Kingdom Notogea, Indo-Malayan Region – to the Kingdom Megagea (Arctogea).

According to LOPATIN (1980), Australia is included in Kingdom Notogea and SE Asia in Kingdom Paleogea (together with Africa and Madagascar), as Indomalayan Region. This division sounds reasonable, moreover biogeographically GRUEV & KUZMANOV (1994) outline Australian Kingdom (Australis), including Australia, New Guinea and many islands. One of its components, New Guinean Region, botanically is more linked with the Oriental Kingdom.

“Today, the waters of SE Asia contain the highest marine faunal diversity in the world, and the islands of the region contain some of the most diverse collections of plant and animal species found on Earth. The period 30-0 Ma is of most interest to biogeographers since before then the separation between Asia and Australia was greater and for almost all land plants and animals it was probably not possible to cross this barrier” As a conclusion, “There were never continuous land links between Sundaland and Australia” (HALL, 2001).

The paleogeography of South China and the adjacent territories is presented in the Atlas of WANG (1985).

The famous lines (Fig. 1), dividing Australian from Indomalayan elements, were based mainly on the distribution of birds and mammals. In his analysis of

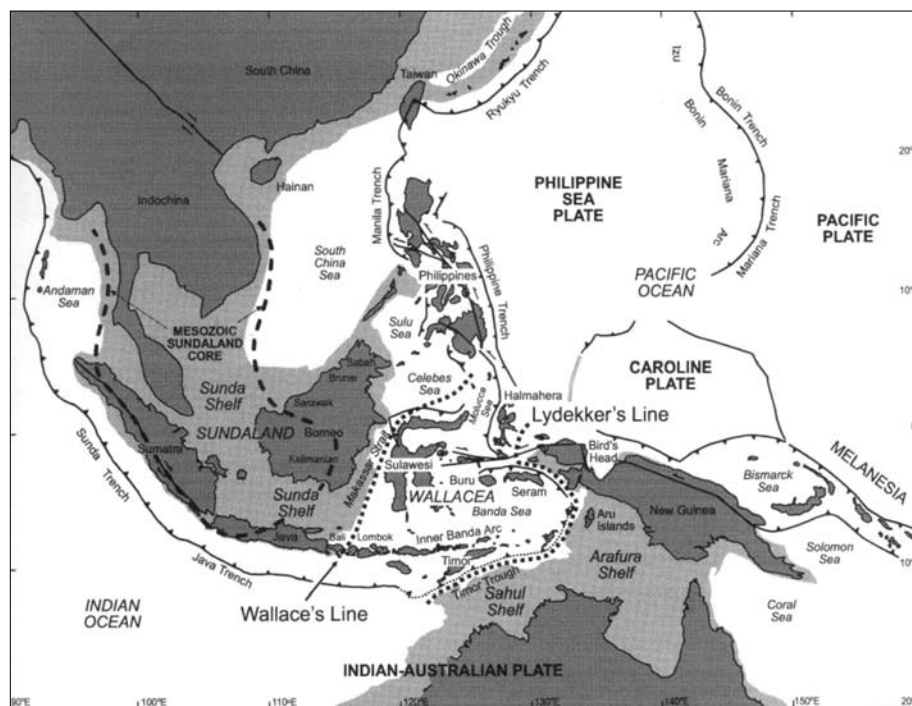


Fig. 1. Australasia and the Lines (after Hall, 2002, modified)

New Guinean insect fauna GRESSITT (1958) points that "...the insect fauna of New Guinea is basically of ancient Asian origin, with only recent invasion from Australia". The prominent specialist of New Guinean insects outlines the history of a presumed very ancient Melanesian continent north of the present day New Guinea. On this "continent" evolved rich and distinctive insect fauna and this greatly antedated the invasion of Australian and other mammals. "Also that the Australian insect forms invading New Guinea encountered the competition of a fairly rich and balanced fauna, which was not the case with the mammals". The continent, according to Gressitt, "apparently divided into two major islands in some period of the Tertiary before the Pliocene". Another interesting conclusion was that New Guinea does not possess a true alpine fauna, despite of mountain chains almost 5000 m high. "The insect fauna of the high altitudes represents a recent development, of lowland forms adapting themselves to a cooler climate". I discussed with Dr Gressitt this last idea during my visit to Wau in 1975 and he was very interested in our collecting in the cool caves at 2200 – 2400 m (13 °C), even at 3100 m on Mt Fugilil (9 °C). No similar wealth of troglobites is usually found in the lowland caves. What concerns New Ireland, it is considered by him as part of the Solomonian Division of the older Melanesian continent and not part of the nearby New Britain (from the high Lelet Plateau in New Ireland was described the troglobite genus and species of Carabidae *Troglagonum novaehiberniae* CASALE, 1982).

According to DEHARVENG (2004), the Wallace's Line "...is reflected in part by the regional subterranean fauna. However...chorological data are too loose to derive any interpretation for most groups". Ten years later the situation hasn't changed too much, mostly because of the scarcity of reliable people to identify the material collected by the many expeditions. The bulk of our PNG material awaits identification since 1975.

**Age of the fauna.** VANDEL (1958), speaking of troglobites, insisted that "Les nombreuses études systématiques qui leur ont été consacrées mettent hors de doute leur appartenance à des lignées très anciennes, disparues aujourd'hui de la surface du globe, ou émigrées dans des régions fort éloignées de leur habitat originel". Indeed, Vandel is discussing here the cave fauna of Europe, Nord Africa, Asia Minor, Japan and North America, as, according to him, "La faune cavernicole qui peuple les grottes tropicales est souvent très abondante, mais elle est composée exclusivement de troglaphiles et de troglonexènes".

CHAPMAN (1986) analyzed the "non-relictual" troglobites in tropical Asian and Australasian caves. According to DEHARVENG (2004), "They might be actually present in Southeast Asia, as suggested by recent discoveries of isolated mono- or oligo-specific genera, like the Opilioacarids *Siamacarus* of Thailand, or the Coleoptera *Mateuellus* of Sulawesi and *Laosaphaenops* of Laos". The stygobites of marine origine are clearly relictual.

#### **Marine relicts in highlands**

Ref.: ANDREEV (1982a, 1982b), BERNASCONI (1995), HARTMANN – SCHRÖDER & MARINOV (1977), VANDEL (1964), WAEGELE et al. (1987).

Typical marine relicts have been found by us in 1975 in the center of New Guinea highlands. They belong to Polychaeta (*Namanereis beroni* Hartmann-Schröder et Marinov), Gastropoda Hydrobiidae (*Selmistomia beroni* Bernasconi), Isopoda Anthuridea (*Cyathura beroni* Andreev). Another species of Anthuridea has been described from Mulu (Sarawak): *Cyathura (Stygocyathura) chapmani* Andreev. Another marine relict is *Theosbaena cambodjana* Cals et Boutin (Thermosbaenacea) from Cambodia. It is interesting that the association (certainly relict) *Namanereis araps* (GLASBY, 1997) – *Cyathura wadincola* (BOTOSANEANU & STOCK, 1997) has been observed also in Oman.

#### **Similarity and differences between the cave faunas of SE Asia and New Guinea**

Despite the inadequate research done in the caves of both areas, especially in New Guinea, some conclusions could be drawn comparing these faunas, divided by Wallace's and other lines. First of all, SE Asia is not a homogenous area – the fauna of the tropical and equatorial caves of Malaya and Indonesia cannot be put together with the rich fauna of some Chinese rather temperate provinces (Guizhou, Hubei, etc.). Also, the fauna of the lowland caves of New Guinea, New Britain and New Ireland certainly differs from the fauna of the highlands of New Guinea (above 1700 m) and of Lelet Plateau in New Ireland.

Only some groups could be compared, for the others there is very limited or no information.

**Gastropoda.** Many cave species of snails have been recorded from SE Asia, but non of them have characteristics of stygobytes. From the high New Guinea we have found the endemic marine relict *Selmistomia beroni*.

**Isopoda Anthuridea** – the same genus *Cyathura* in Papua New Guinea (PNG), the Philippines and Sarawak.

**Isopoda Oniscidea** – no genera in common.

**Decapoda Natantia** – only the genus

*Macrobrachium* in common of SE Asia and New Ireland.

**Decapoda Reptantia** – 12 genera with stygobitic species in SE Asia, 4 other genera in New Guinea and New Britain.

**Pseudoscorpiones** – different fauna; only one troglobitic sp. (Sternophoridae) in PNG, 6 genera with 11 troglobitic species (Chthoniidae, Neobisiidae, Cheiridiidae, Chernetidae, Cheliferidae) in SE Asia.

**Araneae** – many cave spiders, incl. troglobites of 16 genera (Dipluridae, Liphistiidae, Amaurobiidae, Ctenizidae, Leptonetidae, Nesticidae, Ochyroceratidae, Oonopidae, Sparassidae, Telemidae, Tetrablemmidae, Ctenidae). In his preliminary paper on our collection from PNG BRIGNOLI (1981) concluded that the cave spiders of New Guinea and of Bismarck Archipelago are a mixture of Oriental and Austral elements (with perhaps a certain predominance of the second group).

**Diplopoda.** In SE Asia so far have been recorded 30 troglobitic Diplopoda species of 13 genera (of Glomeridae, Polydesmidae, Paradoxosomatidae, Haplodesmidae, Glyphiulidae, Megalotyliidae, Guizhousomatidae, Paracortinidae, Sinocalipodidae, Caspiopetalidae – some of these families are endemic and are known mainly or only from caves). From the caves of PNG are known 8 species of Diplopoda, only the endemic genus and species (*Selminosoma chapmani*, Paradoxosomatidae), found by us in the water of the waterfalls, is a true troglobite.

**Collembola.** From SE Asia are known several genera containing troglobitic species (of Paronellidae, Neanuridae, Entomobryidae, Arrhopalitidae, Cyphoderidae, Tomoceridae). Species of some of these families have been published from New Guinea.

Among the **Diplura** one endemic troglobitic species of *Plusiocampa* has been described from SE Asia (S.China). From PNG has been recorded the endemic genus *Leletocampa* (New Guinea, New Ireland).

In **Thysanura** from SE Asia is known the genus *Subnicoletia*, from New Britain – and endemic and troglobitic genus and species of *Trinemura* (both in Nicoletiidae).

**Blattaria.** In SE Asia caves live at least 7 sp. of troglobitic Blattaria (Blattidae, Nocticolidae, Blatellidae). One of the genera (*Spelaeoblatta*) is represented also in New Britain. *Miroblatta baai* Grandcolas (Blaberidae) lives in the caves of Kalimantan.

**Coleoptera Carabidae.** One of the most remarkable discoveries in SE Asia was the multitude of

new troglobitic Carabids (55 species of more than 30 genera, almost all endemic and recently described, mainly from south China) (of Paussinae, Trechinae, Pterostichinae). Three genera with troglobitic species were found in the highland of New Guinea (*Speagonum*, *Gastragonum*) and in New Ireland (*Troглоagonum*).

One should note the eyeless troglobites found recently in the MSS of South China (*Qianotrechus grebennikovi* Deuve, 2014 and *Duvalioblemus faillei* Deuve, 2014).

**Coleoptera Dytiscidae and Noteridae.** From the water beetles three endemic genera (*Siamoporus*, *Sinodytes*, *Speonoterus*) have been described from Sumatra, Thailand and China. *Platynectes (Georguievtes) beroni* was found by us in the cave waters of New Guinea, but it is not considered to be stygobite.

Much new data from New Guinea will be received from new research and from the identification of the material, collected in 1975. This is not likely to largely alter the conclusions made so far.

**Some cave animals in SE Asia and New Guinea**

#### **Turbellaria**

##### **SE Asia**

*Dugesia batuensis* Ball (Tricladida, Planariidae) – Malaya (BALL, 1970)

*Mitchellia sarawakana* Kawakatsu et Chapman (Tricladida, Dimarcusidae) –

Sarawak (KAWAKATSU & CHAPMAN, 1983)

##### **New Guinea**

Temnocephalida indet. – Papua New Guinea (CHAPMAN, 1976; Smith, 1978)

#### **Hirudinea**

##### **SE Asia**

*Haemadipsa* sp. (Haemadipsidae) – China, Yunnan

##### **New Guinea**

*Leiobdella jawarerenis* (Richardson) (Haemadipsidae) – New Guinea (RICHARDSON, 1974)

#### **Oligochaeta**

##### **SE Asia**

*Haplotaxis glandularis* Yamaguchi (Haplotaxidae) – Thailand (DEHARVENG & LECLERC, 1989)

**New Guinea** – No information.

#### **Polychaeta**

**SE Asia** – No information.

**New Guinea**

*Namanereis beroni* Hartmann-Schröder et Marinov (Nereidae) – New Guinea (HARTMANN-SCHRÖDER & MARINOV, 1977)

**Mollusca****Gastropoda****SE Asia**

*Georissa scalinella* Van Benthem Jutting, 1966 (Prosobranchia, Hydrocenidae) – Sabah (VAN BENTHEM JUTTING, 1966)

*G. saulae* Van Benthem Jutting, 1966 (Prosobranchia, Hydrocenidae) – Sabah (VAN BENTHEM JUTTING, 1966)

*G. pyrrhoderma* Van Benthem Jutting, 1966 (Prosobranchia, Hydrocenidae) – Sarawak (VAN BENTHEM JUTTING, 1966)

*Opeas gracile* Hutton, 1834 (Subulinidae) – Sumatra

*O. doveri* Ghosh, 1929 (Subulinidae) – Malaysia, Malaya

*O. dimorpha* Ghosh, 1929 (Subulinidae) – Malaysia, Malaya

*Paropeas achatinaceum* (Pfeiffer, 1846) (Subulinidae) – Sumatra

*Prosopeas paioense* Bock, 1881 (Subulinidae) – Sumatra

**New Guinea**

*Selmistomia beroni* Bernasconi (Prosobranchia, Hydrobiidae) – New Guinea (BERNASCONI, 1995)

*Georissa papuana* Bernasconi (Prosobranchia, Hydrocenidae) – New Guinea (BERNASCONI, 1995)

? *Omphalorissa* sp. – New Guinea (SMITH, 1978)

*Physastra* sp. (Basommatophora, Planorbidae) – New Guinea (SMITH, 1978)

**Crustacea****Copepoda – Cyclopoida****SE Asia****New Guinea**

*Megacyclops viridis* (Jurine) (Cyclopidae) – New Guinea (CHAPMAN, 1985, sub “*Acanthocyclops v.*”, V. Naidenov det.)

**Bathynellacea****SE Asia**

*Parabathynella malaya* Sars (Parabathynellidae) – Malaya (SARS, 1929)

**New Guinea** – No information.

**Amphipoda****SE Asia**

*Aequigidiella aquilifera* Botosaneanu et Stock (Bogidiellidae) – Thailand (BOTOSANEANU & STOCK, 1989)

*Bogidiellasinica* Karaman et Sket (Bogidiellidae) – S. China (KARAMAN & SKET, 1990)

*B. (B.) thai* Botosaneanu et Notenboom (Bogidiellidae) – Thailand (BOTOSANEANU & NOTENBOOM, 1988)

*B. sarawacensis* Stock (Bogidiellidae) – Sarawak (STOCK, 1983)

*Sinogammarus troglodytes* Karaman et Ruffo (Gammaridae) – China, Sichuan (KARAMAN & RUFFO, 1995)

**New Guinea** – No information.

**Thermosbaenacea****SE Asia**

*Theosbaena cambodjana* Cals et Boutin (Halosbaenidae) – Cambodia (CALS & BOUTIN, 1985)

Thermosbaenacea indet. – Thailand (DEHARVENG & LECLERC, 1989)

**New Guinea** – No information.

**Isopoda – Flabellifera****SE Asia**

*Anopsilana conditoria* Bruce et Iliffe (Cirolanidae) – Philippines (BRUCE & ILIFFE, 1992)

*Exosphaeroides quirosi* Jaume et Queinnee (Sphaeromatidae) – Vanuatu (JAUME & QUEINNEC, 2007)

**New Guinea** – No information.

**Isopoda – Asellota****SE Asia**

Fam. Stenasellidae

*Stenasellus bedosae* Magniez, 1991 (Thailand)

*S. chapmani* Magniez, 1982 (Sarawak)

*S. cambodianus* Boutin et Magniez, 1985 (Cambodia)

*S. covillae* Magniez, 1987 (Sumatra)

*S. deharvengi* Magniez, 1991 (Thailand)

*S. foresti* Magniez, 2002 (Sumatra)

*S. monodi* Magniez, 2001 (Sumatra)

*S. rigali* Magniez, 1991 (Thailand)

*S. strinatii* Magniez, 1991 (Sumatra)

*S. stocki* Magniez, 2001 (Sumatra)

*S. brignolii* Pesce et Argano, 1981 (Thailand)

*S. mongnatei* Magniez & Panitvong, 2005 (Thailand)

**New Guinea** – No information.

**Isopoda – Anthuridea****SE Asia**

*Cyathura (Stygocyathura) chapmani* Andreev (Anthuridae) – Sarawak (ANDREEV, 1982b)

*C. (S.) filipinica* Botosaneanu et Sket (Anthuridae) – Bohol – Philippines (BOTOSANEANU & SKET, 1999)

**New Guinea**

*Cyathura (Stygocyathura) beroni* Andreev (Anthuridae) – New Guinea (ANDREEV, 1982a), New Britain (BOTOSANEANU & HENRY, 1986)

*C. (S.) papuae* Waegle, Coleman et Hosse (Anthuridae) – New Guinea (WAEGELE et al., 1987)

**Isopoda – Oniscidea****SE Asia**

*Clavigeroniscus riquieri* Arcangeli (Styloniscidae) – Togian Is. near Sulawesi (TAITI et al., 1992)

*Thailandoniscus annae* Dalens (Styloniscidae) – Thailand (DALENS, 1989)

*Trogloniscus* [= *Sinoniscus*] *cavernicolus* (Schultz)(Styloniscidae) – China, Guangxi (Schultz, 1995)

*T. clarkei* Taiti et Xue (Styloniscidae) – China, Guangxi (TAITI & XUE, 2012)

*T. deharvengi* Taiti et Xue (Styloniscidae) – China, Guangxi (TAITI & XUE, 2012)

*T. hengliensis* Taiti et Xue (Styloniscidae) – China, Guangxi (TAITI & XUE, 2012)

*T. trilobatus* Taiti et Xue (Styloniscidae) – China, Guangxi (TAITI & XUE, 2012)

*Papuaphiloscia insulana* Vandel (Philosciidae) – Ryukyu Is. (VANDEL, 1970)

*Pseudotyphloscia alba* (Philosciidae) – Togian Is. (TAITI et al., 1992)

*Burmoniscus coecus* (Budde-Lund) (Philosciidae) – Burma (BUDDE-LUND, 1895; TAITI & FERRARA, 1986)

*B. yunnanensis* Kwon et Taiti (Philosciidae) – China, Yunnan (KWON & TAITI, 1993)

? *Lucasioides cavernicolus* Kwon et Taiti (Trachelipidae) – China (KWON & TAITI, 1993)

*L. gigliotosi* (Arcangeli) (Trachelipidae) – China

*Nagurus sundaicus* (Dollfus) (Trachelipidae) – China

*Exalloniscus bicoloratus* Taiti et Ferrara (Oniscidae) – Malaya (TAITI & FERRARA, 1988)

*E. thailandensis* Dalens (Oniscidae) – Thailand (DALENS, 1987)

*E. papillosus* (Budde-Lund, 1912) (Oniscidae) – Malaya

*Exalloniscus beroni* Taiti et Ferrara (Oniscidae) – Thailand (TAITI & FERRARA, 1988)

*E. bessoni* Dalens (Oniscidae) – Laos (DALENS, 1992)

*Indoniscus deharvengi* Dalens (Oniscidae) – Thailand (DALENS, 1987)

*Porcellionides pruinus* (Brandt) (Porcellionidae) – China, Togian Island (TAITI et al., 1992)

*Sinodillo troglophilus* Kwon et Taiti (Armadillidae) – China (KWON & TAITI, 1993)

*S. ferrarai* Kwon et Taiti (Armadillidae) – China, Yunnan (KWON & TAITI, 1993)

*Sphaerillo rafaелиi* (Arcangeli)(Armadillidae) – China, Yunnan (KWON & TAITI, 1989)

*Myrmecodillo* sp. (Armadillidae) – Togian Is. (TAITI et al., 1992)

*Tuberodillo celebensis* (Armadillidae) – Togian Is. (TAITI et al., 1992)

*Philoscia dobakholi* Chopra, 1924 (Philosciidae) (India, Malaysia)(Tph)

*Tenebrioscia antennuata* Schultz (Philosciidae) – Java (SCHULTZ, 1985)

*Sumatrillo* [*Armadillo*] *thienemanni* (Herold, 1932) (Armadillidae) – Sumatra

*Troglodillo emarginatus* Jackson, 1937 (Armadillidae) – Thailand

*T. latellai* Taiti et Gruber (Armadillidae) – China, Guizhou (TAITI & GRUBER, 2008)

*Dryadillo uenoi* Nunomura (Armadillidae) – Vietnam (NUNOMURA, 1995)

*D. guizhouensis* Taiti et Gruber (Armadillidae) – China, Guizhou (TAITI & GRUBER, 2008)

*D. parviocellatus* Taiti et Gruber (Armadillidae) – China, Guangxi (TAITI & GRUBER, 2008)(eutrph)

*Armadillo intermixtus* Budde-Lund, 1904 (Armadillidae) – Malaysia, Malaya

*A. solumcolus* Schultz (Armadillidae) – Sarawak (SCHULTZ, 1982). Blind and colorless, but, according to Schultz (1982), more a soil inhabiting animal, than a true troglobite.

*Cubaris meermohri* Arcangeli (Armadillidae) – Sumatra (ARCANGELI, 1935)

**New Guinea**

*Papuaphiloscia parkeri* Vandel (Philosciidae) – New Guinea (VANDEL, 1964)

*Papuaphiloscia* sp. (Philosciidae) – New Guinea (SMITH, 1978)

*Reductoniscus novaehiberniae* Ferrara et Taiti (Armadillidae) – New Ireland (FERRARA & TAITI, 1990)

*Neodillo simplex* Dalens (Armadillidae) – New Guinea (DALENS, 1990)

*Schismadillo holthuisi* Vandel, 1973 (Armadillidae) – New Guinea (SMITH, 1978)

*Indoniscus* sp. (Oniscidae) – New Guinea (SMITH, 1978)

**Decapoda Natantia****SE Asia**

*Edoneus atheatus* Holthuis (Atyidae) – Philippines, Luzon (HOLTHUIS, 1978)

*Caridina hanshanensis* Tan, 1990 (Atyidae) – China (TAN, 1990)

*C. semiblepsia* Guo, Choy et Gui (Atyidae) – China (GUO, CHOY & GUI, 1996)

*C. demenica* Cai et Li (Atyidae) – China, Guizhou (CAI & LI, 1997)

*Typhlocaridina lanceifrons* Liang et Yan, 1981

(Atyidae) – China (LIANG & YAN, 1981)

*Macrobrachium clymene* (De Man, 1902)

(Palaemonidae) – Sarawak

*M. formosense* Bate, 1868 (Palaemonidae) – Ryukyu I.

*M. lar* (Fabricius, 1789)(Palaemonidae) – Java, Papua

*M. pilimanus* (De Man, 1879)(Palaemonidae) – Java, Sumatra

*M. poeti* Holthuis (Palaemonidae) – Java (HOLTHUIS, 1984)

*M. japonicum* (De Haan, 1848) (Palaemonidae) – Ryukyu I.

#### New Guinea

*Caridina troglodytes* Holthuis (Atyidae) – New Ireland (HOLTHUIS, 1978)

*Macrobrachium microps* Holthuis (Palaemonidae) – New Ireland (HOLTHUIS, 1978)

*M. australe* (Guérin-Méneville, 1838) (Palaemonidae) – Papua

*Palaemon concinnus* Dana, 1852 (Palaemonidae) – Papua, or Irian Jaya

#### Decapoda Reptantia

##### SE Asia

*Cerberusa caeca* Holthuis (Potamidae) – Sarawak (HOLTHUIS, 1979)

*C. tipula* Holthuis (Potamidae) – Sarawak (HOLTHUIS, 1979)

*Daipotamon minus* Ng et Trontelj (Potamidae) – China, Guizhou (NG & TRONTELJ, 1996)

*Erebusa calobates* Yeo et Ng (Potamidae) – Laos (YEO & NG, 1999)

*Isolapotamon bauense* Ng (Potamidae) – Sarawak (NG, 1987). Stygobite?

*Potamon andersonianum* (Wood-Mason, 1871) (Potamidae) – Thailand (NG, 1988)

*Stygothelphusa bidiensis* (Lanchester) (Gecarcinucidae) – Sarawak (LANCHESTER, 1989).

#### Stygobite ?

*Cancrocaeca xenomorpha* Ng (Hymenosomatidae) – Sulawesi (NG, 1991)

*Adeleana chapmani* (Holthuis) (Gecarcinucidae) – Sarawak (HOLTHUIS, 1979)

*Arachnothelphusa rhadamantysi* (Ng et Goh) (Gecarcinucidae) – Sabah (NG & GOH, 1987)

*Phricotelphusa deharvengi* Ng (Gecarcinucidae) – Thailand (NG, 1988). Stygobite ?

*Thelphusula styx* Ng (Gecarcinucidae) – Sarawak (NG, 1989)

*Currothelphusa asserpes* Ng, 1990 (Paratelphusidae) – Halmahera (NG, 1990)

*Parathelphusa celebensis* (De Man, 1892) (Paratelphusidae) – Sulawesi (NG, 1988)

*P. convexa* (De Man, 1879)(Paratelphusidae) – Java (IHLE, 1912)

*P. oxygona* Nobili, 1901(Paratelphusidae) – Sarawak ()

*P. valida* Ng et Goh (Paratelphusidae) – Sabah (NG & GOH, 1987)

*Archipelothelphusa cavernicola* Takeda (Parathelphusidae) – Philippines (TAKEDA, 1983)

*Phaibulamon stilipes* Ng (Caenobitidae) – Thailand (NG, 1992)

*Sesarmoides cerberus* (Holthuis)(Grapsidae) – Nusa Lain, Mollucas (HOLTHUIS, 1964)

*S. emdi* Ng et Whitten (Grapsidae) – Nusa Penida (NG & WHITTEN, 1994)

*S. jacobsoni* (Ihle)(Grapsidae) – Java (Ihle, 1912). Stygobite?

#### New Guinea

*Rouxana phreatica* Holthuis (Paratelphusidae = Sundatelphusidae) – New Guinea (HOLTHUIS, 1982)

*Holthuisiana alba* Holthuis (Paratelphusidae = Sundatelphusidae) – New Guinea (HOLTHUIS, 1980)

*Trogloplax joliveti* Guinot (Goneplacidae) – New Britain (GUINOT, 1986)

*Geelvinkia darnei* Nget Guinot (Gecarcinucidae) – Papua (NG & GUINOT, 1997)

*Sendleria genuitei* Guinot (Gecarcinucidae) – New Britain (GUINOT, 1987). Stygobite?

#### Arachnida

##### Palpigradi

##### SE Asia

*Koeneniodes leclerci* Condé (Eukoeneriidae) – Thailand (CONDÉ, 1992c)

*Eukoeneria lyrifer* Condé (Eukoeneriidae) – Thailand (CONDÉ, 1988)

*E. deleta* Condé (Eukoeneriidae) – Thailand (CONDÉ, 1992c)

*E. thais* Condé (Eukoeneriidae) – Thailand (CONDÉ, 1988)

*E. maros* Condé (Eukoeneriidae) – Sulawesi (CONDÉ, 1992c)

**New Guinea** – No information.

##### Scorpiones

##### SE Asia

*Isometrus (Reddyanus) deharvengi* Lourenço et Duhem (Buthidae) – S. Vietnam (LOURENÇO & DUHEM, 2010)(tph)

*Lychas hosei* (Pocock)(Buthidae) – Sarawak (VACHON & LOURENÇO, 1985)(tph)

*Chaerilus chapmani* Vachon et Lourenço (Chaerilidae) – Sarawak (VACHON & LOURENÇO, 1985)

*Ch. agilis* Pocock, 1899 (Chaerilidae) – Malaya

- Chaerilus* sp. (blind and depigmented) (Chaerilidae) – Sarawak (DEHARVENG & LECLERC, 1989)
- Troglokhammouanus steineri** Lourenço (Pseudochactidae) – Laos (LOURENÇO, 2007)
- Vietbocap canhi** Lourenço et Dinh-Sac Pham (Pseudochactidae) – Vietnam (LOURENÇO & DINH-SAC PHAM, 2010)
- New Guinea**  
No information.
- Pseudoscorpiones**
- SE Asia**
- Lagynochthonius fragilis** Judson (Chthoniidae) – Vietnam (Judson, 2007)
- L. guasirih** (Mahnert)(Chthoniidae) – Sarawak (MAHNERT, 1988)
- Tyrannochthonius akaleus** Mahnert (Chthoniidae) – China, Sichuan (MAHNERT, 2009)
- T. antridraconis** Mahnert (Chthoniidae) – China, Sichuan (MAHNERT, 2009)
- T. ganshuanensis** Mahnert (Chthoniidae) – China, Sichuan, Hubei (MAHNERT, 2009)
- Parobisium martii** Mahnert (Neobisiidae) – China, Yunnan (MAHNERT, 2003)
- P. titanium** Mahnert (Neobisiidae) – China (MAHNERT, 2003)
- P. scaurum** Mahnert (Neobisiidae) – China (MAHNERT, 2003)
- Stenohya chinacavernicola** Schawaller (Neobisiidae) – China (SCHAWALLER, 1995)
- Dhanus doveri** Bristowe (Ideoroncidae) – Malaya (BRISTOWE, 1952)
- Atemnus strinatii** Beier (Atemnidae) – Philippines, Luzon (BEIER, 1977)
- Oratemnus saigonensis** (Beier)(Atemnidae) – Sarawak (BEIER, 1930)(tph)
- Cryptocheiridium philippinum** Beier (Cheiridiidae) – Philippines, Luzon (BEIER, 1977)
- C. lucifugum** Beier (Cheiridiidae) – Malaysia, Batu Caves (BEIER, 1963)
- Pseudochiridium clavigerum** (Thorell) (Pseudochiridiidae) – Malaya, Sarawak (THORELL, 1889)(tph)
- Megachernes glandulosus** Mahnert (Chernetidae) – China, Hubei (MAHNERT, 2009)
- M. grandis** (Beier) (Chernetidae) – Sumatra (BEIER, 1930)
- M. cf. himalayensis** (Ellingsen, 1914) – China, Guangxi
- M. cf. vietnamensis** Beier, 1967 – China, Hubei, Sichuan
- M. tuberosus** Mahnert (Chernetidae) – China, Sichuan (MAHNERT, 2009)
- Nudochernes lipsae** Mahnert (Chernetidae) – China, Yunnan (MAHNERT, 2003)
- N. troglobius** Mahnert (Chernetidae) – China, Hubei, Sichuan (MAHNERT, 2009)
- Stygiochelifer cavernae** (Tullgren) (Cheliferidae) – Sarawak (TULLGREN, 1912)
- New Guinea**
- Afrosterphorus cavernae** (Beier) (Sternophoridae) – New Guinea (BEIER, 1982)(tb?)
- Calocheiridius (= Xenolpium) cyclopium** Beier (Olpiidae) – New Guinea (BEIER, 1965)
- Uropygi**
- SE Asia**
- Typopeltis magnificus** Haupt (Thelyphonidae) – Laos (HAUPT, 2004)
- New Guinea**  
Gen. sp. indet., in a cave in New Ireland (P.Beron leg.)
- Amblypygi**
- SE Asia**  
am. Charinidae
- Sarax sarawakensis** (Thorell, 1888)(Charinidae) – Malaysia)(tph)
- S. cavernicola** Rahmadi, Harvey et Jun-Ichi Kojima (Charinidae) – Kalimantan (RAHMADI et al., 2010)
- S. mardua** Rahmadi, Harvey et Jun-Ichi Kojima (Charinidae) Kalimantan (RAHMADI et al., 2010)
- S. [Phrynichosarax] buxtoni** Gravely, 1915 (= *S. batuensis* ROEWER, 1962)(Charinidae) – Malaya (tph)
- Stygophrynus (S.) cavernicola** (Thorell) (Charontidae) – Burma, Thailand (THORELL, 1889)
- S. (S.) cerberus** Simon, 1901 (Charontidae) – Thailand
- Phrynichus orientalis** Weygoldt (Phrynichidae) – Thailand (WEYGOLDT, 1998), Vietnam (Steiner, 2011)
- Phrynus exsul** Harvey (Phrynidae) – Flores (HARVEY, 2002)
- New Guinea**  
No information.
- Schizomida**
- SE Asia**
- Schizomus siamensis** (Hansen, in Hansen et Soerensen)(Schizomidae) – Ryukyu Is. (SHIMOYANA, 1973)
- S. sauteri** Kraepelin (Schizomidae) – Ryukyu Is. (SHIMOYANA, 1973)
- S. daitoensis** (Shimoyana) (Schizomidae) – Ryukyu Is. (SHIMOYANA, 1981; COKENDOLFER, 1988)
- S. yamasakii** Cokendolfer (Schizomidae) – Taiwan (COKENDOLFER, 1988)



- Trithyreus pileti* Brignoli (Schizomidae) – Malaya (BRIGNOLI, 1974)  
**New Guinea** – no information.
- Opiliones**  
**SE Asia**  
**Cyphophthalmi**  
*Fangensis cavernarum* Schwendinger et Giribet (Stylocellidae) – (SCHWENDINGER & GIRIBET, 2005)  
*F. leclerci* Rambla (Stylocellidae) – Borneo (RAMBLA, 1994)  
*F. spelaeus* Schwendinger et Giribet (Stylocellidae) – Thailand (SCHWENDINGER & GIRIBET, 2005)  
*Stylocellus globosus* Schwendinger, Giribet et Steiner (Stylocellidae) – Malaya (SCHWENDINGER et al., 2004)  
*S. gryllospecus* Shear (Stylocellidae) – Sarawak (SHEAR, 1993a)  
*S. silhavyi* Rambla (Stylocellidae) – Sarawak (RAMBLA, 1991)(tph)  
*S. weberii* Hansen et Soerensen, 1904 (Stylocellidae) – Sumatra
- Laniatores**  
*Gnomulus pulvillatus* (Pocock, 1903) (Oncopodidae) – Malaya (POCOCK, 1903; MARTENS & SCHWENDINGER, 1998)  
*Kilungius tsutsui* Suzuki (Phalangodidae) – Ryukyu Is. (SUZUKI, 1964)  
*Pseudobiantes japonicus* Hirst, 1911 (Phalangodidae) – Ryukyu Is. (SUZUKI, 1964)  
*Sungsotia uenoi* Tsurusaki (Phalangodidae) – Vietnam (TSURUSAKI, 1995)  
*Tokunosia tenuipes* Suzuki (Phalangodidae) – Ryukyu Is. (SUZUKI, 1964)
- New Guinea**  
 No information.
- Araneae**  
**SE Asia**  
**Mygalomorpha**  
*Heptathela kimurai* (Kishida, 1920) (Heptathelidae) – Ryukyu Is. (SHIMOJANA, 1977)  
*Latouchia swinhoei* Pocock, 1901 (Ctenizidae) – Ryukyu Is. (SHIMOJANA, 1977)  
*Ummidia fragaria* (Dönitz, 1887)(Ctenizidae) – Ryukyu Is. (SHIMOJANA, 1977)  
*Macrothele holsti* (Pocock, 1901)(Dipluridae) – Ryukyu Is. (SHIMOJANA, 1977)  
*Masteria caeca* (Simon)(Dipluridae) – Philippines (SIMON, 1892)
- Liphistiomorpha**  
*Liphistius batuensis* Abraham (W. Malaysia) (Liphistiidae) (ABRAHAM, 1923)  
*L. langkawi* Platnick et Sedgwick, 1984 (Liphistiidae) – Thailand, Langkawi I. (PLATNICK & SEDGWICK, 1984)  
*L. panching* Platnick et Sedgwick, 1984 (Liphistiidae) – W. Malaysia (PLATNICK & SEDGWICK, 1984)(tph)  
*L. tempurung* Platnick, Schwendinger et Steiner (Liphistiidae) – W. Malaysia (PLATNICK et al., 1997)
- Araneomorpha**  
*Coelotes troglocaecus* Shimojana et Nishihira (Amaurobiidae) – Ryukyu Is., Okinawa (SHIMOJANA & NISHIHIRA, 2000)  
*C. degeneratus* Liu et Li (Amaurobiidae) – China, Yunnan (LIU & LI, 2009)  
*C. laohuanlongensis* Liu et Li (Amaurobiidae) – China, Yunnan (LIU & LI, 2009)  
*C. uncatus* Liu et Li (Amaurobiidae) – China, Yunnan (LIU & LI, 2009)  
**Draconarius yosianus** (Nishikawa) (Amaurobiidae) – China, Guanxi (NISHIKAWA, 1999)  
*D. auriformis* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2007)  
*D. brachialis* Xu et Li, 2007(Amaurobiidae) – China (LIU & LI, 2009)  
*D. cochleariformis* Liu et Li, 2009(Amaurobiidae) – China, Guizhou (LIU & LI, 2009)  
*D. lini* Liu et Li, 2009 (Amaurobiidae) – China, Yunnan (LIU & LI, 2009)  
*D. ovillus* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2007)  
*D. semicircularis* Liu et Li (Amaurobiidae) – China, Guizhou (LIU & LI, 2009)  
*D. specialis* Xu et Li (Amaurobiidae) – China, Henan (XU & LI, 2007)  
*D. spirallus* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2007)  
*D. tongi* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2007)  
*D. tubercularis* Xu et Li (Amaurobiidae) – China, Hainan (XU & LI, 2007)  
*Platocoelotes icohamatoides* (Amaurobiidae) – China, Hunan (PENG & WANG, 1997)  
*P. bifidus* Yin, Xu et Yan (Amaurobiidae) – China, Hunan (YIN et al. 2010)  
*P. ampulliformis* Liu et Li (Amaurobiidae) – China, (LIU & LI, 2008)  
*P. globosus* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2008)  
*P. latus* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2008)  
*P. paralatus* Xu et Li (Amaurobiidae) – China, Guizhou (XU & LI, 2008)

- P. polyptychus* Xu et Li (Amaurobiidae) – China, Hunan (XU & LI, 2006)
- P. brevis* Liu et Li (Amaurobiidae) – China (LIU & LI, 2008)
- P. daweshanensis* Xu et Li (Amaurobiidae) – China (XU & LI, 2008)
- P. furcatus* Liu et Li (Amaurobiidae) – China (LIU & LI, 2008)
- P. imperfectus* Wang et Jäger (Amaurobiidae) – China (WANG & JÄGER, 2007)
- P. impletus* (Peng et Wang)(Amaurobiidae) – China (PENG & WANG, 1997)
- P. kailiensis* Wang (Amaurobiidae) – China (WANG, 2003)
- P. lichuanensis* (Chen et Zhao)( Amaurobiidae) – China (CHEN & ZHAO, 1998)
- P. strombuliformis* Liu et Li (Amaurobiidae) – China (LIU & LI, 2008)
- Taira liboensis* Zhu, Chen et Zhang (Amaurobiidae) – China, Guizhou (ZHU et al., 2004)
- Panaretidius microphthalmus* Fage (Clubionidae) – W. Malaysia (Fage, 1929) (tph)
- Damarchus cavernicolus* Abraham, 1924 (Ctenizidae) – W. Malaysia (TONG & LI, 2008)
- Leptoneta anocellata** Chen, Zhang et Song (Leptonetidae) – China, Zhejiang (CHEN et al., 1993).
- Troglobite?**
- L. foliiformis* Tong et Li (Leptonetidae) – China, Beijing City, Hebei (TONG & LI, 2008)
- L. miaoshiensis* Chen et Zhang (Leptonetidae) – China, Zhejiang (CHEN & ZHANG, 1993).
- Troglobite?**
- L. taizhensis* Chen et Zhang (Leptonetidae) – China, Zhejiang (CHEN & ZHANG, 1993)
- L. tianxinensis* Tong et Li (Leptonetidae) – China, Henan (TONG & LI, 2008)
- Howaia* sp. (Nesticidae) – China
- Nesticella marapu* Benjamin (Nesticidae) – Indonesia, Sumba (BENJAMIN, 2004)
- Nesticella* sp. Chen et Zhu, 2004 (China)
- Nesticus okinawaensis* Yaginuma (Nesticidae) – Ryukyu Is. (YAGINUMA, 1979)
- Psilodermes leclerci* Deeleman-Reinhold (Ochyroceratidae) – Sulawesi (DEELEMEN-REINHOLD, 1995) (tph)
- P. egeria* Simon (Ochyroceratidae) – Philippines (SIMON, 1892)
- Speocera caeca* Deeleman-Reinhold (Ochyroceratidae) – Sulawesi (DEELEMEN-REINHOLD, 1995)
- S. laureata* Komatsu (Ochyroceratidae) – Ryukyu Is. (KOMATSU, 1974)
- Spermophora* spp. (Ochyroceratidae) (2 tb species from Batu Lubang and Gua Salukkan Kallang, LECLERC et al., 2001)
- Camptoscaphiella sinensis** Deeleman-Reinhold (Oonopidae) – China, Yunnan (DEELEMEN-REINHOLD, 1995)
- Psechrus ancoralis* Bayer et Jäger (Psechridae) – Laos, Vietnam (BAYER & JÄGER, 2010)
- P. antraeus* Bayer et Jäger (Psechridae) – Laos (BAYER & JÄGER, 2010)
- P. steineri* Bayer et Jäger (Psechridae) – Laos (BAYER & JÄGER, 2010)
- Scytodes magna* Bristowe (Scytodidae) – Sarawak (BRISTOWE, 1952)(tph)
- Heteropoda aemulans** Bayer et Jäger (Sparassidae) – Laos (BAYER & JÄGER, 2009)
- H. belua** Jäger (Sparassidae) – Sarawak (JÄGER, 2005)
- H. beroni* Jäger (Sparassidae) – Sulawesi (JÄGER, 2005)
- H. maxima* Jäger (Sparassidae) – Laos (JÄGER, 2001)
- H. schwendingeri* Jäger, 2005 (Sparassidae) – Thailand (JÄGER, 2005)
- H. simplex* Jäger et Ono (Sparassidae) – Laos and Okinawa (JÄGER & ONO, 2000)
- H. steineri* Bayer et Jäger (Sparassidae) – Laos (BAYER & JÄGER, 2009)
- Sinopoda anguina* Liu, Li et Jäger (Sparassidae) – China, Yunnan (LIU et al., 2008)
- S. crassa* Liu, Li et Jäger (Sparassidae) – China, Guangxi (LIU et al., 2008)
- S. fornicata* Liu, Li et Jäger (Sparassidae) – China, Yunnan (LIU et al., 2008)
- S. grandispinosa* Liu, Li et Jäger (Sparassidae) – China, Hainan (LIU et al., 2008)
- S. microphthalma* (Fage) (Sparassidae) – Malaysia (Fage, 1929)
- S. nuda* Liu, Li et Jäger (Sparassidae) – China, Guizhou (LIU et al., 2008)
- S. semicirculata* Liu, Li et Jäger (Sparassidae) – China, Guangxi (LIU et al., 2008)
- S. triangula* Liu, Li et Jäger (Sparassidae) – China, Guizhou (LIU et al. 2008)
- S. undata** Liu, Li et Jäger (Sparassidae) – China, Yunnan (LIU et al., 2008)
- S. yaojingensis* Liu, Li et Jäger (Sparassidae) – China, Yunnan (LIU et al., 2008)
- Telema bella* Tong et Li (Telemidae) – China, Hainan (TONG & LI, 2008)
- T. bifida** Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. breviseta* Tong et Li (Telemidae) – China, Hainan (TONG & LI, 2008)

- T. circularis* Tong et Li (Telemidae) – China, Guizhou (TONG & LI, 2008)
- T. claviformis* Tong et Li (Telemidae) – China, Guizhou (TONG & LI, 2008)
- T. conglobare* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. dengi* Tong et Li (Telemidae) – China, Hainan (TONG & LI, 2008)
- T. dongbei* Xin et Jing (Telemidae) – China, Guizhou (XIN & JING, 1998)
- T. grandidens* Tong et Li (Telemidae) – China, Guizhou (TONG & LI, 2008)
- T. guihua* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. oculata* Tong et Li (Telemidae) – China, Guizhou (TONG & LI, 2008)
- T. pedati* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. spinafemora* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. spirae* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. strentarsi* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. tortutheca* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- T. vesiculata* Lin et Li (Telemidae) – China, Guizhou (LIN & LI, 2010)
- Ablemma baso* Roewer (Tetrablemmidae) – Sumatra (ROEWER, 1963)
- A. shimojanai* (Komatsu) (Tetrablemmidae) – Ryukyu Is., Okinawa (KOMATSU, 1968)
- Bacillemma leclerci* Deeleman-Reinhold (Tetrablemmidae) – Thailand (DEELEMANN-REINHOLD, 1993)
- Amauropelma matakecil* Miller et Rahmadi (Ctenidae) – Java (MILLER & RAHMADI, 2012) (only several of the many Chinese cave spiders described recently are enumerated here as examples)
- New Guinea**
- Nesticus renatus* Bourne (Nesticidae) – New Ireland (BOURNE, 1980)
- N. utuensis* Bourne (Nesticidae) – New Ireland (BOURNE, 1980)
- Acari**
- SE Asia**
- Siamacarus dalgeri* Leclerc (Opilioacarida) – Thailand (LECLERC, 1989)
- Siamacarus withi* Leclerc (Opilioacarida) – Thailand (LECLERC, 1989)
- Vanderhammenacarus deharvengi* Leclerc (Opilioacarida) – Thailand (LECLERC, 1989)
- Caecothrombium deharvengi* Makol et Gabrys (Acariformes, Eutrombidiidae) – Vietnam (MAKOL & GABRYS, 2005)
- New Guinea**
- Ixodes colocaliae* (Parasitiformes, Ixodida, Ixodidae) – New Guinea
- Myriapoda**
- Diplopoda**
- SE Asia**
- Pselaphognatha**
- Monographis* sp. (Polyxenidae) – Ryukyu Is., Okinawa (MURAKAMI, 1975)
- Glomerida**
- Hyleoglomeris albicorporis* Zhang et Zhang (Glomeridae) – China (Yunnan)(ZHANG & ZHANG, 1995)
- H. differens* Golovatch, Geoffroy et Mauriès (Glomeridae) – Laos (GOLOVATCH et al., 2006). Tph.
- H. eusulcata* Golovatch, Geoffroy et Mauriès (Glomeridae) – China (Yunnan) (GOLOVATCH et al., 2006).
- H. maculata* Golovatch, Geoffroy et Mauriès (Glomeridae) – China (Yunnan) (GOLOVATCH et al., 2006). Tph.
- H. reducta* Golovatch, Geoffroy et Mauriès (Glomeridae) – China (Yunnan) (GOLOVATCH et al., 2006). Tph.
- H. speophila* Golovatch, Geoffroy et Mauriès (Glomeridae) – Vietnam (GOLOVATCH et al., 2006).
- Tb?**
- H. sulcostriata* Golovatch, Geoffroy et Mauriès (Glomeridae) – Laos (GOLOVATCH et al., 2006). **Tb?**
- H. yamashinai* Verhoeff (Glomeridae) – Ryukyu Isl., Okinawa (VERHOEFF, 1937)
- Polydesmida**
- Pacidesmus sinensis* (Golovatch et Hoffman) (Polydesmidae) – China (LOKSA, 1960, sub “*Polydesmus hamatus*”, renamed by GOLOVATCH & HOFFMAN, 1989).
- P. martensi* Golovatch et Geoffroy (Polydesmidae) – China (Guizhou) (GOLOVATCH & GEOFFROY, 2006)
- P. bifidus* Golovatch et Geoffroy (Polydesmidae) – China, Sichuan (GOLOVATCH & GEOFFROY, 2014)
- P. trifidus* Golovatch et Geoffroy (Polydesmidae) – China, Sichuan (GOLOVATCH & GEOFFROY, 2014)
- Epanerchodus lipsae* Golovatch et Geoffroy (Polydesmidae) – China, Sichuan (GOLOVATCH & GEOFFROY, 2014)
- E. subterraneus* Verhoeff (Polydesmidae) – Ryukyu Is., Okinawa (MURAKAMI, 1975a)
- E. stylotarseus* Chen et Zhang (Polydesmidae) – China (Guizhou)(CHEN & ZHANG, 1990)
- E. varius* Geoffroy et Golovatch (Polydesmidae)

– China (Hubei) (GEOFFROY & GOLOVATCH, 2004).

**Tb?**

*Desmoxytes longispina* (Loksa) (Paradoxosomatidae) – China (LOKSA, 1960).

**D. scolopendroides** Golovatch, Geoffroy et Mauriès (Paradoxosomatidae) – China (GOLOVATCH et al., 2010). – **Troglobite** or troglophile.

**D. scutigeroides** Golovatch, Geoffroy et Mauriès (Paradoxosomatidae) – China (GOLOVATCH et al., 2010).

*Orthomorpha fluminoris* Hoffman (Paradoxosomatidae) – Malaya (HOFFMAN, 1977)

*Tylopus sinensis* Golovatch (Paradoxosomatidae) – China (GOLOVATCH, 1995)

*Doratodesmus* (= *Cerastelachys*) *cavernicola* (Sinclair) (Haplodesmidae) – Thailand (HOFFMAN, 1977)

**Doratodesmus** (= *Crenatidorsus*) **grandifoliatus** (Zhang) (Haplodesmidae) – China, Yunnan (ZHANG & WANG, 1993; GOLOVATCH et al.,). **Tb?**

*Doratodesmus* (= *Parapauropus*) *monodentus* (Zhang) (Haplodesmidae) – China, Yunnan (ZHANG, in ZHANG & WANG, 1993)

*Eutrichodesmus* (= *Ascetophacus*) *reclinatus* (Hoffman) (Haplodesmidae) – Malaya (HOFFMAN, 1977)

*Eutrichodesmus* (= *Ascetophacus*) *macclurei* (Hoffman) (Haplodesmidae) – Malaya (HOFFMAN, 1977a)

**Eutrichodesmus** (= *Dyomerothrix*) **gremialis** (Hoffman) (Haplodesmidae) – Thailand (HOFFMAN, 1982). **Tb?**

*Eutrichodesmus* (= *Pocillidorsus*) *dorsiangulatus* (Zhang) (Haplodesmidae) – China, Yunnan (ZHANG & WANG, 1993)

*Eutrichodesmus armatocaudatus* Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al., 2009)

**E. aster** Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al., 2009). **Tb?**

**E. asteroides** Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al.,). **Tb?**

*E. basalis* Golovatch, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al., 2009)

*E. communicans* Golovatch, Geoffroy, Mauriès et VandenSpiegel – Vanuatu (GOLOVATCH et al., 2009)

**E. curticornis** Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al., 2009). **Tb?**

*E. demangei* Silvestri (Haplodesmidae) – China, Yunnan (ZHANG & WANG, 1993)

*E. incisus* Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – China, Guizhou (GOLOVATCH et al., 2009)

*E. latus* Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – China, Guangxi (GOLOVATCH et al., 2009)

**E. multilobatus** Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Laos (GOLOVATCH et al., 2009). **Tb?**

**E. regularis** Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – Vietnam (GOLOVATCH et al., 2009). **Tb?**

*E. similis* Golovatch, Geoffroy, Mauriès et VandenSpiegel (Haplodesmidae) – China, Guangxi (GOLOVATCH et al., 2009)

**Glenniea blanca** Golovatch et Geoffroy (Polydesmidae) – China, Sichuan (GOLOVATCH & GEOFFROY, 2014)

**G. lagredae** Golovatch et Geoffroy (Polydesmidae) – China, Sichuan (GOLOVATCH & GEOFFROY, 2014)

#### **Iulida**

*Parabilingulus simplicius* Mauriès et Nguyen Duy – Jacquemin (Glyphiulidae = Cambalopsidae) – China, Guangxi (MAURIÈS & NGUYEN DUY – JACQUEMIN, 1997)

*Glyphiulus rayrauchi* Mauriès et Nguyen Duy – Jacquemin (Glyphiulidae) – China, Guangxi (MAURIÈS & NGUYEN DUY – JACQUEMIN, 1997)

*G. zorzini* Mauriès et Nguyen Duy (Glyphiulidae) – Jacquemin – China, Guizhou (MAURIÈS & NGUYEN DUY – JACQUEMIN, 1997)

*G. lipsorum* Mauriès et Nguyen Duy – Jacquemin (Glyphiulidae) – China, Hubei (MAURIÈS & NGUYEN DUY – JACQUEMIN, 1997)

*G. melanoporus* Mauriès et Nguyen Duy – Jacquemin (Glyphiulidae) – China, Guangxi (MAURIÈS & NGUYEN DUY – JACQUEMIN, 1997)

*G. vietnamicus* Mauriès (Glyphiulidae) – Vietnam, Quang Binh (Mauriès, 1977) *Glyphiulus* (= *Trogloglyphus*) *balazsi* Loksa (Glyphiulidae) – China, Guizhou (LOKSA, 1960).

*Glyphiulus* (= *Trogloglyphus*) *anophthalmus* Loksa (Glyphiulidae) – China, Guizhou (LOKSA, 1960).

*Glyphiulus* (= *Octoglyphus*) *pulcher* Loksa (Glyphiulidae) – China (LOKSA, 1960).

*Glyphiulus beroni* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Yunnan (GOLOVATCH et al., 2007). **Tb?**

*G. subgranulatus* Golovatch, Geoffroy, Mauriès

et Van Den Spiegel (Glyphiulidae) – China, Yunnan (GOLOVATCH et al., 2007). Tph.

*G. semigranulatus* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Yunnan (GOLOVATCH et al., 2007). Tph.

*G. paragranelatus* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Yunnan GOLOVATCH et al., 2007). Tph (or Tb?)

*G. pergranulatus* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Guizhou (GOLOVATCH et al., 2007). Tph.

*G. latellai* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Guizhou (GOLOVATCH et al., 2007).

*G. basalis* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Sichuan (GOLOVATCH et al., 2007).

*G. bedosae* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – Laos (GOLOVATCH et al., 2007). Tph.

*G. deharvengi* Golovatch, Geoffroy, Mauriès et Van Den Spiegel (Glyphiulidae) – China, Hunan (GOLOVATCH et al., 2007).

*Trachyiulus nordquisti ambiguus* Mauriès (Glyphiulidae) – Thailand (MAURIÈS, 1983)

*T. silvestrii* Hoffman (Glyphiulidae) – Malaya (HOFFMAN, 1977).

*Podoglyphiulus sinensis* Meng et Zhang (Glyphiulidae) – China, Guizhou (MENG & ZHANG, 1993)

*Plusioglyphiulus grandicollis* Hoffman (Glyphiulidae) – Malaya (HOFFMAN, 1977)

*P. cavernicolus* Silvestri (Glyphiulidae) – ? Sarawak (SILVESTRI, 1923)

*Dolichoglyphiulus asper* Verhoeff (Glyphiulidae) – Ryukyu Is.

### Stemmiulida

*Eostemmiulus caecus* Mauriès, Golovatch et Geoffroy (Stemmiulidae) – Vietnam (MAURIÈS et al., 2010). Tph.

*Stemmiulus deharvengi* Mauriès et Golovatch (Stemmiulidae) – Indonesia, Halmahera (MAURIÈS & GOLOVATCH, 2006)

### Chordeumatida

*Lipseuma josianae* Golovatch, Geoffroy et Mauriès (Kashmireumatidae) – China, Hubei (GOLOVATCH et al., 2006).

*L. bernardi* Golovatch, Geoffroy et Mauriès (Kashmireumatidae) – China, Sichuan (GOLOVATCH et al., 2006).

*Vieteuma hubeiensis* Mauriès et Nguyen Duy-Jacquemin (Kashmireumatidae) – China, Hubei (MAURIÈS & NGUYEN DUY-JACQUEMIN, 1997).

*Nepalella caeca* Shear (Megalotyliidae) – China, Guizhou (Shear, 1999).

*N. marmorata* Golovatch, Geoffroy et Mauriès (Megalotyliidae) – China, Sichuan (GOLOVATCH et al., 2006). – ?Troglophile.

*N. grandis* Golovatch, Geoffroy et Mauriès (Megalotyliidae) – China, Yunnan (GOLOVATCH et al., 2006).

*Metopidiodithrix kalang* Shear (Metopidiodithricidae) – Indonesia, Sulawesi (SHEAR, 2002).

*Skleroprotopus membranipedalis* Zhang (Mongoliulidae) – China, Beijing (ZHANG, 1985)

*Guizhousoma latellai* Mauriès (Guizhousomatidae) – China, Guizhou (MAURIÈS, 2005).

### Callipodida

*Paracortina wangi* Stoev (Paracortinidae) – China, Yunnan (STOEV, 2004).

*P. chinensis* Stoev et Geoffroy (Paracortinidae) – Yunnan (STOEV & GEOFFROY, 2004).

*P. multisegmentata* Stoev et Geoffroy (Paracortinidae) – Vietnam (STOEV & GEOFFROY, 2004).

*Sinocallipus simplipodicus* Zhang (Sinocallipodidae) – China, Yunnan (ZHANG, 1993).

*Sinocallipus catba* Stoev et Enghoff (Sinocallipodidae) – Vietnam (STOEV & ENGHOFF, 2011).

*S. deharvengi* Stoev et Enghoff (Sinocallipodidae) – Vietnam (STOEV & ENGHOFF, 2011).

*S. jaegeri* Stoev et Enghoff (Sinocallipodidae) – Laos (STOEV & ENGHOFF, 2011).

*S. steineri* Stoev et Enghoff (Sinocallipodidae) – Laos (STOEV & ENGHOFF, 2011).

*S. thai* Stoev, Enghoff, Panha et Fuangarworn (Sinocallipodidae) – Thailand (STOEV et al., 2007).

*Bollmania beroni* Stoev et Enghoff (Caspiopetalidae) – China, Yunnan (STOEV & ENGHOFF, 2005).

### New Guinea

*Astromontosoma jeekeli* Hoffman (Haplodesmidae = Doratodesmidae) – Papua New Guinea (HOFFMAN, 1978)

*Caloma pallidum* Golovatch et Stoev (Paradoxosomatidae) – (GOLOVATCH & STOEV, 2014)

*Eustrongylosoma exiguum* Hoffman (Paradoxosomatidae) – HOFFMAN (1978)

*Selminosoma chapmani* Hoffman (Paradoxosomatidae) – HOFFMAN (1978)

*Nothrosoma beroni* Hoffman (Paradoxosomatidae) – HOFFMAN (1978)

*Aschistodesmus* sp. (Paradoxosomatidae) –  
HOFFMAN (1978)

*Scolopopyge pholeter* Hoffman (Haplodesmidae  
– Doratodesmidae) – HOFFMAN (1978)

*Selminarchushispidus* Hoffman (Haplodesmidae  
– Doratodesmidae) – HOFFMAN (1978)

Fam.? *Opisthoporodesmus* sp. – (HOFFMAN,  
1978)

### Chilopoda

#### SE Asia

*Lithobius tetrophthalmus* Loksa  
(Lithobiomorpha, Lithobiidae) – China (LOKSA,  
1960)

*Ethmostigmus platycephalus* (Newport, 1845)  
(Scolopendromorpha, Scolopendridae) – Halmahera  
(DEHARVENG, 1989)

*Thereuopoda longicornis* (Fabricius, 1793)  
(Scutigermorpha) – caves in all countries of SE Asia  
(tph)

#### New Guinea

#### Insecta

#### Collembola

#### SE Asia

*Troglopedetes fredstonei* Deharveng  
(Paronellidae) – Thailand (DEHARVENG, 1988)

*Ascocyrtus* sp. – Halmahera (DEHARVENG, 1989)

*Acherontiella* sp. – Halmahera (DEHARVENG,  
1989)

*Xenilla yucatanana* Halmahera (DEHARVENG,  
1989)

*Pseudachorutes* cf. *longisetosus* (Neanuridae) –  
Halmahera (DEHARVENG, 1989)

*Mesaphorura* sp. – Halmahera (DEHARVENG,  
1989)

*Cryptopygus* sp. – Halmahera (DEHARVENG,  
1989)

*Isotomiella* sp. – Halmahera (DEHARVENG,  
1989)

*Neeluss* sp. (Neelidae) – Halmahera (DEHARVENG,  
1989)

*Acherontiella thai* Thibaud (Hypogastruridae)  
– Thailand (Thibaud, 1990)

*A. colotlipana* Palacios-Vargas et Thibaud  
(Hypogastruridae) – Thailand (VARGAS & THIBAUD,  
1985)

*Willemia nadchatrami* Yosii (Hypogastruridae)  
– Malaya (YOSII, 1959)

*Willemia* sp. (Hypogastruridae) – Sulawesi  
(Maros karst)

*Brachystomella contorta* Denis  
(Brachystomellidae) – Malaya (DENIS, 1931)

*Brachystomella* sp. (Brachystomellidae) –  
Sulawesi (Maros karst)

*Mesaphorura krausbaueri* Börner, 1901  
(Onychiuridae) – New Guinea

*Mesaphorura* sp. (Onychiuridae) – Sulawesi  
(Maros and Watampone karst)

*Onychiurus* sp. (Onychiuridae) – New Guinea  
(Mouret & Deharveng, 1981)

*Protaphorura* sp. (Onychiuridae) – Thailand

*Blasconura* sp. (Neanuridae) – Sulawesi (Maros  
karst)

*Coecoloba plumleyi* Deharveng (Neanuridae)  
– New Guinea (DEHARVENG, 1983)

*Friesea* sp. (Neanuridae) – Sulawesi (Maros  
karst)

cf. *Lobella* sp. (Neanuridae) – Sulawesi (Maros  
karst)

cf. *Micranurida* sp. (Neanuridae) – Sulawesi  
(Maros karst)

*Paleonura* sp. (Neanuridae) – Sulawesi (Maros  
karst)

cf. *Pseudachorutella* sp. (Neanuridae) – Sulawesi  
(Maros karst)

*Folsomia candida* Willem, 1902 (Isotomidae)  
(New Guinea)

*Folsomia* cf. *candida* Willem, 1902 (Isotomidae)  
– New Guinea (MOURET & DEHARVENG, 1981)

*Folsomia onychiurina* (Denis, 1931) (Isotomidae)  
– New Guinea, New Ireland (DEHARVENG, 1981)

*Folsomides exiguus* Folsom, 1932 (Isotomidae)  
– Sulawesi (Maros karst)

*Folsomides* cf. *parvus* Folsom, 1934 – New  
Guinea, New Ireland (DEHARVENG, 1981)

*Folsomina* sp. – Sulawesi (DEHARVENG, 1987)

*Isotomiella* sp. – Sulawesi (Maros and  
Watampone karst)

*Harlomillsia* sp. (Oncopoduridae) – Sulawesi  
(Maros and Watampone karst)

*Oncopodura* gr. *tricuspidata* (Oncopoduridae)  
– Thailand

*Lepidocyrtus* sp. (Entomobryidae) – Sulawesi  
(DEHARVENG, 1987)

*Pseudosinella Chiangdaoensis* Deharveng  
(Entomobryidae) Thailand (DEHARVENG, 1990)

*P. caoi* Chen, Wang et Christiansen  
(Entomobryidae) China, Guilin (CHEN et al., 2002)  
(tph)

*P. hui* Wang, Chen et Christiansen  
(Entomobryidae) – China, Guangxi (CHEN &  
CHRISTIANSSEN, 2003)

*P. maros* Deharveng et Suharjono  
(Entomobryidae) – Sulawesi (DEHARVENG &  
SUHARJONO, 2004)

*Sinella* sp. (Entomobryidae) – China, Guizhou  
(DEHARVENG & CHEN, 2008)

- Coecobrya guanophila* Deharveng (Entomobryidae) – Thailand (DEHARVENG, 1990)
- C. indonesiensis* Chen et Deharveng (Entomobryidae) – Indonesia (CHEN & DEHARVENG, 1997)
- C. tukmeas* Zhang, Deharveng et Chen (Entomobryidae) – Cambodia (ZHANG et al., 2009)
- Coecobrya* gr. *caeca* Schött, 1896 (Entomobryidae) – Malaya, Thailand
- Sinella papuana* Yosii (Entomobryidae) – New Guinea (YOSII, 1971) ? Tb
- S. insolens* Chen et Christiansen (Entomobryidae) – China, Jiangsu (CHEN & CHRISTIANSEN, 1993)
- S. fuyanensis* Chen et Christiansen (Entomobryidae) – China, Jiangxi (CHEN & CHRISTIANSEN, 1993)
- S. sineoculata* Chen et Christiansen (Entomobryidae) – China, Jiangsu (CHEN & CHRISTIANSEN, 1993)
- S. trogla* Chen et Christiansen (Entomobryidae) – China, Guangxi (CHEN & CHRISTIANSEN, 1993)
- S. whitteni* Zhanget Deharveng (Entomobryidae) – China, Guangxi (ZHANG & DEHARVENG, 2009)
- Lepidonella lecongkieti* Deharveng et Bedos (Paronellidae) – Vietnam (DEHARVENG & BEDOS, 1995b)
- Pseudosinella* sp. (Entomobryidae) – Halmahera (DEHARVENG, 1989)
- Pseudoparonella doveri* Carpenter (Paronellidae) – Malaya (CARPENTER, 1933)
- Pseudoparonella* sp. (Paronellidae) – New Guinea (YOSII, 1971)
- Troglopedetes calvus* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. centralis* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. convergens* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. dispersus* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. fredstonei* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. leclerci* Deharveng (Paronellidae) – Thailand (DEHARVENG, 1990)
- T. longicornis* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. maffrei* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. maunonensis* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. microps* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. multispinosus* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- T. paucisetosus* Deharveng et Gers (Paronellidae) – Thailand (DEHARVENG & GERS, 1993)
- Arrhopalites chiangdaoensis* Nayrolles (Arrhopalitidae) – Thailand (NAYROLLES, 1990)
- Cyphoderus simulans* Imms (Cyphoderidae) – Burma (IMMS, 1912)
- C. songkhlaensis* Jantarit, Satasook et Deharveng (Cyphoderidae) – Thailand (JANTARIT et al., 2014). – ? Tb
- C. khaochakanus* Jantarit, Satasook et Deharveng (Cyphoderidae) – Thailand (JANTARIT et al., 2014). – ? Tb
- Megalothorax* sp. (Neelidae) – Sulawesi (DEHARVENG, 1987)
- Tomocerus* sp. (Tomoceridae) – China, Guangxi (DEHARVENG & CHEN, 2008)
- New Guinea**
- Coecoloba plumleyi* Deh. (Neanuridae) – New Guinea (DEHARVENG, 1983)
- Pseudosinella yosii* Yosii (Entomobryidae) – New Guinea (YOSII, 1959). ? Tb
- Pseudosinella* sp. (Entomobryidae) – New Guinea (DEHARVENG, 1982)
- Sinella papuana* Yosii, 1971 (Entomobryidae) – New Guinea. ? Tb
- Sinella* sp. (SMITH, 1978)
- Folsomia candida* (Willem) (Isotomidae) – New Guinea (SMITH, 1978)
- Pseudoparonella* sp. (Paronellidae) – New Guinea (YOSII, 1971)
- Diplura**
- SE Asia**
- Plusiocampa (Diidymocampa) lipsae* Condé (Rhabdura, Campodeidae) – China, Hubei (CONDÉ, 1993)
- Lepidocampa weberi* Oudemans f. typ. sensu Silvestri (Rhabdura, Campodeidae) – Sarawak (CONDÉ, 1989)
- L. weberi borneensis* Silvestri (Rhabdura, Campodeidae) – Sarawak (CONDÉ, 1993)
- Burmjapyx inferus* (Carpenter) (Dicellurata, Japygidae) – Malaya (CARPENTER, 1933)
- New Guinea**
- Leletocampa marthaleri* Condé (Rhabdura, Campodeidae) – New Ireland (CONDÉ, 1982)
- Lepidocampa weberi* s.l. Oudemans (Rhabdura, Campodeidae) – New Guinea (CONDÉ, 1982)
- L. weberi lawrencei* Bareth et Condé (Rhabdura,

Campodeidae) – New Guinea (CONDÉ, 1989)

*L. chapmani* Condé (Rhabdura, Campodeidae) – New Guinea (CONDÉ, 1989)

### Thysanura

#### SE Asia

*Subnicoletia feai* Silvestri (Nicoletiidae) – Sarawak (PACLT, 1982)

#### New Guinea

*Trinemura subarmata* Paclt (Nicoletiidae) – New Ireland (PACLT, 1982)

*T. pacifica* Carpenter (Nicoletiidae) – New Britain, New Ireland (PACLT, 1982)

### Orthoptera

#### SE Asia

#### Gryllacridoidea

*Diestrammena graveyi* Chopard (Rhaphidophoridae) – Malaya (CHOPARD, 1924)

*D. longipes* Rehn (Rhaphidophoridae) – N. Vietnam (REHN, 1906)

*D. palpata* Rehn (Rhaphidophoridae) – N. Vietnam, China – Sichuan (REHN, 1906)

*D. minuta* Chopard (Rhaphidophoridae) – N. Vietnam (CHOPARD, 1915)

*D. vitalisi* Chopard (Rhaphidophoridae) – Laos (CHOPARD, 1919a)

*D. vandermeermohri* Willemse (Rhaphidophoridae) – Sumatra (WILLEMSE, 1936)

*D. mjobergi* Chopard (Rhaphidophoridae) – Borneo (CHOPARD, 1937)

*D. sarawakana* Chopard (Rhaphidophoridae) – Sarawak (CHAPMAN, 1980)

*D. caudata* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Guangxi (GOROCHOV et al., 2006)

*D. crenata* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Hunan (GOROCHOV et al., 2006)

*D. ferecaeca* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Guizhou (GOROCHOV et al., 2006)

*D. omninoecaeca* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Hunan (GOROCHOV et al., 2006)

*D. semicrenata* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Hubei (GOROCHOV et al., 2006)

*D. solida* Gorochov, Rampini & Di-Russo (Rhaphidophoridae) – China, Hunan (GOROCHOV et al., 2006)

*D. aspes* Rampini & Di-Russo (Rhaphidophoridae) – China, Guizhou (RAMPINI & DI RUSSO, 2008)

*D. caverna* Jiao, Lin, Lei & Bi (Rhaphidophoridae) – China (JIAO et al., 2008)

*D. chenhui* Rampini & Di Russo (Rhaphidophoridae) – China, Guizhou (RAMPINI & DI RUSSO, 2008)

*D. latellai* Rampini & Di Russo (Rhaphidophoridae) – China, Guizhou (RAMPINI & DI RUSSO, 2008)

*D. zorzini* Rampini & Di Russo (Rhaphidophoridae) – China, Guizhou (RAMPINI & DI RUSSO, 2008)

*Eutachycines vandermeermohri* (Willemse) (Rhaphidophoridae) – Sumatra (WILLEMSE, 1936)

*E. cassani* (Chopard) (Rhaphidophoridae) – Laos (CHOPARD, 1954)

*E. annandalei* (Kirby) (Rhaphidophoridae) – Thailand (KIRBY, 1908)

*E. feai* Chopard (Rhaphidophoridae) – Burma (CHOPARD, 1915)

*Rhaphidophora cavernicola* Chopard (Rhaphidophoridae) – Malaysia, Malaya (CHOPARD, 1916)

*R. mulmeinensis* Chopard (Rhaphidophoridae) – Burma (CHOPARD, 1916)

[*R. picea* Serv.] – Java (Gua Djatidjajar, Gua Lawa – CHOPARD, 1924)

*R. dammermanisi* Karny (Rhaphidophoridae) – Java (KARNY, 1924)

*R. oophaga* Chopard, 1959 (Rhaphidophoridae) – Sarawak (CHAPMAN, 1980)

*R. fulva* Brunner, 1888 (Rhaphidophoridae) – Sumatra

*Tachycines racovitzai* Chopard (Rhaphidophoridae) – Vietnam (CHOPARD, 1915)

*T. adelungi* Chopard (Rhaphidophoridae) – Burma (CHOPARD, 1921)

*T. cuenoti* Chopard (Rhaphidophoridae) – Vietnam (CHOPARD, 1929)

*T. tonkinensis* Chopard (Rhaphidophoridae) – Vietnam (CHOPARD, 1929)

*T. coomani* Chopard (Rhaphidophoridae) – Vietnam (CHOPARD, 1929)

### Gryllodea

*Arachnomimus jacobsoni* Chopard (Phalangopsidae) – Java (CHOPARD, 1924)

*A. microphthalmus* Chopard (Phalangopsidae) – Malaya (CHOPARD, 1929)

*Parendacustes cavicola* Chopard (Phalangopsidae) – Sumatra (CHOPARD, 1924)

*Gryllotalpa fulvipes* Saussure, 1877 = *G. nigripennis* Chopard, 1929 (Gryllotalpidae) – (Malaysia, Malaya)

### New Guinea

No information.

### Dictyoptera (Blattaria)

#### SE Asia



- Neostylopyga jambusanensis* Roth (Blattidae) (DEUVE, 1987)  
– Sarawak (ROTH, 1988)
- Nocticola simoni* Bolivar (Nocticolidae) – Philippines (BOLIVAR, 1892)
- N. caeca* Bolivar (Nocticolidae) – Philippines (BOLIVAR, 1892)
- N. uenoi uenoi* Asahina (Nocticolidae) – Ryukyu Is. (ASAHINA, 1974)
- N. uenoi kikaiensis* Asahina (Nocticolidae) – Ryukyu Is. (ASAHINA, 1974)
- N. uenoi miyakoensis* Asahina (Nocticolidae) – Ryukyu Is. (ASAHINA, 1974)
- Spelaeoblatta gestroi* Bolivar (Nocticolidae) – Burma (BOLIVAR, 1897)
- Neotrogloblattella chapmani* (Roth) (Blattellidae) – Sarawak (ROTH, 1988)
- Symploce strinatii* Roth (Blattellidae) – Sarawak (ROTH, 1988) (with eyes !)
- Miroblatta baai* Grandcolas (Blaberidae) – Kalimantan (GRANDCOLAS & DEHARVENG, 2007)
- New Guinea**
- Spelaeoblatta* sp. (New Britain)
- Psocoptera**
- SE Asia**
- Psyllipsocus batuensis* Thornton (Psyllipsocidae) – Malaya (THORNTON, 1962)
- P. hirsutus* Thornton (Psyllipsocidae) – Malaya (THORNTON, 1962)
- Parasoa haploneura* Thornton (Lepidopsocidae) – Malaya (THORNTON, 1962)
- New Guinea**
- No information.
- Dermaptera**
- SE Asia**
- Xeniaria esau* (Burr) (Arixenina, Arixeniidae) – Sarawak (MEDWAY, 1958)
- Arixenia jacobsoni* Jordan (Arixenina, Arixeniidae) – Java ()
- Nala ornata* Borelli (Forficulina, Labiduridae) – Sarawak (BRINDLE, 1980)
- Irdex chapmani* Brindle (Forficulina, Labiidae) – Sarawak (BRINDLE, 1980)
- Chelisoche bimammatus* Hebard (Forficulina, Chelisocheidae) – Malaya ()
- Ch. brevipennis* Bormans (Forficulina, Chelisocheidae) – Sarawak ()
- New Guinea** – No information.
- Coleoptera**
- SE Asia**
- Fam. Carabidae**
- Eustra lebretoni* Deuve (Paussinae) – Thailand (DEUVE, 1987)
- E. trogliphila* Deuve (Paussinae) – Thailand (DEUVE, 1987)
- E. honchongensis* Deuve (Paussinae) – Vietnam (DEUVE, 1996b)
- E. lao* Deuve (Paussinae) – Laos (DEUVE, 2000)
- E. petrovi* Guéorguiev (Paussinae) – China (GUÉORGUIEV, 2014)
- E. [syn. Ozaenaphaenops] deharvengi* Deuve (Paussinae) – Thailand (DEUVE, 1986)
- E. [syn. Ozaenaphaenops] leclerci* Deuve (Paussinae) – Thailand (DEUVE, 1987)
- E. pseudomatanga cavernicola* Deuve (Paussinae) – Sulawesi (DEUVE, 2001).
- E. saripaensis* Deuve (Paussinae) – Sulawesi (DEUVE, 2002).
- Itamus castaneus* Schmidt-Goebel (Paussinae) – Thailand (DEUVE, 1987)
- Gotoblemus (Cimmeritodes) huangi* Deuve (Trechinae) – China (Hunan)(DEUVE, 1996a).
- Agonotrechussinotroglophilus* Deuve (Trechinae) – China (Hubei)(DEUVE, 1999)
- Boreaphaenops hirundinis* Ueno (Trechinae) – China (UENO, 2005b)
- Trechiana siamensis* Deuve (Trechinae) – Thailand (DEUVE, 1988a).
- Laosaphaenops deharvengi* Deuve (Trechinae) – Laos (Deuve, 2000).
- Cathaiaphaenops delprati* Deuve (Trechinae) – China (Hunan)(DEUVE, 1996).
- C. chuangdongziensis* Deuve (Trechinae) – China (Hubei)(DEUVE, 2000).
- C. vignetagliantii* Deuve (Trechinae) – China (Chongqing) (DEUVE, 1999).
- C. amplipennis* S. Ueno (Trechinae) – China (Hubei) (UENO, 2000).
- C. draconis* Deuve (Trechinae) – China (Chongqing) (DEUVE, 1999).
- C. (Amygdalotrechus) lynchae* Deuve et Tian (Trechinae) – China (Hubei) (DEUVE & TIAN, 2008)
- Minimaphaenops lipsae* Deuve (Trechinae) – China (Chongqing) (DEUVE, 1999).
- Oodiotrechus kishimotoi* S. Ueno (Trechinae) – China (Guizhou) (UENO, 1998).
- Libotrechus nishikawai* S. Ueno (Trechinae) – China (Guizhou) (UENO, 1998).
- Sinotroglopytes bedosae* Deuve (Trechdalotrinae) – China (Hunan) (DEUVE, 1996a).
- Guizhaphaenops zorzini* Vigna Taglianti (Trechinae) – China (Guizhou) (VIGNA TAGLIANTI, 1997).
- Guizhaphaenops (Semiaphaenops) lipsorum* Deuve (Trechinae) – China (Yunnan) (DEUVE, 1999).
- G. (S.) baiyinensis* Deuve (Trechinae) – China (Yunnan) (DEUVE, 1999).

- G. (S.) brevioricornis** Deuve (Trechinae) – China (Yunnan) (DEUVE, 1999).
- G.(S.) daheiensis** Deuve (Trechinae) – China (Yunnan) (DEUVE, 1999).
- G. (S.) zhengxionensis** Deuve (Trechinae) – China (Yunnan) (DEUVE, 1999).
- Guiaphaenops lingyunensis** (Deuve) (Trechinae) – China (Guangxi) (DEUVE, 2002)
- Uenotrechusliboensis** Deuve et Tian (Trechinae) – China (Guizhou) (DEUVE et al., 1999).
- U. liboensis nandanensis** Deuve et Tian (Trechinae) – China (Guangxi) (DEUVE & TIAN, 2010).
- Trechiotus qiannanicus** Deuve et Tian (Trechinae) – China (Guizhou) (DEUVE et al., 1999).
- Sinaphaenops** (= *Thaumastaphaenops* Magrini, Vanni & Zanon, 1997)
- mirabilissimus** S. Uéno et Wang (Trechinae) – China (Guizhou) (UÉNO & WANG, 1991).
- S. gracilior** Ueno et Ran (Trechinae) – China (Guizhou) (UENO & RAN, 1998).
- S. wangorum** S. Uéno et Ran (Trechinae) – China (Guizhou) (UENO & RAN, 1998).
- S. (Pilosophaenops) pilosulus** Deuve et Tian (Trechinae) – China (Guangxi) (DEUVE & TIAN, 2008)
- Mateuellus troglobioticus** Deuve (Pterostichinae) – Sulawesi (DEUVE, 1990, GUÉORGUIEV, 2013).
- Metabacetus willi** B.V. Gueorguiev (Pterostichinae) – Java (GUÉORGUIEV, 2013)
- Jujiroa clarkei** Deuve (Pterostichinae) – China () (DEUVE, 2004).
- J. deharvengi** Deuve (Pterostichinae) – Vietnam (DEUVE, 2004).
- J. iolandae** Vigna Taglianti (Pterostichinae) – China (Sichuan) (VIGNA TAGLIANTI, 1995).
- J. lingguanensis** Deuve et Pütz (Pterostichinae) – China (Sichuan) (DEUVE & PÜTZ, 2013)
- Anaulacus sericipennis** MacLeay (Lebiinae) – Sarawak (CHAPMAN, 1980)
- A. fasciatus** Kriechbaumer (Lebiinae) – Sumatra
- Hyphaereon** sp. (Harpalinae) – Sarawak (CHAPMAN, 1980)
- Dongodytes fowleri** Deuve (Trechinae) – China (Guangxi) (CH Gx 11. Hean Dong – DEUVE, 1993).
- D. grandis** S. Ueno (Trechinae) – China (Guangxi) (UENO, 1998a).
- Giraffaphaenops clarkei** Deuve (Trechinae) – China (Guangxi) (DEUVE, 2002)
- Toshiaphaenops oviceollis** S. Uéno (Trechinae) – China (Hunan) (UÉNO, 1999b).
- T. globipennis** S. Uéno (Trechinae) – China (Hubei) (UÉNO, 1999b).
- Shuaphaenops parvicollis** Uéno (Trechinae) – China (Sichuan) (UÉNO, 1999).
- Qianotrechus laevis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Q. tenuicollis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Q. magnicollis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Qianaphaenops tenuis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Qa. rotundicollis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Qa. longicornis** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Qa. pilosus** S. Ueno (Trechinae) – China (Guizhou) (UENO, 2000c).
- Junaphaenops tumidipennis** S. Ueno (Trechinae) – China (Yunnan) (UENO, 2000c).
- Superbotrechus bennetti** Deuve et Tian (Trechinae) – China (Hubei) (DEUVE & TIAN, 2009).
- Tonkinaphaenops marinae** Deuve (Trechinae) – N. Vietnam (DEUVE, 2013)
- Langxangaphaenops louisii** Deuve (Trechinae) – Laos (DEUVE, 2012)
- L. louisii annamensis** Deuve (Trechinae) – Vietnam (DEUVE, 2012)
- L. louisii leukensis** Deuve (Trechinae) – Laos (DEUVE, 2012)
- Plesioaphaenops annae** Deuve et Tian (Trechinae) – China (Guangxi) (DEUVE & TIAN, 2011)
- Satotrechus longlinensis** Deuve et Tian (Trechinae) – China (Guangxi) (DEUVE & TIAN, 2011)
- S. rieae** Ueno (Trechinae) – China (Guizhou) (UENO, 2006)
- Aspidaphaenops masakii** Ueno (Trechinae) – China (Guizhou) (UENO, 2006)
- A. volatidraconis** Ueno (Trechinae) – China (Guizhou) (UENO, 2006)
- A. reflexus** Ueno (Trechinae) – China (Guizhou) (UENO, 2006)
- Morimotoidius zhushandong** Pang et Tian – China (Jiangxi) (PANG & TIAN, 2014)
- Guiodytes cavicola** Tian (Clivinini) – China (Guizhou) (TIAN, 2013)
- G. bedosae** Tian (Clivinini) – China (Guizhou) (TIAN, 2013)
- Dytiscidae**
- Siamoporus deharvengi** Spangler – Thailand (SPANGLER, 1996)

*Sinodytes hubbardi* Spangler – China, Guangxi (SPANGLER, 1996)

#### Noteridae

*Speonoterus bedosae* Spangler – Sulawesi (SPANGLER, 1996)

#### Leiodidae

*Ptomaphagus boutini* Jarrige – Cambodia (JARRIGE, 1969)

*P. leclerci* Perreau – Thailand (PERREAU, 1993)

*P. chapmani* Peck – Sarawak (PECK, 1981)

#### Tenebrionidae

*Harvengia vietnamita* Ferrer – Vietnam (FERRER, 2004)

#### New Guinea and New Ireland

*Speagonum mirabile* Moore (Carabidae) – New Guinea (MOORE, 1978)

*Gastragonum coecum* Moore (Carabidae) – New Guinea (MOORE, 1978)

*Altagonum misim* Darlington (Carabidae) – New Guinea (EMBERSON & MOORE, 1982) – tx

*A. sphodrum* Darlington (Carabidae) – New Guinea (EMBERSON & MOORE, 1982; SMITH, 1978) – Tph

*Notagonum altum* Darlington (Carabidae) – New Guinea (EMBERSON & MOORE, 1982)

*N. margaritum* Darlington (Carabidae) – New Guinea (EMBERSON & MOORE, 1982)

*N. dentellum* Darlington (Carabidae) – New Guinea (SMITH, 1978) – tx

*Montagonum pandum* (Carabidae) – New Guinea (SMITH, 1978) – tph

*Trogloagonum novaehiberniae* Casale (Carabidae) – New Ireland (CASALE, 1982)

*Potamagonum diaphanum* Darlington (Carabidae) – New Guinea (SMITH, 1978)

*Clivinia* sp. (Carabidae) – New Guinea (SMITH, 1978)

#### Dytiscidae

*Platynectes (Gueorguievtes) beroni* Guéorguiev – New Guinea (GUÉORGUIEV, 1978)

*Copelatus nomax* Balfour-Browne – New Guinea (GUÉORGUIEV, 1978)

#### Leiodidae

*Pseudonemadus telefomin* Peck – New Guinea (PECK, 1985)

*P. altus* Peck – New Guinea (PECK, 1985)

*P. tenebrosus* Peck – New Guinea (PECK, 1985)

*P. caninus* Peck – New Guinea (PECK, 1985)

#### Hymenoptera

Ref.: Rohwer (1924), Roncin & Deharveng (2003), WHEELER (1924)

#### SE Asia

*Leptogenys khammouanensis* Roncin et

Deharveng (Formicidae) – Laos (RONCIN & DEHARVENG, 2003)

**New Guinea** – No information

#### Diptera

##### SE Asia

*Phlebotomus (Idiophlebotomus) erebicolus* Quate (Psychodidae) – Philippines (QUATE, 1965)

*Ph. (I.) sejunctus* Quate (Psychodidae) – Philippines (QUATE, 1965)

*Ph. (I.) stellae* Quate (Psychodidae) – Philippines (QUATE, 1965)

**New Guinea** – No information.

#### Trichoptera

**SE Asia** – No information.

##### New Guinea

*Edpercivalia* sp. (Rhyacophilidae) – New Guinea (KUMANSKI, 1978)

*Polycentropus grandis* Kum. (Polycentropodidae) – New Guinea (KUMANSKI, 1978)

*Ecnomus* sp. (Psychomyiidae) – New Guinea (SMITH, 1978)

*Anisocentropus* sp. (Calamoceratidae) – New Guinea (SMITH, 1978)

## Conclusions

The present analysis outlines the existence of more than 209 troglobites and 42 stygobites in the caves of SE Asia and 18 troglobites and 10 stygobites in the caves of New Guinea and New Ireland. Many of these species are to some extent “troglomorphes”, but their belonging to the categories of troglobites or stygobites is disputable, as nothing is known in details concerning their biology. The richest groups in troglobites are Isopoda Oniscidea (13 sp. in SE Asia, 1 in New Guinea), Araneae (46 sp. in SE Asia, unfinished study of PNG collection), Pseudoscorpiones (11 sp. in SE Asia, 1 in New Guinea), Diplopoda (30 sp. in SE Asia, 1 in New Guinea), Collembola (28 sp. in SE Asia, 4 in New Guinea), Coleoptera Carabidae (56 sp. in SE Asia, 3 in New Guinea and New Ireland).

Particularly interesting is the discovery of a rich cave fauna in the highlands of New Guinea (above 2200 m), where the air temperature in the caves is ca. 13 °C, comparable to the temperature in the South European caves. Another interesting fact from the expedition in PNG in 1975 was the discovery of several marine relicts (Nereididae worms, Hydrobiidae Gastropods, Anthuridae Isopods) high in the mountains and very far from the nearest sea.

The differences and the endemism are at a comparatively low level (species, genus, rarely family).

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## Сравнително изследване на безгръбначната пещерна фауна на Югоизточна Азия и Нова Гвинея

Петър БЕРОН

(Резюме)

Направен е опит да се сравнят наличните, макар и непълни, данни върху безгръбначните в пещерната фауна на Югоизточна Азия (областта на изток от Индия и на юг от Янцзъ, заедно с островите на Филипините, Индонезия без Папуа и островната част на Малайзия) с данните за тази фауна в Нова Гвинея и Бисмарковия архипелаг. Особено последните са явно недостатъчни, но скоро няма да се увеличат поради трудния достъп в района. От Югоизточна Азия вече има известни много видове в пещерите на всички страни, а за Нова Гвинея почти единствените данни са резултатите от Британската спелеологична експедиция в Папуа Нова Гвинея през 1975 г. с участието на автора на настоящата статия.

Настоящият анализ се базира на над 204 вида троглобионти и 42 вида стигобионти от пещерите на ЮИ Азия и на 18 троглобионти и 10 стигобионти от пещерите на Нова Гвинея и Нова Ирландия. Много от видовете са донякъде „трогломорфни“, но тяхното причисляване към троглобионтите или стигобионтите е спорно, тъй като няма данни за тяхната екология и биология. Най-богатите на троглобионти групи са Isopoda Oniscidea (13 в. в ЮИ Азия, 1 в Нова Гвинея), Araneae (46 в. в ЮИ Азия, недовършено изследване на колекцията от Нова Гвинея), Pseudoscorpiones (11 в. в ЮИ Азия, 1 в Нова Гвинея), Diploroda (30 в. в ЮИ Азия, 1 в Нова Гвинея), Collembola (28 в. в ЮИ Азия, 4 в Нова Гвинея), Coleoptera Carabidae (56 в. в ЮИ Азия, 3 в Нова Гвинея и Нова Ирландия).

Особено интересно е откриването на богата пещерна фауна в планините на Нова Гвинея (над 2200 m), където температурата на въздуха в пещерите е около 13°C, сравнима с тази в южноевропейските пещери. Друг интересен резултат от нашата експедиция в Папуа Нова Гвинея през 1975 г. беше откриването на няколко морски реликти (червеи полихети, охлювчета от сем. Hydrobiidae, изоподи от сем. Anthuridae) високо в планините и много далече от най-близкото море. Друг морски реликт, *Theosbaena cambodjana* Cals et Boutin, е описан от Камбоджа.