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Comparative arachnogeographical analysis of Australia, Papuan Area, New Caledonia and New Zealand

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Abstract: Arachnogeographical analysis of all orders of Arachnida in Australia (incl. Tasmania), New Guinea, New Caledonia, Lord Howe Isl. and New Zealand. The purpose of this study was to outline the representation of the different orders in the separate territories and to verify the arachnological proves for the zoogeographical subdivision of Nothogea and the world. The conclusion is that the level of representation of Arachnida in the classical Notogea (including Papuan area, but excluding Patagonia) was much lower as compared to the level in the vertebrates, with their endemic subclasses, orders and suborders. Even in the most isolated area (New Zealand) there were no endemics of very high rank. They included (endemisms above genus):
Australia (cont.): one endemic family of Scorpions (Urodacidae)
Tasmania: only endemic subfamilies of spiders (Plesiothelinae and Hickmanniinae)
New Guinean area: no endemics above genus
New Caledonia: one endemic family of Opiliones (Troglosironidae)
New Zealand: one endemic family of spiders (Huttoniidae) and one of Opiliones (Synthetonychiidae)

Key words: arachnogeographical analysis, Australia, Papuan Area, New Caledonia, New Zealand, Arachnida, endemism

Introduction

The unusual and highly endemic fauna of Australia, New Zealand, New Caledonia and Melanesia has been subject to many analyses, speculations and attempts to explain the presence of animals like Marsupialia, the tuatara, the frog *Leiopelma*, the extinct moa and the still-living kiwi with regard to past connections or isolation of these remote islands. Most of these efforts were (and are) based on vertebrates leading to delimitating an Australian Region, Papuan and Newzealandian areas of changing status. The vertebrate fauna of Australia is highly endemic, to a degree of a separate kingdom Notogea, but the plants and invertebrates, especially in New Guinea and Northern Australia are closer to the flora and fauna of Indo-Malayan Region (Paleotropic). A complex analysis of Arachnida from these territories could help to elucidate the history of this fauna and to give weight to one or another zoogeographical subdivision.

What is Notogea?

Huxley (1868) coined the term "Notogea" (including Australia and South America). In different books it is considered differently (with or without New Zealand or the Papuan Subregion and sometimes including Patagonia).

Notogea is usually regarded as Kingdom.

In the scheme of Sclater (1858) – Australian or Oriental paleotropical region (New Guinea, Australia and Tasmania) Geptner (1936) – Australian Region with five subregions: Papuan, Australian, New Zealandian, Polynesian and Hawaiian Bobrinskij, Zenkevich & Birstein (1949) – Notogean Kingdom (in Russian Susha = dry land), divided into three Regions: New Zealandian, Australian and Polynesian.

New Guinea, Bismarck Archipelago, Solomon Islands and Timor are parts of the Australian Region (Papuan Subregion) Darlington (1957) – Australian Region: Australia and New Guinea De Lattin (1967) Australian Region with three sub-

regions: Continental Australian, New Zealandian and Polynesian. New Guinea is included in the Continental Australian Subregion, the Solomon Islands – in the Polynesian.

Lopatin (1980) – Kingdom Notogea with three Regions: Australian, New Zealandian and Patagonian. According to him, the islands East of the Lombok Strait including New Guinea and ? the Solomon Islands, form the Papuan Subregion of Indo-Malayan Region (Paleotropical Kingdom) Krizhanovskij (1980). New Guinea is part of the Paleotropical Dominion, together with Africa, South Asia and Madagascar.

Krizhanovskij (2002) – Kingdom Notogea with three Regions: Australian, New Zealandian and Chilean-Patagonian. New Guinea is again part of the Paleotropical Kingdom as the Papuan Region.

Recently Holt et al. (2012) proposed a new subdivision of the continents based on amphibians, birds and mammals. Thus the Earth could be divided into 11 "realms", including the Oriental and Australian realms. New Guinea is included in the Oceanian Realm.

Geography

Axelrod & Raven (1982), Brown, Campbell & Crook (1968), Campbell (1943), Chase (1971), Coleman (1970), Craw (1988, 1989), Doutch (1972), Embleton (1973), Fleming (1962, 1963a, 1963b, 1967, 1970, 1975), Grehan (1989), Gressitt (1956, 1958, 1967, 1971, 1974, 1982a, 1982b), Griffiths (1975), Heads (2002, 2008a, 2008b, 2009, 2010), Keast (Ed)(1981), Lillie & Brothers (1970), McElhinny, Embleton & Pozzi (1976), Mitchell & Warden (1971), Page (1989), Paramonov (1958, 1960), Robbins (1971), Sarasin (1925), Sharma & Wheeler (2013), Sloane (1915), Smith (1990), Solem (1958), Taylor, Goodliffe & Martinez (1999), Thompson (1967), Veevers & McElhinny (1976), Voris (2000), Walker (Ed.)(1972), Weissel, Hayes & Herron (1976), Whitmore (Ed.) (1981)

Melanesia consists of the island of New Guinea, the Bismarck Archipelago, d'Entrecasteaux Islands, the Louisiade Archipelago, the Maluku Islands (not included here), Fiji, Norfolk Island, the Solomon Islands, the Schouten Islands, the Torres Strait Islands, the Trobriand Islands, Vanuatu, Woodlark Island and some other islands. Central is the huge island of New Guinea (829 000 km^2, maximal height 4884 m). It is actually a small continent – only the surface of the state of Papua New Guinea is 462 840 km^2. Within this state there are also the „smaller" islands – New Britain (35.600 km^2, bigger than Belgium), New Ireland (8600 km^2, comparable to Corsica), Bougainville (10.500 km^2) and others.

About 25% of New Guinea is situated higher than 1000 m a.s.l. The giant mountain chain, stretching along the entire island, is long more than 2000 km and is higher than the Alps (4884 m a.s.l.). The other islands are also mountaineous (New Britain 2440 m, Bougainville 2740 m). The rivers of the Big Island, which are fed by up to 6500 mm rain annually) are impressive. The Sepik, Fly, Ramu and Baliem Rivers are comparable to the Rhine or Don. In the Papuan phytogeographic Province (of the Malesian Region) are known more than 9000 species and 1400 genera of higher plants, from which 8500 species and 140 genera are endemic.

On the summit of Jaya (Carstensz) the glacial ice covers 6.9 km^2 (16.4 km^2 in the middle of 19 century), and is retreating rapidly. Its thickness is circa 40 m.

Australia

The continent of Australia has an area of 7 692 000 km^2 (without Tasmania, but including the offshore islands). The highest point is Mount Kosciuzko (2228 m).

The continent was detached from the Antarctic some 95-80 Ma (late Cretaceous) and drifted northwards, coming close to the equator and to Sundaland, the present day Indochina and the Greater Sunda islands. Present- day Australia consists of several subregions with very different landscape. Huge areas in Western and Central Australia are deserts and form the so called Eremial.

The northernmost part of the continent, on the Torres Straight, consists of dry savanna in the western part and of rainforests similar to the forests in New Guinea in the eastern part. Udvardy (1975) notes, that Usinger (1963) included Cape York (the northern peninsula of Queensland) to his Papuan subdivision of the Oriental Region, while Gressitt (1961) treated it as a clearly transitional area together with southern New Guinea, and in 1975 in a letter to Udvardy, wrote that „the overlap of Australian and Oriental in southern New Guinea and Northern Australia needs to be shown as an overlap zone with dominance of Oriental elements…". Prof. Gressitt told the same personally to the present author during a visit in Wau in the same 1975. However, this remark concerns mostly to the flora and the invertebrates, especially the insects. Based on vertebrates, the Papuan Subregion is clearly part of the Australian Region (the differences are between kingdoms!).

According to Keast (1959), approximately one-third of the Australian continent lies within the tropics and the rest is either temperate or sub-temperate. Special adaptations to a cold climate are little developed in Australian animals. According to the same author, Australia has not been in direct land contact with Asia since the beginning of the Tertiary, over 50 Ma. Actually, according to the modern concepts, Australia has never been in direct contact with Asia, as it drifted from the south.

If for the final phase of extinction of the giant animals in Australia (*Diprotodon, Palorchestes, Thylacoleo*) could be attributed to the combination of aridity and the arrival of aboriginal man and the dingo, eventual changes in the composition of the arachnofauna are to be explained only with the aridisation.

New Caledonia

New Caledonia is located in the subregion of Melanesia in the South-West Pacific. It comprises the main island (Grande Terre), the Loyalty Islands, and several smaller islands. It has a land area of 18 575.5 km^2.

The Grande Terre is by far the largest of the islands, with an area of 16 372 km^2, and is elongated northwest-southeast, 350 km long and 50 to 70 kilometers wide. A mountain range runs along the length of the island, with five peaks over 1500 m. The highest point is Mont Panié at 1628 m a.s.l.

The detailed analysis of Grandcolas et al. (2008) concerning the formation of the New Caledonian biota comes to the conclusion that it is not a continental, but rather an oceanic island, having its biota formed not earlier than 37 Ma during the Oligocene (confirmed by molecular research).

New Caledonia is extremely interesting from biogeographical point of view and different problems are raised. As a mater of fact, it is archipelago of one big and very varied island, the islands Loyalty, the Pine Island and many other islets and reefs. The total surface is 18 575,5 km^2, the population – 258 000.

The isolation of New Caledonia dates at least from the Miocene (perhaps from the Oligocene) and thus have been preserved many relict animal and plant, also neoendemics have been formed. After the arriving of the first settlers (the Canaques) ca. 3200 – 3300 years ago disappeared many endemic animals and plants, and the Europeans (since 1853 New Caledonia is a French territory) contributed to this process mostly by mining and agrarian activities, forest destruction, planting foreign trees and others. New Caledonia is 1300 km away from Australia, 1500 km from New Zealand and 1200 km from Fiji.

Tasmania

Tasmania is an Australian island and state. It is 240 km^2 south of the continent, separated by Bass Strait. The state includes the island of Tasmania and some smaller islands (state area 68 401 km^2), of which the main island covers 62 409 km^2. The highest point is Mount Ossa (1614 m). Situated at 42^{o}S, Tasmania has a cool temperate climate with four distinct seasons.

The island was joined to the mainland of Australia until the end of the last glacial period approximately 10,000 years ago. Much of Tasmania is still densely forested, with the Southwest National Park and neighbouring areas holding some of the last temperate rain forests in the Southern Hemisphere.

Lord How Is.

The small Lord Howe Island is „The riddle of Pacific" (Paramonov, 1958, 1960). On a surface of 14.55 km^2 (10 km long and up to 2 km wide) many endemic species live, and the island is 600 km away from Australia and 900 km away from Norfolk Island. Its inhabitants (387 permanent and up to 400 tourists) are in the „settled area", in the lowland, because since 1981 70% of the island is a reserve. Fortunately, there are some forest left on the 875 meter high Maunt Gower. The archipelago includes also 28 uninhabited islands.

It is considered that Lord Howe is part of the island chain, having existed along the western edge of the shelf Lord Howe Rise, 3000 km long and 300 km wide. The rise extends from New Zealand to the west of New Caledonia and consists of continental rocks, detached from Australian plate 60-80 Ma ago. The shelf is part of Zealandia microcontinent.

New Zealand

The archipelago, called by the Europeans in 1645 New Zealand, is one of the amazing places on Earth, when discussing zoogeography. It is composed by two bigger islands (North and South Islands), which are separated by the Cook Strait (22 km wide), one less big (Stewart) and many smaller islands with a total surface of 268 000 km^2. New Zealand is 1500 km away from Australia. The relief is very varied with highest point Mount Cook, or Aoraki at 3754 m and 17 other summits above 3000 m. The biota is very altered by humans and the animals they introduced, one way or another. For the invertebrates most important was the change in the environment – the land use, deforestation etc.

Paleogeography

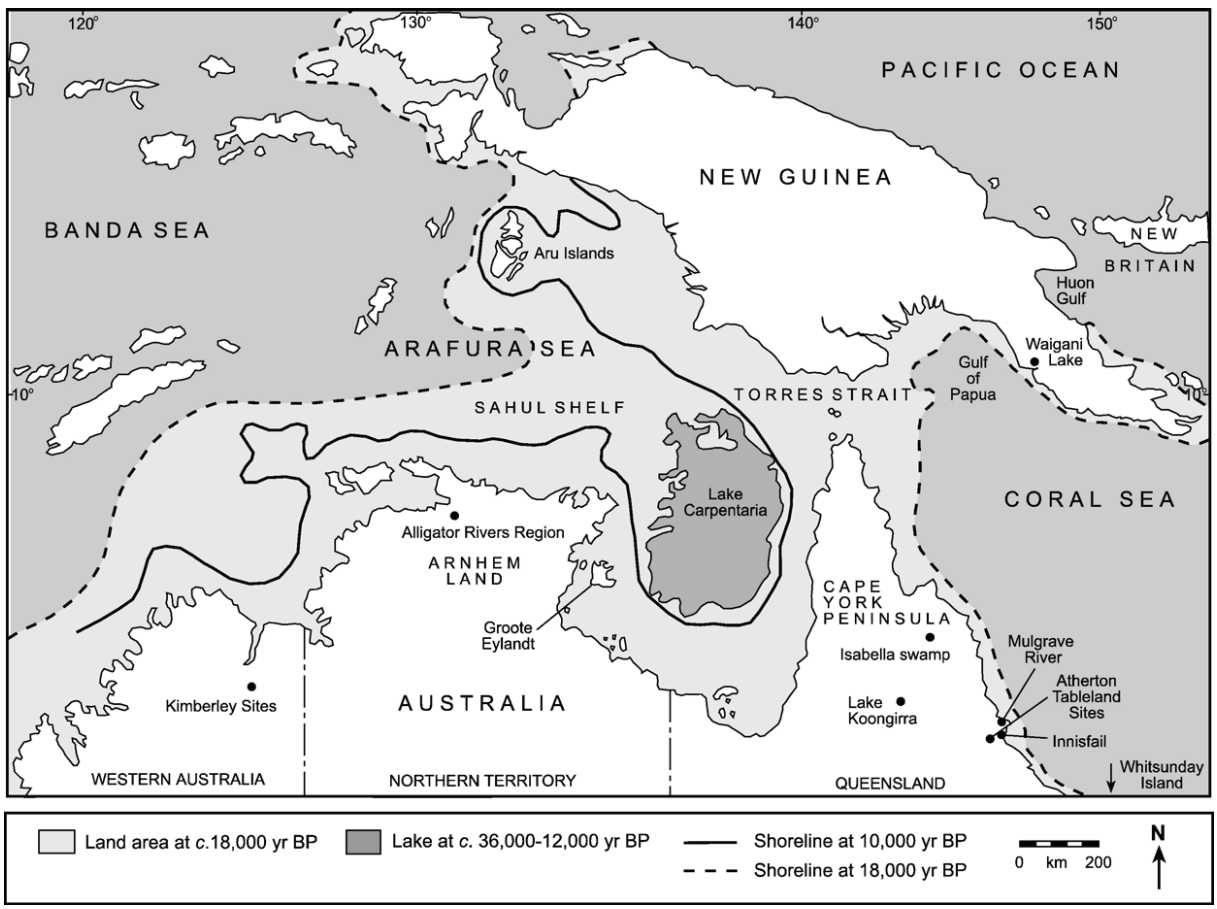
New Guinea. "The consensus of contemporary zoogeographic studies is that though New Guinea and its shelf islands were joined to Australia during several phases of the Pleistocene, New Guinea has a basic, rich biota, much more ancient in origin as well as evolutionary history, and independent of Australian faunal or floral influence" (Udvardy, 1975).

"When New Guinea, the leading edge of of the Australian plate, was first elevated to form an extensive land area in the late Oligocene, it was colonized largely from the adjacent rich tropical lowlands of Malaysia. Biogeographic affinities with Australia are poorly developed, but there has been a spectacular late Tertiary radiation of many groups…Land connections between Australia and New Guinea are also suggested by the mid-Pliocene appearance of the marsupials…The island as a whole is a region of faunal and floral misxing, survival, and evolution in the middle to late Tertiary"(Raven & Axelrod, 1972).

Some data on the glaciation and climate change in New Guinea we find in Löffler (1982): "The Pleistocene glacial history of New Guinea may date back to about 700000 -+ 100 000 years BP when lava erupted under ice on Mt Giluwe....The last glaciation lasted until about 15 000 years BP when the ice receded rather rapidly to completely disappear by about 9000 years BP…The snowline during the last glaciation was at about 3550 – 3600 m altitude indicating a lowering of the snowline by about 1000 – 1100 m. This would correspond to a temperature depression of about 5-6°C assuming that precipitation was similar to the present".

Australia.

To partly quote Keast (1959): "New Guinea and Tasmania, lying on the Australian continental shelf, would be brought into contact by a fall in sea-level of about 10 m and 50 m, respectively. They are known to have been joined to Australia during part of the Tertiary and apparently twice during the Pleistocene…This being so, it would seem surprising that the flora of New Guinea bears little resemblance to that of Australia…and much of its invertebrate fauna is likewise Indo-Malayan…In explanation of this it has been suggested that the geologically ancient northern part of New Guinea was once, presumably in the Mesozoic, in direct land contact with



Map 1. Location map of Torres Strait in relation to regional Quaternary shoreline changes (adapted from Rowe, 2007)

Asia … Another proposal is that Australia did not always lie in close proximity to New Guinea but "drifted" into it".

Wallacea

The area, called by Dickerson (1928) "Wallacea" is about 347 000 km^2 between Wallace and Lydekker Lines (between the Makassar and Lombok Straits and some islands near New Guinea) is usually considered part of Indo-Malayan Region (sometimes considered a separate subregion of Notogea – see Buchar, 1983, or part of the Papuan Subregion of Australian Region – see Krzhanovskiy, 2002). Included are the main island Sulawesi, Lombok, Sumbawa, Flores, Sumba, Timor, Halmahera, Buru, Seram, and many smaller islands. Regarding the fauna, some Australian or Papuan elements (Marsupialia, birds) are represented on Sulawesi and some other islands.

Analyzing the Arachnida of Wallacea, we may observe the following (endemics in **bold**):

Palpigradi – fam. Prokoeneniidae (*Prokoenenia* Börner, in Sulawesi)

Amblypygi – fam. Charinidae (*Charon* Karsch – Maluku, Sumbawa); in Flores was found one species of the genus *Phrynus* – the only known member of Phrynidae in the Old World.

Thelyphonida (Uropygi) – fam. Thelyphonidae (*Chajnus* Speijer in Lombok, *Thelyphonus* Latreille s.l. in Maluku)

Schizomida – fam. Hubbardiidae indet. (in Sulawesi)

Solifugae – fam. Melanoblossiidae (*Dinorhax* Simon in Maluku, the easternnmost member of Solifugae)

Opiliones – Cyphophthalmi – Stylocellidae (*Leptopsalis* Thorell in Sulawesi); Eupnoi – Sclerosomatidae (***Gagrellina*** Roewer); Laniatores – Assamiidae, Epedanidae (***Epedanulus*** Roewer, ***Parepedanulus*** Roewer – Sulawesi), Zalmoxidae

Pseudoscorpiones – Chthoniidae, Chernetidae (***Chiridiochernes*** Muchmore – Sulawesi), Cheliferidae (***Aporochelifer*** Beier – Flores), Atemnidae, Garypidae, Garypinidae, Geogarypidae, Hyidae, Olpiidae, Parahyidae, Pseudochiridiidae, Syarinidae, Tridenchthoniidae, Withiidae

Scorpiones – fam. Buthidae, Chaerilidae, Hormuridae, and Scorpionidae.

Araneae – no endemic families.Some endemic genera: Araneidae – ***Plicatiductus*** Millidge et Russell-Smith (in Sulawesi); Linyphiidae – ***Dumoga*** Millidge et Russell-Smith (in Sulawesi); Eutrichuridae – ***Summacanthium*** Deeleman-Reinhold in (in Sulawesi)

Missing from the area are Ricinulei, Palaeoamblypygi, Opilioacarida, Dyspnoi, Holothyrida.

It seems that arachnogeographically Wallacea does not contain elements that are very peculiar or different from the Arachnida of the remaining Indonesia. Sensational exception is the amblypygid *Phrynus* on the Flores island.

Western Sulawesi was connected with East Borneo by late Cretaceous and early Eocene (more than 50 Ma) allowing dispertion of fauna. An island chain was established between east Sulawesi and Australia (late Miocene to late Pliocene).

Collision happened between parts of Gondwanic Outer Banda Arc and Laurasian (volcanic) Inner- Banda Arc (latest Miocene to early Pliocene). Probable land connection(s) existed south, across the Makassar Strait (from late Pliocene).

The Torres Strait as a biogeographical barrier

Discussing the first discovery of Gagrellinae in Australian mainland, Taylor (2009) says: "While Gagrellinae have not previously been reliably recorded from Australia, their discovery in northern Queensland should not represent much of a surprise. Species of Gagrellinae have been described from New Guinea (Roewer 1954a,b, 1955a) and the Solomon Islands (Rainbow 1913; Forster 1949). A land connection between New Guinea and Queensland bridging the Torres Strait would have been present when sea levels were only 10 m lower than the present time, and they have been at least that much lower for 91% of the past 250 000 years (Voris 2000). Closely related or shared taxa are known from both New Guinea and Australia in freshwater fish (…), flowering plants (…), reptiles (…), spiders (Harvey & Waldock 2000) and insects (….), among others. Taylor (1972) concluded that Torres Strait had not been a significant barrier to dispersal for most insect groups. The apparent absence of Gagrellinae from Australia to date has therefore been unusual, though not unique (species of Uropygi (Arachnida) have been described from New Guinea and the Solomon Islands, but the order is currently unknown in Australia – Rowland & Cooke 1973)". According to Szymkowiak (2007), "Despite similar geological history and close vicinity of both areas, the crab spiders show great distinction between New Guinea and Australia. 36 genera on both areas have been recorded, of which only 13 are common (*Amyciaea*, *Cymbacha*, *Diaea*, *Hedana*, *Loxoporetes*, *Mastira*, *Misumena*, *Porropis*, *Runcinia*, *Stephanopis*, *Tharrhalea*, *Tmarus* and *Xysticus*), and 167 species, of which 6 are common…. Thus, similarity of the spider

fauna of the family Thomisidae at genera level is near 37%, while at species level it is 3.7%".

Tasmania. The island was joined to mainland Australia until the end of the last glacial period approximately 10,000 years ago. Much of Tasmania is still densely forested, with the South-west National Park and neighbouring areas holding some of the last temperate rain forests in the Southern Hemisphere. The Tarkine, located in the far North-West of the island, is the largest temperate rainforest area in Australia covering approximately 3800 km^2.

According to Darlington (1960), the fauna of Tasmania is depauperate, both in diversity of basic stocks and in total number of species. On the island are (or were) preserved animals that are extinct in mainland Australia.

"Tasmania has long been regarded as a biological treasure trove, supporting an astounding range of species found nowhere else, many of which have survived the perturbations of climate change during the Pleistocene" (Harvey, 1998).

New Caledonia is one of the northernmost parts of the continent Zealandia of which a 93% is submerged. It sank after rifting away from Australia 60–85 million years ago (Ma) and from Antarctica between 130 and 85 Ma. New Caledonia was separated from Australia in the late Cretaceaous (65 – 66 Ma ago), and subsequently drifted in a north-easterly direction, reaching its present position about 50 Ma ago. According to Neall & Trewick (2008), New Caledonia separated from New Zealand 83 Ma. There is also hypothesis that the islands emerged 37 Ma ago (Oligocene) and that its biota started developing by this time. Some geologists insist that New Caledonia has been entirely submerged several times and repopulated after that. However, biologists accept that parts of the land remained above water as refugia for the archaic animals and plants. Many species from the Gondwanian flora in the late Cretaceous and early Tertiary had probably survived in the temperate climate of New Caledonia and died out in Australia during its strong aridisation. This opinion is contested too.

New Zealand. To understand the history of the biota of New Caledonia, New Zealand and Lord Howe Island we have to follow up the hypothetical development of Zealandia, the New Zealand microcontinent, having existed until some 23 million years ago as result of the break away from Australia about 60-85 Ma and from Antarctic 85 – 130 Ma ago.

According to Fleming (1975), the isolation of New Zealand becomes effective for the land vertebrates (and may-be invertebrates) before the end of Cretaceous. According to Cracraft (1973) „Australia separated from Antarctica in the Eocene and with spreading rates approximately twice as fast as those for New Zealand and this differential movement between Australia-New Zealand and Antarctica formed the Tasman See"(see also Griffiths & Varne, 1972). In any case New Zealand was detached from Antarctida more than 80 Ma ago (Cracraft, 1973), together with the ancestors not only of the moa, kiwi, tuatara and other well known cases also with the ancestors of many insects and other invertabrates. According to Cracraft (1974) "The next portion of Gondwanaland to separate was New Zealand, which was adjacent to West Antarctica and which began drifting in the late Cretaceous at about 40-45 Ma ago".

Analysis and comments

Palpigradi

In Australia, besides *Eukoenenia mirabilis* (imported), was described an indigenous member of Palpigradi: *Eukoenenia guzikae* Barranco et Harvey, 2008

In New Guinea are recorded only two species: *Eukoenenia* cf. *lawrencei* and *Koeneniodes* cf. *frondiger* (fam. Eukoeneniidae: see Condé 1980, 1981).

In New Zealand. Was not recorded

In New Caledonia. Present, non identified.

Ricinulei. Absent in all territories.

Solifugae. Absent in all territories, the closest locality is on Maluku islands (Harvey, 2013b).

Scorpiones

New Zealand: absent

Australia. In his monograph Koch (1977) enumerates for the "Austalo-Papuan Region" 29 species of scorpions of the genera *Cercophonius* (Bothriuridae), *Lychas, Isometroides*, *Isometrus* (Buthidae), *Liocheles* (Hormuridae), *Urodacus* (Urodacidae). **Endemic family** is Urodacidae, **end. genera** – *Urodacus* Peters with 19 species (incl. seven newly described by L.E. Koch), *Aops* Volschenk et Prendini, and *Isometroides* Keyserling. *Cercophonius* Peters with one sp. (Australia and Tasmania) has been recorded also from the Himalaya. As there are no strictly Papuan species (not found in Australia), after this is the final figure (32, adding the new genus and sp. *Aops oncodactylus* Volschenk et Prendini, 2008 and the two new *Urodacus*, described by Volschenk, Smith & Harvey (2000) and Volschenk, Harvey & Prendini (2012) of species of scorpions on the Australian mainland or

Table 1. Presence of Arachnida in the territories of the described area

Group	Australia (Mainland)	Tasmania	Papuan Area	New Caledonia	New Zealand
Order **Palpigradi**	+	-	+	+	-
Fam. Eukoeneniidae	+	-	+	?	-
Order **Ricinulei**	–	–	-	-	-
Order **Solifugae**	-	-	–	-	–
Order **Scorpiones**	+	+	+	+	-
Fam. Buthidae	+	–	+	-	-
Fam. Hormuridae	+	-	+	-	-
Fam. Scorpionidae	+	-	+	+	-
Order **Schizomida**	+	-	+	+	–
Fam. Hubbardiidae	+	–	+	+	-
Order **Uropygi**	-	-	+	-	–
Fam. Hypoctonidae	–	-	+	-	–
Order **Amblypygi**	+	+	+	+	-
Suborder **Neoamblypygi**	+	+	+	+	-
Fam. Charinidae	+	-	+	+	-
Order **Opiliones**	+	+	+	+	+
Suborder **Cyphophthalmi**	+	-	+	+	+
Fam. Stylocellidae	-	-	+	-	-
Fam. Pettalidae	+	-	-	-	+
Fam. Troglosironidae	-	-	-	+	-
Suborder **Eupnoi**	+	+			+
Fam. Acropsopilionidae	+	+	–	-	+
Fam. Sclerosomatidae	+				
Fam. Neopilionidae	+	-	–	-	+
Suborder **Dyspnoi**	-	-	-	-	-
Suborder **Laniatores**	+	+	+	+	+
Fam. Triaenonychidae	+	+	-	+	+
Fam. Synthetonychiidae	-	-	–	+	+
Fam. Assamiidae	+	-	–	-	-
Fam. Samoidae	+	-	–	–	–
Fam. Epedanidae	-	-	+	–	-
Fam. Zalmoxidae	-	-	+	+	-
Order **Pseudoscorpiones**	+	+	+	+	+
Suborder **Epiocheirata**	+	+	+	+	+
Fam. Chthoniidae	+	+	+	+	+
Fam. Tridenchthoniidae	+	-	+	+	-
Fam. Pseudotyrannochthoniidae	+	+	–	-	-
Fam. Feaellidae	+	-	-	–	-
Fam. Pseudogarypidae	-	+	–	–	–
Suborder **Iocheirata**	+	+	+	+	+
Fam. Hyidae	+	-	-	-	-

Table 1. Continued

Group	Australia (Mainland)	Tasmania	Papuan Area	New Caledonia	New Zealand
Fam. Syarinidae	-	-	+	–	-
Fam. Garypidae	+	+	-	-	+
Fam. Geogarypidae	+	-	–	–	–
Fam. Cheiridiidae	+	-	+	-	+
Fam. Pseudochiridiidae	–	–	+	-	-
Fam. Olpiidae	+	-	+	+	-
Fam. Garypinidae	+	-	+	-	+
Fam. Menthidae	+	-	-	-	–
Fam. Sternophoridae	+	-	+	-	–
Fam. Withiidae	+	-	+	-	+
Fam. Cheliferidae	+	-	+	-	+
Fam. Atemnidae	-	–	+	+	-
Fam. Chernetidae	-	–	+	-	-
Order **Araneae**	+	+	+	+	+
Suborder **Mesothelae**	–	–	–	–	–
Suborder **Orthothelae**	+	+	+	+	+
Infraorder **Mygalomorphae**	+	+	+	+	+
Fam. Barychelidae	+	-	+	+	-
Fam. Hexathelidae	+	-	–	-	+
Fam. Dipluridae	+	-	-	+	-
Fam. Nemesiidae	+	-	-	-	+
Fam. Theraphosidae	+	-	+	-	-
Fam. Cyrtaucheniidae	+	-	-	-	-
Fam. Idiopidae	+	-	–	-	+
Fam. Ctenizidae	+	-	+	-	-
Fam. Migidae	+	-	-	-	+
Infraorder **Araneomorphae**	+	+	+	+	+
Fam. Austrochilidae	-	+	–	-	-
Fam. Gradungulidae	+	-	-	-	+
Fam. Filistatidae	+	-	+	-	–
Fam. Periogopidae	+	-	-	-	+
Fam. Stenochilidae	-	-	+	-	-
Fam. Malkaridae	+	–	-	-	-
Fam. Scytodidae	+	-	+	-	+
Fam. Sicariidae	+	–	–	-	+
Fam. Ochyroceratidae	-	-	+	-	-
Fam. Telemidae	-	-	+	+	-
Fam. Pholcidae	+	+	+	+	+
Fam. Tetrablemmidae	+	-	+	+	-
Fam. Dysderidae	+	–	-	-	-
Fam. Oonopidae	+	+	-	+	+

Table 1. Continued

Group	Australia (Mainland)	Tasmania	Papuan Area	New Caledonia	New Zealand
Fam. Orsolabidae	+	+	-	–	+
Fam. Segestriidae	+	-	-	-	+
Fam. Hersiliidae	+	–	-	-	+
Fam. Oecobiidae	+				+
Fam. Huttoniidae	-	-	–	–	+
Fam. Mimetidae	+	+	-	–	+
Fam. Deinopidae	+	+	+	+	+
Fam. Uloboridae	+	-	+	-	+
Fam. Anapidae	+	+	+	+	+
Fam. Araneidae	+	+	+	+	+
Fam. Cyatholipidae	+	-	-	-	–
Fam. Linyphiidae	+	+	+	+	+
Fam. Nesticidae	+	-	+	–	-
Fam. Mysmetidae	-	+	–	+	–
Fam. Symphytognathidae	+	+	+	-	-
Fam. Synotaxidae	+	+	-	-	-
Fam. Tetragnathidae	+	+	+	+	+
Fam. Theridiidae	+	+	+	+	+
Fam. Theridiosomatidae	+	-	-	-	-
Fam. Ctenidae	+	–	+	-	–
Fam. Lycosidae	+	+	+	+	+
Fam. Oxyopidae	+	+	+	+	+
Fam. Gnaphosidae	+	+	+	+	+
Fam. Pisauridae	+	-	+	+	-
Fam. Psechridae	+	-	–	-	-
Fam. Stiphidiidae	+	+	+	+	+
Fam. Zoridae	+	+	-	-	+
Fam. Zoropsidae	+	-	-	-	+
Fam. Agelenidae	/	/	/	/	+
Fam. Amphinectidae	+	+	-	-	+
Fam. Amaurobiidae	+	-	-	-	+
Fam. Anyphaenidae	+	+	+	-	-
Fam. Desidae	+	+	-	+	+
Fam. Dictynidae	+	+	–	-	+
Fam. Hahniidae	+	+	-	–	+
Fam. Nicodamidae	+	+	+	-	+
Fam. Sparassidae	+	+	+	+	+
Fam. Selenopidae	+	-	+	-	-
Fam. Zodariidae	+	+	+	-	+
Fam. Tengellidae	-	-	–	-	+
Fam. Clubionidae	+	-	-	-	-

Table 1. Continued

Group	Australia (Mainland)	Tasmania	Papuan Area	New Caledonia	New Zealand
Fam. Miturgidae	+	-	+	-	+
Fam. Titanoecidae	-	-	+	-	-
Fam. Lamponidae	+	-	-	+	+
Fam. Prodidomidae	+	–	-	-	-
Fam. Trochanteriidae	+	-	-	+	-
Fam. Philodromidae	+	-	+	-	-
Fam. Thomisidae	+	+	+	+	+
Fam. Salticidae	+	+	+	+	+
Fam. Corinnidae	+	+	+	+	+
Fam. Liocranidae	+	-	+	-	–
Order **Opilioacarida**	+	-	-	-	-
Fam. Opilioacaridae	+	-	-	-	-
Order **Holothyrida**	+	-	+	+	+
Fam. Allothyridae	+	-	-	–	+
Fam. Holothyridae	-	-	+	+	-
Order **Ixodida**	+	+	+	+	+
Fam. Argasidae	+	+			+
Fam. Ixodidae	+	+	+	+	+
Order **Mesostigmata**	+	+	+	+	+
Order **Sarcoptiformes**	+	+	+	+	+
Order **Trombidiformes**	+	+	+	+	+

in Tasmania (the last has no endemic scorpions and shares with the mainland *Cercophonius squama*). We should extract from the 32 sp. *Lychas variatus* (also in Fiji), and the widespread *Isometrus maculatus, I. melanodactylus, Liocheles australasiae, L. waigiensis,* and *L. karschii.* Thus the endemic species for Australia (*Cercophonius squama* also in Tasmania) are 26. Australia and New Guinea share only the six widespread species of *Isometrus, Lychas* and *Liocheles.*

To quote Koch (1977): "The highly speciated urodacine scorpionid genus *Urodacus* is widespread in Australia but absent from both New Guinea and Tasmania. Because of the time required for the evolution of a genus, there are two possibilities: either the genus *Urodacus* has always been confined to inland Australia, or there have been species outside Australia and these became extinct. The exclusion from Tasmania of the genera *Urodacus* and *Lychas*… could be due to cold. There is however an absence of factors…which might exclude *Urodacus* from New Guinea. I consider therefore that either its species in the more peripheral northern areas of the Australian mainland have reached there relatively recently (since the last major transgression of the sea) or that species in New Guinea have been eliminated ".

In his article on the zoogeography of Australian scorpions Koch (1981) distributed the scorpion taxa in three "levels of endemism":

1. Cosmopolitan species or non-endemic species shared with Asia: *Isometrus* one species, *Liocheles* three species.

2. Species that have arisen in the Australo-Papuan area from non-endemic genera: *Lychas* three species, *Isometrus* one species.

3. Species that have arisen in Australo-Papua: *Isometroides* one species, *Cercophonius* one species, *Urodacus* 20 species.

He also classified the genera regarding the continental drift:

1. Genera derived from an ancient stock with related genera only in South America: *Cercophonius*

2. Australian genus with less certain relationships and probably ultimately derived from Asia: *Urodacus*

3. Genera in common with Asia: *Isometrus*, *Lychas, Liocheles*

4. Genus clearly derived from *Lychas* in Australia: *Isometroides*

Further, the scorpions are distributed into three groups: Southern, Central and Northern species.

The family **Urodacidae** is endemic.

From **Tasmania** has been recorded only *Cercophonius squama* (Bothriuridae), shared with mainland Australia. Also on Flinders I. and King I. (Koch, 1977).

New Guinea. According the monograph of Koch (1977) and the older papers of Takashima (1948, 1950) in New Guinea (incl. the islands Aru and Bougainville) live only six widespread species of the genera *Isometrus, Lychas* (Buthidae), and *Liocheles* (Hormuridae). They are shared with Australia. From the Rennell Island (the Solomon Isls) have been found three sp., including the newly described (endemic sp.) *Liocheles penta* Francke et Lourenço, 1991.

New Caledonia. Only three species (Kraepelin, 1914, Simon, 1877, Vachon, 1976).

Fam. Hormuridae

Liocheles australasiae (Fabricius)

L. neocaledonicus Simon

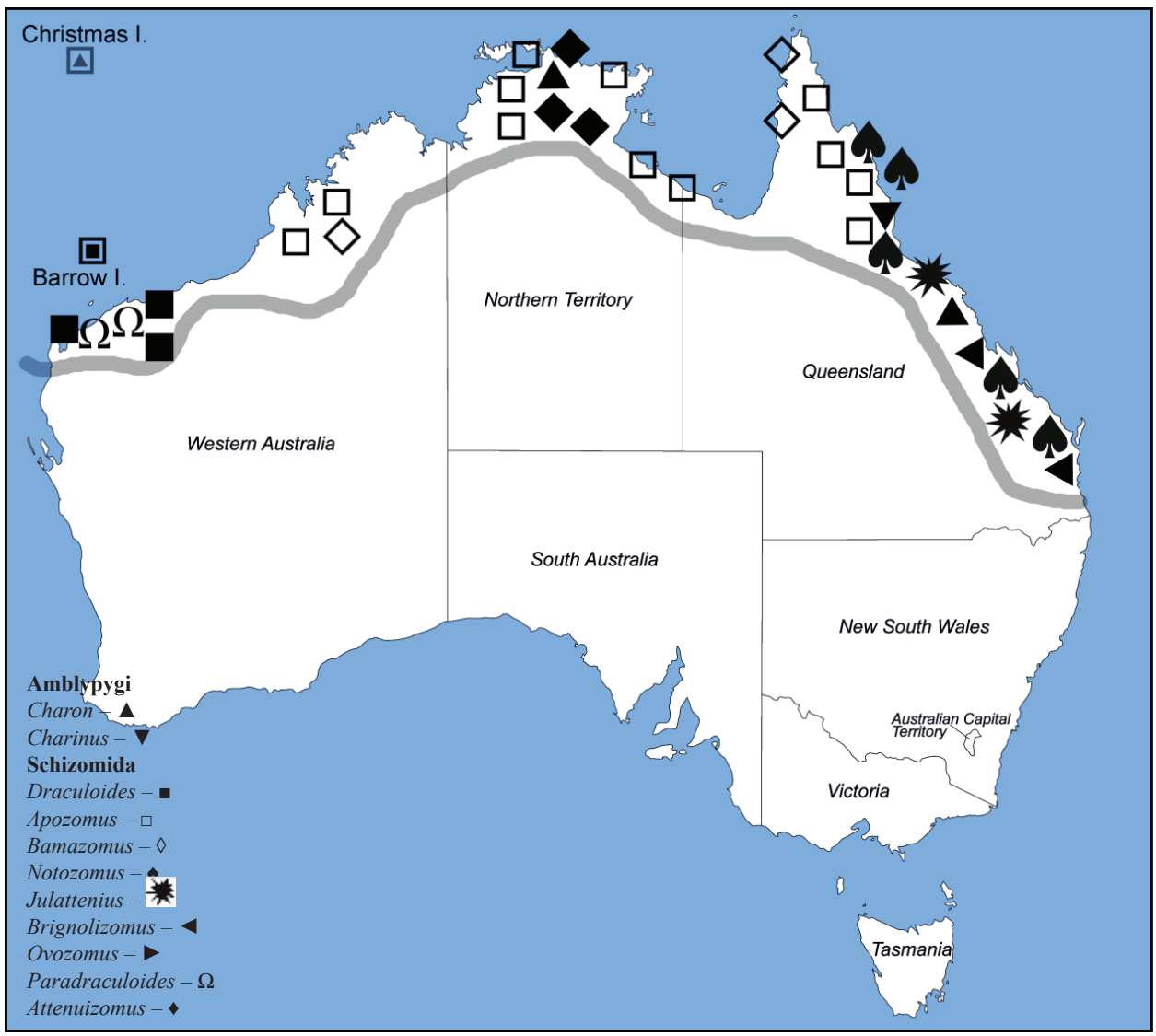
Fam. Buthidae

Isometreus (*Reddyanus*) *heimi* Vachon

Schizomida. Present in Australia and New Guinea, indet. in New Caledonia, absent in New Zealand.

Australia. See Harvey (1992, 2000a, 2000b, 2001b), Harvey, Berry, Edward & Humphreys (2008); for **Melanesia** see Hansen & Srensen (1905)

The first member of the order Schizomida from **Australia** (a troglobitic one) was described by Harvey (1988), despite the fact that the order was recorded from this continent as early as 1963. In his impor-



Map 2. Distribution of Amblypygi and Schizomida in Australia

tant paper of 1992 Harvey described five new genera (*Draculoides, Apozomus, Bamazomus, Notozomus* and *Julattenius*) and 24 new species of Schizomida. From the map 2 is clear, that all these species are known from the periphery of the continent: the far west, far north and the easternmost parts of Australia. Later Harvey (2000) added two more genera *Brignolizomus* and *Attenuizomus*, with three new species, in 2008 was added *Paradraculoides* Harvey, Berry, Edward et Humphreys. Currently (2017) in Australia are known 53 sp. of the genera ***Draculoides*** (6), *Apozomus* (11), *Bamazomus* (5), ***Notozomus*** **(17),** ***Julattenius*** (2), ***Brignolizomus*** (3), ***Paradraculoides*** (4), [*Ovozomus*] and ***Attenuizomus*** (4) (end. genera in **bold**). This is the highest number of genera and species in one country and is due mostly to the research of M. Harvey.

"Schizomus" modestus Hansen, 1905 is described from **New Guinea** and recorded also in New Britain and W. Malaysia (unverified record of Buxton, 1917). In the collection of P. Beron in Sofia there are Schizomids, collected by me in New Ireland in 1975 (Beron, 1975).

Only Hubbardiidae indet. are mentioned from **New Caledonia** (Reddell & Cokendolpher, 1995).

Amblypygi

For **Australia** see Dunn (1949), Harvey (1985), Harvey & West (1998), Monteith (1965); for **New Guinea** see Dunn (1949), Gravely (1915), Rahmadi & Kojima (2010), Thorell (1888); for **New Caledonia** see Kraepelin (1914), Simon (1895)

In **Australia** (the Northern Territory, Queensland and the Australian Christmas Island) are known six sp. of Amblypygi of the genera *Charon* Karsch (three sp.) and *Charinus* Simon (three sp.) (Charinidae). They are known only from the tropical part of the continent. All species are (so far) endemic for the areas of description. From Western Australia has been recorded another species (Harvey, Rahmadi & Aland, 2012).

In **Melanesia** are present four genera of Amblypygi:

Fam. **Charinidae**

Charinus Simon, 1892 – *Ch. australianus* (L. Koch)(Samoa, Fiji), *Ch. pescotti* Dunn (Solomon Isl.)

Sarax Simon, 1892 – *S. monodenticulatus* Rahmadi et Kojima (Papua, Waigeo), *S. newbritainensis* Rahmadi et Kojima (New Britain, New Ireland), *S. sarawakensis* (Thorell) (New Guinea, Solomon Isl.), *S. willeyi* Gravely (New Britain), *S. subterraneus* Thorell (= *papuanus*)(New Guinea, Maluku)

Fam. **Charontidae**

Charon Karsch – *Ch. grayi* (Gervais)(? = *papuanus* Thorell)(New Guinea)

Stygophrynus Kraepelin – *S. (Neocharon) forsteri* Dunn (Solomon Isl., endemic for Guadalcanal)

Members of Amblypygi recorded from **New Caledonia** include *Charinus neocaledonicus* Simon, 1895 (Charinidae), endemic species of a widespread genus.Other members of the same genus (all of them known from caves) are three subspecies of *Ch. australianus* and the endemic *Charinus pecki* Weigoldt, 2006.

Thelyphonida (Uropygi). Present in the Papuan area, absent in Australia, New Zealand and New Caledonia.

On the island of New Guinea and the nearby islands of Fergusson, New Ireland and New Britain live three species of "*Abaliella*" Strand (Pocock, 1898). One *Thelyphonus* was described by Rowland (1973a) from Guadalcanal (Solomon Islands), added to the other species from the Solomons *Thelyphonus leucurus* Pocock, 1898. The widespread *Minbosius manilanus* (C.L. Koch) lives on the Mollucas, in New Guinea and the Philippines. All they belong to Thelyphonidae, Thelyphoninae, typical for the Papuan area, Samoa, the Philippines and SE Asia. Haupt (2009a) synonymise *Abaliella* Strand, *Minbosius* Speijer and *Tetrabalius* Thorell with *Thelyphonus* Latreille.

Pseudoscorpiones.

New Guinea: see Beier (1940, 1965, 1971, 1982), Morikawa (1963). In Papua New Guinea are known Pseudoscorpions of 12 families, 35 genera and 65 specis (Harvey, 2013).

Endemic genera of pseudoscorpions in New Guinea are:

Fam. Cheliferidae – *Papuchelifer* Beier, 1965 (three species)

There are also genera (*Cacoxylus, Acanthicochernes, Gelachernes*) known only from New Guinea and the nearby Solomon Islands (Melanesian endemics)

Australia (Tasmania excluded) – 150 registered species of Pseudoscorpions of 17 families (for the whole of Australia 181 sp.)(Harvey, 2009, 2011, 2013, actualized). Other sources: Beier, 1948, 1954, 1975, Edwards & Harvey, 2008, Harvey, 1992, 2006, Harvey & Edward, 2007, Harvey & Mei Chen Leng, 2008a, 2008b, Hoff, 1947).

Endemic genera of pseudoscorpions in Australia (without Tasmania) are:

Fam. Olpiidae: ***Austrohorus*** Beier, 1966 (one

sp.); ***Linnaeolpium*** Harvey et Leng (one sp.)

Fam. Cheliferidae: ***Australochelifer*** Beier, 1975 (one species)

Fam. Chernetidae: ***Conicochernes*** Beier, 1948 (four species), ***Marachernes*** Harvey, 1992 (three species)

In **Tasmania** are registered Pseudoscorpiones from the families Chthoniidae, Pseudogarypidae, Pseudotyrannochthoniidae, Garypidae, Syarinidae, Garypinidae, and others (Benedict & Malcolm, 1978, Dartnall, 1970, Harvey, 1998, Morris, 1948).

Endemic genera for Tasmania are ***Neopseudogarypus*** Morris, 1948 and ***Oreolpium*** Harvey et Štáhlavský (Garypinidae)

New Guinea. Beier (1965, 1967, 1971, 1975, 1982) raised the Pseudoscorpions from Papua New Guinea (incl. Bismarck Islands to 65 species of 36 genera and 12 families (Chthoniidae, Tridenchthoniidae, Syarinidae, Cheiridiidae, Garypinidae, Geogarypidae, Atemnidae, Olpiidae, Sternophoridae, Cheliferidae, Chernetidae, Withiidae). Beier (1966) listed 24 genera and eight families of Pseudoscorpions from the Solomon Islands (incl. Bougenville and Buka Isls, which belong to Papua New Guinea), mostly from Guadalcanal (26 sp.). Now the known species of Pseudoscorpiones in the islands are 38, including some endemic. Species living on both Solomon Islands and New Guinea and the Bismarcks are *Acanthicochernes biseriatus* Beier, 1964 and common genus of both is *Gelachernes* Beier, 1940 – four sp. (Chernetidae).

Endemic genus for New Guinea and the Bismarck Archipelago:

Fam. **Cheliferidae**

Papuchelifer Beier, 1965 – Indonesia (Papua), Papua New Guinea (three sp.)

Endemic genus for the Solomon Islands:

Fam. **Chernetidae**

Cyclochernes Beier, 1970 – Guadalcanal (one sp.)

The known pseudoscorpions from Vanuatu (New Hebrides) are only four species belonging to four genera and the families Atemnidae, Cheliferidae, Chernetidae. *Lissochelifer insularis* (Beier) is common with New Guinea, *Paratemnoides salomonis* and *Haplochernes hebridicus* – with the Solomon Islands. Only *Hebridochernes paradoxus* is endemic species to Vanuatu.

On Fiji are registered three species of the genera *Geogarypus* (Geogarypidae) and *Haplochernes* (Chernetidae). *Geogarypus longidigitatus* (Rainbow, 1897) and *Haplochernes funafutensis* (With, 1907) were described from Funafuti (Tuvalu), *Haplochernes ellenae* Chamberlin, 1938 – from Viti Levu (Fiji).

In **New Caledonia** and the Loyalty Isls are known 14 species of Pseudoscorpiones from 10 genera of seven families: Chthoniidae, Tridenchthoniidae, Parahyidae, Syarinidae, Garypinidae, Atemnidae, and Chernetidae. Among them are the endemic species *Hebridochernes caledonicus, H. gressitti, H. maximus, Nesidiochernes caledonicus, Paraldabrinus* (**end. genus**) *novaecaledoniae, Amblyolpium ruficeps, Ideobisium antipodum, Anaulacodithella novacaledonica, A. reticulata, Sathrochthonius kaltenbachi, Tyrannochthonius troglophilus, T. zonatus* – 12 sp., or 86% endemism (Beier, 1940, 1964, 1966, 1966d, 1968, 1976, 1979; Simon, 1880).

For the **Lord Howe Island** Beier (1976) has published data on eight species of pseudoscorpions (four **endemics** for the island), seven genera, six families (Chthoniidae, Dithidae, Olpiidae, Atemnidae, Chernetidae, Cheliferidae). One **endemic** subgenus *Pholeochthonius* – troglobite. Notogean genera are *Anaulacodithella, Philomaoria.*

New Zealand. The pseudoscorpion fauna of New Zealand and the subantarctic islands in the area consists now of 70 species of 28 genera and nine families: Chthoniidae, Syarinidae, Garypidae, Garypinidae, Olpiidae, Cheiridiidae, Cheriferidae, Chernetidae, Withiidae, including six **endemic genera**. One genus (*Philomaoria*) is shared with Lord Howe Is., 11 genera – with Australia (Beier, 1966, 1967, 1969, 1973, 1976, Chamberlin, 1925, Harvey, 2009 (Pseudoscorpions of the World, version 1.2.).

Endemic genera:

Fam. **Chthoniidae**

Maorichthonius Chamberlin, 1925 (one sp.), ***Sathrochthoniella*** Beier, 1967 (one sp.),

Tyrannochthoniella Beier, 1966 (one sp.)

Fam. **Olpiidae**

Nelsoninus Beier, 1967 – New Zealand (South Isl.)(one sp.)

Fam. **Chernetidae**

Apatochernes Beier, 1948 – New Zealand (Campbell Isls, Snares Isls, Auckland Isls, Chatam Isls, Norfolk Isl. (17 sp.)

Heterochernes Beier, 1966 – New Zealand (one sp.)

Opiliones

In **Australia** (without Tasmania) are known ten indigenous families of Opiliones.

Cyphophthalmi

In Australia have been registered nine sp. of Cyphophthalmi of two genera of the family Pettalidae (Boyer & Giribet, 2007, Clouse & Giribet, 2007,

Giribet, 2003, Juberthie, 1988b,). The genera are endemic in Queensland (***Austropurcellia*** Juberthie, 1988, six sp.) and Western Australia (***Karripurcellia*** Giribet, 2003, three sp.).

Eupnoi (Forster, 1949a, 1952b, 1955, Hunt, 1971, 1985, 1992, Hunt & Cokendolpher, 1991, Hunt & Hickman, 1993, Kauri, 1954, Roewer, 1914-1949, Shear, 1996, 2001, Taylor, 2009, 2011, Hickman, 1957, 1958, Hogg, 1909, Hunt, 1990, 1995)

Fam. **Neopilionidae** – ***Arrallaba*** Hunt et Cokendolpher (one sp.), ***Ballarra*** Hunt et Cokendolpher (six sp.), ***Plesioballarra*** Hunt et Cokendolpher (one sp.), ***Hypomegalopsalis*** Taylor (one sp.)

Hesperopilio Shear (WA, one sp.). Unclear family withion Phalangioidea.

Fam. Sclerosomatidae – *Gagrella* Stoliczka (one sp.)

Dyspnoi – Fam. Acropsopilionidae – *Acropsopilio* Silvestri, 1905 – Queensland (one sp.), *Austropsopilio* Forster, 1955 (=*Tasmanopilio* Hickman, 1957) – NSW, Queensland (two endemic sp., the genus known also from Tasmania and Chile)]

Laniatores

In Australia (without Tasmania) are known Laniatores of 54 genera (39 genera in Triaenonychidae) and six families (Assamiidae, Phalangodidae, Podoctidae, Samoidae, Zalmoxidae, Triaenonychidae).

Endemic genera of Opiliones Laniatores for Australia (Tasmania excluded) are:

Fam. Triaenonychidae – ***Breviacantha*** Kauri, 1954 (one sp.), ***Callihamina*** Roewer, 1942 (one sp.), ***Callihamus*** Roewer, 1931 (one sp.), ***Cluniella*** Forster, 1955 (three sp.), ***Heteronuncia*** Roewer, 1920 (one sp., Queensland), ***Holonuncia*** Forster, 1955 (13 sp., ACT, NSW, Victoria), ***Perthacantha*** Roewer, 1931 (one sp.), ***Yatala*** Roewer, 1942 (SA, one sp.), ***Conoculus*** Forster, 1949 (one sp.), ***Dingupa*** Forster, 1952 (one sp., WA), ***Dipristes*** Roewer, 1931 (one sp.)

Fam. Assamiidae – ***Octobunus*** Roewer, 1923, ***Metamermerus*** Roewer, 1920, ***Dampetrus*** Karsch, 1880, ***Wintonia*** Roewer, 1923

Fam. Samoidae – ***Badessania*** Roewer, 1915

Dyspnoi

Fam. **Acropsopilionidae**

Austropsopilio Forster, 1955 (= *Tasmanopilio* Hickman, 1957) –three sp.

Laniatores

In Tasmania are registered Laniatores of family Triaenonychidae (Hickman, 1957, 1958, Hogg, 1909, Hunt, 1990, 1995, Roewer, 1914)

Endemic genera are:

Fam. **Triaeninychidae**

Allonuncia Hickman, 1958 (one sp.), ***Ankylonuncia*** Hickman, 1958 (three sp.), ***Bryonuncia*** Hickman, 1958 (one sp.), ***Calliuncus*** Roewer, 1931 (five sp.), ***Cluniella*** Forster, 1955 (three sp.), ***Hickmanoxyomma*** Hunt, 1990 (seven sp.), ***Leionuncia*** Hickman, 1958 (one sp.), ***Notonuncia*** Hickman, 1958 (three sp.), ***Nucina*** Hickman, 1958 (two sp.), ***Nuncioides*** Hickman, 1958 (two sp.), ***Odontonuncia*** Hickman, 1958 (one sp.), ***Parattahia*** Roewer, 1914 (one sp.), ***Rhynchobunus*** Hickman, 1958 (one sp.), ***Stylonuncia*** Hickman, 1958 (one sp.), ***Tasmanonyx*** Hickman, 1958 (one sp.), ***Pyenganella*** Hickman, 1958 (one sp.), ***Tasmanonuncia*** Hickman, 1958 (one sp.), ***Thelbunus*** Hickman, 1958 (one sp.), ***Allobunus*** Hickman, 1958 (one sp.), ***Chilobunus*** Hickman, 1958 (one sp.), ***Chrestobunus*** Roewer, 1914 (three sp.), ***Eubunus*** Hickman, 1958 (one sp.), ***Glyptobunus*** Roewer, 1914 (two sp.), ***Mestonia*** Hickman, 1958 (two sp.), ***Miobunus*** Roewer, 1915 (six sp.), ***Phanerobunus*** Roewer, 1915 (four sp.), ***Phoxobunus*** Hickman, 1958 (two sp.)

From **Melanesia** have been recorded Opiliones of at least 29 genera and the families Stylocellidae, Sclerosomatidae, Assamiidae, Podoctidae, Epedanidae, Samoidae, Zalmoxidae (Forster, 1949b, Goodnight & Goodnight, 1947, Loman, 1906, Roewer, 1911, 1912, 1913, 1915b, 1935-36, 1949, 1963, Suzuki, 1982).

The collection of P. Beron from New Guinea, New Britain and New Ireland is still under study.

Cyphophthalmi

Until recently, Cyphophthalmi were not registered east of the Lyddeker Line. However, two sp. of *Stylocellus* Westwood,1874, genus known from Malaysia, Indonesia, Singapore, and Palawan (Philippines), have been found in Papua (Indonesian New Guinea)(Clouse & Giribet, 2007). These animals don't cross salt water areas, so a problem arises about their establishment in New Guinea.

Eupnoi

Fam. **Sclerosomatidae** – *Gagrella* Stoliczka

Dyspnoi – not recorded from Melanesia

Laniatores

In Melanesia are recorded Laniatores of 27 genera and the families Assamiidae, Podoctidae, Epedanidae, Samoidae, Zalmoxidae.

Endemic genera in New Guinea are:

Fam. **Assamiidae**

Granobunus Roewer, 1912 (one sp.),

Euwintonius Roewer (two sp.), ***Heteropygoplus*** Roewer, 1915 (one sp.), ***Apygoplus*** Roewer, 1912 (three sp.), ***Macrodampetrus*** Roewer, 1915 (two sp.), ***Metadampetrus*** Roewer, 1915 (two sp.), ***Metamosoia*** Roewer, 1915 (one sp.), ***Mosoia*** Roewer, 1912 (one sp.), ***Neonothippus*** Roewer, 1912 (one sp.), *Dukkeriana* Roewer (one sp.), ***Sermowaius*** Roewer

Fam. **Podoctidae** (incl. Erecananinae and Ibaloniinae)

Asproleria Roewer, 1949 (one sp.), ***Heteroibalonius*** C.J. Goodnight et M.L.Goodnight, 1947 (one sp.), ***Heteropodoctis*** Roewer, 1912 (one sp.), ***Orobunus*** Goodnight et Goodnight, 1947 (one sp.), ***Paramesoceras*** Roewer, 1915 (one sp.), ***Podoctinus*** Roewer, 1923 (one sp.), ***Proholozoster*** Roewer, 1915 (one sp.)

Santobius Roewer, 1949 (= *Mesoceras* Soerensen, 1886, preoccup., = *Mesoceratula* Roewer, 1949) – Vanuatu, Fiji (two sp.)

Fam. **Samoidae**

Badessa Sørensen, in L. Koch 1886 – Fiji (one sp.)

Fijicolana Roewer, 1963 – Melanesia (one sp.)

Fam. Zalmoxidae – in New Guinea and the nearby islands live 26 sp. of the genus *Zalmoxis* Sorensen (the only Zalmoxid in the Eastern Hemisphere)

New Caledonia (Juberthie, 1979, Kury & Machado, 2009, Shear, 1993)**;**). Most interesting is the endemic family of **Cyphophthalmi Troglosironidae** with one genus ***Troglosiro*** Juberthie, 1979 and 13 sp.

Dyspnoi – missing

Laniatores

From New Caledonia and the Loyalty Isls are known Laniatores from the families Triaenonychidae, Zalmoxidae (eight endemic sp. of genus *Zalmoxis*)(Simon, 1881, Roewer, 1912, 1914, 1949, Goodnight & Goodnight, 1948, Sharma et al., 2012).

Endemic Laniatores in New Caledonia are the following genera:

Fam. **Triaenonychidae**

Diaenobunus Roewer, 1914 (one sp.), ***Triconobunus*** Roewer, 1914 (one sp.), ***Santobius*** Roewer, 1949 (= *Mesoceras* Soerensen, 1886, preoccup., = *Meso ceratula* Roewer, 1949) – Vanuatu, Fiji (two sp.)

In **New Zealand** (s. str.) live 111 species of Opiliones (Forster, 1975, actualized), from the families Pettalidae, Acropsopilionidae, Neopilionidae (incl. Monoscutidae), **Synthetonychiidae**, Triaenonychidae, (Boyer & Giribet, 2009, Crawford, 1992, Forster, 1947, 1948, 1952, 1954, 1964, 1975, 16 papers from 1943 to 1975, Hirst, 1925, Roewer, 1931, Taylor, 2004, 2009, 2011, 2013).

Cyphophthalmi

In New Zealand have been recorded 23 sp. of the fam. Pettalidae:

Rakaia Hirst, 1925 – 12 species (**endemic genus**)

Aoraki Boyer et Giribet, 2007 – eight specis (**endemic genus**)

Neopurcellia Forster, 1948 – South Island (three species)(**endemic genus**)

Eupnoi

Fam. **Neopilionidae** (incl. Monoscutidae) – ***Forsteropsalis*** Taylor (nine sp.), ***Mangatangi*** Taylor (one sp.), *Pantopsalis* Simon (nine sp.); **Monoscutinae** (end. subfamily): ***Acihasta*** Forster, ***Monoscutum*** Forster, ***Templar*** Taylor

Dyspnoi

Fam. **Acropsopilionidae** – *Acropsopilio* Silvestri, 1904 (one sp.)

Laniatores

In New Zealand are registered 68 sp. of Laniatores of 15 genera and two families. **Endemic** supraspecific taxa:

Fam. **Synthetonychiidae – end. family**

Synthetonychia Forster, 1954 (14 sp.)

Fam. **Triaenonychidae**

Hedwiga Roewer, 1931 (one sp.), ***Hendea*** Roewer, 1931 (14 sp.), ***Hendeola*** Forster, 1954 (two sp.), ***Metanuncia*** Roewer, 1914 (one sp., Stewart Island), ***Neonuncia*** Roewer, 1914 (five sp.), ***Prasma*** Roewer, 1931 (three sp.), ***Prasmiola***

Forster, 1954 (one sp.), ***Psalenoba*** Roewer, 1931 (one sp.), ***Triregia*** Forster, 1948 (three sp.), ***Algidia*** Hogg, 1920 (eight sp.), ***Cenefia*** Roewer, 1931 (four sp.), ***Muscicola*** Forster, 1954 (one sp.), ***Pristobunus*** Roewer, 1931 (two sp.)

Subfam. **Sørensenellinae – end. subfamily** (eight sp.)

Karamea Forster, 1954 (four sp.), ***Sørensenella*** Pocock, 1903 (four sp.)

Araneae. For Australia (cont.) see Baehr & Baehr (1987), Crews & Harvey (2011), Dunn (1951), Harms & Harvey (2009, 2013), L. Koch (1873), Main (1969, 1976, 1981a, 1981b, 1987), Platnick (2000, 2004), Platnick & Forster (1989), Raven (1978, 1980, 1984, 1985, 1991), Rix (2006), Rix & Harvey (2010, 2011, 2012a, 2012b), Thorell (1881), Zabka (1993); **Tasmania**. Gertsch (1958), Hickman (1957, 1958, 1969), Platnick & Forster

(1989), Raven (1978);

New Guinea. Balogh (1936), Baehr & Baehr (1993), Baert (1979, 1980, 1982, 1984), Bourne (1980), Brignoli (1981), Chrysanthos (several papers), Lehtinen & Saaristo (1980), Main (1982), Robinson (1982), Thorell (1881), Versteirt, Baert & Jocqué (2010), York (1982); **New Caledonia**. Berland (1924, 1929), Platnick (1993), Platnick & Forster (1993), Rainbow (1920), Raven (1994), Raven & Churchill (1991), Rix & Harvey (2010), Simon (1889, 1892)

Following the table of Main (1981) in **Australia** are registered 46 families of spiders. Without Salticidae, they contained 276 indigenous genera, of which 77 (27.9%) are endemic; including the Salticidae they are 338 genera of which 88 (26%) are endemic. The family Salticidae contained 62 genera, of which 11 endemic. Other families with many genera are Araneidae (33, six endemic), Lycosidae (25, two endemic) and Thomisidae (23, five endemic).

Since 1981 many new records of spiders in Australia have changed these numbers. Now (2017) in Australia are registered at least 73 families. The families Gradungulidae, Periogopidae, Holarchaeidae (Tasmania), Pararchaeidae (also New Caledonia), Nicodamidae (also New Guinea) are shared only (or almost only) with New Zealand, the families Hexathelidae (Hexathelinae), Migidae (Calathotarsinidae), Malkaridae, Amphinectidae are shared with southern South America (Argentina and Chile).

Endemic genera of spiders in Australia (Tasmania excluded) are:

Fam. **Hexathelidae**

Hexathelinae

Atrax O. P-Cambridge, 1877 (three sp.), ***Bymainiella*** Raven, 1978 (four sp.),

Hadronyche L. Koch, 1873 (31 sp., incl. one from Tasmania), ***Paraembolides*** Raven, 1980 (eight sp.), ***Teranodes*** Raven, 1985 (two sp.)

Fam. **Dipluridae**

Subfam. Euagrinae

Australothele Raven, 1984 (seven sp.), ***Caledothele*** Raven, 1991 (seven sp., one is from New Caledonia), ***Carrai*** Raven, 1984 (one sp., New South Wales), ***Cethegus*** Thorell, 1881 (12 sp.), ***Namirea*** Raven, 1984 (seven sp.) incertae sedis

Troglodiplura Main, 1969 (one sp.)

Fam. Anapidae

Chasmocephalon O. P-Cambridge, 1889 (eight sp.), ***Maxanapis*** Platnick et Forster, 1989 (nine sp.), ***Nortanapis*** Platnick et Forster, 1989 (one sp.), ***Octanapis*** Platnick et Forster, 1989 (two sp.), ***Queenslanapis*** Platnick et Forster, 1989 (one sp.), ***Risdonius*** Hickman, 1939 (three sp.), ***Spinanapis*** Platnick et Forster, 1989 (nine sp.), ***Victanapis*** Platnick et Forster, 1989 (one sp.)

Fam. **Pararchaeidae**

Westrarchaea Rix, 2006 – Western Australia (three sp.)

Fam. **Gallienelliidae**

Meedo Main, 1987 (13 sp.), ***Neato*** Platnick, 2002 (seven sp.), ***Oreo*** Platnick, 2002 (five sp.), ***Peeto*** Platnick, 2002 (one sp., Queensland), ***Questo*** Platnick, 2002 (one sp., Australia, Victoria)

Fam. **Lamponidae**

Asadipus Simon, 1897 (20 sp.), ***Bigenditia*** Platnick, 2000 (two sp.), ***Centroina*** Platnick, 2002 (11 sp.), ***Centrothele*** L. Koch, 1873 (10 sp.), ***Centsymplia*** Platnick, 2000 (one sp.), ***Graycassis*** Platnick, 2000 (10 sp.), ***Lampona*** Thorell, 1869 (56 sp., five of them shared with Tasmania, two with New Zealand, one in New Guinea), ***Lamponata*** Platnick, 2000 (one sp.), ***Lamponega*** Platnick, 2000 (three sp.), ***Lamponella*** Platnick, 2000 (10 sp., one shared with Tasmania), ***Lamponicta*** Platnick, 2000 (one sp.), ***Lamponina*** Strand, 1913 (six sp.), ***Lamponoides*** Platnick, 2000 (one sp.), ***Lamponova*** Platnick, 2000 (one sp., shared with New Guinea), *Lamponusa* Platnick, 2000 (one sp.), ***Longepi*** Platnick, 2000 (eight sp.), ***Notsodipus*** Platnick, 2000 (18 sp.), ***Paralampona*** Platnick, 2000 (eight sp.), ***Platylampona*** Platnick, 2004 (one sp.), ***Prionosternum*** Dunn, 1951 (three sp., one shared with Tasmania), ***Pseudolampona*** Platnick, 2000 (12 sp.), ***Queenvic*** Platnick, 2000 (four sp.)

In **Tasmania** have been recorded two **endemic** subfamilies (Plesiothelinae and Hickmanniinae) and some **endemic genera** of spiders:

Fam. **Hexathelidae**

Plesiothelinae – Tasmania (end.)

Plesiothele Raven, 1978 – one sp.

Fam. **Anapidae**

Acrobleps Hickman, 1979 – (one sp.), ***Hickmanapis*** Platnick et Forster, 1989 (two sp.), ***Tasmanapis*** Platnick et Forster, 1989 (one sp.)

Fam. **Austrochilidae** – Chile, Argentina, Tasmania (nine sp.)

Hickmaniinae (as family Hickmaniidae)

Hickmania Gertsch, 1958 – one sp. – *Hickmania troglodytes* (Higgins et Petterd, 1883), Cave

Fam. **Orsolabidae**

Cornifalx Hickman, 1979 (one sp.), ***Hickmanolobus*** Forster et Platnick, 1985, ***Olgania*** Hickman, 1979, ***Carathea*** Moran, 1986, ***Tupua*** Platnick *in* Forster, Platnick et Coddington, 1990, ***Cicirra*** Simon,

1876, ***Namandia*** Lehtinen, 1967, ***Ommatauxesis*** Simon, 1903, ***Toxops*** Hickman, 1940, ***Lithodamus*** Harvey

Fam. **Malkaridae**

Carathea Moran, 1986 (two sp.)

Fam. **Micropholcommatidae**

Epigastrina Rix et Harvey, 2010 (three sp.)

Fam. **Synotaxidae**

Tupua Platnick, 1990 (four sp.)

Fam. **Lycosidae**

Tasmanicosa Roewer, 1959 (one sp.)

Fam. **Psechridae**

Tjurunga Lehtinen, 1967 (one sp.)

Fam. **Miturgidae** (Zorinae)

Odomasta Simon, 1909 (one sp.)

Fam. **Araneidae**

Collina Urquhart, 1891 (one sp.)

Fam. **Amphinectidae**

Tanganoides Davies, 2005 (six sp., incl. one in Victoria), ***Tasmabrochus*** Davies, 2002 (three sp.), ***Tasmarubrius*** Davies, 1998 (five sp.), ***Teeatta*** Davies, 2005 (three sp.)

Fam. **Amaurobiidae** – only endemic species

Fam. **Desidae**

Cicirra Simon, 1886 (one sp.), ***Namandia*** Lehtinen, 1967 (one sp.), ***Ommatauxesis*** Simon, 1903 (one sp.), ***Toxops*** Hickman, 1940 (one sp.)

Fam. **Hahniidae**

Neoaviola Butler, 1929 (one sp.)

The spiders of **New Guinea**

In New Guinea and the Bismarck Archipelago (incl. Buka and Bougainville) have been recorded spiders of at least 54 families (Balogh, 1936, Baert, 1980, 1984, Brignoli, 1981). The collection, brought by me (43 sp. of 15 families), was identified only partially by Brignoli (1981), but his untimely death did not allow him to describe the many new taxa in this collection. It as noted that some species related to groups believed "typical" of New Zealand (Stiphidiidae). The preliminary conclusion of Brignoli (1981) is: "It is still too early to appreciate the value of the proposal of Lehtinen (1980), of abandoning the traditional Oriental and Austral regions in favour of an Indo-Pacific and a South Gonwanian region, but I would like to observe that, if it is probably possible to accept the limited value of Wallace's and Weber's lines for spiders, I do not see every definite border between the two new regions proposed by Lehtinen".

Some endemic genera of spiders in the "Papuan area" are:

Fam. **Telemidae**

Jocquella Baert, 1980 – New Guinea (two sp.)

Fam. **Theridiidae** (Hadrotarsinae)

Yoroa Baert, 1984 – New Guinea (two sp.)

Fam. **Philodromidae**

Pseudopsellonus Balogh, 1936 (one sp.), ***Senoculifer*** Balogh, 1936 (three sp.)

Fam. **Sparassidae**

Exopalistes Hogg, 1914 – New Guinea

Strandiellum Kolosváry, 1934 – New Guinea

Fam. **Lycosidae**

Satta Lehtinen et Hippa, 1979 – New Guinea

Fam. **Salticidae**

Allococalodes Wanless, 1982 – New Guinea

Aruana Strand, 1911 – New Guinea, Aru

Bulolia Zabka, 1996 – New Guinea

Chalcolemia Zhang et Maddison, 2012 – New Guinea

[***Coccorchestes*** Thorell, 1881 – 38 sp. from New Guinea, one from New Britain, one from Queensland]

Cucudeta Maddison, 2009 – New Guinea

Diolemus Thorell, 1870 – 16 sp. in New Guinea, 2 in Moluccas

Furculattus Balogh, 1980 – New Guinea, New Britain (one sp.)

Leptathamas Balogh, 1980 – New Guinea

Opistoncana Strand, 1913 – New Ireland

Papuaneon Maddison, 2016 – New Guinea

Paraharmochirus Szombathy, 1915 – New Guinea

Porius Thorell, 1892 – New Guinea (two sp.)

Saitissus Roewer, 1938 – New Guinea

Tabuina Maddison, 2009 – New Guinea (three sp.)

Tarodus Pocock, 1899 – New Britain

Variratina Zhang et Maddison, 2012 – New Guinea

Viribestus Zhang et Maddison, 2012 – New Guinea

Zabkattus Zhang et Maddison, 2012 – New Guinea

It is to notice, that many families of spiders, known from Northern Australia, are not (yet?) registered in New Guinea.

The list of Araneae of **Fiji** contains 122 sp. of spiders (part of them indet.), of 35 families (Evenhuis, 2006). ***Lakarobius*** Berry et al.(Salticidae) is endemic genus.

In **New Caledonia** have been recorded spiders of Anapidae, Dipluridae, Desidae, Pararchaeidae. Nearly 200 spider species have been recognized thus far (until 1993 have been 112 genera and 194 sp., af-

ter Platnick, 1993). Platnick & Forster (1993) synonymized the "endemic family" Bradystichidae Simon, 1884 with Pisauridae. Raven (1994) explored the Mygalomorphae of New Caledonia.

Endemic genera of spiders are:

Fam. **Dipluridae**

Stenygrocercus Simon, 1892 (six sp.)

Fam. **Anapidae**

Caledanapis Platnick et Forster, 1989 (six sp.), ***Mandanapis*** Platnick et Forster, 1989 (one sp.), ***Montanapis*** Platnick et Forster, 1989 (one sp.)

Fam. **Barychelidae**

Barychelinae

Barycheloides Raven, 1994 (five sp.), ***Barychelus*** Simon, 1889 (two sp.), ***Encyocrypta*** Simon, 1889 (32 sp.), ***Natgeogia*** Raven, 1994 (one sp.), ***Orstom*** Raven, 1994 (four sp.), ***Questocrypta*** Raven, 1994 (one sp.)

Fam. **Desidae**

Canala Gray, 1992 (two sp.)

Fam. **Lamponidae**

Centrocalia Platnick, 2000 (three sp.)

Fam. **Theridiidae**

Anatea Berland, 1927 (one sp.)

Fam. **Pisauridae**

Bradystichus Simon, 1884 (five sp.)

Pseudohostus Rainbow, 1915 (five sp.)

Fam. **Miturgidae** (Zorinae)

Zoroides Berland, 1924 (one sp.)

Fam. **Salticidae**

Corambis Simon, 1901 (two sp.), ***Lystrocteisa*** Simon, 1884 (one sp.), ***Rhondes*** Simon, 1901 (one sp.),

New Zealand.

It would be hardly possible to assess the entire endemism and richness of New Zealand arachnofauna some 40 years ago. Forster (1949c, 1973, 1975) analysed the particularities of this amazing fauna, but since (mostly with the efforts of Forster himself and his co-laborators) new data have been accumulated. The orders Scorpiones, Ricinulei, Uropygi, Amblypygi, Schizomida, Opilioacarida are completly missing (naturally) from New Zealand and the surrounding islands. Some other sources: Blest (1979), Forster (1955, 1959, 1964, 1970), Forster & Blest (1979), Forster & Platnick (1977, 1984), Forster & Wilton (1968, 1973), Paquin, Vink & Dupérré (2010), Parrott (1942), Platnick & Forster (1989), Rix (2006), Vink & Dupérré (2010), Zabka, Pollard & Anstey (2002) and others.

From **New Zealand** have been recorded one endemic family (Huttoniidae), one subfamily (Pahorinae), 93 end. genera and at least 93% of the species of spiders are endemic:

Fam. **Huttoniidae:** ***Huttonia*** Pickard-Cambridge),

Fam. **Hexathelidae**: ***Hexathele*** Ausserer, ***Porrhothele*** Simon)

Fam. **Anapidae**: ***Novanapis*** Platnick et Forster, ***Paranapis*** Platnick et Forster, ***Zealanapis*** Platnick et Forster

Fam. **Pararcheidae**: ***Forstrarchaea*** Rix, ***Pararchaea*** Forster

Fam. **Cycloctenidae**: ***Plectophanes*** Bryant, ***Toxopsiella*** Forster, ***Uzakia*** Koçak et Kemal, ***Cantuarea*** Hogg

Fam. **Gradungulidae**: ***Gradungula*** Forster, ***Pianoa*** Forster, ***Spelungula*** Forster Fam. Orsolabidae: ***Anopsolobus*** Forster et Platnick, ***Ascuta*** Forster, ***Bealeyia*** Forster et Platnick, ***Dugdalea*** Forster et Platnick, ***Duripelta*** Forster, ***Maoriata*** Forster et Platnick, ***Orongia*** Forster et Platnick, ***Paralobus*** Forster et Platnick, ***Pounamuella*** Forster et Platnick, ***Subantarctia*** Forster, ***Tangata*** Forster et Platnick, ***Tautukua*** Forster et Platnick, ***Turretia*** Forster et Platnick, ***Waiporia*** Forster et Platnick, ***Wiltonia*** Forster et Platnick

Fam. **Mecysmauchenidae**: ***Aotearoa*** Forster et Platnick, ***Zearchaea*** Wilton, ***Parapua*** Forster, ***Pua*** Forster, ***Forstarchaea*** Rix, ***Tekelloides*** Forster, ***Waitkerra*** Opell, ***Nomana*** Forster, ***Pahora*** Forster, ***Pahoroides*** Forster, ***Runga*** Forster, ***Wairua*** Forster, ***Meringa*** Forster, ***Mangua*** Forster, ***Ahua*** Forster et Wilton, ***Huka*** Forster et Wilton, ***Mahura*** Forster et Wilton, ***Neoramia*** Forster et Wilton, ***Oramia*** Forster et Wilton, ***Oramiella*** Forster et Wilton, ***Orepukia*** Forster et Wilton, ***Paramyro*** Forster et Wilton, ***Porotaka*** Forster et Wilton, ***Tararua*** Forster et Wilton, ***Tuapoka*** Forster et Wilton, ***Anhunga*** Forster et Wilton, ***Maloides*** Forster et Wilton, ***Muritaia*** Forster et Wilton, ***Pakeha*** Forster et Wilton, ***Paravoka*** Forster et Wilton, ***Poaka*** Forster et Wilton, ***Gasparia*** Forster et Wilton, ***Gohia*** Forster et Wilton, ***Goyenia*** Forster et Wilton, ***Hapona*** Forster, ***Helsinia*** Forster, ***Hulua*** Forster et Wilton, ***Lamina*** Forster, ***Mangareia*** Forster, ***Matachia*** Dalmas, ***Mesudus*** Özdikmen, ***Neomyro*** Forster et Wilton, ***Notomatachia*** Forster, ***Nuisiana*** Forster et Wilton, ***Otagoa*** Forster, ***Panoa*** Forster, ***Rapua*** Forster, ***Toxopsoides*** Forster et Wilton, ***Tuakana*** Forster

Fam. **Dictynidae**: ***Paradictyna*** Forster, ***Viridictyna*** Forster, ***Karanga*** Forster, ***Poroides*** Forster, ***Forstertyna*** Harvey, ***Megadictyna*** Dahl, ***Haurokoa*** Koçak et Kemal, ***Zealoctenus*** Forster et Wilton, ***Pacificana*** Hogg, ***Kaitawa*** Forster, ***Matua***

Forster, ***Nauhea*** Forster, ***Notiodrassus*** Bruyant, ***Zelanda*** Özdikmen.

Recently an overview of **New Zealand** spiders has been published by Paquin, Vink & Dupérré (2010). Best characterized is the spider fauna of New Zealand by the book review of Duffey (2010, Newsl. Br. Arachnol. Soc., 119): "Britain and New Zealand are comparable in area but the former has 658 species while the latter has 1126 described and another 536 awaiting description, making a present total of about 1662 species in 236 genera and 57 families. As new species are still being found the authors think the true total could be about 2000. One can't help feeling this is a conservative estimate because even the well-worked fauna in Britain, which recorded a total of 584 in 1958, has since added another 74 species. The best known New Zealand arachnologist, R.R. Forster, though the New Zealand total could be as much as 2500 species. Whether 2000 or 2500, the fascinating question is why New Zealand has such a rich fauna when no country in Europe reaches even the lower figure. France, one of the largest, is two and half times the area [of NZ], but has a total of 1569 sp. (Le Peru 2007). The family Linyphiidae is the largest in New Zealand but only 12% of the total and they are all in the subfamily Linyphiinae. Endemic Erigoninae apparently do not exist as all known species are introduced. In Britain about 40% of the spider fauna are Linyphiidae, of which over 70% are Erigoninae".

The endemism of New Zealand spiders is amazing: one family, one subfamily and at least 93 genera and 93% of species. In total, in New Zealand are recorded 57 families of spiders.

Opilioacarida

In **Australia** are found unidentified Opilioacarida (Walter & Proctor, 1998).

Holothyrida (Beron, 2014).

Australia. Domrow (1955), Van der Hammen (1961, 1983), Womersley (1935);

New Guinea. Thorell (1882), Beron (2014), Canestrini (1897), Lehtinen (1981, 1995), Van der Hammen (1983);

New Zealand. Womersley (1935)

Endemic family (Allothyridae) for **Australia** and **New Zealand** (?! the same species *Allothyrus* (?) *australasiae* (Womersley).

In Australia also the endemic species *Allothyrus constrictus* Domrow, 1955.

In **New Guinea** are found 11 sp. of another family (Holothyridae), out of all 29 species in the order Holothyrida (New Guinea looks like the center of speciation of these strange Arachnids). All species are endemic, so are the genera *Hammenius* Lehtinen and *Thonius* Lehtinen. *Hammenius niger* (Thon) lives on Silhouette Isl. (the Seychelles), a highly interesting distribution for these conservative animals.

In **New Caledonia** live two genera of Holothyridae, one of them endemic (*Haplothyrus* Lehtinen – two sp.), another one (*Lindothyrus* Lehtinen) is shared with Lord Howe Is. (Berlese, 1923, Lehtinen, 1995). On New Caledonia endemic sp. is *Lindothyrus rubellus* Lehtinen, 1995. Both genera belong to the family Holothyridae and not to the Allothyridae, known from Australia and New Zealand. The New Guinean genera also are not represented in New Caledonia. The same observation is valid for the Holothyrida of Lord Howe Island (*Lindothyrus elongatus* Lehtinen, 1995).

Parasitiformes (some Ixodida and Mesostigmata)

Ixodida

New Zealand has eleven named species of ticks, four of which **endemic:** *Aponomma sphenodonti* (Dumbleton, 1953)(on tuatara), *Ixodes anatis* Chilton, 1904 (on kiwi and Anatidae), *I. jacksoni* Hoogstraal, 1967 (from nest of *Stictocarbo* = *Phalacrocorax punctatus*) and *Carios quadridentatus* Heath, 2012 (from the endemic bat *Mystacina tuberculata*). Six are known also from Australia (Dumbleton, 1953, 1963, Heath, 1977, 2012, Heath et al., 2011, Hoogstraal, 1967, Spain & Luxton, 1971)

Acariformes: Haliday (1998), Spain & Luxton (1971)

Sarcoptiformes

Oribatida: Hammer (1966, 1967, 1968), Coloff & Cameron (2014). Thanks to the research of M. Hammer, from New Zealand have been listed at least 50 families of Oribatida (Spain & Luxton,1971)

Trombidiformes (some).

Australia. Beron (2008), Domrow & Lester (1985), Haliday (1998); **New Caledonia.** Southcott (1966);

New Zealand. Hirst (1926), Southcott (1988), Zhang (2000)

Prostigmata

Fam. **Smarididae** – **end. genus *Sphaerotarsus*** Womersley, 1936

Fam. **Erythraeidae**

Endemic genera in Australia: ***Erythrellus*** Southcott, 1946, ***Erythrites*** Southcott, 1946, ***Erythroides*** Southcott, 1946, ***Rainbowia*** Southcott, 1961, ***Pussardia*** Southcott, 1961, ***Mypongia*** Southcott, 1961, ***Wartookia*** Southcott, 1961

End. species in New Caledonia: *Charletonia rageaui* Southcott, 1966

Endemic genera in New Zealand: ***Neosmaris*** Hirst, 1926, ***Taranakia*** Southcott, 1988, ***Ramsayella*** Zhang, 2000

Charcteristics of the areas analysed in this article

Kingdom Notogaea – no endemic orders or suborders among Arachnida

Region Australia

Palpigradi – some brought from Europe, one local (endemic?) sp.

Solifugae – missing

Amblypygi – fam. Charinidae (*Charinus* Simon)

Uropygi – not found in Australia

Schizomida – fam. Hubbardiidae (*Apozomus* Harvey, ***Attenuizomus*** Harvey, *Bamazomus* Harvey, ***Brignolizomus*** Harvey, ***Draculoides*** Harvey, *Ovozomus* Harvey, ***Jullatenius*** Harvey, ***Notozomus*** Harvey, ***Paradraculoides*** Harvey et al.

Scorpiones – Endemic family is **Urodacidae**, end. genera – ***Urodacus*** Peters with 19 species, ***Aops*** Volschenk et Prendini, ***Isometroides*** Keyserling and ***Cercophonius*** Peters (Australia and Tasmania).

Pseudoscorpiones – no endemic families; 150 sp., 17 fam. Endemic genera of pseudoscorpions in Australia (without Tasmania) are: fam. Olpiidae – ***Austrohorus*** Beier (one sp.), ***Linnaeolpium*** Harvey et Leng (one sp.), fam. Cheliferidae – ***Australochelifer*** Beier (one sp.), fam. Chernetidae – ***Conicochernes*** Beier (four sp.), ***Marachernes*** Harvey (three sp.); in Tasmania: ***Neopseudogarypus*** Morris.

Opiliones – no endemic families

Cyphophthalmi – fam. Pettalidae (two genera, **endemic** in Queensland **(*Austropurcellia*** Juberthie) and Western Australia (***Karripurcellia*** Giribet).

Laniatores – fam. Triaenonychidae (endemic: ***Breviacantha*** Kauri, ***Callihamina*** Roewer, ***Callihamus*** Roewer, ***Cluniella*** Forster, ***Heteronunci****a* Roewer, ***Holonuncia*** Forster, ***Perthacantha*** Roewer, ***Yatal****a* Roewer, ***Conoculus*** Forster, ***Dingupa*** Forster, ***Dipristes*** Roewer, Assamiidae, Samoidae, Zalmoxidae (= Stygnoleptinae)

Eupnoi – fam. Neopilionidae (incl. Monoscutidae), Ballarriinae (***Arrallaba*** Hunt et Cokendolpher, ***Ballarra*** Hunt et Cokendolpher, ***Plesioballarra*** Hunt et Cokendolpher, ***Vibone*** Kauri). ***Hesperopilio*** Shear – unclear fam. within Phalangioidea.

Dyspnoi – fam. Acropsopilionidae (*Acropsopilio* Silvestri)

Araneae – in Australia 73 fam. with 237 end. genera; in Tasmania two endemic subfamilies (**Hickmaniinae, Plesiothelinae**)

Opilioacarida – one indeterm. recorded

Holothyrida – fam. Allothyridae (*Allothyrus* van der Hammen, ***Australothyrus*** van der Hammen)

Other Acari – many endemic genera

Region New Zealand

Very unbalances fauna. Seven orders of Arachnida are missing, the remaining are Pseudoscorpiones (67 sp.), Opiliones (111 sp.), Araneae (1662 sp.), Holothyrida (one sp.), Ixodida (11 sp.), Mesostigmata, Sarcoptiformes and Trombidiformes. Particularly well is represented the order Araneae.

Palpigradi – missing

Solifugae – missing

Amblypygi – missing

Uropygi – missing

Schizomida – missing

Scorpiones – missing

Pseudoscorpiones – no endemic families; 67 sp. of 27 genera and eight

families. Endemic genera: ***Maorichthonius*** Chamberlin, ***Sathrochthoniella*** Beier, ***Tyrannochthoniella*** Beier, ***Nelsoninus*** Beier, ***Apatochernes*** Beier (together with Campbell Isls, Snares Isls, Auckland Isls, Chatam Isls, Norfolk Isl.), ***Heterochernes*** Beier.

Opiliones – one endemic family

Cyphophthalmi – three endemic genera (***Rakaia*** Hirst, ***Aoraki*** Boyer et Giribet, ***Neopurcellia*** Foster) from the family Pettalidae (in total 21 sp.)

Laniatores – endemic family: Synthetonychiidae (*Synthetonychia* Forster), Triaenonychidae (***Hedwiga*** Roewer, ***Hendea*** Roewer**,** ***Hendeola*** Forster, ***Metanuncia*** Roewer (Stewart Island), ***Neonuncia*** Roewer, ***Prasma*** Roewer, ***Prasmiola*** Forster, ***Psalenoba*** Roewer, ***Triregia*** Forster, ***Algidia*** Hogg, ***Cenefia*** Roewer, ***Muscicola*** Forster, ***Pristobunus*** Roewer, **subfam. Sørensenellinae** (***Karamea*** Forster, ***Sørensenella*** Pocock);

Eupnoi – fam. Neopilionidae (incl. Monoscutidae) (***Forsteropsalis*** Taylor (nine sp.), ***Mangatangi*** Taylor (nine sp.), *Pantopsalis* Simon (nine sp.); **Monoscutinae** (end. subfamily): ***Acihasta*** Forster, ***Monoscutum*** Forster, ***Templar*** Taylor) (New Zealand, Auckland, Snares, Campbell Islands)

Dyspnoi – fam. Caddidae (*Acropsopilio* Silvestri)

Araneae: one endemic family (**Huttoniidae**),

one subfamily (**Pahorinae**), and at least 93 **endemic genera** of spiders.

Opilioacarida – missing

Holothyrida – no endemic families or genera: *Allothyrus* van der Hammen (one sp., in common with Australia)

Ixodida – no endemic genera. Fam. Ixodidae and Argasidae (11 sp., four endemic)

Other Acari: no endemic families.

Trombidiformes

Prostigmata – fam. Erythraeidae (***Neosmaris*** Hirst, ***Taranakia*** Southcott, ***Ramsayella*** Zhang)

Papuan Area (New Guinea, Bismarcks, Salomon Islands)

Arachnida: no endemic families

Palpigradi – fam. Eukoeneniidae (*Eukoenenia* cf. *lawrencei* and *Koeneniodes* cf. *frondiger*)

Solifugae – missing

Amblypygi – fam. Charinidae (*Charinus* Simon, *Sarax* Simon – New Guinea), Charontidae (*Charon* Karsch – New Guinea)

Uropygi (Thelyphonida) – fam. Thelyphonidae (Thelyphoninae). Genera: *Abaliella*, *Thelyphonus* and *Minbosius* (New Guinea, Fergusson, New Ireland, New Britain, Guadalcanal). Haupt (2009a) synonymized *Abaliella* Strand, *Minbosius* Speijer and *Tetrabalius* Thorell with *Thelyphonus* Latreille. **Only endemic species**.

Schizomida – fam. Hubbardiidae (*Apozomus* Harvey, *Bamazomus* Harvey – New Guinea)

Scorpiones – In New Guinea (incl. Aru and Bougainville) are known six widespread species of the genera *Isometrus, Lychas* (Buthidae), and *Liocheles* (Hormuridae).

Pseudoscorpiones – fam. Chthoniidae, Tridenchthoniidae, Syarinidae, Cheiridiidae, Garypinidae, Geogarypidae, Atemnidae, Olpiidae, Sternophoridae, Cheliferidae, Chernetidae, Withiidae. **Endemic genera*: Papuchelifer*** Beier, ***Cyclochernes*** Beier

Opiliones

Cyphophthalmi – fam. Stylocellidae (two sp. of *Stylocellus* on Bird's Head of New Guinea)

Laniatores – fam. Assamiidae, Epedanidae, Podoctidae (incl. Erecananinae and Ibaloniinae), Zalmoxidae (= Stygnoleptinae)

Dyspnoi – missing

Araneae – ca. 200 sp**., no endemic families**

Holothyrida – fam. Holothyridae (***Hammenius*** Lehtinen, ***Leiothyrus*** van der Hammen)(all from New Guinea)

Opilioacarida – missing

New Caledonia

Palpigradi – present, unidentified

Solifugae – missing

Amblypygi – fam. Charinidae (*Charinus*), only endemic species and subspecies

Uropygi – missing

Schizomida – Hubbardiidae indet.

Scorpiones – two species of *Liocheles* (Hormuridae)

Pseudoscorpiones – families Chthoniidae, Tridenchthoniidae, Syarinidae, Cheiridiidae, Garypinidae, Geogarypidae, Atemnidae, Olpiidae, Sternophoridae, Cheliferidae, Chernetidae, Withiidae

Opiliones

Cyphophthalmi – one endemic fam. Troglosironidae (13 sp.)

Laniatores – fam. Assamiidae, Epedanidae, Podoctidae (incl. Erecananinae and Ibaloniinae), Zalmoxidae (= Stygnoleptinae)

Dyspnoi – missing

Araneae – 33 families: Anapidae, Barychelidae, Dipluridae, Desidae, Pararchaeidae, Lamponidae, Theridiidae, Pisauridae, Zoridae, Salticidae, Scytodidae, Tetrablemmidae, Telemidae, Segestriidae, Oonopidae, Mimetidae, Deinopidae, Uloboridae, Mysmenidae, Linyphiidae, Tetragnathidae, Araneidae. Until 1993 have been recorded spiders of 112 genera and 194 sp. Endemic genera: ***Stenygrocercus*** Simon (Dipluridae), ***Caledanapis*** Platnick et Forster, ***Mandanapis*** Platnick et Forster, ***Montanapis*** Platnick et Forster, ***Caledothele*** Raven (Anapidae), ***Barycheloides*** Raven, ***Barychelus*** Simon, ***Encyocrypta*** Simon (32 sp.), ***Natgeogia*** Raven, ***Orstom*** Raven, ***Questocrypta*** Raven (Barychelidae), ***Canala*** Gray (Desidae),***Centrocalia*** Platnick (Lamponidae), ***Anatea*** Berland (Theridiidae), ***Pseudohostus*** Rainbow (Pisauridae), ***Zoroides*** Berland, 1924 (Zoridae), ***Corambis*** Simon, ***Lystrocteisa*** Simon, ***Rhondes*** Simon (Salticidae)

Holothyrida – fam. Holothyridae (two genera, one of them endemic

(***Haplothyrus*** Lehtinen – two species), the other (*Lindothyrus* Lehtinen) is shared with Lord Howe Is.

Opilioacarida – missing

Conclusion

The level of representation of Arachnida in the classical Notogea (with Papuan area, but excluding Patagonia) is much lower than the level in the

vertebrates, with their endemic subclasses, orders and suborders. Even in the most isolated area (New Zealand) there are **no endemics of very high rank**. Here are the endemisms above genus:

Australia (cont.): one endemic family of Scorpions (Urodacidae)

Tasmania: only endemic subfamilies of spiders (Plesiothelinae and Hickmanniinae)

New Guinean area: no endemics above genus

New Caledonia: one endemic family of Opiliones (Troglosironidae)

New Zealand: one endemic family of spiders (Huttoniidae) and one of Opiliones (Synthetonychiidae)

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Сравнителен арахногеографски анализ на фауните на Австралия, Папуаския подрайон, Нова Каледония и Нова Зеландия

Петър Берон

(Резюме)

Арахногеографски анализ на всички разреди от клас Arachnida в Австралия (вкл. Тасмания), Нова Гвинея, Нова Каледония, о. Лорд Хоу и Нова Зеландия. Целта е да се очертае представянето на различните разреди в отделните територии и да се види арахногеографската подкрепа на едно или друго ниво на ситуирането на териториите в зоогеографското поделяне на Нотогея и на света. Заключението е, че нивото на отделните групи Arachnida в класическата Нотогея (с Папуаския район, но без Патагония) е много по-ниско от нивото на гръбначните, с тяхните ендемични подкласове, разреди и подразреди. Даже в най-изолираната част няма ендемични арахниди от много висок ранг. Ето нивото на ендемизъм, по-високо от род:

Австралия (континентална част): едно ендемично семейство скорпиони (Urodacidae)

Тасмания: само ендемични подсемейства паяци (Plesiothelinae и Hickmanniinae)

Новогвинейския район: няма ендемични арахниди по-високо от род.

Нова Каледония: едно ендемично семейство опилиони (Troglosironidae)

Нова Зеландия: едно ендемично семейство паяци (Huttoniidae) и едно ендемично подсемейство (Pahorinae). При опилионите (енд. сем. Synthetonychiidae), както и едно ендемично подсемейство (Monoscutinae).