

## DESCRIPTION OF NEW SPECIES OF THE GENUS *PTERONETA* (ARACHNIDA: ARANEAE: CLUBIONIDAE) FROM PAPUA NEW GUINEA

V. Versteirt

Royal Belgian Institute for Natural Sciences, Department Entomology, Section Arachnomorphs,  
Vautierstraat 29, B-1000 Brussels, Belgium

C. Deeleman-Reinhold

Sparrenlaan 8, 4641 GA Ossendrecht, The Netherlands

L. Baert

Royal Belgian Institute for Natural Sciences, Department Entomology, Section Arachnomorphs,  
Vautierstraat 29, B-1000 Brussels, Belgium

**ABSTRACT.** – Specimens of the genus *Pteroneta* (Deeleman, 2001) were studied from fogging samples from Papua New Guinea. Four new species are described (males and females) and compared with type material from the region (*P. saltans* Deeleman): *Pteroneta longichela*, *P. brevichela*, *P. baiteta* and *P. madangiensis*. Detailed morphological description and figures of male pedipalp and female epigyne are also given.

**KEYWORDS.** – Araneae, Clubionidae, *Pteroneta*, four new species, Papua New Guinea.

---

### INTRODUCTION

The family Clubionidae consists of three subfamilies (Clubioninae, Eutichurinae and Systariinae) in the Asian (and Australian) region and is the subject of many discussions and much controversy (Deeleman-Reinhold, 2001; Raven & Stumkat, 2002, 2003). The species studied belonging to the three genera *Clubiona*, *Matidia* and *Simalio* in the subfamily Clubioninae are widely known. Deeleman-Reinhold (2001) found five new genera (*Malamatidia*, *Nusatidia*, *Pristidia*, *Pteroneta* and *Scopalio*) in material of Southeast Asia (Thailand, Malaysia and Indonesia with the exception of New Guinea which belongs to the faunal province of Australia). In this paper we discuss four new species of the genus *Pteroneta*.

The genus *Pteroneta* was described by Deeleman-Reinhold (2001) on a male from Indonesia (Lesser Sunda Island, Sumba), sampled in an evergreen forest near a spring. The genus is currently only known from the Asian-Australian region. *Pteroneta saltans* and *P. tertia* were both found in primary or secondary light forest, at ground level as well as in the canopy. Until recently, only four species were known, the two previous ones from Indonesia, one described from Queensland (Raven & Stumkat, 2002) and one was transferred from the genus *Clubiona* to *Pteroneta*, which was described from Japan by Ono (1989).

*Pteroneta* is distinguished from other clubionids by the lengthened tarsi II and especially by the feathery flag on the whole prolateral surface of tarsi II. A pattern of lazulite blue spots on abdomen and coxae can be observed on species preserved in alcohol (and are species-specific), but the colour on living species is not yet known. The body shape is somewhat similar to *Simalio* from Sri Lanka, but they are separated by the position of the AM eyes and the presence of a thoracic groove. The genital organs on the other hand are similar in structure to those in *Pristidia* but the somatic features are quite distinct in both genera (Deeleman-Reinhold, 2001). Characteristic for most male species are spines on the dorsal side of the chelicerae, the number is variable amongst species. Leg spination is an important (but difficult) characteristic for identification and is therefore described in detail.

### MATERIALS AND METHODS

Spiders were collected during a sampling campaign with insecticidal fogging technique (Erwin, 1989) in a 1 km<sup>2</sup> area located in the center of Baiteta forest (5°01'S 145°45'E, Madang Province, Papua New Guinea). This region has an annual rainfall of 3,558 mm, with a moderate dry season from June till October; mean air temperature is 26.5°C with little variation through the year. Baiteta forest is a remnant

patch of lowland mixed tropical rainforest (Johns, 1982) of about 20 km<sup>2</sup>, 4 km inland from the North Coast and about 40 km north of Madang town. The canopy was relatively high, at about 35–40 m. Samples were collected during three sampling periods (March–June 1993, March–June 1994 and April–August 1995), covering the end of the rainy and the beginning of the dry season. The first two sampling campaigns were on individual trees with large discrete crowns whilst during the last sampling campaign trees with intermingled crowns were sampled (Missa, 2000).

First, the ground vegetation was cleared under the selected tree or area, afterwards 15–20 funnels were placed under the crown at breast height (each 1 m<sup>2</sup> in collecting surface). Foggings were only carried out under standard weather conditions, to minimise any variation in the sampling pattern. The foggings were begun after dawn, following a rainless night, when the air was still allowing the warm insecticide cloud to rise into the canopy and slowly disperse. Fogging duration was about 20 min, over fogging the whole area.

This technique is very valuable in documenting the relative densities of arboreal insects in a forest canopy (Erwin, 1989; Basset et al., 1997; Stork & Hammond, 1997; Floren, 1997a and 1997b). It is particularly useful for sampling insects unable to fly and therefore mostly under sampled by other techniques.

The specimens used in the present study are deposited in the Department of Entomology of the Royal Belgian Institute of Natural Sciences, except for some allotypes, in the possession of Christa Deeleman-Reinhold. Measurements are given in millimetres (mm). There can be quite a variation in the size of the specimens; it is merely an indication instead of a fixed character.

Species captured during the fogging campaign were afterwards stored in 75% ethanol.

External structures were studied, measured and drawn with a Wild M8 stereoscope, whilst epigynal structures were drawn with a Leica microscope. Therefore they were cleared in methylsalicylate and absolute alcohol. The left male pedipalp is illustrated and described. The epigyne and vulva are given separately if hereby more structures can be seen. Measurements of body length do not include chelicerae nor spinnerets.

Specimens examined with a Philips XL30 ESEM scanning electron microscope were dehydrated in acetone, critical point dried in carbon dioxide and sputter coated with gold prior to observation.

In serial spines an asterisk is used to indicate the unpaired spination for example: 2\*d are 2 unpaired (serial) spines on the dorsal side of the leg whilst 202d are 4 paired spines (2 proximally and 2 distally); d=dorsal, p=prolateral, r=retrolateral, v=ventral. Spines that were broken off (marked by a little hole) were also counted.

Other abbreviations: PME=post median eyes, PL=post lateral eyes, Fe =femur, Ti= tibia, Pa=patella, Mt=metatarsus, Ta=tarsus, I=1<sup>st</sup> leg, II=2<sup>nd</sup> leg, III=3<sup>rd</sup> leg, IV= 4<sup>th</sup> leg

The codes of the sampled trees where *Pteroneta* species were found are listed in Table 1.

## TAXONOMY

### Key to male *Pteroneta* of the Southeast Asian region

1. Number of spines on distal side of the chelicerae less than 10 ..... 2
- Number of spines on distal side of the chelicerae more than 10 (see Fig. 1) ..... 5
2. Distal spines on chelicerae absent ..... *Pteroneta saltans*
- Distal spines on chelicerae present ..... 3
3. Tibial apophysis simple, elongated and ending in a sharp tip ..... *P. terttia*
- Tibial apophysis with bifid tip ..... 4
4. Tibial apophysis very small and digit form .... *P. ultramarina*
- Finger like tibial apophysis with round tip, embolus beak (sickle) shaped (Fig. 6 A–B) ..... *P. brevichela*
5. Chelicerae extremely long and narrow (Fig. 1) *P. longichela*
- Chelicerae shorter and broader ..... 6
6. Semi lunar shaped embolus with long tip, absence of additional apophysis, tibial apophysis square like (Fig. 8 A–B) ..... *P. madangiensis*
- Half moon shaped embolus with short tip ..... 7
7. Presence of a large additional (membranous) apophysis, half moon shaped embolus with short tip, square like tibial apophysis (Fig. 7 A–B) ..... *P. baiteta*
- Dorsal prong off blade like long tibial apophysis, long tegulum, half moon shaped embolus with very short tip ..... *P. spinosa*

### Key to female *Pteroneta* of the Southeast Asian region

Females have to be distinguished by the shape of their primary reproduction organs

1. Insemination ducts coiled (making a loop), entering lower spermathecae apically ..... 2
- Insemination ducts shaped differently ..... 3
2. Lower spermathecae smaller than upper ones (Fig. 5 C) ..... *Pteroneta longichela*
- Upper and lower spermathecae equally in size (Fig 6 C) ..... *P. brevichela*
3. Upper spermathecae circular shaped ..... 4
- Upper spermathecae more or less triangular, epigyne openings more chitinous, ducts slightly coiled, ending centrally (Fig. 7 A–B) ..... *P. baiteta*
4. Upper and lower spermathecae more or less same size, circular; adjacent ..... 5
- Upper and lower spermathecae differ in shape and size ..... 6
5. Insemination duct curved but not coiled ..... *P. saltans*
- Insemination duct more hook like ..... *P. terttia*
6. Upper spermathecae largest, upper and lower pair spermathecae not adjacent ..... *P. spinosa*
- Lower spermathecae largest ..... 7
7. Insemination ducts straight, long, lower spermathecae not adjacent to upper one and rectangular shaped (Fig. 8 A–B) .. *P. madangiensis*

Table 1: List of sampled trees where *Pteroneta* species were sampled.

Code	Date	Tree species
AR1	27 Apr.1995	<i>Spondias spec.</i> (Anacardiaceae)
AR5	10 May 1995	<i>Chisocheton ceramicus</i> (Meliaceae)
AR8	25 May 1995	<i>Planchonella thysoidis</i> (Sapotaceae)
AR9	26 May 1995	<i>Terminalia sepikana</i> (Combretaceae)
AR12	8 Jun.1995	<i>Hapholobus spec.</i> (Burseraceae)
AR14	14 Jun.1995	<i>Chisocheton ceramicus</i> (Meliaceae)
AR16	16 Jun.1995	<i>Celtis philippinensis</i> (Ulmaceae)
AR17	21 Jun.1995	<i>Celtis latifolia</i> (Ulmaceae)
AR18	22 Jun.1995	<i>Neonauclea spec.</i> (Rubiaceae)
AR20	28 Jun.1995	<i>Ficus polyantha</i> (Moraceae)
AR22	30 Jun.1995	<i>Ficus spec.</i> (Moraceae)
AR25-14	30 Jun.1995	<i>Ficus spec.</i> (Moraceae)
AR26	7 Jul.1995	<i>Maniltoa psylogyne</i> (Caesalpinaceae)
AR27	11 Jul.1995	<i>Vitex cofassus</i> (Verbenaceae)
		<i>Garuga floribunda</i> (Burseraceae)
AR29	13 Jul.1995	<i>Dysoxylum patigravianum</i> (Meliaceae)
AR30	14 Jul.1995	<i>Neonauclea spec.</i> (Rubiaceae)
AR31	18 Jul.1995	<i>Mangifera minor</i> (Anacardiaceae)
AR33	20 Jul.1995	<i>Celtis latifolia</i> (Ulmaceae)
AR35	26 Jul.1995	<i>Piteleocarpus indicus</i> (Fabaceae)
AR40	3 Aug.1995	<i>Artocarpus incisus</i> (Moraceae)
AR43	17 Apr.1996	No tree species known
AR44	18 Apr.1996	No tree species known
AR50	9 May 1996	No tree species known
AR52-11	9 May 1996	No tree species known
AR55	6 Jun.1996	No tree species known
AR56	7 Jun.1996	No tree species known
AR58	18 Jun.1996	No tree species known
AR68	23 Jul.1996	No tree species known
AR69	24 Jul.1996	No tree species known
AR70	25 Jul.1996	No tree species known
M2	30 Mar.1993	<i>Dracontomelum doa</i>
M4	22 Apr.1993	<i>Dracontomelum doa</i>
M6	18 May 1993	<i>Dracontomelum doa</i>
M10	14 Jun.1994	<i>Dracontomelum doa</i>
T1	16 Mar.1993	<i>Pometia pinnata</i>
T2	24 Jun.1993	<i>Pometia pinnata</i>
T3	31 Mar.1993	<i>Pometia pinnata</i>
T7	6 May 1993	<i>Pometia pinnata</i>
T9	8 Jun.1993	<i>Pometia pinnata</i>
T10	3 Mar.1994	<i>Pometia pinnata</i>
T12	8 Jun.1994	<i>Pometia pinnata</i>
XB	13 May 1993	<i>Chisocheton wenlandii</i> (Meliaceae)
XB"	28 Jun.1994	<i>Chisocheton wenlandii</i> (Meliaceae)
XC	19 May 1993	<i>Buchanania spec.</i> (Anacardiaceae)
XF	10 Jun.1993	<i>Sloanea sogerensis</i> (Eleaeocarpaceae)
XG	15 Mar.1994	<i>Sloanea sogerensis</i> (Eleaeocarpaceae)
XI	6 Apr.1994	Unidentified (but distinct from others)

- Insemination ducts more curved, shorter, both spermathecae adjacent, lower ones oval shaped ..... *P. ultramarina*

### *Pteroneta* Deeleman-Reinhold, 2001

*Pteroneta* Deeleman-Reinhold, 2001: 145.

**Type species.** – *Pteroneta saltans* (Deeleman-Reinhold, 2001). A description of this species is given by Deeleman-Reinhold (2001) based on a male specimen from the Lesser Sunda Island, Sumba [Province], Indonesia.

**Remarks.** – For further diagnosis and description of the genus we refer to the work done by Christa Deeleman-Reinhold (2001). A total of 109 specimens were sampled (60 location points) and studied (26 males and 83 females).

### *Pteroneta longichela*, new species (Figs. 1–5)

**Material examined.** – Holotype male: Papua New Guinea, Madang [=Province], Baiteta forest 18 May 1993 (M6, coll. O. Missa). Female allotype: Papua New Guinea, Madang [=Province], Baiteta forest 18 May 1993 (M6, coll. O. Missa).

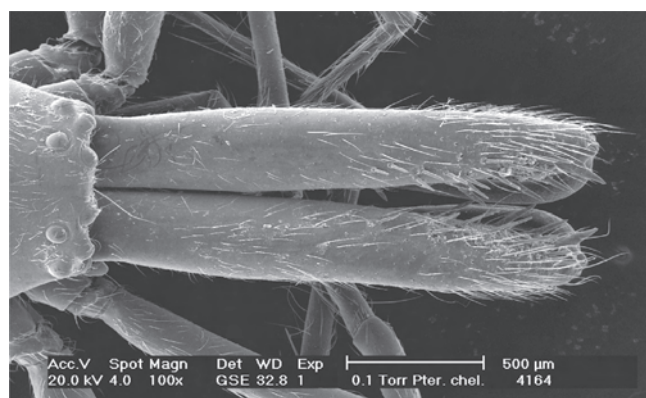


Fig. 1: *Pteroneta longichela*, SEM photo, dorsal view of chelicerae and carapace.

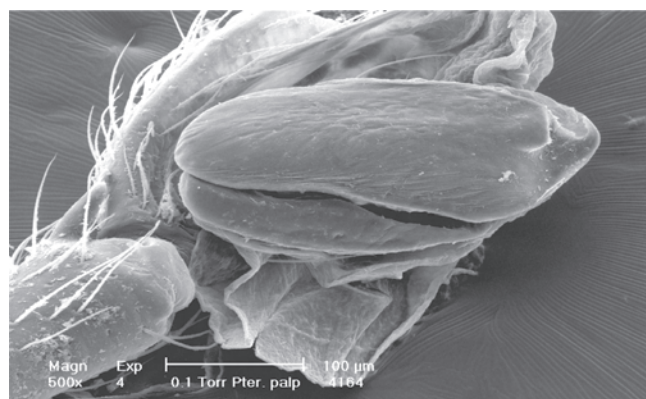


Fig. 2: *Pteroneta longichela*, SEM photo, ventral view of right pedipalp.

Paratypes: 1 female 25 May 1995 (AR8), 4 females 8 Jun.1995 (AR 12), 1 female 16 Jun.1995 (AR16), 1 female 28 Jun.1995 (AR20), 1 female 30 Jun.1995 (AR22), 2 females 7 Jul.1995 (AR26), 1 female 11 Jul.1995 (AR27), 1 female 18 Jul.1995 (AR31), 1 female 26 Jul.1995 (AR35), 3 females 3 Aug.1995 (AR40), 1 female 23 Jul.1996 (AR68), 1 male and 1 female 24 Jul.1996 (AR69), 2 females 30 Mar.1993 (M2), 1 female 18 May 1993 (M6), 1 female 16 Mar.1993 (T1), 1 female 31 Mar.1993 (T3), 1 male and 2 females 6 May 1993 (T7), 1 male 3 Mar.1994 (T10), 1 female 8 Jun.1994 (T12), 3 females 13 May 1993 (XB), 1 female 28 Jun.1994 (XB”), 1 male and 9 females 19 May 1993 (XC), 1 male and 2 females 10 Jun.1993 (XF), 1 female 15 Mar.1994 (XG). All from Papua New Guinea, Madang [=Province], Baiteta forest (Table 1).

**Diagnosis.** – Males of this species are distinguished by the extremely long chelicerae (more than half body length), the number (ca. 20) and position of spines on the chelicerae and the fingerlike shape of the tibial apophysis. Females are characterized by the large upper spermathecae, the long insemination ducts making a loop mesally and by the prominent fertilization ducts.

**Description.** – Male: total body length: 4.5 mm; carapace length: 2.05 mm, width: 1.41 mm; abdomen length: 2.33 mm,

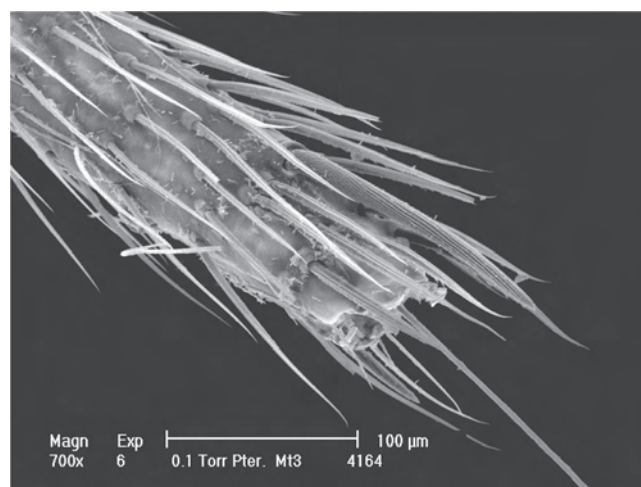


Fig. 3: *Pteroneta longichela*, SEM photo of MtIII.

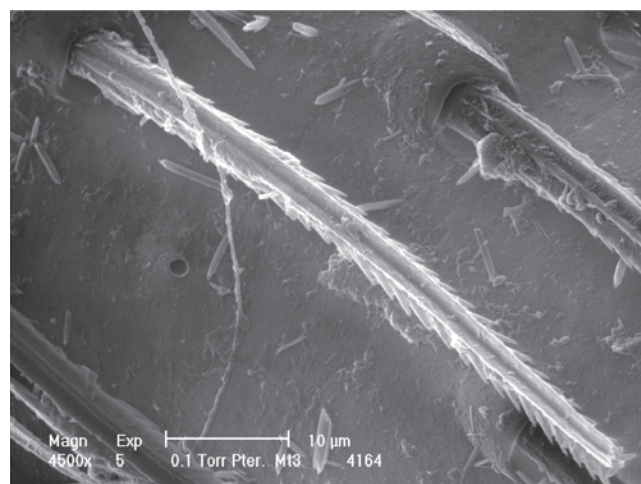


Fig. 4: *Pteroneta longichela*, SEM photo of MtIII, detailed view of barbed spines.



width 0.94 mm. Eyes: PME: 0.38 mm and PL: 0.71 mm apart, head width: 0.95 mm. Pale yellow spiders with a pattern of blue spots on venter. Chelicerae with 5 promarginal and 7 retromarginal teeth, almost 20 spines central on dorsal side, fangs long and small with 2 spines mesally situated (see Fig. 1). Legs same colouration as body, pale yellow. Spination: femora I-III 3\*d 2\*p, IV 112d; tibiae I-II 222v (+ 1 spiny hair dorsal), III 2\*v, IV 1p 2\*r 2\*v; metatarsi I-II 220v, III 202d 201v + circle of 10 (barbed) spines (see Figs. 3–4), IV 212d 1p 1r 102v + retrolateral bunch of 5 small spines and 1 ventral small spine. Measurements: Fe I: 1.55 mm, Pa+Ti I: 2.25 mm, Mt I: 0.93 mm, Ta I: 0.48 mm; Fe II: 1.88 mm, Pa+Ti II: 2.88 mm, Mt II: 1.08 mm, Ta II: 0.6 mm; Fe III: 1.05 mm, Pa+Ti III: 1.35 mm, Mt III: 1.0 mm, Ta III: 0.38 mm; Fe IV: 1.55 mm, Pa+Ti IV: 2.0 mm, Mt IV: 1.53 mm, Ta IV: 0.53 mm.

Male pedipalp (see Figs. 2 & 5 A–B): tibial apophysis broad at basis, narrowing in middle and ending in a blunt tip, tibia

with 2 dorsal spines. Sperm duct originating proximally from funnel like structure, going distally making a curve of 180° and returning to proximal end of tegulum. Embolus short, small with sharp tip. Tegulum longer than wide with additional small transparent appendage (retrolateral flange), distally, near embolus basis. Cymbium with apical spine on ventral side.

Female: total body length: 3.45 mm; carapace length: 1.55 mm, width: 1.23 mm; abdomen length: 1.73 mm and width: 1.15 mm. Eyes: PME: 0.23 mm and PL: 0.44 mm apart, head width: 0.63 mm. Legs, carapace and abdomen yellow only chelicerae are brownish yellow. Chelicerae with 6 promarginal and 5 small dot like retromarginal teeth. Legs: Spination: femora I-III 2\*d, IV 012d; tibiae I-II 222v, III 1v, IV 2\*d 022v, metatarsi I-II 200v (lateral row of hairs), III 202d 101v + circle of 8 (barbed) spines, IV 201d 2\*p 2\*r 101v. Measurements: Fe I: 0.83 mm, Pa+Ti I: 1.09 mm, Mt I: 0.44 mm, Ta I: 0.31 mm; Fe II: 0.99 mm, Pa+Ti II: 1.45 mm, Mt II: 0.48 mm, Ta II: 0.44 mm; Fe III: 0.68 mm, Pa+Ti III: 0.76 mm, Mt III: 0.66 mm, Ta III: 0.28 mm; Fe IV: 1.06 mm, Pa+Ti IV: 1.34 mm, Mt IV: 1.06 mm, Ta IV: 0.39 mm.

Epigyne (see Fig. 5 C): consisted of 2 pairs of spermathecae (separated from each other), the upper ones large and circular the lower ones much smaller and irregularly shaped (more or less oval). Upper spermathecae with a large diverticulum (fertilization duct) laying laterad between upper and lower ones. Large insemination ducts opening caudo-lateral and making mesally a loop before entering in the spermathecae.

**Etymology.** – After the diagnostic character of the very long male chelicerae.

### *Pteroneta brevichela*, new species

(Fig. 6)

**Material examined.** – Holotype male: Papua New Guinea, Madang [=Province], Baiteta forest 8 Jun.1993 (T9, coll. O. Missa). Female allotype: Papua New Guinea, Madang [=Province], Baiteta forest 8 Jul.1993 (T9, coll. O. Missa).

Paratypes: 1 female 21 Jun.1995 (AR17), 1 female 22 Jun.1995 (AR18), 1 female 30 Jun.1995 (AR22), 1 female 30 Jun.1995 (AR25-14), 2 females 13 Jul.1995 (AR29), 2 males 17 Apr.1996 (AR43), 1 female 9 May 1996 (AR50), 1 female 7 Jun.1996 (AR56), 1 female 18 Jun.1996 (AR58), 1 female 25 Jul.1996 (AR70), 1 male and 2 females 30 Mar.1993 (M2), 1 male and 1 female 22 Apr.1993 (M4), 1 male 14 Jun.1994 (M10), 1 female 6 Apr.1994 (XI). All from Papua New Guinea, Madang [=Province], Baiteta forest (Table 1).

**Diagnosis.** – Males of this species are distinguished by the shorter, thick chelicerae, by the number (only one) and position of spines on the chelicerae, with bulge in mesal part of the fangs. Females of this species are characterized by the very long insemination ducts, entering caudolaterally and by the smaller upper dark spermathecae and larger more transparent lower spermathecae.

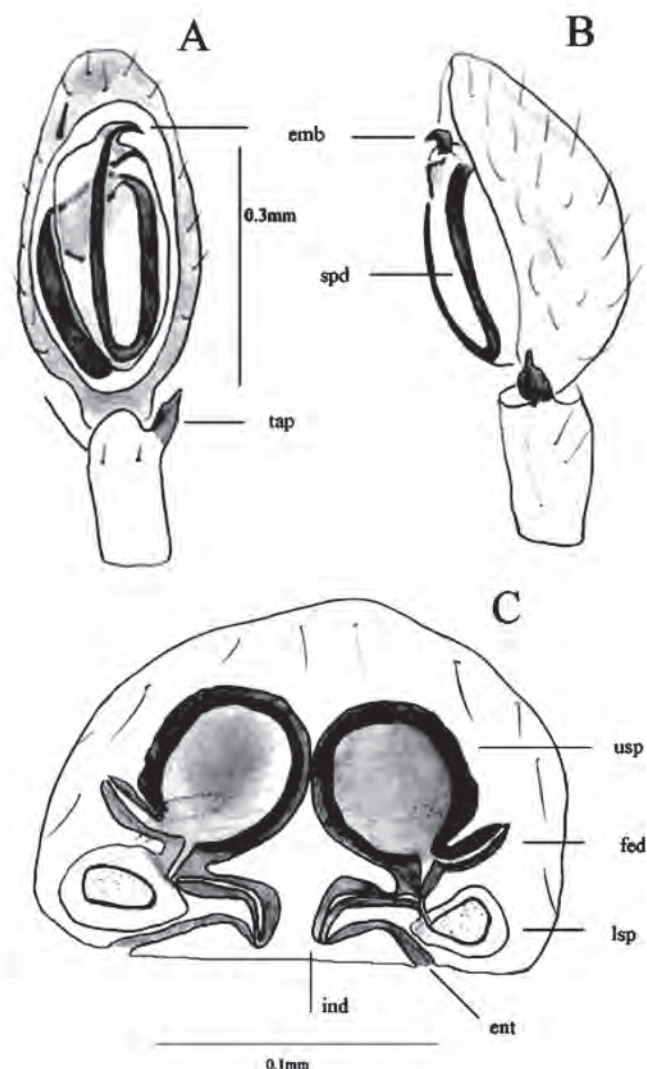


Fig. 5. *Pteroneta longichela*; A, ventral view of left male pedipalp; B, dorsolateral view of left male pedipalp; C: ventral view (epigyne). Abbreviations used: emb, embolus; spd, spermiduct; ste, subtegulum; tap, tibial apophysis; ent, entrance opening; fed, fertilization duct; ind, insemination duct; lsp, lower spermathecae; usp, upper spermathecae.

**Description.** – Male: total body length: 3.0 mm; carapace length: 1.45 mm, width: 1.1 mm; abdomen length: 1.53 mm and width: 1.0 mm. Eyes: PME: 0.26 mm and PL: 0.56 mm apart, head width: 0.74 mm. Abdomen and legs are coloured pale yellow, carapace and chelicerae on the other hand are brownish yellow. Chelicerae with 3 promarginal teeth and 1 retrolateral tooth; only one short blunt spine on dorsal side, bunch of hairs on chelicerae mesally situated (till PMT 2). Legs: Spination: femora I-II 2\*d 1p, III 2\*d, IV 1d (left); tibiae I 2\*v, II-III spineless, IV 1d; metatarsi I-II spineless, III 102d 2\*v + circle of 11 (barbed) spines, IV 202d 1p 102v + retrolateral bunch of 11 small spines + 1 ventrally situated. Measurements: Fe I: 0.86 mm, Pa+Ti I: 1.2 mm, Mt I: 0.53 mm, Ta I: 0.36 mm; Fe II: 1.08 mm, Pa+Ti II: 1.54 mm, Mt II: 0.56 mm, Ta II: 0.55 mm; Fe III: 0.59 mm, Pa+Ti III: 0.81 mm, Mt III: 0.58 mm, Ta III: 0.26 mm; Fe IV: 0.95 mm, Pa+Ti IV: 1.18 mm, Mt IV: 0.94 mm, Ta IV: 0.3 mm.

Male pedipalp (see Fig. 6 A–B): Tibial apophysis similar to *P. longichela* with exception of the tip, which is much sharper; tibia without any spines. Sperm duct originating from larger structure, going distally, making a curve of 180°

and ending in a sharp beak like embolus. Tegulum longer than wide with additional small, sharp ridged appendage (retrolateral flange), distally, near embolus basis. Cymbium with 2 apical spines on ventral side.

Female: total body length: 3.5 mm; carapace length: 1.4 mm, width: 1.03 mm; abdomen length: 1.98 mm and width: 1.15 mm. Eyes: PME: 0.2 mm apart, PL: 0.44 mm and head width: 0.6 mm. Sometimes very pale yellow spiders (abdomen and carapace), chelicerae and fangs are slightly darker. Chelicerae with 6 very small promarginal teeth and 6 dot like retromarginal teeth. Legs: Spination: femora I-IV 2\*d; tibiae I-III spineless, IV 1p 1r, metatarsi I 200v, II (10-01-0)v, III 102d 1v + circle of 10 (barbed) spines, IV 202d 102v + retrolateral bunch of 9 small spines. Measurements: Fe I: 0.64 mm, Pa+Ti I: 0.98 mm, Mt I: 0.39 mm, Ta I: 0.3 mm; Fe II: 0.94 mm, Pa+Ti II: 1.23 mm, Mt II: 0.36 mm, Ta II: 0.55 mm; Fe III: 0.56 mm, Pa+Ti III: 0.61 mm, Mt III: 0.46 mm, Ta III: 0.23 mm; Fe IV: 0.7 mm, Pa+Ti IV: 1.15 mm, Mt IV: 0.76 mm, Ta IV: 0.33 mm.

Epigyne (see Fig. 6 C): circular and smaller upper spermathecae and two larger and circular lower spermathecae. Long insemination ducts originating from caudo-laterally situated entrance openings; making a loop of 180° ending in the proximal part of the lower spermathecae. Short and wide fertilization duct originating from upper spermathecae.

**Etymology.** – After the shorter male chelicerae, by which it differs from the previous species.

**Remarks.** – *Pteroneta longichela* and *P. brevichela* are very alike in habitus (as do most *Pteroneta* species) but differs in a number of somatic characteristics. The most important ones in male individuals are the length of the chelicerae (and number of spines) and the number of promarginal retromarginal teeth. The pedipalps of both species are slightly different, whilst the epigynes can easily be distinguished (see Figs. 5–6). Preliminary cladistic analyses show that they are closely related but differ enough to be placed in different branches.

#### *Pteroneta baiteta*, new species (Fig. 7)

**Material examined.** – Holotype male: Papua New Guinea, Madang [=Province], Baiteta forest 18 Jul.1995 (AR 31, coll. O. Missa).

Paratype: 1 female 17 Apr.1996 (AR43, coll. O. Missa) (see Table 1)

**Diagnosis.** – Males of this species are distinguished by the number (18) and position of spines on the chelicerae, the strong indentation at basis of the chelicerae and the shape of the tibial apophysis. Females are characterized by the structure of the epigyne, with 2 darker kidney shaped upper spermathecae, two more oval smaller lower spermathecae and sclerotised entrance openings.

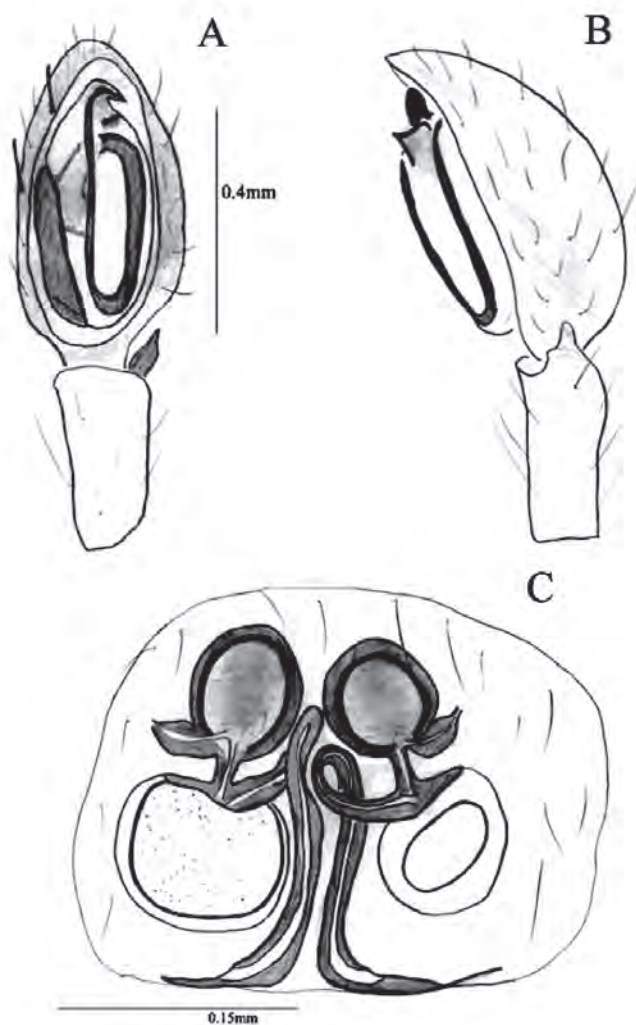


Fig. 6. *Pteroneta brevichela*: A, ventral view of left male pedipalp; B, dorsolateral view of left male pedipalp; C, ventral view (epigyne).

**Description.** – Male: total body length: 4.5 mm; carapace length: 2.03 mm, width: 1.5 mm; abdomen length: 2.35 mm and width: 1.18 mm. Eyes: PME: 0.33 mm apart, PL: 0.75 mm and head width: 1.03 mm. The carapace, legs and chelicerae are brownish yellow whilst the abdomen of the spiders is more pale yellow. Chelicerae with 3 promarginal teeth and 2 large and 3 dot like retromarginal teeth; on the dorsal side are 18 blunt short spines. Legs: Spination: femora I-II 2\*d 2\*p, III 3\*d 2\*p, IV 2\*d; tibiae I 220v, II 1v, III spineless, IV 1p 1r; metatarsi I 200v, II (10-01-0)v, III 202d 201v + circle of 14 (barbed) spines, IV 202d 101v + retrolateral bunch of 5 spines. Measurements: Fe I: 1.08 mm, Pa+Ti I: 1.53 mm, Mt I: 0.65 mm, Ta I: 0.43 mm; Fe II: 1.53 mm, Pa+Ti II: 1.98 mm, Mt II: 0.73 mm, Ta II: 0.68 mm; Fe III: 0.8 mm, Pa+Ti III: 1.03 mm, Mt III: 0.73 mm, Ta III: 0.33 mm; Fe IV: 1.35 mm, Pa+Ti IV: 1.6 mm, Mt IV: 1.15 mm, Ta IV: 0.45 mm.

Male pedipalp (see Figs. 7 A-B): Palpal tibia with one spine and small, arrow shaped tibial apophysis with pointed tip. Sperm duct originating proximally from funnel like structure, going distally making a curve of 180° and returning to proximal end of tegulum ending in a large, short embolus with sharp tip. Cymbium oval shaped and rounded at the top. Tegulum broad, subtegulum clearly visible, large additional apophysis (almost all retrolateral side), straight ridged at its top.

Female: total body length: 3.0 mm; carapace length: 1.24 mm, width: 0.86 mm; abdomen length: 1.68 mm and width: 0.8 mm. Eyes: PME: 0.14 mm apart, PL: 0.38 mm and head width: 0.56 mm. Abdomen, legs and carapace are coloured yellow only the chelicerae are darker, more

brownish. Chelicerae with 6 promarginal and 6 (dot like) retromarginal teeth. Legs: Spination: femora I-IV 2\*d; tibiae I 1v, metatarsi I-II (0-0-10-01), III 102d 101v + circle of 14 (barbed) spines, IV 202d 1p (10-0-01)v + retrolateral bunch of 15 spines. Measurements: Fe I: 0.71 mm, Pa+Ti I: 0.99 mm, Mt I: 0.4 mm, Ta I: 0.29 mm; Fe II: 0.96 mm, Pa+Ti II: 1.19 mm, Mt II: 0.39 mm, Ta II: 0.51 mm; Fe III: 0.58 mm, Pa+Ti III: 0.7 mm, Mt III: 0.46 mm, Ta III: 0.26 mm; Fe IV: 0.86 mm, Pa+Ti IV: 1.08 mm, Mt IV: 0.8 mm, Ta IV: 0.33 mm.

Epigyne (see Fig. 6 C–D): with large upper and small lower spermathecae. Upper ones peculiarly shaped, kidney like, touching each other; they are slightly darker than the 2 lower more oval ones. Entrance openings mesally situated and sclerotised. Insemination ducts short, going to lower spermathecae and from there to upper ones. Fertilization ducts short, broad at basis, smaller at tip, originating at the distal part of the upper spermathecae.

**Etymology.** – After the type locality, the forest of Baiteta (Madang province, Papua New Guinea), baiteta is a noun in apposition.

*Pteroneta madangiensis*, new species  
(Fig. 8)

**Material examined.** – Holotype male: Papua New Guinea, Madang [=Province], Baiteta forest 6 May 1993 (T7, coll. O. Missa). Female allotype: Papua New Guinea, Madang [=Province], Baiteta forest (AR14)

Paratypes: 1 male and 3 females 27 Apr.1995 (AR1), 2 females 10 May 1995 (AR5), 1 male 26 May 1995 (AR9), 2 males 14 Jun.1995 (AR14), 1 female 21 Jun.1995 (AR17), 2 males 13 Jul.1995 (AR29), 3 males and 2 females 14 Jul.1995 (AR30), 1 male and 1 female 18 Jul.1995 (AR31), 2 females 20 Jul.1995 (AR33), 2 females 17 Apr.1996 (AR43), 1 male 18 Apr.1996 (AR44), 1 female 9 May 1996 (AR50), 1 male 9 May 1996 (AR52-11), 2 females 6 Jun.1996 (AR55), 1 female 25 Jul.1996 (AR70), 3 females 22 Apr.1993 (M4), 1 female 18 May 1993 (M6), 1 female 24 Jun.1993 (T2). All from Papua New Guinea, Madang [=Province], Baiteta forest (Table 1).

**Diagnosis.** – Males of this species are characterized by the shape of the tibial apophysis, the number (14) and position of spines on the chelicerae and the light indentation at basis of the chelicerae. Females are distinguished by the structure of the epigyne, with 2 small circular upper spermathecae and 2 large more oval lower spermathecae.

**Description.** – Male: total body length: 3.5 mm; carapace length: 1.78 mm, width: 1.4 mm; abdomen length: 1.7 mm and width: 0.85 mm. Eyes: PME: 0.3 mm and PL: 0.65 mm apart, head width: 0.93 mm. Carapace, chelicerae, abdomen and legs are brownish-yellow. Chelicerae are long and small with 2 promarginal teeth and 5 retromarginal teeth (2 larger and 3 small (dot like) ones), on the dorsal side 14 short spines are present. Legs: Spination: femora I 3\*d 2\*p, II 3\*d 1p, III 2\*d 1p, IV 3\*d; tibiae I 220v, II 2\*v, III spineless, IV 1p 1r; metatarsi I 200v, II (10-01-0)v, III 202d 2\*v + circle of

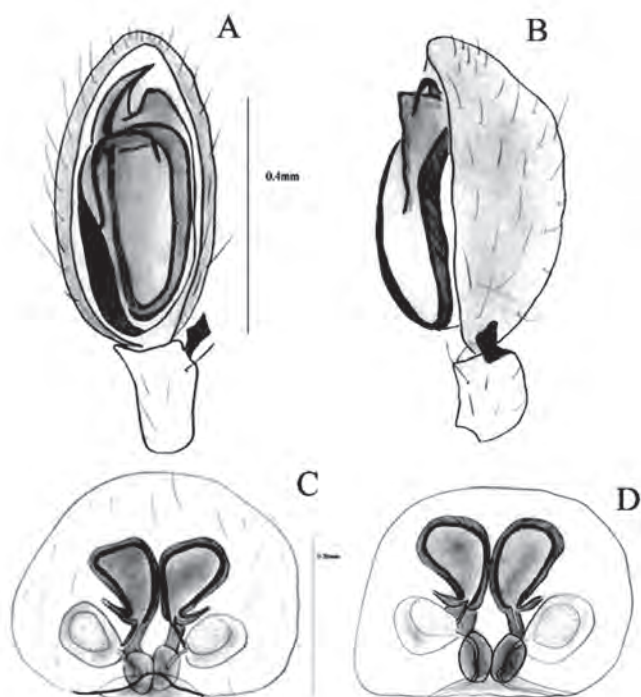


Fig. 7. *Pteroneta baiteta*: A, ventral view of left male pedipalp; B, dorsolateral view of left male pedipalp, C, ventral view (epigyne); D, dorsal view (vulva).



12 (barbed) spines, IV 202d 1p 2\*v + retrolateral 2 spines. Measurements: Fe I: 1.0 mm, Pa+Ti I: 1.4 mm, Mt I: 0.68 mm, Ta I: 0.43 mm; Fe II: 1.41 mm, Pa+Ti II: 1.9 mm, Mt II: 0.66 mm, Ta II: 0.59 mm; Fe III: 0.78 mm, Pa+Ti III: 0.93 mm, Mt III: 0.69 mm, Ta III: 0.34 mm; Fe IV: 1.2 mm, Pa+Ti IV: 1.43 mm, Mt IV: 1.06 mm, Ta IV: 0.43 mm.

Male pedipalp (see Fig. 8 A–B): palpal tibia with a short thick apophysis ending in a blunt tip, and with more than 4 spines on its ventral side. Subtegulum only partially visible, tegulum longer than wide, oval shaped with short, straight ridged apophysis (prolateral). Sperm duct originating from funnel like sac, going distally, making a curve of 180° and returning to the top of the tegulum. Embolus small and elongated, threadlike at its tip.

Female: total length: 3.6 mm; carapace length: 1.48 mm, width: 1.13 mm; abdomen length: 2.03 mm and width: 1.1 mm. Eyes: PME: 0.23 mm apart, PL: 0.48 mm and head width: 0.69 mm. Carapace, chelicerae and legs are brownish yellow, abdomen paler and yellow. Chelicerae with 8 (small) promarginal teeth and 6 dot like retromarginal teeth. Legs: Spination: femora I–IV 2\*d; tibiae I (0–10–0)v, II–III spineless,

IV 1r, metatarsi I 200v, II (10–10–0), III 202d 101v + circle of 12 (barbed) spines, IV 202d 1p 102v + retrolateral bunch of 6 spines. Measurements: Fe I: 0.78 mm, Pa+Ti I: 1.15 mm, Mt I: 0.48 mm, Ta I: 0.35 mm; Fe II: 1.06 mm, Pa+Ti II: 1.45 mm, Mt II: 0.39 mm, Ta II: 0.55 mm; Fe III: 0.63 mm, Pa+Ti III: 0.69 mm, Mt III: 0.55 mm, Ta III: 0.24 mm; Fe IV: 1.01 mm, Pa+Ti IV: 1.26 mm, Mt IV: 0.99 mm, Ta IV: 0.36 mm.

Epigyne (see Fig. 8 C): entrance openings caudo-laterally situated. Long, almost straight insemination ducts originating from entrance openings and ending at the caudal side of the upper spermathecae, going upwards to the upper ones and downwards (through straight tube like structure) to lower ones. Epigyne with two pairs of spermathecae, small circular upper ones and large square shaped lower ones. The fertilization ducts originates caudally from the upper spermathecae, broad at basis, very small at tip.

**Etymology.** – After the type locality, the province of Madang

## GENERAL DISCUSSION

The goal of the present paper is to give a taxonomic view of the genus *Pteroneta* in the Southeast Asian region and especially those from Papua New Guinea. Several samples were taken during a fogging campaign in Baiteta forest, Province of Madang and four new species new to sciences were discovered. No other previously described species were found.

After comparison with all species known from the region, four new species could be described. Two males are very alike (*Pteroneta longichela* and *P. brevichela*) but differ in the length of their chelicerae, the number of promarginal and retromarginal teeth, the leg spination and in some other smaller details (see cladistic analyses Versteirt et al., in prep). Male pedipalps are at first sight very similar and therefore many characteristics have to be taken into account to determine the specimen. There are more obvious differences in the female epigynes which can be used on their own for identification. The biggest problem was to assign the males and females together. Assignment was made on basis of the structure of the genitalia (the length of the embolus compared to the length of the insemination ducts) and on the appearance of males and females in the same samples (more difficult because most males and females occurred in separate samples). Female chelicerae do not have spines on their dorsal side, only males of this genus have this characteristic.

It can be expected that new species of this genus will be discovered when forest canopies or/and collection are studied. The problems currently existing in the Clubionidae, still remained untangled and will not easily be solved. Further taxonomical and phylogenetic studies will be necessary and are strongly recommended.

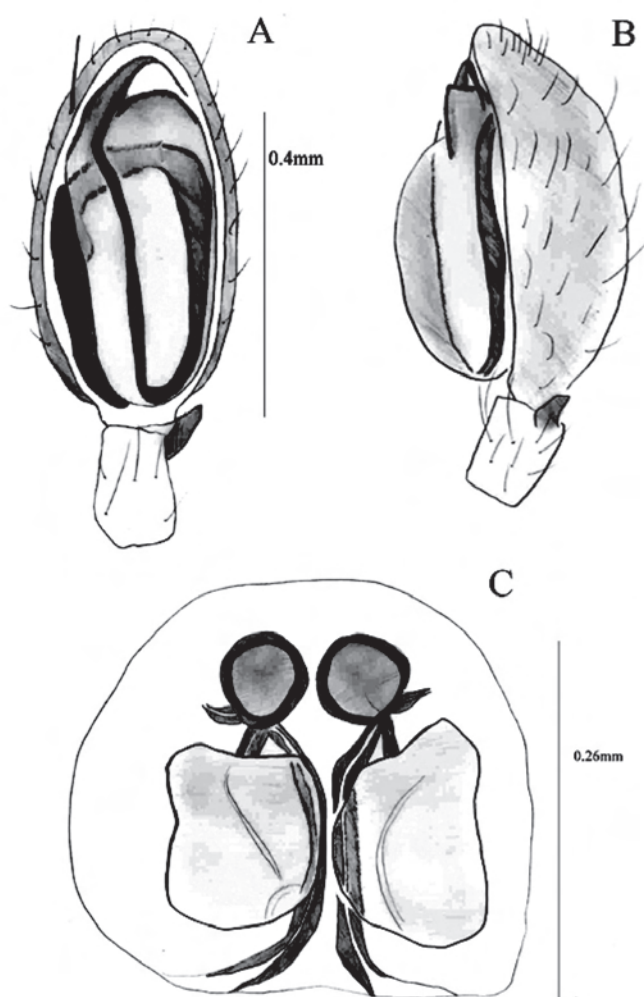


Fig. 8. *Pteroneta madangiensis*; A, ventral view of left male pedipalp; B, dorsolateral view of left male pedipalp, C, ventral view (epigyne).



# ACKNOWLEDGEMENTS

We would like to thank Dr. Olivier Missa for the sampling of the fogging material (as we would all the technicians of the Christensen Research Institute, Papua New Guinea). Many thanks to Domir De Bakker for sorting out the material and other preliminary work. We are Julien Cillis grateful for making the SEM photos of our studied species. We would like to thank Desmond Kime for critical reading of the manuscript. Thanks to the POD for funding the research.

# LITERATURE CITED

- Basset, Y., N. D. Springate, H. P. Aberlanc, & G. Delvare, 1997. A review of methods for sampling arthropods in tree canopies. In Stork, N. E., J. A. Adis, and R. K. Didham, (eds.), Canopy Arthropods. Chapman and Hall, London. Pp 27–52.
- Deeleman Reinhold, C. L., 2001. Forest Spiders of Southeast Asia: with a revision of the sac and ground spiders (Araneae: Clubionidae, Corinnidae, Liocranidae, Gnaphosidae, Prodidomidae and Trochanterriidae). K. Brill: Leiden, Boston and Koln: 591pp.
- Erwin, T. L., 1989. Canopy arthropod biodiversity: a chronology of sampling techniques and results. Revista Peruana Entomologia, **32**: 71–77.
- Floren, A., 1997a. Diversität und Wiederbesiedlungsdynamik arborikoler Arthropodengemeinschaften in einem Tieflandregenwald auf Borneo, Sabah, Malaysia. Wissenschaft und Technik Verlag Berlin, Pp. 1–124.
- Floren, A. & K. E. Linsenmair, 1997b. Diversity and recolonisation dynamics of selected arthropod groups on different tree species in a lowland rainforest in Sabah, Malaysia with special reference to Formicidae. In: Stork, N. E., J. A. Adis & R. K. Didham (eds.), Canopy Arthropods. Chapman and Hall, London. Pp. 344–381.
- Johns, R. J., 1982. Plant zonation. In: Gressitt, J. L. (ed.), Biogeography and Ecology of New Guinea. Dr. W. Junk Publishers, The Hague: vol. **42**: 309–330.
- Missa, O., 2000. Diversité et Hétérogénéité de la faune des charançons (Coleoptera, Curculionidae) dans la canopée d’une forêt tropicale humide en Papouasie Nouvelle Guinée. Thèse de Docteur en Sciences, ULB, 158 pp.
- Ono, H., 1989. New species of the genus Clubiona (Araneae, Clubionidae) from Iriomotejima Island, the Ryukyus; Bulletin of the National Science Museum, Tokyo **15**: 155–166.
- Raven, R. J. & K. S. Stumkat, 2002. *Pteroneta* Deeleman-Reinhold and a remarkable sympatric *Clubiona* (Clubionidae: Araneomorphae:Arachnida) in northern Australia. Memoirs of the Queensland Museum **48**(1): 199–206.
- Raven, R. J. & K. S. Stumkat, 2003. Problem solving in the spider families Miturgidae, Ctenidae and Psecridae (Araneae) in Australia and New Zealand. The Journal of Arachnology, **31**(1): 105–121.
- Stork, N. E., 1987. Arthropod faunal similarity of Bornean rain forest trees. Ecological Entomology, **12**: 219–226.
- Stork, N. E. & P. M. Hammond, 1997. Sampling arthropods from tree-crowns by fogging with knockdown insecticides: lessons from studies of oak tree beetle assemblages in Richmond Park (UK). In: Stork, N. E., J. A. Adis & R. K. Didham (eds.). Canopy Arthropods. Chapman and Hall, London. Pp. 3–26.
- Versteirt, V., R. Jocqué & L. Baert. Description and cladistics of new genera and species of the Clubionidae (Araneae) from Papua New Guinea. in prep.