Procrustomachia

Occasional Papers of the Uncensored Scientists Group

10, 2: 13-27

Milanówek 9 XI 2025 ISSN 2543-7747

Review of the *[Cyphogastra* DEYR.*]*-supergenus (Coleoptera: Buprestidae) IX. Phylogenetical, taxonomical and biogeographical conclusions

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> *Whoever wants to hold firm rules, should give up taxonomic work. Nature is too disorderly for such a man* E. STRESEMANN
>
> *I am a firm believer, that without speculation there is no good & original observation* C. DARWIN
>
> *... now and then scientists are hampered by believing one of the oversimplified models of science that have been proposed by philosophers ... The best antidote to the philosophy of science is a knowledge of the history of science* S. WEINBERG

Introduction

With the appearance of the hitherto published **Parts I-VIII** of the **Review** (HOŁYŃSKI 2016, 2020b,c,d, 2021c, 2022a,b, 2024a), supplemented with some additional descriptons and remarks (HOŁYŃSKI 2020a, 2021a,b, 2023a,b,c, 2024b, 2025), the principal morphological characteristics and geographical distribution of all terminal taxa ([sub-]species) of what I consider the *[Cyphogastra* DEYR.*]*-supergenus (the genera *Pleiona* DEYR. and *Cyphogastra* DEYR.), known (in nature or at least from literature) to me, as well as ***preliminary*** keys, attribution to ***somewhat intuitively defined*** circles (for the interpretation of the term *cf.* HOŁYŃSKI 1992, 2009), phylogenetic reconstructions *&c.*, presented according to my actual knowledge, have already been known to the interested reader. The present **Part IX** was originally conceived as a summary of the results published hitherto, with the comprehensive phylogenetic analysis of the relationships between the circles; however, each of the eight **Parts** was aimed at the clarificaton of relations ***within*** a particular group (or few, supposedly closely related, groups ***tentatively*** assessed as a monophyletic circles), based on the characters variable within or unique to those very groups and leaving out of consideration the data relevant only to the remaining (at the particular stage of the review not targeted) taxa. Thus, while the formal descriptions, nomenclature, geographical distributions, and (with some reservations) ***within group*** phylogenetical reconstructions published in **Parts I-VIII** may be considered as approaching the "state of art", the delimitation of circles and relations ***between*** them have at the very best the value of preliminary working hypotheses, the more so that, as my concepts of the validity and content of particular circles changed in course of the work, (and thus the classification and evolutionary relations suggested in later **Parts** of the **Review** are not always fully congruent with those proposed in earlier ones!), the there established groupings were evidently unsuitable to be automatically applied as units of final classification and phylogenetic reconstructions. Moreover, as a fully convinced follower (*cf. e.g.* HOŁYŃSKI 2005, 2010 for justification) of the synthetic (as opposed to cladistic) taxonomy, in delimiting the circles I did not differentiate between holo- and paraphyly; this is perfectly acceptable – indeed, the only correct – approach in synthetic classification, but may introduce some interpretational problems in the results of phylogenetic analysis which, therefore, should preferably be based on holophyletic groups! In this situation, several additional partial analyses, each including all the [sub-]species of a not assuredly holophyletic circle and its potential (based on both "intuitive" evaluation and earlier phylogenetic reconstructions) closest relative[-s] must have been preliminarily performed, and the careful comparison of the obtained cladograms (*Cyphogastra* 9a-9j – not shown) between themselves and with those presented in **Parts I-VIII** had resulted in the demarcation of 50 (some of them monotypic) consistently holophyletic groups whose concise characterization and then mutual relationships I am attempting to clarify in the hereby presented last, **IX part** of the **Review**.

Conventions

Like in my other publications (unless "corrected" by editors...), I follow the very useful conventions of applying (of course, except wordly citations, where the original form must be retained) SMALL CAPS to ***all*** [irrespective of context (main text, taxon author name, reference list, *&c.*) and full *vs.* abbreviated version: inconsistent use deprives the display of any sense!] personal FAMILY- (***not*** given-) names, *italicizing* species- and genus-group names (as well as citations and words in languages different from that of the main text), and writing the suprageneric taxon-names in **Bold** [the latter is not a generally accepted custom, but is often important, as some of such names (*e.g.* of the subtribes **Buprestina LEACH**, **Melobasina BÍLÝ** or **Coraebina BED.**) are (or may easily become) "homonymous" (but valid!) with [sub-]generic ones (*Buprestina* OBB., *Melobasina* KERR., *Coraebina* KERR.)]

Italicized names without authors or other determinants (*Collarti*, *Bicolor* *&c.*) denote operational terminal groups [as contrasted with particular formal taxa (*sg. Guamia* THY., *C. collarti* DESC.) or circles (*Bicolor*-c.)]; bold-face and colour (***Hivaia***, ***Bruyni*** *&c.*) signalize that discussed is just the taxonomic position of the denoted group].

As usual, my phylogenetic reconstruction has been performed with MICSEQ – see HOŁYŃSKI (2001a) for the general outline of the algorithm with presentation and justification of basic assumptions, and HOŁYŃSKI (2016) for the present state of its development and discussion of some aspects of the procedure.

Operational (holophyletic) terminal groups

Pleiona DEYR.

Included [sub-]species: *P.tayauti* (GUÉR.).
Geographical distribution: Marquesas: Hiva Oa, Nuku Hiva.

Hivaia HOŁ.

Included [sub-]species: *C. (H.) taitina* KERR., *C. (H.) similis* KERR.
Geographical distribution: Marquesas: Fatu Hiva, Ua Pou, Nuku Hiva.

Guamia THY.

Included [sub-]species: *C. (G.) auripennis* SND., *C. (G.) latro* KERR., *C. (G.) longueti* THY.
Geographical distribution: Marianas: Guam, Rota, Saipan.

Tinianica-gr.

Included [sub-]species: *C. tinianica* KUR.
Geographical distribution: Marianas: Tinian.

Armata-gr.

Included [sub-]species: *C. longicauda* THY., *C. wollastoni* THY., *C. armata* THY., *C. stephensae* BMY., *C. ludmilae* HOŁ., *C. mosyakini* HOŁ.

Geographical distribution: W-New Guinea: Snow Mts., Arfak Mts.

Uxorismeae-gr.

Included [sub-]species: *C. uxorismeae* HOŁ.

Geographical distribution: N-New Guinea: Bulolo/Watut and lowest Markham valleys.

Bruyni-gr.

Included [sub-]species: *C. wallacei* THY., *C. fruhstorferi* NFR., *C. sulcicollis* KERR., *C. dissimilis* KERR., *C. intae* HOŁ., *C. bruyni* LSB., *C. nigra* KERR., *C. atramentaria* KERR.

Geographical distribution: N-Moluccas, N-New Guinea betwen Geelvink and Astrolabe Bays.

Gigantica-gr.

Included [sub-]species: *C. gigantica* OBB.

Geographical distribution: Key Is.

Flavimana-gr.

Included [sub-]species: *C. flavimana* LSB., *C. solorensis* THY., *C. detecta* HOŁ.

Geographical distribution: Lesser Sunda Is.

Tuberculata-gr.

Included [sub-]species: *C. tuberculata* THS.

Geographical distribution: New Hebrides: Aneityum.

Jadwiszczaki-gr.

Included [sub-]species: *C. jadwiszczaki* HOŁ.

Geographical distribution: SE-New Guinea: vicinities of Port Moresby.

Mincik-gr.

Included [sub-]species: *C. mincik* HOŁ., *C. misimana* HOŁ.

Geographical distribution: Louisiade Is.

Woodlarkiana-gr.

Included [sub-]species: *C. atroazurea* HOŁ., *C. punctatissima* KERR., *C. personata* HOŁ., *C. woodlarkiana* MTR., *C. montrouzieri* THY.

Geographical distribution: N-New Guinea: Karkar I., Huon Pen.; Woodlark Is., Louisiades.

Nigripennis-gr.

Included [sub-]species: *C. nigripennis* DEYR., *C. aeripennis* KIRSCH, *C. celebensis* KERR.

Geographical distribution: S-Moluccas: Buru I., Amboina; ?Celebes.

Cribrata-gr.

Included [sub-]species: *C. kubaryi* HOŁ., *C. cribrata* KIRSCH, *C. alicunde* HOŁ., *C. rudior* HOŁ.

Geographical distribution: Wangiwangi I. (off SE-Celebes), S-Moluccas: Matabello (=Watubela) Is., Mandioli I.; Karel I.

Remarks: Originally (HOŁYŃSKI 2025), having been unsuccessful in searching for “Karel” and “Mandioli” islands, I suggested the possibility of the former having something to do with Karel Satsuitubun Airport in Tual (Kai Is.) and the latter being misspelled Mangole I. (Sula Is.). However, Vincent DUCHATEAU (pers. inf.) made me aware of the real existence of minute islet Karel [off the SW-shore of Supiori (W-Biak I.): $0^0$49’S-$135^0$29’E] and somewhat larger Mandiole I. [E of Batjan I.: $0^0$37’-$0^0$48’S; $127^0$08’-$127^0$19’E.]. Unfortunately, both identifications look suspect: member (*C. alicunde* HOŁ.) of the *Cribrata*-gr. (whose all other known representatives live W of the Lydekker Line) inhabiting a widely remote minute islet of the Papuan region, looks biogeographically improbable, while the native existence of two similar and rather closely related large buprestids [*C. rudior* HOŁ. and (see below) *C. aerata* HOŁ.] on also remote and but slightly larger piece of land does not seem much more likely...

Rothschildi-gr.

Included [sub-]species: *C. rothschildi* KERR., *C. wetteriana* KERR.

Geographical distribution: Lesser Sundas: Wetar I.

Herculeana-gr.

Included [sub-]species: *C. herculeana* OBB.
Geographical distribution: Key Is.

Javanica-gr.

Included [sub-]species: *C. angulicollis* DEYR., *C. javanica* SND., *C. calepyga* (THS.), *C. strandi* OBB., *C. staudingeri* KERR.
Geographical distribution: Key Is., Aru Is., Tanimbar Is., Dammar I.

Aerata-gr.

Included [sub-]species: *C. aerata* HOŁ.
Geographical distribution: Mandioli I.
Remarks: See remarks on that island above (*Cribrata*-gr.)!

Rollei-gr.

Included [sub-]species: *C. rollei* THY.
Geographical distribution: Lesser Sundas: Moa and Leti I.

Incolans-gr.

Included [sub-]species: *C. incolans* HOŁ., *C. duchateaui* HOŁ.
Geographical distribution: Two widely disjunct and not convincingly reliable localities: W-New Guinea: Bomberai Pen: Fakfak and W-Borneo: Mt. Bawang.

Gestroi-gr.

Included [sub-]species: *C. haidanae* THY., *C. gestroi* THS.
Geographical distribution: E-New Guinea.

Pistor-gr.

Included [sub-]species: *C. pistor* (C.G.), *C. vulnerata* THY., *C. quadrivittata* CART., *C. insolens* HOŁ.
Geographical distribution: N-Australia from SE-Queensland through Northern Territories to Dampier Land.

Canaliculata-gr.

Included [sub-]species: *C. kerremansi* THY., *C. franki* HOŁ., *C. conjungens* HOŁ., *C. sekerkai* HOŁ., *C. canaliculata* THY., *C. inconscita* HOŁ., *C. websteri* HOŁ., *C. hoschecki* HOŁ., *C. biroi* HOŁ., *C. exul* HOŁ.
Geographical distribution: New Guinea and surrounding islands from Waigeo and Aru to New Ireland and Louisiades.

Collarti-gr.

Included [sub-]species: *C. collarti* DESC.
Geographical distribution: Timor I.

Modesta-gr.

Included [sub-]species: *C. loriai* THY., *C. modesta* GST.
Geographical distribution: Two localities widely disjunct between NW- and SE-New Guinea: Mafor I. (Geelvink Bay) and mouth of Purari Riv. (Gulf of Papua).

Atroviridis-gr.

Included [sub-]species: *C. atropurpurea* HOŁ., *C. atroviridis* HOŁ.
Geographical distribution: New Guinea: S-Highlands Pr. and unknown.

Mniszechi-gr.

Included [sub-]species: *C. westcotti* HOŁ., *C. takeshii* HOŁ., *C. mniszechi* DEYR., *C. pratti* HOŁ.
Geographical distribution: S-Moluccas: (Buru, Amboina, Ceram); New Guinea: (?Arfak Mts., Snow Mts., Morobe Pr.: Tekadu.

Bicolor-gr.

Included [sub-]species: *C. cognita* HOŁ., *C. bicolor* WATH., *C. acuminicauda* HOŁ., *C. caudata* LSB.
Geographical distribution: New Guinea highlands.

Friendorum-gr.

Included [sub-]species: *C. incongruens* HOŁ., *C. friendorum* HOŁ.
Geographical distribution: New Guinea: S-Morobe and mid-Central Pr.

Radwanskae-gr.

Included [sub-]species: *C. oculata* HOŁ., *C. radwanskae* HOŁ.

Geographical distribution: New Guinea: Morobe and E-Highlands Pr.

Albertisi-gr.

Included [sub-]species: *C. coriacea* KERR., *C. pisciformis* DEYR., *C. geelvinkiana* GST., *C. flavitarsis* GST., *C. nitida* KERR., *C. aereiventris* KERR., *C. violaceiventris* KERR., *C. albertisi* GST., *C. malinowskii* HOŁ.

Geographical distribution: N- and SE-New Guinea and surrounding islands from Waigeo to Trobriands.

Viridis-gr.

Included [sub-]species: *C. viridis* KERR., *C. nearnsi* HOŁ., *C. maura* HOŁ.

Geographical distribution: N-Moluccas: Gébé I.; N-New Guinea: Madang and Morobe Pr.

Gloriosa-gr.

Included [sub-]species: *C. gloriosa* GST., *C. arcuaticollis* KERR., *C. bennigseni* KERR., *C. aenigma* HOŁ., *C. jordani* THY., *C. abdominalis* WATH., *C. praeclara* KERR., *C. theryi* HOŁ., *C. malaitae* HOŁ., *C. popei* HOŁ., *C. granulosissima* THY., *C. cristovallensis* (MTR.), *C. santaecrucis* KERR.

Geographical distribution: Biak, Mafor [?and Roon] islands, ?New Guinea (Madang and Northern Pr.), Bismarck Arch. from New Britain to Hermit Is., Solomons.

Satrapa-gr.

Included [sub-]species: *C. pilsudskii* HOŁ., *C. carbonaria* THY., *C. satrapa* (SCHH.), *C. obiensis* THY., *C. augustini* THY., *C. sulana* HOŁ., *C. minahassae* HOŁ.

Geographical distribution: N-Moluccas, Celebes.

Semipurpurea-gr.

Included [sub-]species: *C. romanensis* THY., *C. semipurpurea* (C.G.), *C. plana* HOŁ., *C. transmarina* HOŁ.

Geographical distribution: Lesser Sundas (Timor, Pantar, Roma Is.); Tomia I. off SE-Celebes.

Lateralis-gr.

Included [sub-]species: *C. lateralis* KERR.

Geographical distribution: Lesser Sundas: Alor I.

Petrillarum-gr.

Included [sub-]species: *C. petrillarum* HOŁ.

Geographical distribution: New Guinea: Huon Pen.

Impressa-gr.

Included [sub-]species: *C. impressa* KERR., *C. borneensis* KERR.

Geographical distribution: Malay Arch. from Borneo and Java [?Sumatra] to Alor.

Invictis-gr.

Included [sub-]species: *C. ralskii* HOŁ., *C. invictis* HOŁ.

Geographical distribution: N. Guinea: Jobi (Yapen) I., Jayapura.

Lansbergei-gr.

Included [sub-]species: *C. lansbergei* THS., *C. alorensis* KERR.

Geographical distribution: Lesser Sundas: Timor, Flores, Adonara, Alor.

Farinosa-gr.

Included [sub-]species: *C. venerea* THS., *C. farinosa* (F.), *C. macfarlani* WATH., *C. papuigena* OBB.

Geographical distribution: Vogelkop Pen., Aru Is., New Guinea S of the main watershed, W-coasts of Queensland and ?northernmost NSWales.

Ventricosa-gr.

Included [sub-]species: *C. domeykoi* HOŁ., *C. esignata* HOŁ., *C. ventricosa* (OL.), *C. impressipennis* GST., *C. sulcipennis* GST., *C. foveolata* DEYR.

Geographical distribution: W-New Guinea, Gébé I.

Bellamyi-gr.

Included [sub-]species: *C. bellamyi* HOŁ., *C. cupreofossa* KERR.

Geographical distribution: N-coast of New Guinea between Humboldt and Astrolabe Bays; Hindenburg Range SW from uppermost Sepik Vy.

Nigerrima-gr.

Included [sub-]species: *C. nigerrima* Hoł., *C. aterrima* Kerr.

Geographical distribution: New Guinea: Chimbu, E-Highlands, SE-Morobe and Central Provinces.

Aureoatra-gr.

Included [sub-]species: *C. aureoatra* Hoł.

Geographical distribution: W-New Guinea: env. of lake Jamur.

Cyaniceps-gr.

Included [sub-]species: *C. cyaniceps* Kerr.

Geographical distribution: Highlands of N-New Guinea: Torricelli, Adalbert, Bismarck, Finisterre, Saruwaged Mts.

Snowensis-gr.

Included [sub-]species: *C. snowensis* Ths.

Geographical distribution: W-New Guinea: Snow Mts.

Obloquens-gr.

Included [sub-]species: *C. obloquens* Hoł., *C. melaneza* Hoł.

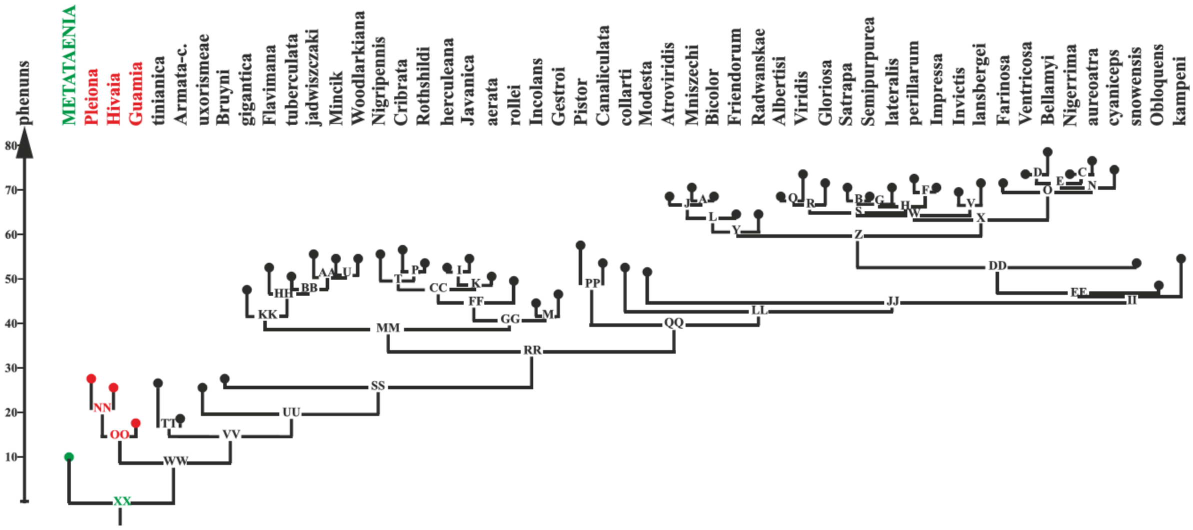
Geographical distribution: N. Ireland I.

Kampeni-gr.

Included [sub-]species: *C. kampeni* Thy.

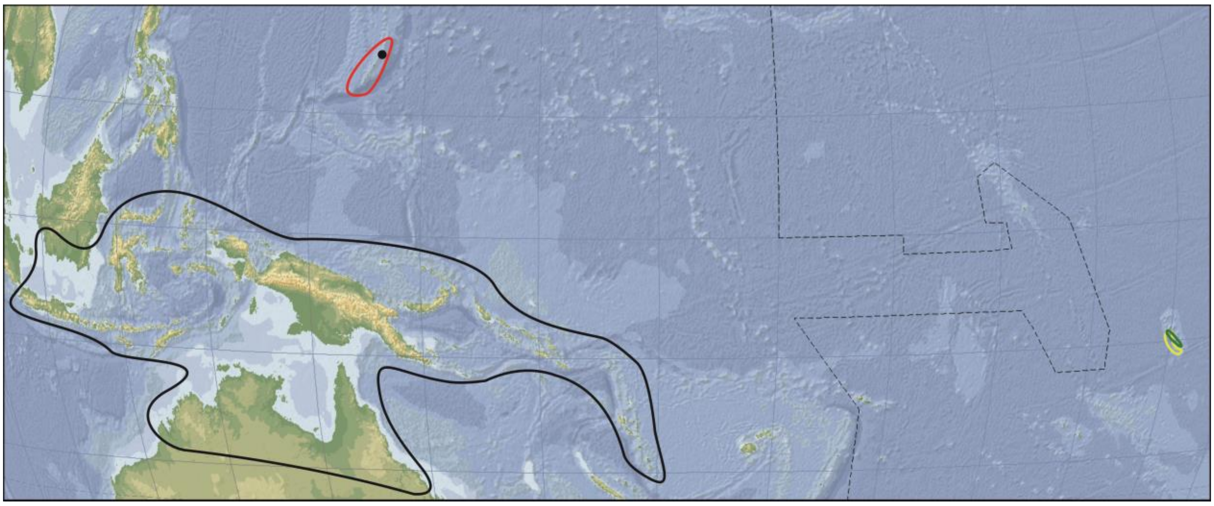
Geographical distribution: N. Guinea: Cyclops Mts.

Phylogeny, classification and biogeography



The cladogram (see above), showing the presumed phylogenetic relationships between the apparently holophyletic terminal groups listed above, has served as the main – but of course not dogmatically exclusive – base for the systematic conclusions presented below: external (morphological, biogeographical, ecological *&c.*) evidence, results of previous (published in **Parts I-VIII** of the **Review** as well as clarifying – p. introduction – 9a-9j) phylogenetic reconstructions have also been taken into account what might (and often did) have resulted in modification or even falsification of, and – consequently – partly or entirely incongruent with, the here suggested affinities. Nevertheless, even despite so many-sided evaluation of possibly all available evidence, the results are still by far not always satisfactorily well supported, mostly because of the notorious problems frequently mentioned in my – and not only my – publications: scarcity of adequate, geographically representative, reliably labelled material and almost total lack of serious α-taxonomic and faunistic research...

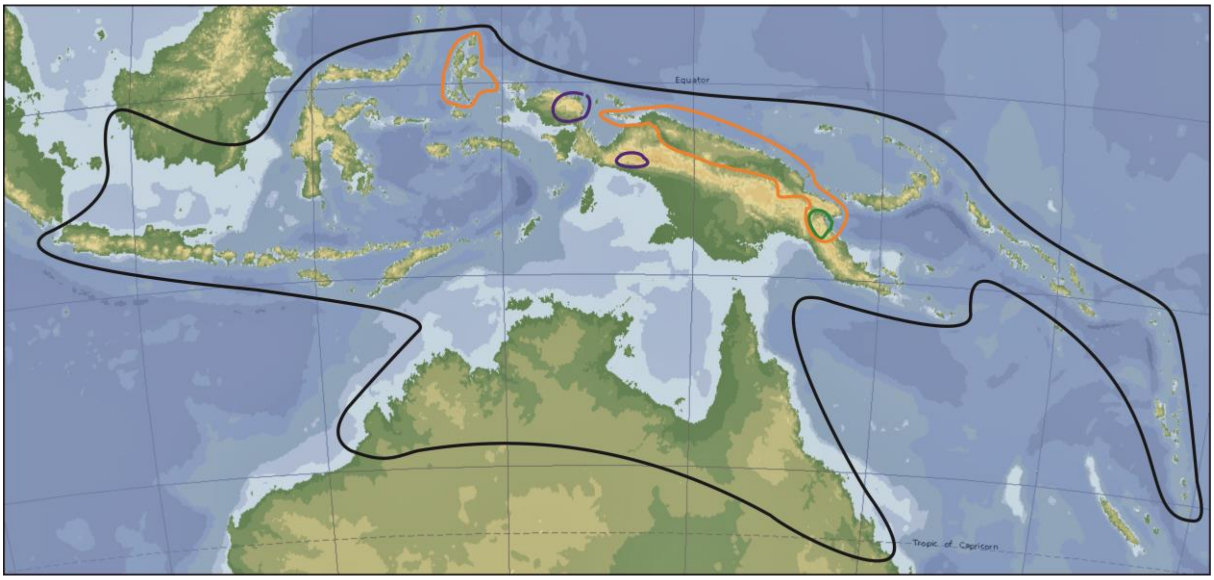
With but two exceptions (**Part I** and 9a) ***Pleiona+Hivaia+Guamia*** appear as a holophyletic (or, exceptionally, paraphyletic to *Tinianica* and/or *Uxorismeae*) clade, "sister" (or "daughter" of basalmost ancestors) of *Cyphogastra* DEYR. *s.str.* – the conclusion fully congruent with the generally accepted [sub-]generic rank[-s] and expectations based on geographical pattern [*cf.* **Part I** (: 89) for the hypothetical evolutionary history and possible ways of invasion of Mariana and – especially – hopelessly remote Marquesas Islands!]. *Pleiona* DEYR., despite close superficial similarity to *Hivaia* HOŁ., fully deserves its generic rank: the main differences consist just in loss of the most striking, almost uniquely peculiar characteristics of *Cyphogastra* DEYR.! ***Pleiona*** almost invariably appears as "sister" or "daughter" group of ***Hivaia*** [in both cases rendering *Cyphogastra* DEYR. paraphyletic]; its evolution – after invasion of *Cyphogastra* DEYR. onto Marquesas – might have followed one of two conceivable scenarios: besides that outlined in **Part I** (**a**: ***allopatric*** differentiation on Hiva Oa predating ***secondary*** sympatry on Nuku Hiva – here the main weakness is the difficulty in explaining the factor[-s] prompting to so drastic morphological "revolution" in apparent absence of serious competitors: transfer to a different host plant does not seem either sufficient or adequate!), a somewhat "unorthodox" hypothesis of **b**: ***sympatric*** speciation (with rapid competitive ecological [host plant] and morphological differentiation) on Nuku Hiva with ***subsequent*** invasion of Hiva Oa may be considered. In this instance the critical problem is the notorious paradox inherent in any suggested case of sympatric speciation: the need to rapidly – within one or few generations – develop effective reproductive isolation in the absence of external obstacles preventing gene flow [here the critical initial step might have been just the abrupt adaptation to radically different (**Rosales: Urticaceae** *vs.* **Myrtales: Combretaceae**) host plant].



Map 1

Geographical distribution of the *[Cyphogastra]*-supergenus
— *Pleiona* DEYR.; —,● *Cyphogastra s.str.* [● *C. (s.str.) tinianica* KUR.]; — *C. (Hivaia* HOŁ.*)*;
— *C. (Guamia* THY.*)*

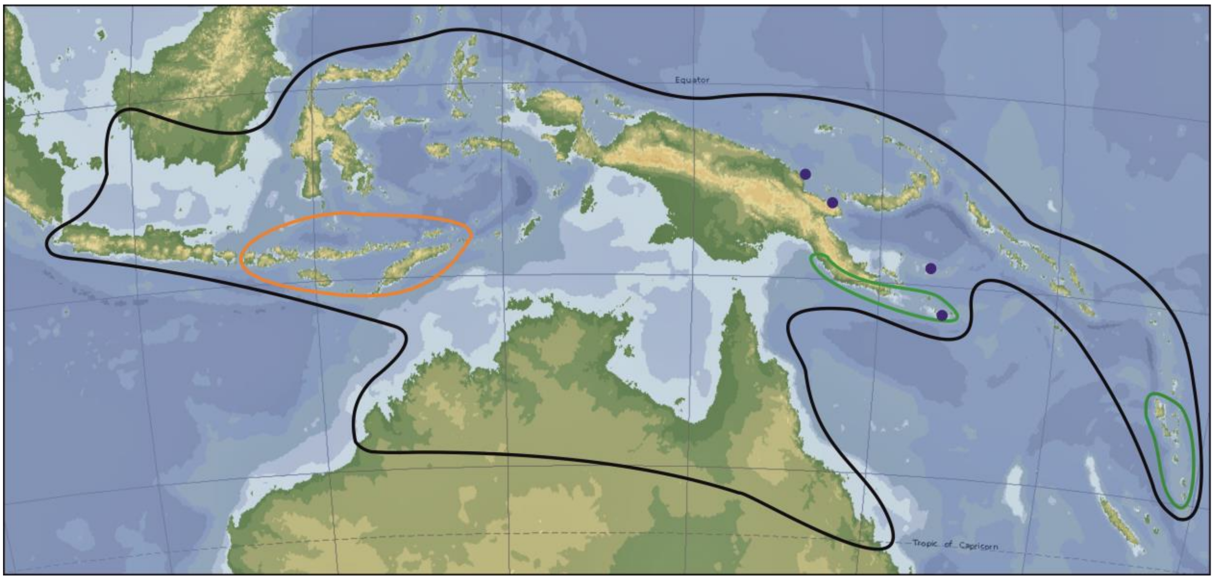
The affinities of ***Tinianica*** appear in almost any analysis differently, typically with very poor support, so all of them – including the relatively often suggested "sister" relation to ***Armata*** or ***Uxorismeae*** must be treated as doubtful, based on a kind of long branch attraction: being but remotely related to each other and to all other group, accidental superficial convergences decide which of them appears as "the closest". On the other hand, the great evolutionary distances from the suggested relatives and ancestors point to *Tinianica*, *Armata*, *Uxorismeae* or even ***Bruyni*** (whose cladistic affinity to *Armata* and/or *Uxorismeae* may indeed prove nevertheless real) as ancient lineages, close to the roots of the *Cyphogastra* Deyr. *s.str*. evolution, with *Tinianica* might, perhaps, have invaded the chain of Mariana Is. – contrary to what I suggested in **Part I** – ***before*** the ancestors of *Guamia* Thy. (being then successively outcompeted by them on southern islands). Anyway, all these groups must be classified as separate circles.



Map 2

Geographical distribution of the *Uxorismeae*-, *Armata*- and *Bruyni*-circles
— *Uxorismeae*-c.; — *Armata*-c.; — *Bruyni*-c.
Here and on the following maps: — entire [without *C. (s.str.) tinianica* Kur.] area of sg. *Cyphogastra s.str.*

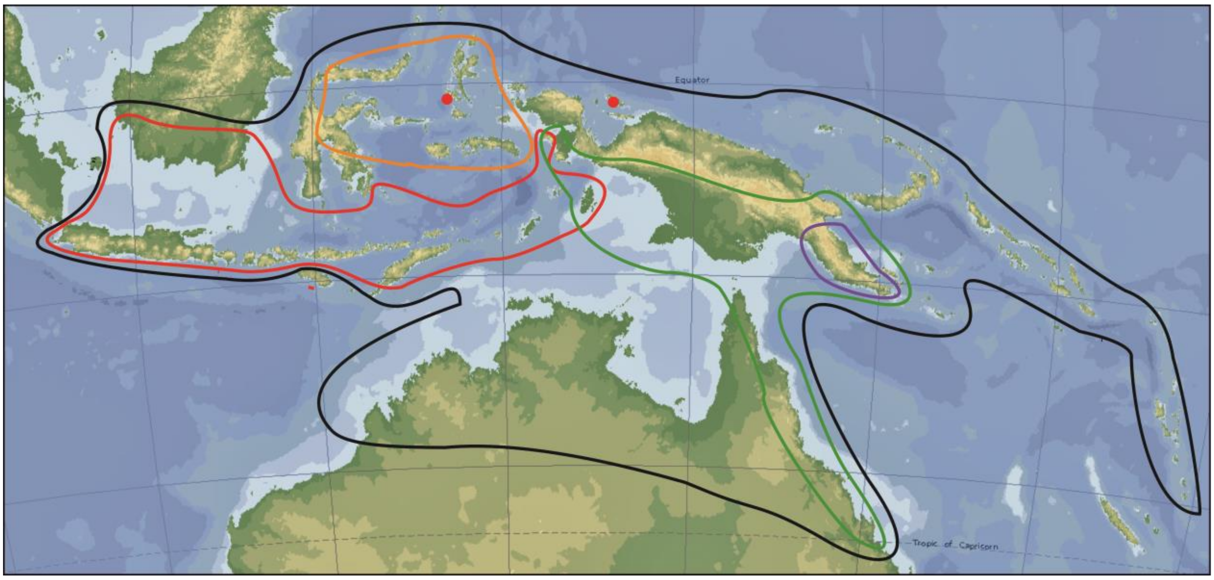
The evolutionary relationships of ***Gigantica*** remain uncertain: in phylogenetic analyses it appears sometimes as close to *Javanica*, sometimes to *Gloriosa* or *Herculeana*, but often far from any; evaluation of available morphological and distributional data convincingly



Map 3

Geographical distribution of the *Flavimana*-, *Tuberculata*- and *Woodlarkiana*-circles
— *Flavimana*-c.; — *Tuberculata*-c.; ● *Woodlarkiana*-c.

suggests that ***a)*** *C. herculeana* Obb. is but a variety of *C. gigantica* Obb., and ***b)*** *Gigantica* is a subgroup of the *Javanica*-circle. Affinities of ***Flavimana*** – are also enigmatic: some similarities to *Armata* on the one hand and *Tuberculata*/*Jadwiszczaki*/*Mincik* on the other may – as suggested *e.g.* by geographical isolation – or may not be based on but superficial convergences. ***Tuberculata***, ***Jadwiszczaki*** and ***Mincik*** seem indeed closely related, but their affinity to ***Woodlarkiana*** – even if conceivable – looks nevertheless much less likely than relations of the latter to *Gloriosa* as suggested by **Part VIII**.



Map 4

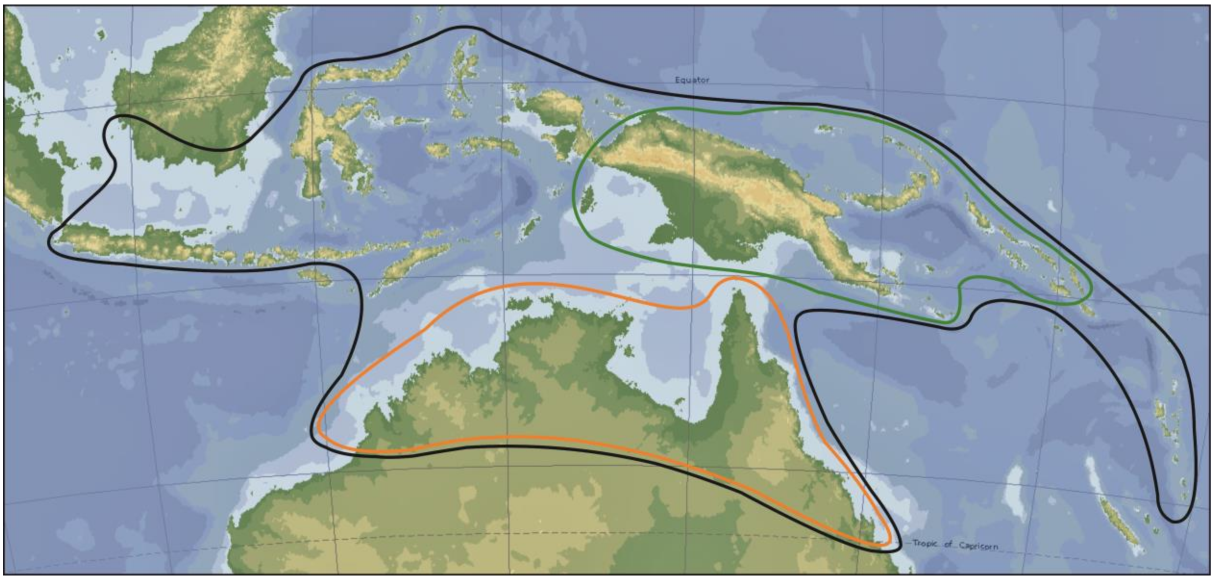
Geographical distribution of the *Satrapa*-, *Javanica*-, *Gestroi*- and *Farinosa*-circles

— *Satrapa*-c.; —, ● *Javanica*-c.; — *Gestroi*-c.; — *Farinosa*-c.

The groups from *Nigripennis* to *Gestroi*, appearing on our cladogram as a clade [astoundingly missing one very important member: *Satrapa*, which ***Nigripennis*** is evidently (based on both intuitive evaluation and previous analyses) a somewhat aberrant subgroup of], seem indeed loosely but really related. The relations within this group (as suggested by the cladogram) do not look convincing: ***Cribrata*** and ***Rothshildi*** are certainly closer to ***Javanica*** that to each other, the same is apparently true of ***Incolans*** and ***Gestroi*** [the latter being too distinct morphologically and too remote geographically to be simply included in the *Javanica*-circle]; the positions of ***Herculeana*** (*i.e.* in fact *Gigantica* – see above!), ***Aerata*** and ***Rollei*** do not raise serious doubts.

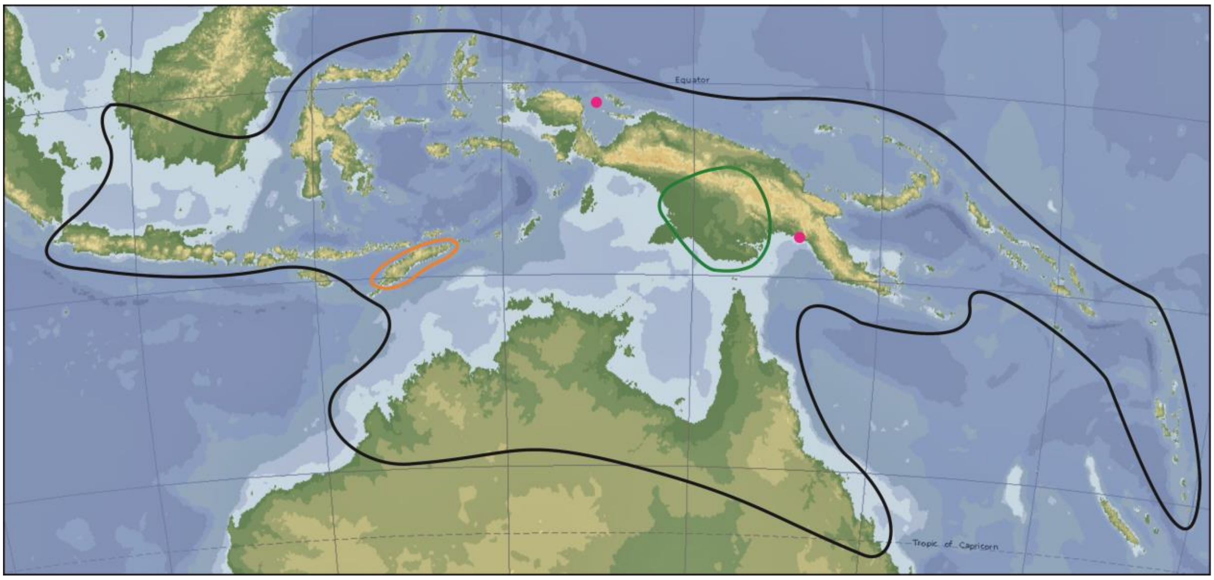
Although intuitively the suggested close affinity between ***Pistor*** and ***Canaliculata*** – both themselves very compact but highly distinctive groups, unquestionably deserving the rank of separate circles – seems rather odd and unlikely, it has been more or less convincingly supported by some earlier analyses; such support might or might not be misleading (based on some accidental convergences), but for the moment no better justified hypothesis could be seriously proposed.

Collarti is yet another freak with no apparent relatives: the affinity (suggested in **Part III** and 9c) to *Atroviridis* has not been supported by other analyses, and looks rather unlikely in biogeographical context. ***Modesta*** (=*Loriai* on the cladogram), a group of two very poorly known (only from – seen decades ago and now not available to me for examination! –



Map 5
Geographical distribution of the *Canaliculata* and *Pistor*-circles
— *Canaliculata*-c. ; — *Pistor*-c.

holotypes collected on widely disjunct localities at opposed ends of New Guinea) species, is an also apparently ancient lineage, so any hypothesis as to its affinities would be no more than scientific poetry... The placement of ***Atroviridis*** in the *Bicolor*-clade, and especially its suggested close association to the *Mniszechi*/*Bicolor* pair, does not seem justified, either: flat body, fine sculpture, very large pronotal fossa, prominent abdominal plaque, blackish dorsal and metallic ventral colouration, *&c*., make so "exotic" combination that no guess as to its relations seem more likely than any other...

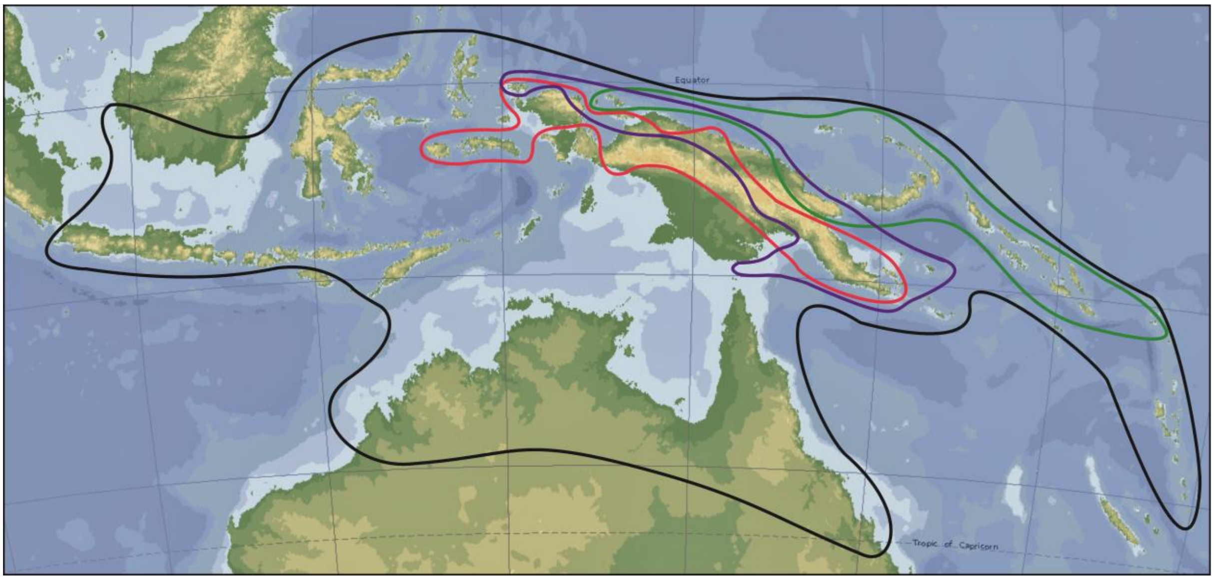


Map 6
Geographical distribution of *Collarti*-, *Atroviridis*- and *Modesta*-circles
— *Collarti*-c.; — *Atroviridis*-c.; ● *Modesta*-c.

The affinity between ***Mniszechi*** and ***Bicolor*** themselves does not raise serious doubts, like their close relation to the other pair of evident kins: ***Friendorum*** and

Radwanskae; this group, rather than *Viridis*, is almost certainly closely related to – albeit distinct at the circle-level from –***Albertisi***.

The affinity of ***Viridis*** to *Gloriosa* cannot be fully dismissed, but the evidence pointing to its close relationship to *Bruyni* seem much more persuasive. ***Gloriosa*** itself is a speciose, well delimited group, probably related to *Albertisi* and/or *Ventricosa*.



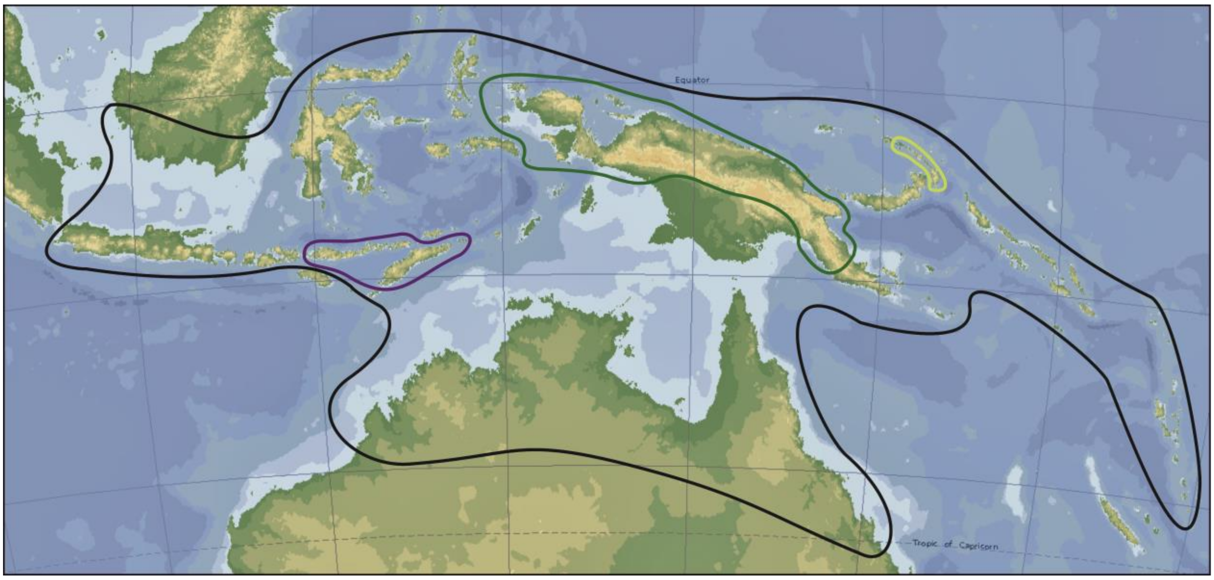
Map 7
Geographical distribution of the *Gloriosa*-, *Albertisi* and *Bicolor*-circles
— *Gloriosa*-c. ; — *Albertisi*-c.; — *Bicolor*-c.
The occurrence of (acclimatized but evidently introduced) *C.abdominalis* Wath. (*Gloriosa*-c.) on Samoa not shown

Satrapa (with its, on the present cladogram evidently misplaced, subgroup *Nigripennis*) may be somewhat related to ***Semipurpurea*** and ***Lateralis***; the latter two seem indeed to make a natural lineage, including also the ***Impressa*** cluster, and apparently related to *Javanica*. ***Invictis*** does not seem to have anything to do with *Lansbergei*, being rather a somewhat aberrant member of *Bicolor*. The affinities of ***Lansbergei*** remain enigmatic.

Farinosa includes four allospecies of a single superspecies, possibly related to *Javanica* or *Semipurpurea*, but sufficiently distinctive to warrant the status of separate circle. The relationships between ***Ventricosa***, ***Bellamyi*** (including ***Kampeni***), ***Nigerrima***, ***Aureoatra*** and ***Cyaniceps*** are apparently correctly shown by the cladogram, but ***Petrillarum*** and ***Snowensis*** (evidently related to the latter three) should also be considered members of this circle. ***Obloquens*** seems to be a relict of another isolated, perhaps relatively ancient lineage.

Thus, the extraordinary distribution area of the supergenus *Cyphogastra* Deyr. consists of three widely disjunct parts: the Marquesas [*Pleiona* Deyr., sg. *Hivaia* Hoł.], Mariana Is. [sg. *Guamia* Thy. and – unexpectedly – *C. (s.str.) tinianica* Kur.], and extensive expanse between Malay Archipelago, Melanesia, and Australia [sg. *Cyphogastra s.str*. except *C. tinianica* Kur.]. The structure and hypothetical origin of the former two have been outlined above, let’s have a closer look at the latter [**Map 9**]!

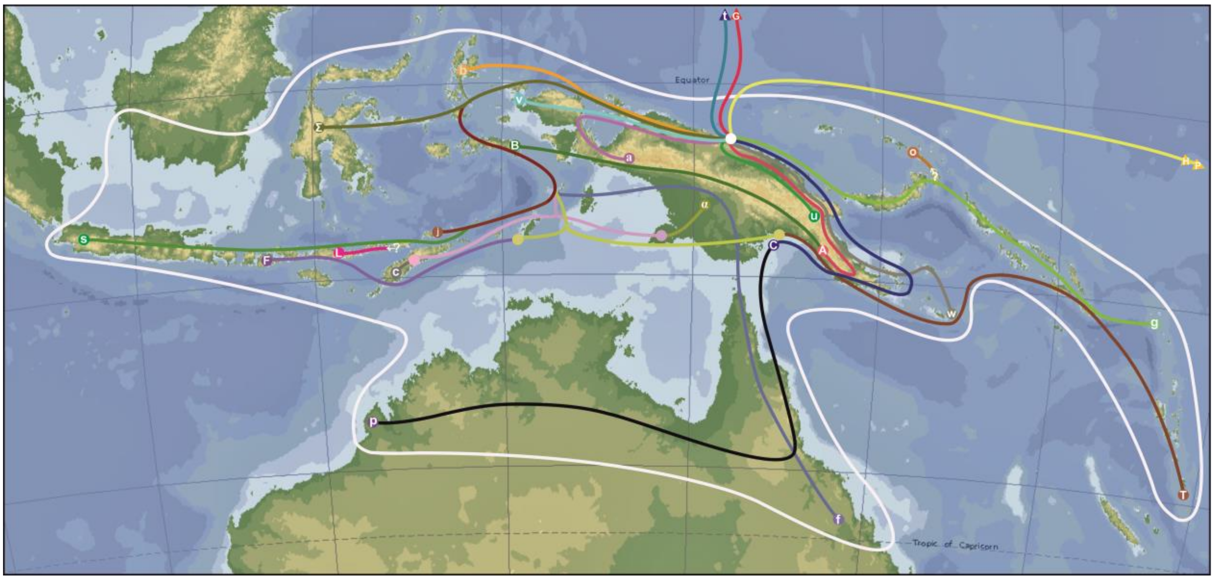
The expression “*between Malay Archipelago ... and Australia*” is somewhat misleading as defining the extremes of *Cyphogastra s.str*. geographical distribution: NW part of Malay Arch. is almost free of *Cyphogastra* Deyr. [except *C. duchateaui* Hoł., known from



Map 8
Geographical distribution of the *Ventricosa*-, *Lansbergei*- and *Obloquens*-circles
🟩 *Ventricosa*-c. ; 🟪 *Lansbergei*-c.; 🟨 *Obloquens*-c.

holotype and one paratype collected allegedly on Mt. Bawang (SW-Borneo), and a poorly differentiated subspecies of *C impressa* Kerr. occurring on Bali, Java, ?Sumatra and ?Borneo ("Sancang" =?Sansang in SE Borneo) apparently no other representative of the genus has crossed the Wallace Line], and only the *Pistor*-circle and one subspecies of *C. farinosa (F.)* are known to inhabit the northern peripheries of Australia. Thus, the range of the "genuine homeland" of the sg. *Cyphogastra s.str.* seems to be better described as "between Wallacea and Solomons".

According to my hypothesis based on the reconstruction of phylogenetic history of the entire subtribe **Chrysochroina Cast.** (Hołyński 1997, 2009) and developed specifically for the supergenus *Cyphogastra* Deyr. in **Part I** (Hołyński 2016 – see also above remarks on *Pleiona* Deyr., *Hivaia* Hoł. and *Guamia* Thy.) the ancestor of the supergenus was some representative of the "*Mroczkowskia*-knot" (Hołyński 1997) showing the characteristics (abdomen swollen but without distinct abdominal plaque, laterobasal pronotal fossae narrow, no dfp sulci on elytra) somewhat intermediate between the recent *Mroczkowskia* Hoł. and *Hivaia* Hoł. It had most likely inhabited the eastern center of origin of Indo-Pacific **Buprestidae** (Hołyński 2001b), the Palaeomelanesia, more exactly its eastern margin, the Melanesian Arc: island chain of changing configuration extending along what is now Bismarck Arch., Solomons, New Hebrides, Fiji and Tonga Is. From there the ancestor of *Pleiona* Deyr. and *Hivaia* Hoł. set out adrift towards Marquesas, and when – towards the end of Oligocene – the western end of the Arc closely approached the southern extreme of Palau-Kyushu-Mariana Ridge, the ancestors of *Guamia* Thy. (followed by – or, perhaps, following? – *C. tinianica* Kur.) took the opportunity to disperse northwards and, at about the same time, terminal terranes began to accrete to the incipient northern New Guinea, allowing *Cyphogastra s.str.* to invade the island which then became the center of its diversity and distribution. Critics of the more detailled discussion (see **Part I**) of these early steps of the supergenus evolution, especially the hypotesis attempting to explain the mysterious, *ca.* 7000 km. long, "jump" of the ancestor of *Pleiona* Deyr. and *Hivaia* Hoł. over Pacific Ocean to Marquesas, point out that at that time (*ca.* 25-20 m.y.a.) the configuration of lands and – especially – the directions of oceanic currents were certainly different than now, so the reference to the Equatorial Counter Current as the “vehicle” is not justified; this objection is in principle right, but ***1)*** at the end of Oligocene the most likely starting point of the journey – northwestern end of the original Melanesian Arc – just met the eastern end of the South Caroline Arc (which thus became its western extension) at *ca.* 10^0S (HALL 2002), and ***2)*** also at that time some eastward currents in equatorial zone must have existed (KROENKE 1996). So, while I agree that the hypothesis presented in **Part I** may be not true in detail, I neverhteless strongly believe that it may be treated as the “model” of most likely explanation of the strange, extraordinarily disjunct, distribution of the *[Cyphogastra]*-supergenus – anyway, for crossing by a beetle (alive and able to reproduce) thousands of kilometers wide stretch of ocean I am unable to imagine any mechanism more conceivable than eggs or larvae floating (deep in the wood) in a tree with some appropriate current...



Map 9

Simplified schematic illustration of the distributional history of the subgenus *Cyphogastra* DEYR. *s.str.*
white line – approximate boundary of the geographical area of the subgenus (except *C. tinianica* KUR.);
coloured lines terminated with triangles – extralimital taxa: genus *Pleiona* DEYR. [**P**], subgenera *Hivaia* HOŁ. [**H**] and *Guamia* THY. [**G**], and *Tinianica*-circle [**t**]
coloured lines terminated with rings – circles: **α** – *Atroviridis*-circle, **a** – *Armata*-c., **A** – *Albertisi*-c., **b** – *Bruyni*-c., **B** – *Bicolor*-c., **c** – *Collarti*-c., **C** – *Canaliculata*-c., **f** – *Farinosa*-c., **F** – *Flavimana*-c., **g** – *Gloriosa*-c., **j** – *Javanica*-c., **L** – *Lansbergei*-c., **o** – *Obloquens*-c., **p** – *Pistor*-c., **s** – *Semipurpurea*-c., **Σ** – *Satrapa*-c., **T** – *Tuberculata*-c., **u** – *Uxorismeae*-c., **v** – *Ventricosa*-c., **W** – *Woodlarkiana*-c.
[*Gestroi*- and *Loriai*-circles not included]

The ex-Melanesian Arc terranes, with the ancestral *Cyphogastra s.str.*, have accreted to form what is now northern part of New Guinea; their collision with the northern edge of Australian plate – the present southern N.Guinea – resulted in the emergence of cloud-capped Central Range, a formidable barrier to dispersal of buprestids; and indeed, the distribution of the majority of New Guinean representatives of *Cyphogastra* DEYR. (at least those whose biogeographic origins and history I am able to more or less justifiably hypothesize...), including those of all presumably ancient circles (*Armata*-, *Uxorismeae*-c.), is restricted to the northern part of the island (*Uxorismeae*-c.), or but marginally evades the Central Range around its western (*Armata*-c.), eastern (*Canaliculata*-, *Albertisi*-, ?*Gestroi*-c.) or both (*Ventricosa*-, ?*Modesta*-c.) ends; also later – westward [to Moluccas: *Bruyni*-c.] or eastward [to Bismarck and Solomon (*Gloriosa*-c.), D’Entrecasteaux and Louisiade (*Woodlarkiana*-c.) Archipelagoes, Australia: (*Pistor*-c.)] – expansions started apparently from northern N.Guinea to reach the southern part only indirectly, having made a circuit round the “head” (Vogelkop

Pen.: →*Satrapa-* →*Javanica-* →*Farinosa*-c.) or “tail” (Papuan Pen.: →*Albertisi-* →*Bicolor*-c.; →*Canaliculata-* →*Pistor*-c.) of the “dragon”. If *Tuberculata*-c. is truly related to *Flavimana*-c., it was probably their common ancestor (descendant of the *Javanica*-c.) which invaded southern New Guinea (and, in the opposite direction, Malay Arch.); similarly might, perhaps, be interpreted the distribution of the pair *Semipurpurea-*/*Farinosa*-c. and (assuming reality of their kinship) *Collarti-*/*Atroviridis*-c. The currently available factual evidence does not make it possible to reconstruct the origins and distribution history of the *Modesta-*, *Gestroi*-c., *Lansbergei-* and *Obloquens*-circles with any reasonable degree of reliability... For more detailed (although not always exactly congruent with that presented above) hypotheses concerning particular circles *cf.* **Parts I-VIII** of the **Review** and maps 1-8 herein.

Acknowledgements

I am greatly indebted to Dr. Lukáš SEKERKA (EONMP), David FRANK and Vincent DUCHATEAU whose friendly cooperation (loans of material, critical comments and explanations) enabled me to make this part of the Review more than simple abbreviated recapitulation of the previously published ones.

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Edited, published and distributed by:
Informal *Uncensored Scientists Group*
c/o Roman B. HOŁYŃSKI
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