



**HAL**  
open science

## Geographic structure of masked stingray in the Indo-Malay-Papua archipelago

Irma S. Arlyza, Philippe Borsa

► **To cite this version:**

Irma S. Arlyza, Philippe Borsa. Geographic structure of masked stingray in the Indo-Malay-Papua archipelago. 2010. ird-00725423v2

**HAL Id: ird-00725423**

**<https://ird.hal.science/ird-00725423v2>**

Submitted on 4 Mar 2013

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Geographic structure of masked stingray in the Indo-Malay-Papua archipelago

Irma S. Arlyza, Philippe Borsa  
(LIPI P2O, Jakarta, Indonesia; IRD-UR 227, Montpellier, France)

The blue-spotted or masked stingray, *Neotrygon kuhlii* (Myliobatiformes: Dasyatidae), is one of the most common elasmobranch species from the Indo-Malay-Papuan waters, where it occurs in reef-associated habitats. For rationally managed exploitation, it is important to acquire fundamental knowledge of its stock structure.

Another issue is the origin of the high marine biodiversity in the Indo-Malay-Papuan archipelago at the core of the Coral Triangle, which is the global epicentre for marine biodiversity (P.H. Barber, J. Biogeogr. 2009). Does speciation occur within the Coral Triangle?

We used the mitochondrial DNA marker to investigate (1) the population geographic structure and (2) the phylogeography of *Neotrygon kuhlii* in the central Indo-West Pacific seas.

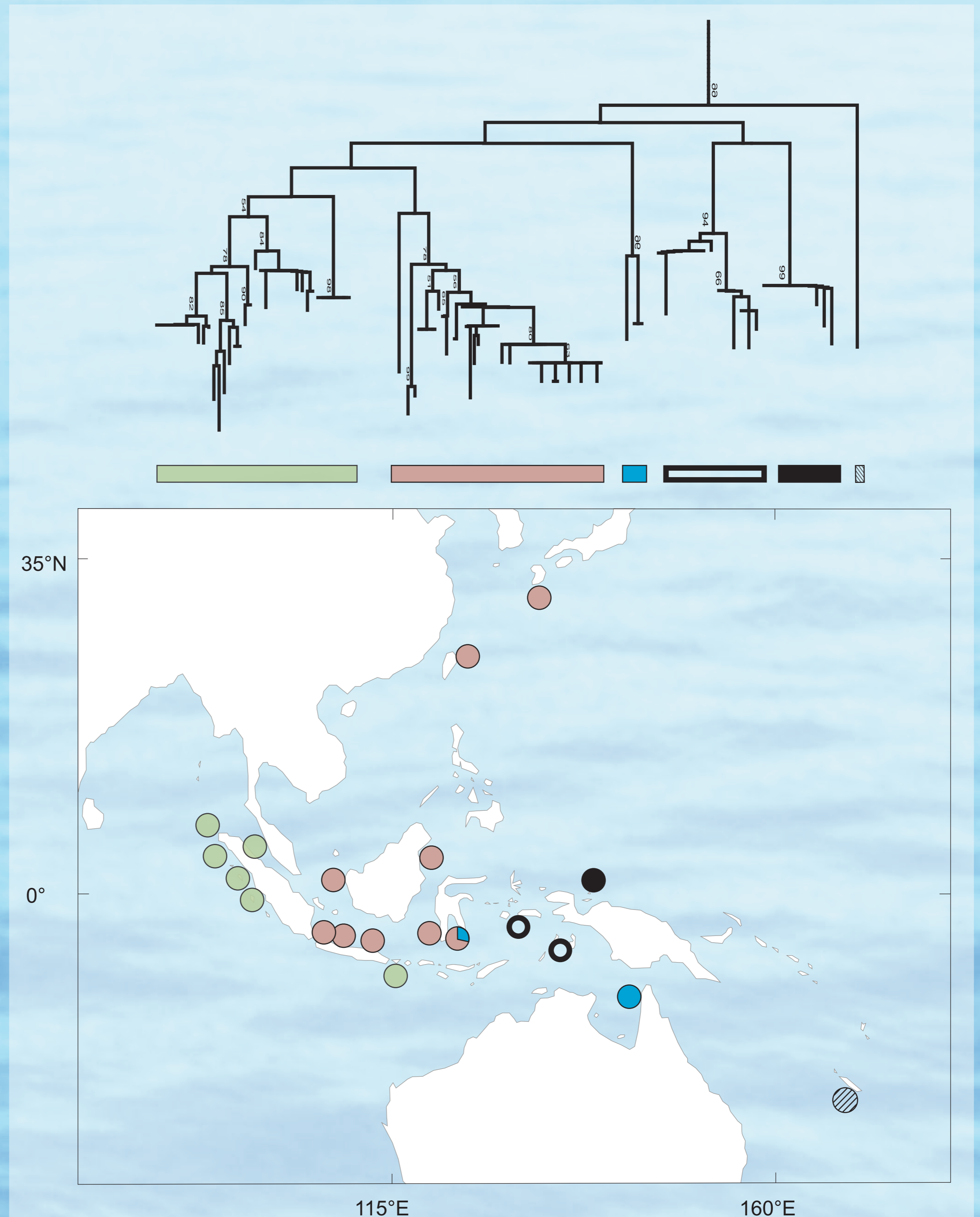
## Methods

*Neotrygon kuhlii* specimens were collected from 21 local fish-landing places throughout Indonesia, in West Papua, and in New Caledonia. Tissue samples of a total  $N = 102$  individuals were collected. The nucleotide sequences of a fragment (611 bp) of the *COX-I* gene were produced. Homologous sequences from GenBank (*Neotrygon kuhlii* from Java, Bali, Taiwan, Japan and Queensland) were added to the dataset. A neighbor-joining tree of haplotypes (Kimura-2 parameter distances) was produced.

## Results

Six deeply divergent lineages were observed. Separate lineages corresponded to separate geographic regions, with no, or very little, overlap. Further geographic partition was evident, with some populations or groups of populations within a region being characterized by private haplogroups.

The topology of the tree suggests that the ancestral form that gave rise to the present-day *Neotrygon kuhlii* populations was in the West Pacific rather than the Coral Triangle. Bootstrap scores were not sufficient yet to provide a watertight support to this hypothesis, which makes increasing the length of the assayed marker our priority.



## Conclusions

Unexpectedly strong geographic composition was uncovered in *Neotrygon kuhlii*. It is sensible to assume that the shallow-benthic habits and the lack of egg and juvenile dispersal enhance geographic isolation in this species.

It has been argued that deeply divergent mitochondrial lineages in *Neotrygon kuhlii* may indicate cryptic species (R.D. Ward et al., Mar. Freshw. Res. 2008). Testing that hypothesis requires the use of nuclear-DNA markers on adequately chosen samples.



Batang T.....G...CG...G.....T.TA..T...G...T.....G.T.CA...T..C..  
 Batang .....C.....CG...G.....T.TA..T.....T.....G.T.CA...T..C..  
 Batang T.....G...CG...G.....T.TA..T...G...T.....G.T.CA...T..C..  
 Paotere .....CG...G...C...T.TA..T.....T...C.....G.T..A...C..  
 Paotere .....CG...G.....T.TA..T.....T.....G.T.CA...T..C..  
 Tarakan .....CG...TG.....T.TA..T.....T...C..A.....G.T.CA...C..  
 Tarakan .....CG...G.....T.TA..T.....T...C.....G.T.CA...C..  
 Tarakan .....CG..T..G.....T.TA..T.....T...C.....G.T.CA...T..C..  
 Tarakan .....CG..T..G.....T.TA..T.....T...C.....G.T.CA...T..C..  
 Tarakan .....CC.....CG...G.....T.TA..T.....T...C.....G.T.CA...C..  
 Tonra .....T.....CGC...G...C...T.TA..T.....T.....G.T..A...C..  
 Tonra .....T.....CGC...G...C...T.TA..T.....T.....G.T..A...C..  
 Tonra .....T.....CGC...G...C...T.TA..T.....T.....G.T..A...C..  
 Tonra .....T.....CGC...G...C...T.TA..T.....T.....G.T..A...C..  
 Tonra .....T.....CGC...G...C...T.TA..T.....T.....G.T..A...C..  
 Sinjai .....T.....T.....G...G.....T.C.....T.....T...G..G.....C..  
 Sinjai .....T.....T.....G...G.....T.C.....T.....T...G..G.....C..  
 Ambon .....T...GAG.....A.....T.C.....T.....T.....C..  
 Ambon .....T...GAG.....A.....T.C.....A..T.....T.....C..  
 Ambon .....T...GAG.....A.....T.C.....T.....C..  
 Ambon .....C.C.....T...GAG.....A.....A..T.C.....T.....C..  
 Ambon .....C.....T...GAG.....A.....CT.C.....T.....T.....C..  
 Ambon .....T...GAG.....A.....T.C.....T.....C..  
 Kei .....C.C.....G..T..G.G.....A.....CTG.....C...T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Kei .....G..T..G.G.....A.....TT.....T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Kei .....G..T..G.G.....A.....TG.....T.....C..  
 Biak .....G..T..A.....G..T...C...G.....A.....G.....C..  
 Biak .....C.....T.....T.G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G..T..A.....G..T...C...G.....G.....C..  
 Biak .....G.....G..T..A.....G..T...C...G.....C.G.....C..  
 Bali .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Bali\* .....GC...G...C...G..TA.....T...G.....C...C..  
 Java\* T.....G...CG...G...C...T.TA..T...G...T.....G.T.CA...T..C..  
 Java\* T.....G...CG...G.....T.TA..T...G...T.....G.T.CA...T..C..  
 Java\* .....C.....CG...G.....T.TA..T.....T.....G.T.CA...T..C..  
 Java\* T.....G...CG...G.....T.TA..T...G...T.....G.T.CA...T..C..  
 Java\* T.....G...CG...G.....T.TA..T...G...T.....C.....G.T.CA...T..C..  
 Penghu\* .....TT.....CG...G.....T.TA..T.....T...C.....T...G.TC...T..C..  
 Penghu\* .....TT.....CG...G.....T.TA..T.....T...C.....T...G.TC...T..C..  
 Penghu\* .....TT.....CG...G.....T.TA..T.....T...C.....T...G.TC...T..C..  
 Queensland\* .....T..T.T.....G...G.....T.C.....T...C.....T...G.TC...T..C..  
 Japan\* .....G.....A...G...G..A...T.TA..TC..G...T.....G.....G.T.....GC..  
 NewCaledonia .....G...CG.....GA.....TA.C.CC...T.T.....C.G.....C...C.C

---