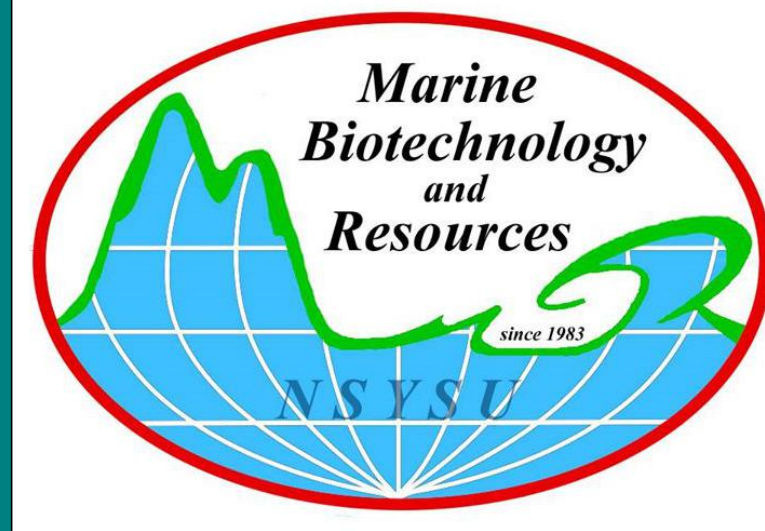


Biogeographic Influence of the North Equatorial Current Bifurcation on the Population Structure of *Selaroides leptolepis* (Perciformes: Carangidae) in the Tropical Western Pacific

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ABSTRACT

The North Equatorial Current (NEC) is a westward flowing current from the Pacific. It bifurcates between the 11° and 17°N latitude upon reaching the eastern Philippine seaboard. This diverging event is hypothesized as a determinant of a north-south geographic differentiation of marine organisms by influencing larval dispersal and gene flow. In this study, we want to test such hypothesis on a commercially important fish taxa - the *Selaroides leptolepis*. Our work intends to apply the cutting edge advantage of next generation sequencing technology, through Single Nucleotide Polymorphism (SNP) analyses, in inferring the species' genetic structuring in the tropical western Pacific. We also propose to develop and study their novel microsatellite markers as it prove to be effective tools in detecting fine-scale population structures. Moreover, we plan to integrate studying morphometric variability in the *S. leptolepis* populations to reveal possible differences expressed in morphology. This research can help us infer how the NEC divergence influences inshore fish population structures in the area. Most importantly, it allows us to understand the evolutionary adaptation, demographic history, and population connectivity of this economically-valuable yet understudied fish taxon..

RATIONALE

The bifurcation of the prevailing NEC along Luzon Island, Philippines creates the two western boundary currents: Kuroshio and Mindanao currents. Studies indicate this divergence's influence on the structuring of *Siganus fuscescens* [1,2] and *Tridacna crocea* [3]. However, there is still shortage of information on how it influences distribution of other marine taxa—especially on small epipelagic fishes. Adding to the limited knowledge, the spatial extent of such influence is not clearly delineated. In here, we propose to look deeper into this plausible association using a genome-wide approach. We put our attention into an understudied fish taxon from the region—the *Selaroides leptolepis* (Cuvier, 1833). Initial findings [4] previously indicated the presence of at least two haplogroups in Central Philippines based on mtCO1 gene sequences. However, inference was inadequate due to the limited spatial scale being studied. There is a need to conduct extensive investigation of the taxon, using more robust approach, alongside extended locations of the NEC divergence boundaries.

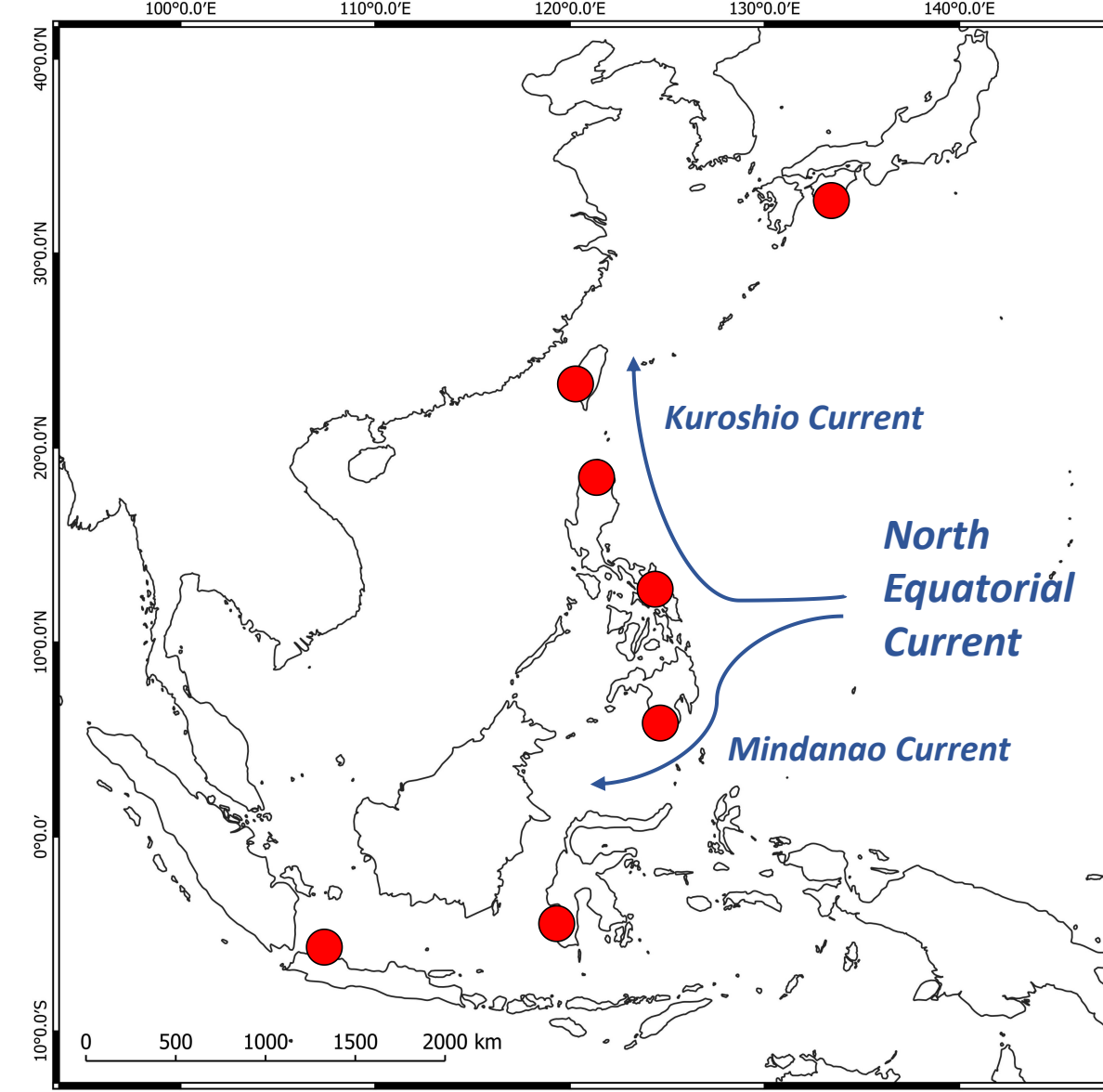
METHODOLOGY



The *Selaroides leptolepis* is commonly known as 'yellowstripe scad' or 金帶細鯵. This species is intensively exploited in Malaysia, United Arab Emirates, Australia, and Philippines (FAO 2018).

The *S. leptolepis* can be morphologically discerned from other carangids by:

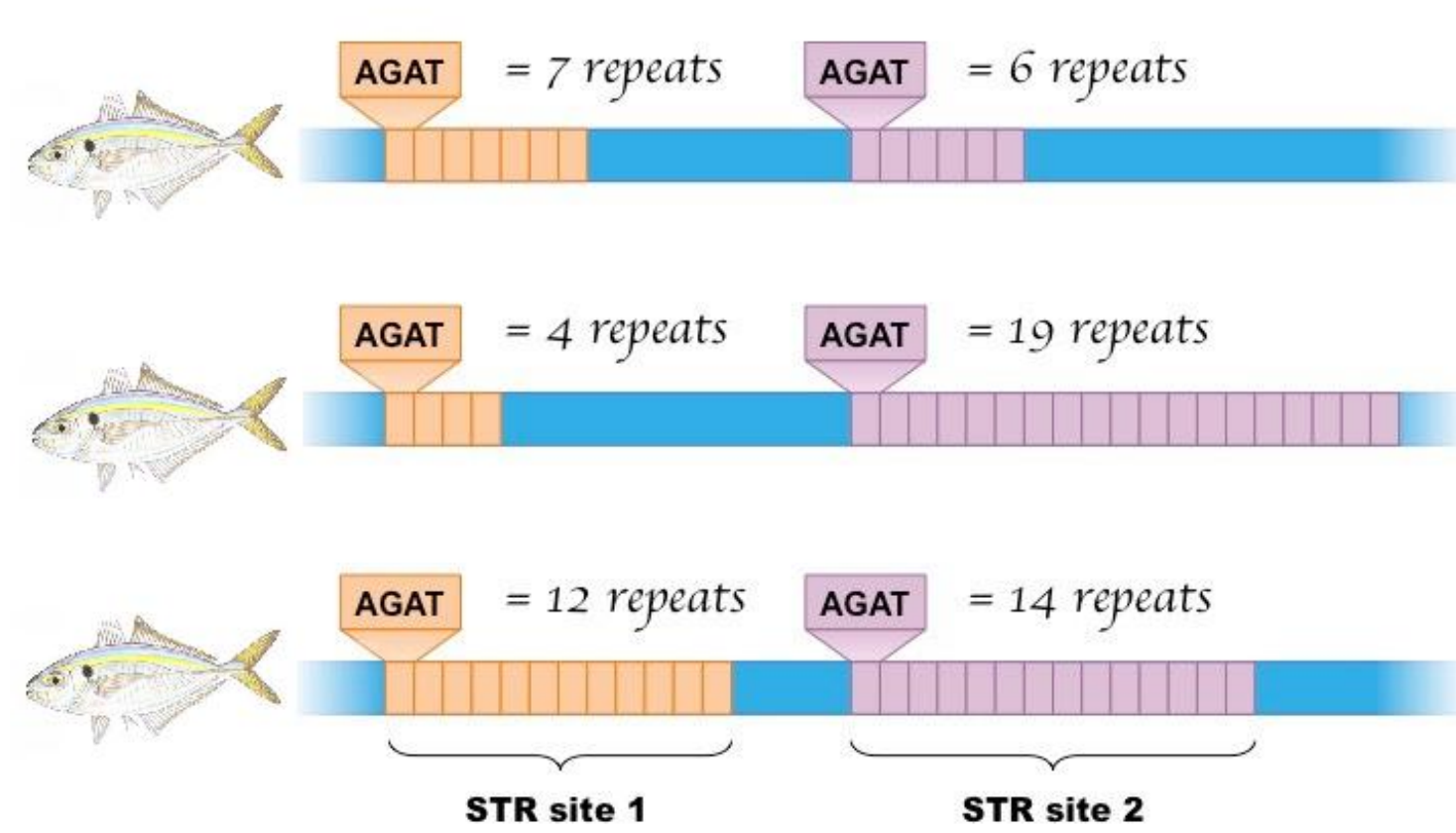
- position of **scutes** originating below or after origin of 2nd dorsal fin,
- absence of **finlets** on caudal peduncle,
- prominent **black blotch** at opercular area, and
- distinct **yellow stripe** from upper part of eye to caudal peduncle.



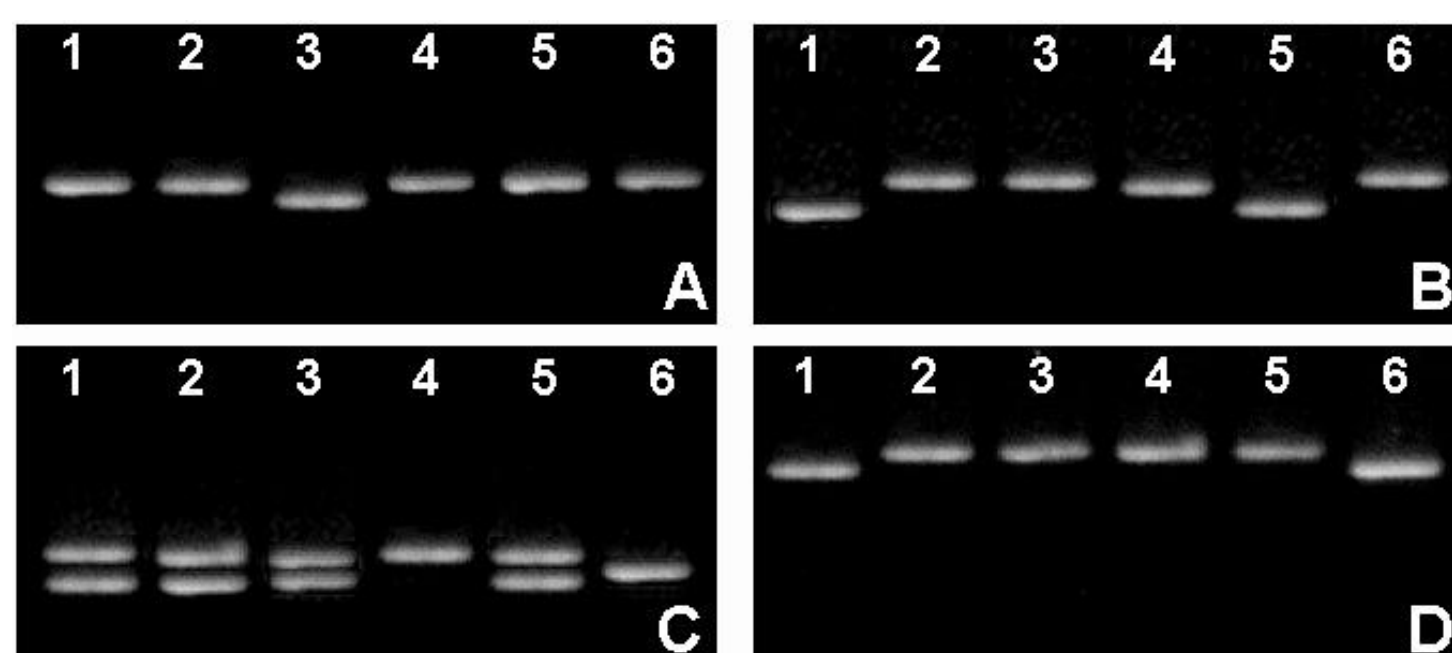
Specimens will be collected alongside strategic locations of the Kuroshio and Mindanao current boundaries:

- Southwest Japan
- Taiwan
- Philippines
- Makassar and Java, Indonesia

Microsatellite DNA (SSR) Analysis

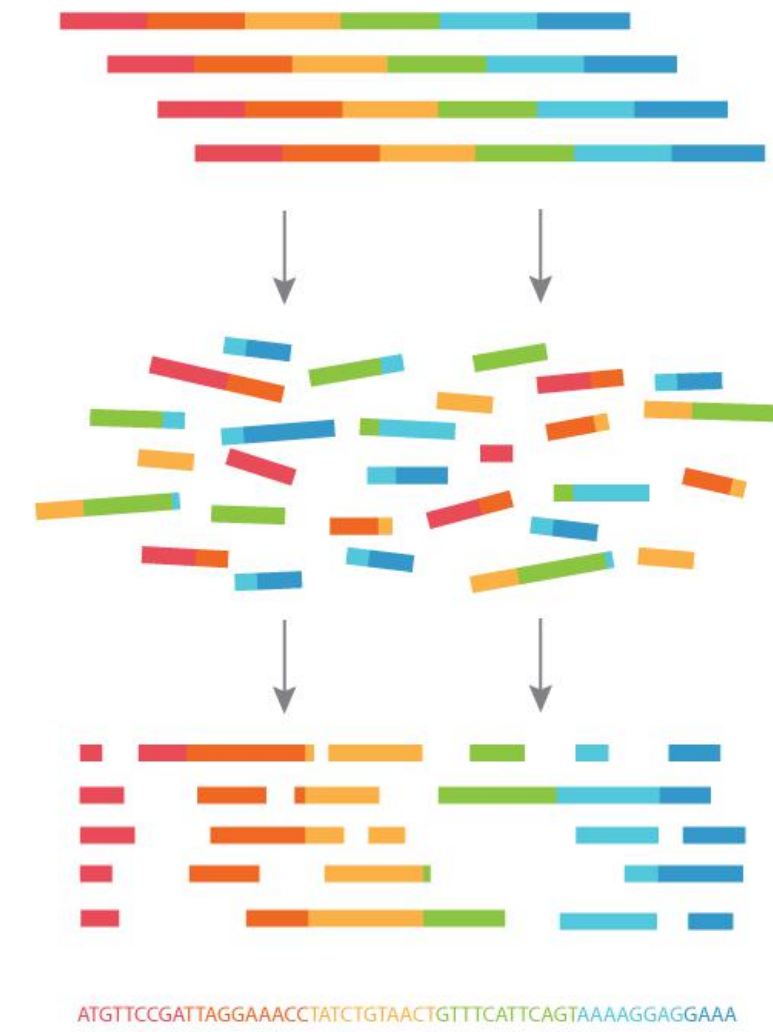


SSR analysis will detect variability in the repeat regions of the DNA. **Novel SSR markers** will also be used for cross-species amplification.



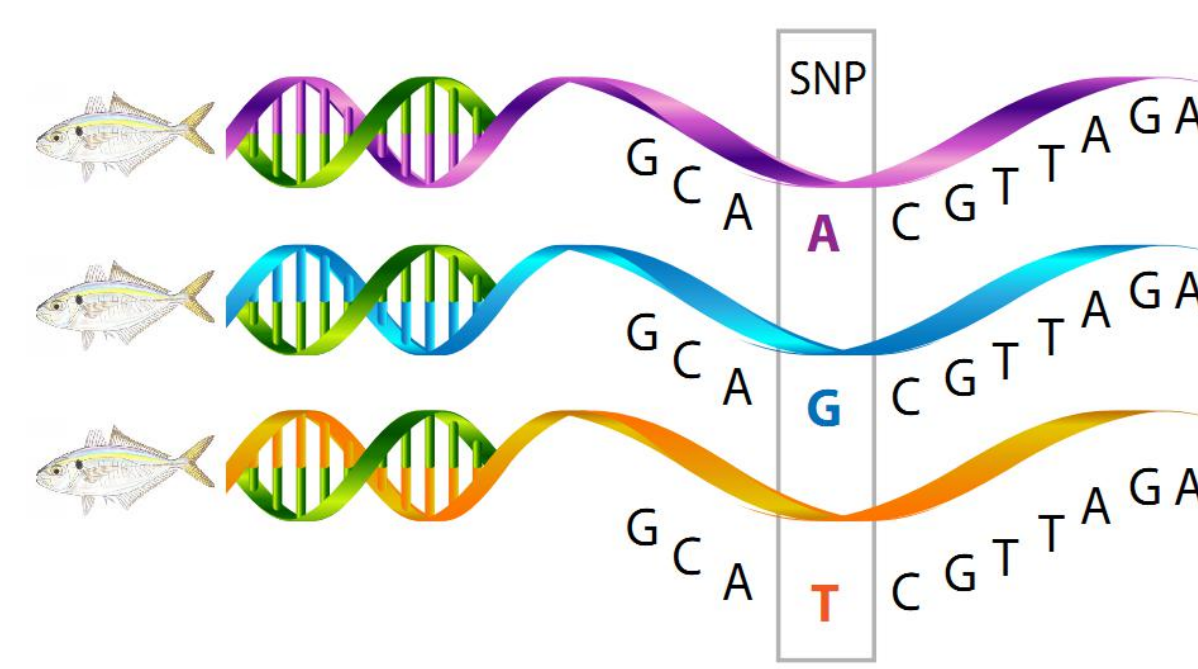
SSRs will measure levels of relatedness between *S. leptolepis* individuals or populations.

Single-nucleotide Polymorphism (SNP)



Next Generation Sequencing (NGS) steps will initially involve:

- Library preparation (fragmentation),
- Sequencing, and
- Alignment



SNP analysis will detect single-nucleotide variations within the *S. leptolepis* populations.

Morphometric Analysis



Measurable-character variations in the body will also reveal differences between the tropical western Pacific *S. leptolepis* samples.



Multivariate (*i.e. principal component*) analysis will quantify the degree of morphometric variations.

OUTPUT

- Results will provide insights on how the NEC bifurcation influences population dynamics of *S. leptolepis*, and probably of other small epipelagics, along the tropical western Pacific region.
- It can also help infer the species' evolutionary adaptation, demographic history, and their degree of population connectivities.
- Findings can serve as baseline information for effective transnational management strategies to protect this commercially-important taxon.

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