

10th October, 2025, 5th HPU Sea Turtle Workshop

Same Clutch, Different Journeys?

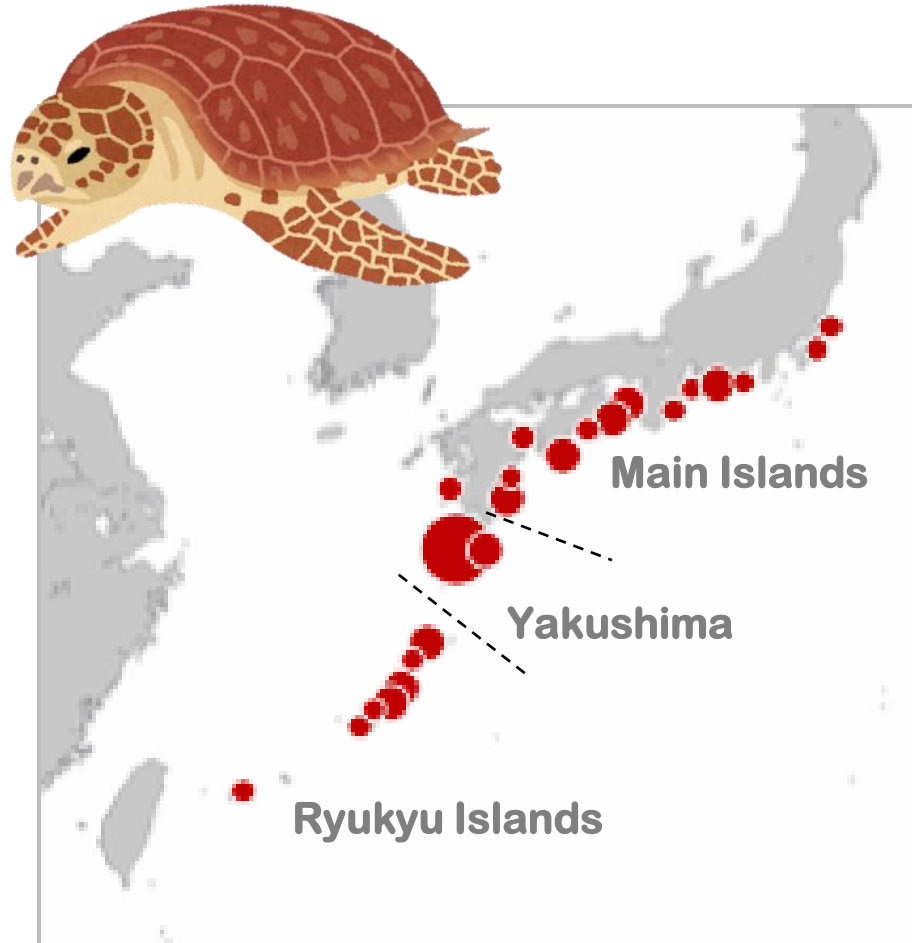
A research proposal to explore the genetic background of movement variability in loggerhead turtles.



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Graduate School of Information Sciences, Tohoku University

Loggerhead turtles in Japan



Matsuzawa et al. (2016) modified

Foraging (Larger juveniles)

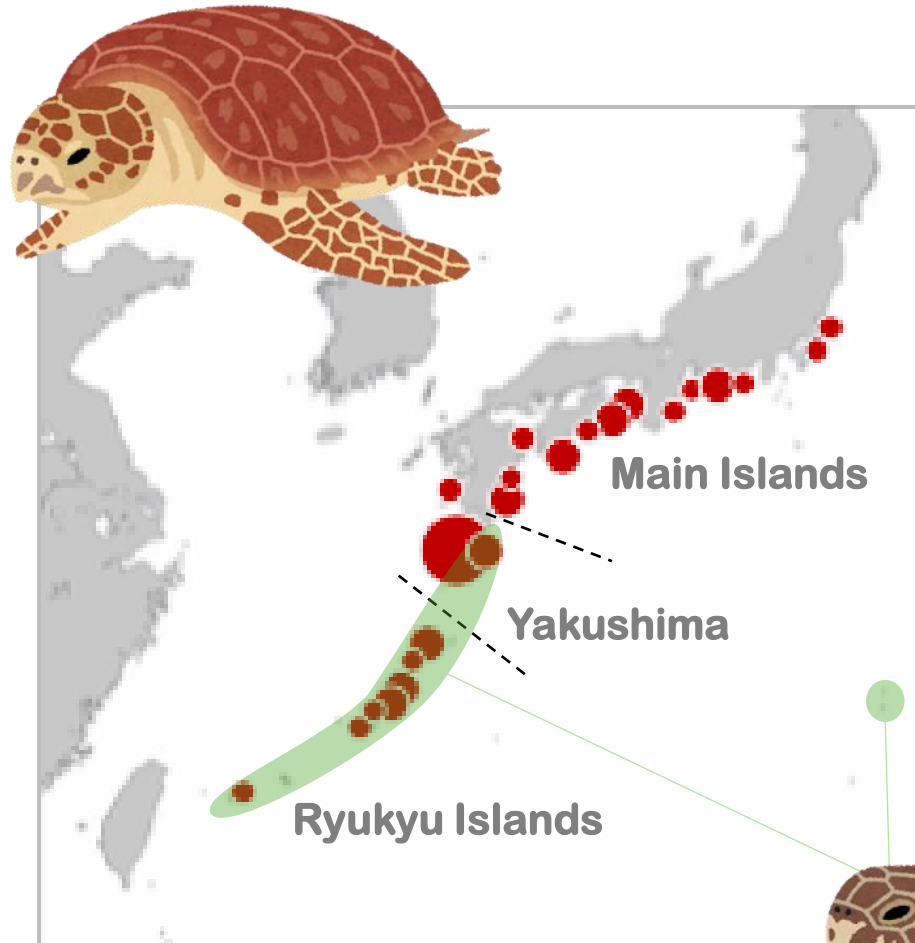
Reproduction

**- Three populations by mitochondrial DNA
(mtDNA, Matsuzawa et al. (2016))**

Population trend- NOT in good condition

In some areas, significantly decreasing

Loggerhead turtles in Japan



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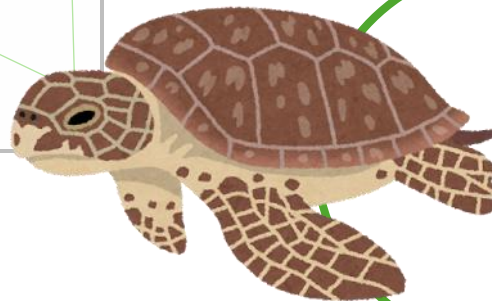
Reproduction

**Three populations by mitochondrial DNA
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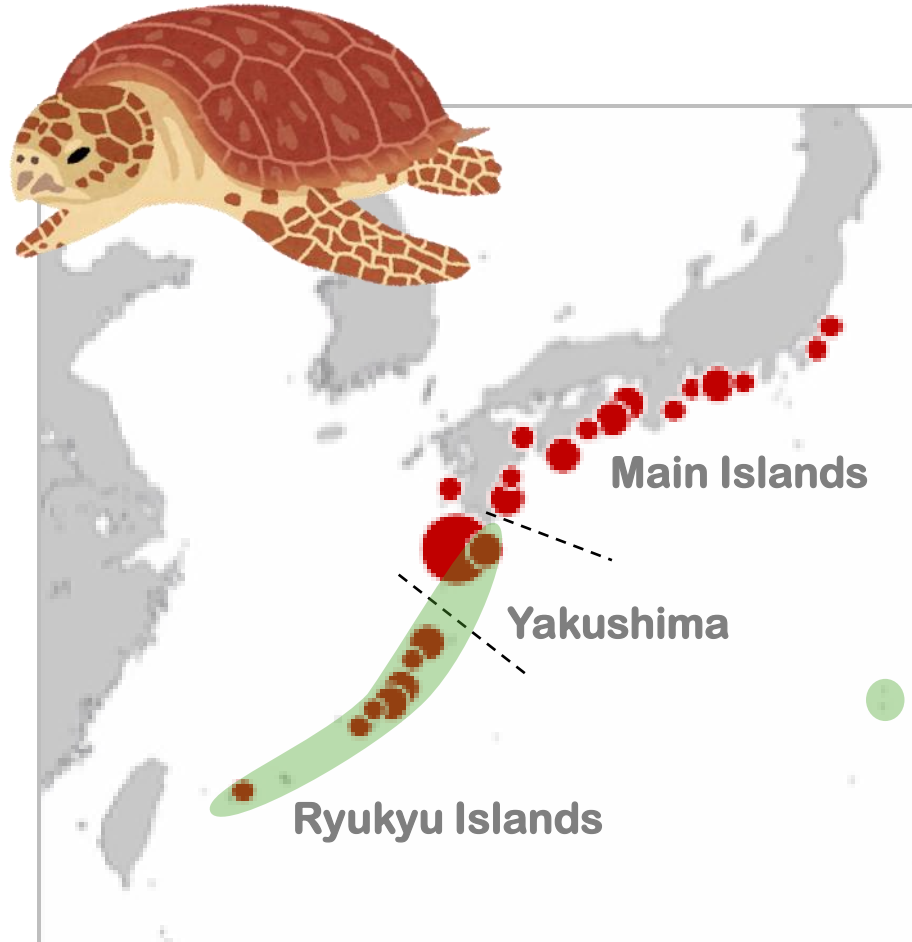
Population trend- NOT in good condition

In some areas, significantly decreasing

**Green turtles in Japan:
Increasing/stable**



Comparison: what is known so far about genetics



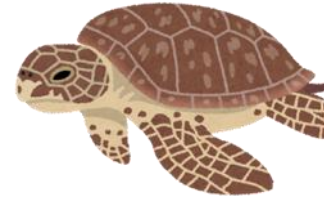
Matsuzawa et al. (2016) modified

Loggerhead turtle	Green turtle
Population structure	
Only the mtDNA	mtDNA, Nuclear DNA
Genomic condition	
Unknown	Good

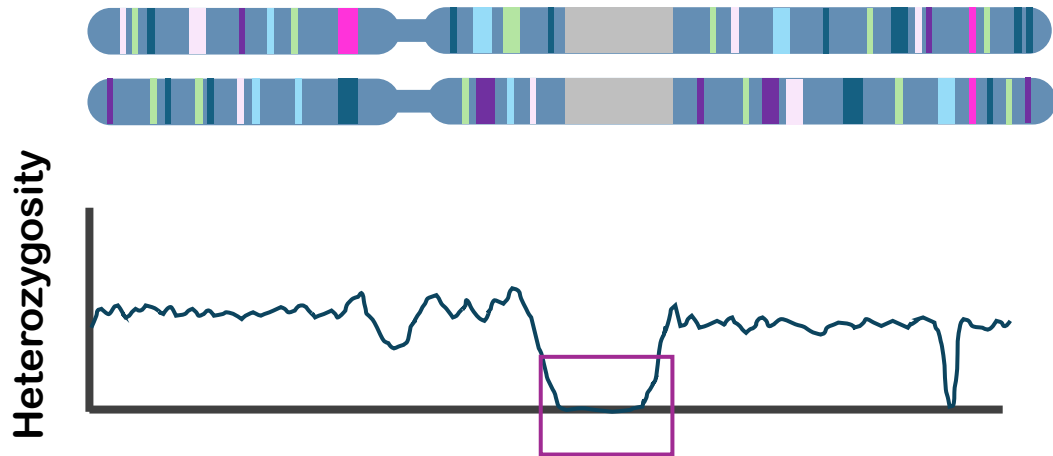
More serious situation

Need the same level of information

Evaluation of genomic condition

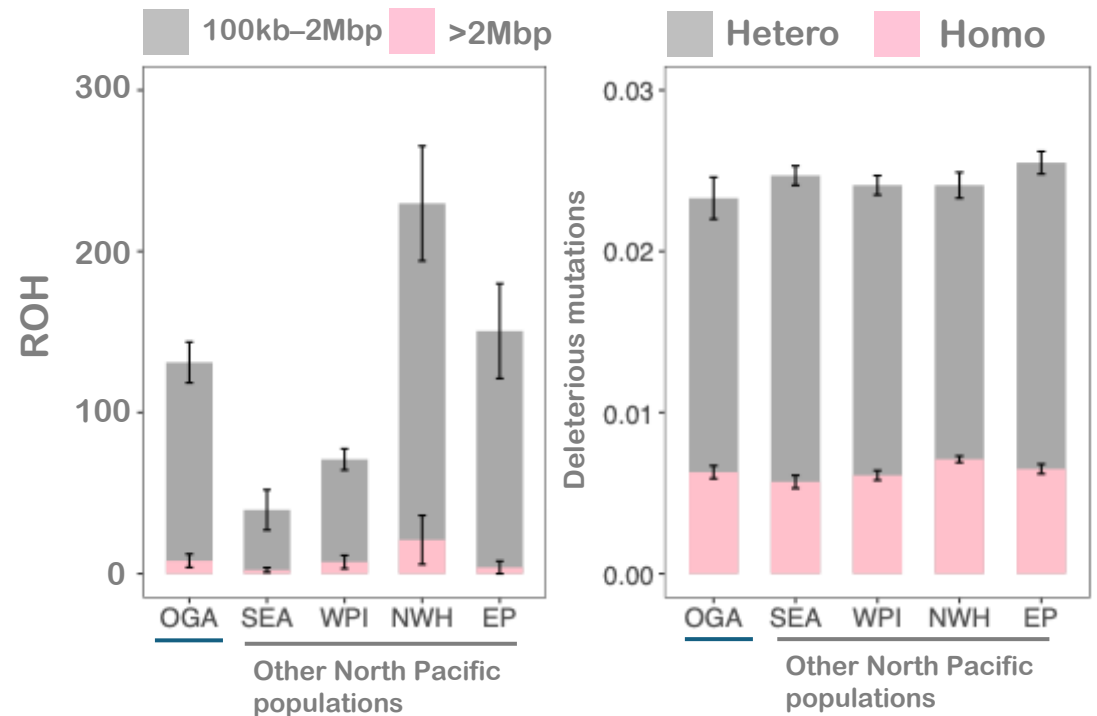


The green turtle
Ogasawara population in Japan

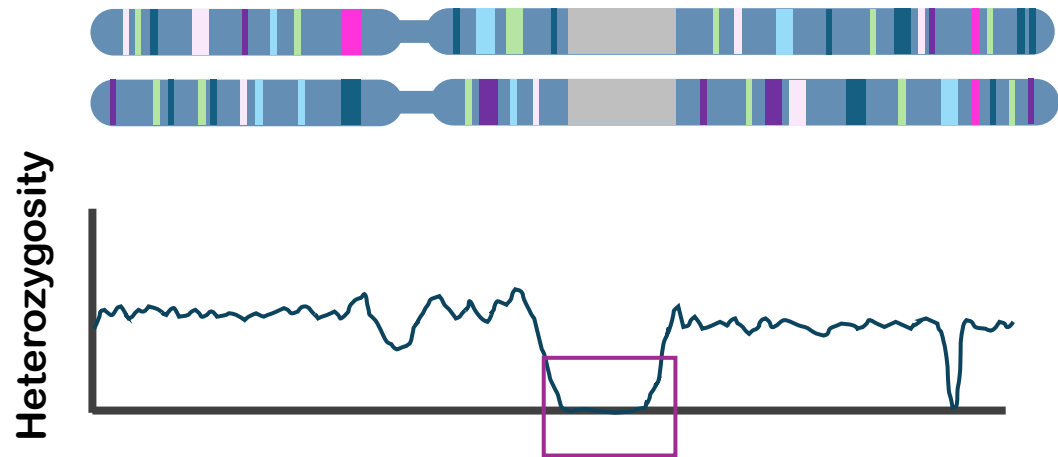


Runs of Homozygosity (ROH)

Accumulation of deleterious mutations
Inbreeding depression

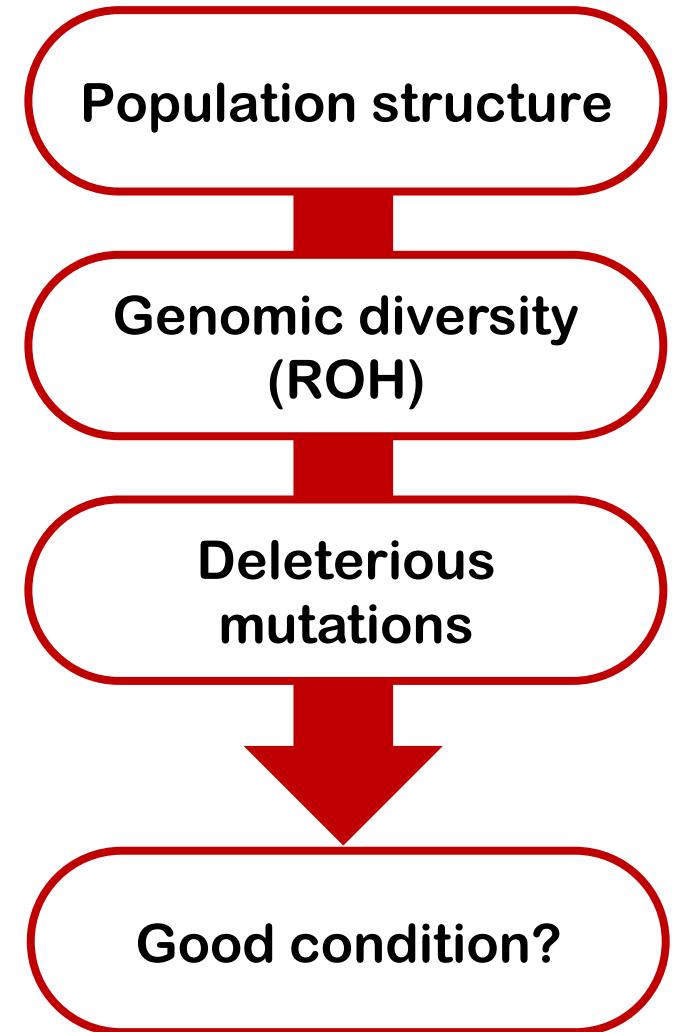
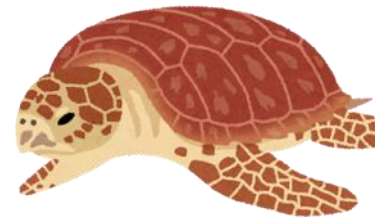


Evaluation of genomic condition



Runs of Homozygosity (ROH)

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Current progress: sampling

With the cooperation of many people, samples from >40 individuals were collected.



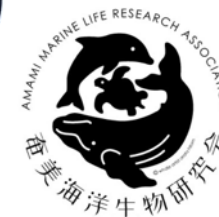
Four individuals in Kochi were from the turtles in STRETCH (one per cohort)



Kochi university



Collaborators



Miyazaki university

Current progress: sequencing

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DNA extraction



DNA Quality Check



Sequence library preparation



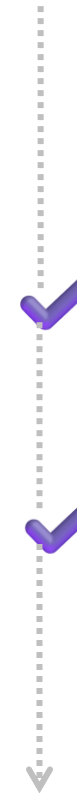
Library Quality Check



Whole genome sequencing
Illumina Nova-seq X
45 Gb/turtle



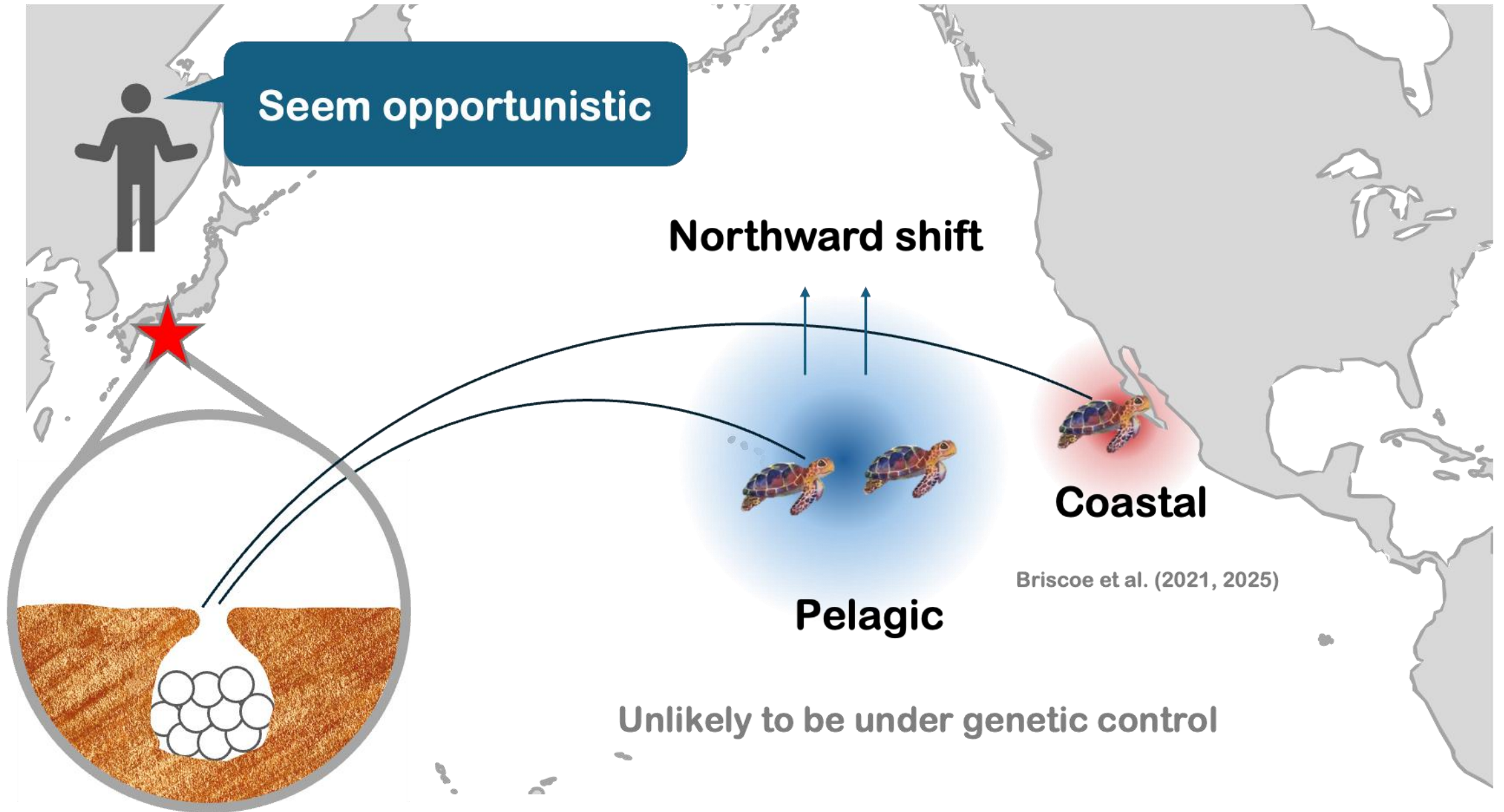
Sequencing 28 individuals



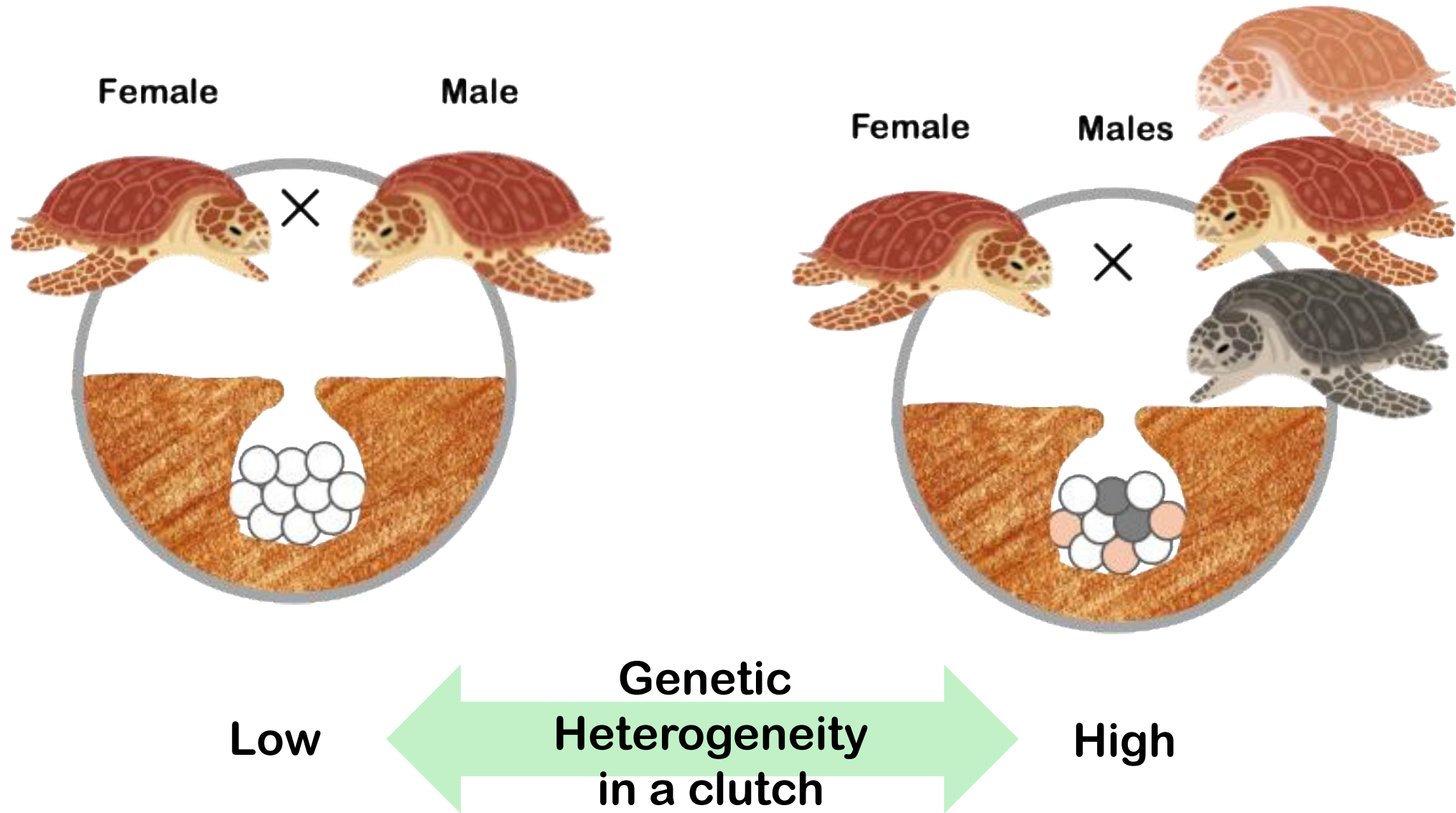
From nesting genetics to the genetics of migration



Migration pattern/Habitat selection



Multiple paternity



Previous studies of multiple paternity in sea turtles

★ Loggerhead ★ Green ★ Hawksbill ★ Kemp's Lidley

Mediterranean Zbinden et al. (2007), Kaska et al (2025)

MP: 56–95%

No. of Father: 1–5 males/clutch

Florida Moore & Ball Jr (2002)

MP: 22–70%

No. of Father: 1–3 males/clutch

Brazil Amorim (2025)

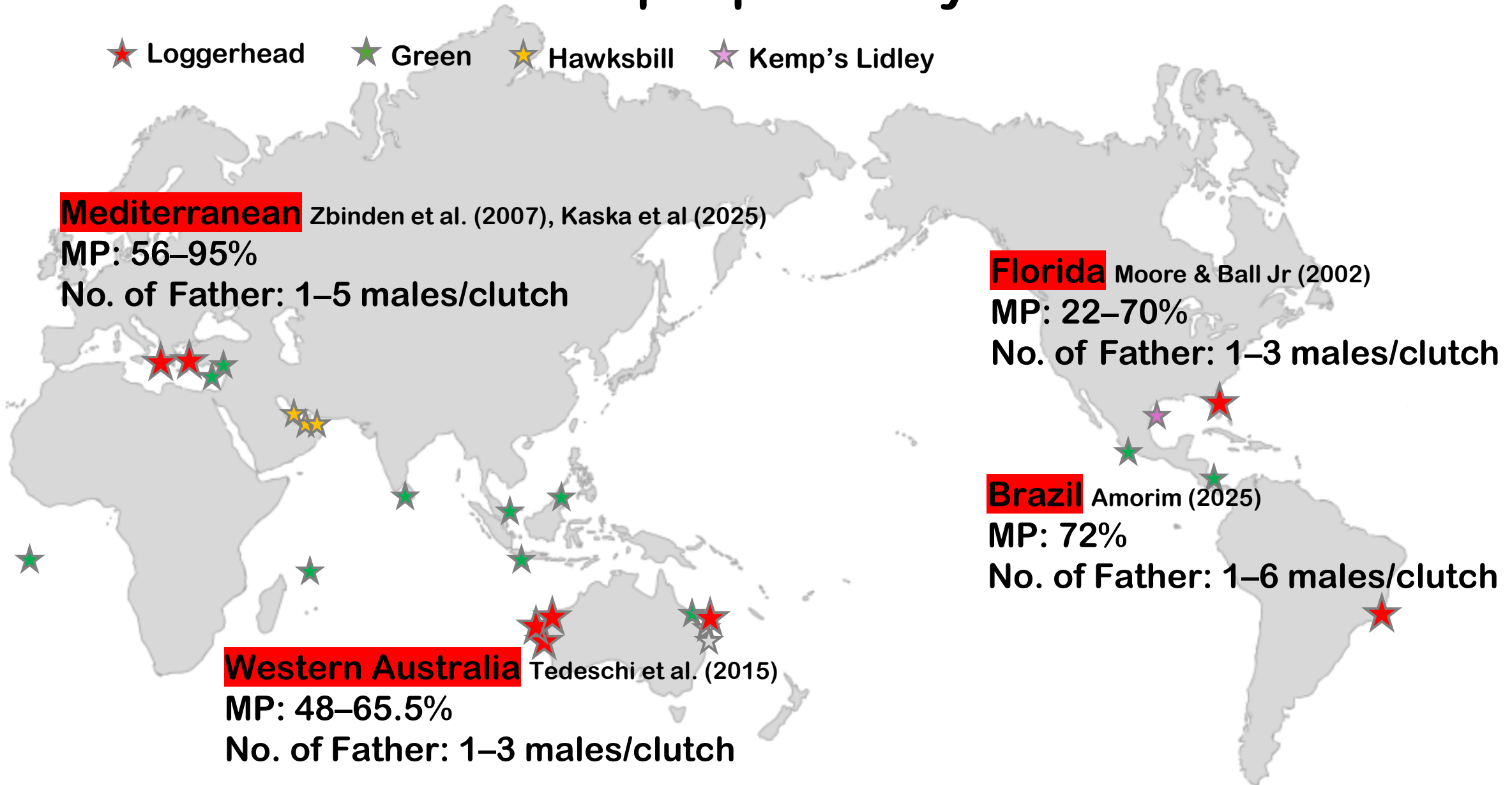
MP: 72%

No. of Father: 1–6 males/clutch

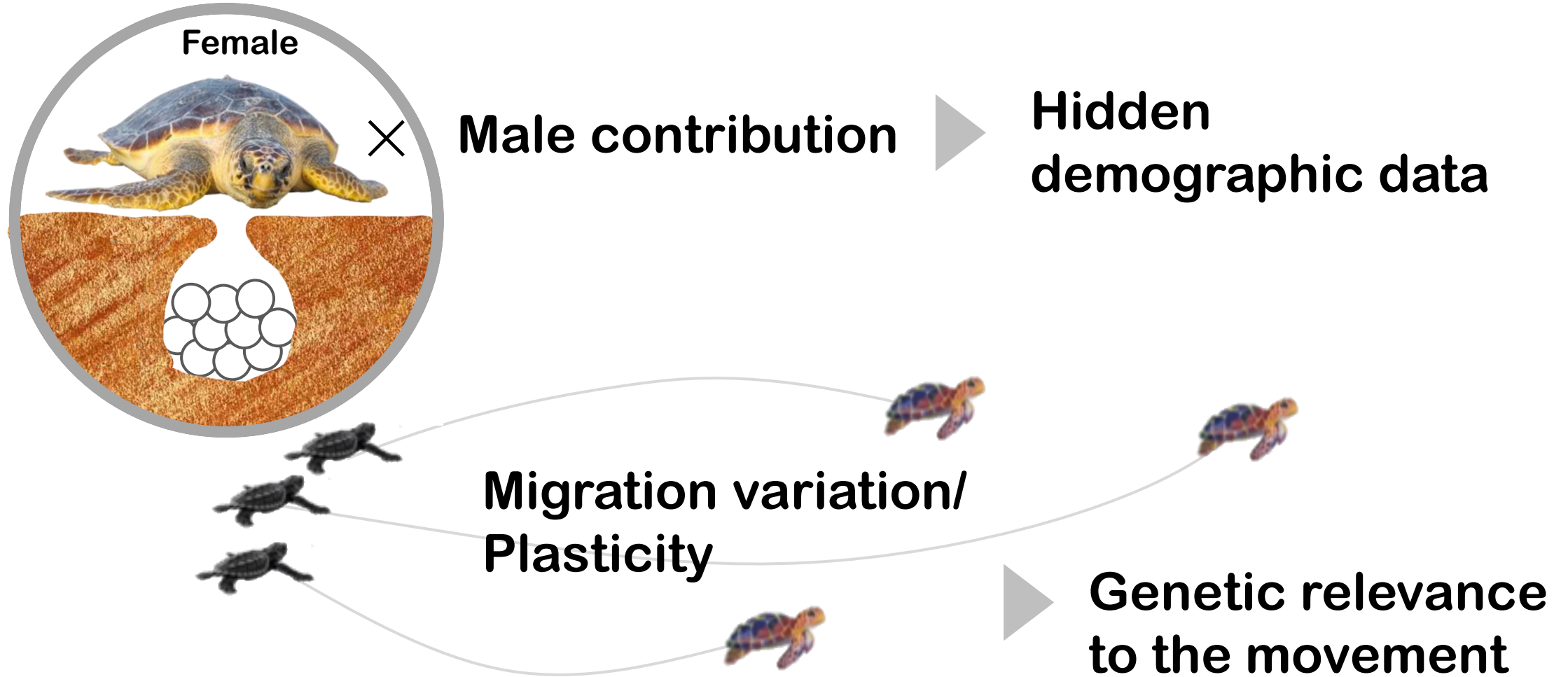
Western Australia Tedeschi et al. (2015)

MP: 48–65.5%

No. of Father: 1–3 males/clutch



Genetic heterogeneity and its implications





**Thank you very much
for your attention.**