WITH A PINCH OF SALT

THE FISH GILL, A SURFACE OF EXCHANGE FOR PARASITES

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The latid-diplectanid model system

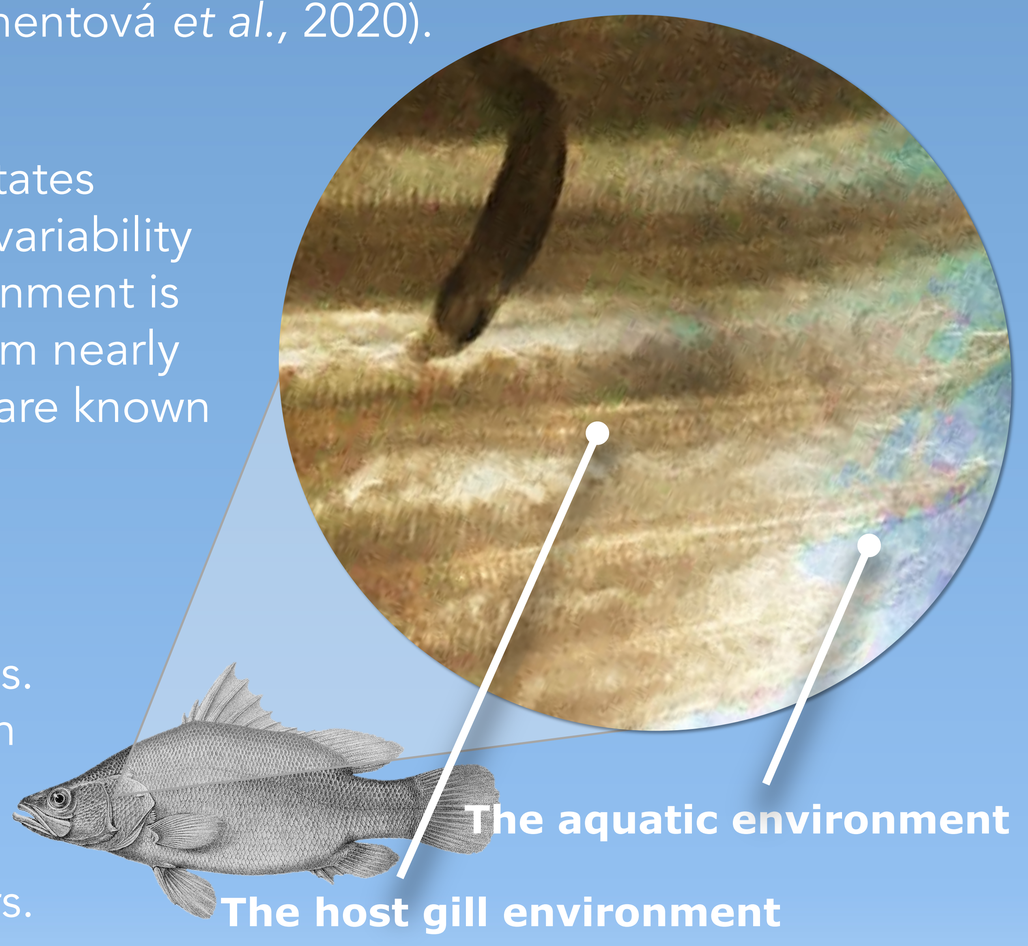
Monogenean gill parasites are typically more species-rich and diverse than their hosts, especially when infecting large, and long-living hosts. Lates perches (Latidae) host various monogenean flatworms in the marine and estuarine environments of the Indo-Pacific region. In contrast, African lates perches host only a single species, *Dolicirroplectanum lacustre* (Monogenea, Diplectanidae) (Kmentová *et al.*, 2020).

Biodiversity and environmental stability

Large-scale patterns of biological diversity suggest that stability facilitates diversification. Consequently, it can be expected that environmental variability counters diversification. In contrast to seawater, the freshwater environment is characterized by an extremely variable ionic composition, ranging from nearly distilled water, up to one-third of seawater. These diverse conditions are known to markedly affect gill morphology (Laurent & Perry, 1999).

The environments of a monogenean gill parasite

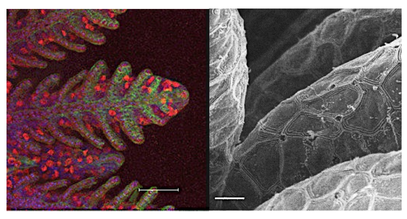
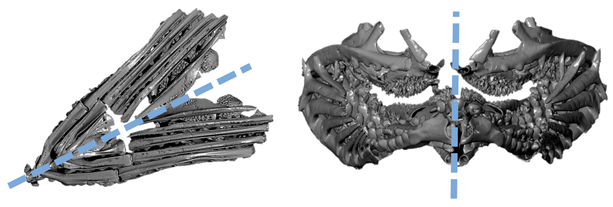
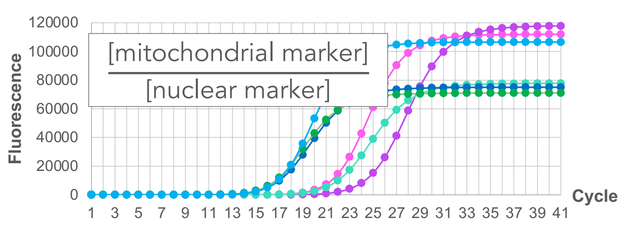
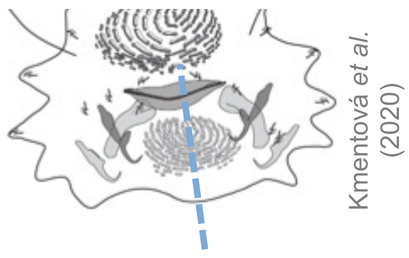
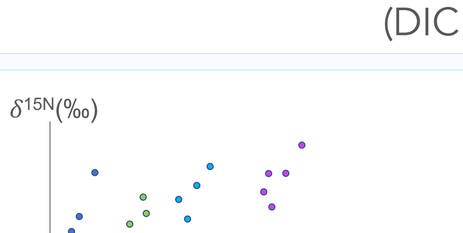
Monogenean gill parasites are exposed to the external aquatic environment which can be highly variable in oxygen and salinity levels. In addition, they are directly exposed to the gill environment. The fish gill is a continuously adapting organ, as it plays a role in osmoregulation, respiration, and immune response. Consequently, monogeneans experience environmental and immunological stressors.



HYPOTHESIS

As environmental stability facilitates diversification, we expect that the fluctuating freshwater and gill environments counteract diversification in monogenean gill parasite *Dolicirroplectanum lacustre*

Methods to characterise the environmental variability and stress

Time scale	Physiological - days to weeks	Ontogenetic - life span
host gill environment	 Fridman *et al.* (2011)	
	Chloride cell content (confocal microscopy, SEM)	Fluctuating asymmetry of the gill (3D CT scan, morphometrics)
parasite	 Mitochondrial cel content (qPCR)	 Kmentová *et al.* (2020)
		Fluctuating asymmetry of haptoral structures (DIC microscopy)
aquatic environment		✓ trophic level (N) ✓ ultimate carbon source (C) ✓ aquatic environment (H)
	The isotopic niche (stable isotope analysis)	

AIMS

Using the measured indicators for environmental variability, we aim to relate the level of diversification in the lineage of *Dolicirroplectanum* to the stability in the environments, and the level of environmental and gill stress experienced by *D. lacustre* and its host.

References
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- Laurent, P., Perry, S. F. (1991). Physiological Zoology. 64, 4-25.

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