



Relaxed Parasite-Mediated Selection Reduces Resistance and Limits Gene Flow Between Lake and River Stickleback Ecotypes

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SUMMARY: We found evidence in a lake-river natural system that **three-spined sticklebacks** (*Gasterosteus aculeatus*) adapted to low parasite pressure fail to establish in a parasite-rich environment. As theory predicts, we confirmed experimentally that **reduced parasite-mediated selection has led to lower resistance to infections**, highlighting the fundamental role of parasites in the ecological divergence of organisms.



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Paper coming soon !!

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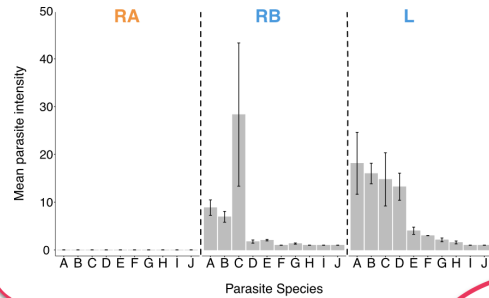
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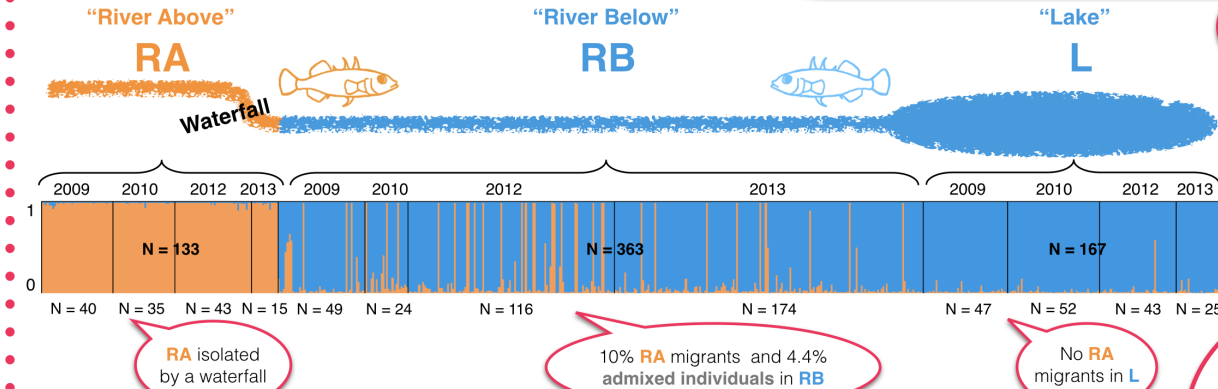
Contrasting parasite communities



- Trematodes**
- A: *Diplostomum* sp. (free)
 - E: *Apotemon* sp. (cyst)
 - D: *Strigeinae* gen. sp.
 - H: *Diplostomum* sp. (eyelense)
- Cestodes**
- B: *Diphyllobothrium* sp.
 - C: *Eubothrium* sp.
 - G: *Schistocephalus solidus*
 - I: *Proteocephalus* sp.
- Nematodes**
- J: *Eustrongylides* sp.
 - F: *Contracaecum* sp.

From the wild...

Estimated population structure analysis for nine neutral microsatellite loci over four survey years (N = 663):



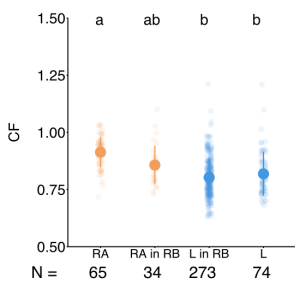
1. Parasites Screening
RA fish are devoid of macroparasites!

2. Population Genetic Structure
Two distinct genetic clusters (K = 2) with continuous unidirectional flow of RA migrants into RB but limited introgression into L cluster

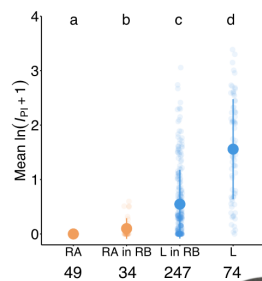
3. Fish Conditions
While being in better condition in their native habitat (a) and harbouring less parasite than residents in RB habitat (b), RA migrants have the same level of immune activation as RB and L fish (c)

4. Experimental infections of lab-bred fish exposed to a generalist trematode parasite (d) and a host-specific cestode (e-f), confirms that RAxRA fish have a lower resistance than LxL fish, and F1-hybrid are intermediate

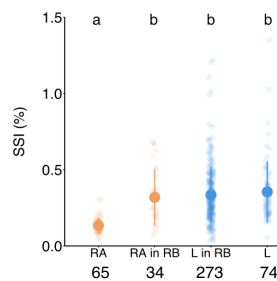
(a) Condition factor*



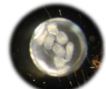
(b) Parasitization index*



(c) Splenosomatic index*



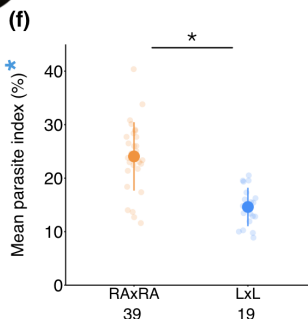
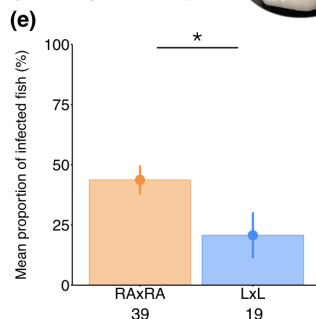
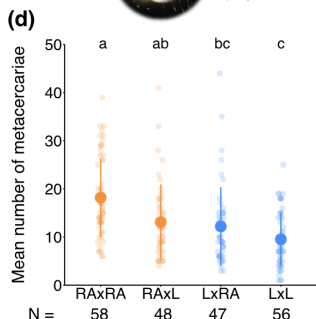
to the lab!



Eye fluke trematode (*Diplostomum pseudospathaceum*)



Cestode (*Schistocephalus solidus*)



Parasites isolate

Acknowledgement

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*Indices calculations

$$CF = \frac{\text{somatic weight}}{\text{standard length}^3} \times 100$$

$$PI = \frac{\text{parasite weight}}{\text{somatic weight}} \times 100$$

$$I_{PI} = \sum_{i=0}^{j=n_p} = (10s_{mi}^{-1} \cdot n_i s_{i-1}^{-1})$$

(Kalbe et al. 2002 J Fish Biol)

$$SSI = \frac{\text{spleen weight}}{\text{somatic weight}} \times 100$$