# Interactive effects of selection and plasticity during phenotypic divergence

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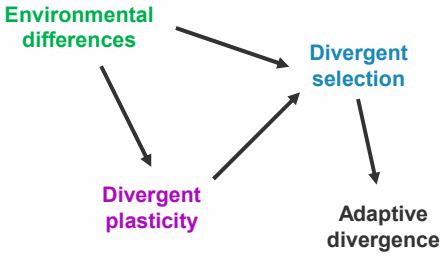
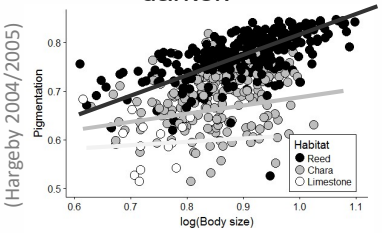
**Selection and phenotypic plasticity** jointly determine the dynamics of adaptive phenotypic differentiation within and among populations

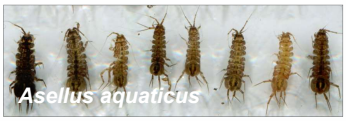



**However**, environmental aspects may induce both plastic or genetic responses, either on their own or through complex interactions

**Pigmentation** in *Asellus aquaticus* (freshwater isopod, detritivorous) varies along a macrophyte gradient: in the presence of macrophytes isopods are darker.



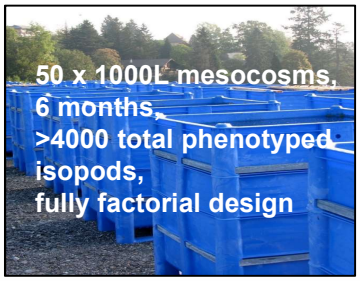

**Hypothesis 1:**
Macrophytes provide shelter from predation, but only for dark phenotypes (selection).

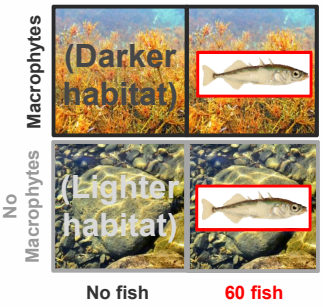



**Hypothesis 2:**
Macrophytes increase pigmentation by providing higher nutrition (plasticity)

## Selection experiment

**Do macrophytes select for specific phenotypes of *A. aquaticus* via visual predation from fish?**



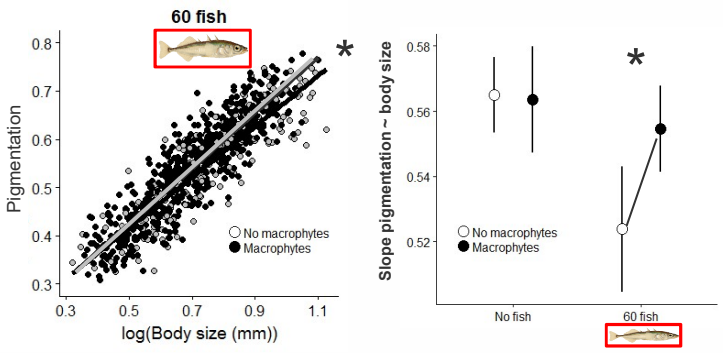




## Plasticity experiment

**Does variability in nutrient supply lead to differential expression of pigmentation (across families)?**

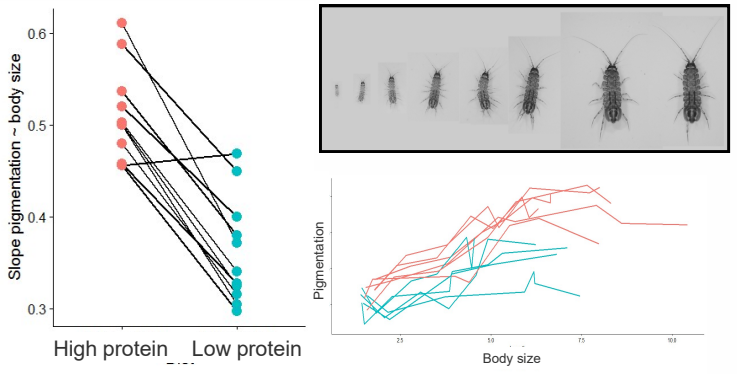

| High protein diet | Low protein diet |
|---|---|
| + yeast<br>- starch,<br>Low C/N<br>Low C/P | - yeast<br>+ starch,<br>High C/N<br>High C/P |

## Results




Isopods from mesocosms without macrophytes and fish were less pigmented, across all size classes

## Results




Across all families (except one) isopods developed stronger pigmentation under high protein diet.

We found some **support for both hypotheses: (1)** Macrophytes and fish can **interactively determine pigmentation** in *A. aquaticus*, putatively via selection for lighter phenotypes in the absence of macrophytes (cryptic pigmentation). **(2)** We found **evidence for resource mediated plasticity** in pigmentation. Therefore, should macrophyte presence constitute a resource gradient in nature, it is possible that any resulting plastic responses are aligned with responses to selection

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