



ATTACK OF THE CRAB MONSTERS

Comparing the predatory impact of invasive and native crabs

SFU

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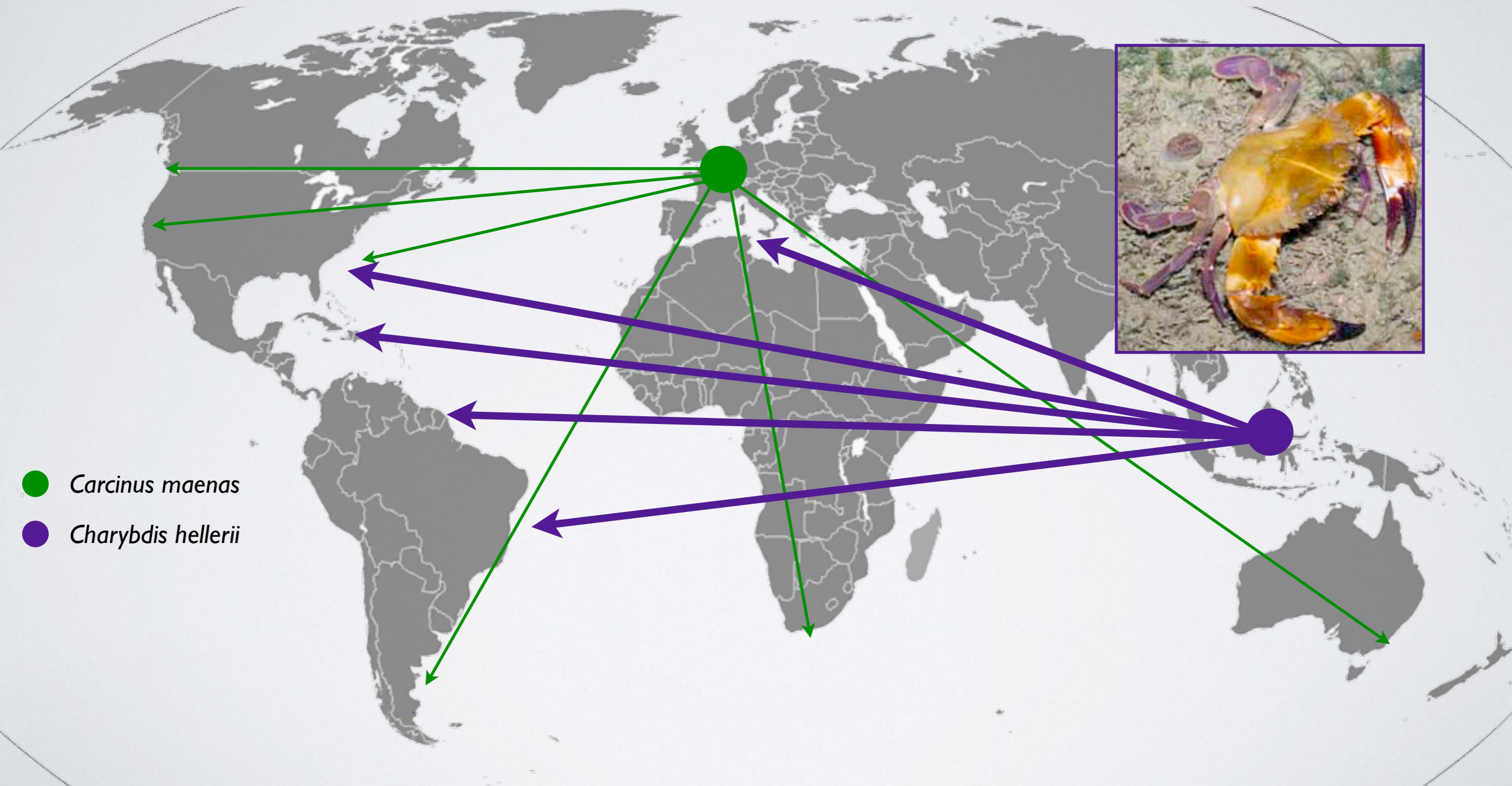
CAISN CANADIAN
AQUATIC
INVASIVE
SPECIES
NETWORK

Global invaders

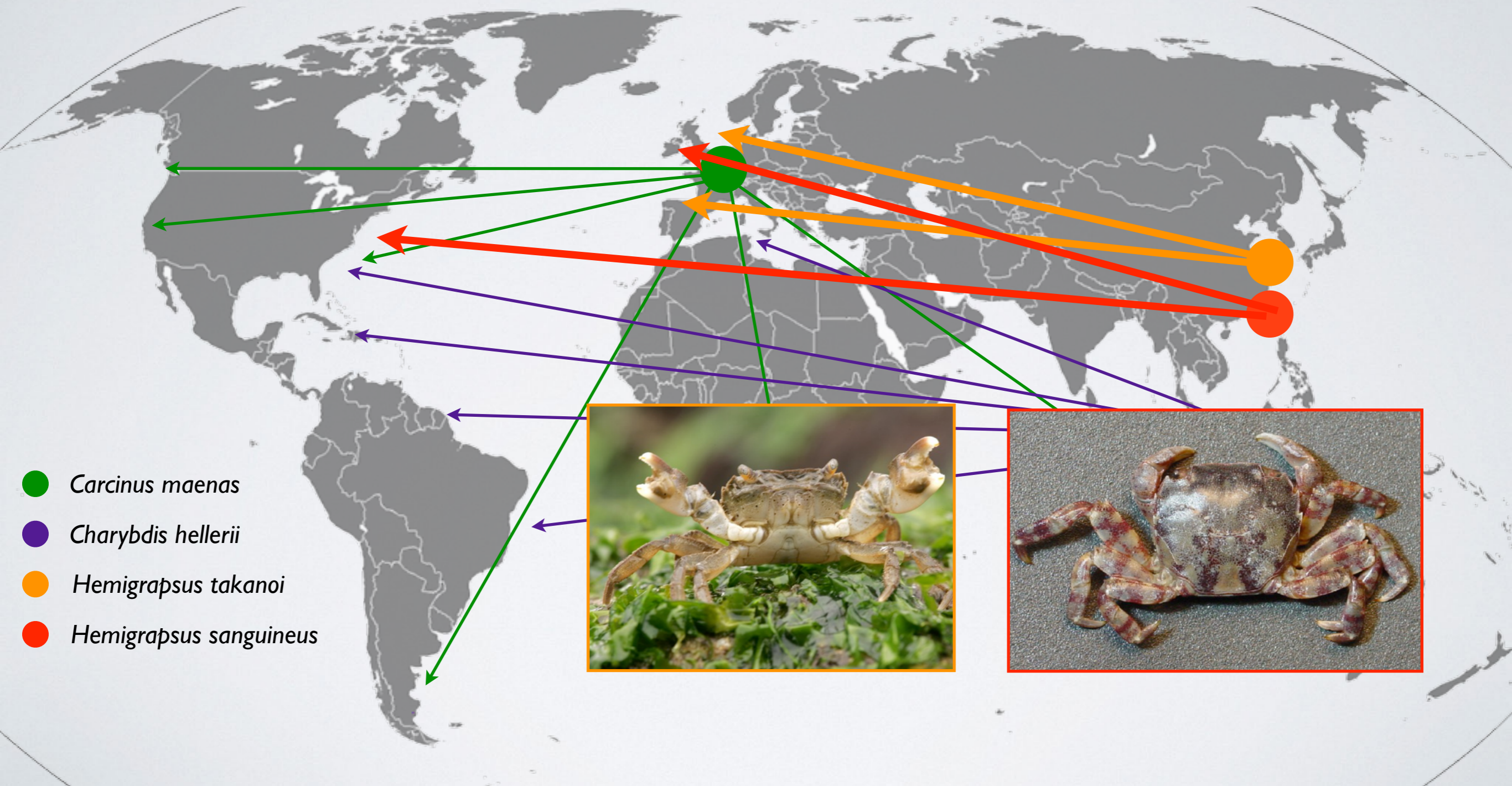


● *Carcinus maenas*

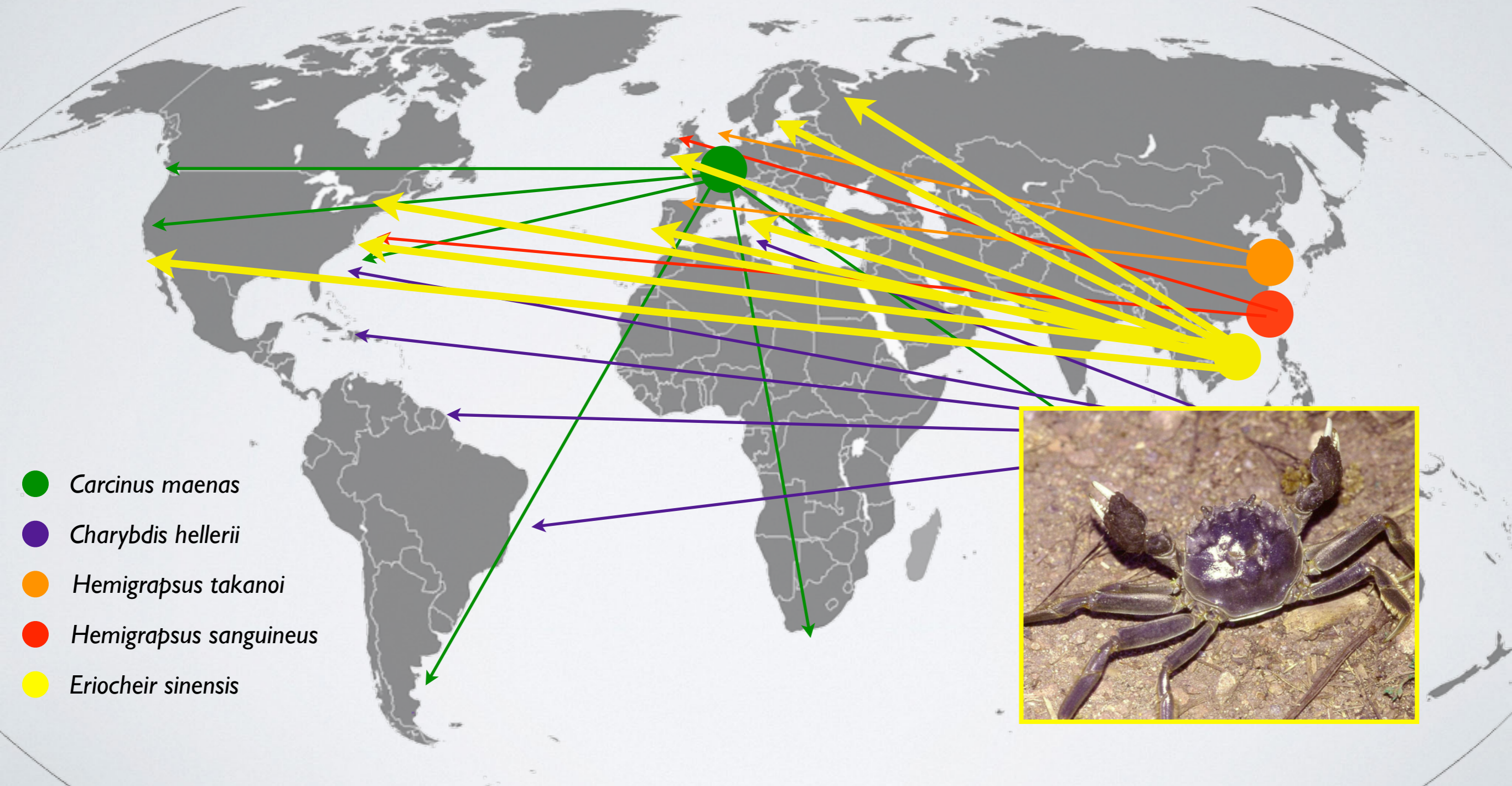
Global invaders



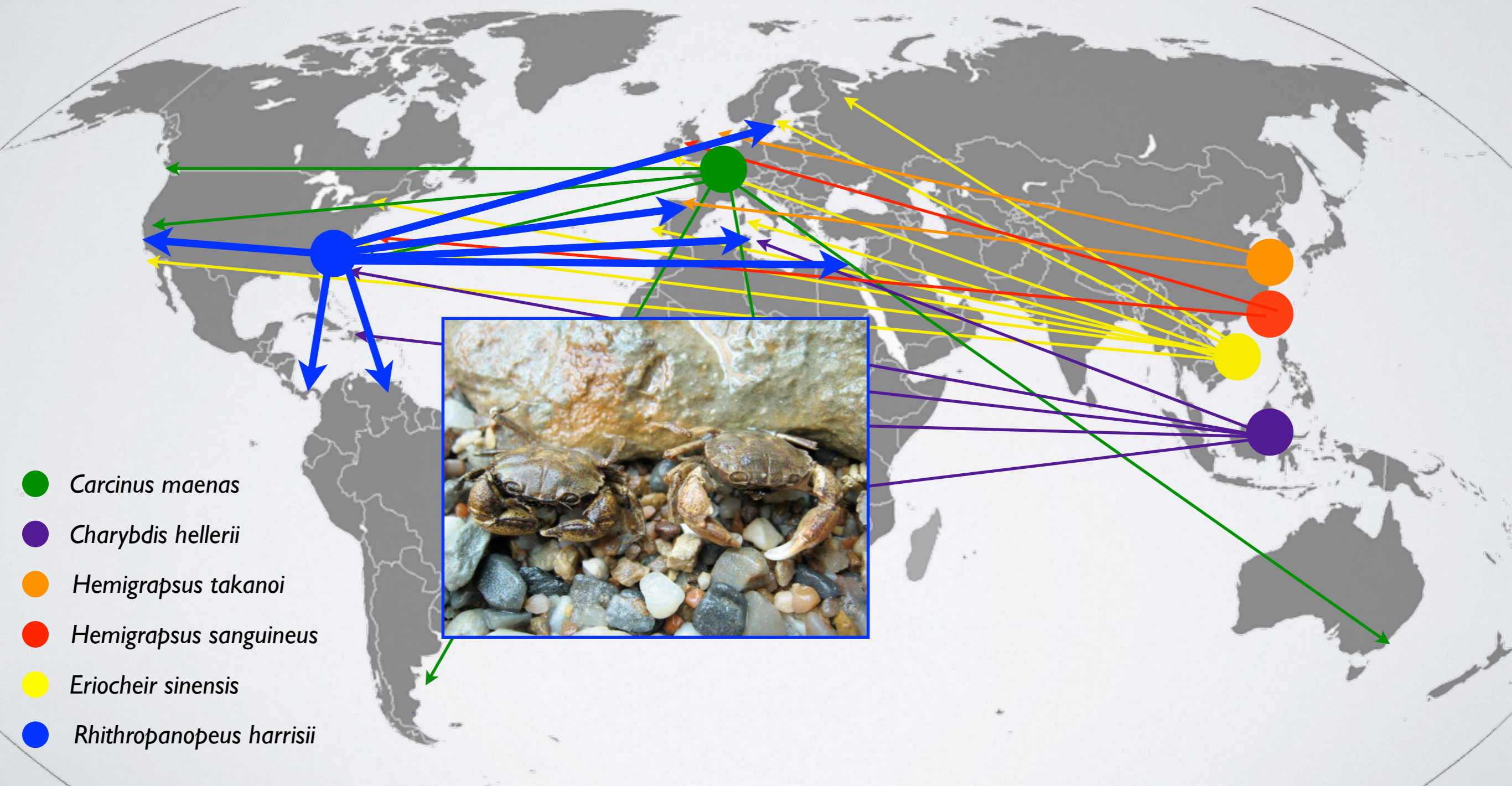
Global invaders



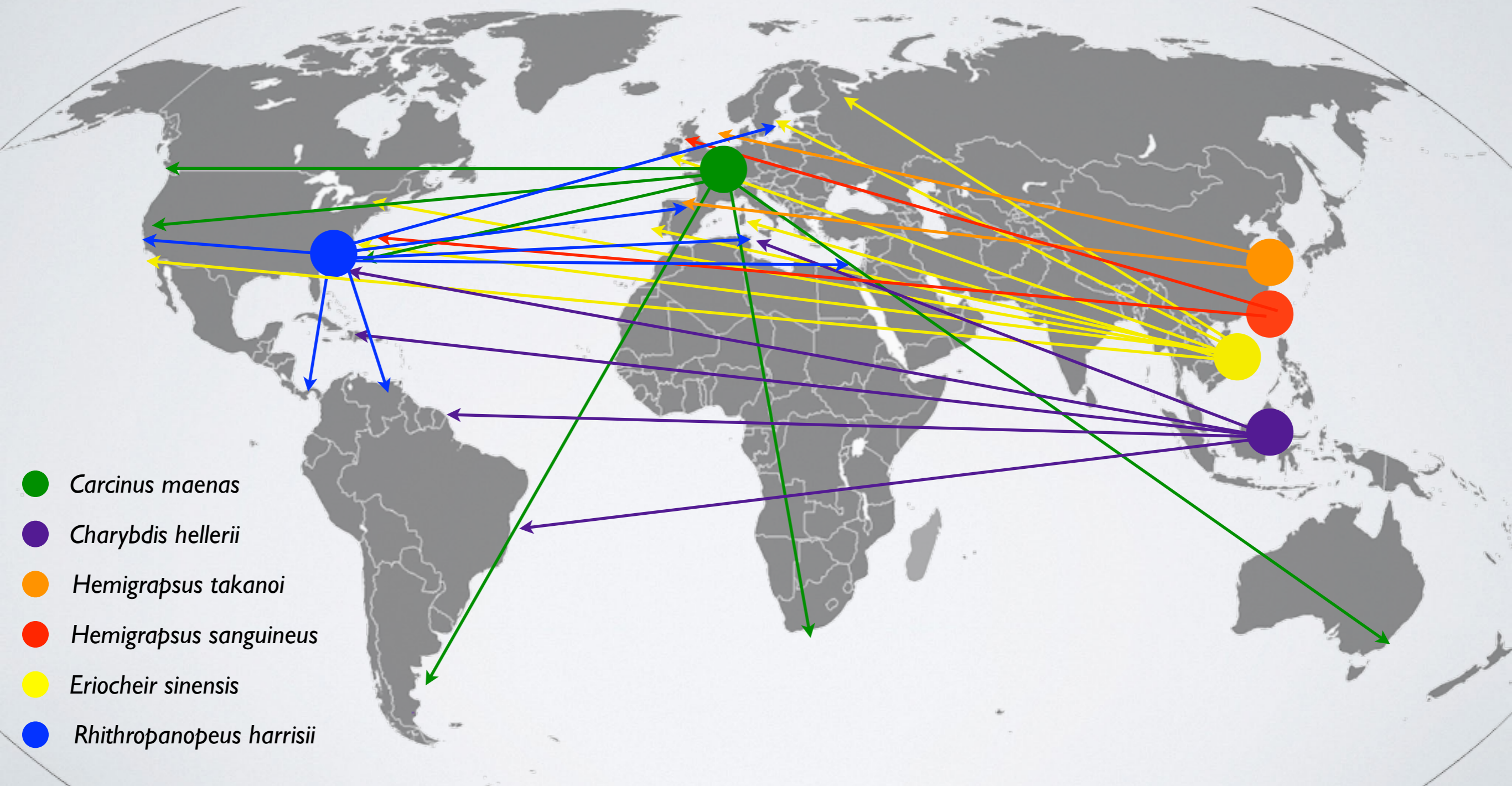
Global invaders



Global invaders



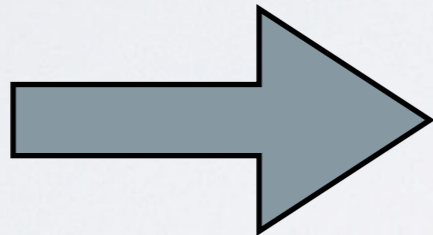
Global invaders



Interactions with native species



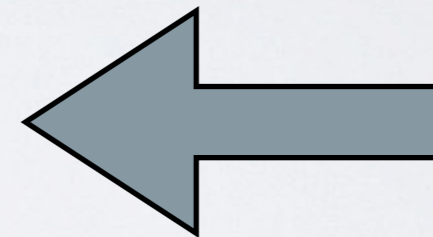
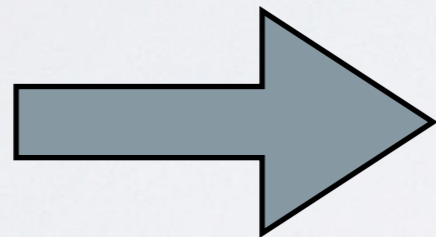
non-native



Interactions with native species



non-native

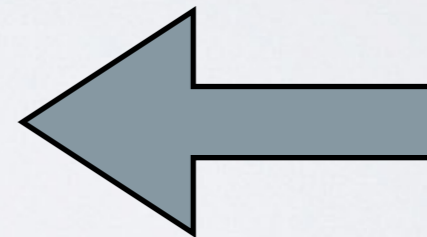
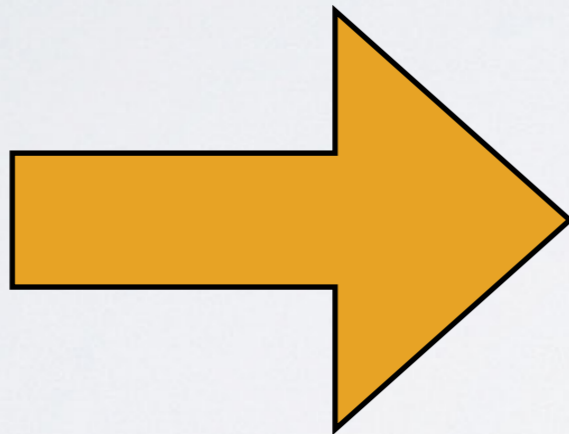


native

Interactions with native species



non-native



native

Differences in design

Experimental

A Comparison of Predation Rates by Non-indigenous and Indigenous Crabs (Juvenile *Carcinus maenas*, Juvenile *Cancer irroratus*, and Adult *Dyspanopeus sayi*) in Laboratory and Field Experiments

Erin Breen • Anna Metaxas

Spatial

East meets west: competitive interactions between green crab *Carcinus maenas*, and native and introduced shore crab *Hemigrapsus* spp.

Gregory C. Jensen*, P. Sean McDonald, David A. Armstrong

School of Aquatic and Fishery Sciences, University of Washington, Box 355020, Seattle, Washington 98195, USA

Temporal

Competition and niche segregation following the arrival of *Hemigrapsus takanoi* in the formerly *Carcinus maenas* dominated Dutch delta

A.M. van den Brink ^{a,*}, S. Wijnhoven ^b, C.L. McLay ^c

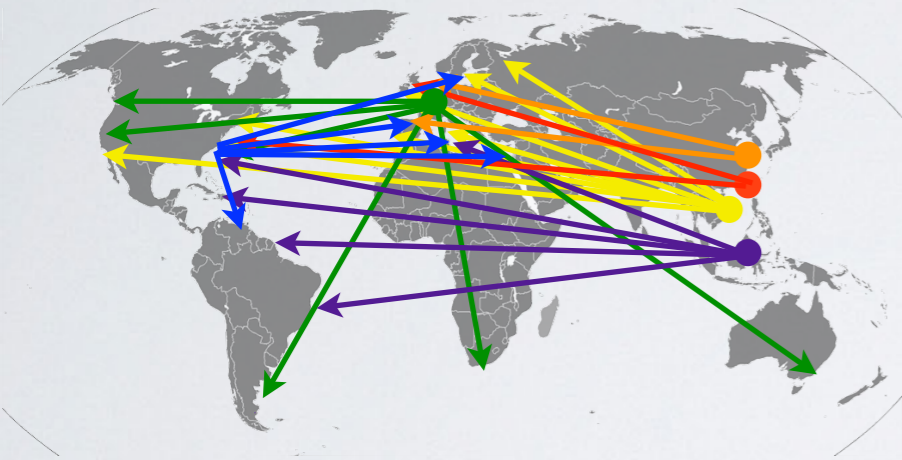
^a IMARES Wageningen UR, Wageningen Institute for Marine Resources and Ecosystem Studies, P.O. Box 77, 4400 AB Yerseke, The Netherlands

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Are invasive crabs better predators?

Global invasions



Design differences

Meta-analysis

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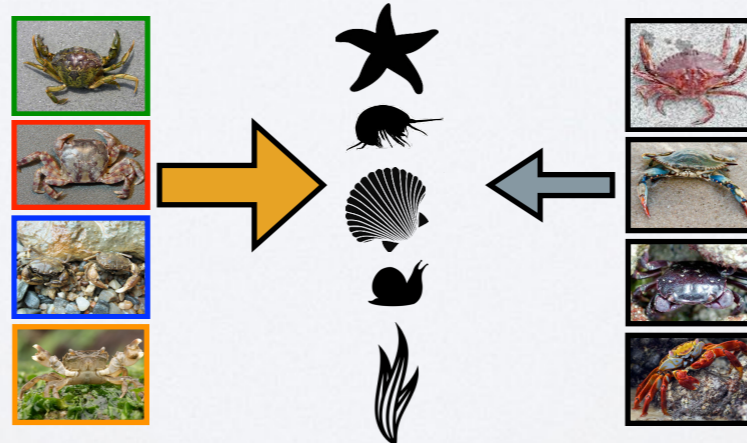
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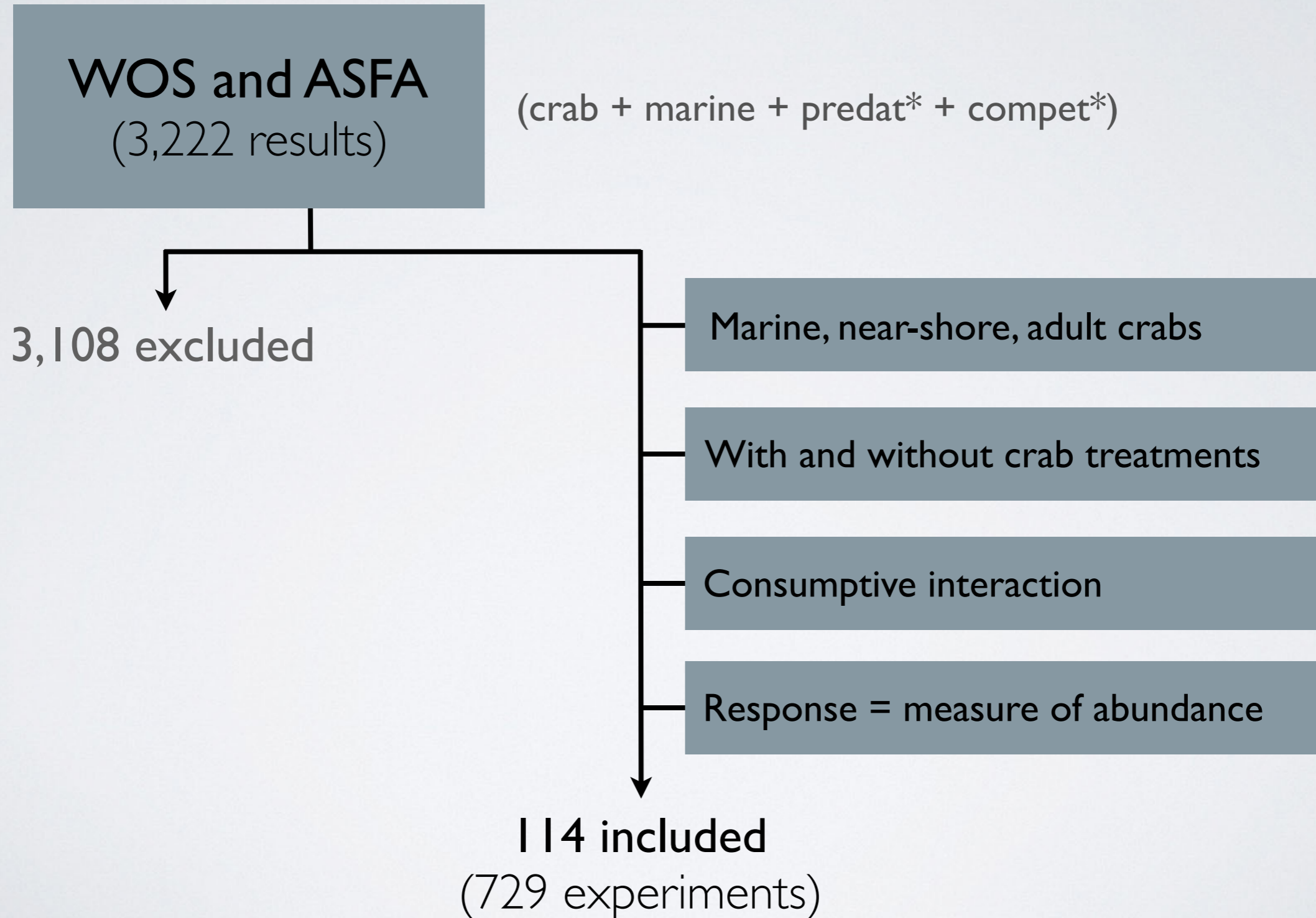
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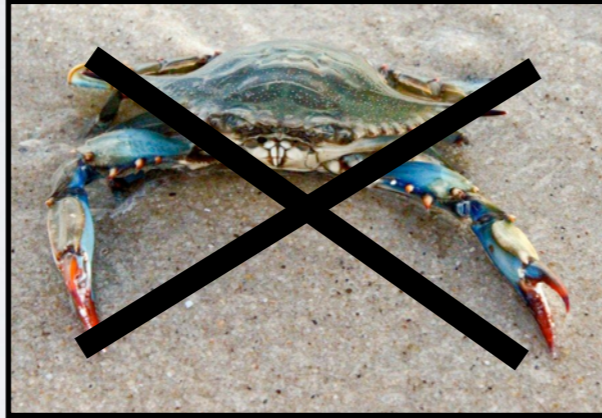
Species interactions



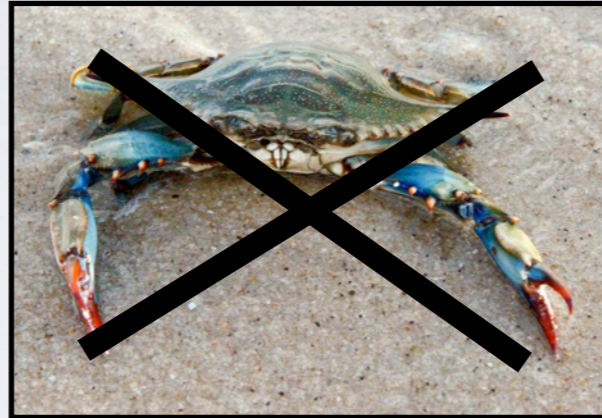
Literature search



Moderators



Moderators

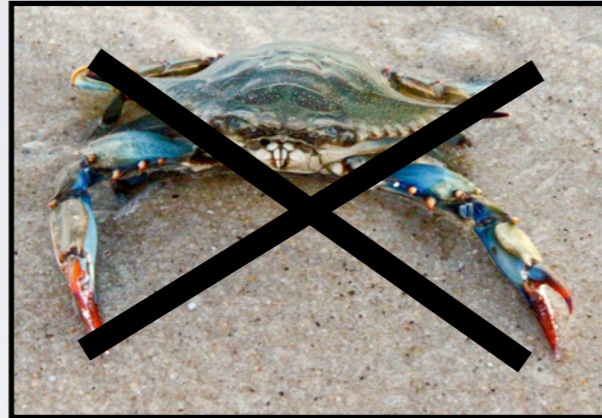


Crab species

Native

Non-native

Moderators



Crab species

Native

Non-native

Prey functional group

Mobile infauna

Mobile epifauna

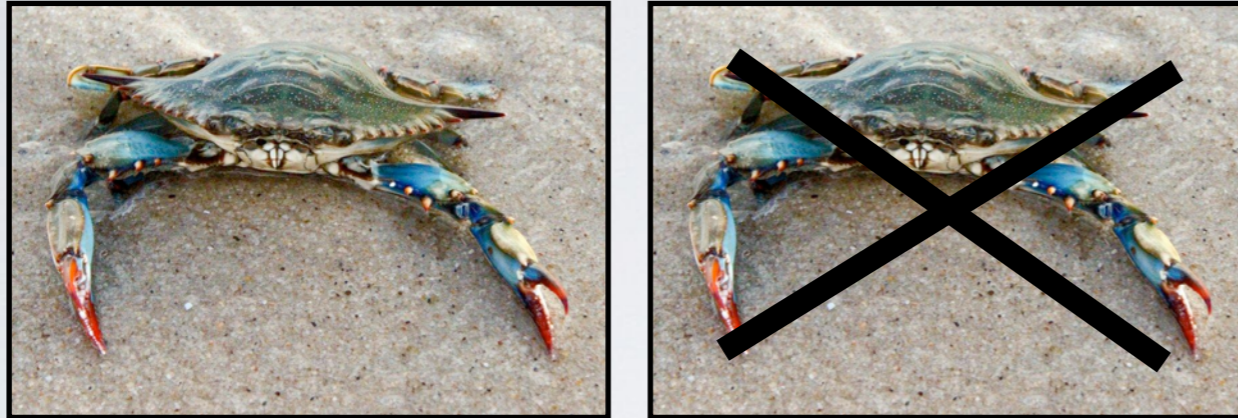
Vertebrates

Sessile epifauna

Primary producers



Moderators



Crab species

Native

Non-native

Prey functional group

Mobile infauna

Mobile epifauna

Vertebrates

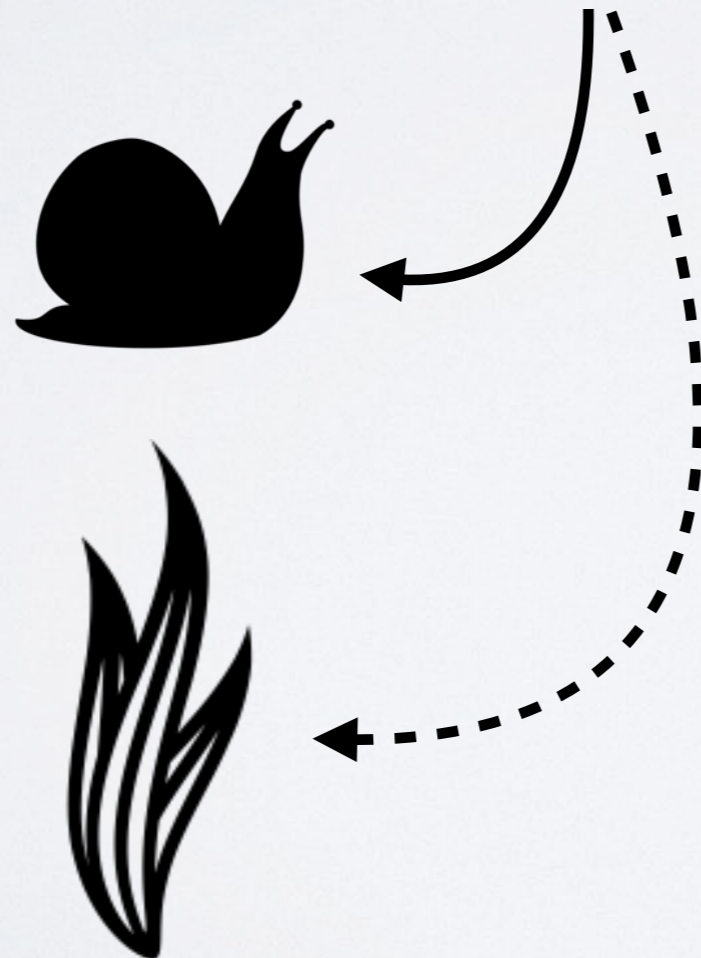
Sessile epifauna

Primary producers

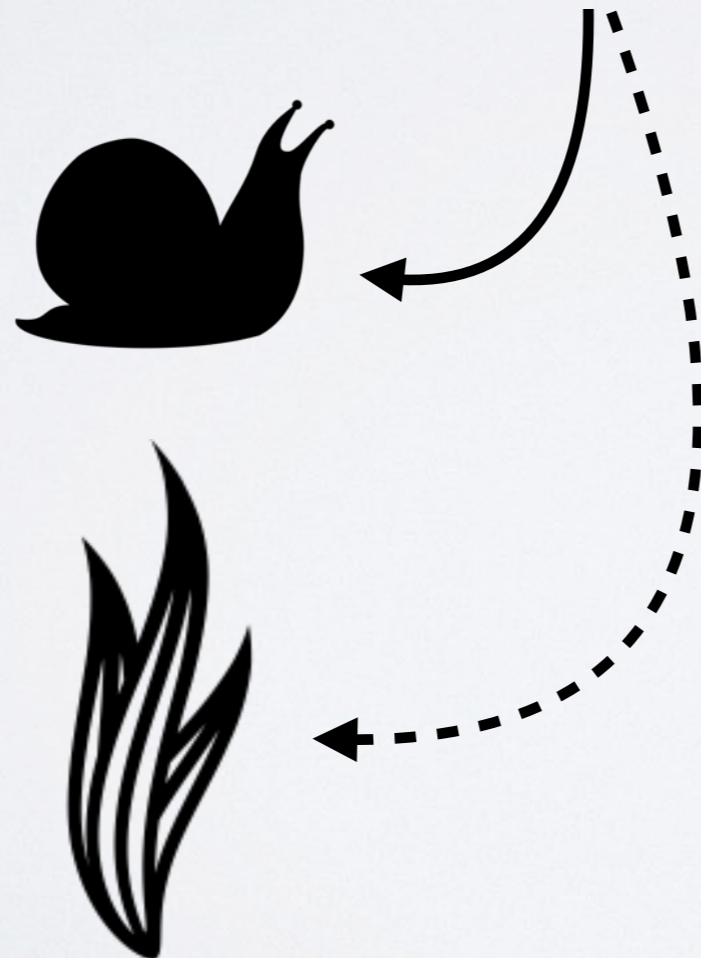
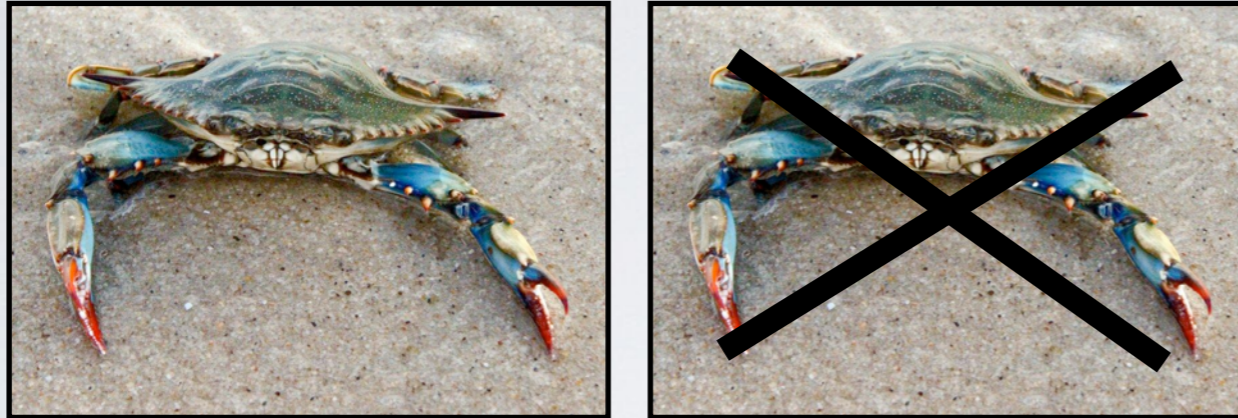
Interaction

Direct

Indirect



Moderators



Crab species

Native
Non-native

Prey functional group

Mobile infauna
Mobile epifauna
Vertebrates
Sessile epifauna
Primary producers

Interaction

Direct
Indirect

Experimental design

Natural field experiments
Unstocked enclosures
Stocked enclosures
Lab mesocosms
Predation experiments

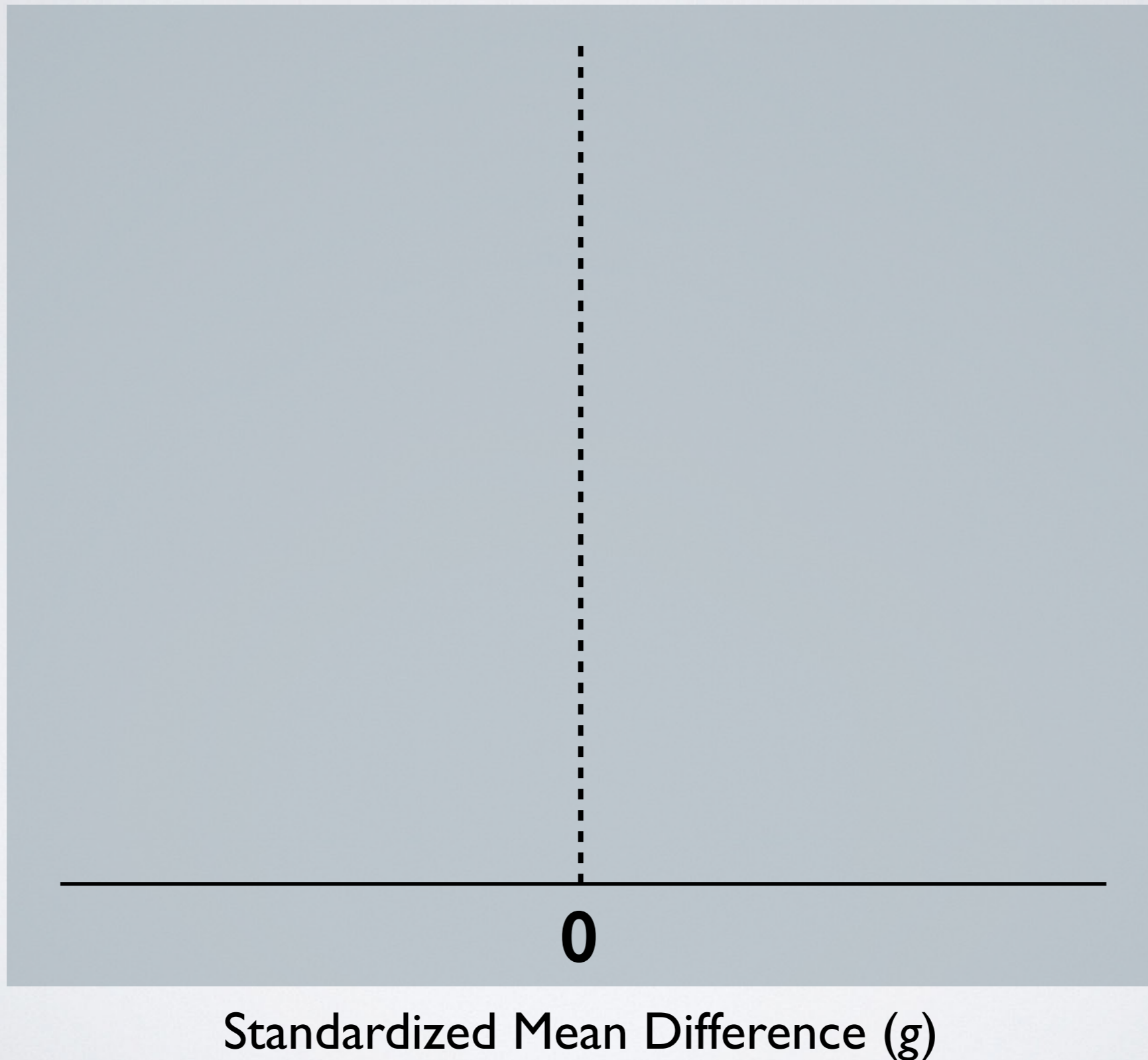
Measuring effect sizes

- Effect size metric = standardized mean difference (Hedges g)
- X = mean abundance of responding species

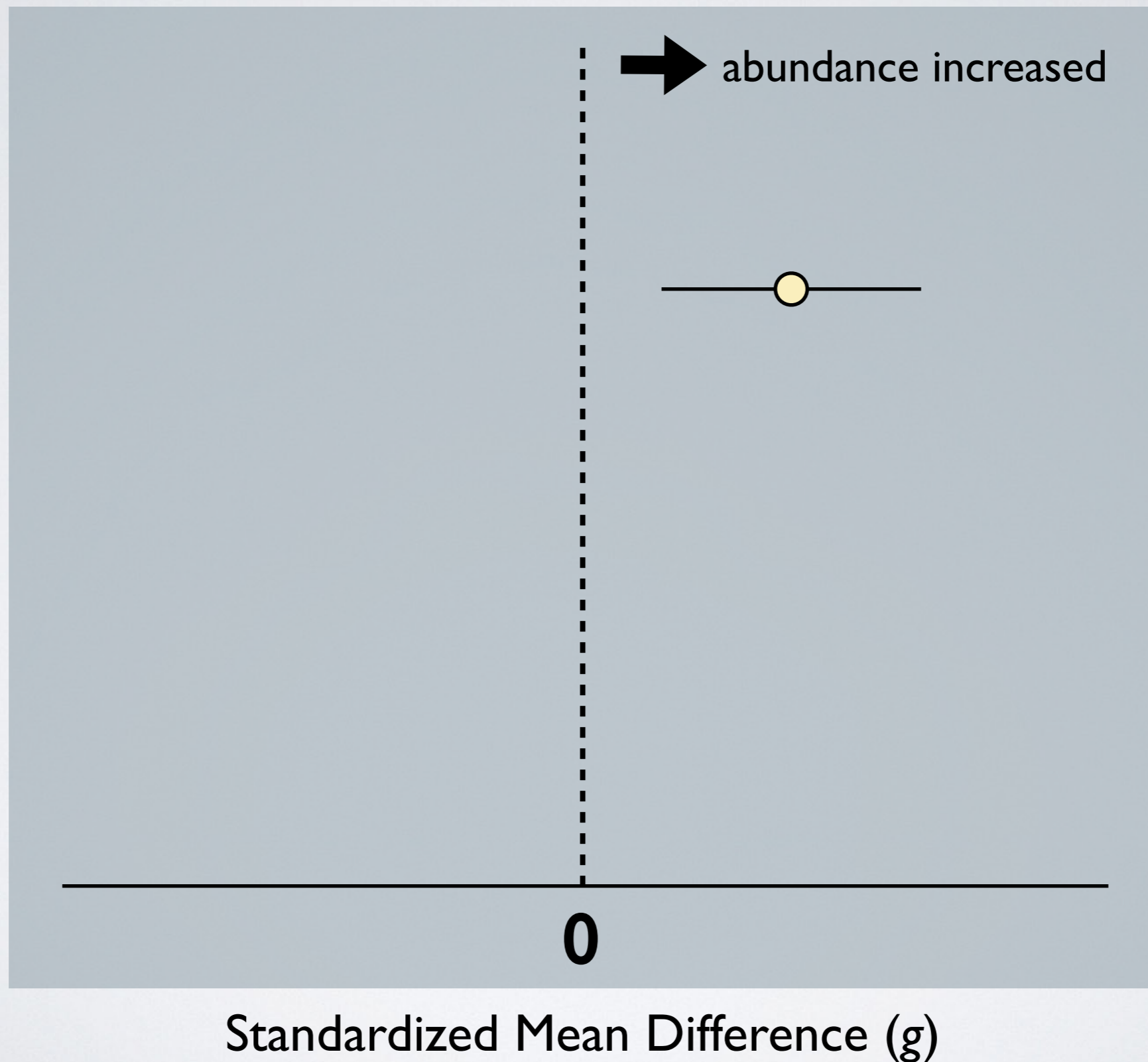
$$g = \frac{X_{\text{without}} - X_{\text{with}}}{S_{\text{pooled}}}$$

- S_{pooled} is the pooled standard deviation across groups
- Effect sizes weighted by the inverse of the sampling variance

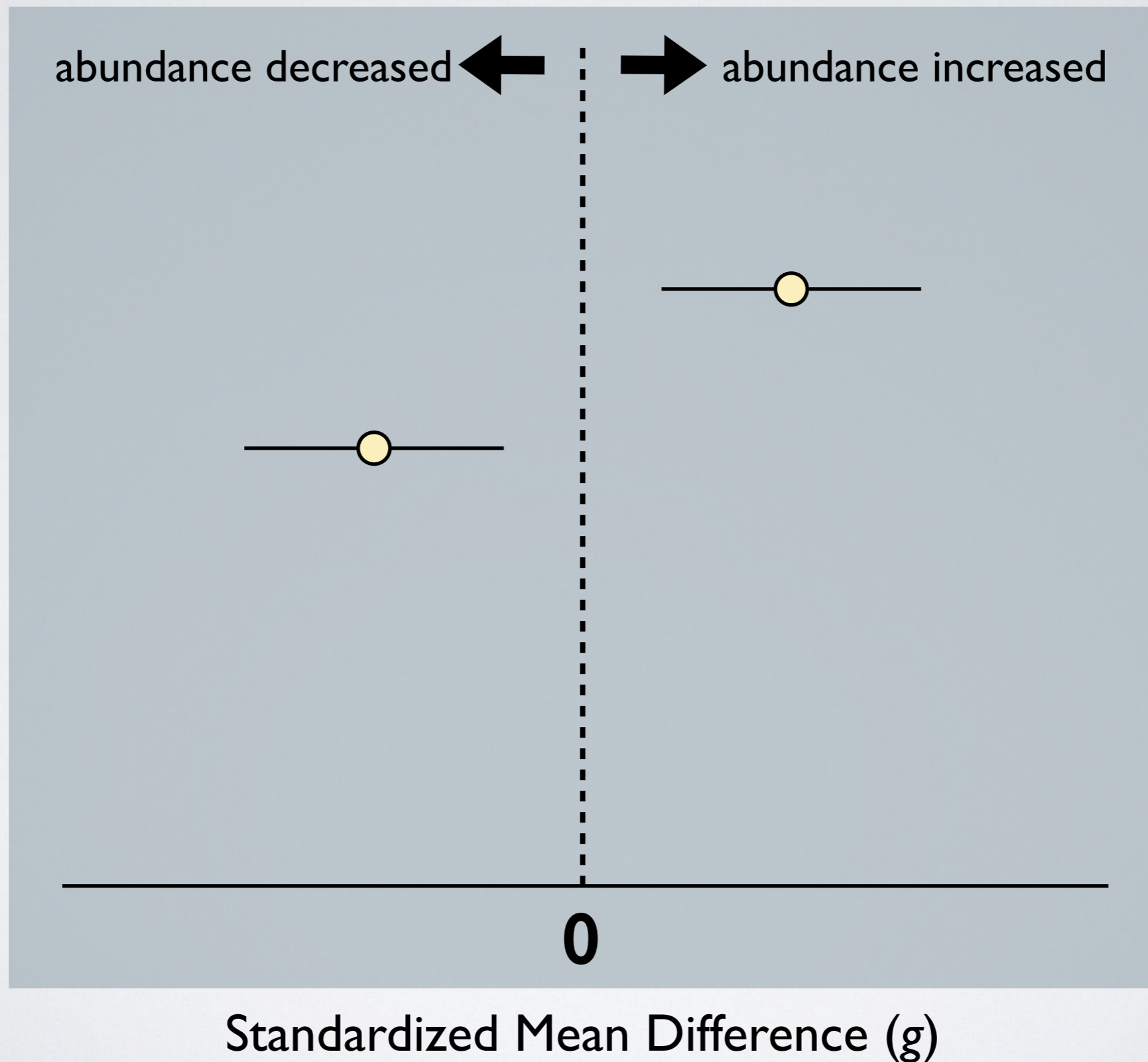
Interpreting effect sizes



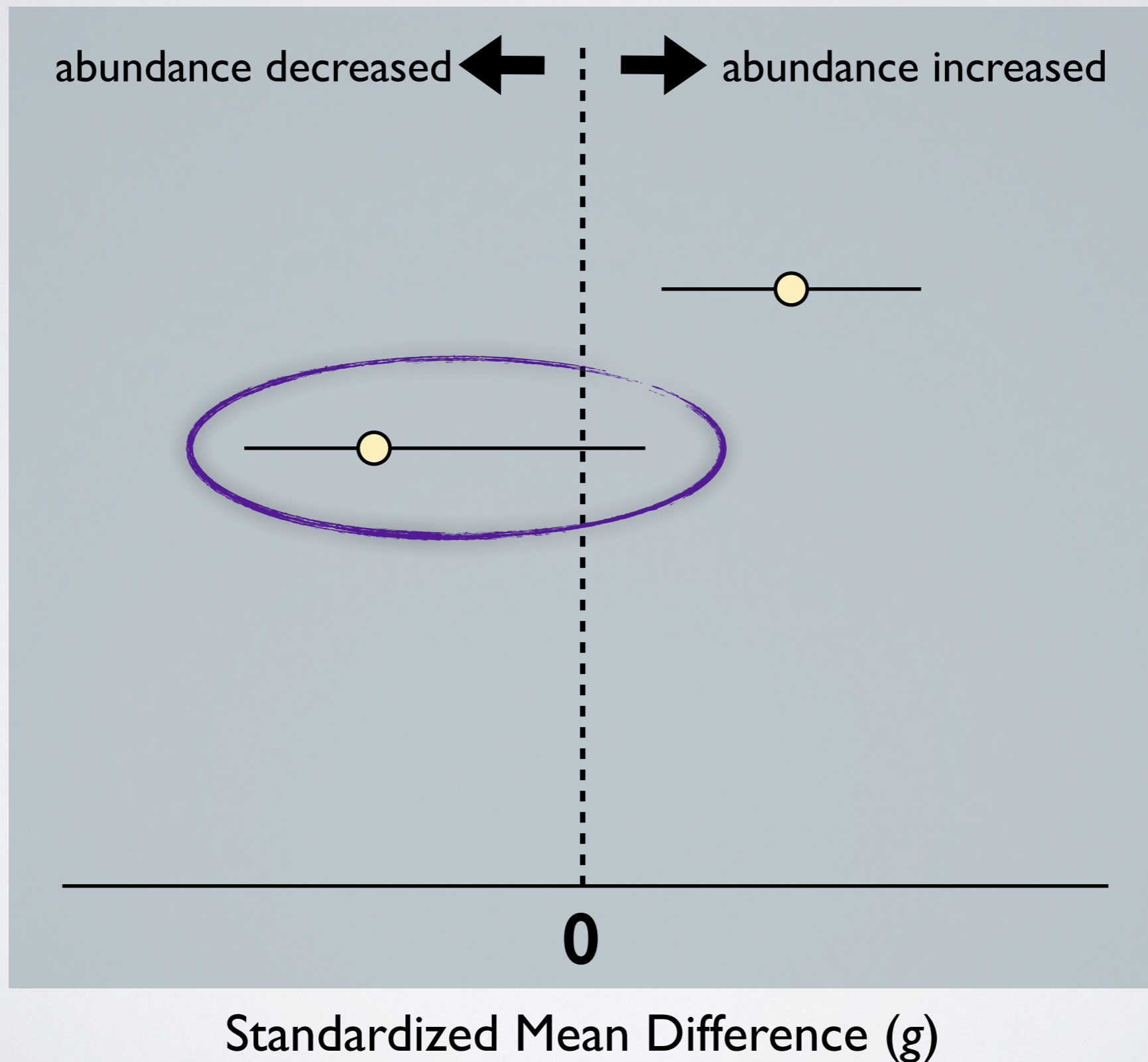
Interpreting effect sizes



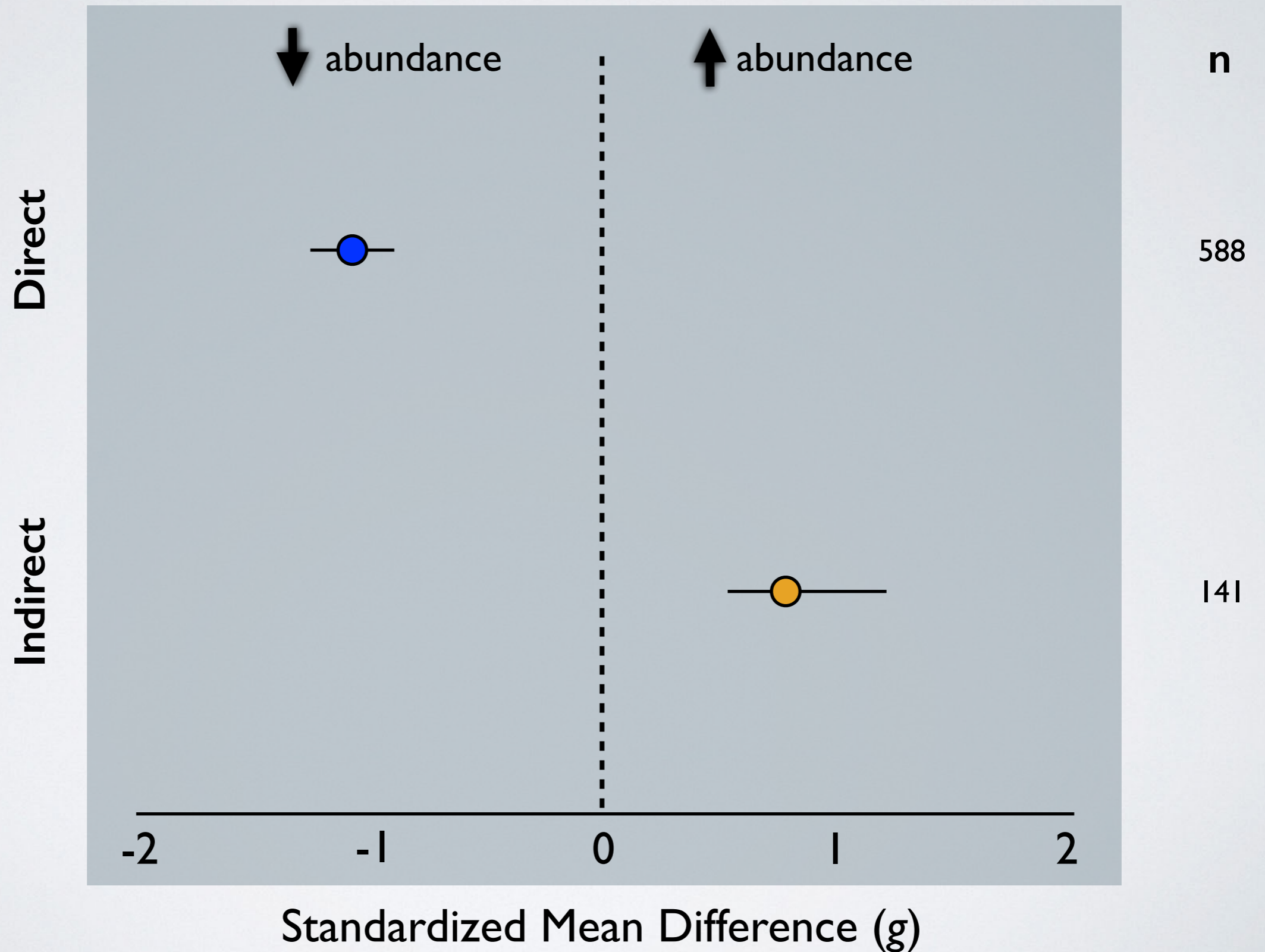
Interpreting effect sizes



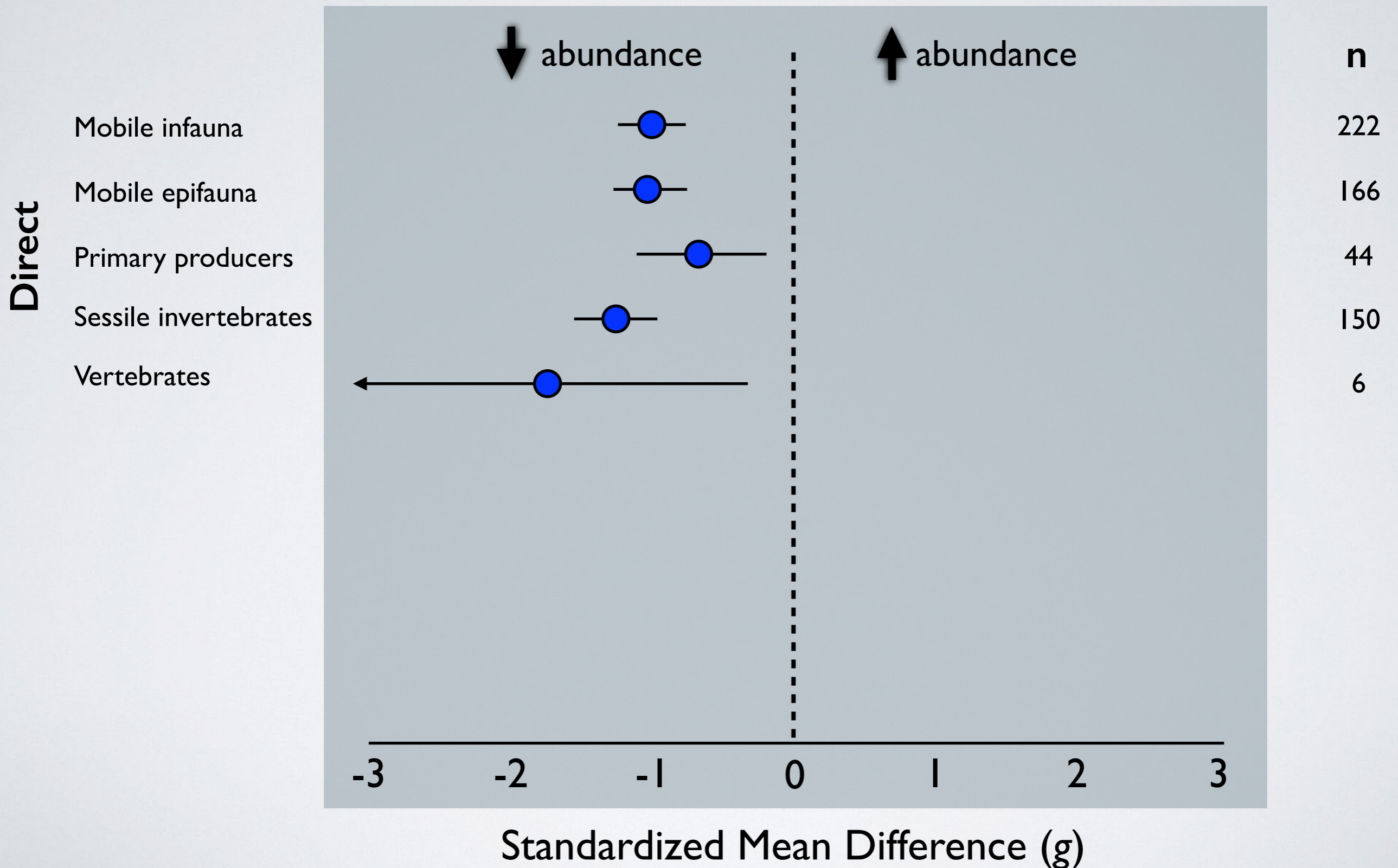
Interpreting effect sizes



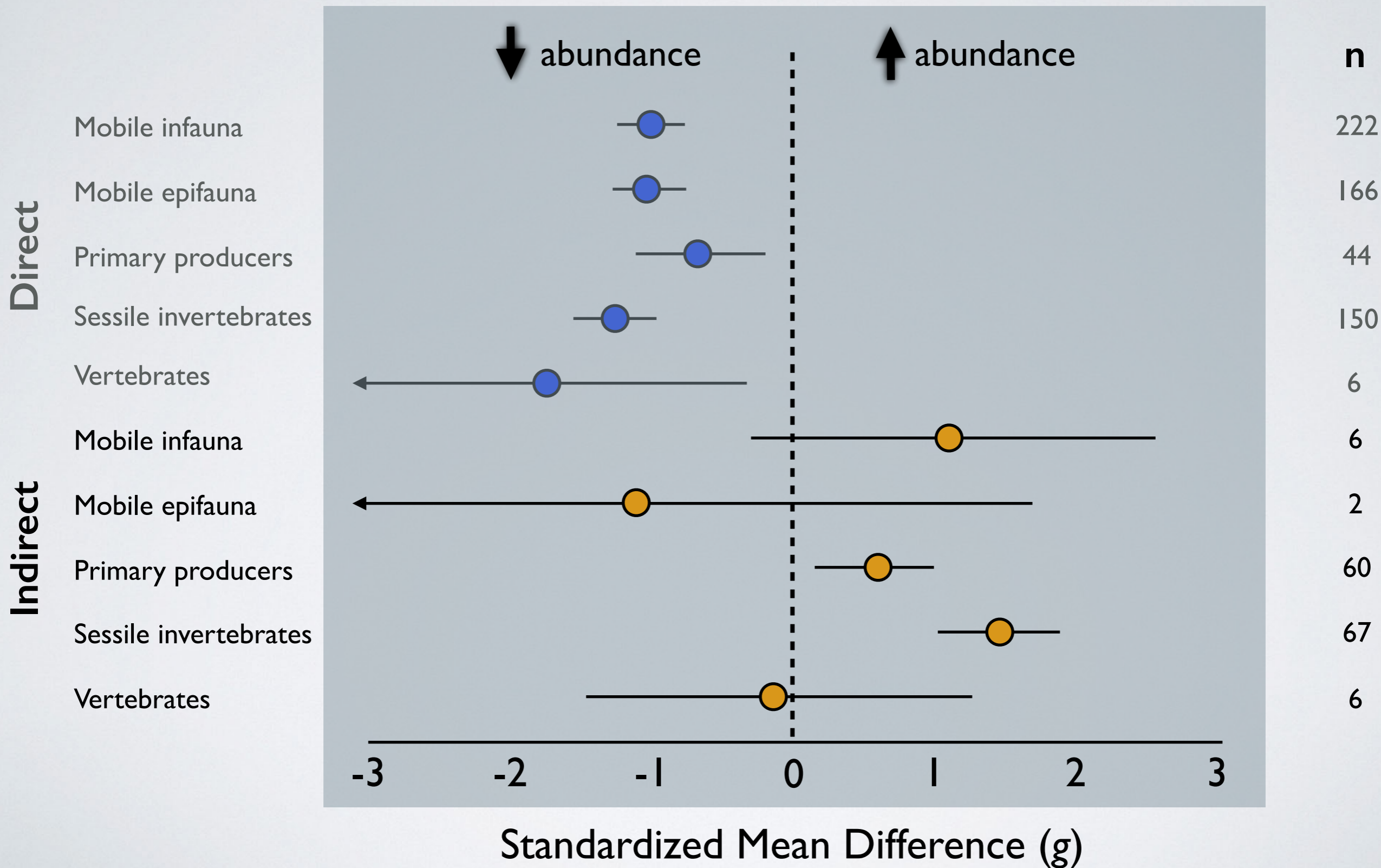
Direct vs. indirect



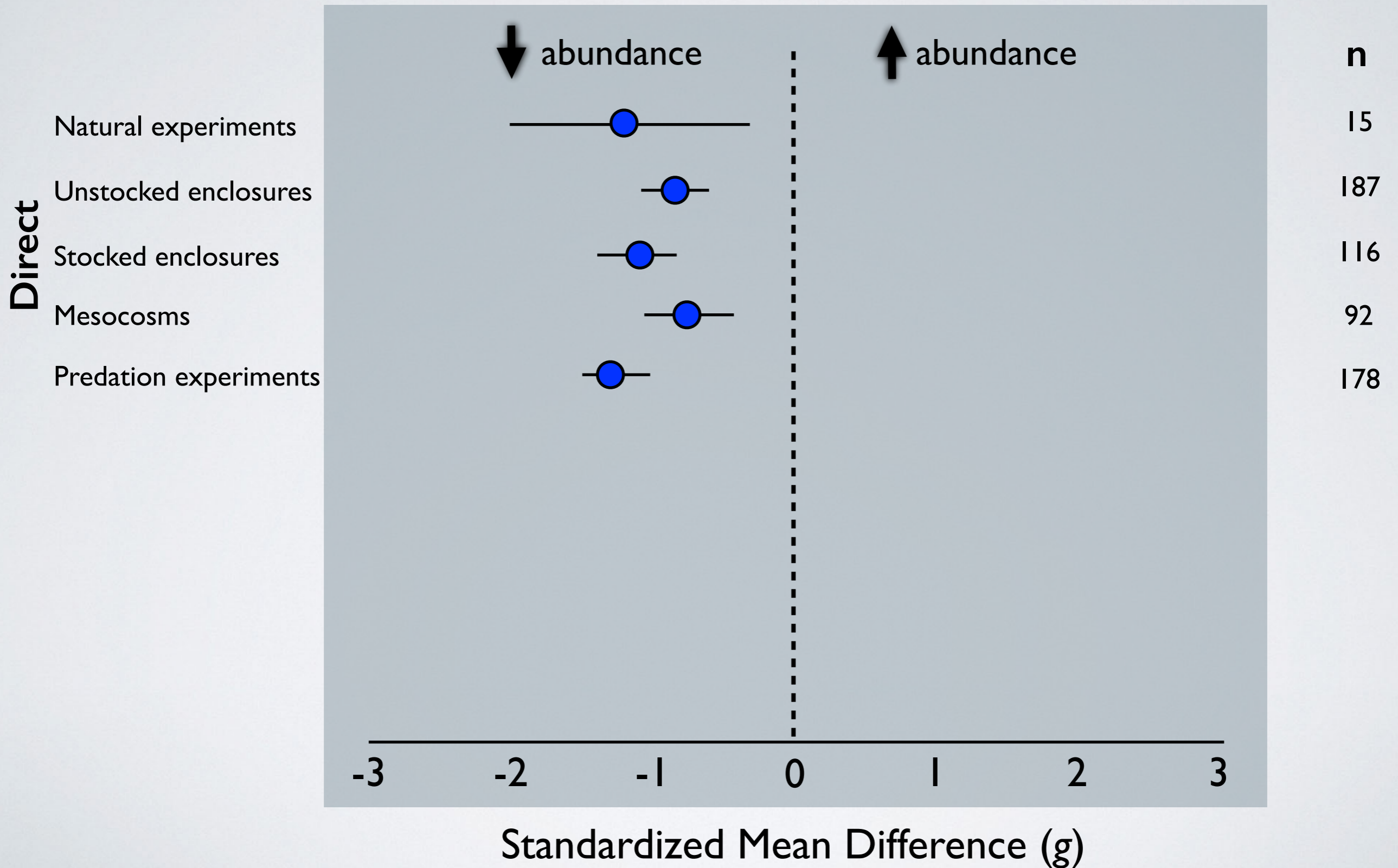
Prey functional group



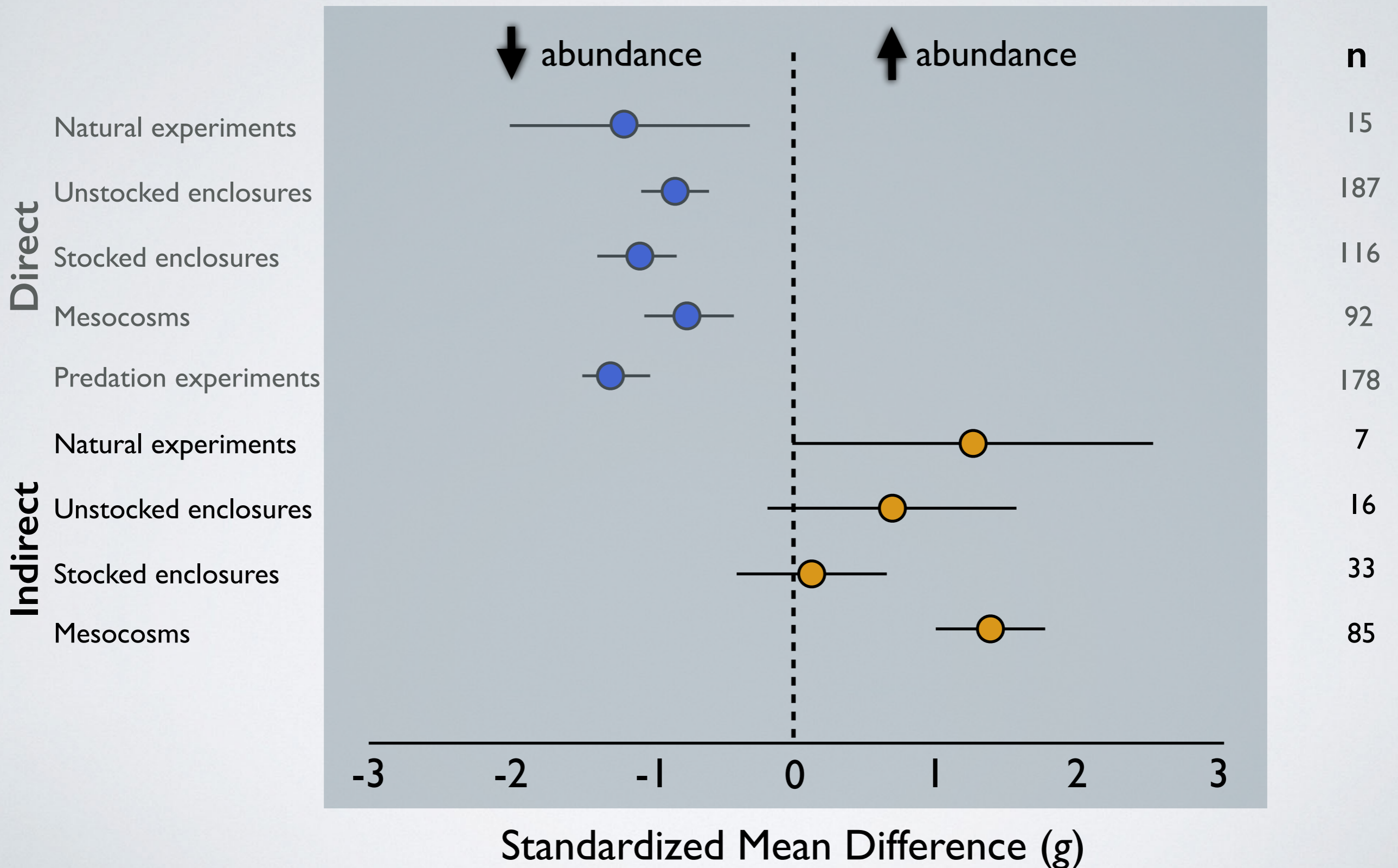
Prey functional group



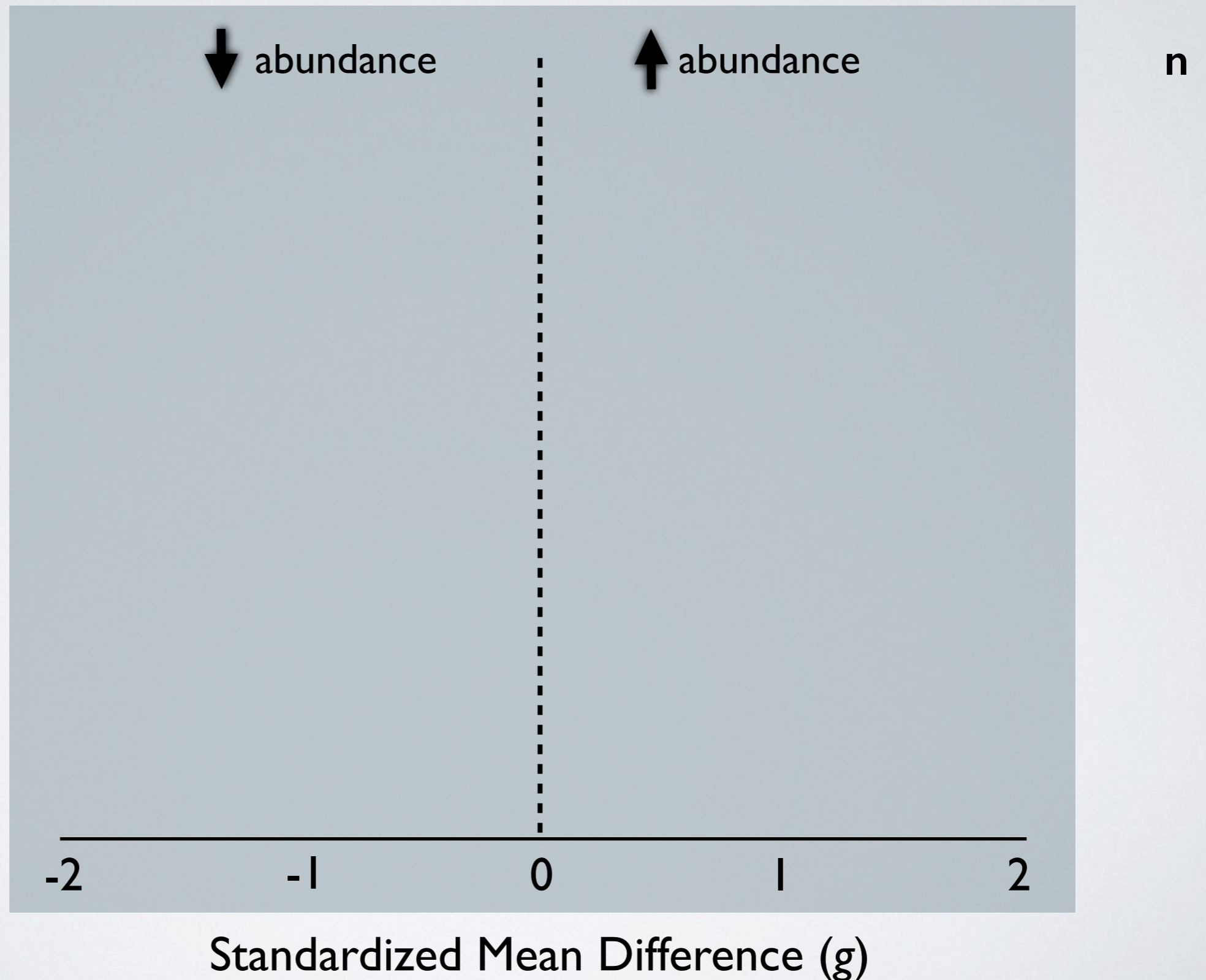
Experimental design



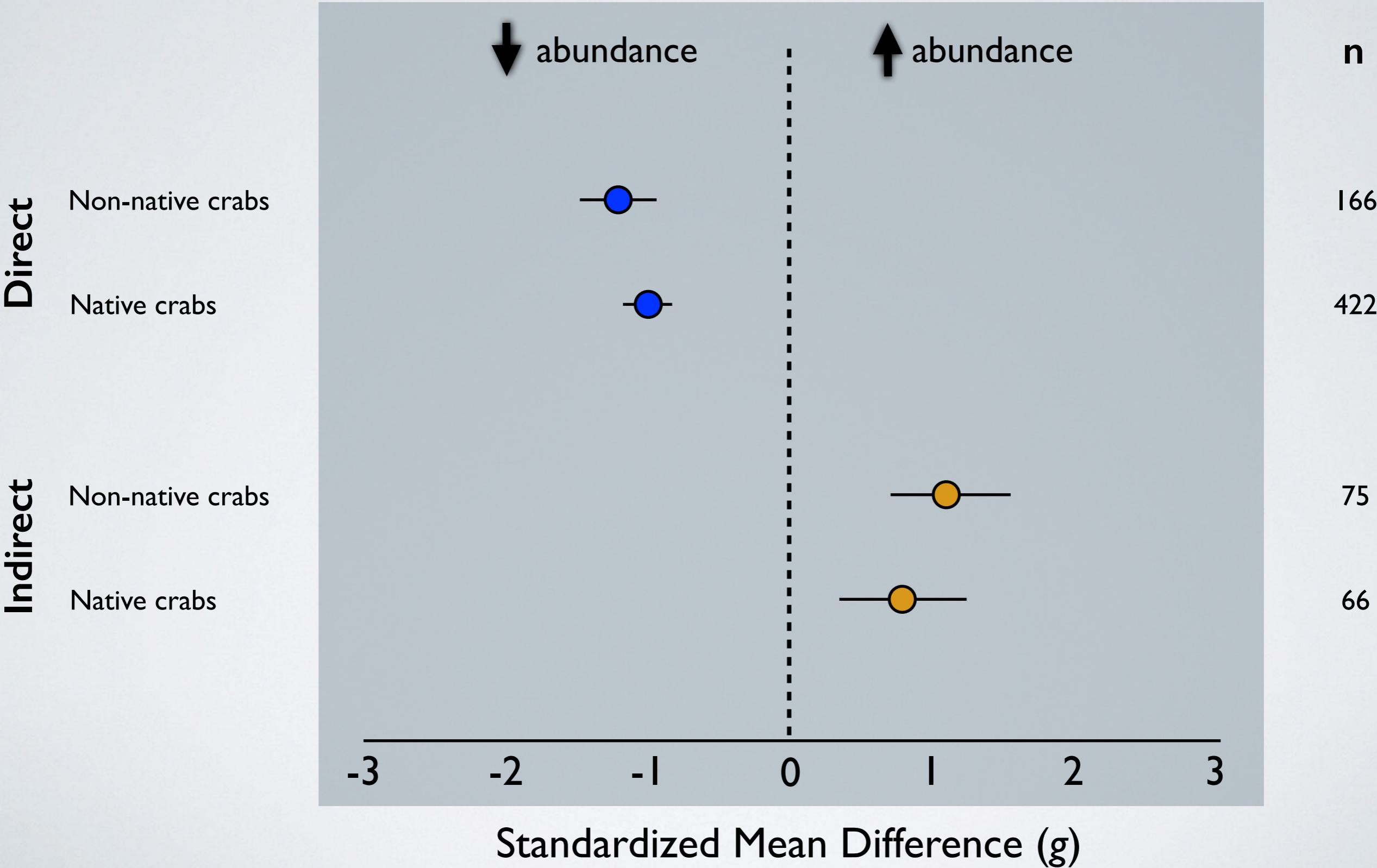
Experimental design



Are invasive crabs better predators?



Are invasive crabs better predators?



Functionally novel predators



Interspecific competition



Population vs. *per capita* effects



Functionally novel predators



Interspecific competition



Population vs. *per capita* effects

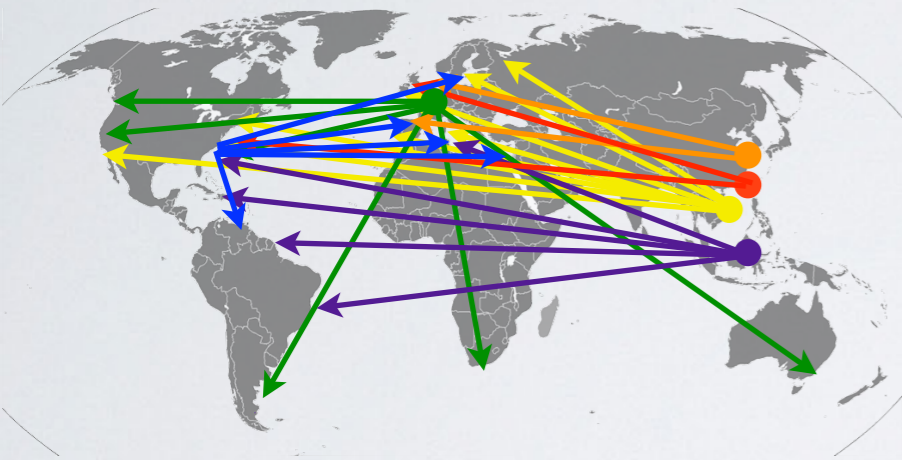


Cumulative impacts on native biodiversity



Conclusions

Global invasions



Design differences

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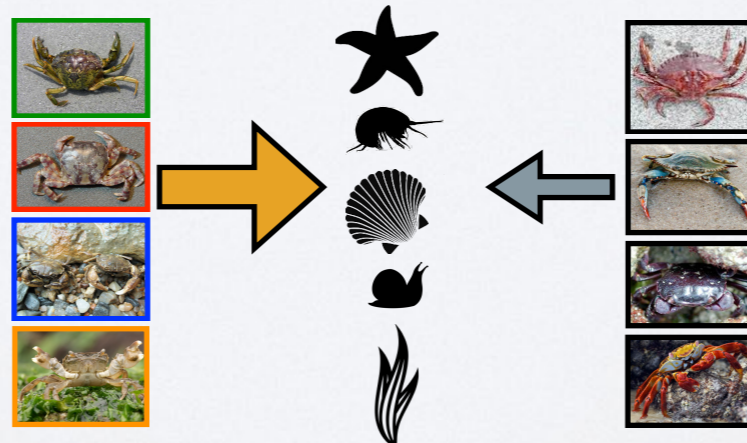
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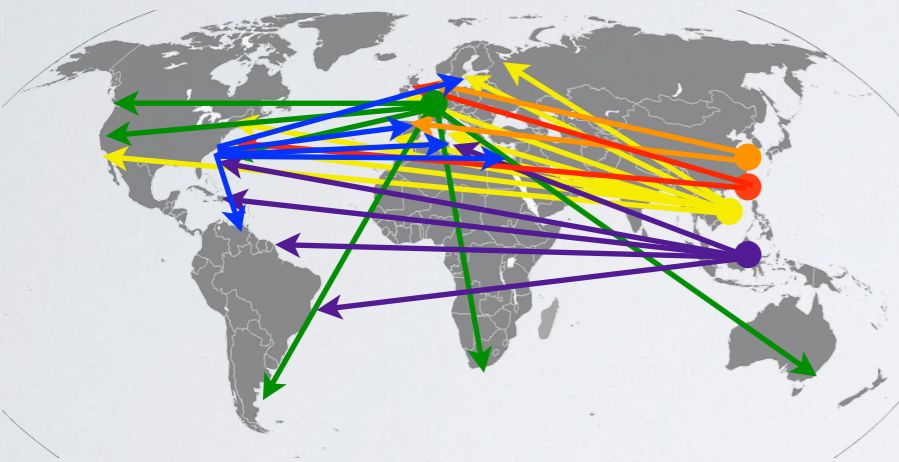
Meta-analysis

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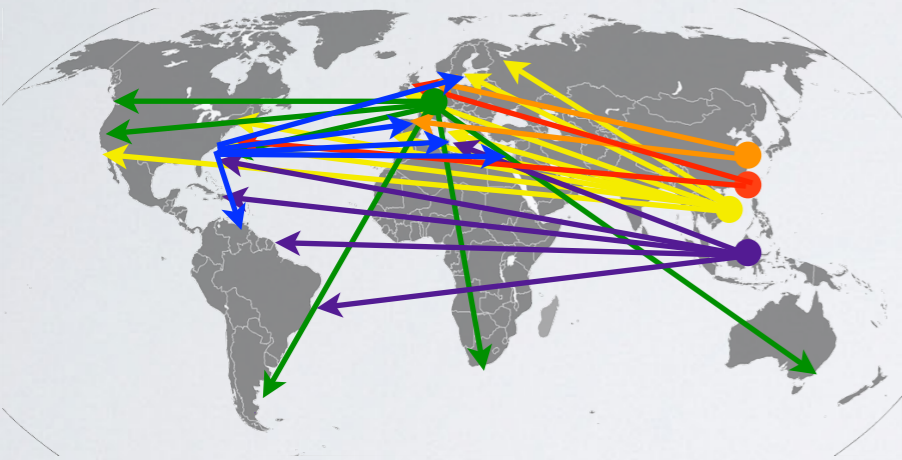
All crabs have negative direct effects

Indirect effects generally positive

Future research: emphasis on interspecific competition

Conclusions

Global invasions



Design differences

No significant difference between designs

Future research: focus on population and ecosystem effects

Meta-analysis

Species interactions

All crabs have negative direct effects
Indirect effects generally positive

Future research: emphasis on interspecific competition

Conclusions

Global invasions

Non-native and native crabs are equally effective predators

Future research: compare native and non-native *in situ* to determine functional redundancy

Design differences

No significant difference between designs

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Meta-analysis

Species interactions

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Indirect effects generally positive

Future research: emphasis on interspecific competition

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