



Royal Netherlands Institute for Sea Research

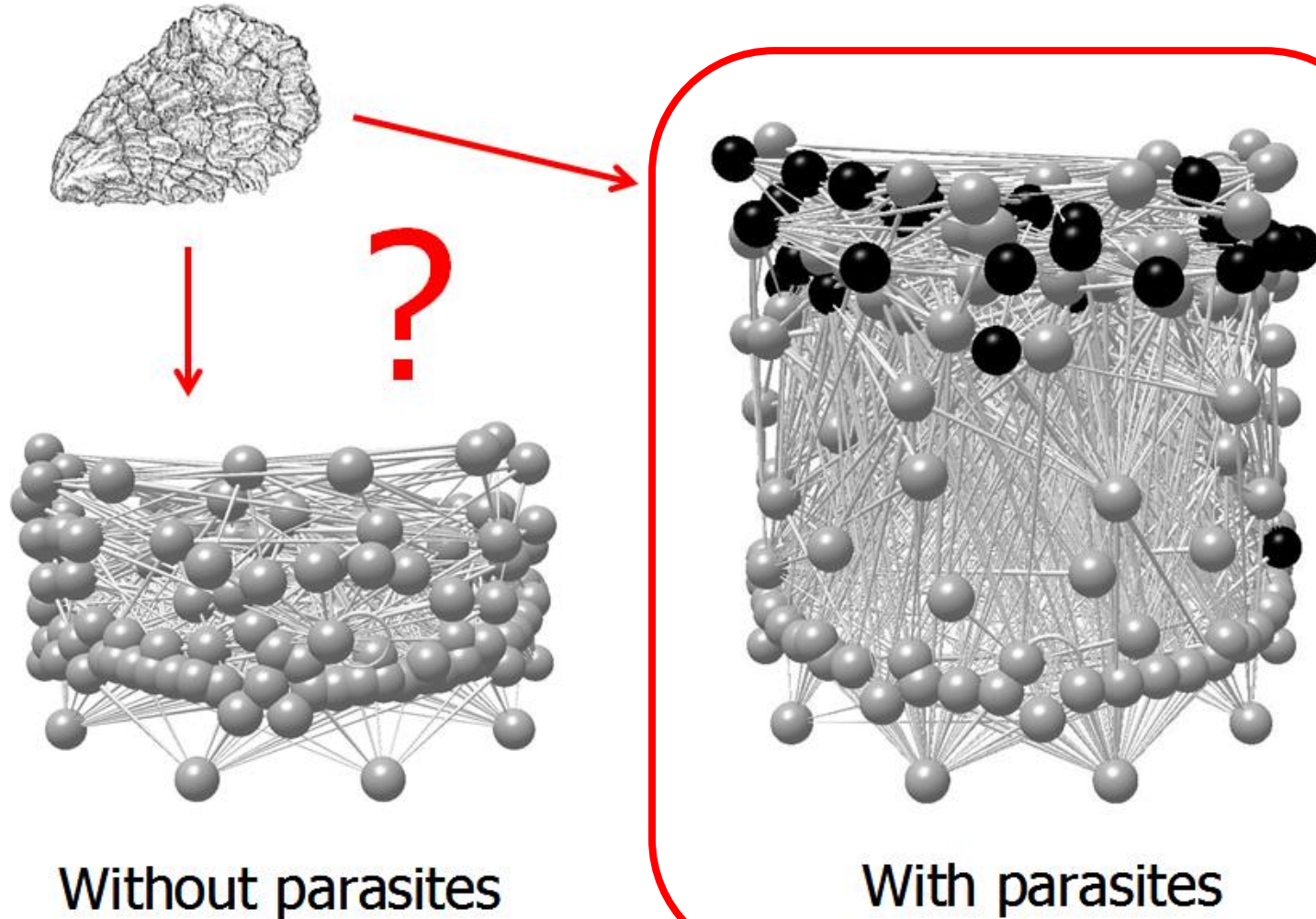
Parasite spill-over, spill-back and dilution effects of invasive oysters

M. Anouk Goedknecht

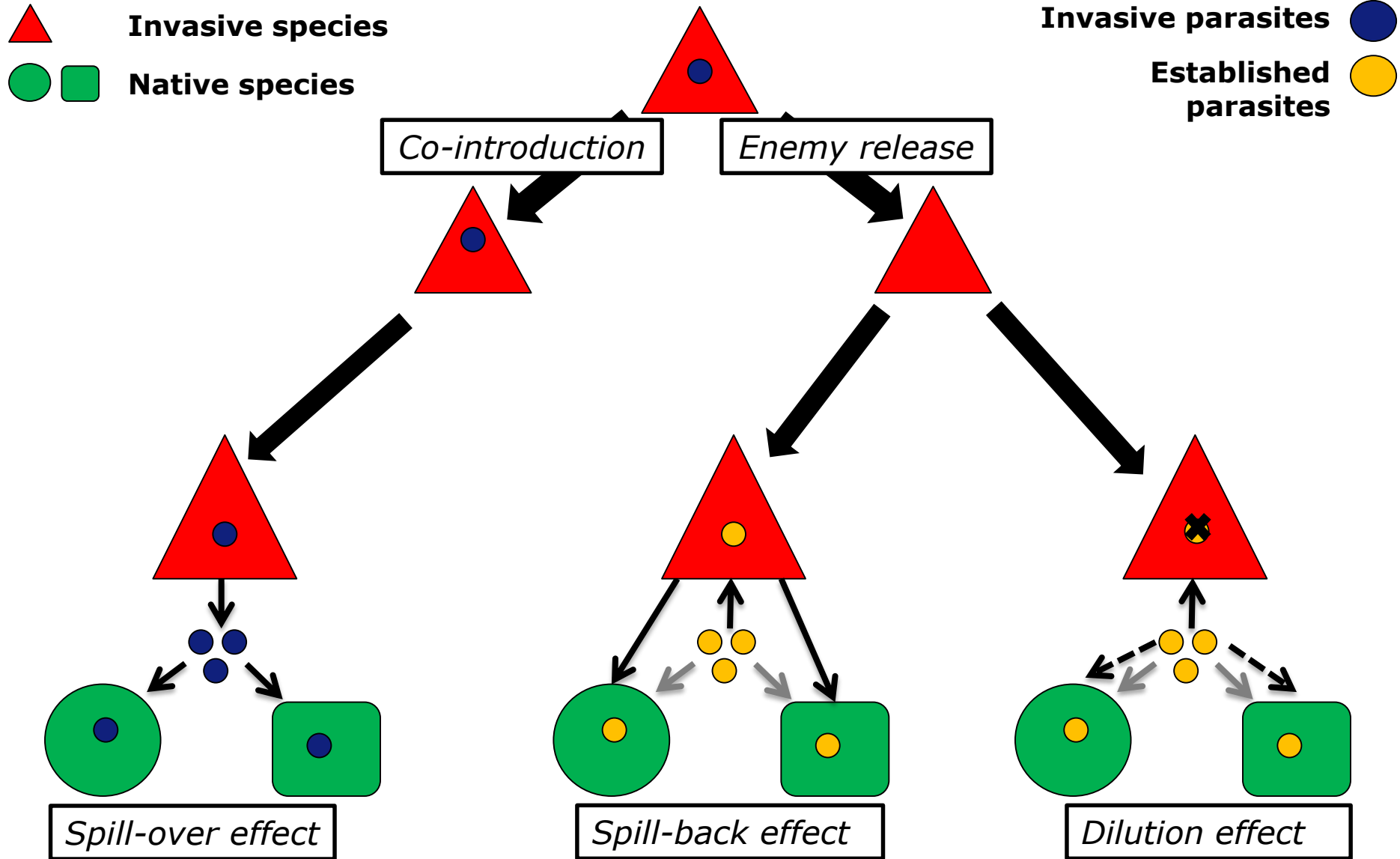
R.W. Nauta, A. Schuster, M. Markovic, S.L. Bedolfe,
D. Shoemith, J.Havermans, J.E. Welsh, P. Luttikhuisen,
C. Buschbaum, K.M. Wegner, J. Van der Meer,
D.W. Thielges

Anouk.Goedknecht@nioz.nl

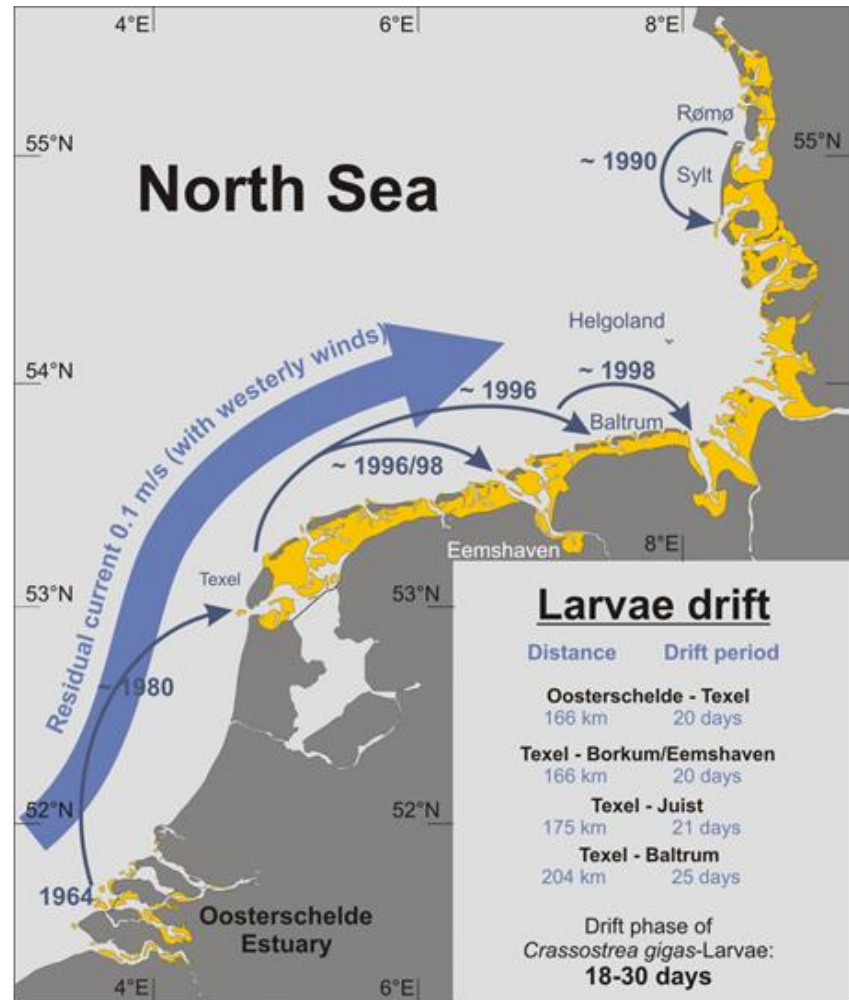
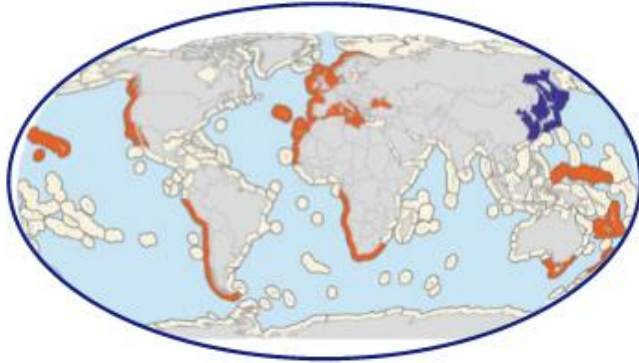
PhD project



Invasive species and parasites

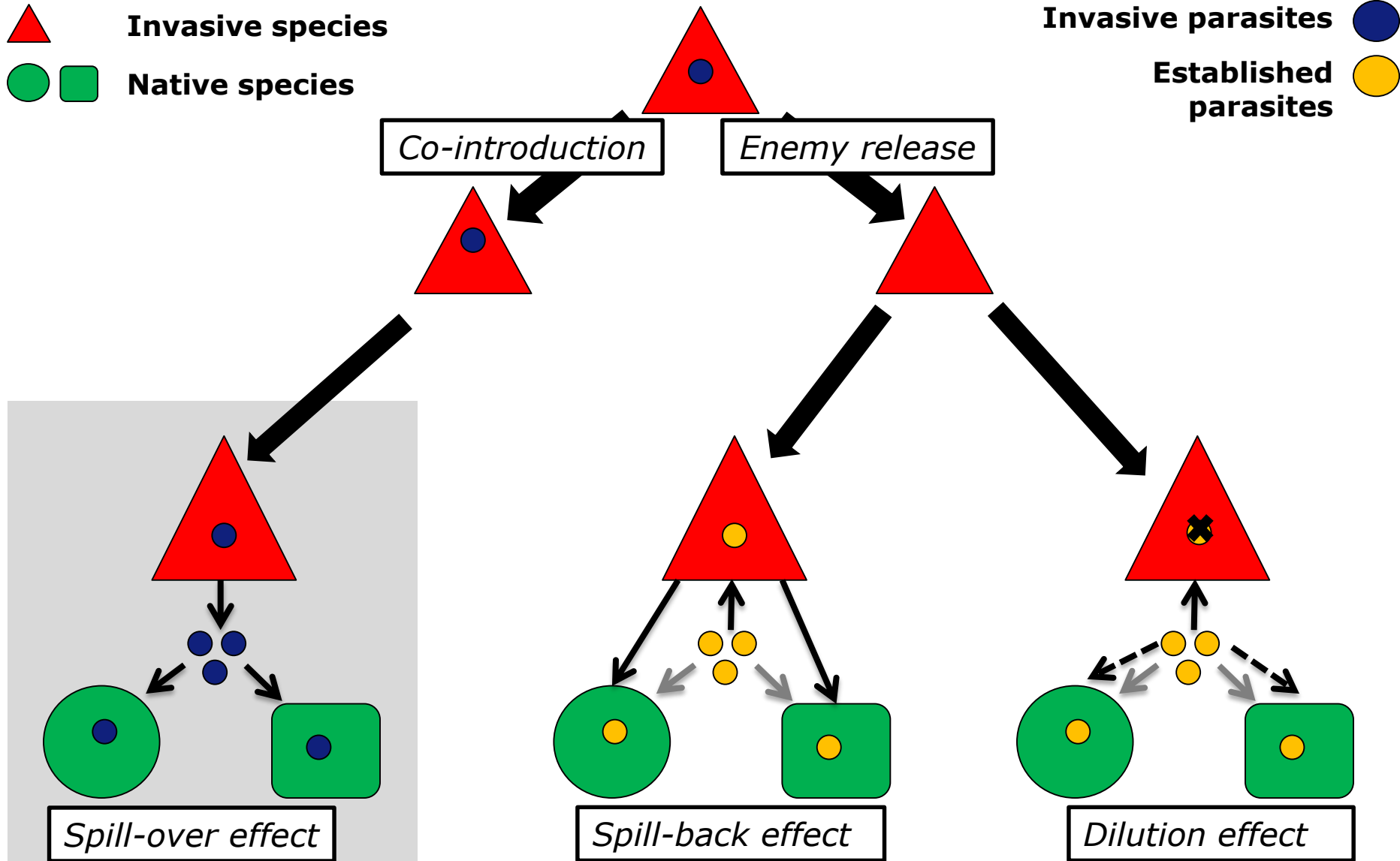


Pacific oyster invasion



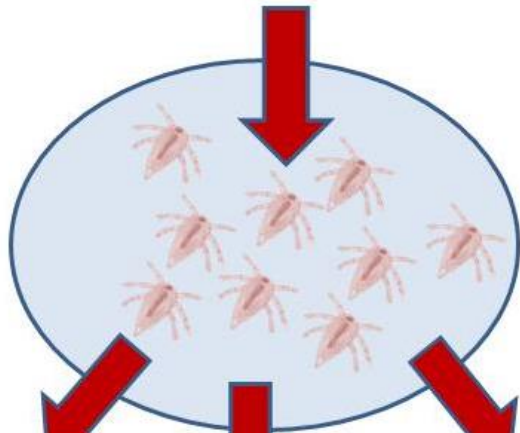
Source: Achim Wehrmann /
Senckenberg Research Institute

Pacific oysters and parasites



Spill-over *Mytilicola orientalis*

Crassostrea gigas
2 - 50 %



Mytilus edulis
3 - 53 %



Cerastoderma edule
2 - 18 %



Macoma balthica
6 - 7 %



Anne-Karin Schuster

Mussel culture plots



Jarco
Havermans

Oosterom

N = 155

Prev = 6,5%

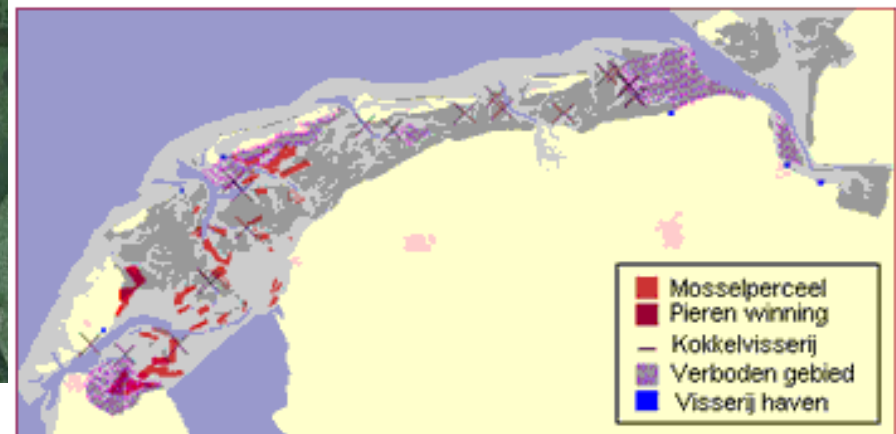
Int = 2 ± 1.5

Inschot

N = 47

Prev = 2,1%

Int = 4



Field work campaign



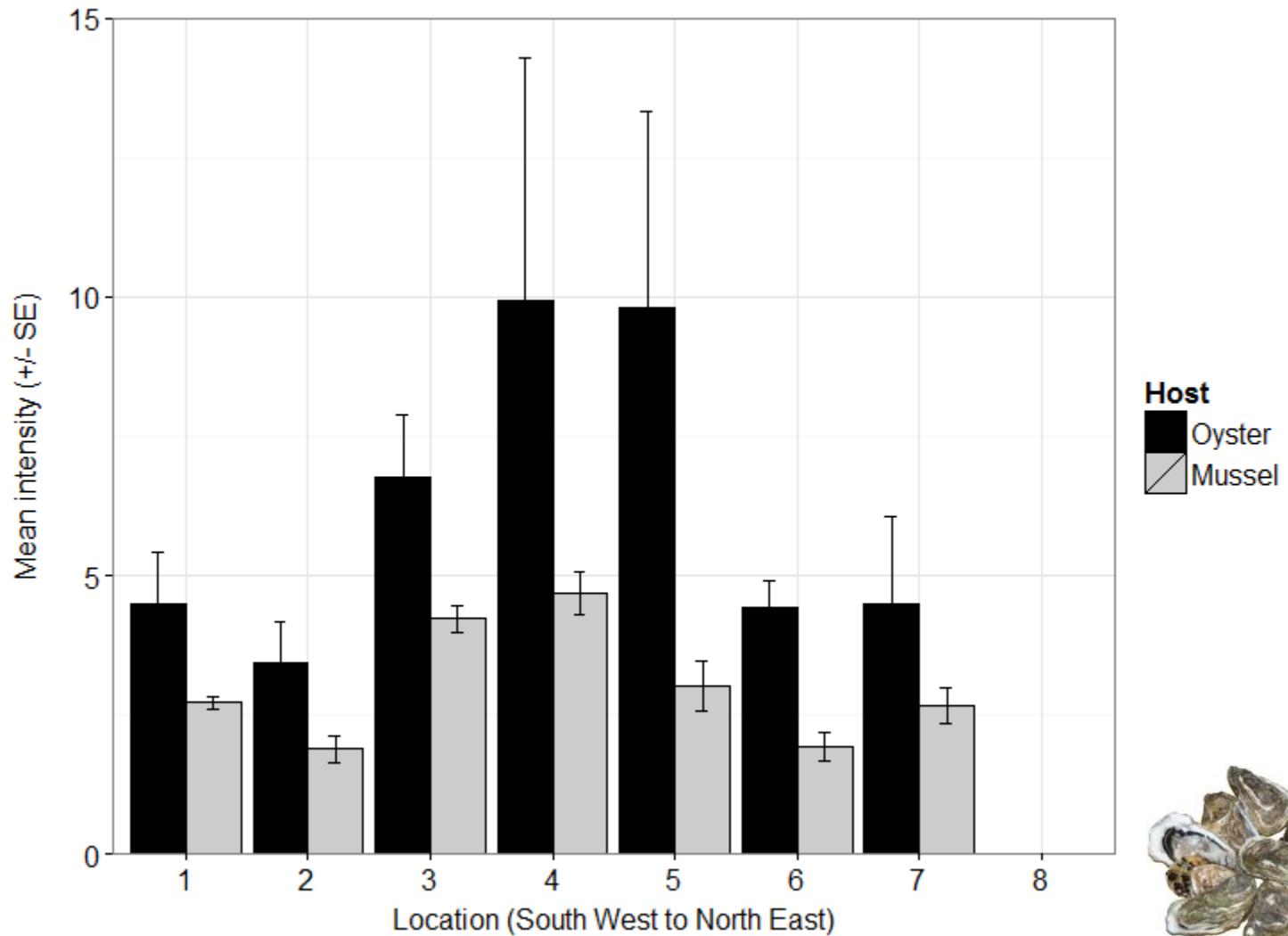
Reinier Nauta



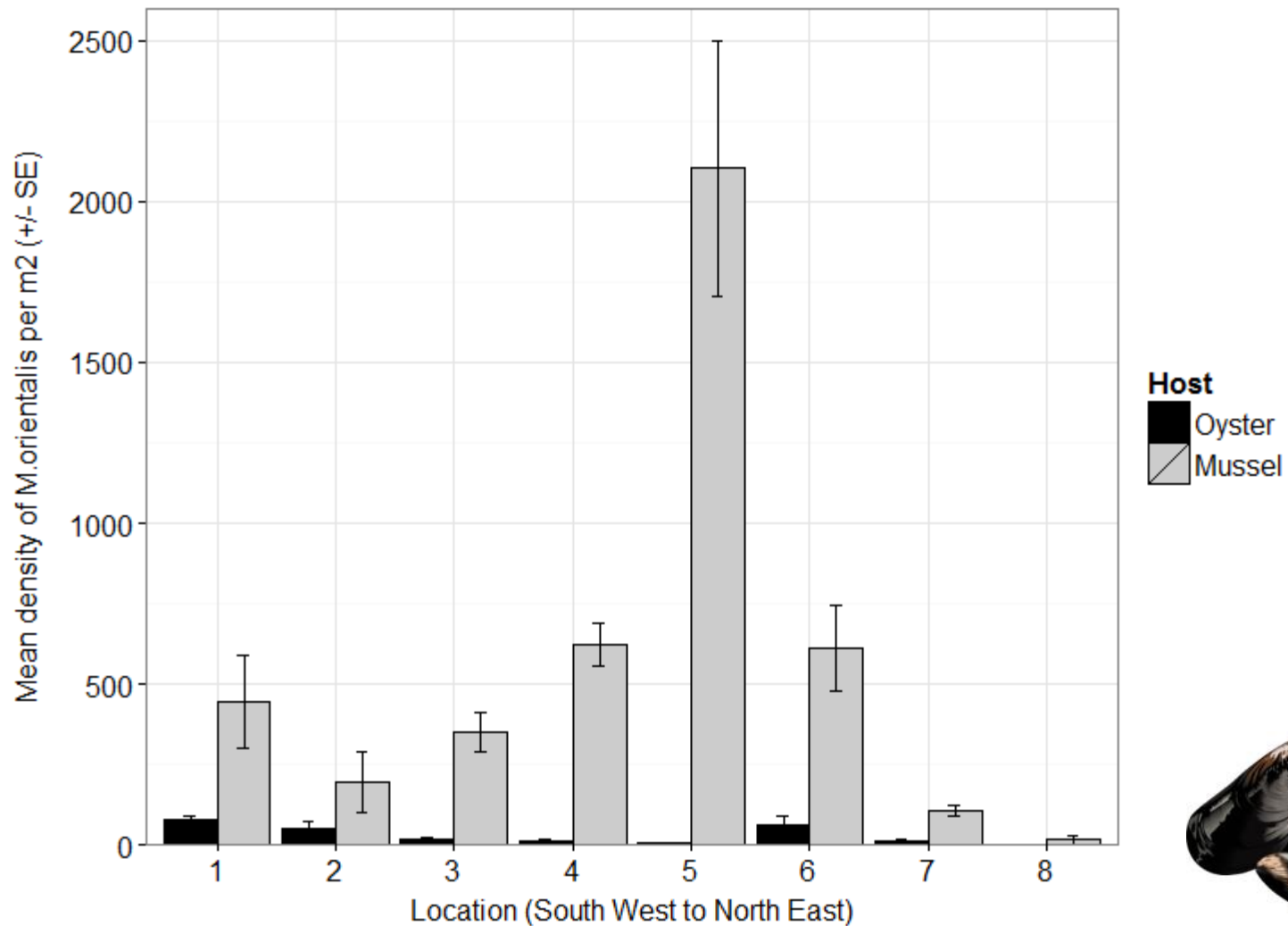
Methods:

- 6 weeks
- 8 beds
- 4 plots per bed
- 20 hosts per plot
- Parasite/host data

Population size *M. orientalis*



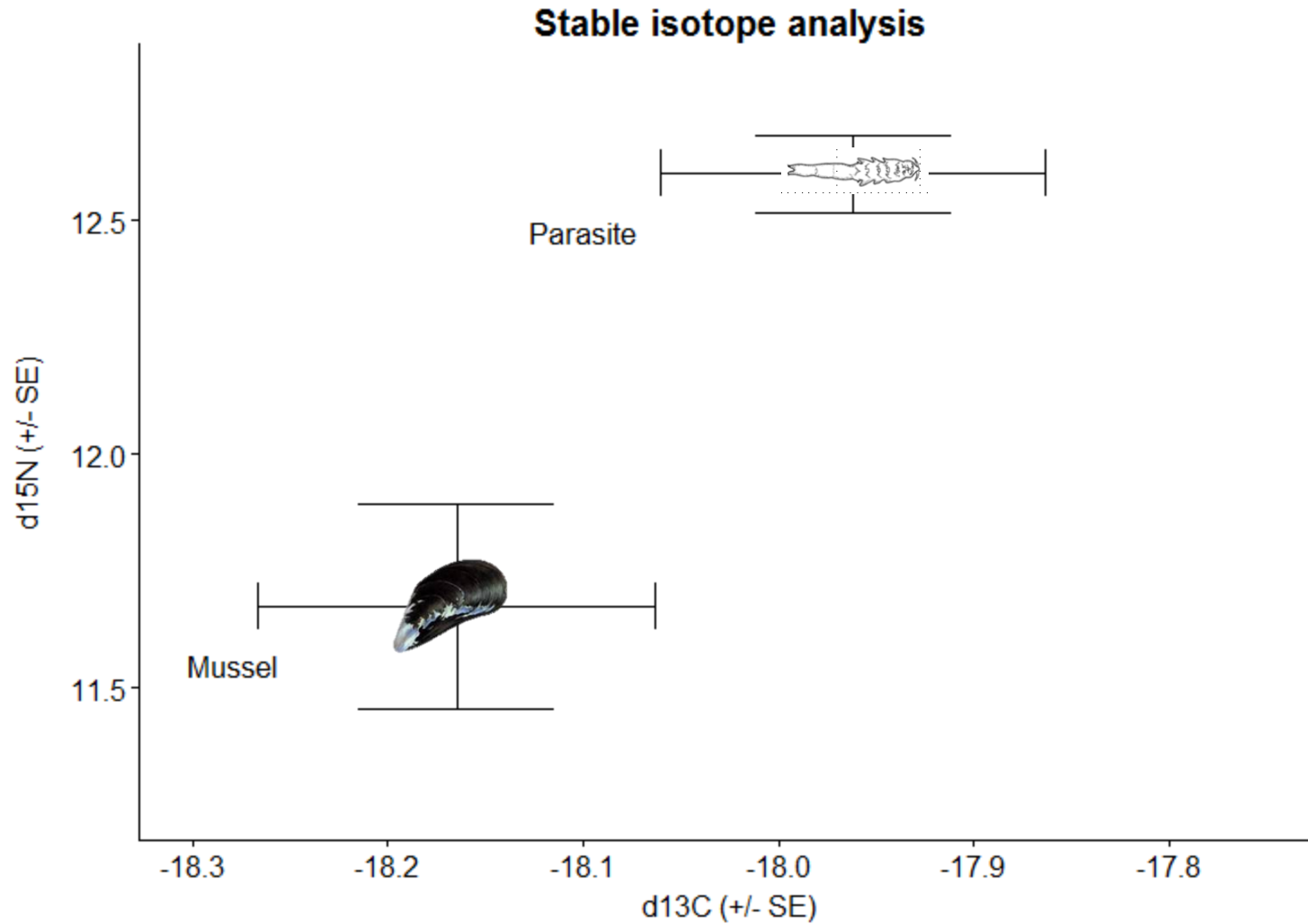
Population size *M. orientalis*



True parasite?



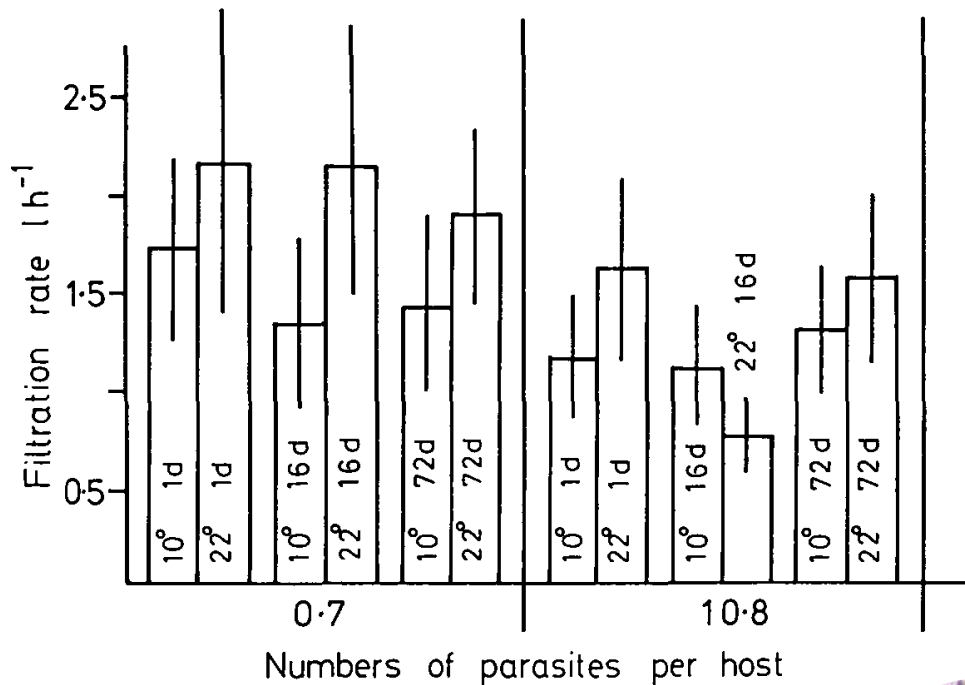
Dave
Shoemith



Effects on host



Sarah Bedolfe



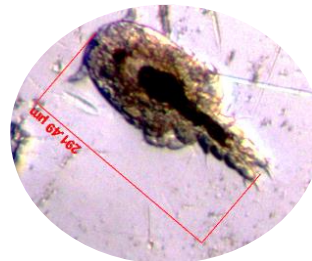
On-going experiments:

Effects of infection on:

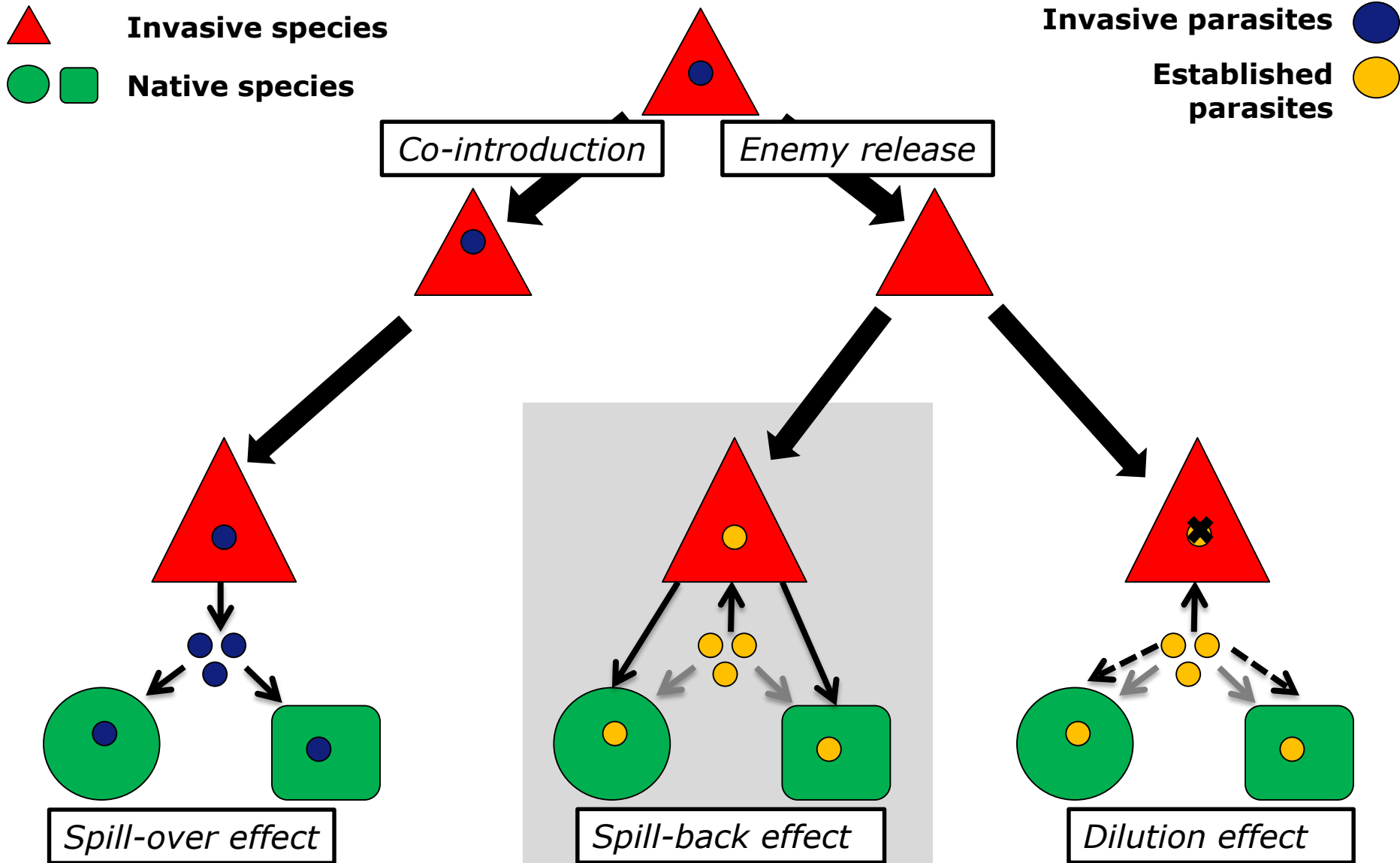
- Filtration capacity
- Body condition
- Attachment strength

Additional stressors:

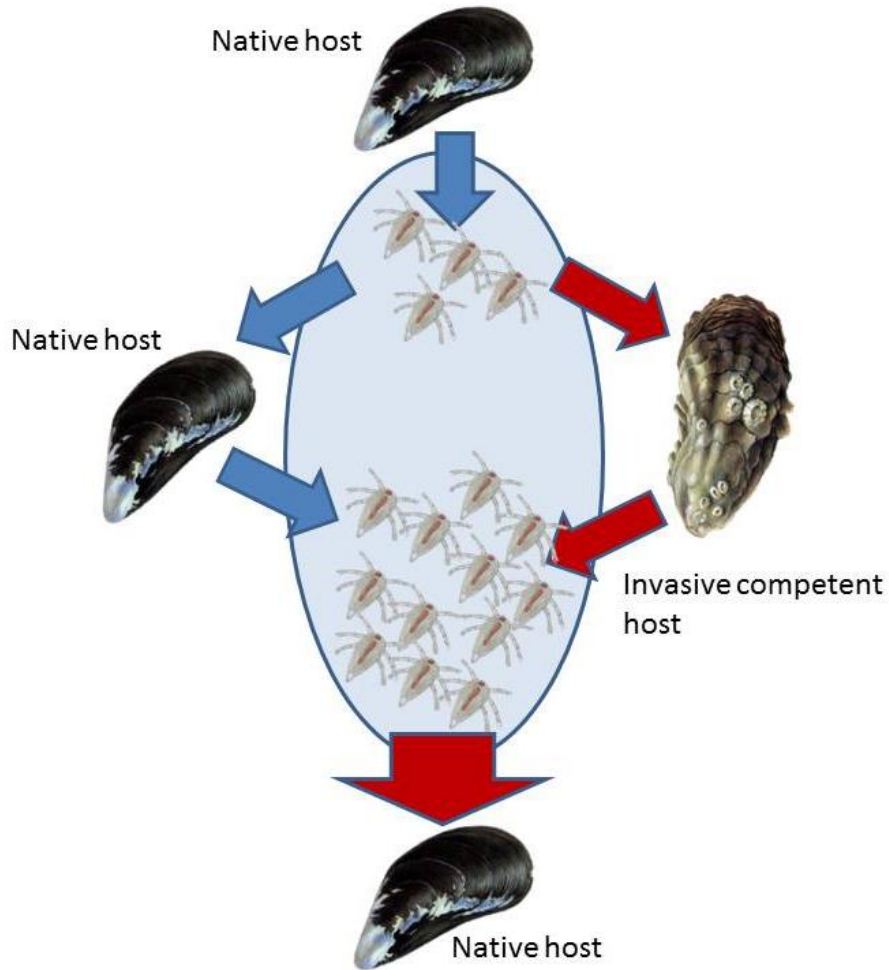
- Oyster competition
- Food limitation



Pacific oysters and parasites



Spill-back effect



Mytilicola intestinalis



Polydora spp.



The enemy of the mussel culture

† *Parasiet doet duizenden dieren sterven*
**Mosselkwekers staan voor
catastrofe** Geen Am. hulp

*De Telegraaf,
8th August 1950*



*Leeuwarder Courant
28th of March 1961*

***Mosselparasiet sprong in
Harlinger percelen***
Vernietigde Zeeuwse mosselkultuur in 1950;
schade voor Waddenzee nog onbekend
(Van onze landbouwredakteur)

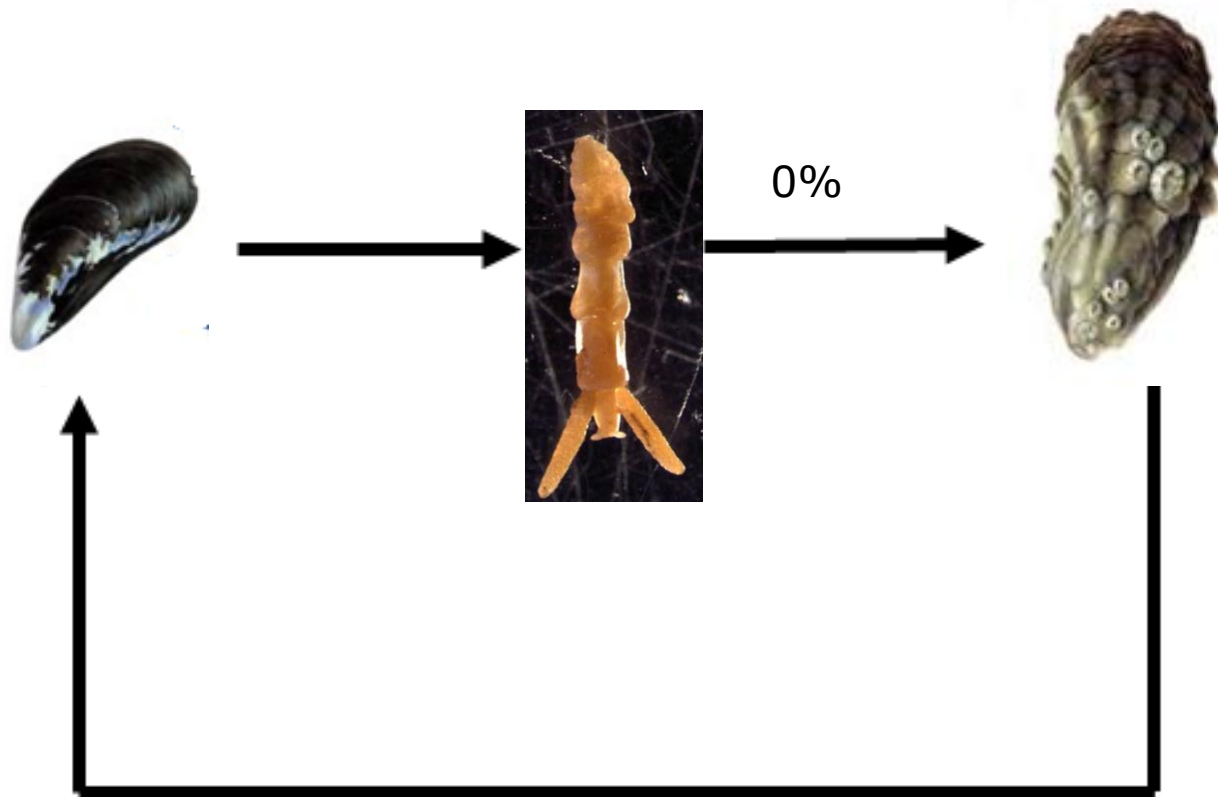
WOENSDAG, 12 DECEMBER 1962

LEEUWARDE

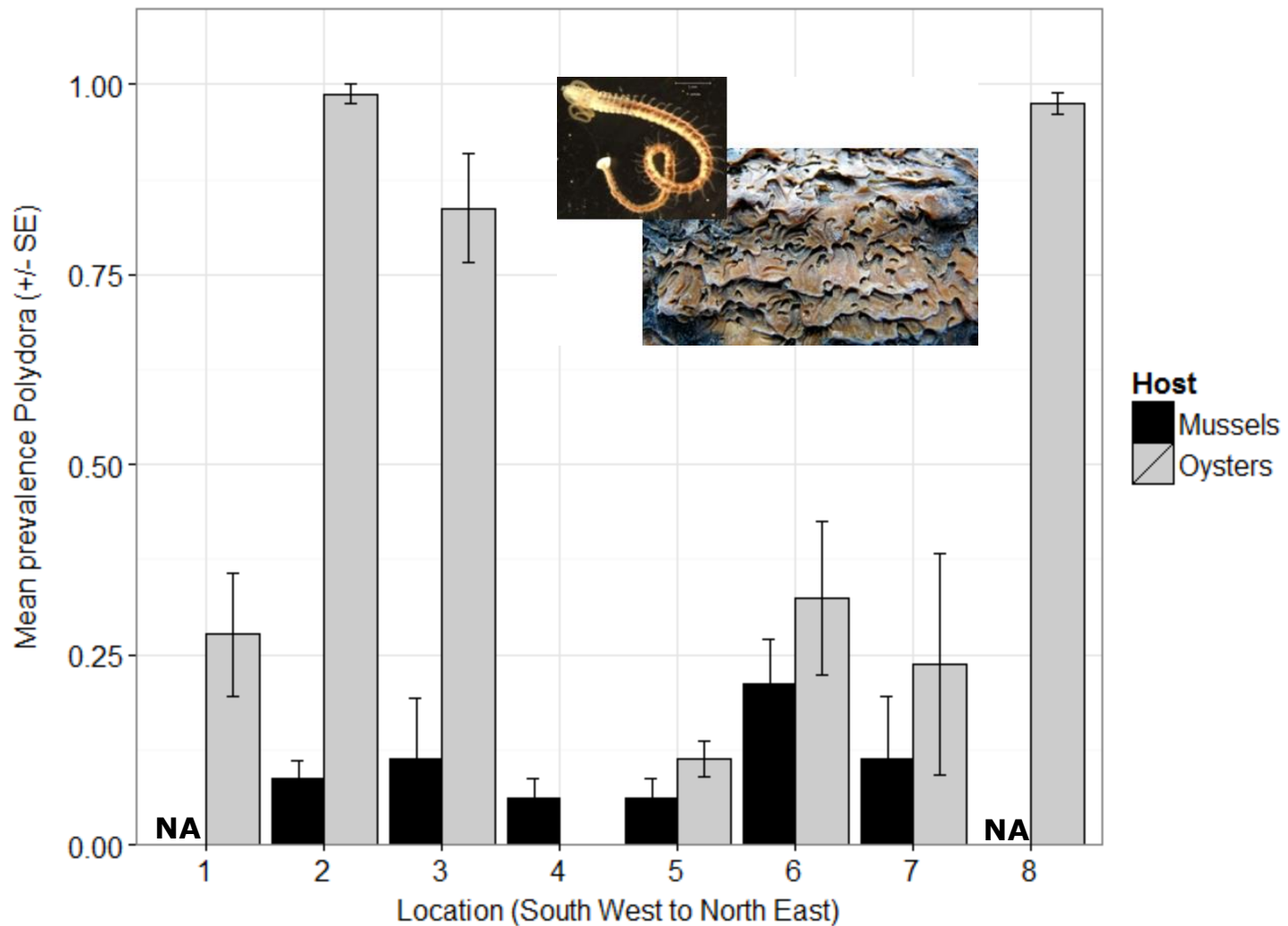
Marine kwam met vlammenwerpers
***Aktie tegen parasiet om behoud
mosselkultuur in Waddenzee***

*Leeuwarder Courant
12th of December
1962*

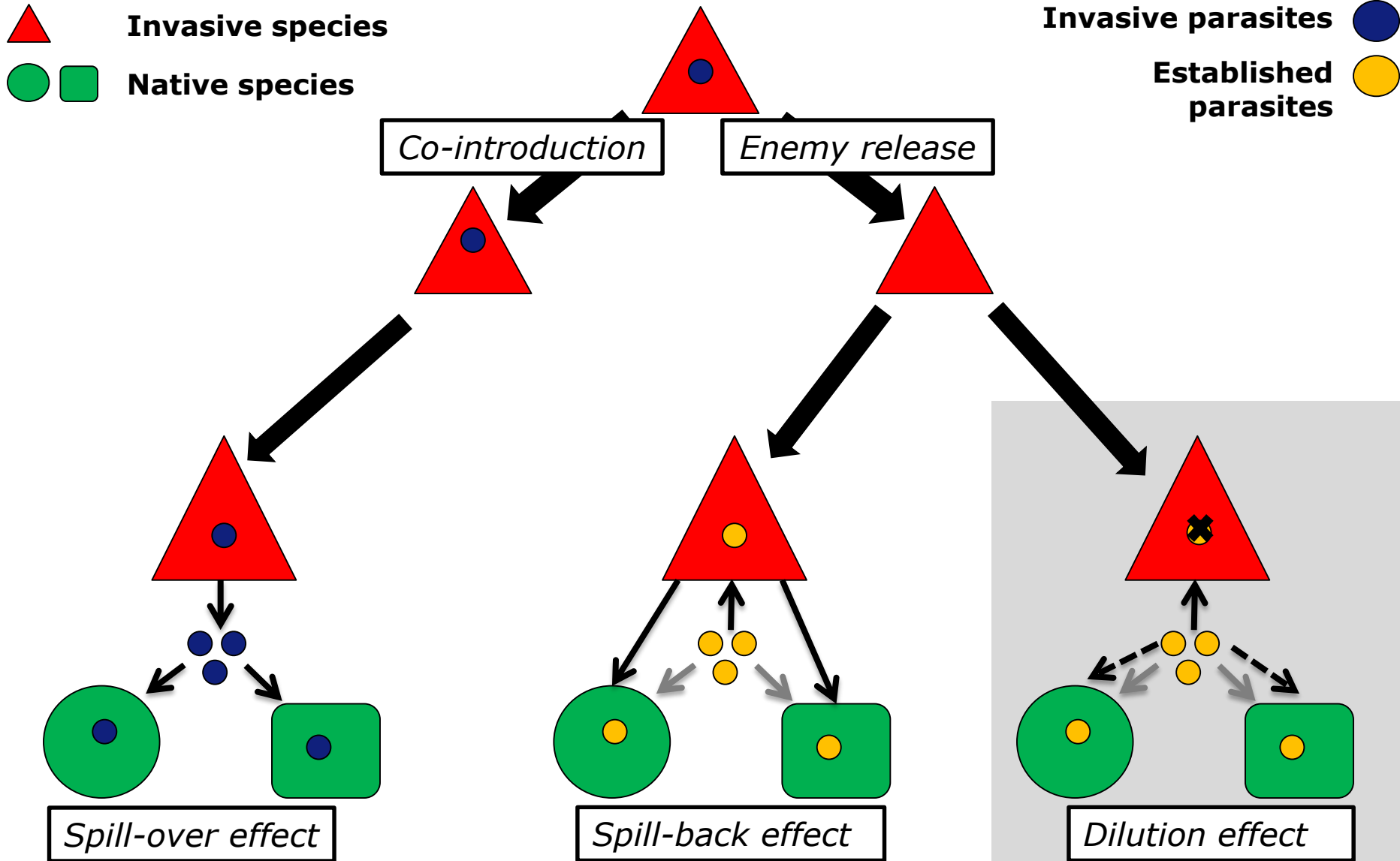
Spill-back *Mytilicola intestinalis*



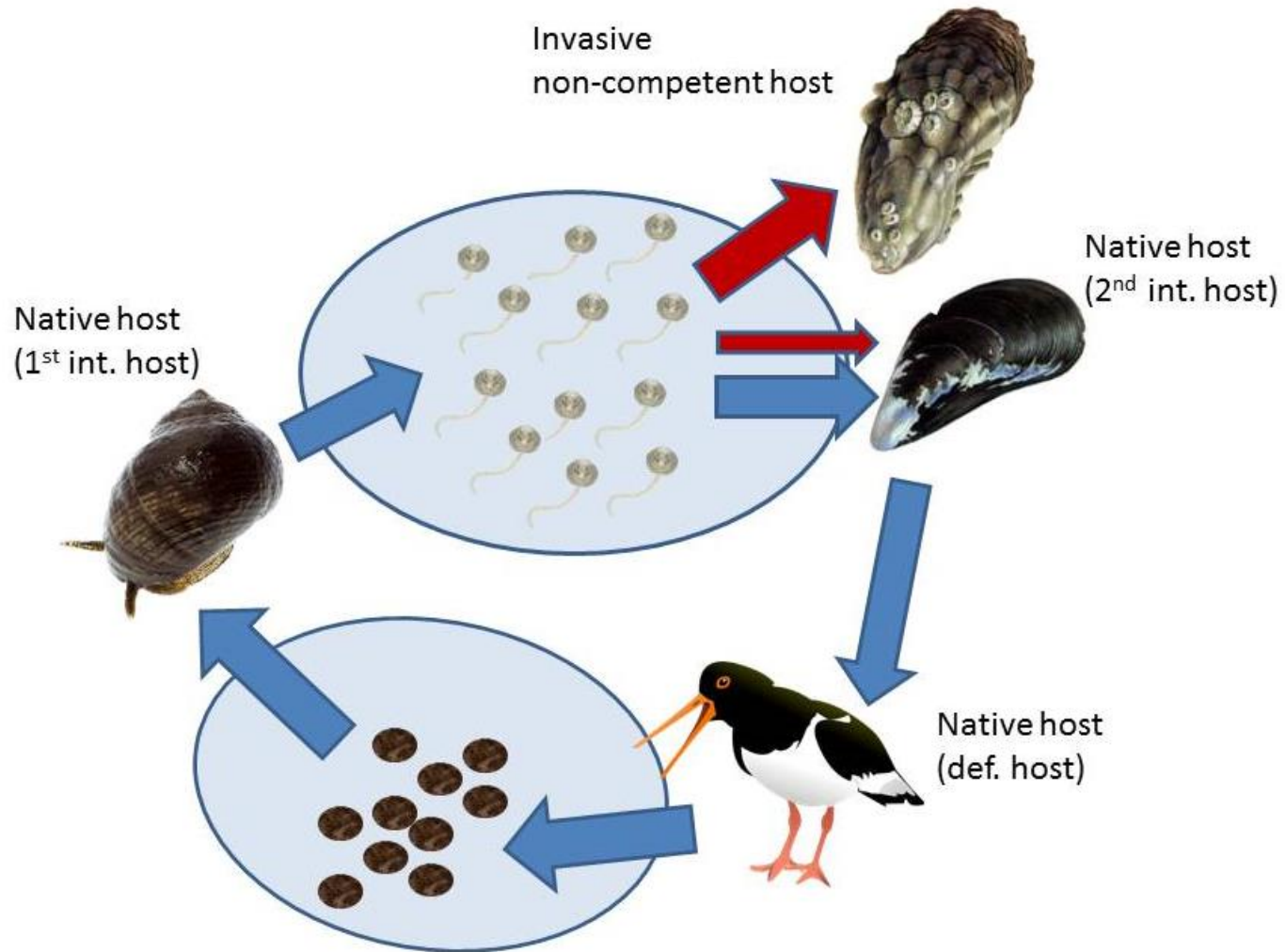
Spill-back of *Polydora* spp.



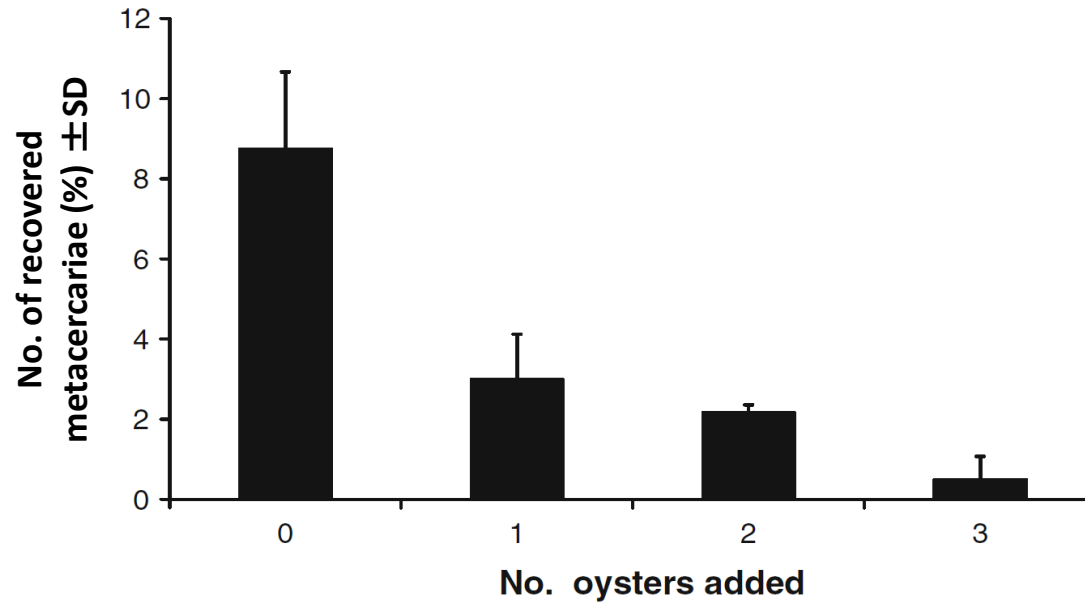
Pacific oysters and parasites



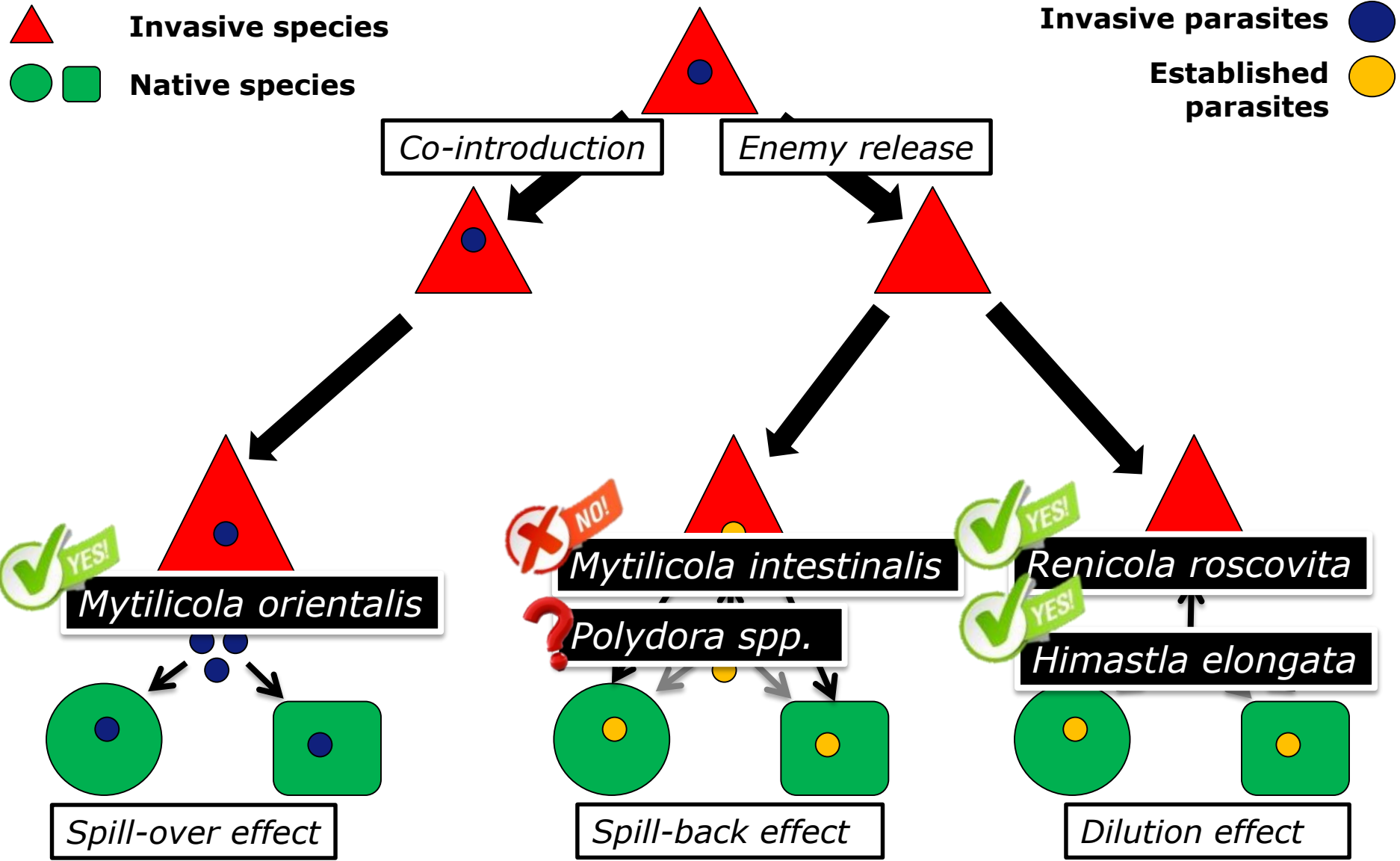
Dilution effect



Pacific oysters dilute trematodes



Conclusions



Biorisks: impact of Pacific oysters


- Impacts of invasive species include effects on native parasite-host webs via spill-over, spill-back and dilution effects



Disease risk assessment of Pacific oyster invasion

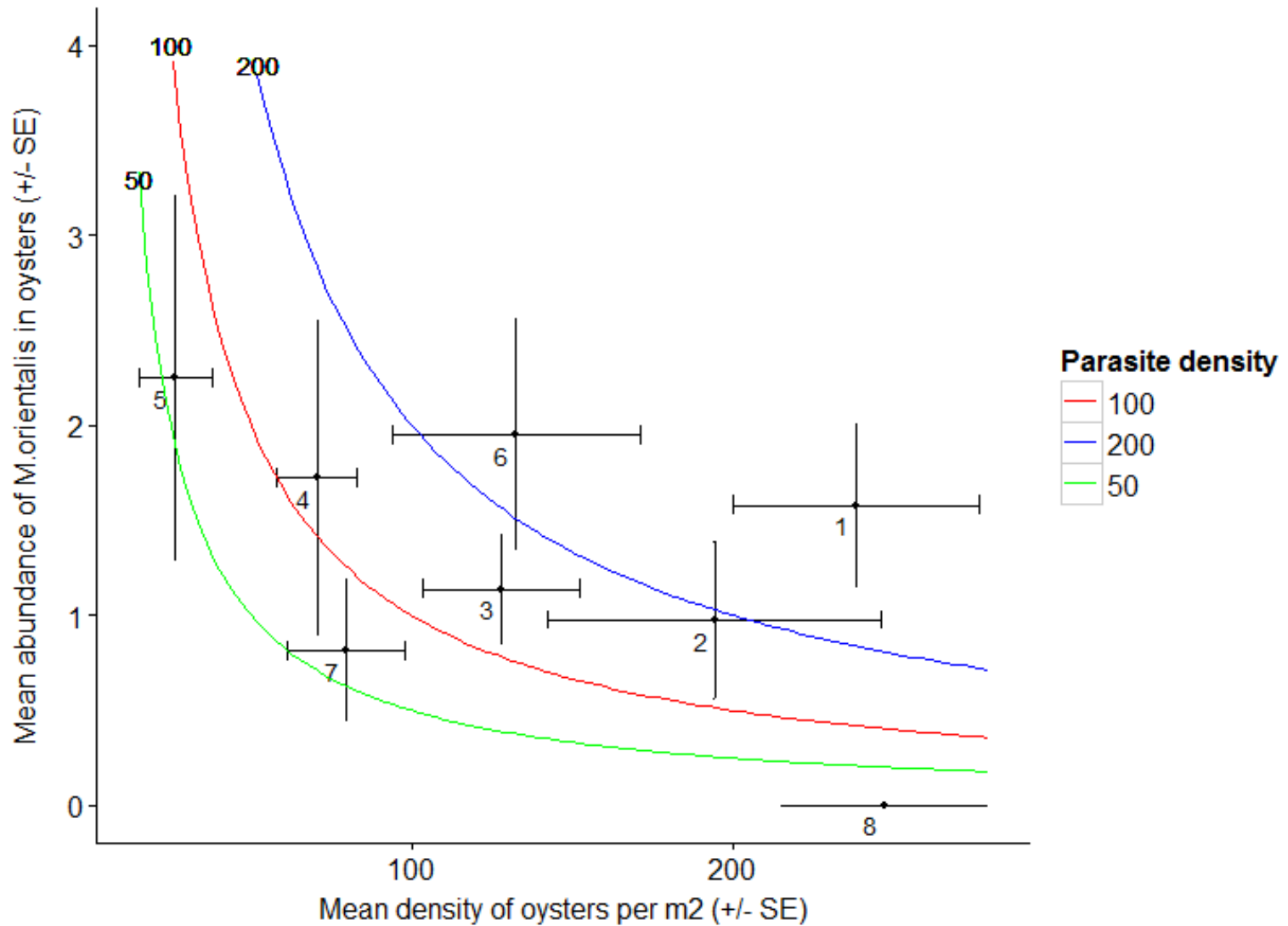
- Potential high risk: spill-over of *M. orientalis*
- No or low risk: spill-back of *M. intestinalis* & *Polydora spp.*
- Risk reduction for native hosts: dilution of infective stages of native trematodes

Thank you!

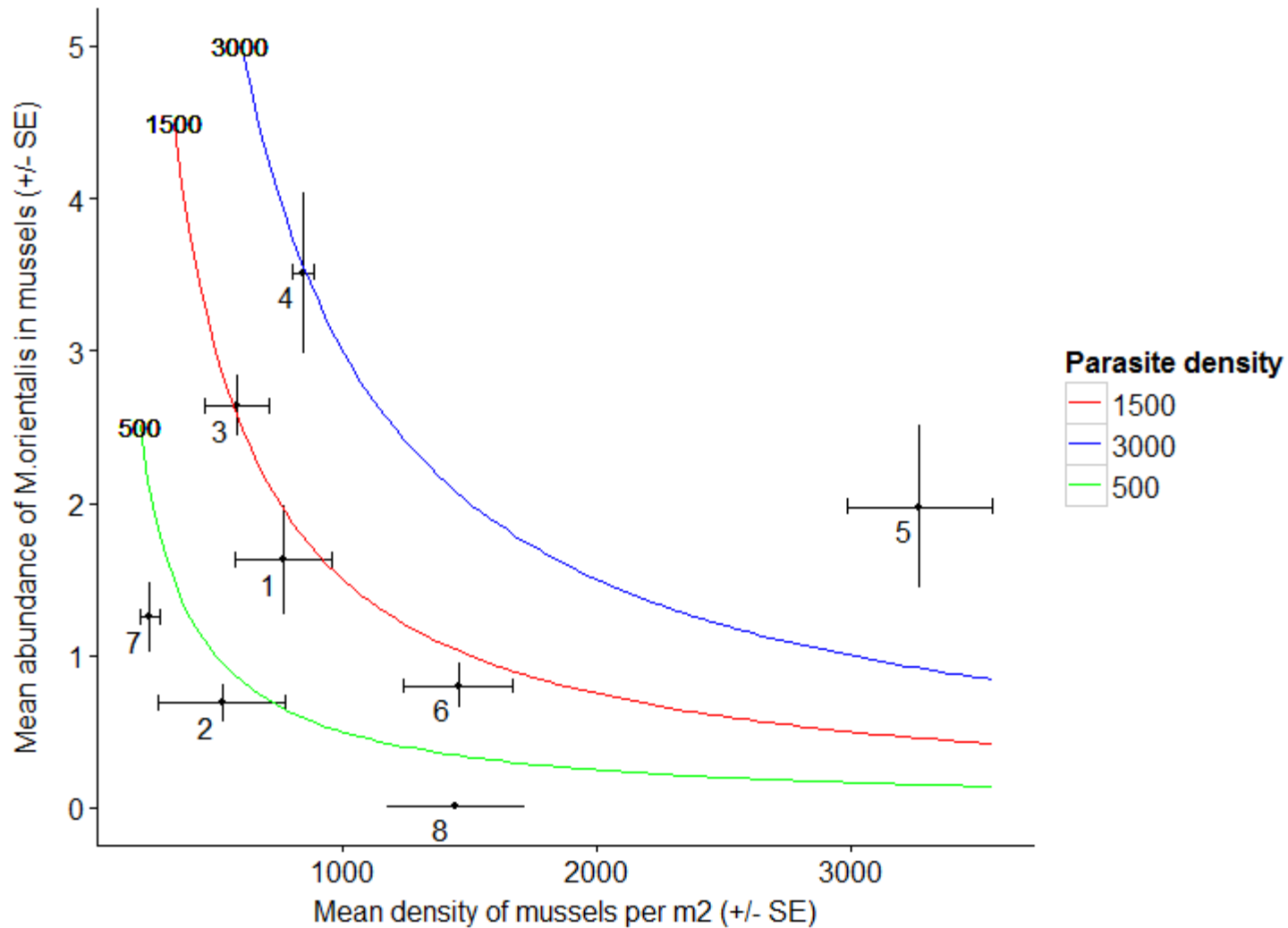
A person wearing a green jacket is seen from behind, pushing a blue cart through a grassy field. The cart has two blue bins and a green bag inside. In the background, a sunset is visible over a body of water, with the sun low on the horizon and its light reflecting on the water. The sky is filled with soft, colorful clouds. The overall scene is peaceful and scenic.

David Thieltges, Jaap van der Meer,
Pieterella Luttikhuizen, Kees Camphuysen,
Mathias Wegner, Christian Buschbaum,
Karsten Reise, Jennifer Welsh, Klemens
Eriksson, Anneke Bol, Mirjana Markovic, Marc
Engelsma, Anne-Karin Schuster, Karin Troost,
Ad van Gool, Carola van Zweeden, Reinier
Nauta, Jarco Havermans, David Shoesmith,
Sarah Bedolfe, Annabelle Durain, Jonas
Martin, Fokje Schaafsma, Samira Theis,
Christian Einer

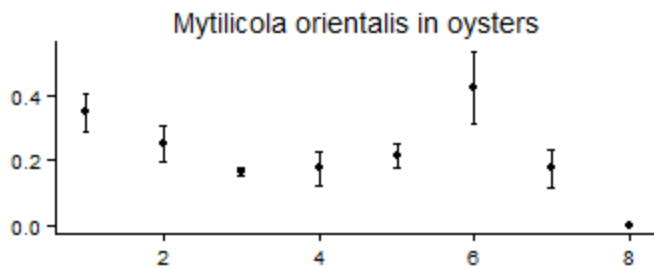
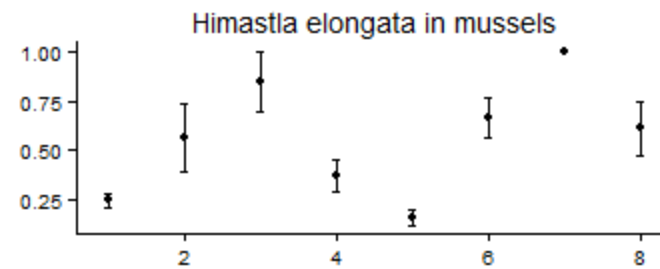
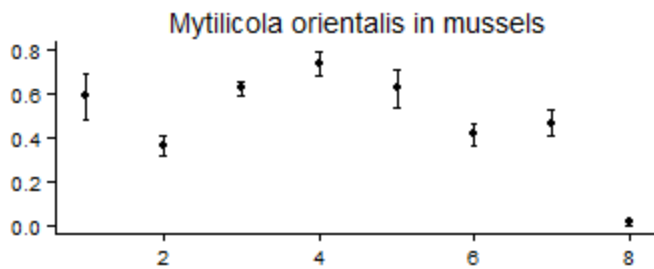
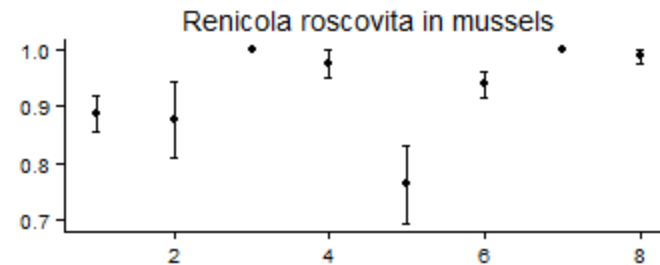
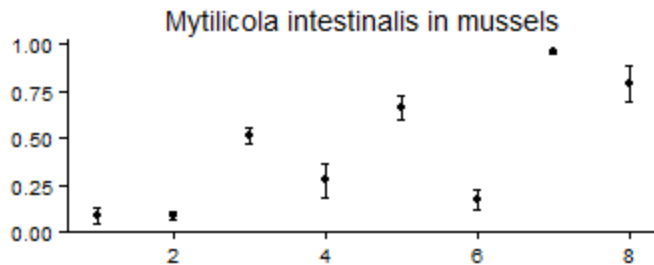
Population size in oysters



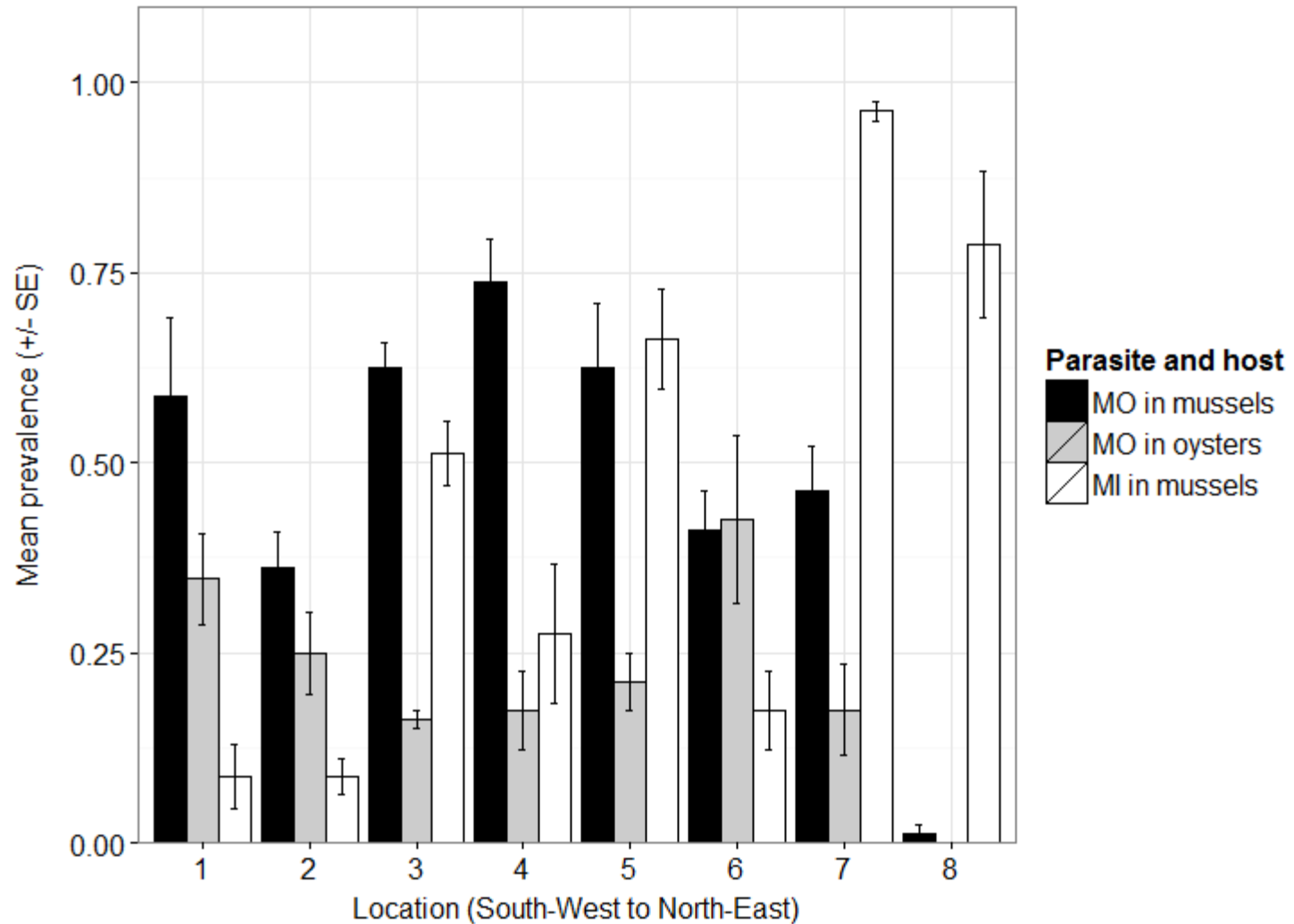
Parasite population size in mussels



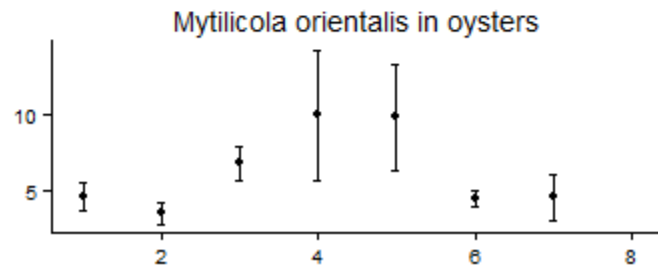
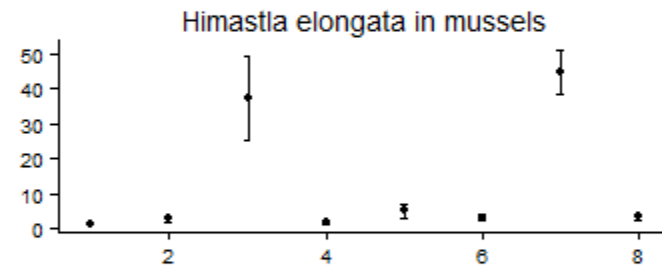
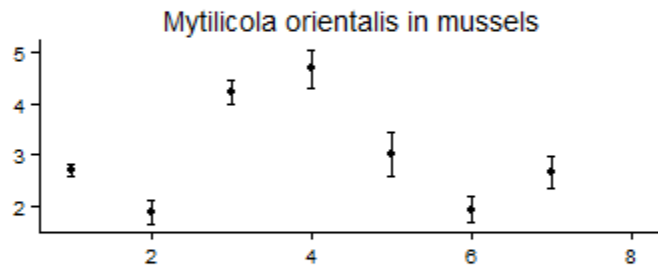
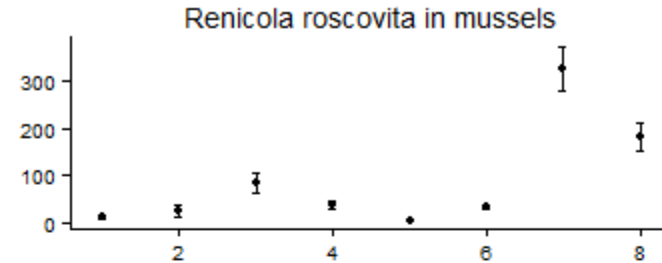
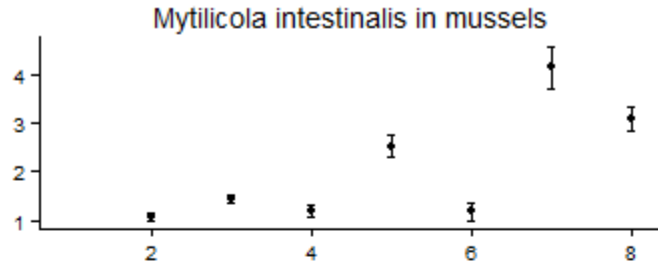
Mean prevalence parasites



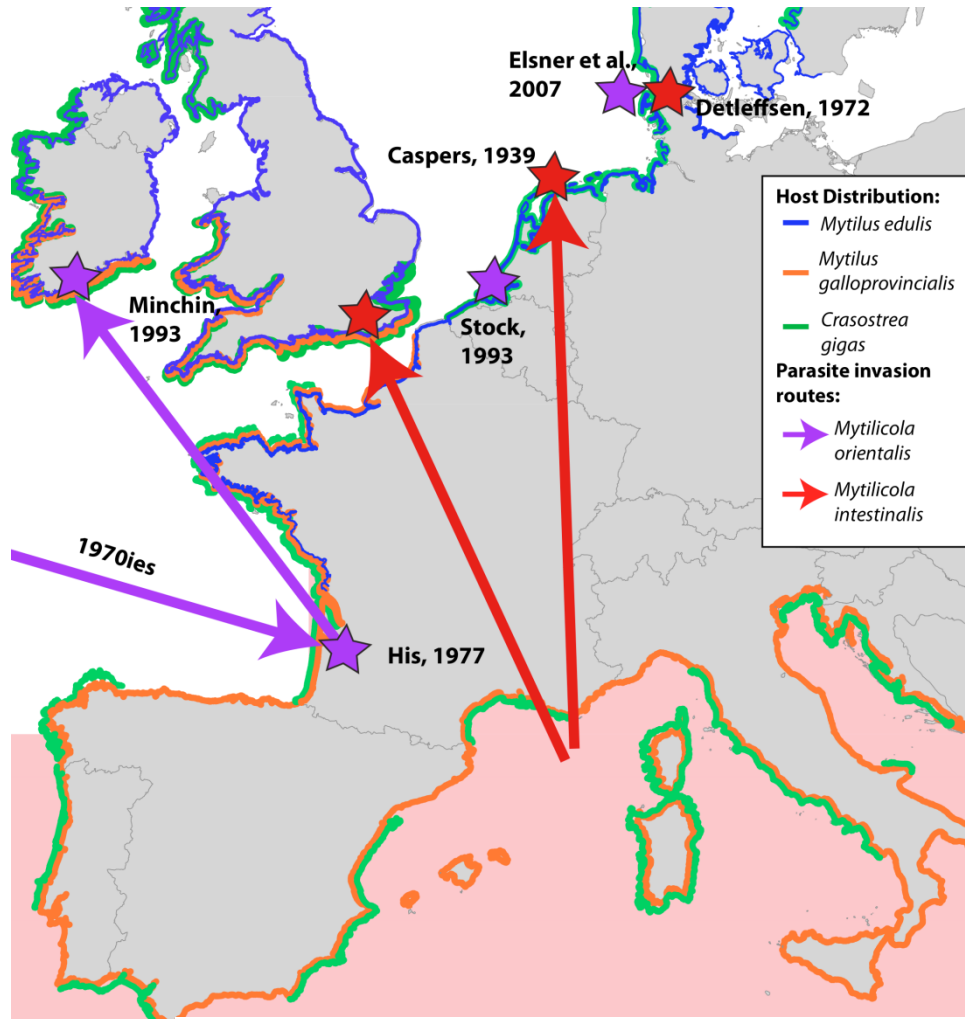
Mean prevalence parasites



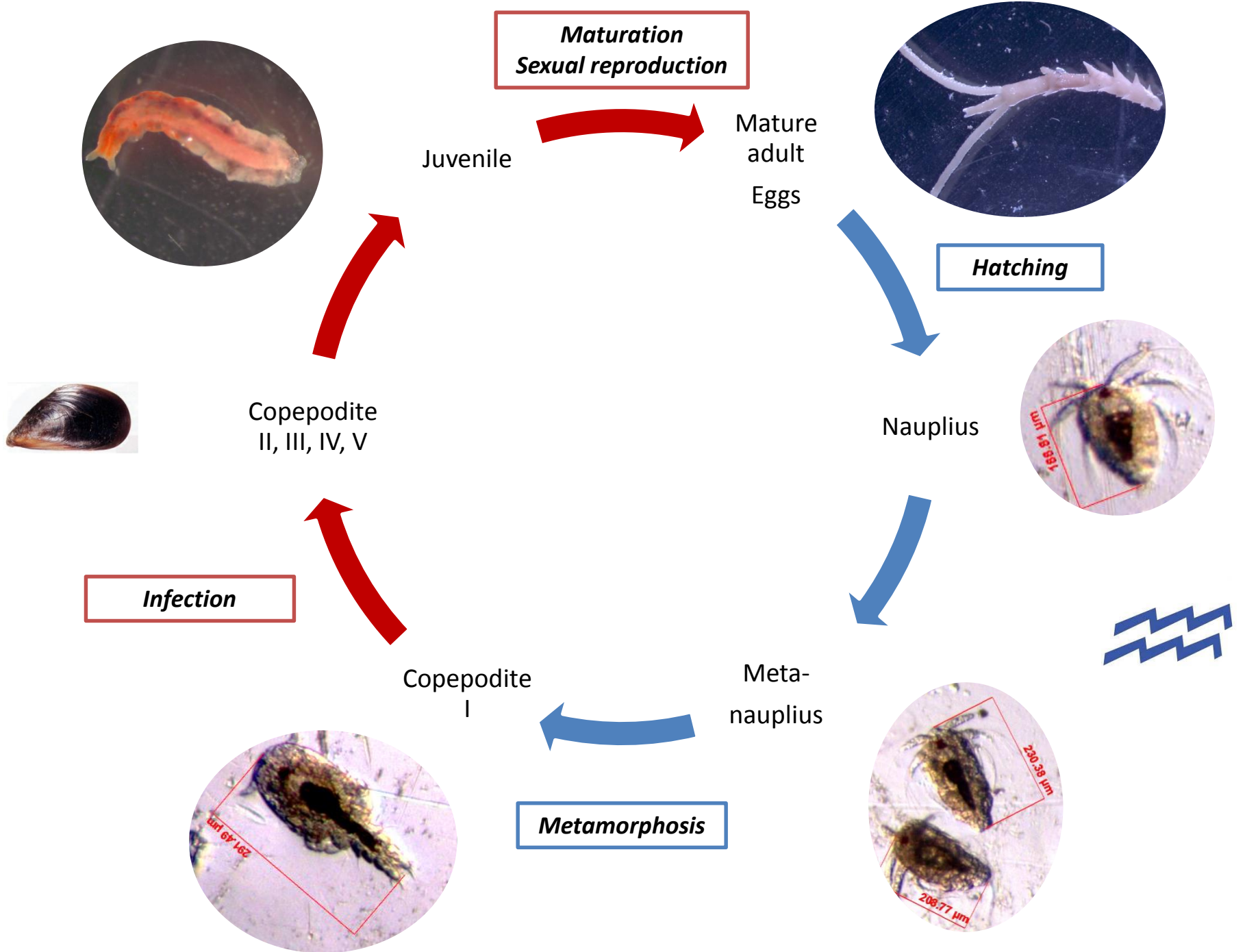
Mean intensities parasites



Mytilicola spp. Invasion



Mathias Wegner



Host specificity

