Hatchery production of *Bonamia*-free and –resilient flat oysters (*Ostrea edulis* L.)

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Ministerie van Landbouw, Natuur en Voedselkwaliteit Flat oyster restoration projects in Dutch North Sea

Areas Ostrea edulis extinct: treat as Bonamia-free area

Sourced oysters from disease free areas

















#### Bonamia distribution in NW Europe

- Sourced oysters from Ireland and Norway
- Oysters from *Bonamia* free areas suceptible to the disease
- Need for Bonamia-free and Bonamia-resilient oysters
- Oysters in SW Netherlands in Bonamia infected area



negative positive unknown



Sas et al, in 2020

# Produce *Bonamia*-free oysters with broodstock from infected area



#### Non-lethal screening of broodstock



19000652 Bonamia samples WMR Pauline Kamermans																			
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Use *Bonamia* free individuals (green) as broodstock

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LIMSNUMMER : 19010789									
			PCR Bon						
volgnr	sample - code	inhoud	Ct						
1	Oe19	larven	undet	negatief					
2	17A	larven	undet	negatief					
3	Oe21	larven	undet	negatief					
4	16A	larven	undet	negatief					
5	16B	larven	undet	negatief	ſ				
6	15	larven	undet	negatief	ſ				
7	Oe21b	larven	undet	negatief					
8	14B	larven	undet	negatief					
9	17B	larven	undet	negatief					
10	14A	larven	undet	negatief					
11	18A	larven	undet	negatief					
12	28	larven	undet	negatief					
13	wk20 spat nieuw	broed	undet	negatief					
14	wk20 spat oud	broed	undet	negatief					
15	wk20 spat oud	broed	undet	negatief					

Bonamia-free larvae and spat (green) produced in hatcheries

#### Are selected *Bonamia*-free oysters also resilient?

- Off spring of two European oyster broodstocks tested for presence of resilient markers:
- Bonamia-free oysters from Bonamiafree Oosterschelde broodstock through non-destructive pre-selection
- 2. Bonamia-naïve oysters from
  broodstock discovered in Wadden
  Sea where Bonamia has not been
  detected







#### Challenge test with Bonamia-free and resilient oysters



Haenen & Engelsma (2020)





#### Challenge test with Bonamia-free and resilient oysters

Survival of *Bonamia*-free and resilient oysters (orange) better than *Bonamia*-naïve and not resilient oysters (blue)





### Do better surviving oysters also have resilient markers?





WAGFNING

No *Bonamia* detected in any of the individuals!

### Bonamia-free and resilient oysters conclusions

- Developed method to screen broodstock from *Bonamia* area and produce *Bonamia*free oysters
- Bonamia-free oysters contain more resilient markers and show more survival in Bonamia area than naïve individuals
- No Bonamia detected in Bonamia-free or Bonamia-naïve oysters
  - Why was this not detected (no Bonamia present)?
  - Why did naïve oysters show more mortality (not adjusted to new environment)?
  - Other explanations???









## Thanks you for your attention

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