



ACDPHARMA
INNOVATIONS IN AQUACULTURE

CUSTUS[®]_{YRS}

A phage-based tool for
controlling *Yersinia ruckeri*.

Nordic RAS Workshop, NMBU
2018-11-20

Dr. Hans Petter Kleppen

Director of research and development, Nordly Holding as.



NORDLY



CUSTUS[®]_{YRS}



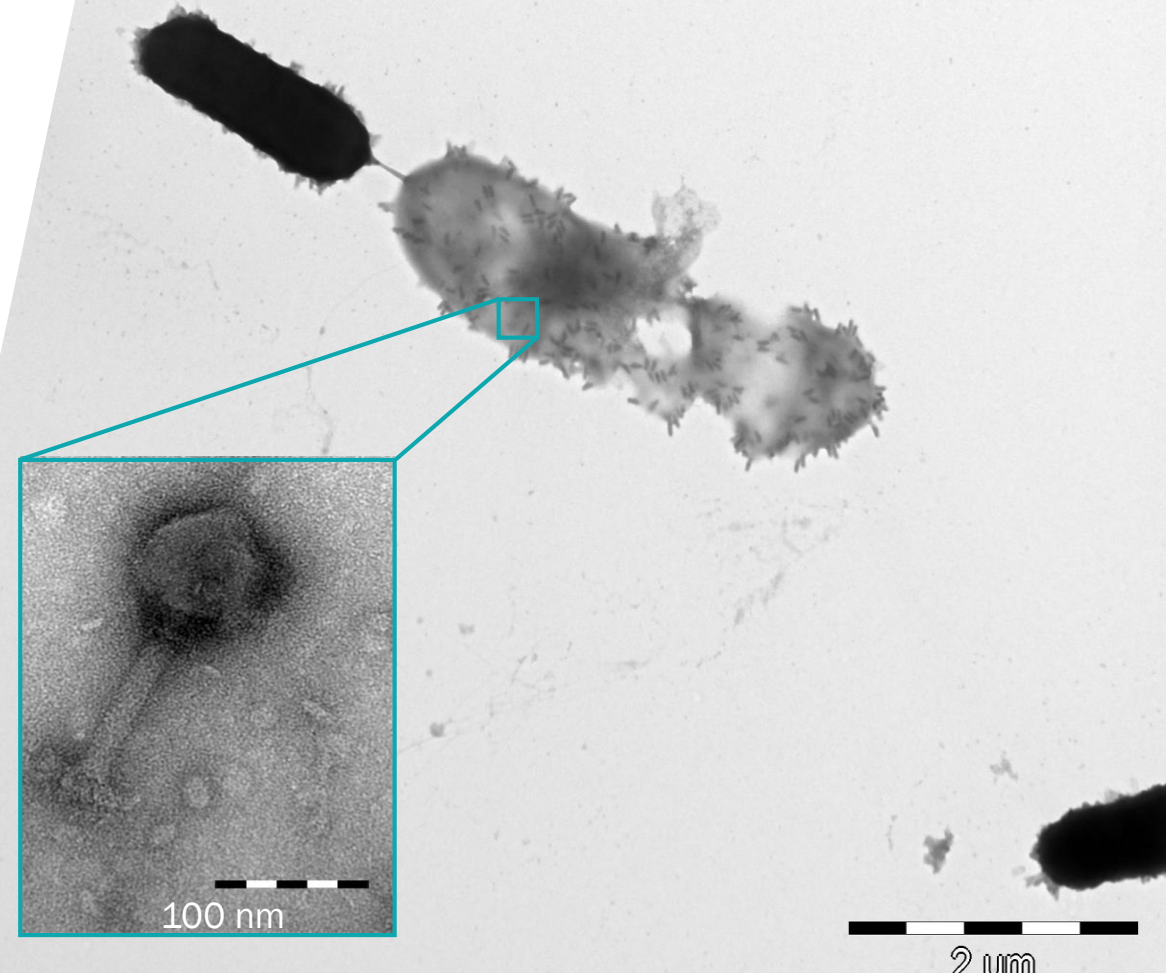
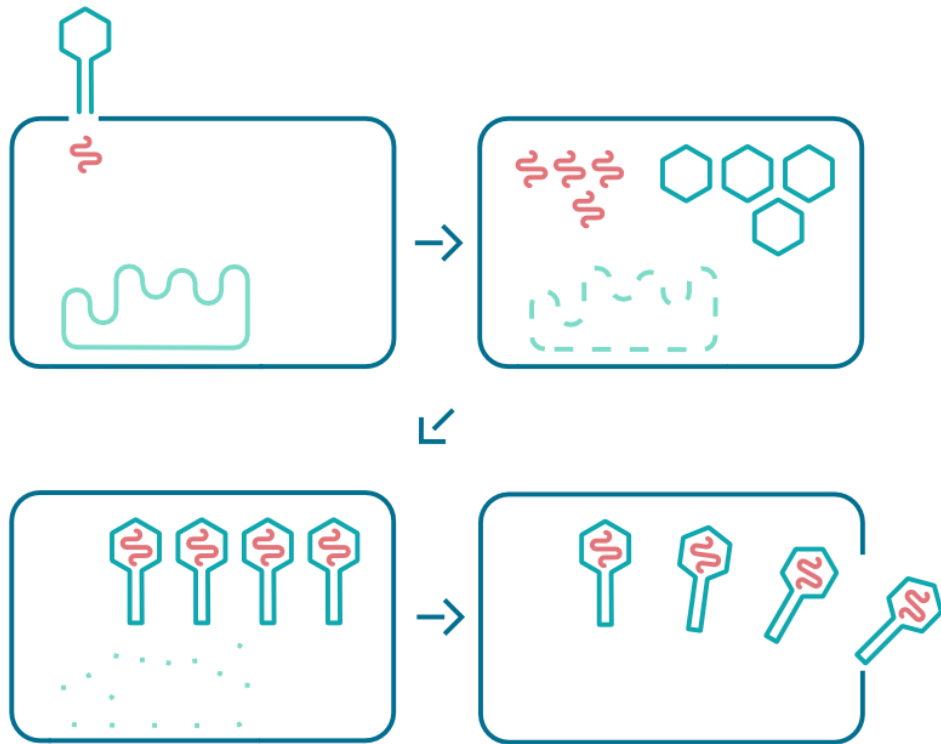
- A new tool for controlling infection pressure from *Yersinia ruckeri*.

- › Contains naturally occurring bacteriophages specifically infecting and killing *Yersinia ruckeri*.
- › Controls infection pressure from *Y. ruckeri* in water.
- › To be used in stressful situations when fish are especially vulnerable to infection. E.g. during transport, after vaccination and sorting.
- › CUSTUS[®]_{YRS} is safe, effective and easy to use!



CUSTUS[®]_{YRS} is bacteriophage

- The natural enemy of bacteria



CUSTUS[®]_{YRS} is biocontrol

- The use of naturally occurring organisms to counteract or repress other, unwanted organisms from an environment



Foto: bakker.com



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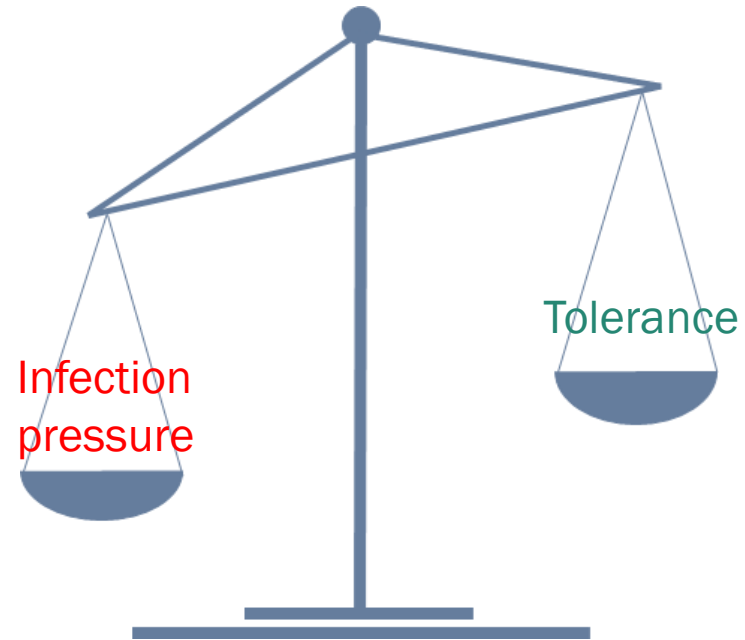
CUSTUS[®]_{YRS} is safe!



- › CUSTUS[®]_{YRS} is an aqueous solution easily added to farm water.
 - Mostly water, some salts
 - and less than 0.01% (v/v) bacteriophage specifically infecting and killing *Yersinia ruckeri*.
- › Safe for the fish
 - GLP safety documentation (Veso Vikan)
 - > 3 Million salmon exposed in field trials
 - Injecting undiluted Custus i safe (MSc, UiB)
- › Safe for the operator
- › Safe for the farm microflora
- › Safe for the biofilter
- › Safe for the environment
- › **Bacteriophages are already present, but in too low concentration to take immediate effect.**

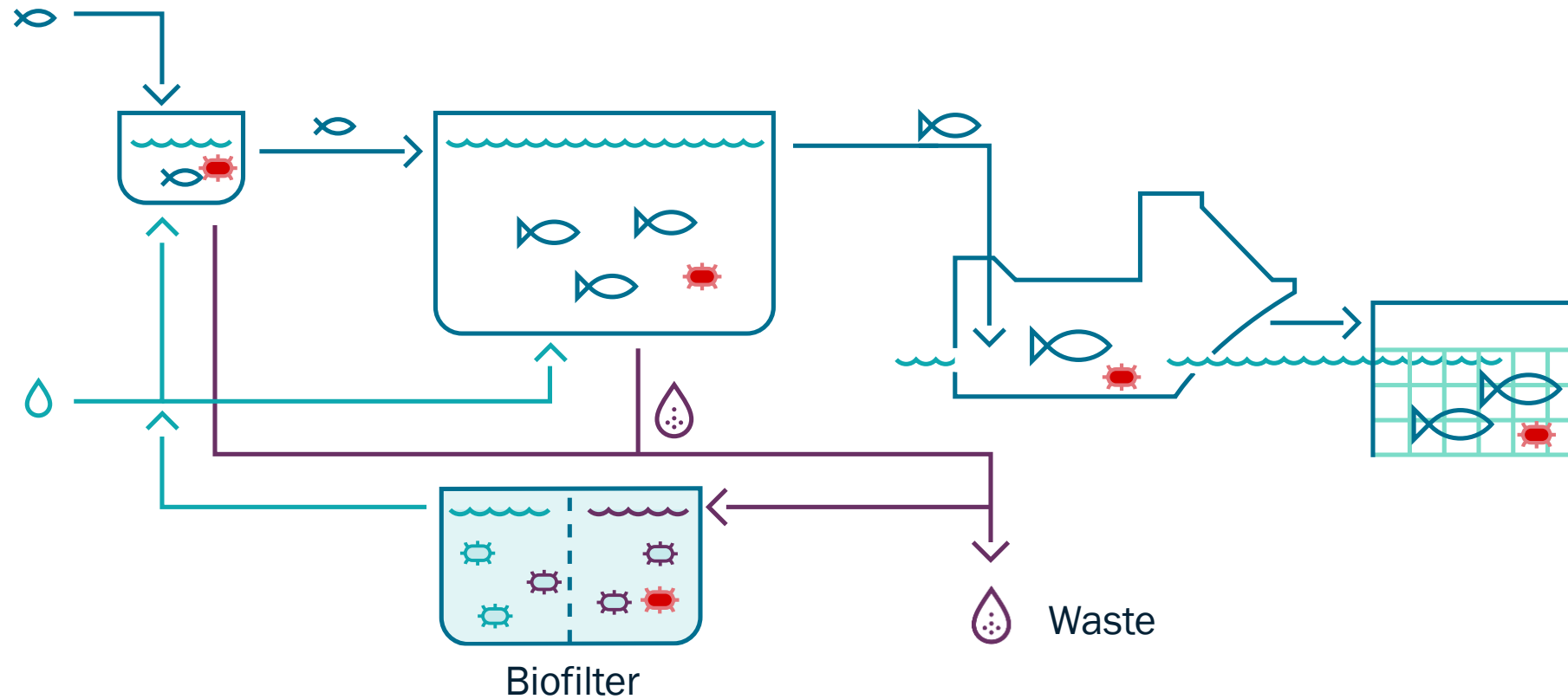


The important balance between infection pressure and tolerance



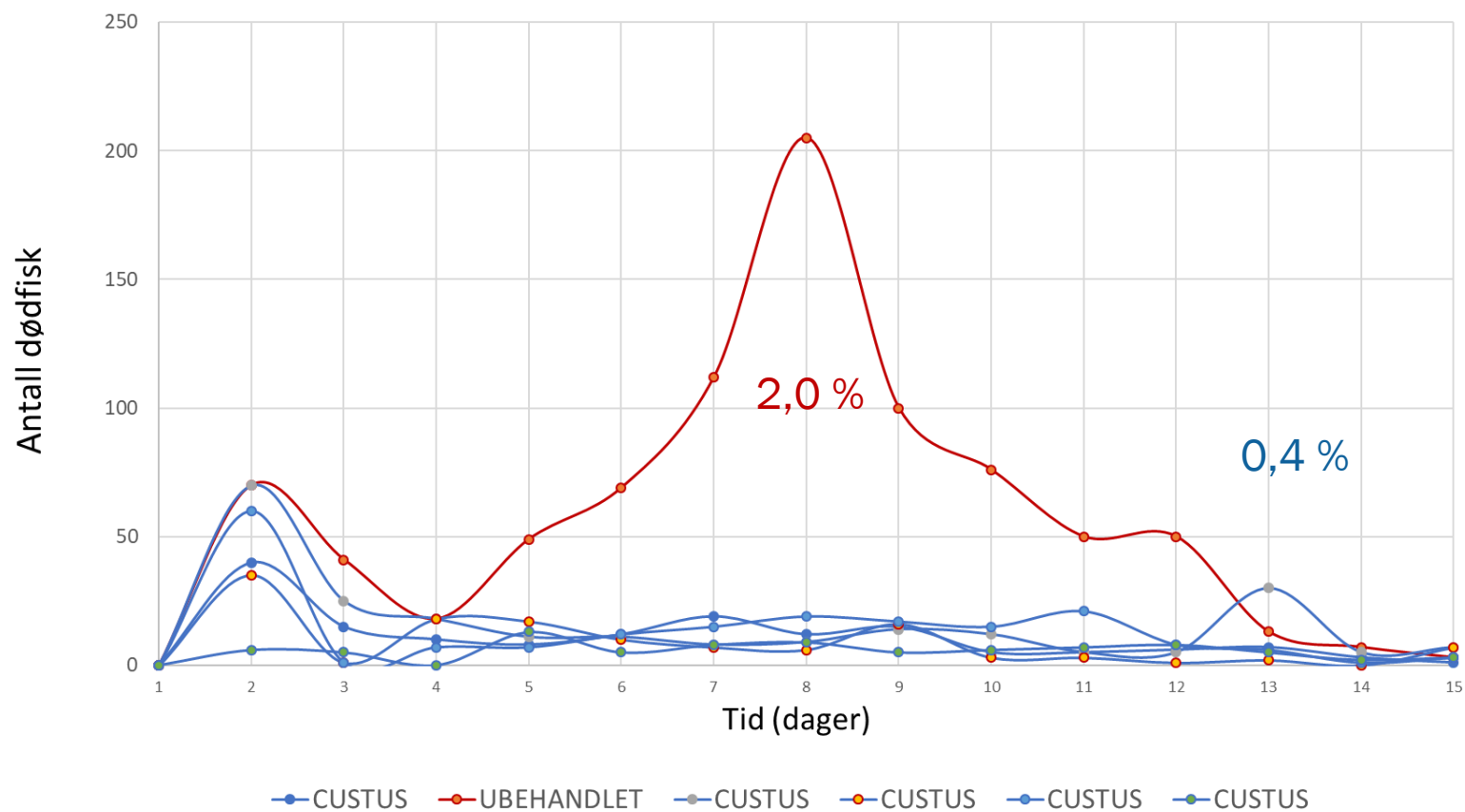
Challenging to maintain the balance during stressful farm operations

Infection pressure and stressful operations in the production cycle



REDUCED MORTALITY AFTER VACCINATION

Controlling infection pressure with CUSTUSyrs after vaccination:
Daily mortalities with and without CUSTUSyrs



YERSINIA RUCKERI IN WELL-BOAT DE-LICING



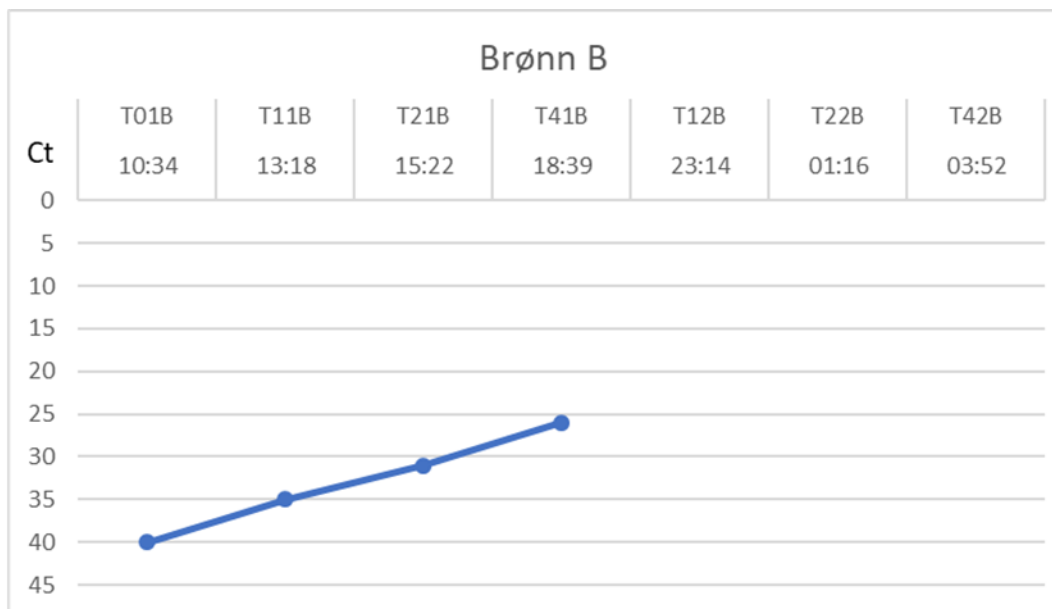
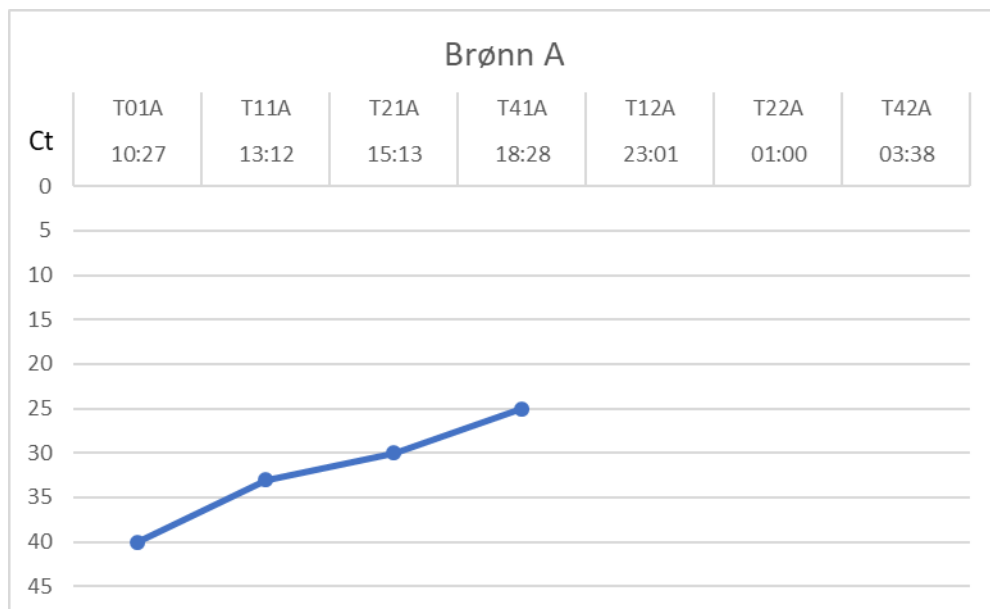
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Explanation: Freshwater de-licing in two wells (A and B) on a wellboat. Fish were not vaccinated against *Y. ruckeri*, and of *Y. ruckeri* had previously been detected on some sampled fish from this group. CUSTUS or antibacterials were **not** used during the de-licing operation.

Water samples from wells were taken at time points and *Y. ruckeri* infection pressure determined by qPCR with *Y. ruckeri* O1-specific primers.

Samples taken during the second filling of fish in the same freshwater could not be analyzed in a way comparable to the first set of samples. This was due to very high concentrations of bacteria, mucus, skin and other debris in the samples.

The analyses we were able to perform showed that the *Y. ruckeri* concentration continued to increase but not as rapidly as during the first filling.

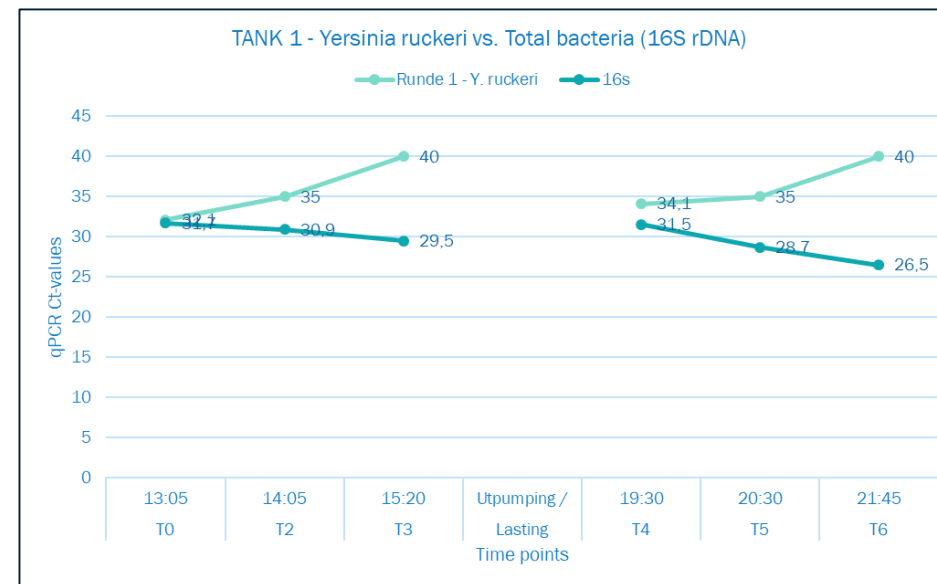
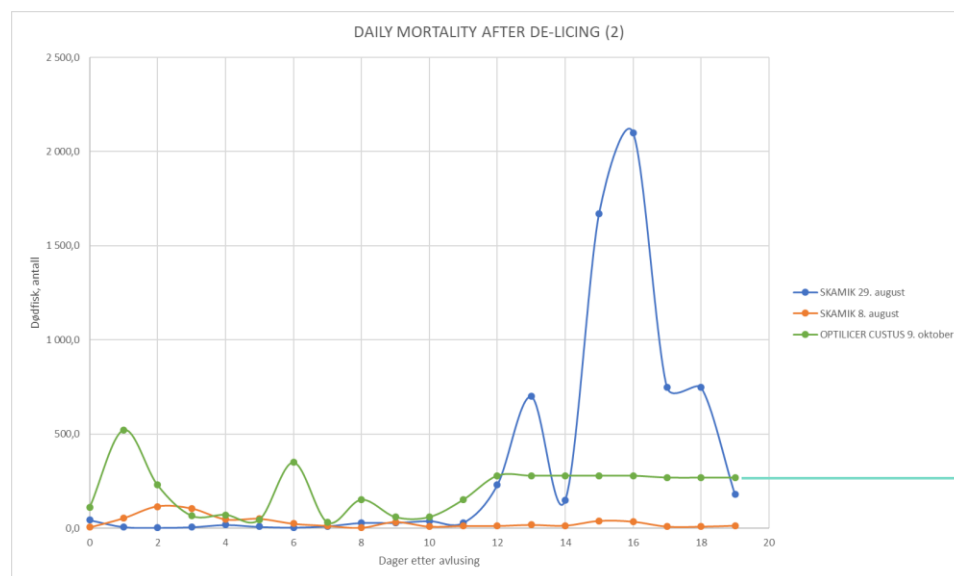
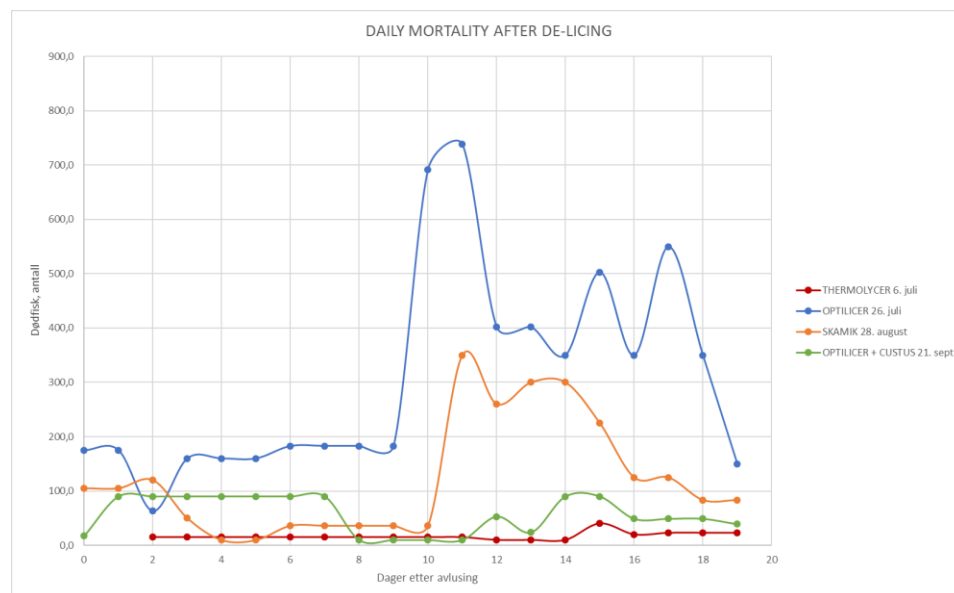


- More than 32 000 x increase in *Y. ruckeri* infection pressure during holding time
- *Yersinia ruckeri* concentration at the end of operation near that in infection challenge models

CUSTUS CONTROLS *YERSINIA RUCKERI* IN THE OPTILICER



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- *Yersinia ruckeri* infection pressure in well boat holding tanks goes down, not up.
- Use of CUSTUS with Optilicer treatments on fish groups with yersiniosis outbreak history gave very good results.
- *Serratia* sp. predominant in dead fish 14 days post de-licing, not *Yersinia ruckeri*.

Summary

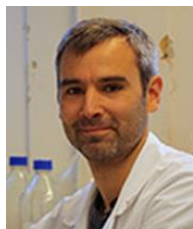


- › CUSTUS[®]_{YRS} is a new product used to control infection pressure from *Yersinia ruckeri*.
- › CUSTUS[®]_{YRS} is safe, effective and simple to use.
- › CUSTUS[®]_{YRS} is available and ready to use (Norway).
- › Since bacteriophages are host specific, we need to verify that your farms *Yersinia* strains are sensitive to the CUSTUS phages.
- › Contact us for more information: www.acdpharma.com

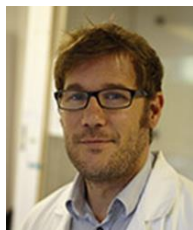
The people behind



Mariann Dønnum
Daglig leder



Hans Petter Kleppen
PhD, Forskningsdirektør



Juan José Jimenéz
PhD, Forsker



Cyril Frantzen
PhD, Forsker



Eirik Bårdsen
MSc, Senioringeniør



Ingrid Sofie Siqveland Larsen
MSc, Forskningsassistent



Maud Ricatti
Veterinær og produktansvarlig
Benzoak vet

KONTAKTINFO PÅ

WWW.ACDPHARMA.COM

**TAKK FOR
OPPMERKSOMHETEN!**

Hans.kleppen@acdpharma.com

(+47) 977 50 860

www.acdpharma.com



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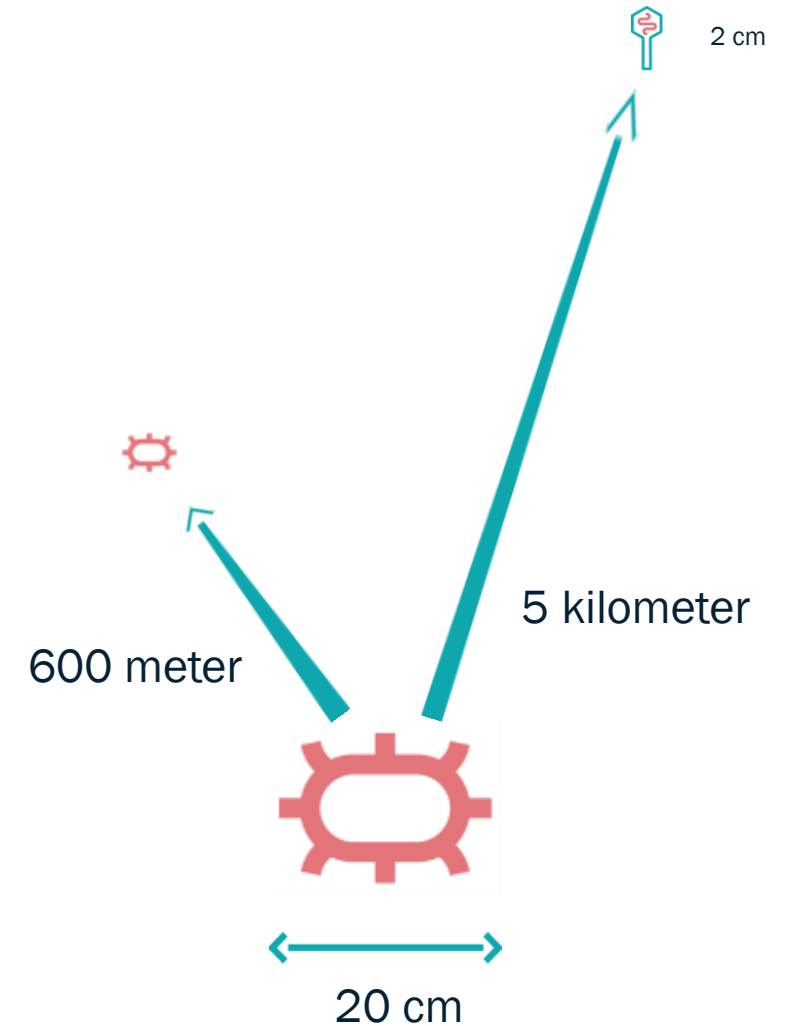
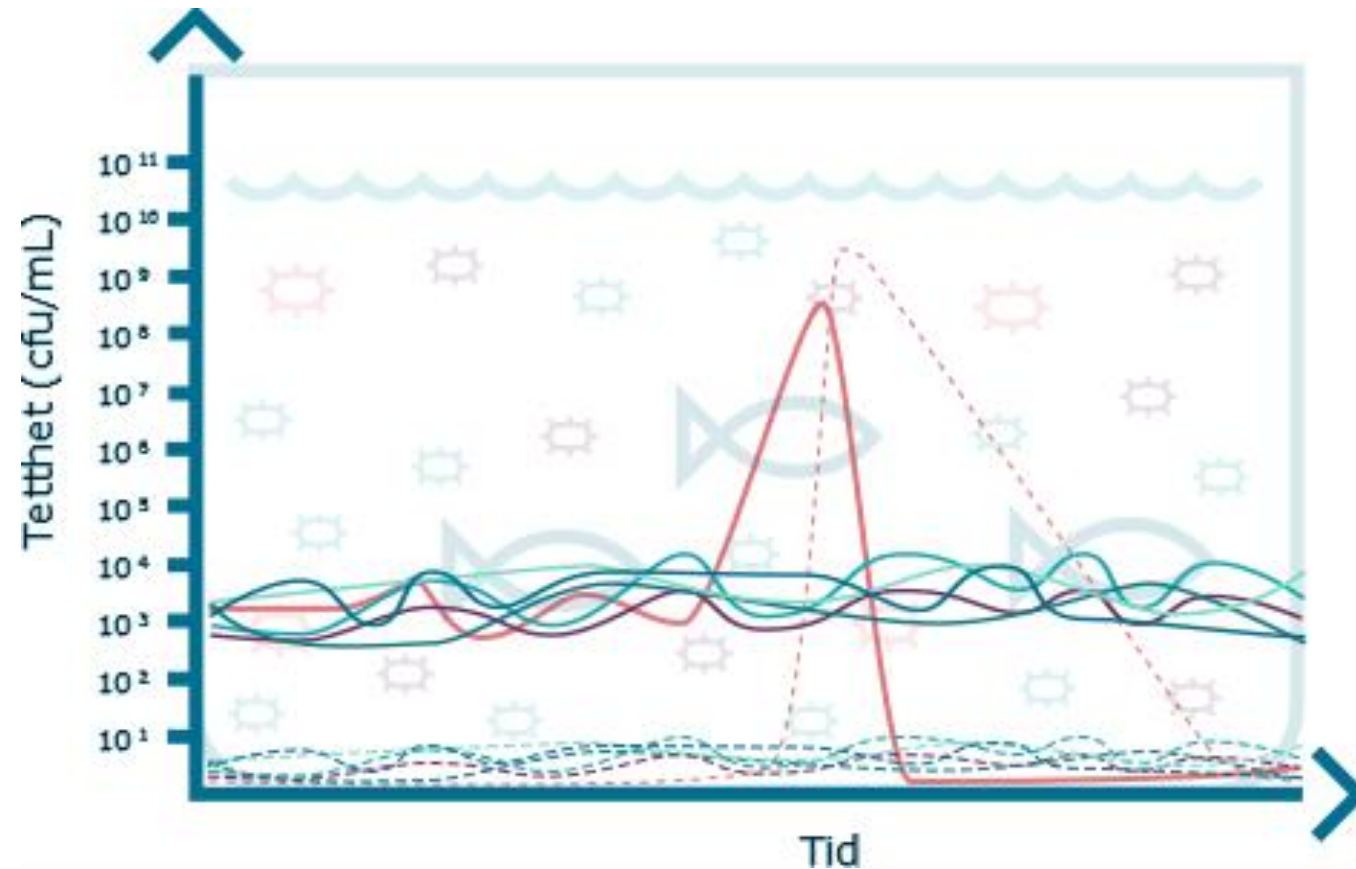
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Mechanism

Control *Yersinia ruckeri* infection pressure with CUSTUS[®]_{YRS}



Control *Yersinia ruckeri* infection pressure with CUSTUS[®]_{YRS}

