

Possible common etiological agent for strawberry disease and **red** mark syndrome in rainbow trout

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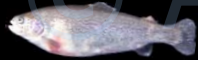


Possible common etiological agent for strawberry disease and **red** mark syndrome in rainbow trout

- Introduction
 - Symptoms
- Material and Methods
- Results
- Summary
- qPCR

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Red mark syndrome

- Relative new
- High morbidity, low mortality
- Below 16°C
- Appetite or growth
- Down-grading
- Economical disease
- No known cause





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Epidemiology

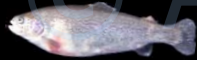
- Imported ova
 - Re-imported in 2006
- Movement of fish
- Mechanical handling

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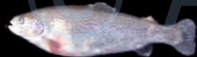
Aethology

- Unknown
- Bacterial cause is suggested
 - Antibiotics
 - Transmissible



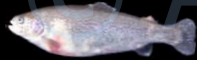
Material and Methods

- 34 fish (RMS or SD)
- 3 UK sites, 2 USA sites
 - Samples from skin and internal organs
- Immunohistochemistry
- PCR
- Histology
- Clinical isolation

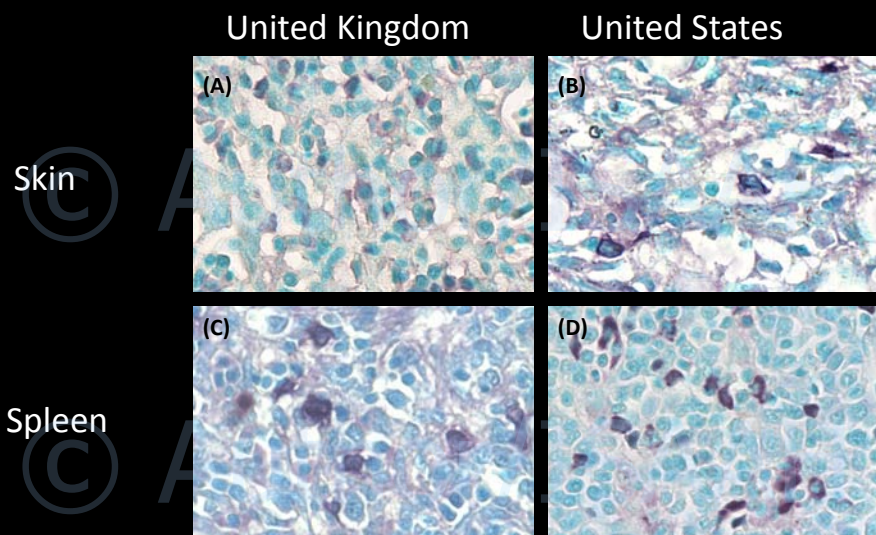


Material and methods

- 2 Pabs anti-*P. salmonis*
- 8 MAbs anti-*P. salmonis*
- 1 PAb anti-*F. psychrophilum*
- Nested RLO
- Nested *F. psychrophilum*
- *P. salmonis*
- H&E

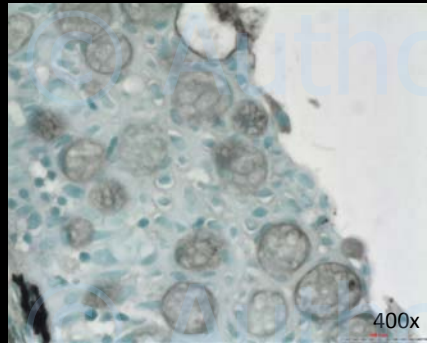


Results IHC

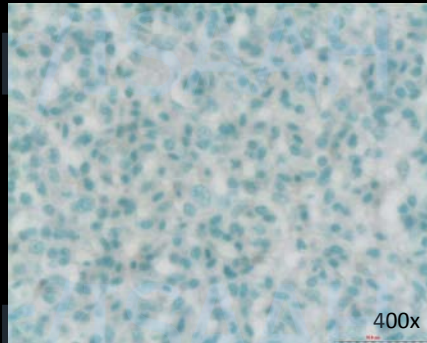


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Normal skin with anti-Ps PAb

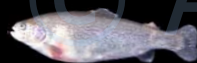
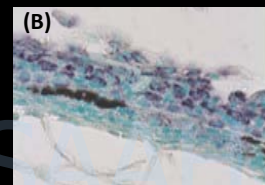
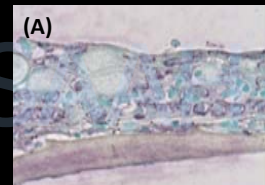


Anti-ISA MAb



© Author/ISAAH 16s PCR

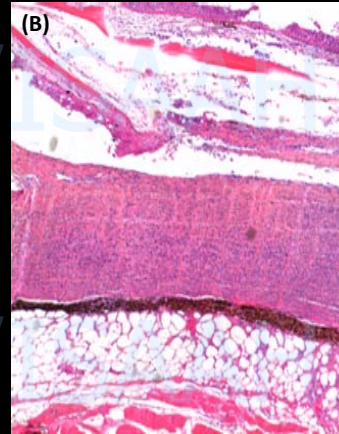
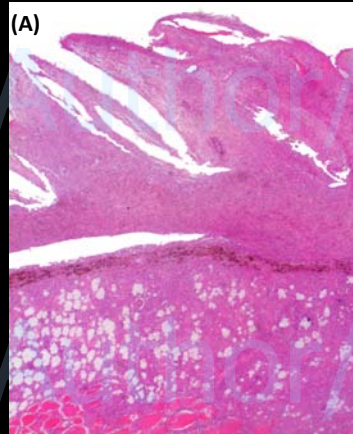
- RLO:
 - 8/9 skin
 - 7/10 spleen
 - 5/10 liver
- *F. psychrophilum*
 - 9/10 skin
- *P. salmonis*.
 - None



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Results Histology

United Kingdom

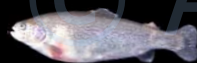
United States



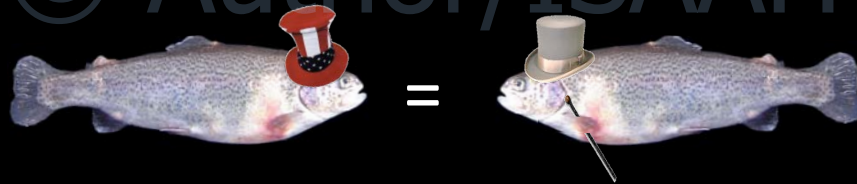
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Skin
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Clinical Isolation

- So far no agent has been isolated
 - Agar
 - Cell culture
- New techniques are being tried

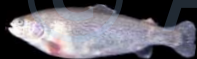


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RMS in the UK and SD in the USA are both likely to be caused by the same intracellular *Rickettsia*-like organism.

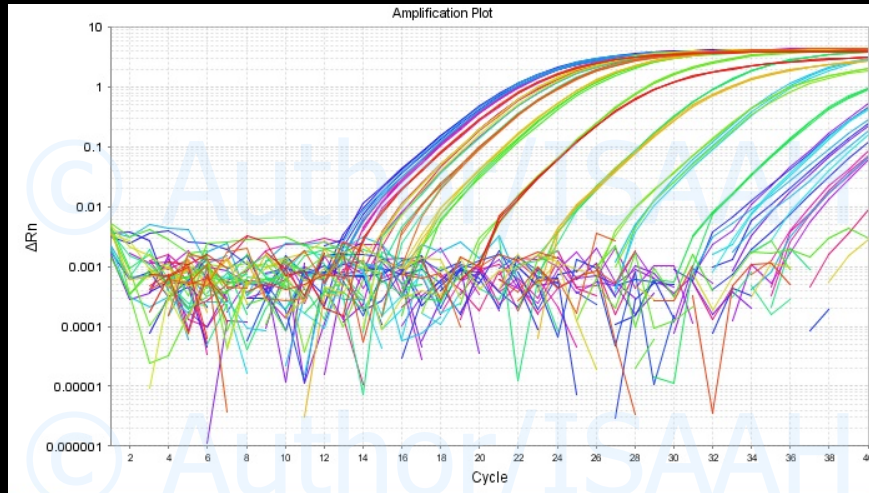


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qPCR

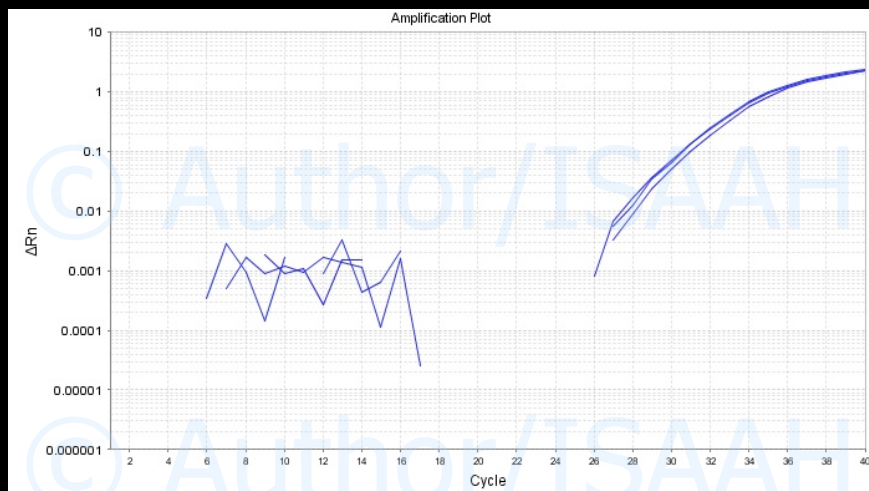
- Developed by S. Lloyd and D. Call
- 20 fish from negative farms
- 20 fish from positive farms with clinical symptoms



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Amplification plot



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Skin lesion of infected farm



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Preliminary results

Fish	Diseased	Normal	Heart	Liver	Gill	Kidney	Spleen
3.1	+						
3.9	+						
3.10	+	+	+	+	+		
4.1	+	+	+		+	+	+
4.2	++			+	+	+	+
4.3	+		+			+	
4.4	+	+	+	+	+	+	+
4.5	+	+			+	+	
4.6	+	+	+		+	+	+

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Questions?

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Acknowledgements

KD Thompson SJ Lloyd
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MJL Kik PD Smith
SE LaPatra A Adams



 **Intervet**
Schering-Plough Animal Health

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