Animal Health & Welfare

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GLOBAL OUTLOOK FOR AQUACULTURE LEADERSHIP
GUANGZHOU, CHINA | DAY 1
HEALTHY FISH | HEALTHY PEOPLE | HEALTHY PLANET
Dr. Hamish Rodger

- Dr. Hamish Rodger graduated from the University of Glasgow Veterinary School in 1984 and has worked as an aquatic animal veterinarian for more than 20 years, in addition to working in general land animal practice.
- He has a masters in aquatic veterinary medicine from the Institute of Aquaculture, University of Stirling, Scotland, and also completed his Ph.D. on the EIBS virus of salmonids in 1997.
- He is founder and principal of the Ireland-based veterinary aquatic animal practice Vet-Aqua International and is a past president of the Fish Veterinary Society, a division of the British Veterinary Association.
- Rodger is registered with the Royal College of Veterinary Surgeons in the United Kingdom
PROGRESS ON SEA LICE CONTROL IN SALMON & STREPTOCOCCOSIS IN TILAPIA

Hamish Rodger

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Outline

- Sea lice in salmon farming
- Progress on control
- Streptococciosis in tilapia
- Progress on control
BENCHMARK & FISH VET GROUP

Our Locations

- FVG Ltd
  Inverness, Scotland
- FVG Inc.
  Portland, USA
- VET-AQUA INTERNATIONAL
  Galway, Ireland
- FVG CHILE
  Puerto Montt, Chile
- FVG BRAZIL
  Natal, Brazil
- FVG NORGE
  Oslo, Norway
- FVG ASIA
  Bangkok, Thailand
Global salmon farming production & value

- 2.2 million tonnes (2015)
- 10.2 billion euro (2015) (USD $11.4 billion)
Sea lice remain the most serious threat to salmon farms in majority of Northern hemisphere
Sea lice (L. salmonis & Caligus spp.)

- Highly successful parasite
- Skin damage, osmoregulatory failure, mortality
- Increased susceptibility to other disease
- Egg to adult (4 to 6 weeks)
- One adult female (1000 eggs/batch & 6 to 11 batches in 7 months)
Current sea lice control

- Chemotherapy
- Management (fallowing, single year class/bay, monitoring, trigger levels & pen level action) (Codes of Good Practice)
- Cleaner fish (25 million fish 2015)
- Non-medicinal treatments (pressure, temperature, freshwater, etc.)
- Others (depth, fine mesh, lasers, etc.)
- Functional feed
- Genetic selection
- Combinations of the above
Chemotherapy challenges

- Multiresistant lice in some regions (treatment selects for resistance)
- Bath treatment related mortalities
- Discharge consents
- Residues
Management
(area based management)

Scotland
www.scottishsalmon.co.uk

Norway
www.lusedata.no

However lice management not just about health management: also public, media, political and retail expectations and communication.
Cleaner fish - wrasse

- Wrasse
  - Wild capture
  - Farming
  - Juvenile survival rates
  - Diseases
  - Welfare
Cleaner fish - lumpfish

- Lumpfish
  - Survival rates in pens
  - Diseases
  - Farming
  - Welfare
Non-medicinal treatment

Pressure (water e.g. Skamik, Hydrolicer)  Heat e.g. Thermolicer, Optilicer
Thermolicer:
30 to 33.5°C for 25 to 30 seconds
Desalination vessels and units (for freshwater treatments)

One hour freshwater kills lice copepodite stage.
Non-medicinal lice therapy challenges

- Stress and trauma
- Robustness of fish?
- Sub-clinical gill disease, myopathies give rise to mortality during treatment
Other engineering solutions

Fine mesh skirt for surface 5 to 10m

Electrical mesh, lasers, Helixer, etc.
Breeding, genetics & nutrition

Genomic selection (coupled with family performance)

Functional feed (to reduce attachment of juveniles)
Modification of behaviour/environment

- Swimming depth
- Swimming speed (current speeds)
- Jumping behaviour
- Feeding depth (snorkel pen, IMR, Bergen)
Streptococciosis in tilapia

- Tilapia farming $5 billion global value
- Bacterial infection with *Streptococcus* sp. major challenge
- *S. iniae*
- *S. agalactiae*
  (biotypes I & II)
Control of streptococcosis - historical

• Medical (antibiotics)
• Vaccines (injection)
• Management (reduce stress, reduce feed, stable environment [oxygen, temperature], reduce stocking density)
• All of above have challenges
Control of streptococcossis - progress

- Probiotics (*Bacillus* spp.) & nutrition
- Genetic selection (tolerance)
- Biosecurity (SPF broodstock)
- Improved vaccines (best practice)
BALANCED HEALTH: BENCHMARK’S APPROACH

- Building immunity
  - Natural immunity through optimal environment and stress management
  - Concurrent disease management
  - Vaccine research and development programmes

- Building resilience
  - Specific genetic programmes to establish disease resistance
  - Genetic programmes to improve robustness
  - Optimising animal husbandry and management
  - Life stage optimal nutrition

- Reducing disease challenge
  - Clinical and diagnostic services
  - Disease specific pharmaceutical treatments
  - Biological disease control measures
  - Biosecurity, management and husbandry programmes
  - Monitoring and data analysis
Knowledge gaps & challenges

• Sea lice
  – How to improve fish robustness?
  – Improved welfare of fish at crowding, movement
  – Cleaner fish health & welfare

• Streptococcosis in tilapia
  – Best practice for different systems (RAS, flow-through, extensive)
  – Vertical transmission (Pradeep et al. 2016)
  – Functional feed
Summary

• **Sea lice** continues to be a major challenge
• Engineering, genetic and biological control methods work
• Management and integrated sea lice management required on area and site basis
• **Streptococcus**is significant challenge to tilapia farming
• Improved biosecurity, genetics, nutrition and management coupled with vaccination will be successful
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