



Measuring zebrafish husbandry and performance

HCMLF Symposium 2020: Managing Fish Health, Husbandry, and Welfare in the Time of COVID19

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- Cycling & Marginal Gains!
- David Brailsford – performance director of British Cycling (2003) & Team Sky (2010)
- Ambition was to transform British Cycling and win the Tour de France for Team Sky within five years
- Mantra – ‘Marginal Gains’ (1% factor)



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- ‘Marginal Gains’ (1% factor) – “break everything down that goes into cycling then improve each element by 1% and see a significant increase when you put them all back together”
- “Do you really know how to clean your hands? Without leaving the bits between your fingers? If you do things like that properly, you will get ill a little bit less. They're tiny things but if you clump them together it makes a big difference”



1903 Tour de France —————→ 2020?

No British Winner from 1903-2012

2012 2013 2015 2016 2017 2018



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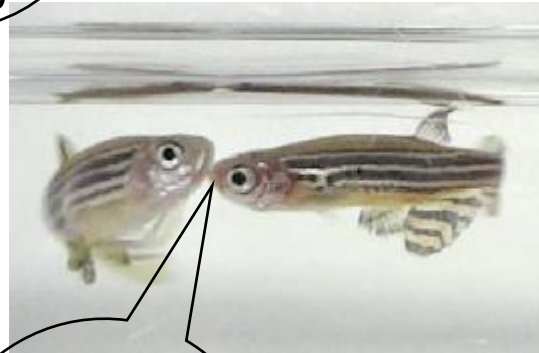
What the heck have you been eating?

I'm only 3 weeks old!



We did it over sand!

It is much nicer in here!



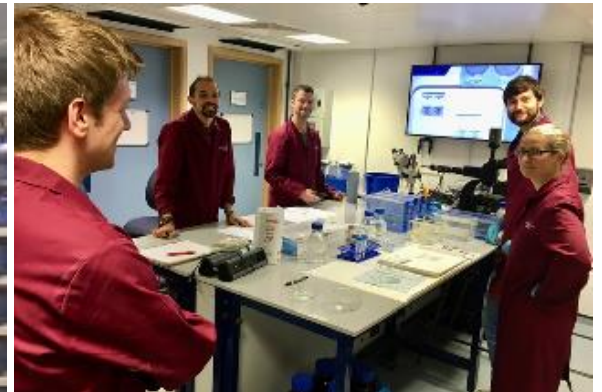
I might be 3 years old but I'm still firing!



- Improving Husbandry = 'Marginal Gains'
- Often referred to as 'low hanging fruit'
- How do we elevate anecdotal evidence?

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- Rich knowledge base with 10's/100's questions/topics discussed at our husbandry forums
- Very few funded studies to address these questions
 - despite potential to impact performance research outcomes
- Generally presumed that best husbandry practice is done within the context of the experiment
 - presumes a good working partnership between researchers and animal care staff?
- Are animal care staff involved in experimental design?



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- Fortunate in the UK to have NC3Rs
 - they can't fund everything!
- What else is at our disposal if we are to continue to improve our model system
 - make better use of how we collect existing data?
 - foster wider community projects?
 - better engagement between research and husbandry needs?



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- Make better use of how we collect existing data?
- Requires relevant database/record keeping systems
- Need help here!!
 - come up with the questions we want to answer and then develop the database accordingly?

ARC Embryo Spawning Information Request

In order to better manage the transgenic and wild type zebrafish stocks in the ARC, we would like to collect information about spawning success from users. This will help us to manage demand, keep lines in good spawning condition, manage feeding levels, and build a profile of lifetime reproductive output for individual lines. We hope that this information will be a useful resource for both the ARC and its users. To help us with this, we would ask that you fill in this short form after each embryo collection.

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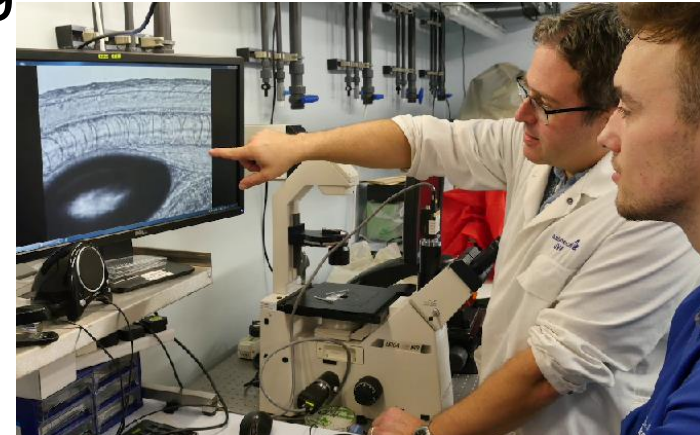
- Helps inform on what breeding methods different research groups are using
- Helps us assess the success or otherwise of those methods
- Helps us weigh up success against resource needs
- Helps us weigh up success against any welfare concerns of the methods used
- Go further – link answers to other factors that influence performance and probe against:
 - age; line; provenance; usage; environmental regime; tank cycling; diet;....maybe even user vs staff!

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- Foster wider community projects?
- Powerful resource and data set if we can share/co-ordinate that information between facilities
- Approach we should take for all of our needs, whether that is developing:
 - protocols, e.g. questionnaire on genotyping
 - policies (local or national), e.g. maximum age
 - best welfare practices

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- Better engagement between research and husbandry needs?
- Include researchers input in our data gathering
 - rationale for their approaches
 - uptake of new methods
- Identify ongoing research that can help us address husbandry questions for which there would otherwise be no funding
- Joined up thinking!



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- Are people doing this already?
- Are you able to do it?
 - do you have the resources
 - collective approach makes it possible?
- Creative in how we develop and share information?
- Mantra for husbandry improvement should be 'Marginal Gains' and not 'low hanging fruit'



Gold standard