

Animal experiments

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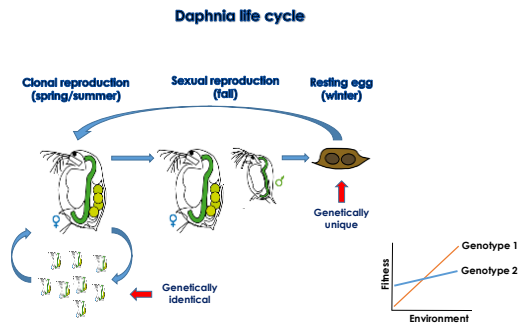
Eco-evolutionary dynamics in the model organism *Daphnia*



Why *Daphnia*?

Daphnia ecology





Sample questions addressed

- Effects of population density on activity and metabolic rate
- Genetic variance in thermal reaction norms (r and K)
- Genetic variance in population dynamics
- Importance of transgenerational plasticity for dealing with changing temperatures
- Rates of acclimation to temperature fluctuations
- Environmental stressors – mercury/antidepressants

(contact me if interested in project, Sigurd.Einum@ntnu.no, 01-212)

Why a lecture on animal experiments?

https://www.youtube.com/watch?time_continue=196&v=4E3kIacTww

Why a lecture on animal experiments?

Make you aware of issues regarding how we treat animals

- ethical considerations
- public concerns
- legislation
- requirements from scientific journals
- quality of data

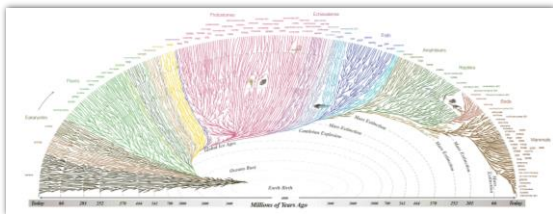
Example: testing for density effects on stress hormone



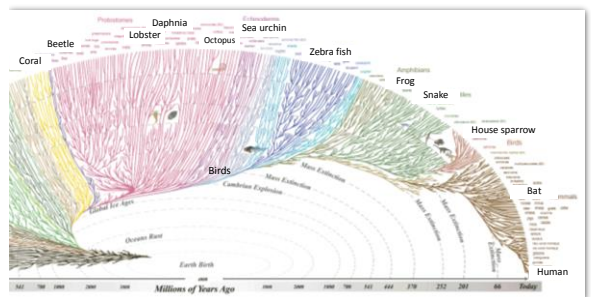
- Pre-test conditions (happy, well fed fish during rearing)
- Abiotic conditions; light, temperature, water chemistry (oxygen, ph, etc), cover/substrate
- Food conditions (quality and quantity)
- Disease/parasites
- Social behaviour/agresion
- Procedure during sampling (anesthetics?). Can we measure using non-invasive techniques (from water samples)?
- Termination, how to kill
- Number of replicates required?
- Duration of experiment?

- Which species? Brings us to the question of whether some species less problematic to do experiments on from an ethical perspective...

Ethical concern depend on type of animal?



Rank organisms!



Legislation

- Dyrevelferdsloven
Norwegian Animal Welfare Act
- Forsøksdyrkonvensjonen
European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes
- Forskrift om bruk av dyr i forsøk
Norwegian Regulation on Animal Experimentation

NORWEGIAN ANIMAL WELFARE ACT

§ 1 Animals covered by the Act.

Live mammals, birds, reptiles, amphibians, fish, decapods, cephalopods and honey bees.

§ 3 General provisions on how animals should be treated.

Animals shall be treated well, and consideration shall be given to the instinctive behaviour and natural needs of animals, so that there is no risk of causing them unnecessary suffering

European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes

- "animal", any live non-human vertebrate, including free-living and/or reproducing larval forms, but excluding other foetal or embryonic forms.

The Norwegian Regulation on Animal Experimentation

§1 Aim

To **reduce the number of animals** used in research and education and to ensure that animals governed by the regulation receive correct treatment and are not subjected to **unnecessary pain and suffering**

§2 Area of application

- The Regulation regulates **experimentation with animals**, and in addition the **breeding, rearing and keeping** of animals that are to be used in **experiments**.
- Applies to the use of **living vertebrates, decapods and cephalopods**

Why animal experiments?

- a) Basic research
- b) Applied research to
 1. Prevent and treat disease in humans/animals/plants
 2. Evaluate/adjust physiological conditions in humans/animals/plants
 3. Improve animal welfare
- c) Develop and test pharmaceutical products, food or other products
- d) Research for protection of health and environment of humans/animals
- e) Research to protect an animal species
- f) Education

The 3 R's

Internationally recognised principle

1. **Replacement**
 - Substitution of conscious living higher animals with insentient ('unfeeling') material.
2. **Reduction**
 - Decrease in the number of animals used to obtain information of a given amount & precision.
3. **Refinement**
 - Any decrease in the incidence or severity of "inhumane" procedures applied to those animals which still have to be used.

Introduced by Russel & Burch in 1959 in their report: '*The principle of Humane Experimental Techniques*'

Application to perform experiments

Experiments to be done in our laboratory animal unit

- Apply directly to the 'Norwegian Food Safety Authority' through the FOTS-website – need to be approved by the 'IBI-responsible' person.

Field experiments:

- Same procedure!

Website of "Mattilsynet" regarding animal research in Norway:

http://www.mattilsynet.no/dyr_og_dyrehold/dyrevelferd/forsoksdyr/