Egg cannibalism promotes paternal care in brown trout (Salmo trutta)

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Egg cannibalism promotes paternal care in brown trout (*Salmo trutta*)

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UMR Ecologie Comportementale et Biologie des Populations de Poissons

(Fish Behavioural Ecology and Population Biology)

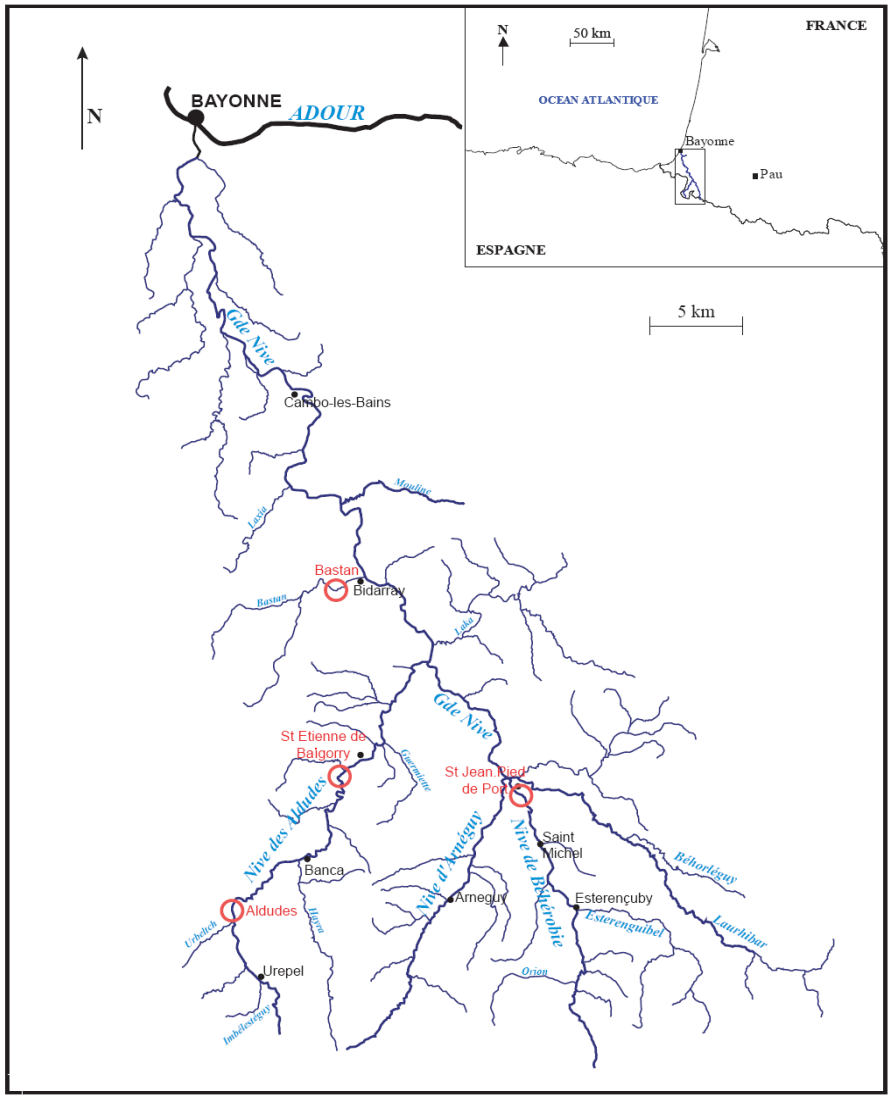
UNIVERSITÉ DE PAU ET DES PAYS DE L'ADOUR

Points against paternal care in brown trout

1. No one has ever observed it!
2. High r females than caring
3. Fem g → if she cares of the eggs, why do it?
4. Paternity uncertainty → don't loose time and energy caring of other's eggs

So, why the hell did you study paternal care?

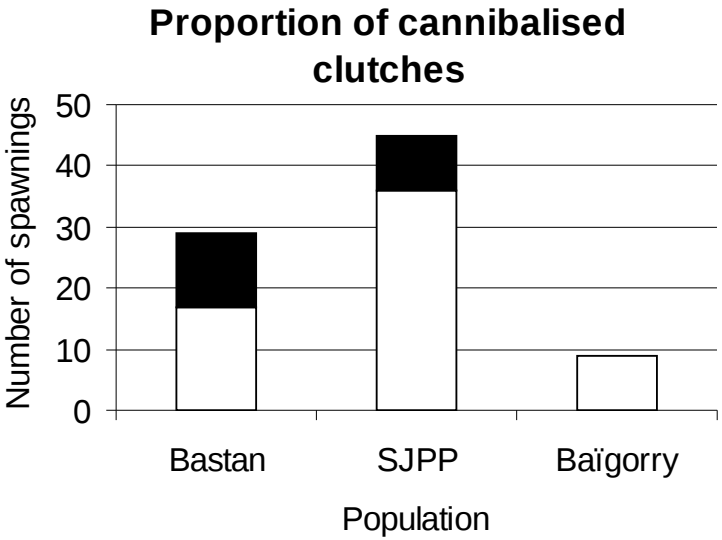
but…

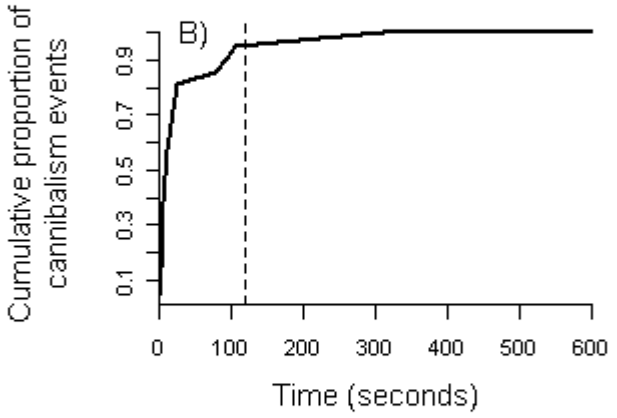


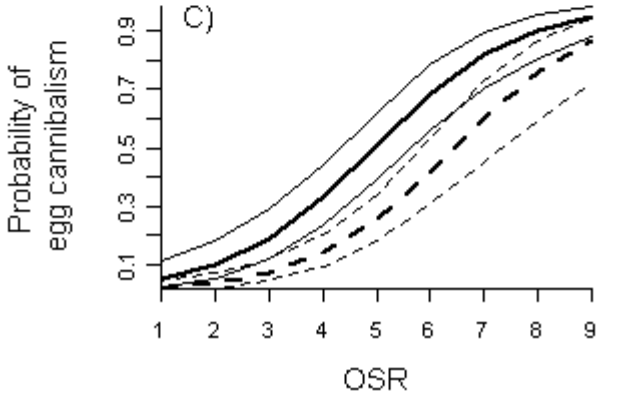
83 aerial/underwater videos shot in
3 natural populations over
5 reproductive seasons

Aymes et al. 2010. *Naturwissenschaften*

but…







Aymes et al. 2010. *Naturwissenschaften*

Points **for** paternal care in brown trout

Males could protect their eggs against cannibalism

1. No one has ever observed it!
   It may not be found everywhere, and should not last long

1. High OSR → better spend time competing for females than caring
   Cannibalism occurs soon after fecundation → low time cost of care
   OSR increases the risk of cannibalism → increases the benefits of caring

1. Female stays on the nest after spawning → if she cares of the eggs, why do it?
   She's busy covering the eggs, so she can not defend them at the same time

1. Paternity uncertainty → don't loose time and energy caring of other's eggs
   Then males should not care after multiple mating

Questions

1. Can the dominant male lower the risk of egg cannibalism (paternal care)?

2. Could the female assess a male's capacity of defense, before spawning (mate choice)?

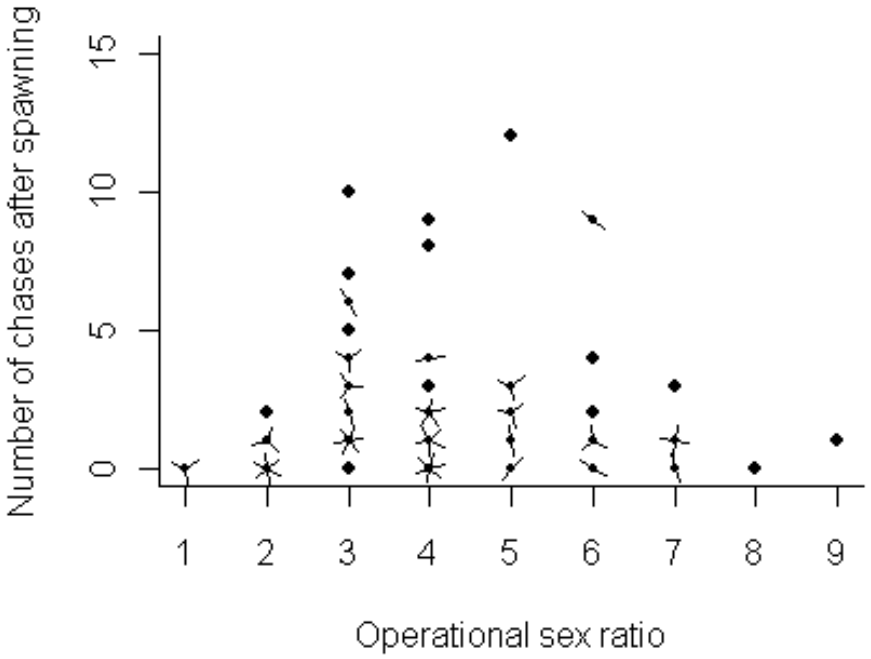
Methods

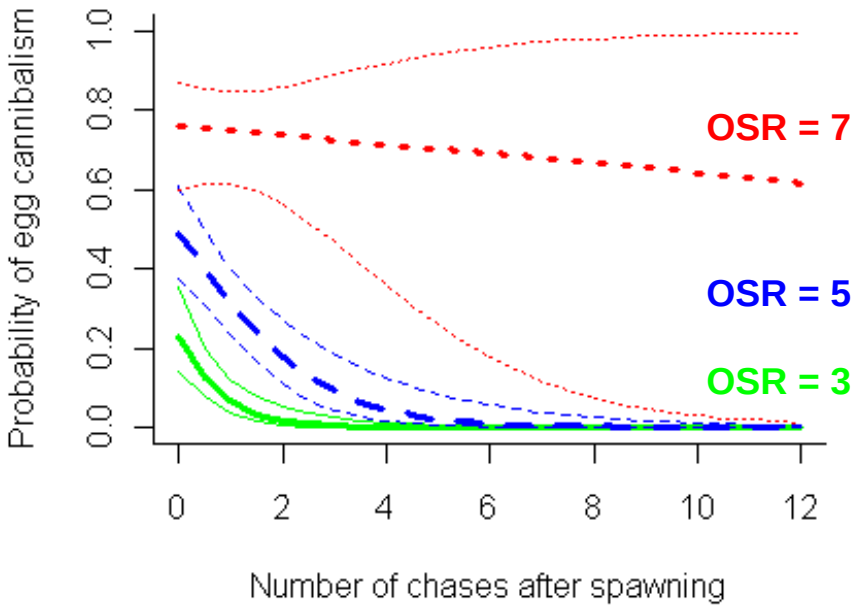
- 83 aerial/underwater videos shot in 3 natural populations over 5 seasons
- Analysis of 30 min. before and 2 min. after spawning
  - Cannibalism
  - **Operational sex ratio (number of males)**
  - **Male/female size**
  - **Rate of chase by dominant male towards peripherals before and after spawning**
  - **Multiple or single fecundation**

- Binomial GLM on probability of egg cannibalism

Results

Males chased peripherals after spawning (unless there were too many), and this reduced the probability of egg cannibalism.



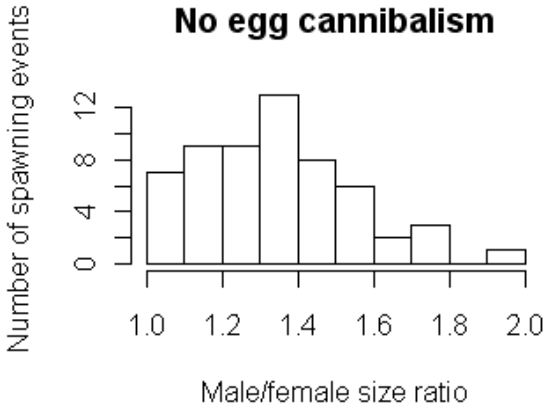


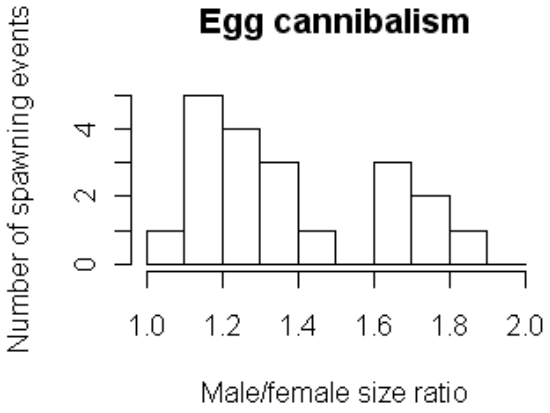
P(cannib.) ~ chases x OSR

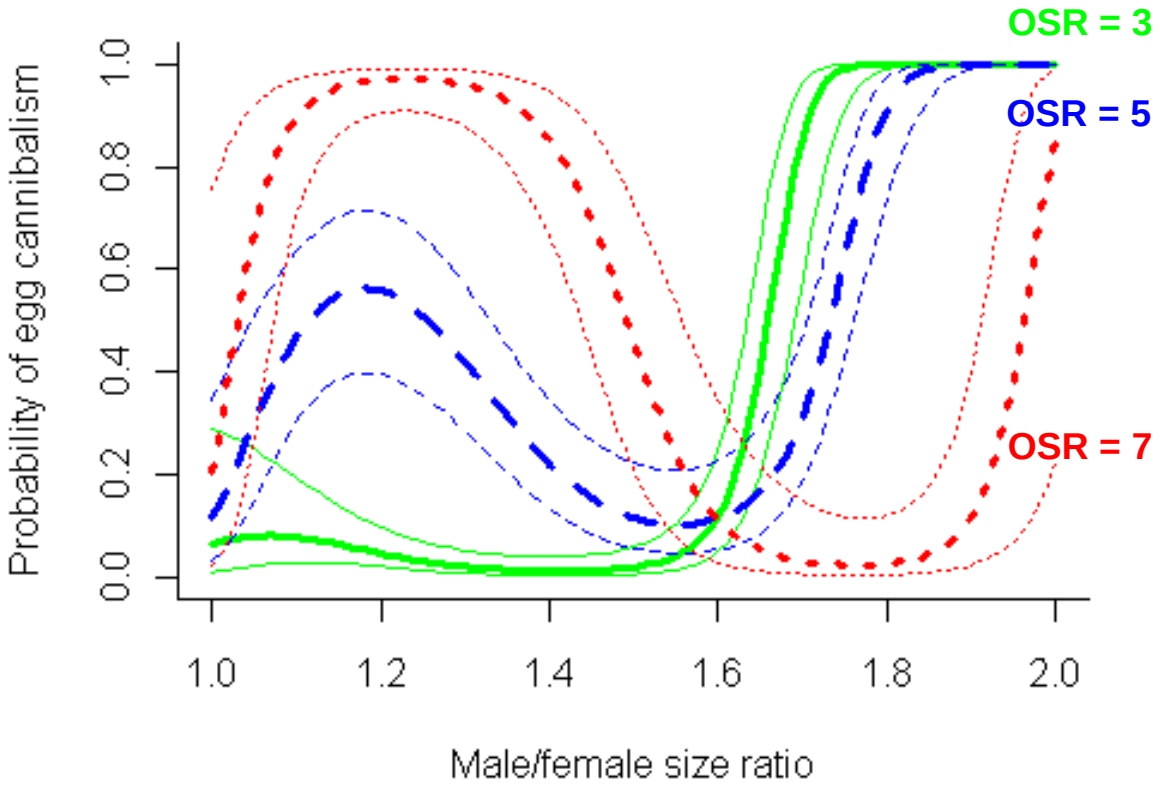
Chasing rate after spawning not correlated to pre-spawning indicators

Results

There was an optimal size ratio which minimized the probability of egg cannibalism



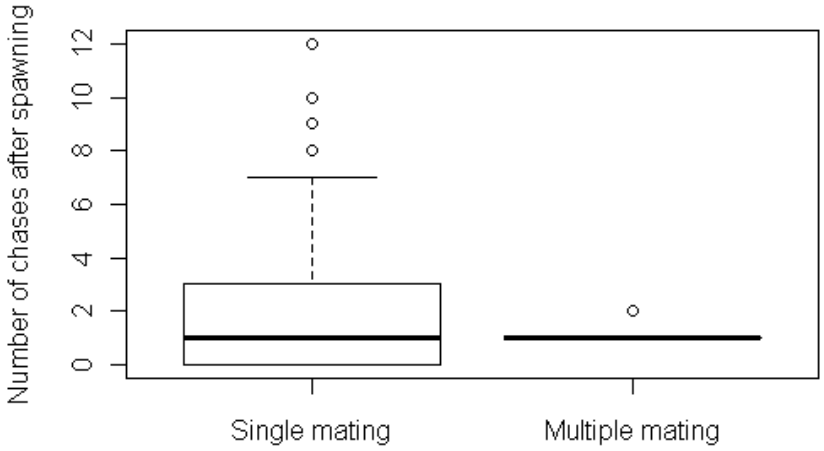




P(cannib.) ~ size ratio x OSR

Results

Multiple mating did not reduce paternal care but promoted cannibalism by dominant male



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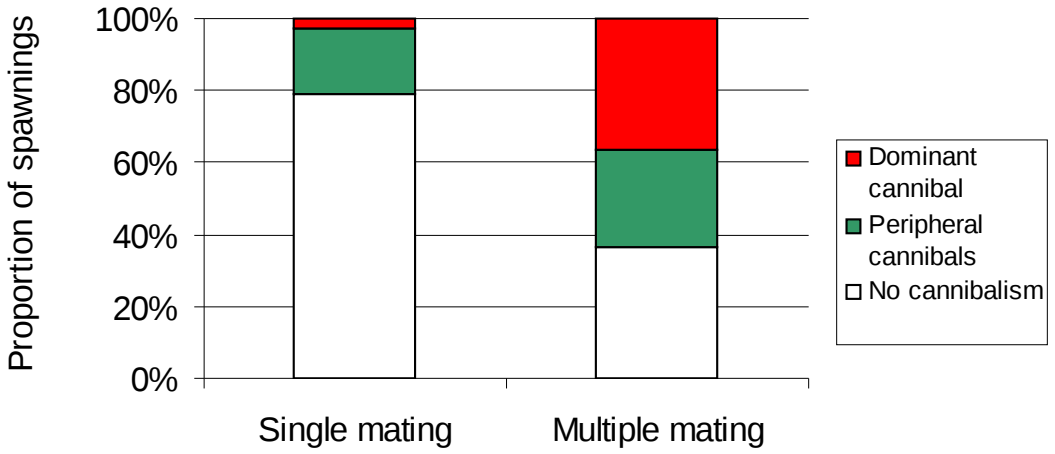
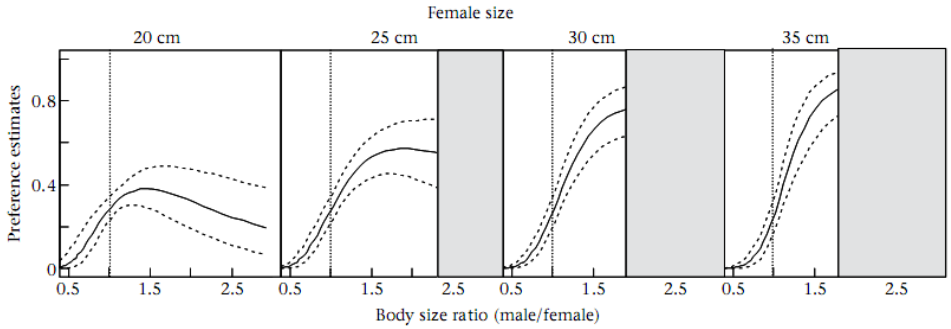


Discussion

1. Can the dominant male lower the risk of egg cannibalism (paternal care)? ***YES!***
   - Chases *after* spawning = paternal care (not male-male competition)
   - Male size can also serve male-male competition
1. Could the female assess a male's capacity of defense before spawning (mate choice)? ***POSSIBLY***
   - Chases after spawning correlated to no pre-spawning cue
   - Male size assessable before spawning



Labonne et al. 2009 *Anim. Behav.*

Discussion

Implications

Direct benefits, among which paternal care, may matter in salmonids mating systems.

Brown trout so far considered a good model for mate choice based on indirect benefits only (good genes, sexy sons, compatible genes)

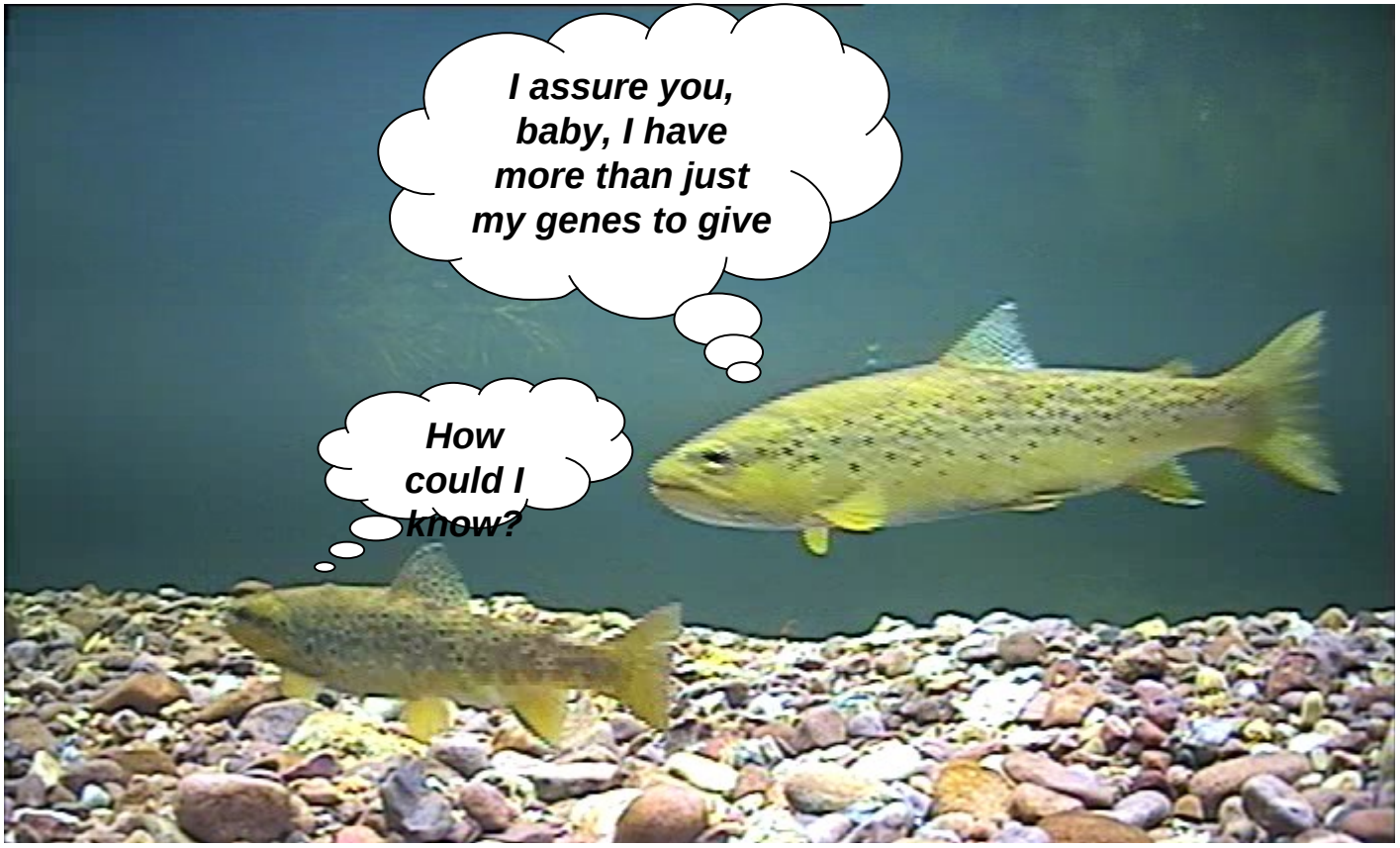
Future directions

→ ***Cannibalism as a selective force in the evolution of mating systems***

Costs and benefits of cannibalism/care

Occurrence at large scale (your help needed)

Thank you!


I assure you, baby, I have more than just my genes to give
How could I know?