

Swim for your life!

Survival of brown trout (*Salmo trutta*) fry in the wild: effects of activity, body size and starvation

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Background

The first year of life is a major survival bottleneck for the brown trout, where only ~10% survives. Therefore, it is important to identify individual traits and environmental factors that affect selection pressure at this life-stage. So far, the number of experiments conducted in natural conditions is scarce.

Method and Aim

Fish in our experiment were starved and refed under controlled laboratory conditions. Activity was measured twice, before experimental start and during refeeding. All fish were released in their native stream and recaptured after a month to check for survival.

The aim of this study was to investigate if brown trout fry

1. survival in nature was affected of activity, body size or starvation
2. were able to compensate growth of body structures after a period of growth depression
3. changed their individual activity level due to starvation

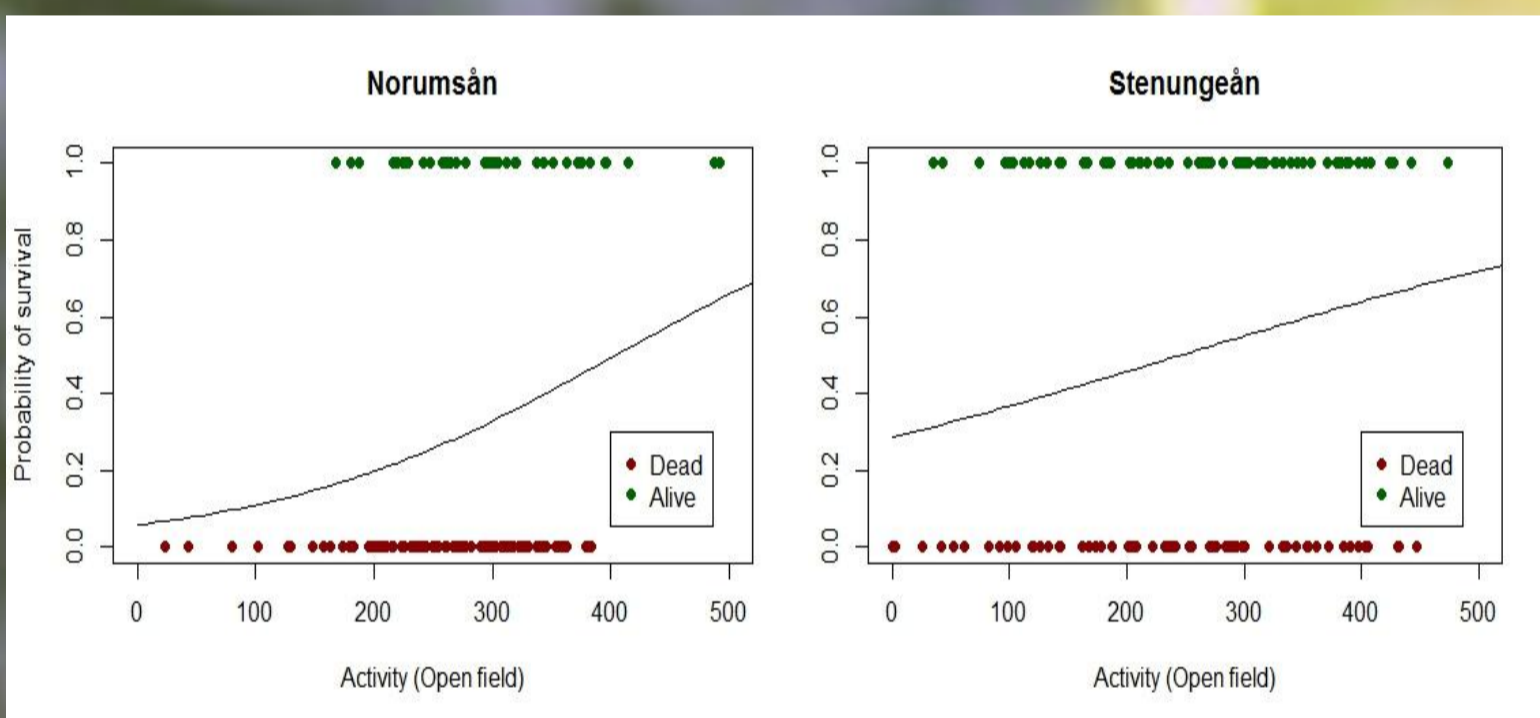


Figure 1. Predicted probability of survival depending on individual activity level.

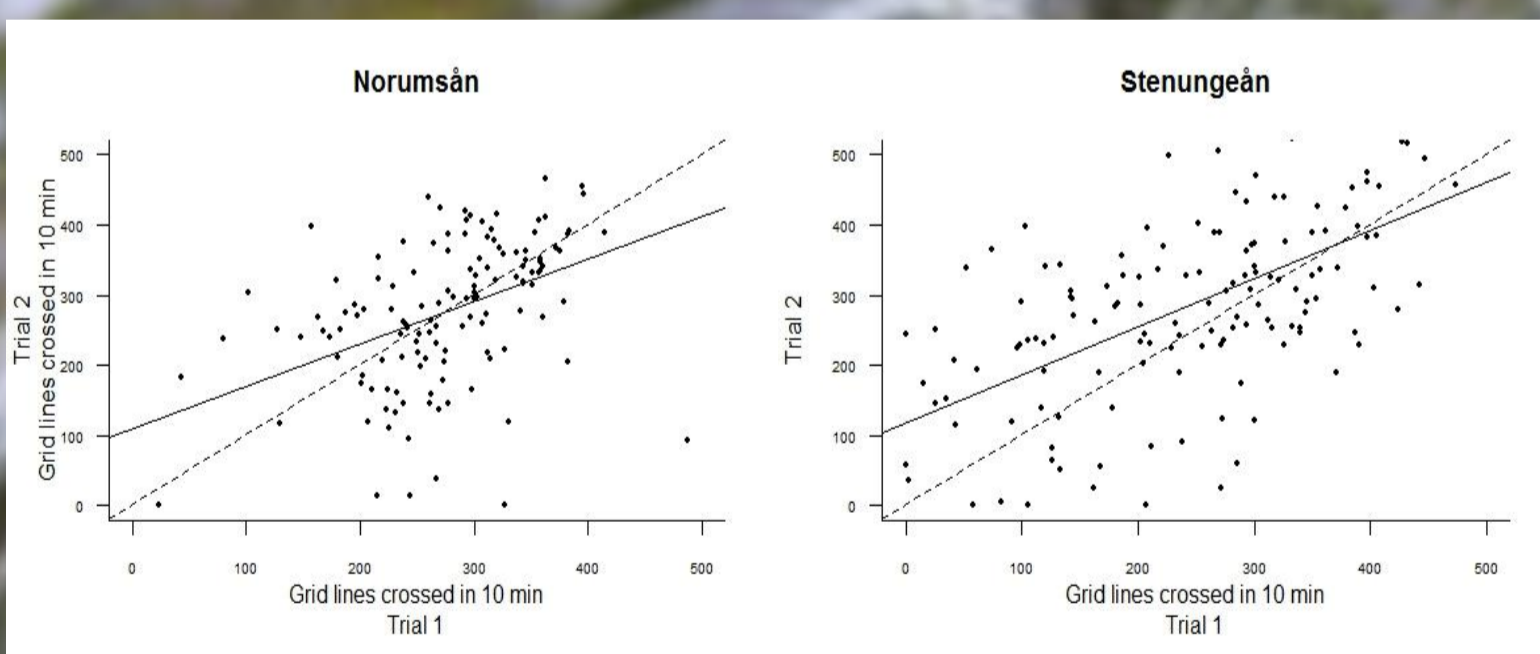


Figure 2. Correlation in level of activity between the first and second behavioural trial for each individual from the two streams. Solid lines represent fitted regression lines where statistically significant correlation ($p > 0.0001$) was found in both experiments. Dashed line represent 1:1 correlation between trial 1 and trial 2.

Results

1. Individual variation in activity level was consistent over time and more active individuals had higher probability of survival in nature.
2. Body size affected survival in nature in one out of two experiments
3. No compensation in body structure was found

		Starvation period	Refeeding period	Period in nature
		Mean±SD	Mean±SD	Mean±SD
Norumsån	Control	0.43±0.05*	0.64±0.11*	0.41±0.13
	Starved	0.01±0.08	0.37±0.13	0.41±0.11
Stenungeån	Control	0.28±0.10*	0.46±0.06*	0.21±0.09
	Starved	0.02±0.09	0.38±0.10	0.23±0.07

* indicates statistically significant ($p < 0.05$) higher growth rate than other treatment group during the same period.

Conclusion

Individual behaviour can be as, or even more, important for the survival of brown trout fry as morphological and physiological traits. Furthermore, since body size not always is of importance for survival, compensatory growth as a response to growth depression is not a priority.



Photo: Bart Adriaenssens

