

13. Artificial selection for predation survival shapes life-history traits and collective motion in guppies (*Poecilia reticulata*)

Hannah De Waele^{1,*}, Regina Vega-Trejo^{2,3}, Kevin Chou¹, Jori Noordenbos¹, Alexander Kotrschal¹

¹Department of Animal Sciences: Behavioural Ecology, Wageningen University & Research, 106708 WD Wageningen, Netherlands

²Department of Zoology, Stockholm University, Svante Arrhenius väg 18B, 10691, Stockholm, Sweden

³Department of Zoology, Edward Grey Institute, University of Oxford, Oxford OX1 3SZ, UK

* Corresponding author. E-mail: hannah.dewaele@wur.nl

Predation pressure exerts strong selection pressure on many traits. For instance, it is likely a major driver of the evolution of life-history traits and collective behaviour. A wealth of empirical evidence corroborates this idea. However, such data is often derived by comparing natural populations with associated confounding factors inherent to ecological comparisons. Experimental evidence on how predation impacts evolution is surprisingly scarce. Here, we experimentally tested how predation impacts the evolution of life-history traits and collective behaviour in juvenile and adult guppies (*Poecilia reticulata*). We used three replicate lines of guppies artificially selected for adult predation survival for three generations and compared them to three control lines. We found that predation selected fish had larger, and more offspring, in particular early in life than controls, while several other traits were remarkably unaffected by selection. Additionally, we found that the offspring of survivors showed differences in polarization and cohesiveness, compared to fish from control lines. Our results demonstrate which aspects of life-history are shaped by predation and show that collective motion can rapidly evolve under strong predation selection.