

Abstract 16:

The evolution of cognition via predation: an experimental approach in guppies
(*Poecilia reticulata*)

Hannah De Waele^{1,*}

¹ Behavioural Ecology Group, Wageningen University & Research, The Netherlands

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

A key objective in modern biology is understanding the evolutionary processes that underlie the substantial variation in behaviour and life-history traits in animals. Surprisingly, the causes for the striking variation in cognition across species are still poorly understood. Comparative studies suggest that predation pressure imposes strong selection on cognitive evolution, yet experimental tests are thus far lacking. To fill this knowledge gap, I will perform several experiments to test how predation shapes the evolution of cognition. I will use Trinidadian guppies (*Poecilia reticulata*), a species that naturally occurs in high and low predation areas and is therefore ideal to link cognitive performance to an ecological and evolutionary relevant framework. I will use selection lines developed for survival under predation, allowing me to identify the link between cognition and predation in an unprecedented way. Since cognition consists of different domains, which are likely impacted by predation in different ways, I will investigate several key domains. The fish will be subjected to state-of-the-art cognitive assays that make use of novel technology. While domain-specific results are exciting on their own, the most innovative aspect will be the opportunity to construct “cognitive landscapes”. These landscapes allow for complex comparisons, providing opportunities to uncover intricate links between cognitive domains and underlying structures of cognition. My project fills a void in modern biology by providing causal conclusions about the evolution of cognition and by contributing to our understanding of how loss of predators can have downstream effects on traits essential to cope with environmental challenges.