



The Mating System of the Blue-striped Pipefish, Utilizing Both Behavioral and Genetic Methods

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Abstract: To date, little is known about the blue-striped pipefish, *Doryrhamphus excisus*. This reef-dwelling species of pipefish has been assumed to be monogamous due to their monomorphic coloring across sexes and the consistency at which they are found in pairs in the wild. However, no experimental studies of the *D. excisus* mating system have been published. We set out to study the social system of the blue-striped pipefish using both behavioral and genetic methods. We quantified variation in aggression by performing one-on-one aggression trials with inter- and intrasexual pairs. Overall, while very little aggression was observed in the intersexual trials, we found that intrasexual pairs demonstrated higher levels of aggression via a flicking behavior. We then used RNA-seq to compare gene expression levels in the brains of males and females, both pair bonded and non-pair bonded. Some of the genes of interest included arginine vasotocin (AVT) and isotocin, which have previously been shown to affect pair bonding and paternal care in other fish species. Overall, we found strong signatures of sexually dimorphic gene expression patterns in the blue-striped pipefish brains (141 genes), regardless of their mating status. There were 84 genes that showed statistically significant differences in gene expression levels across the paired and non-paired fish. Future work will investigate gene expression patterns in the brains of several additional syngnathid fish species to identify differentially expressed genes across varied mating systems.

Keywords: Behavioural ecology, Genomics