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Editorial

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Behavioral syndrome and ecological hypothesis in fishes

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EDITORIAL

Fishes are virtually the only major taxon in which behavioral correlations have been compared between populations. This research has guided the field in examining how variation in selection regime may shape personality. Recent research on fishes has also made important strides in understanding genetic and neuroendocrine bases for behavioral syndromes using approaches involving artificial selection, genetic mapping, candidate gene and functional genomics. This work has illustrated consistent individual variation in highly complex neuroendocrine and gene expression pathways. In contrast, relatively little work on fishes has examined the ontogenetic stability of behavioral syndromes or their fitness consequences. Finally, adopting a behavioral syndrome framework in fisheries management issues including artificial propagation, habitat restoration and invasive species, may promote restoration success.

Few studies, however, have examined the ecological relevance of behavioral syndromes in the field. Knowledge of how behavioral syndromes play out in the wild will be crucial to incorporating such a framework into management practices.

Ecological trait

The link between ecology and reproductive isolation constitutes the cornerstone of the ecological hypothesis of speciation. Such a link can arise when traits under ecologically based selection are also used as cues for mating (magic traits) or as a by product of habitat choice when mating takes place within habitats. Here, we propose that behavioral syndromes may also constitute such a link. We illustrate this mechanism in the butter hamlet, hypoplectrus unicolor, a reef fish from the wider Caribbean, with aggressive mimicry as the focal ecological trait. Aggressive mimicry is of particular interest in hamlets since it has been proposed to play a key role in the radiation of hypoplectrus. Individuals from a natural population in Bocas del Toro, Panama, were tagged and their diurnal and spawning behaviors observed over 2 years. The results indicate that aggressive mimicry behavior differed consistently between individuals and formed two discrete behavioral types that also differed with respect to territoriality. Differences in territoriality between the two behavioral types translated into different use of space in spawning contexts, which generated a tendency for assortative mating by behavioral type.

Foraging behavior

Foraging is not only the activity, which consists to take off resources in the environment, that is, prey, but also the choice of the best site or the most favorable period where and when to forage. The animal must be at the good place at the best moment. This aim seems easy for animals in controlled environments where the food is abundant and regular; but this fact could be a disadvantage when aquaculture reared fish are released in natural environment in order to supply the low level of the wild stocks.

Traditionally, fish have been viewed by some as simplistic animals unintelligent and with a limited behavioural repertoire and severely compromised memory leading to the discounting of their ability to feel pain. In reality, however, fish are neither behaviourally deficient nor cognitively impaired.

Fish do not have the ability to make facial expressions and, relative to mammalian animals, have a limited ability for postural changes and vocalizations. Therefore they do not exhibit familiar mammalian responses such as screaming, crying, whimpering, flattening their ears, tucking their tails between their legs, or raising their hackles when threatened. Fish react to threatening or stressful stimuli in more subtle ways such as color changes, alterations to their level of movement by swimming rapidly or becoming immobile, and water column utilization by swimming in the upper, middle, or bottom depths of the water.