

# A Shoal of Wolves

**Joshua Pickett dives into the theory of social behaviour in captive raised prehistoric bichir fish.**

**T**here are many types of fish that display a societal pecking order, from the comical-looking dragonet gobies of the Indo-Pacific oceans, to the colourful sand-sifting cichlids of South American rivers. The primitive bichir fish of Africa, however, aren't known to show this group dynamic - at least not in the wild.

## What exactly are bichirs?

Bichirs are a group of tropical, armoured, air-breathing fish belonging to the genus *Polypterus*. 145 million years ago, they began swimming the lakes and rivers of what is now Africa; they continue to do so today, remaining almost unchanged.

There are 16 species (including subspecies) still alive now, and almost all of them are available in the aquarium trade. Ranging in size, bichirs often measure up to between 14–42 inches in length; they are ambush predators, and use their sharp teeth to grip large prey, tearing them apart by performing death rolls in a similar way to the distinctive behaviour of many crocodilians.

Bichirs are semi-aggressive and somewhat territorial, a characteristic pertaining more to the ornate species, *P. ornatipinnis* and *P. teugelsi*. In the wild, when a territorial animal comes into contact with another conspecific (belonging to the same species), the smaller animal has the freedom to leave the situation to avoid conflict. In contrast, within a captive environment, the smaller animal doesn't have the choice; it needs to develop a language to communicate that it is submissive and doesn't wish to fight. For many species this communication isn't an option, and they will inevitably clash. Yet for a few of the more tolerant semi-aggressive species, it formed the foundation for a unique social hierarchy to develop in many captive-raised animals - notably bearded dragons and, more recently observed, the bichirs.

Similar to carp and salmon, bichirs release a hormone into the water, that, in a closed environment such as a small lake, will stunt their growth - nature's ingenious resolution to overcrowding. It is speculated that this is where the bichir's submissive language first originated.

**“When you think of animals that have a social hierarchy featuring an alpha and a beta, primates, lions, or the pack structure of wolves might come to mind - but not fish”.**

## Where do they fit into this social hierarchy?

There are three types of systems on a social spectrum. On one end of the spectrum is an egalitarian (equal) social order; towards the middle is the linear hierarchy where each individual has its own social rank; at the other end is a despotic hierarchy, where there is one dominant alpha. Hierarchical systems in captive bichirs can be complex

because there are an abundance of factors that influence behaviour in an aquarium. Different species of bichirs have different temperaments - details such as stocking levels, space, age, and diet can determine how aggressive they will be, and will have an impact on the formation of the hierarchy.

Generally, captive bichirs fall between a linear and despotic social hierarchy, although less conflicting personalities can mean they will sit closer to the egalitarian end of the spectrum.

In a despotic bichir aquarium, the larger or more aggressive fish may challenge the alpha for its position. Both will raise their dorsal spines, stiffen their bodies, and sway back and forth, often nipping fins. These behaviours will continue, communicating that it is the bigger, stronger fish, until one of them submits. Otherwise, the tank generally remains peaceful, with rare moments of conflict occurring when the alpha is challenged.

A bichir aquarium with a linear hierarchy can often be a nippy one. Determined by size and aggression, each fish has its own place in the pecking order. Individuals often rework their system entirely to figure out new territories when changes to the layout of the tank occur, including minor decorative rearrangements. Even when a new bichir is added, most of the others will introduce themselves by twitching their heads beside the newcomer, and nipping its fins to make their place in the hierarchy clear.

It is an amazing opportunity to be able to witness new behavioural traits such as these form in an aquarium. It truly is a testament to their adaptability, and it comes at no surprise that they have survived for so long.

(Left to right) *Polypterus teugelsi*, *P. bichir lapradei*  
Photographs by Joshua Pickett

