

Piddling fish face off threat of competition

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Research published today in the online open access journal, *BMC Biology*, shows that male tilapia fish use pheromones in their urine to fight off competitors and enforce social dominance.

Aggressive territorial male Mozambique tilapia fish (*Oreochromis mossambicus*) send chemical messages to rival males via their urine. They increase urination, have smellier urine and store more in their bladders than less aggressive males, according to research published in the open access journal *BMC Biology*.

Animal behaviourists have known for some time that the urine of freshwater fish is a vehicle for reproductive hormones that act in the water as pheromones, affecting the behaviour and physiology of members of the opposite sex. Now, this research sheds light on the role of urine in influencing members of the same sex.

“Few studies have looked at the roles of pheromones in urine during competition between individuals of the same sex. We’ve found that tilapia dominant males store more urine in their bladders than subordinates, actively urinate during times of confrontation and the urine’s olfactory potency or smell strength is even greater,” explained Eduardo Barata, who led the Portuguese research.

As a lekking species – where males group together in the same area to breed, never leaving their nest, not even to feed – social hierarchy is important for the cichlid fish from Africa. Males actively advertise their dominant status through urinary odorants, which are thought to control

aggression in rival males and so maintain social stability within the area, or lek. By measuring male urination frequency during competition, Barata et al. found that dominant or ‘resident’ males increased urination frequency in the presence of ‘intruder’ males from once every ten minutes to once every minute. Dominant males stopped urination when their opponent gave up, indicating a close link between aggression and urination rate. By also collecting urine and measuring the volume over five days and evaluating olfactory potency using an electro-olfactogram, it was seen that subordinate males also stored less urine and the urine was less smelly than that of dominant males.

“We know pheromones are involved in reproductive and non-reproductive behaviours of fish, for example during migration, mating and schooling,” explained Barata. “While we do not yet know what these chemicals are, it is clear they play a major role in many aspects of tilapia social behaviour by providing information about the fish’s aggressive capabilities for instance. This is also probably not unique to tilapia, so we’re touching the tip of the urinary pheromone iceberg!” concluded Barata.

Source: BioMed Central

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