

# **Behavioural Adaptation to diminished Gravity in Fish - a Parabolic Aircraft Flight Study**

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During the “micro” gravity phases in the course of parabolic aircraft flights (PFs), some fish of a given batch were frequently shown to exhibit sensorimotor disorders in terms of revealing so-called looping responses (LR) or spinning movements (SM), both forms of motion sickness, a kinetosis. In order to gain some insights into the time-course of the behavioural adaptation towards diminished gravity, in total 272 larval cichlid fish (*Oreochromis mossambicus*) were subjected to PFs, and their respective behaviour was monitored. With the onset of the first parabola (P1), 15.9% of the animals revealed a kinetotic behaviour, whereas kinetoses were shown in 6.5%, 1.5% and 1% of the animals in P5, P10 and P15. With P20, the animals had adapted completely (0% swimming kinetotically). Since the relative decrease of kinetotic animals was especially prominent from P5 to P10, a detailed analysis of the behaviour was undertaken. Regarding SM, a ratio of 2.9% in P5 decreased to 0.5% in P10. Virtually all individuals showing a SM in P5 had regained a normal behaviour with P10. The SM animals in P10 had all exhibited a normal swimming behaviour in P5. The ratio of LR-fish also decreased from P5 (3.6%) to P10 (1.0%). In contrast to the findings regarding SM, numerous LM specimens did not regain a normal postural control and only very few animals behaving normally in P5 began to sport a LM behaviour by P10. Summarizing, most kinetotic animals rapidly adapted to diminished gravity, but (few) individual fish, who swam normally at the beginning of the flights, may lose sensorimotor control in later parabolas and thus possibly display uncoordinated stress responses. Acknowledgement: This work was financially supported by the German Aerospace Center (DLR) (FKZ: 50 WB 9997).