

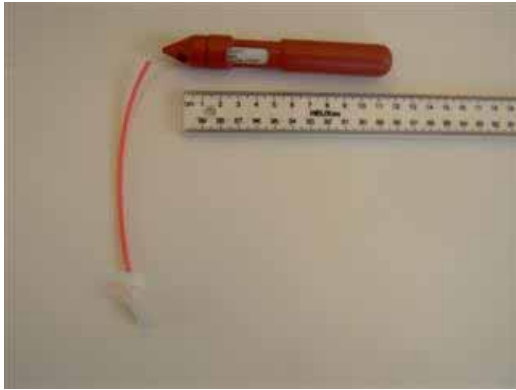
Broodstock Tagging in Marine Fish- Applications of Data Logging for Behaviour Monitoring

The monitoring of behaviour of broodstock in Tuna aquaculture is becoming more important particularly since "closing the reproductive cycle has become possible and the future lies in controlled spawning within a Containment System. In February 2005 a newly designed System was implemented in Mazarron, Spain and consisted of a polypropylene body with a nylon monofilament leader attached to a "Floy" Arrow head. The arrowhead was large enough to accommodate a PIT tag. The propylene body is made up of a screwtop through which the Star-Oddi DST milli - TD logger Small Temperature and Depth Logger could be inserted. The leader consisted of a slider which held the monofilament link together followed by a medical silicon tube together with a Penetration marker (8cm) and then colour coded tubing.

In total three fish from a broodstock cage were implanted under-water using a spear-gun technique. One of the tags had become detached. The other 2 tags (male and female tuna) remained in place for six months until the fish were recaptured at slaughtering and the data downloaded.

From the recordings is clear that both fish follow similar patterns of activity although the female fish remained at a lower depth than the male fish. There appears to be activity peaks as the sun rises and at sunset both fish to approached the surface. This may be indicative of spawning behaviour or the precursors of such activities. From the more intensive measurement periods a clearer picture is given of the water conditions and the behaviour of the fish themselves. During the middle of June a thermocline was formed within the water column. The water temperature was 2 to 3° higher at the surface (4 m) compared with a depth of 16 to 20 m. The temperature profiles in both fish, as expected are almost identical. In June both fish only approached the surface during periods of darkness, during the daytime they spend more time below a depth of 8 m. On the whole in June and July the majority of time at night is spent above the 8 m mark. It is clear from measurements in both fish that the preferred spawning temperature of 25°C is reached only in July, and then at a depth above 12 m. These points should be taken into consideration when considering the "spawning window" of the tuna.

Through the use of the implanted data loggers it has been possible to track spawning behaviour and in general observe the behaviour of individual fishes within open sea cages.



Picture 1: The DST inside the module



Picture 2: Diver with the spear-gun



Picture 3: The tag streams behind the fish



Picture 4: Tagged tuna caught from the cage



Picture 5: The DST module after recovery



Picture 6: Broodstock cage in Spain