

Sleeping behaviour of some nearshore teleosts

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Résumé: Le comportement du sommeil des poissons d'activité diurne peut se classifier comme suit: rapport écologique au substrat, qualité du sommeil, coloration. 1. Sommeil en pleine eau: sommeil léger, coloration structurelle, pas de coloration de nuit. 2. Sommeil au ras du sol: repose sur le sol, sommeil profond, coloration à base de pigments, colorations de nuit sont rares. 3. Sommeil à l'abri: sommeil très profond, abrité, coloration à base de pigments, colorations de nuit sont fréquentes. Description du comportement du sommeil de quelques poissons de l'île d'Elbe (Italie).

Zusammenfassung: Tagaktive Küstenfische lassen sich in ihrem Schlafverhalten nach der ökologischen Beziehung zum Substrat, der Tiefe des Schlafs sowie der Art der Körperfärbung unterteilen in: 1. "Freiwasserschläfer": übernachten im offenen Wasser schwebend, sehr leichter Schlaf, vorw. Strukturfärbung, keine Nachtfärbung. 2. "Bodenschläfer": nächtigen offen auf dem Substrat liegend, tiefer Schlaf, Pigmentfärbung, Nachtfärbungen selten. 3. "Versteckschläfer": suchen Verstecke, sehr tiefer Schlaf, Pigmentfärbung, Nachtfärbungen häufig. Beschreibung des Schlafverhaltens einiger Fische der Insel Elba (Italien).

According to their sleeping behaviour diurnal shore fishes may be divided into open water-, bottom- and hiding place-sleepers. These types of behaviour demonstrate a basic ecological relation between the animal and the substrate.

The open water-sleepers, sleeping suspended motionless above the bottom, have no contact to the substrate. The preferred distance to the surface, the bottom and the shore varies from species to species (fig. 1). Most open water-sleepers have physical colours producing silvery, greenish or bluish glittering liveries. Dark melanophore patterns are often developed. Fast colour change does not occur but the intensity of the dark pattern may vary a little. All fins are spread at night.

Among others the *Atherinidae* and the *Engraulidae*, two pelagic groups, and also the more substrate linked *Sparidae* belong to this category. The larger the body size, the more extendet the distance between the sleeping place and the shore. The *Atherinidae* and the *Engraulidae* sleep in loose school formation within the whole range between surface and bottom. The coordinated orientation of the school in the daytime is lost at night. Most of the *Sparidae* sleep suspended only 10 to 50cm above the bottom. Open water-sleepers have a very light sleep.

A mid-position between the open water- and the bottom-sleepers is taken in by the *Emmelichthyidae*. They feed on plankton during the day in open waters far from the bottom. At night they return to the substrate for sleeping, spreading their unpaired fins like open water-sleepers but lying directly on the substrate or being suspended very closely above it. In contrast to open water-sleepers they have a sound sleep and an evident night livery.

The bottom-sleepers are strictly substrate linked, pigmentary coloured fishes, resting unprotected on the open bottom at night. In most species the air bladder is reduced. Many *Blenniidae*, *Tripterygiidae*, *Gobiidae* and *Mullidae* belong to this group. In most cases the coloration is faded but not changed at night. Bottom-sleepers have quite a sound sleep and flee over a short distance only when disturbed.

Hiding place-sleepers are generally coloured by pigments. They seek a hiding place for sleeping, e.g. caves, fissures, grass-weed etc. Typical hiding place-sleepers are found among the *Syngnathidae*, the *Blenniidae*, the *Gobiidae* and especially among the *Labridae*. Characteristic night colorations can be found mainly among the *Labridae*, usually a cross running pattern to fuse the outline with the background. The change of colour patterns happens within a few seconds and can, for some time, be cancelled immediately. During the second half of the night a reversal of coloration takes several minutes. *Coris julis*, digging itself into coarse sand for sleeping, has no night coloration.

During the day the mediterranean Pomacentrid *Chromis chromis* picks plankton in the open water, without losing sight contact with the bottom. At night all *Chromis chromis* return to the substrate and look for a hiding place. When these are all occupied, the remaining animals unite and form "sleeping clouds". These may include 10 to 20 individuals swimming freely suspended about half a meter above the bottom, tipping their tails down and swimming vertically in the water.

fig. 1: TYPICAL DISTRIBUTION OF SOME OPEN WATER-SLEEPERS:

