

### **Molecular analysis**

Samples of blood, muscle, liver and eye were collected from 226 individuals of *Sufflogobius bibarbatatus* for analysis of the genetic structure of the goby populations along the Namibian coast. The blood samples were analysed fresh using agar gel electrophoresis at constant PH and isoelectric focusing in a PH gradient between 3.5 and 9.5. Various PH buffers were tested out for agar gel electrophoresis. The others were frozen and will be analysed for DNA and proteins on land. Two NORAD-fellowship students at the department of Fisheries and Marine Biology, University of Bergen will do their M.Phil project on these samples.

### **Behavioural observations of gobies**

Fish that came from shallow bottom trawl hauls (shallower than 70 m) that were slowly hauled to the surface at a speed varying between some minutes of no hauling and some minutes of 59 m/min. A needle of a syringe was used to carefully remove air from abdomen if this was present. Only fish that swam to the bottom of the aquarium and that were otherwise healthy were used. It was impossible to obtain blood samples from newly caught fish. They had first to be held in aquaria for at least 2 H.

#### *Adults*

We studied how the goby *Sufflogobius bibarbatatus* recovered from stress from low oxygen and sulphide by counting the frequency of gill opercula beat rates (no of beats per minute) before, during and after exposure to stress. The fish were first acclimatized to seawater of 15.6 °C and 6.537 ml/l O<sub>2</sub> for 2 H in a 100 l aquarium (A). Then they were transferred into the treatment aquarium (B) of similar size and the same temperature, but where oxygen was absent and sulphide added (0.0 ml/l O<sub>2</sub> and ?? ml/l H<sub>2</sub>S ). After 30 minutes the fish were transferred back into aquarium A for recovery. They were observed for gill opercula after four times during acclimation and it was noted whether the individuals were active or inactive. Observations were made twice during stress and at 30 and 90 minutes after initiation of the recovery period. 17 adults (mean size 9.9 cm TL and 10.7 g) were individually tagged with colour coded wire tags and studied.

#### *Juveniles*

18 juveniles (mean size 4.9 cm and 1.0 g) were exposed in the same way as adults but they were not tagged individually. It was not possible to observe visually the beat rate before exposure to stress, but only during the 20 minutes of stress. Instead we counted the number of active individuals before, during and after exposure and we noted eventual mortality.

## Results

### Behaviour

The inactive individuals responded more pronounced to low oxygen stress than active swimming fish. The opercula beat rate frequency more than doubled during stress, but the individuals recovered rapidly (Fig. AG1). The ventilation volume also increased dramatically under stress, but reduced to normal and low volume during recovery, although this could not be measured.

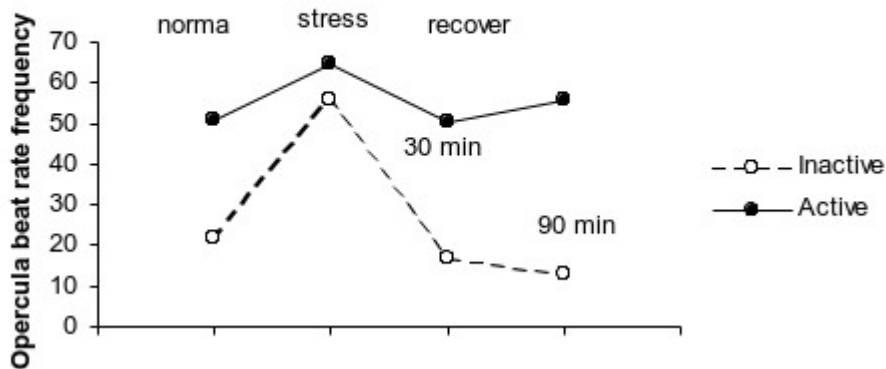


Figure AG1 The number of opercula beat rates per minutes under the period of normal, low oxygen stress and recovery period for active and inactive *Sufflogobius bibarbatus*.

The proportion of fish that were active reduced from 45% to 15 % during low oxygen stress (Fig. AG2). The proportion active increased to normal immediately after the onset of the recovery period.

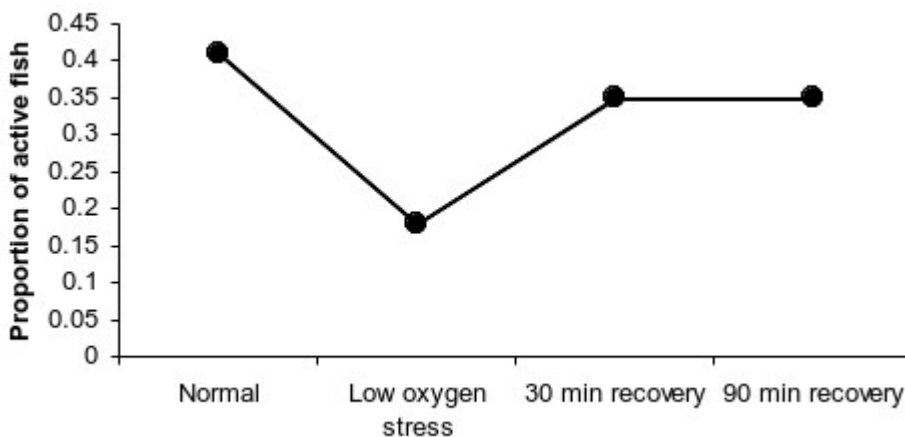


Figure AG2. The change of the proportion of active *Sufflogobius bibarbatus* individuals under normal, low oxygen stress and recovery from stress.

### *Distribution of gobies*

The *Sufflogobius bibarbatus* was recorded on the continental shelf and shallower than 300 m (AG3). The highest catch of adults (1510 kg/H) was taken during daytime in a bottom haul inshore at Lüderitz. Both juveniles and adults were recorded more frequently during the night than during daytime. Juveniles were observed in 30% and 41%, respectively at day and night. Adults were observed in 37% and 59%, respectively, of the day and night hauls. The two 24 H positions demonstrated that the goby undertake diel vertical migration. Adults were nearly absent in daytime trawl hauls and present in 30-60 m depths at night. Juveniles, but also larvae occurred more often than adults in shallow water, and mainly inshore and at depths 30-60 m, where also adults were recorded at night.

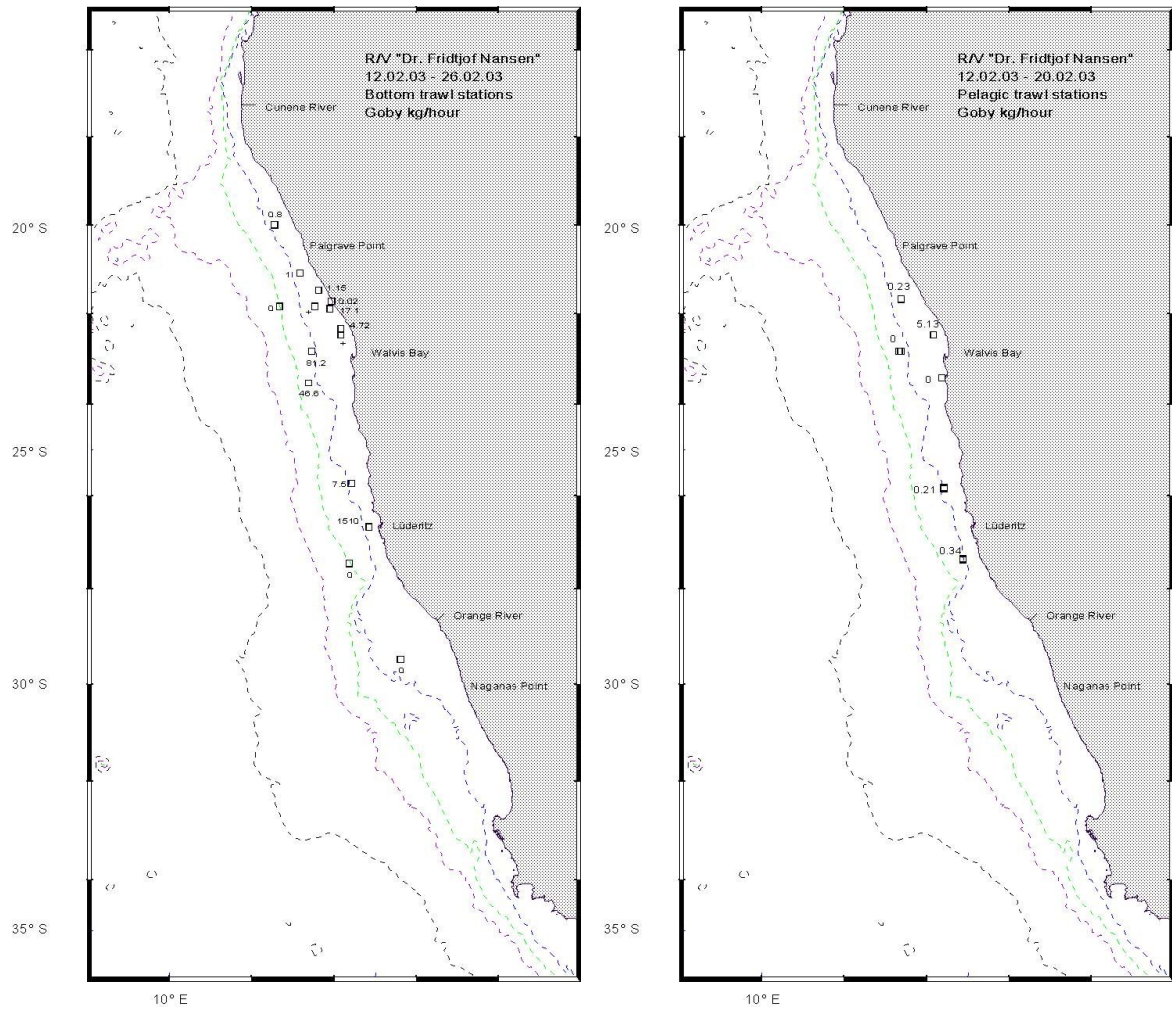


Figure AG3. The catch (kg/H) of *Sufflogobius bibarbatus* in bottom (left) and pelagic (right) trawl hauls