

# Scientific diving, a new tool for monitoring *in-situ* North Sea biodiversity: preliminary results

Cl. MASSIN, J. MALLEFET & A. NORRO

## Introduction

Biodiversity of Belgian marine benthos is well documented for the meiobenthos and the small macrobenthos (up to a few mm long) from soft bottoms (see CATTRIJSSE & VINCX 2001 for extensive literature review). Large epibenthos and sessile fauna have been collected for more than a century (GILSON 1900) but few papers have been published until now, e.g. COENJAERTS (1997), DEGRAER (1999), DEGRAER *et al.* (1999) and BEYST (2001). The collection of samples in these studies were all based on the same method (the Van Veen grab).

Since GILSON (1900), collecting methods for the study of marine benthic biodiversity did not vary much: Van Veen grabs, box corers, trawls and sledges. These methods may be sufficient to give an overview of the soft bottom benthic fauna on the Belgian Continental Shelf, but are totally inappropriate or result in underestimations for hard bottoms (rocks and wrecks) and particularly for sessile fauna. Besides, data about this sessile epifauna are very scarce (CATTRIJSSE & VINCX 2001). To fill the gap of our knowledge on the sessile macrofauna of the BCS, a preliminary campaign on board of *r/v Belgica* was performed in July 2001 to test the feasibility of a study of sessile macrofauna by means of scientific diving.

**Keywords:** scientific diving, biodiversity, North Sea, wreck.

## Material and methods

The target was the ship wreck "*Birkenfels*" (ED50, N51°39',040-E02°32',350; 156 m length; 42 m depth HW). It was prospected twice by two teams of divers. Three samples were taken on horizontal surfaces at 22, 28 and 29 m depth. Only macro-organisms (visible with naked eye) were taken into account. Three complementary techniques were used:

- photograph: surfaces delimited by a frame of 50x50 cm were photographed (using digital video camera). Species diversity can be estimated from these photographs;

- estimate of covering: within the same frame of 50x50 cm, divers estimated the rate of coverage with the main benthic sessile organisms using the techniques established by DAHL (1981);
- sampling: within each frame of 50x50 cm a surface of 25x25 cm was scraped off in order to collect all the sessile fauna and slow moving vagile fauna. On board, each sample was properly labelled, animals anaesthetized in 3 % magnesium chloride and preserved in buffered formalin. Later the material was transferred to buffered alcohol, identified and for a few species the number of specimens/surface unit was counted.

Fishes living in open water were identified *in-situ* by divers. Topography of the wreck was carried out using the onboard Belgica Kongsberg Simrad EM1002S multi-beam sonar. Such technique require tidal reduction. Maps were produced with the help of the Fund for sand extraction (Belgian Ministry of Economic Affairs).

## Results

Samples revealed an extremely rich sessile and slow moving fauna (at least 40 species), 3 jellyfish species and 8 fish species. The presence of at least 51 species represents a biodiversity of macrofauna on the wreck that is much higher than that found in nearly all known surrounding soft bottom communities belonging to the BCS. The covering of large parts of the wreck (80 %) is represented by three species: *Sarsia eximia* (Hydrozoa) and *Jassa herdmanni* (Crustacea) associated with *Tubularia indivisa* (Hydrozoa). Sea anemones and particularly *Diadumene cincta* and *Metridium senile* represent more or less 10 % of the covering. Locally they are more abundant, particularly on overhangs.

## Conclusions

Scientific diving from aboard the *r/v Belgica* has been employed to carry out a preliminary study of the macrofauna living on a wreck (the *Birkenfels*) located on the Belgian Continental Shelf (BCS). The presence of at least

51 species represents a biodiversity of macrofauna on the wreck that is much higher than that found in nearly all known surrounding soft bottom communities belonging to the BCS. The covering of large parts of the wreck is represented by three species: *Sarsia eximia* (Hydrozoa) and *Jassa herdmanni* (Crustacea) associated with *Tubularia indivisa* (Hydrozoa). It must also be pointed out that 53 % of the species identified in this study are species not mentioned as members of the Belgian marine fauna in a recent list dealing with offshore fauna. Moreover, some, such as *Sarsia eximia* or *Epithonium clathratulum*, supposed to be rare, have been found in large numbers. *Diadumene cincta* and *Caprella tuberculata* are to be considered new species for the Belgian marine fauna. This preliminary study illustrated clearly our poor knowledge of this kind of fauna and the interest of sampling properly the hard bottom fauna of the CBS. In this respect scientific diving is an efficient tool.

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### References

BEYST, B., 2001. Epi- and hyperbenthic communities of Belgian sandy beaches. PhD Thesis University Ghent: 351 pp.

CATRIJSSE, A. & VINCX, M., 2001. Biodiversity of the benthos and the avifauna of the Belgian coastal waters. Federal Office for Scientific, Technical and Cultural Affairs, Brussels: 48 pp.

COENJAERTS, J., 1997. Het macrobenthos van de Vlaamse Banken en omliggende zandbank ecosystemen. M. Sc. Thesis, University Gent: 115 pp. + 5 bijlagen.

DAHL, A.L., 1981. Coral reef monitoring handbook. South Pacific Commission, Noumea: 21 pp.

DEGRAER, S., 1999. Macrobenthos of shallow marine habitats (Belgian Coast) and its use in Coastal zone management. PhD Thesis University Ghent 156 pp.

DEGRAER, S., VINCX, M., MEIRE, P. & OFFRIGA, H., 1999. The macrozoobenthos of an important wintering area of the common scoter (*Melanitta nigra*). *Journal of the Marine Biological Association U.K.*, 79: 243-251.

GILSON, G., 1900. Exploration de la mer sur les côtes de la Belgique. *Mémoire du Musée royal d'Histoire naturelle de Belgique*, 1: 1-81.

Claude MASSIN

Malacology Section

Royal Belgian Institute of Natural Sciences

Vautier Street 29

B-1000 Brussels

Jérôme MALLEFET

Laboratory of Animal Physiology

and Marine Biology

Catholic University of Louvain-la-Neuve

square Croix du Sud 5, Carnoy's Building

B-1348 Louvain-la-Neuve

Alain NORRO

Marine ecosystem management

Royal Belgian Institute of Natural Sciences

Gulledelle 100

B-1200 Brussels