A REPORT ON THE CZECHOSLOVAK ARCTIC BIOLOGICAL AND DIVING EXPEDITION "SPITSBERGEN '91"

During summer, 1991, a small biological team was using SCUBA diving method for investigating shallow-water marine benthic communities and collecting samples of Arctic organisms in the southern part of the Bellsund region, Western Spitsbergen. The team consisted of three members: dr. Zdeněk Duriš — a marine biologist and a diver, a leader of the expedition; dr. Zdeněk Prymus — a biologist and a doctor; and Mr. Antonín Šimčík — a diver and an underwater photographer. The Czechoslovak group was placed at Calypsobyen, south-eastern Bellsund, at the summer station of the Institute of Earth Sciences, Maria Curie-Skłodowska University, Lublin, Poland. This station is very well situated placed: protected from the open sea, mouths of three fiords (Van Mijen-, Van Keulen-, and Recherche), and almost the whole Bellsund, can be observed from that place. Most parts of the region, as well as adjacent western coasts faced to the Greenland Sea, are easily attainable with a gummi-boat. The region provides various types of coasts, sea bottoms and depths.

The scientific program of the Czechoslovak expedition covered participation in the inventorization of the Arctic Sea, and studies of marine benthic ecosystems. A special attention was paid to SCUBA investigations of the zone of large brown macroalgae where standard hydrobiological methods for quantitative sampling seem to be less effective.

The Czechoslovak team came to Spitsbergen by Scandinavian Airlines on July 6, 1991, and reached Calypsobyen, together with the expeditional equipment, on a board of the Russian vessel "Pomor" early morning on July 8. The group spent about five weeks at Calypso, and left that place on August 15. During the time our team made 18 dives at nine localities (see: Duriš, 1992: Fig. 1; — this volume). Only one action was undertaken at the open-sea side, off Tomtvika, south of Bellsund. Most of works were done within Recherchefjorden, single localities were also investigated inside the mouths of both the Van Keulen and Van Mijen Fiords.

Diving works consisted mainly in immediate observations of shallow-water benthic and pelagic ecosystems, of collecting organisms, and of underwater photography. Several quantitative samples were taken by using a frame 0.5 × 0.5 m determining the sampled area of the bottom, and the hand net was used as
a scraper to collect the biotic material. In all, every of the divers spent 18.5 hours under water of the temperature range from 1 to 4°C, and depths from 0 to 43 m.

Although the collected material is still being examined, the part dealing with systematics and biology of decapod crustaceans has been finished now (Duriš, 1992:— this volume). During that work, more than 1400 specimens of Decapoda have been examined. Most part of the material was represented by specimens in early postlarval stages. Eight species were determined, some morphological data and description of live colour have been reported. Protected by shallow-water, 10-25 m deep, localities in fiords are pointed out as important places for early postlarval development of most shrimp species and hermit crabs. Thus such places would also be covered by official conservation activities at Svalbard.

A part of the collected material will be studied in cooperation with other institutions, for example with the Institute of Oceanography in Sopot. The National Museum in Prague and the Biological Faculty of Ostrava University will also be provided with a part of the material for investigations.

Besides the main scientific programme, our group made several interesting but unpublished naturalistic observations, which are as follows:

— A large group of bearded seal, Erignathus barbatus (Erxleben) was frequently observed moving in fresh water or resting on ice-bergs in the lagoon just under the front of the Recherche Glacier.

— An Arctic cyclopterid fish, 97 mm long spiny lum-sucket Eumicrotremus spinosus (Fabricius), was caught at the depth of about 30 m near Josephbukta, Recherchefjorden, August 1, 1991. Our recording contributes to the known recent distribution and depth range of the species (Klekowski, Węsławski, 1990).

— An interesting association of young, up to one year old specimens of polar cod, Boreogadus saida (Lepechin) (five specimens collected, 21-37 mm long; Vestervågen, August 10), with 15-50 cm in diameter large specimens of arctic jellyfish Cyanea capillata, was seen several times under the water. The fish moved just along the jellyfish and inside ,,tail" of long tentacles; in danger, however, the fish quickly hide actively intruding themselves between rich frilled mouth lobes of a jellyfish. Poisonous cells on the lobes and tentacles do not affect those fish.

— A fairly large invertebrate organism was seen three or four times and photographed in Vestervågen and off Josephbukta, east of Recherchefjorden, at the depths of 15-20 m. Occupying a burrow in a soft, sandy-clayed bottom, the animal showed a yellowish, flat and tongue-shaped, about 30 cm long and 3 cm broad part of the body lying usually on substratum. In emergency, the ,,tongue" glidingly but rather quickly hid in a burrow distinctly narrower (about 1.5 cm in diameter) than the ,,tongue". As no opening was visible on the distal end, we do not suggest it to be a large siphon of bivalve mollusk of the genus Mya or similar.

— One of the most exciting underwater observations made during the first diving, July 11, just opposite Calypsobyen was on unexpected meeting a large adult male of whalroes, Odobaenus rosmarus rosmarus (see Fig. 1) which took
place over the bottom densely covered with brown macroalgae, at the depth of
5-7 m. As the animal was able to find one of the divers three times under the
conditions of very muddy water (horizontal visibility about 4-5 m), and then to
find another diver operating about 200 m away, we suggest that walroeses are
able to use an echolocation under water, in a similar way as seals, dolphins and
whales are.

Besides biological activities, the diving team participated also in some other
works in cooperation with other groups present or visiting Calypso. Water
temperature and salinity were measured by dr S. Swerpel of the Institute of
Oceanology with an assistance of our divers and a person on a gummi-boat.
Several samples of the bottom substratum were taken by divers from various
depths near Calypsobyen and Josephbukta — for our colleagues from Maria
Curie-Sklodowska University of Lublin. The short sublittoral terrace and sheer
slope just opposite an archaeological locality near Josephbukta were investigated
by divers to check possible presence of old ship wrecks or any objects of historical
importance. These dives were performed for the Norwegian-Russian group of
the University of Trondheim, Norway, and the Institute of Archaeology,
Moscow, Russia.

Although the part of the program dealing with quantitative sampling could
not be fully realized because of certain technical and methodological problems,
in all, the SCUBA method of sampling accompanied with underwater photog-
raphy appears as fairly effective and informative for biological and ecological
researches of the shallow-water Arctic biocenoses. Of main importance is,
however, the opportunity of active choice of the sampling site, and immediate
observation of marine organisms and their behaviour in their natural environ-
ment. Further preparations of expedition equipment, development of sampling
methods, and application of the underwater videocamera will be used for
extending possible ranges and effectiveness of diving works in the next years.

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REFERENCES


Fig. 1. Z. Ðuriš — Unexpected but the most exciting underwater meeting (off Calypso byen, July 11, 1991, depth 5-7 m).