

6. Monitoring the Interactions by Diet Study

6.1 Trophic studies of pelagic fish

by Padmini Dalpadado and Alina Rey

A coordinated study between PINRO and IMR on the diet of capelin and polar cod in the Barents Sea was initiated in 2005 and 2007 respectively.

Main aims: identify key feeding areas of capelin and polar cod, their main prey, climate impact on food and feeding conditions, and interactions with zooplankton

Area investigated: whole area covered by the ecosystem cruises in the Barents Sea

Time period: August to early October

IMR sampling and data processing

A standard randomly selected pelagic fish sample in the Barents Sea ecosystem cruises where biological parameters are measured may consist up to 100 individuals. In the Barents Sea, as a rule, we remove the stomachs of the first 10 and freeze these immediately for later analysis. The stomachs were processed in detail later on at the laboratory. Each prey category was determined to species level when possible and dry weight of prey group or species was taken to the nearest 0.001 gram. The identification of prey to species was highly dependent on the state of digestion of the content. The dry weight of the prey was obtained by drying at 60 C° in an oven for about 24 hours. For larger organisms, the drying period was prolonged until a constant weight was obtained.

The stomach data are entered in the “W” form, in IMR fish data base (Regfisk) at the Norwegian Marine Data centre (NMD). The diet information is coupled to other biological parameters such as length, weight, sex, and age, recorded for capelin and polar cod (entered in “V” forms in the Regfisk data base), in the ecosystem cruises.

Access to IMR diet data: NMD (Norwegian marine data centre, IMR). At PINRO, pelagic stomach content data are not included in BIOFOX. Thus exchange of such data is difficult (a spreadsheet format is used), and time-consuming. Also only main prey groups, and e.g. no information on prey stage or size, are at present exchanged. Allowing for computerisation of

such data in BIOFOX will enhance the cooperation on such data, and this task should be given high priority.

6.2 Trophic studies of demersal fish

by Bjarte Bogstad

The goal of the investigations is to monitor the diet of cod, which is the main predator in the ecosystem. Stomach content data of cod have been sampled since 1984, and this is thus a long and very valuable time series giving a lot of management-relevant and ecological information about the Barents Sea ecosystem.

Cod stomachs are sampled regularly by Norway and Russia during the ecosystem survey. The sampling strategy is the same as that for sampling otoliths (i. e. 1 stomach pr 5 cm length group at all stations where biological samples of cod are taken). Stomachs are frozen individually onboard and analysed in the laboratory. The total content of sampled stomachs is weighed and the content of the stomachs are divided according to prey species when identifiable. The total weight and the degree of digestion (from 1: newly eaten to 5: digested not identifiable) of the different prey items are recorded. Length measures are taken of prey species that can be identified and when the length is unaltered because of digestion. All the prey items are measured to the nearest cm (or to a finer scale for very small prey).

Finally, the number of identifiable prey individuals per stomach is recorded. Since 1995, PINRO has in addition to the standard methods used a simplified version of the quantitative method, which is conducted onboard at the sea conditions. Total weight of stomach content, visually estimated proportion of prey species and in some cases length and number of commercially important species are determined onboard (Dolgov, 1996). For details about the sampling methodology and the Norwegian-Russian cooperation on diet investigations in the Barents Sea, see Mehl and Yaragina (1992) and Dolgov et al. (2007).

PINRO also regularly analyses stomachs of other demersal species (e.g. haddock, redfish, Greenland halibut) during the ecosystem survey.

The stomach data are entered in the W form in the IMR data base (Regfisk) and in a similar form in the BIOFOX data base at PINRO. The data are thus linked to other biological parameters such as length, weight, sex and age, which are registered in the V form in Regfisk and in a similar form in BIOFOX. A good system for exchanging the data between IMR and PINRO using a special exchange format has been established. However, Russian stomach data are not converted to W-format and included in the regular data exchange of fish data from the ecosystem survey and *vice versa*. This should be done in the future.