

# Baltic Sea Regional Project (BSRP), März 2004

## Gröhsler

### PROTOCOL FOR GERMAN AGE DETERMINATION OF SPRAT IN THE BALTIC SEA

#### 1 Sampling system

The sprat samples are delivered from two different sources:

- market samples (pelagic trawl)
- survey samples (pelagic and bottom trawl)

##### 1.1 Market samples

For sprat it is tried to achieve quarterly 6 market samples per 15 kg in Sub-Division 22 and 24 respectively. The numbers of fish used for age-reading are fixed by sample to 5 individuals per length-class.

##### 1.2 Survey samples

The following fishery independent German surveys are/were conducted every year by 'RV SOLEA':

Survey	Area	Month	Comments
German Bottom Trawl Survey*	Sub-div. 22, 24	Nov./Dez.	target species cod
German Bottom Trawl Survey*	Sub-div. 24	Jan./Feb.	target species cod
German/Danish Hydroacoustic Survey (Pelagic Trawl)	Sub-div. 22, 23, 24, partly Sub-div. 21	Sept./Oct.	target species herring and sprat
German Hydroacoustic Survey** (Pelagic Trawl)	Sub-div. 24, 25 partly 26, 27 and 28	May.	target species sprat

\* Sampling stopped in 2000, since from 2001 onwards a new bottom trawl was introduced, which is catching sprat to a low extent.

\*\* In former GDR times this survey was conducted every year. In 1999 this survey was repeated for the first time after the German reunification. Since 2001 this survey was conducted every year.

During hydroacoustic survey time it is intended to carry out at least two hauls per ICES statistical rectangle. The numbers of fish per length-class used for age-reading are fixed in correspondence to the Baltic hydroacoustic manual (ICES 2003).

#### 2 Age determination

##### 2.1 Frequent problems encountered in sampling, preparation and interpretation, and free description of the procedure

In general sprat otoliths are not easy to read and the annuli cannot be easily recognized. Misleading false rings, caused by resorption by hunger, diseases or spawning etc. are not very pronounced and are therefore not having a great effect on the reading process. By contrast problems are encountered by mixing of sprat stocks and locally occurring fast growing populations in Sub-Divisions 22-32. Mixing of fast growing sprat from the west with slower growing specimens from the east occurs in the Sub-Division 24 (Arkona Basin) and Sub-Division 25 (Bornholm Basin), due to the decreasing salinity from west and the subsequent decrease of annual growth. The otoliths of sprat from the east are generally more difficult to read, as a result of the slower growth and the higher age at a given size.

##### 2.2 Description of methodology

- Otoliths not burnt, not broken or embedded, but dried in air only
- Microscope Olympus SZ 40/60 with 50-63 times magnification

- Black ceramic disk in which the otoliths are laid in ordinary tap water

### 2.3 Description of age reading

For age determination hyaline zones (winter rings) are counted. For valid otoliths at least the first two annuli should be traceable throughout the whole otolith. The reading of the otolith is done primarily in the postrostrum, however, the rest of the otolith shall not be neglected.

For individuals being caught during the first half of the year the hyaline edge of the otolith is going to be regarded as annulus, not however in cases when the fish is caught in the second half year.

In the centre of the otolith is a very strongly light refracting spot, which is the nucleus. The nucleus is surrounded by a metamorphosis ring, which is not following the outer otolith contour. This marks the metamorphosis from larvae to the young fish. The sprat in the western Baltic Sea spawns between May-June.

The nucleus is surrounded by the central part of the otolith as a very marked hyaline zone. This zone follows the outer contour of the otolith. This zone is followed by an extended broad opaque zone, followed again by the next hyaline zone etc. For otoliths with more than 5-6 annuli these opaque zones become very thin layers on a hyaline background, which however all follow the outer contour of the otolith.

### 2.4 Name(s) and address of otolith reader(s)

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### 2.5 Experience in age reading

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Mean 93-03
Number Aged (N)	1,431	1,825	2,570	1,956	2,048	1,913	2,300	1,909	1,547	1,061	1,631	1,836

### 2.6 Partner institutes working on the same part of the stock in Subdivisions 22/24/25

- Institute for Marine Research, Lysekil, Sweden
- Danish Institute of Fisheries Research (DIFRES), Charlottenlund Castle, Denmark

### 2.7 Validation

There are no validated otoliths of sprat available at the Institute.

### 2.8 Exchanges/Workshops

There have been the following exchanges and/or workshops for sprat within the past 15 years:

- Results of the Workshop on Comparative Age Reading on Sprat from ICES Div.IIIa. CES-CM-1994/H:13. Lysekil, Sweden, May 10-12 1993. Contact Else Torstensen (N, IMR Floedevigen).

- Report of the Workshop on sprat age reading. Working Document for ICES HAWG S 62°, 1996. Floedevigen, Norway, 20-22.09.1994. (S. Blistrup (DK), M. Johansson (S), B. Lundin (N), H. Rasmussen (DK), L. Sindal (DK), E. Torstensen (N))

### **3 Literature**

Aps, R., Ustinova, L., Gentzen, B., Paatt, T & Uder, Y-O. (1992) Guide for the use of Baltic Sprat and Herring Otoliths in Fisheries Studies. Fischereiforschung, 1992.

ICES 2003. Report of the Baltic International Fish Survey Working Group. ICES CM 2003/G:05 Ref.: D,H.: Annex 3.