

Name of sampling scheme: **Sampling of commercial trapnet fishing and monitoring of flounder by gillnets in Muuga Bay**

**1. Purpose of sampling**

The aim is to collect biological data on commercial catches. The lengths and ages of fish are most affected by commercial fishing (trapnets), or how commercial fishing affects the structure of the stock. Data from samples collected from commercial fisheries are used to make stock management recommendations, as well as to assess stock dynamics depending on environmental conditions. Monitoring data collected with gillnets shall be used to assess the dynamics of the relative abundance of flounder.

**2. PSU (primary sampling unit).**

In the case of trap and Danish seine fisheries, the sample unit is the fishing trip and one sample shall consist of 50 fish. If 50 fish cannot be caught in a single trip, the sample shall consist of several trips, each trip being treated as a separate unit. In the case of gillnet monitoring, the sampling unit is 1 fishing trip.

**3. Sampling frame.**

The sampling frame consists of all professional fishermen using traps and Danish seine.

**4. Sampling frequency and spatial coverage.**

15-25 flounder samples are collected annually. Samples from commercial fisheries are collected from all subdivisions of the Estonian coastal sea: 28, 29, and 32. From each subdivision, generally 1-2 samples per month, excluding closed seasons. There are 3-5 nets fishing for gillnet monitoring at a time. The fishery is conducted in Subdivision 32 with two rows of nets with mesh sizes of 36 and 44 mm (net length 30 m, height 3 m) and 80, 90, 100, 110 mm (net length 60 m, height 1,5-1,8 m). Fishing takes place in the Muuga Bay area.

**5. Selection of sample (fishing trip).**

Samples are taken 1-2 times a month from each subdivision in suitable weather conditions (wave shall not be high). Every fisherman catching flounder had an equal chance to be included in the sample, and today a network of trusted fishermen has developed. The sample is collected, if possible, from the first catch of the month. In Subdivision 28, a sample of flounder is collected from Danish seine, which catches a significant part of the catch in Subdivision 28. In Subdivision 32, samples are collected from a trap in Muuga Bay (sometimes from Nõva). In Subdivision 29, trap samples are collected. The fish needed for the sample is bought from the fisherman, so there has been no situation where the fisherman has refused to give (sell) the sample.

**6. Sample size and composition**

Only flounder and turbot (the latter is rarely caught) are sampled. In the case of flounder, the sample consists of at least 50 specimens. All specimens from the fisherman's catch are taken for analysis (if the catch is small) or randomly taken from the catch (if the catch is significantly bigger than the sample).

**7. Data to be collected from the sample and accuracy of measurement**

From samples of commercial catches the following measurements are performed for all specimens:

- Total length (L, to the nearest 1 mm)
- Standard length (length without a tail fin, to the nearest 1 mm)
- Weight (to the nearest 0,5 g)
- Sex (female / male / juvenile)
- Degree of maturity (on a scale of 1 (juv), 2 to 6 (female / male))
- Intestinal filling in the first, second, and third parts of the intestine (approximate filling on a scale of 0 to 3, corresponding to empty, low filling, average filling, and maximum filling)
  - Otoliths are removed to determine an age
  - Record on which side the flounder lies (right / left)

**8. Data storage.**

Sample data is recorded on analysis sheets, which are stored indefinitely both as sheets and entered into a computer, and otoliths are stored in otolith books indefinitely.

**References**

Sparre, P. & Venema, S. C. 1992a. Introduction to tropical fish stock assessment. Part I - Manual. FAO, Rome.