Use and design of biological samples

fish5101fishsci Introduction to fish population dynamics

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Biological measurements from catches

When collecting biological measurements from catches one needs to consider...

Coverage: Needs to be representative!

and

Randomization: Must not select for large fish, for example!

MUST HAVE A DECENT SAMPLING SCHEME

If not: Need totally different techniques for control, but theory still applies

Ideally: For each individual in the sample one would gather the following pieces of information:

Length measurements

Length measurements can be obtained at a minimal cost from most fish stocks.

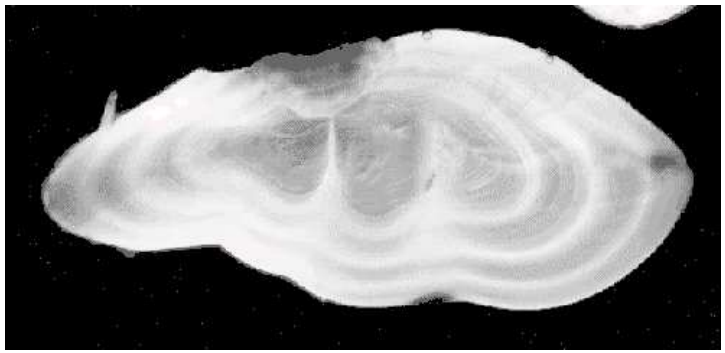
Usually, lengths are measured on a measuring board and simple counts are tallied as the measurements progress.

A better strategy is to simply record individual measurements. In this case one commonly also records sex, maturity stage, weight etc.

Try to take random samples!!

Age readings

If there are age markers (rings), then one can sample randomly from catches to obtain the proportion of fish in each age group. To accomplish this a random sample is needed with good coverage of space and time for each gear type.



May not be able to observe cohorts but they form a fundamental concept
Will therefore put major emphasis on the theory of fish population dynamics with age groups included. Later consider how things get more complex if these need to be estimated without direct measurements.
The hard part in the figure is a slice of a haddock otolith. The otolith is put into resin before slicing.

Main biological measurements

Typical data on each fish

no	le	wt	sex	mat	age
1	14.5	12.5	0	4	3
2	15.0	13.0	0	5	3
3	14.5	12.0	0	4	3

Must be stored consistently with information on location, gear, time, etc.

Still other measurements

Other measurements include:

- Liver weight
- Fat content
- RNA/DNA ratios
- Size and number of eggs
- Backcalculated growth
- ...