

PGCCDBS Guidelines for collecting maturity data and maturity ogive estimation for stock assessment purpose

These guidelines should be regularly evaluated based on research developments and the experience from maturity staging workshops.

Date	Details of changes, person/group making them, reference
19 Jan 2007	Guidelines initially developed at WKMAT (ICES 2007).
6 June 2008	Reviewed and extended to include estimating proportion mature at WKMOG (ICES 2008).
6 March 2009	reviewed and updated at PGCCDBS (ICES 2009) to include the number of samples or hauls sampled (point 15 below).

- 1) For survey data to be used in maturity index of the spawning stock, the survey must be conducted at the right time compared to the spawning period and have adequate coverage. If survey data are not available at the right time then histologically validated maturity data obtained outside spawning season can be used, although this should be confirmed on a stock-by-stock basis.
- 2) Where valid (see 3) maturity data are available from market samples they can be used to estimate maturity. This is mainly the case for species with a protracted spawning season where survey data do not cover the whole spawning season or stock area. Also, if survey and market data do not show systematic differences they can be used together.
- 3) Maturity data from market samples should be collected during the whole prespawning (for determinate species¹) or spawning (for indeterminate species²) season on a métier based sampling programme, and cover the whole stock distribution area.
- 4) As with market samples, on-board samples should be collected on a métier basis to avoid gear and fleet selectivity effects and collected from the correct time and spatial frame compared to spawning.
- 5) If possible, maturity staging should be done on board the survey vessel.
- 6) A comprehensive illustrated manual should be available for all stocks requiring maturity observations.
- 7) Macroscopic maturity scales used should be validated, either histologically or by another appropriate way.
- 8) Plot and map the data collected to assess differences by source, strata, location and time.

- 9) Length stratified maturity data should be weighted by the length distribution. If samples are collected from a random sampling scheme or the stock is assessed on a length basis, no weighting according to the length distribution is required.

1 Determinate fecundity species. Number of oocytes to be released in the spawning season (potential fecundity) is defined prior of the onset of the spawning.

2 Indeterminate fecundity species. Number of oocytes to be released in the spawning season are not defined prior of the onset of the spawning, i.e oocyte recruitment continues after the commence of the spawning.

- 10) If the fish maturation process is dependent on age and/or sex as well as length then a Sex-Maturity-Age-Length-Key (SMALK) should be used. Age reading precision is important in this context.
- 11) If the stock shows a sexual difference in maturity a female maturity ogive should be used, or the effect of combining both sexes considered in detail.
- 12) If the maturity data are modelled, a Binomial GLM with logit link is current standard practice. Alternative approaches should be compared against this baseline approach.
- 13) Check appropriate model diagnostics.
- 14) Report the number of maturity staged fish used to calculate the estimates. If length classes are used, report the width of length classes.
- 15) Report the number of samples or hauls that the maturity staged fish came from. This is likely to be more representative of the effective sample size.
- 16) When maturity estimates (as proportions) are reported to DCR specifications (Commission Decision 2008/949/EC), calculate the mean confidence interval width for the age and/or length range which correspond to a 20 % and 90% of mature fish. Convert this to a precision level using:
 - if half confidence interval width is less than 0.4 then the precision level is 1
 - if half confidence interval width is less than 0.25 then the precision level is 2
 - if half confidence interval width is less than 0.05 then the precision level is 3Optionally, report the range of precision levels achieved as well as the mean level.