# New approaches to stock assessment of *Sardinella aurita* in West Africa

Ad Corten

# Problems in current assessment

No reliable age determination of fish > 3 years

No possibility to use age- structured models

# Choice for production models

Drawbacks:

- Based on arbitrary assumptions

- Not capable to estimate recruitment

- Not capable to make realistic stock projections

# Current assessment not sufficiently precise

| year | Assessment | Recommendations |
|---|---|---|
| 2002 | MSY of 650 000 tons for both species of sardinella combined | Set a precautionary TAC of 500,000 tons for both species combined in the total area. This figure corresponds approximately to the maximum level observed in the period 1990-2001 |
| 2003 | Advice for precautionary approach | The combined catch of both species in 2003 should not exceed the mean level of the preceding three years, which is 420,000 t. |
| 2004 | Stock of *S. aurita* over-exploited; no reliable results for *S. maderensis* | Reduce fishing effort on sardinella by 20 percent, particularly in fleets targeting *S. aurita* |
| 2005 | Stock of *S. aurita* fully exploited; no reliable results for *S. maderensis* | Do not increase catches of the sardinellas above the current level of 400 000 tonnes (2004). |
| 2006 | Stock of *S. aurita* probably over-exploited; no reliable results for *S. maderensis* | Decrease effort in total sardinella fishery by 50% corresponding to a total catch of sardinellas of not more than 220 000 tonnes (2007). |
| 2007 | Stock of *S. aurita* overexploited<br>No reliable results for *S. maderensis* | Decrease effort in total sardinella fishery by 50%. For 2008 catches should not exceed the level recommended last year 220 000 tonnes (2008). |

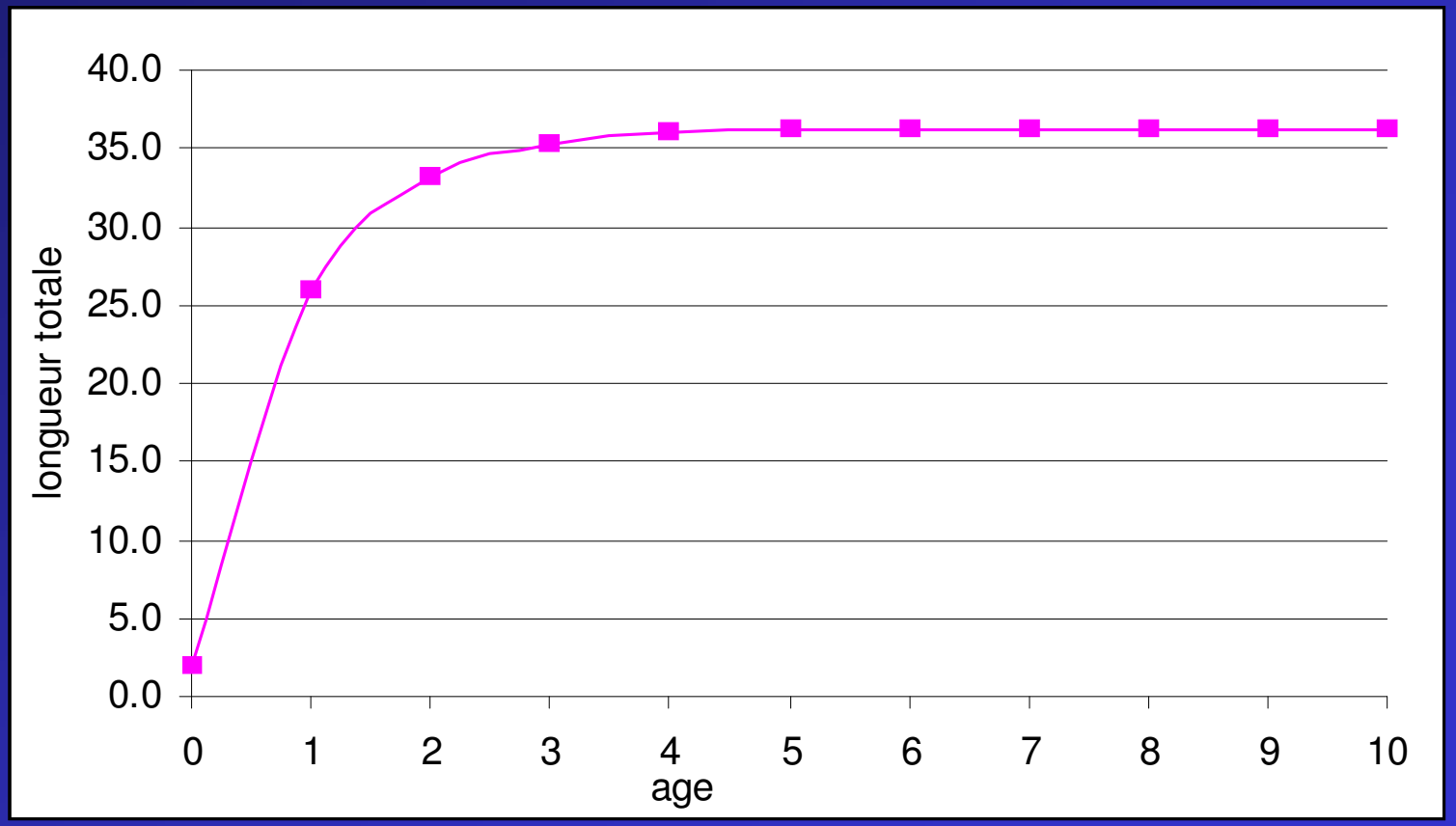
# More information is available than is used in current assessment

- Length composition of catches

- Length compositions from acoustic surveys

New information has become available on the growth rate of sardinella

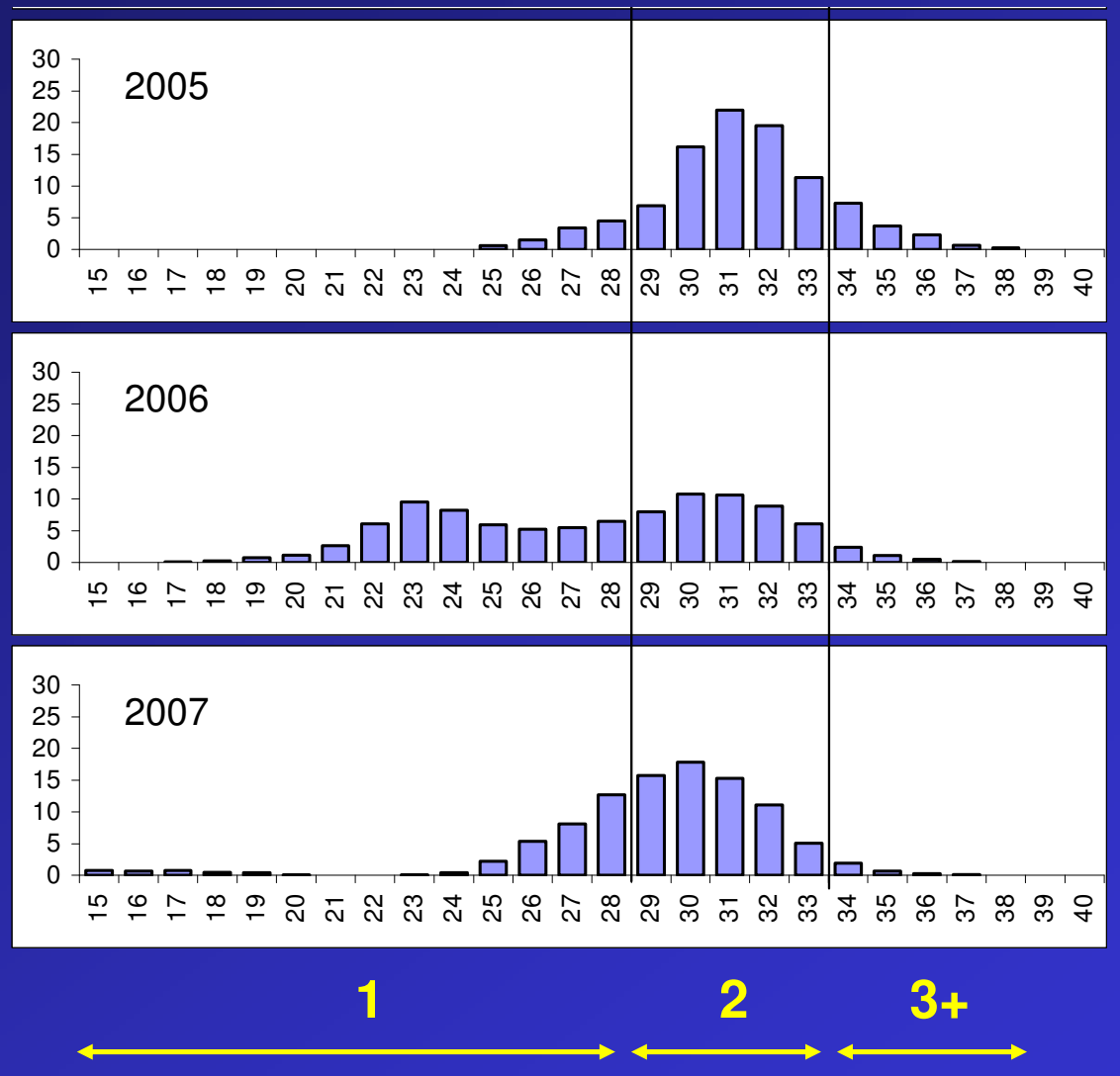
Why don’t we use it?



# Using information on growth rate, length distributions can be split into at least 3 different age groups

| age in years | mean length in cm (total length) | range of length in catch |
|---|---|---|
| 1 | 26 | 10-28 |
| 2 | 33 | 29-33 |
| 3+ | 35 | >33 |

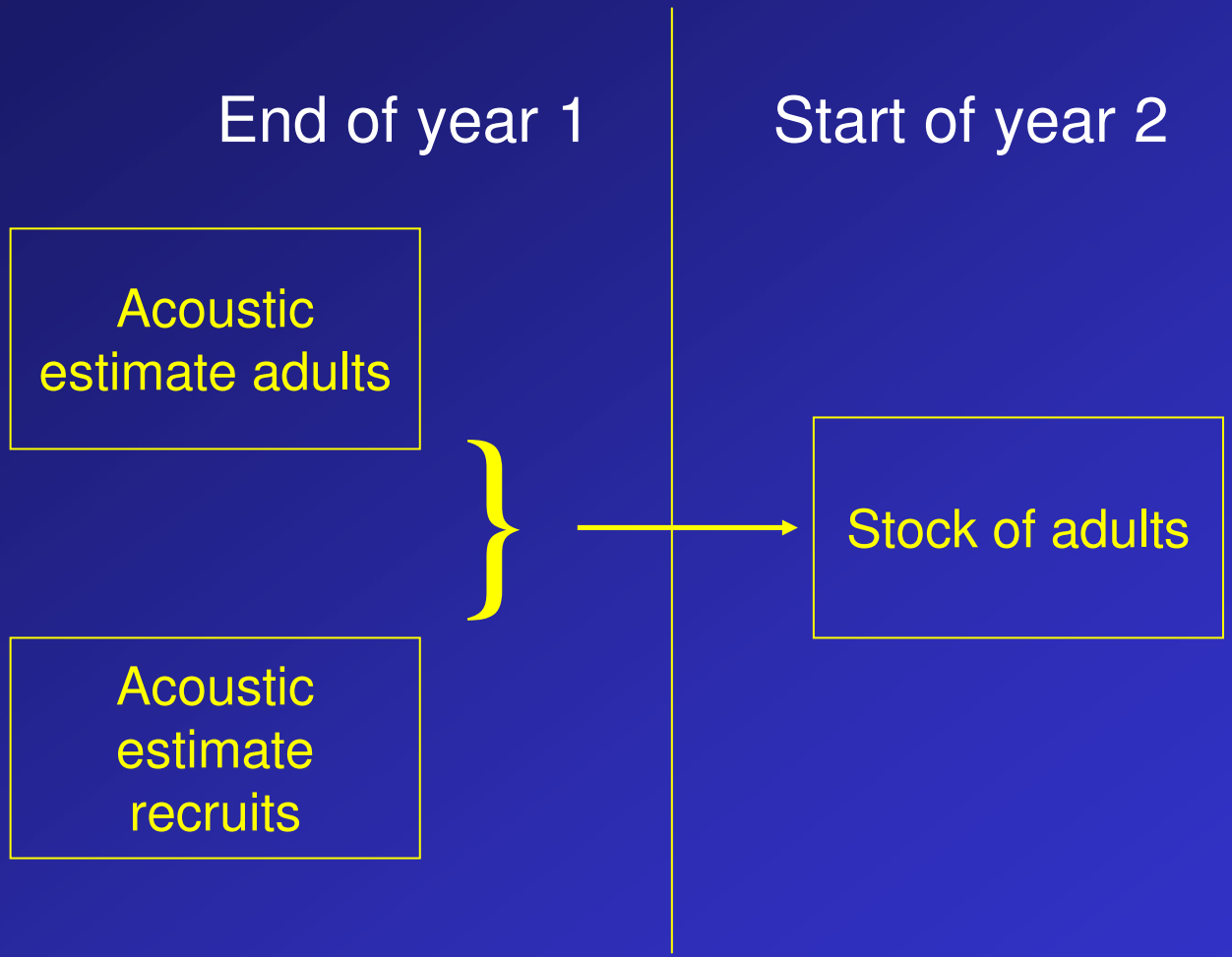
# Example of split length distributions into age groups



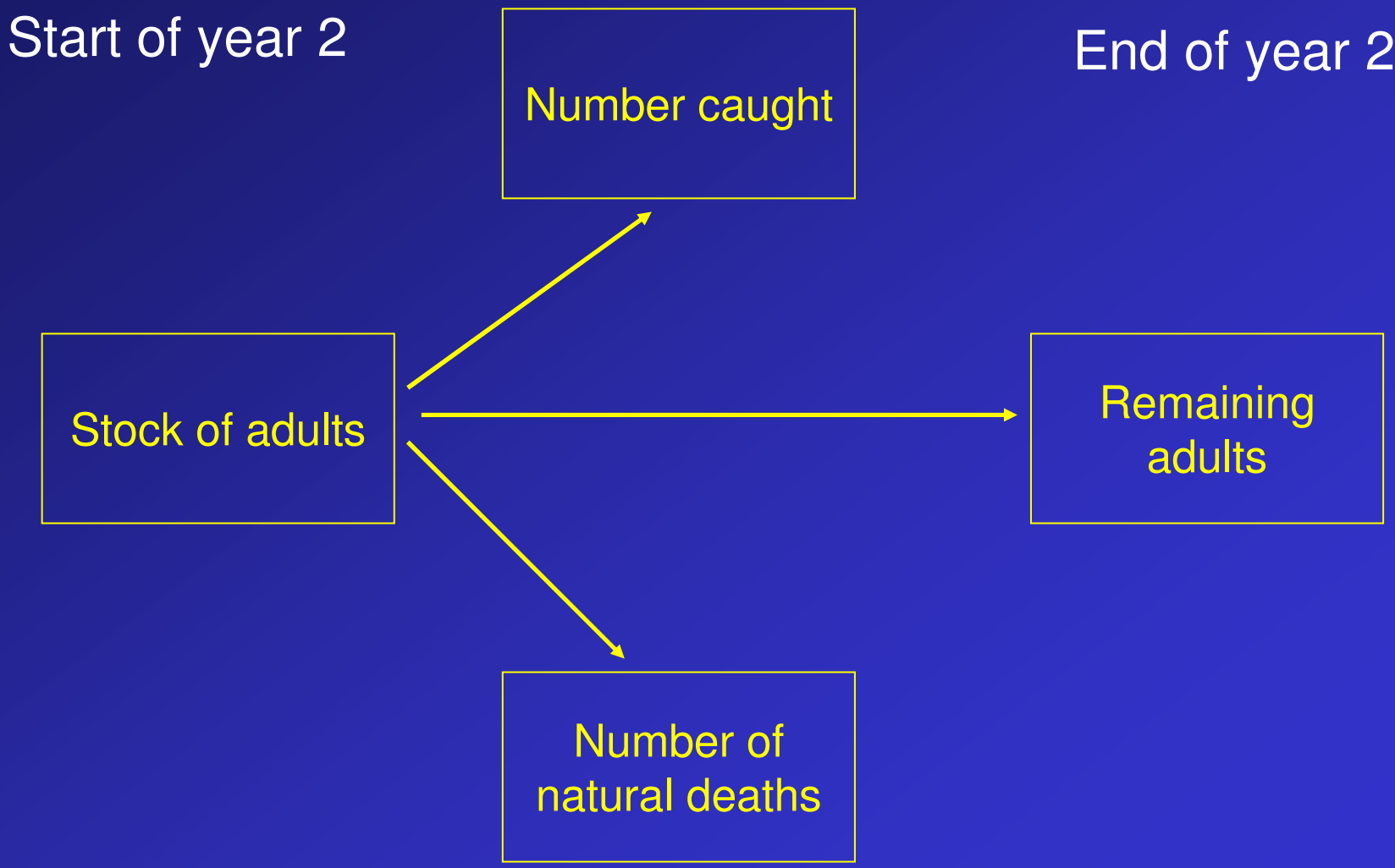
Using these separate age groups, we could do some simple bookkeeping on the stock

The pre-requisite is that we can use our acoustic estimates as absolute values

# Acoustic surveys can give us an estimate of the adult stock at the beginning of the year



We know the adult stock at the beginning and end of the year (from acoustic surveys), and the number of adults caught (from sampling the catch)



Comparing the stock of adults at the beginning of the year with the remaining numbers at the end of the year gives us an estimate of total mortality.

Adding information on the total catch in numbers provides estimates of both fishing mortality and natural mortality.

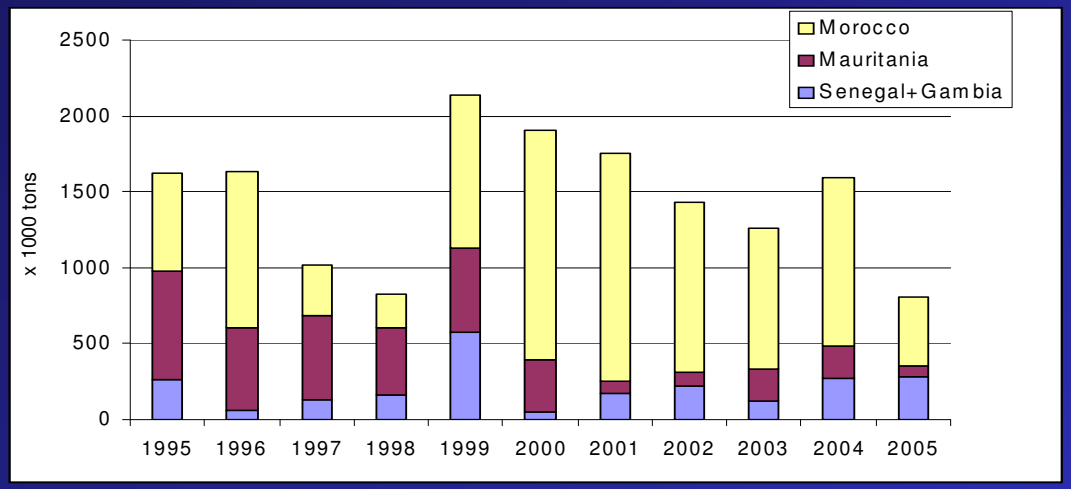
Over the years, his will give us a series of annual values of:

- adult stock at beginning of year
- fishing mortality during the year
- natural mortality during the year
- recruitment at the end of the year

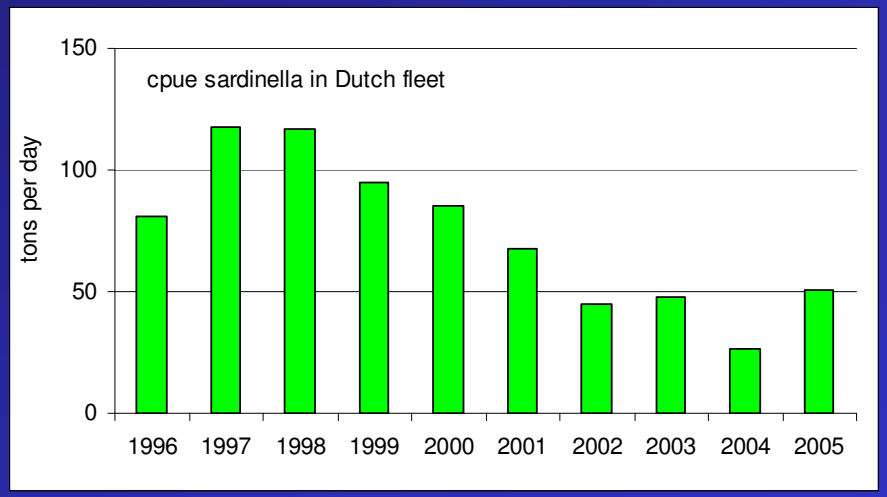
This approach requires an improvement of present acoustic surveys by

- using appropriate TS values
- better timing of surveys
- coverage coastal areas
- less avoidance of vessel
- improved species identification

# Illustration of inaccuracy of acoustic surveys




Acoustic estimates




Catches per day


# *The End*