

# **Age Determination – Integrated Method**

# USES

- **To optimise age at Lm**
- **To use as an input data in estimating growth parameters**
- **To use as an input data in estimating mortality parameters**
- **To fit the growth parameters in stock assessment models**
- **To assess the sustaining power of the fish stock from their growth and mortality parameters**

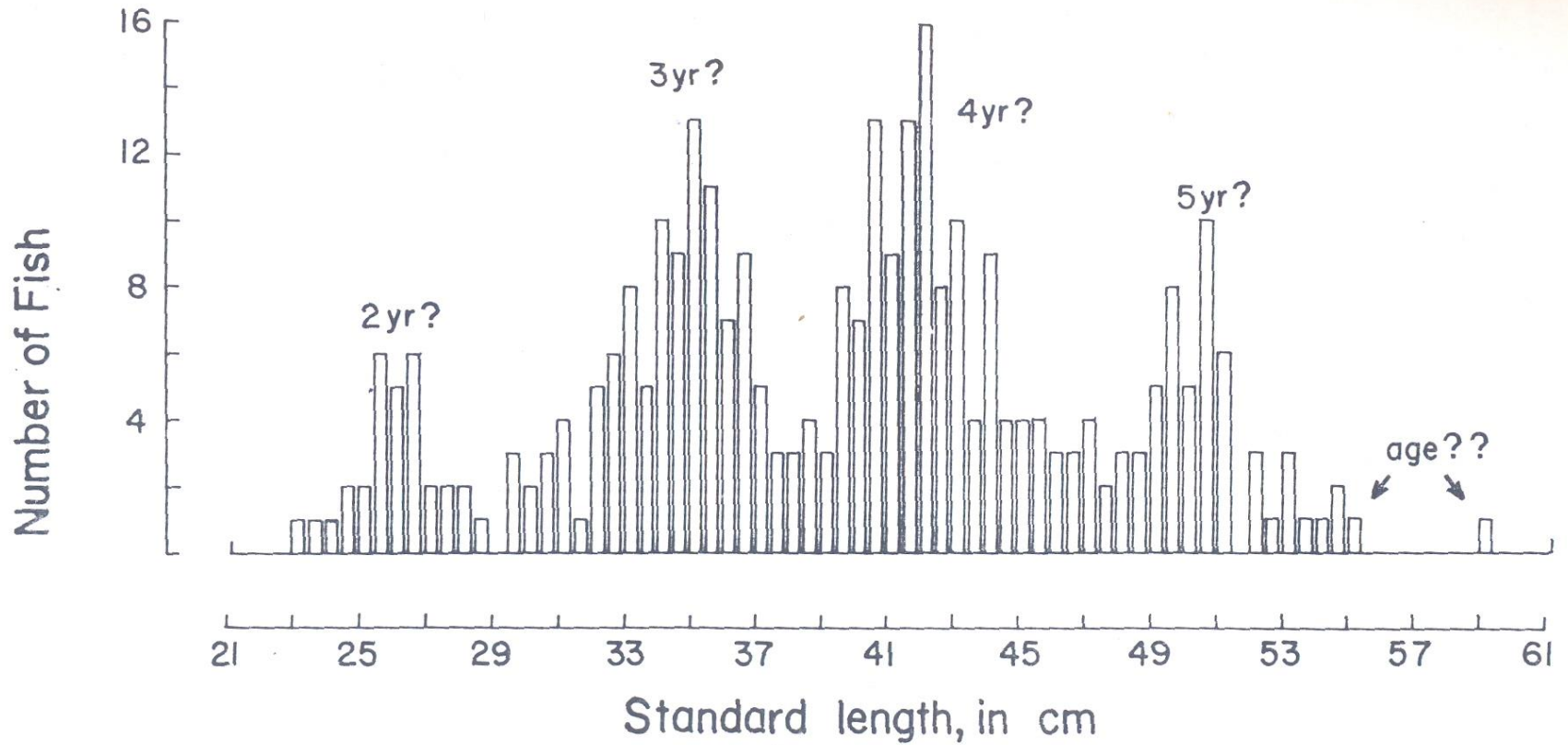
# Methods of age determination

- 1. Hard parts**
- 2. Length Frequency Analysis**
  - **Hard parts – Merits & Demerits – Tropical Fish**
  - **Length Frequency**
    - 1) Petersen Method**
    - 2) Modal Class Progression Technique**
    - 3) Integrated Method**

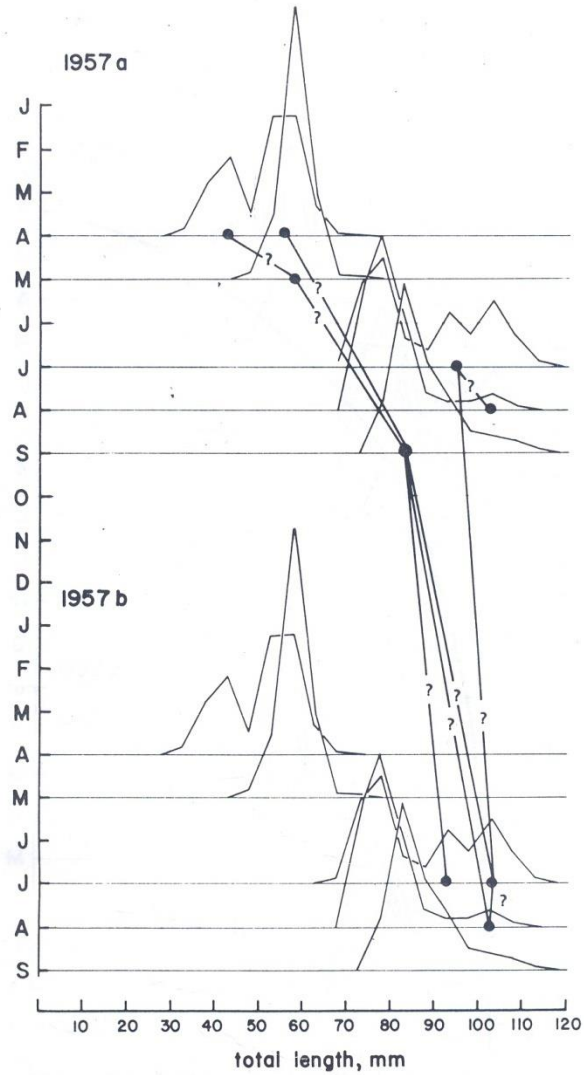
# N

- Peterson Method – Assumptions made to time interval separating various peaks of one length frequency sample, these peaks summed to represent distinct groups
- Modal Class Progression Analysis - Assumptions made to which of the peaks can be interconnected that belong to various samples arranged sequentially in time

# PETERSON METHOD



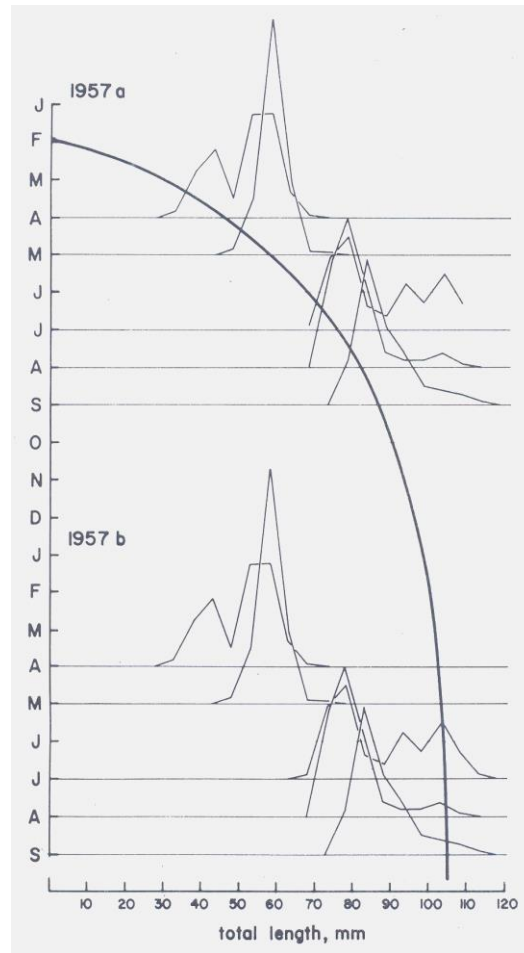
# MODAL PROGRESSION ANALYSIS



# Tenets in integrated method

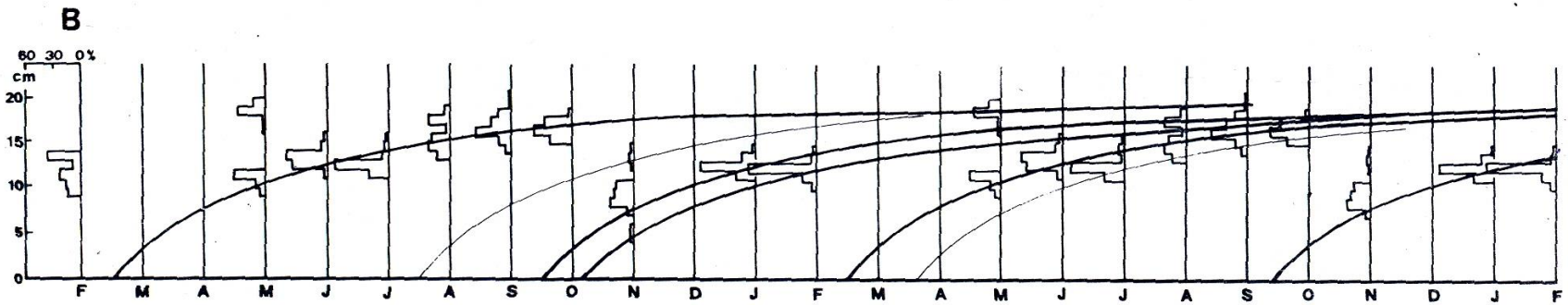
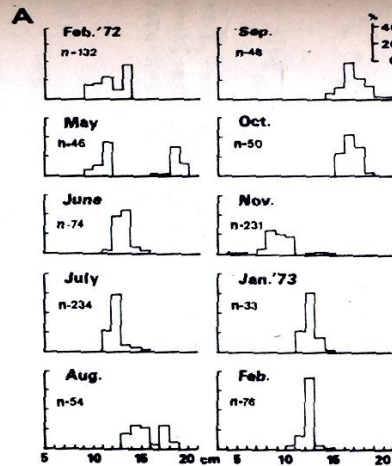
- **Length growth in fishes is rapid at first – decreases smoothly – continuous curve – several short– straight segments**
- **Single smooth curve connecting – majority of peaks – sequentially arranged – length frequency samples – average growth of the stock**
- **Growth patterns repeat themselves from yr to yr (which is also assumed when annuli or otoliths are counted)**

# INTEGRATED METHOD





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# Steps to be taken to draw curves

- **Proportional to the time**
- **Plotting of original data twice or more along time axis – longer and stabilised growth curves - all relevant age groups**
- **Growth curves drawn – variations – same shape - vary only as to their origin**
- **Scale of ordinate (length) should start at Zero – to allow approximate spawning periods**
- **Growth curves must connect majority of peaks – more peaks connect – actual growth of population**
- **Modal length – corresponding to various age groups – read – at regular time intervals**

# Steps to be taken to draw curves

- Length frequency distribution tend to group themselves around a central value called the mode from which the curves are to be drawn
- The progression of the modes – successive interval of time indicate growth

# Scatter diagram techniques

1. Collection of data for 12 / 24 months
2. Plotting the data month-wise (percentage)
3. Peaks of all months – plotted – and drawn by curves
4. Plotting the age with length data

# Collection of data

- **For length frequency – Total Length, Standard length,  
Fork Length - should be taken**

## **List out steps**

- 1. Random collection – commercial catches**
- 2. Collection of data from different gears**
- 3. Weekly sampling (10 % of the sampling if landing heavy)**
- 4. Classify the length frequency data (should not exceed 25)**
- 5. Pooling of weekly data on monthly basis**
- 6. Draw frequency polygons or histograms according to months**
- 7. Trace the progression of modes (plot could also be made in the form of scattered diagram)**

**END**