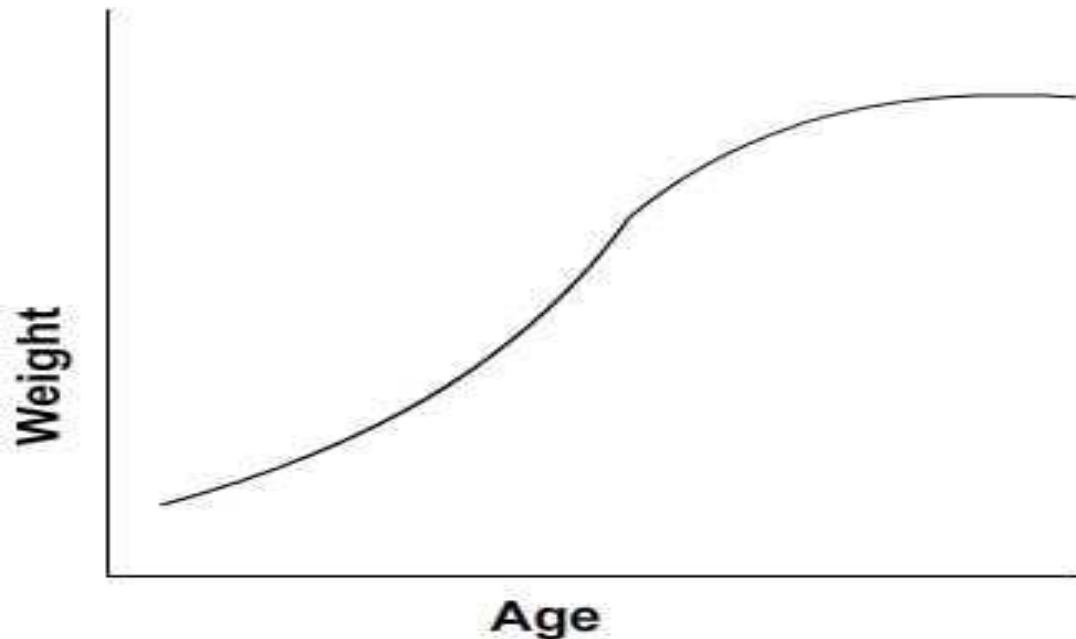


Yield curves

YIELD CURVES

The information needed to draw yield curves with usage of analytic models is growth rate and natural mortality of fish.

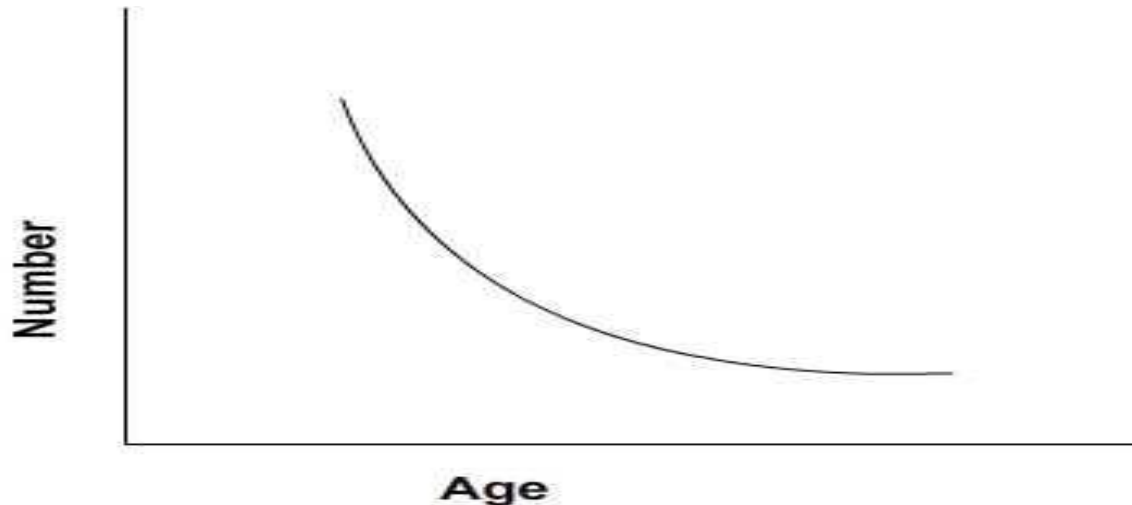
'S' shaped curve results growth in weight overtime.



An exponential decline occurs with survival over time.

YIELD CURVES

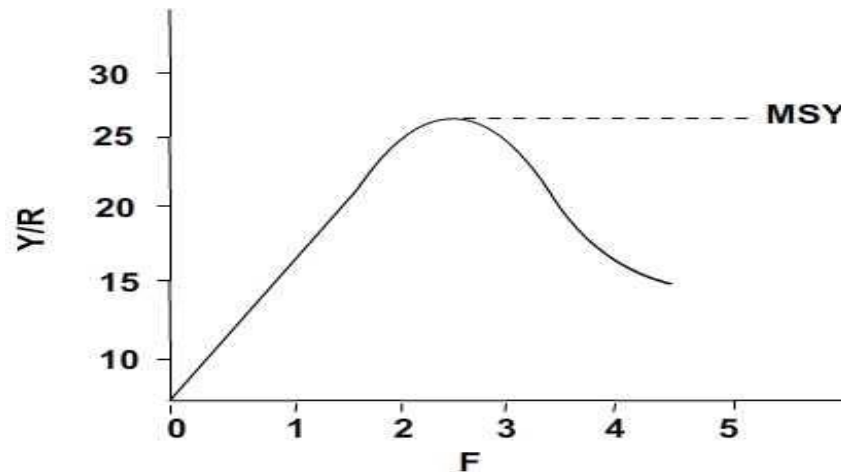
From the biomass recruit model, biomass per recruit curve will be obtained. This curve will always decrease by increasing the effort. In any fishery with decreasing in CPUE, the biomass will increase when effort increases.



From these two curves, it is possible to derive yield per recruit curve for a fixed age of fish capture T_c . The T_c is the age at which the fish becomes vulnerable.

YIELD CURVES

In yield / recruit curve, F is taken as independent variable and Y/R is dependent variable. Knowing the yield, keeping T_c constant, for a given value of F , the number of recruits could be ascertained by dividing the total yield by yield in gms of recruit



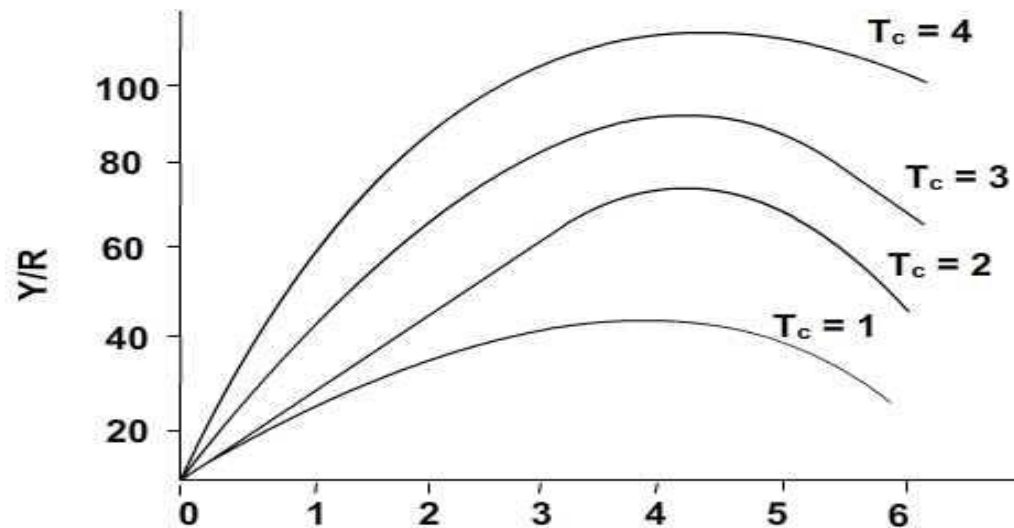
The curve drawn in the above figure is called as yield per recruit curve, and the peak of the curve is MSY.

Yield isopleths could be drawn for various combinations of F and T_c .

YIELD CURVES

The yield per recruit curve depicts the MSY. The MSY depends on age at first capture T_c , and in turn T_c depends on mesh size used for a fishery.

The following curves show how the yield is affected with T_c .



MSY is highest at highest value of T_c with higher value of fishing effort.

YIELD CURVES

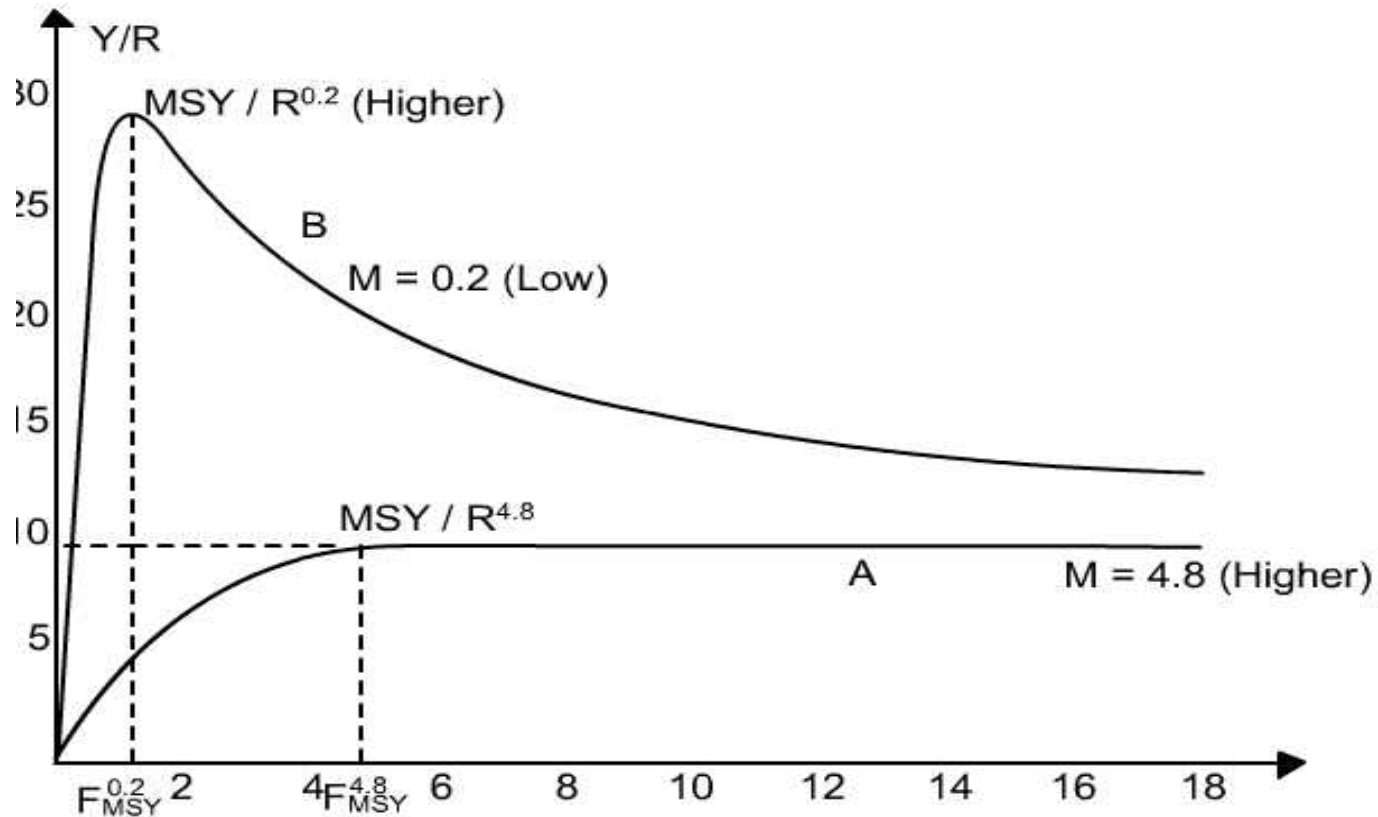
The T_c and F could be managed by stock assessment scientist/fishery managers to have highest MSY.

' F ' is proportional to effort.

T_c is the function of gear selectivity.

Thus combining a range of values of T_c with a range values of F , sustainable yield could be achieved, for a certain level of T_c and F .

YIELD CURVES



In the above graph, curve B is higher compared to curve A. But it has lower value of F_{MSY} but with higher MSY/R . The main difference between two curves is the natural mortality rate 0.2 for the curve B and 4.8 for the curve A.

YIELD CURVES

Several parameters can influence yield curve. Among them 'M' affects the yield curve. The variations in M can influence on the shape of the curves Y/R .

Thus when M is lower, lower FMSY is produced and a higher MSY/R . Increasing the fishing effort above FMSY leads to decrease in total yield.

When M is high, FMSY is difficult to estimate in the Y/R curve.

END