# Fish Population Dynamics

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AGE AND RECRUITMENT

- When working with analytical models we need to define the concept of "*age*". As was said above in connection with body length, we do not operate at the individual specimen's level, so "age" means the average age of a cohort. To define age we must start with a definition of "*birthday*". The obvious biological definition of the day of birth is the day the larva hatches from the egg. We say that a newly hatched fish has age zero.

- In the first part of their life the larvae (or juveniles) are usually little influenced by the fishery. We say that the fish is then in the unexploited phase of life. Because we are interested in the exploited phase of its life the unexploited phase is not important in the present context.
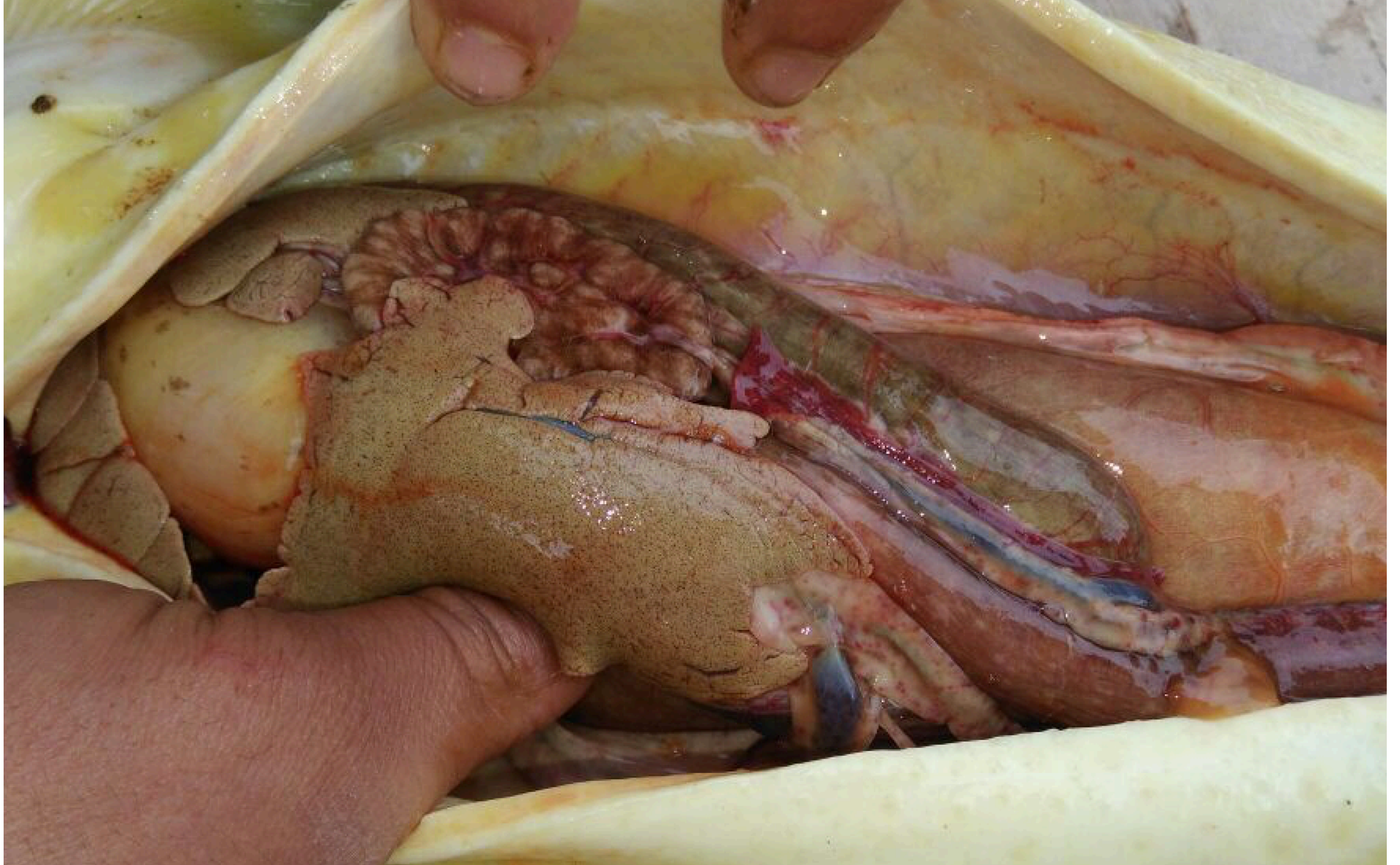
- Let Tr be the youngest age at which the fish may be vulnerable to fishing gears. A fish of age Tr is called a "*recruit*". By "*recruitment*" we mean the number of recruits, i.e. the number of fish that have attained age Tr during a "*recruitment season*". The "*recruitment intensity*" is the number of recruits per time unit.

- The "*recruitment pattern*" of a temperate species could be as shown in A, where each line represents the recruitment intensity in one week. In most tropical fish stocks recruitment continues (more or less) all year round, but with seasonal oscillations, for example where monsoons occur (Pauly and Navaluna, 1983)

- Let us tentatively define the recruitment season of a tropical fish stock by the dates (fractions of the year) tr1 and tr2 which correspond to the dates of minimum recruitment. With $0 <= tr1 < tr2 <= 1.0$ we define the "spring cohort" as the fish recruited from time tr1 to tr2 and the "autumn cohort" as the fish recruited from time tr2 to tr1. ("Spring" and "autumn" refer here to the northern hemisphere).

- In general, the recruitment patterns of tropical fish stocks are not very well understood at present. However, as will appear from the following chapters, the seasonality in recruitment is a very important prerequisite for the methods suggested.

Recruitment intensity
(= number of fish attaining
age Tr per time unit)

A TEMPERATE FISH STOCK

A

A TROPICAL FISH STOCK

B