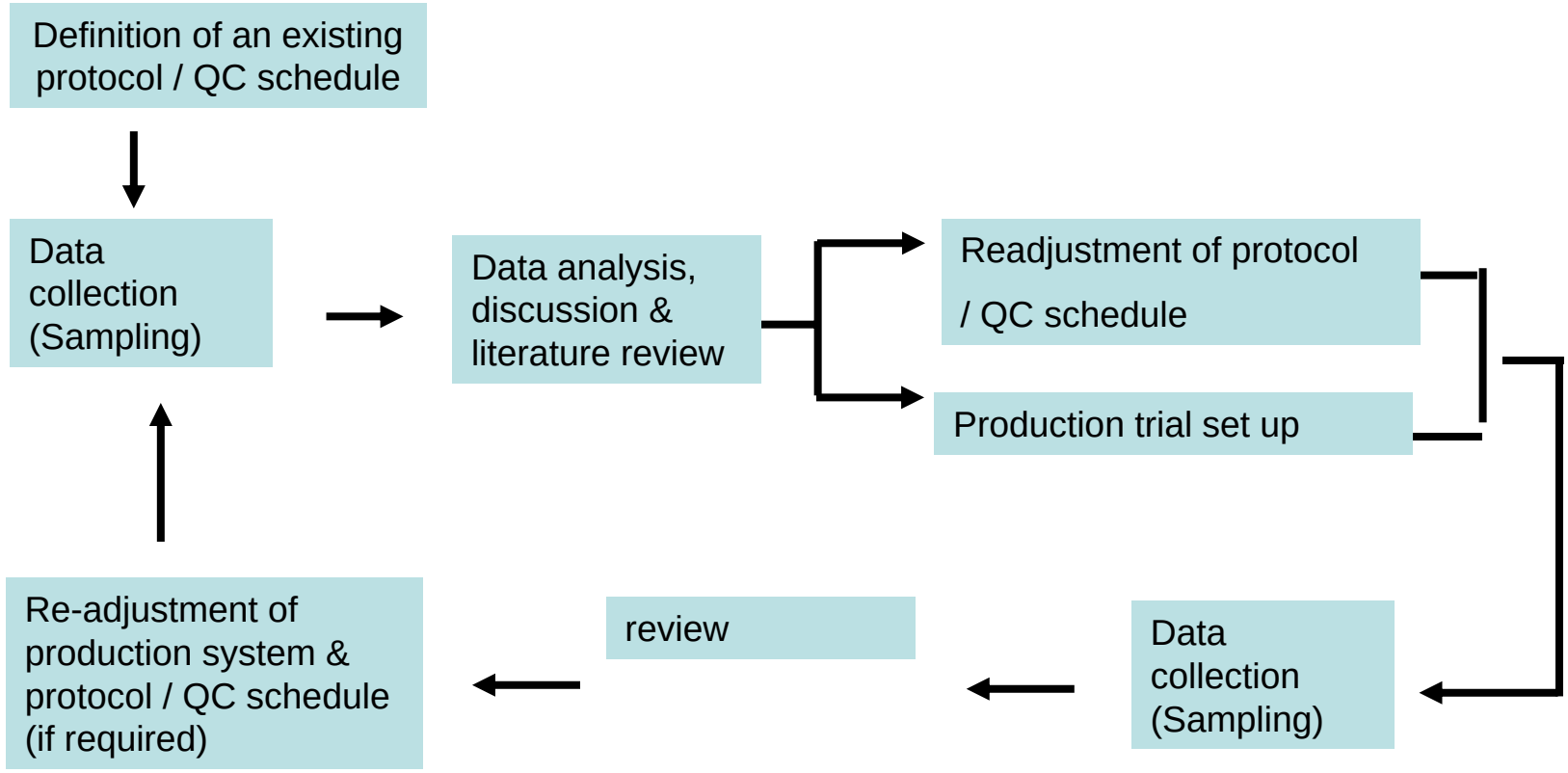
Larvae, fry and fingerling quality

Quality control plan

- Analyse historical production season records to identify weaknesses and develop a **quality control plan**
- Improve data records and the flow of information so that you have information on previous production
  - Deformity controls
  - Health and sanitary controls
  - Size variation controls
- Evaluate requirements for veterinary support, pathology laboratory and training
- Prepare a manual with all the working procedures/protocols.
  - Standarize production methodology
  - Collect reliable data and analyse
  - to find out what is causing a problem.

Problem identification and resolution strategy for SOP & QC



Skimmer removing surface films

Skeletal deformity due to lack of swim bladders

Role of nutrients in skeletal metabolism in fish (Lall and Lewis McCrea 2007)

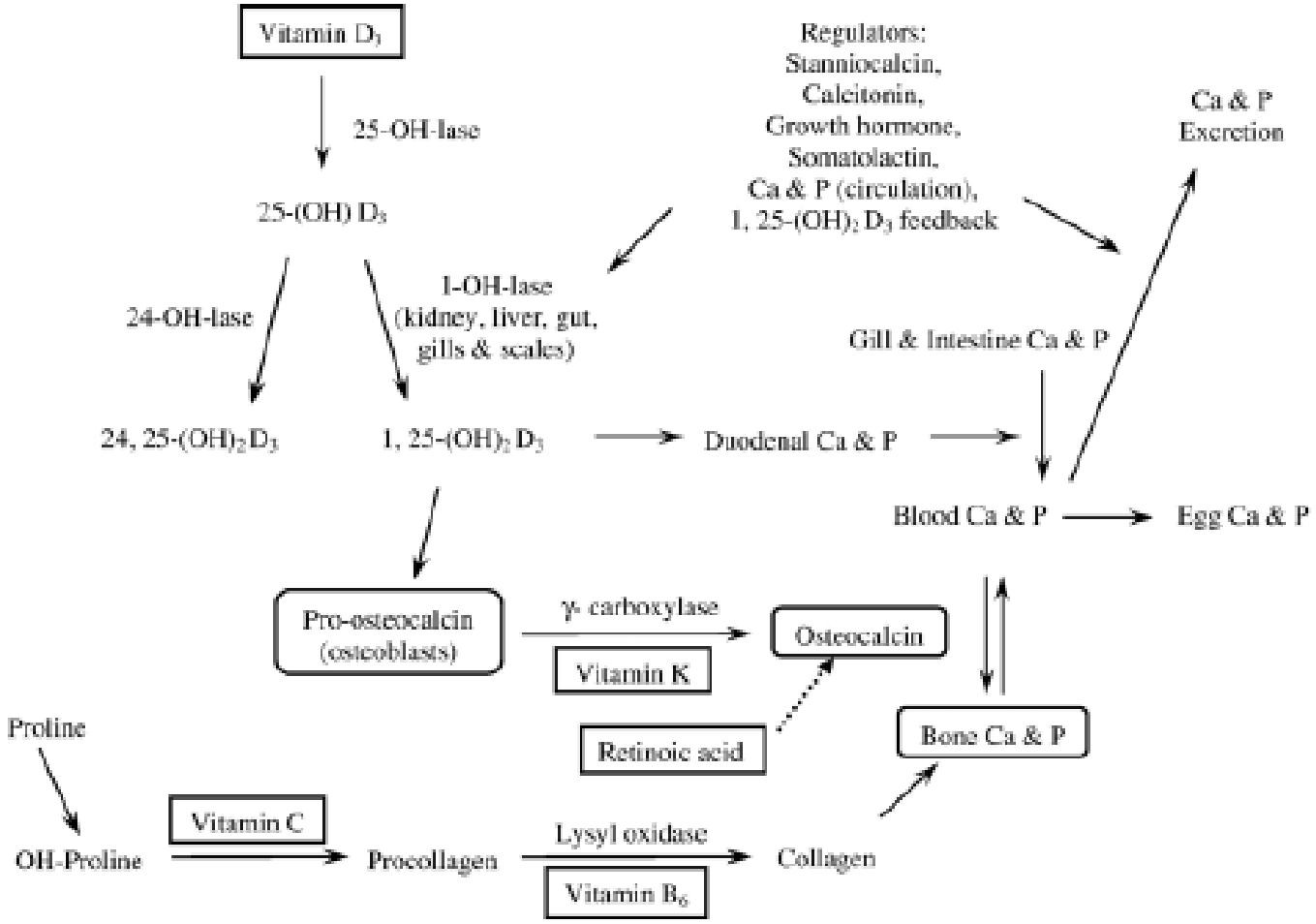


Fig. 1. Proposed role of calcium, phosphorus, vitamins in bone metabolism of fish.

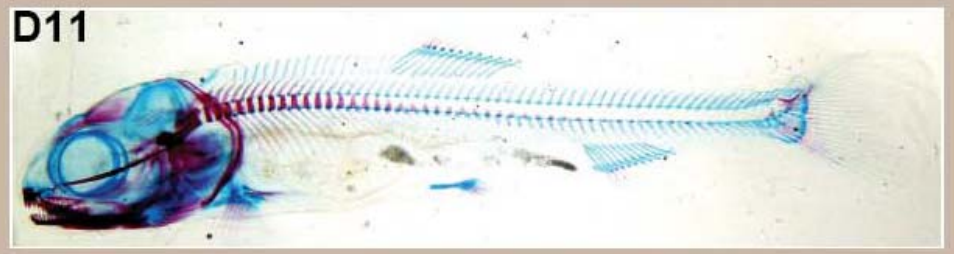
Skeletal development in rainbow trout

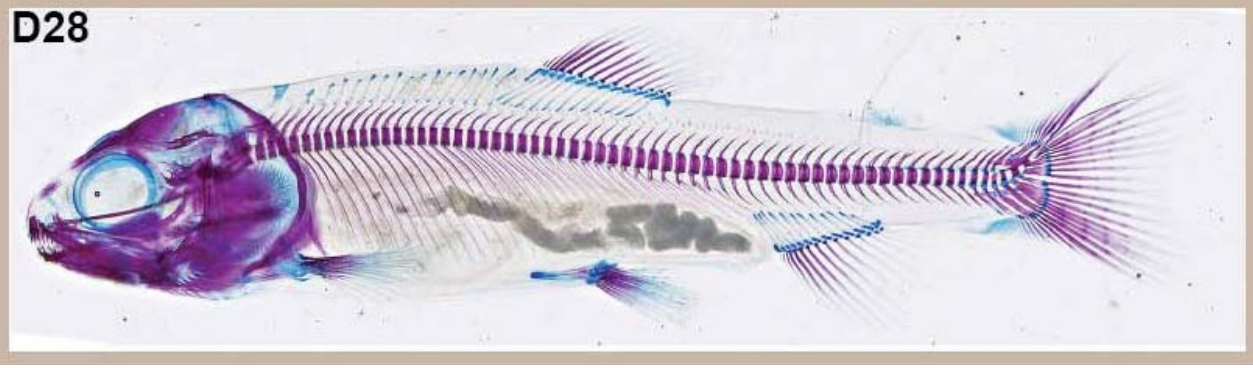
S. Fontagné, UMR NuAGe, INRA

"Ossification" is the process of bone formation in which connective tissues, such as cartilage are turned to bone or bone-like tissue. As young larvae are not fully ossified, two different staining products are used to follow the ossification process; Alcian blue and Alizarin red. The cartilage is stained blue whereas the ossified bone is stained red.

The three pictures are of rainbow trout fry, stained in Alcian blue and Alizarin red in three different life stages. The first picture shows the rainbow trout fry at the swim-up stage (mean wet weight: 100mg) and the ossification has not yet started as the fry is only stained blue. 11 days later (picture 2), the ossification has started; mainly in the head and in the tail.

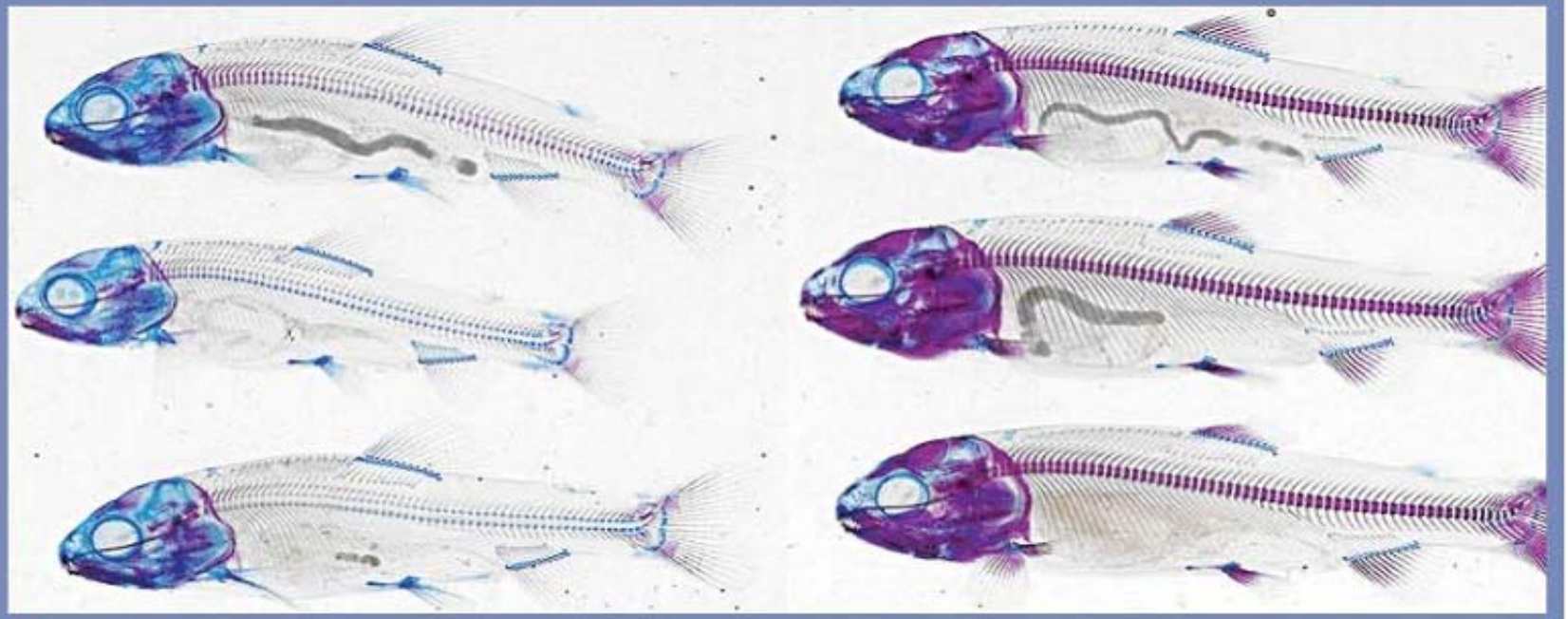
The fry on picture 3 (28 days later, mean wet weight: 500mg) has achieved complete ossification. X-ray analyses are the best method to follow the skeletal development of larger fish.





Phosphate deficiency

Ossification can be altered by dietary phosporus defiency

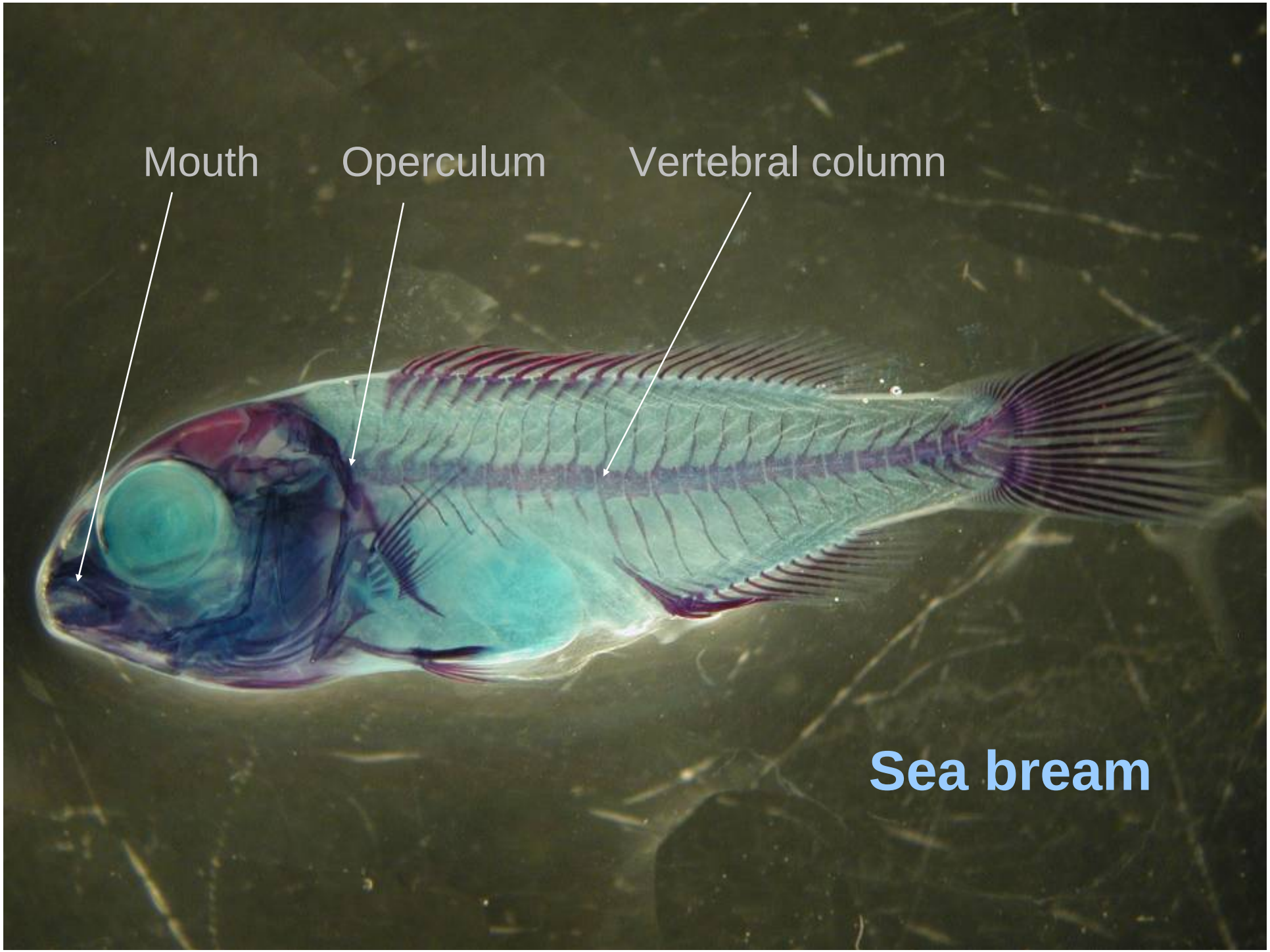


The conclusion of the experiment done by the FineFish project was that the ossification process can be altered by dietary phosphorus deficiency. The picture above shows the results of this experiment.

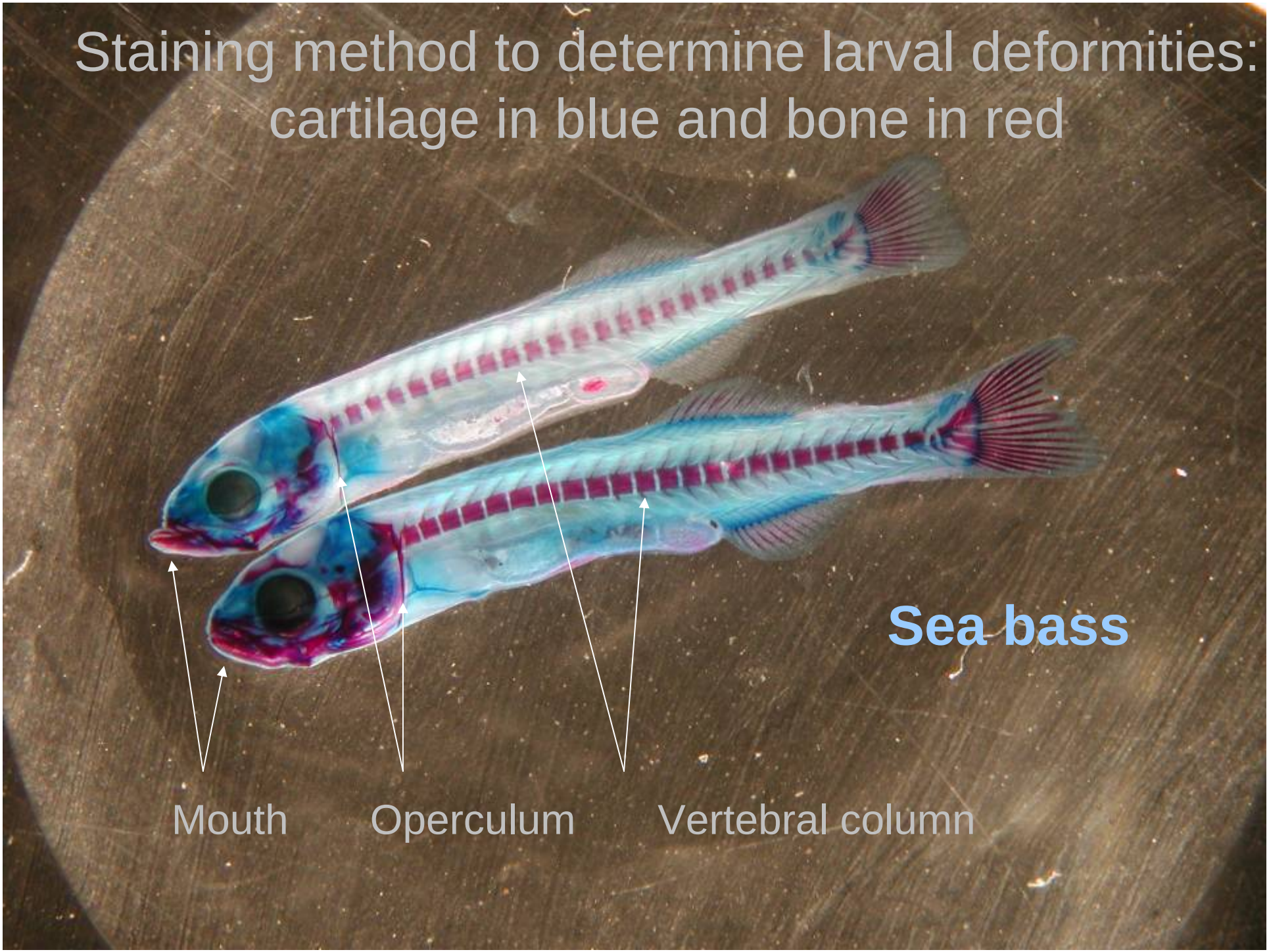
The three fry on the left are 28-day fry fed on a P-deficient diet and the three fry on the right are 28-day fry fed on a P-control diet.

The fry are stained in Alcian blue and Alizarin red; the cartilage is stained blue whereas the ossified bone is stained red.

There was no difference of size was registered between rainbow trout fry groups whereas a significant difference in degree of ossification was noticed.

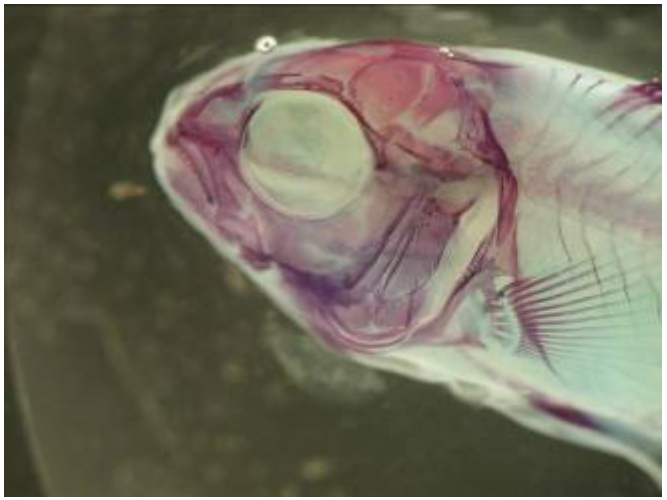

Mouth
Operculum
Vertebral column
Sea bream

Staining method to determine larval deformities: cartilage in blue and bone in red



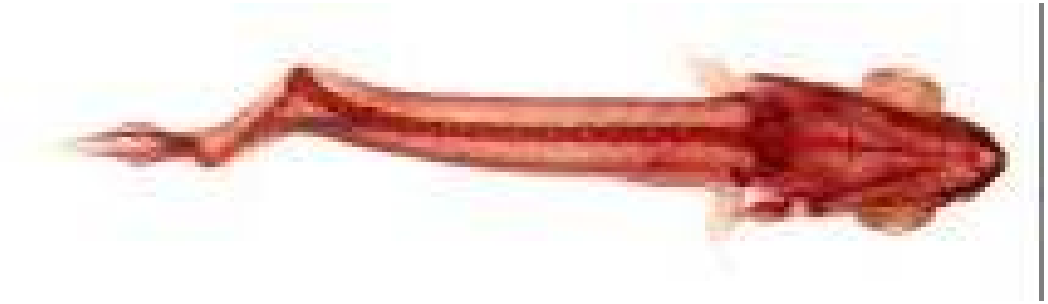
Mouth and column deformities in sea bass

Operculum deformity in sea bream

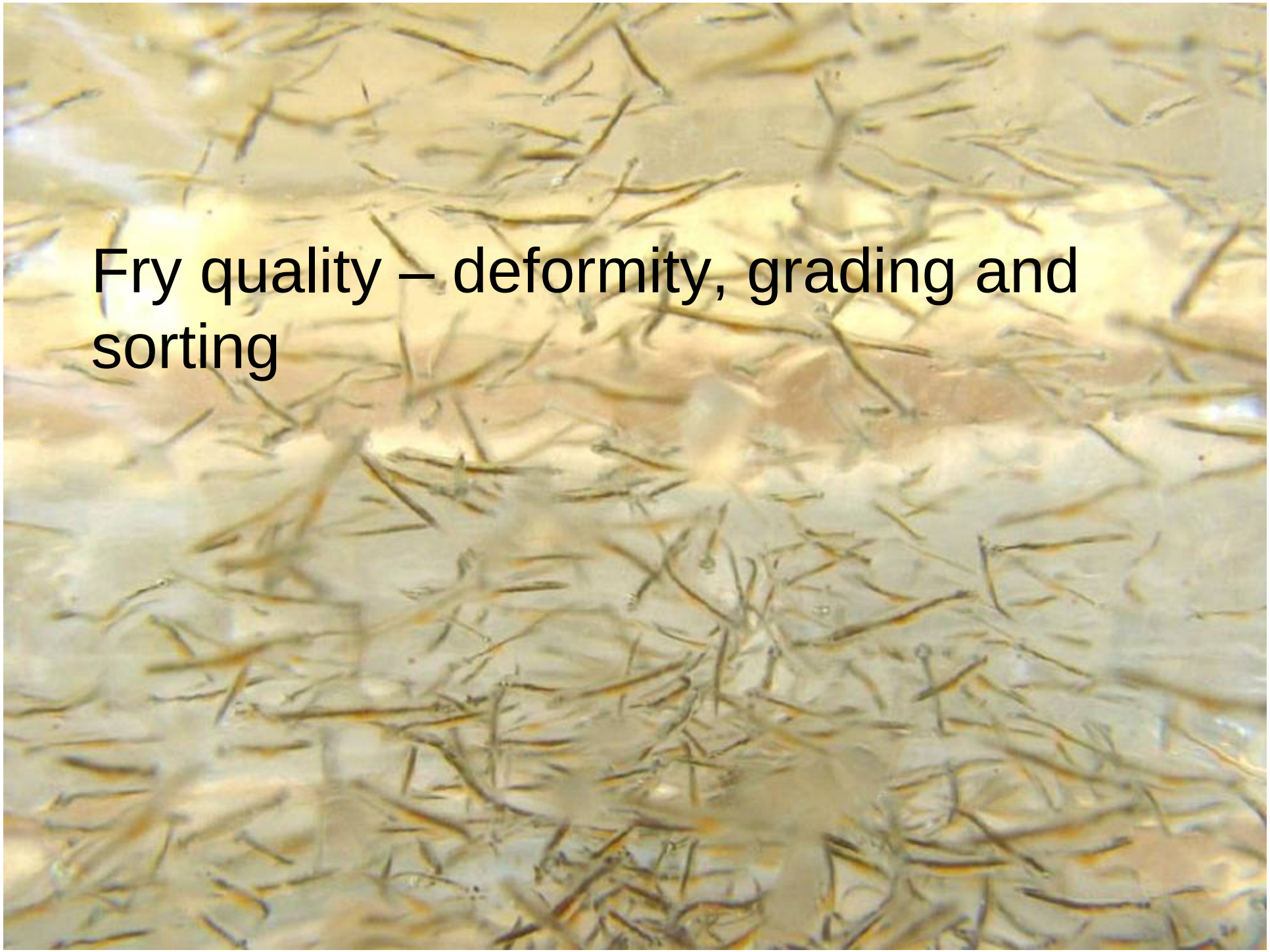


Skeletal deformities

Pagrus major

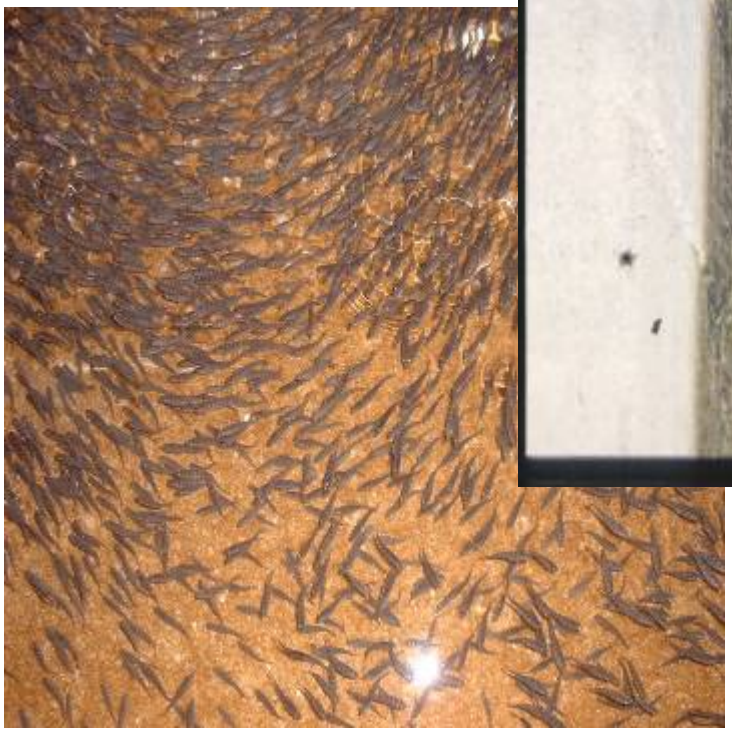


Bass



Fry quality – deformity, grading and sorting

Collecting fish for grading



Crowding screens

Regular nursery grading essential to avoid cannibalism and disease

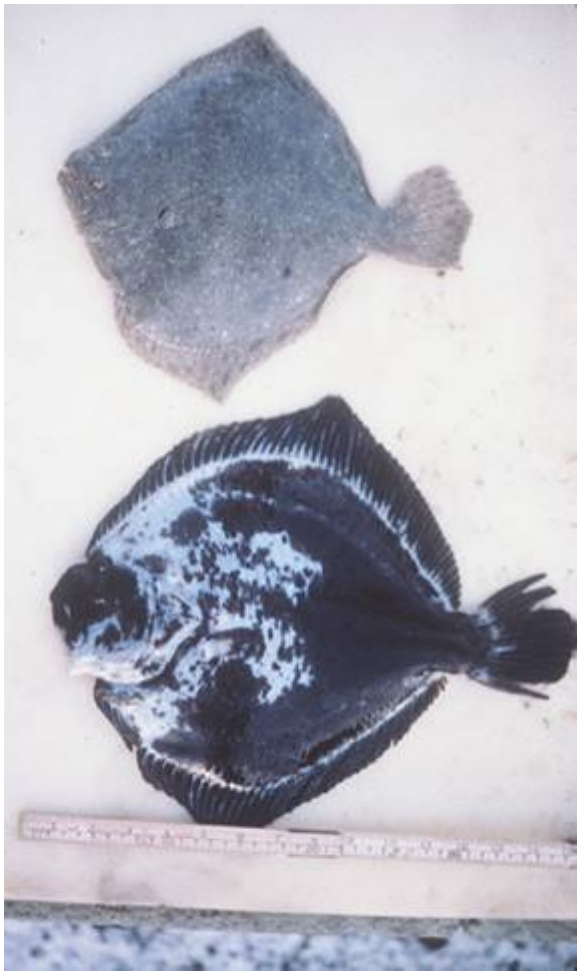
Bar graders

Grading facilities

Fish counters

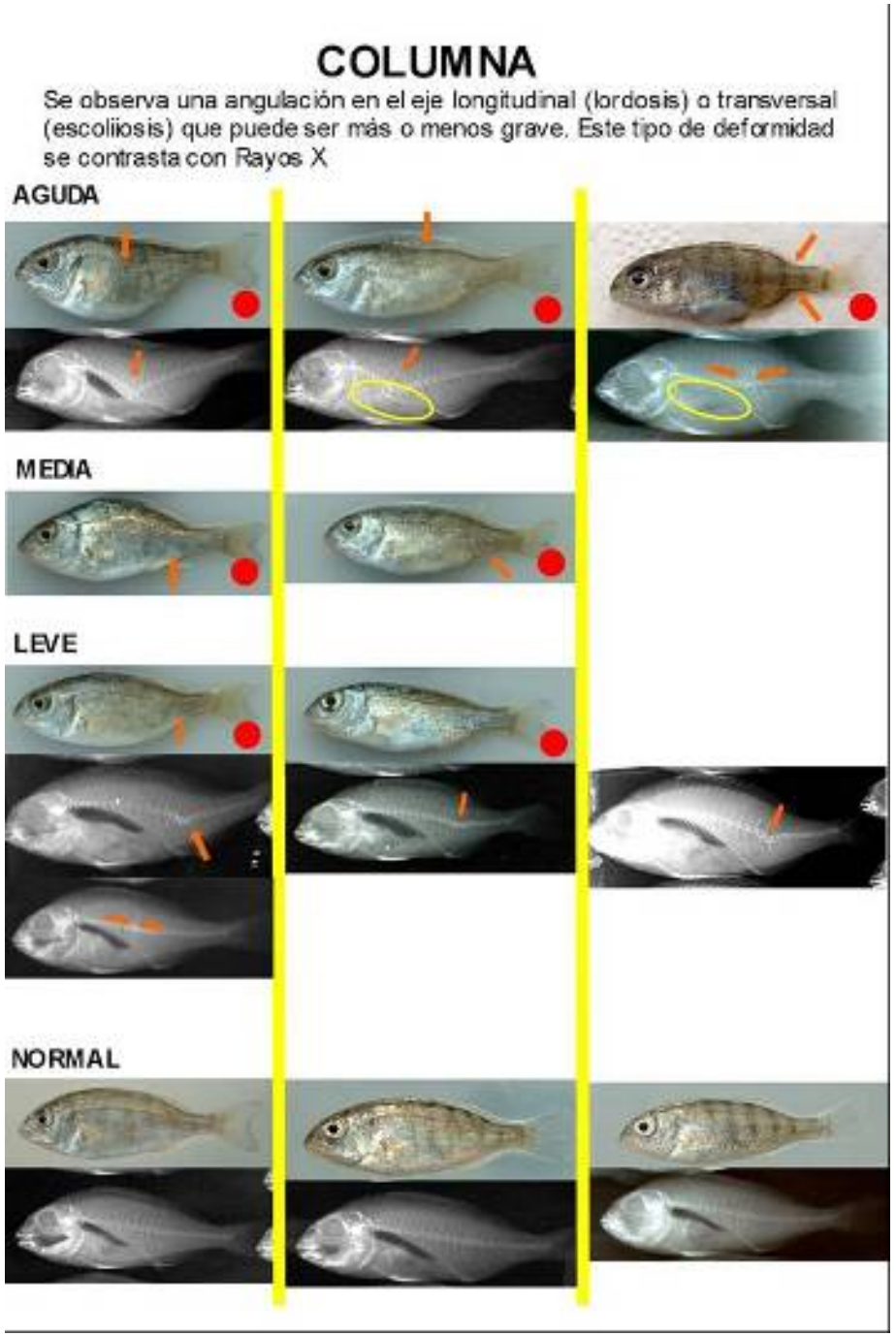
Quality control - sorting table

Deformities - Pigmentation



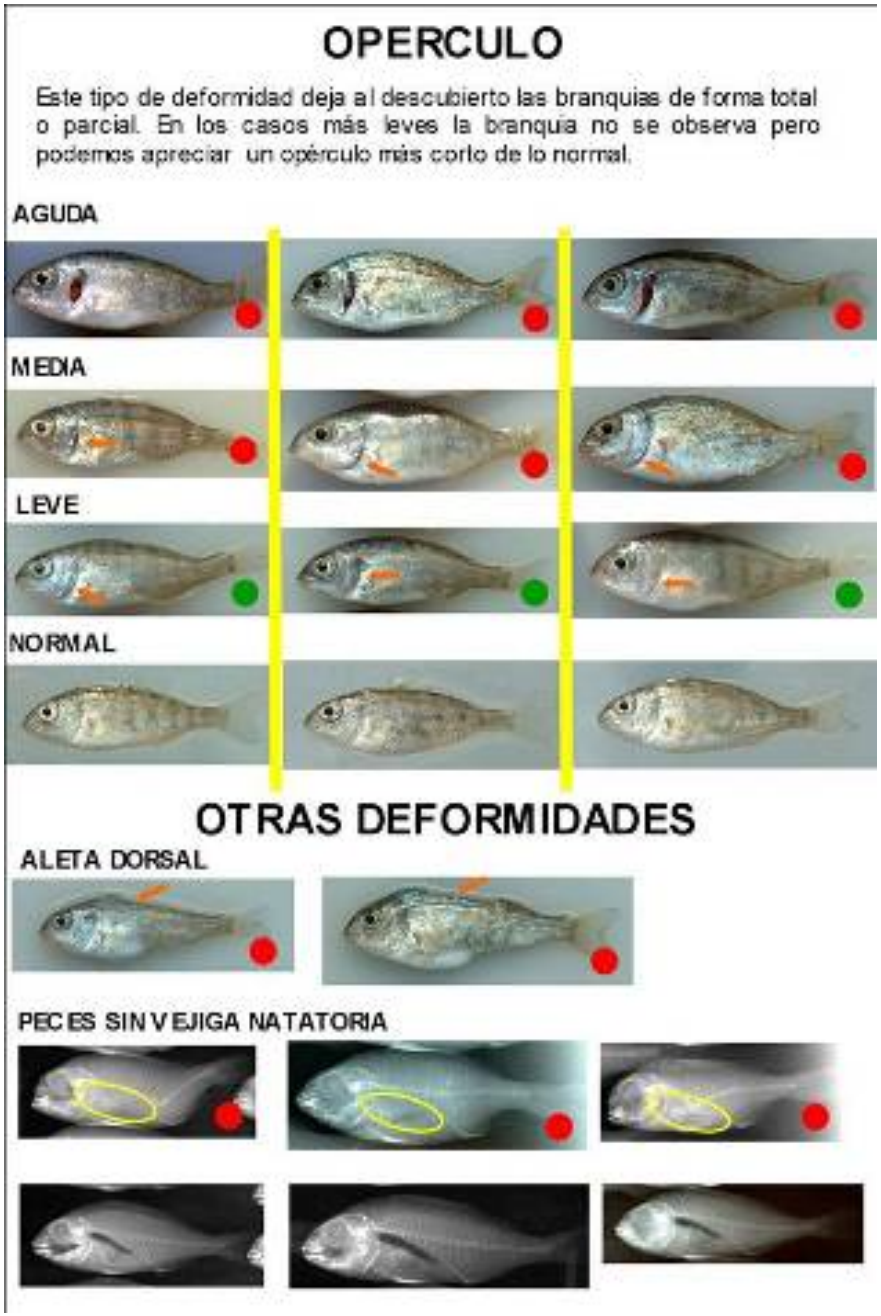
Skeletal deformities

- Unacceptable – to be discarded



Opercula and swim bladder deformities

- Unacceptable – to be discarded
- Acceptable – to be kept



Fin and mouth deformities

- Unacceptable – to be discarded
- Acceptable – to be kept