Photographing the affected fish

- It is important to photograph the infected fish so that the details of the tumors/growths viz. size, colour, shape, texture etc are well documented
- The debris/dirt sticking on to the surface of the infected fish should be cleaned
- The fish should be then kept on an even surface (avoid textured surfaces) having a white/ light coloured background
- Photographs should be taken in a well lighted place, but not under direct sunlight to avoid harsh shadows
- It is always preferable to keep a graduated scale/ruler by the side of the fish, since this will provide an idea about the size of the fish as well as the growths on the body
- More than one image could be taken which should include images of the whole animal as well as magnified regions of the tumors/ warts/ lumps/ abnormal growth

Preparation of 10% Neutral Buffered Formalin (NBF):

Commercial formalin (37% formaldehyde)	100 ml
Distilled water	900 ml
$Na\ H_2\ PO_4 . H_2 0$	4 g
$Na_2\ HPO_4$	6.5 g

Mix the components to make up to 1 litre.

Note: Although samples can be stored indefinitely in 10% NBF, it is preferable to send them immediately for further analysis

Collecting fish samples for laboratory analysis

For laboratory analysis (histopathology and molecular) the samples should be collected and processed as follows:

- Affected fish less than 5cm in size, can be fixed whole in 10% Neutral Buffered Formalin (NBF). An incision in the abdominal cavity helps better penetration of the fixative
- Larger fishes with small tumors - excise the tumors/warts/lumps/abnormal growths with the underlying fish tissues (1 cm^3) and transfer to 10% NBF. If available, another sample from same fish/lot may be fixed separately in 100% ethanol.
- In case of large tumors, cut the tumors and take a 1 cm^3 piece from the center & fix in NBF. A small piece from the same sample should be fixed separately in 100% ethanol.
- The volume of fixative (NBF/ethanol) should be, at least 10 times the volume of the sample taken.
- Never freeze the samples or take frozen samples for histopathology studies.

The container with the sample should be sealed, labelled (with date, location and species name) and along with the data sheet, sent to -

Head, Marine Biotechnology Division (MBTD)
Central Marine Fisheries Research Institute
P.B. No. 1603, Ernakulam North P.O.
Kochi - 682 018, KERALA.
Phone: 91-484-2394867 / 2391407 Fax: 91-484-2394909
Email: director@cmfri.org.in Web: www.cmfri.org.in

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CMFRI Pamphlet No: 28/2014

Monitoring neoplasia/tumors in marine fish

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Neoplasia / tumors

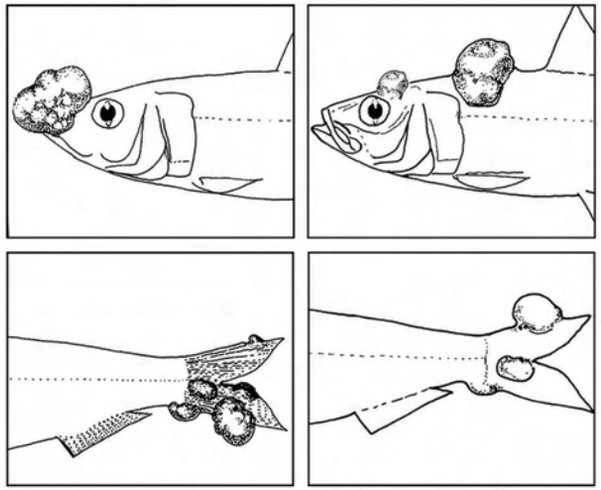
Neoplasia is a condition associated with uncontrolled growth of cells resulting in the formation of abnormal growths / enlargements or 'tumors'.

Externally, they appear as lumps, warts or tumor-like growths on the body of the fish. Mostly unilobed but sometimes multilobed or cauliflower-like shapes are also observed. Colour varies from opaque white to translucent, while the texture may appear soft or jelly-like, hard or even bony in nature. Neoplasms/ tumors have also been noticed in various internal organ syatems.

Generally, neoplasms are classified into benign and malignant.

Benign neoplasms do not metastasize/ invade surrounding tissues, are solitary/multiple and characterized by slow growth.

Malignant neoplasms have a higher rate of proliferation and can potentially invade and metastasize into the surrounding tissues.



Tumours observed on the body of the fish

(above drawings are only illustrative and the actual size/shape of the tumors can vary from case to case)

Usually, the origin for many neoplasms is obscure, the causes may range from exposure to various chemicals (both man-made and natural), toxins (aflatoxins), radiations (ultraviolet, gamma etc), oncogenic viruses or may be hereditary in nature.

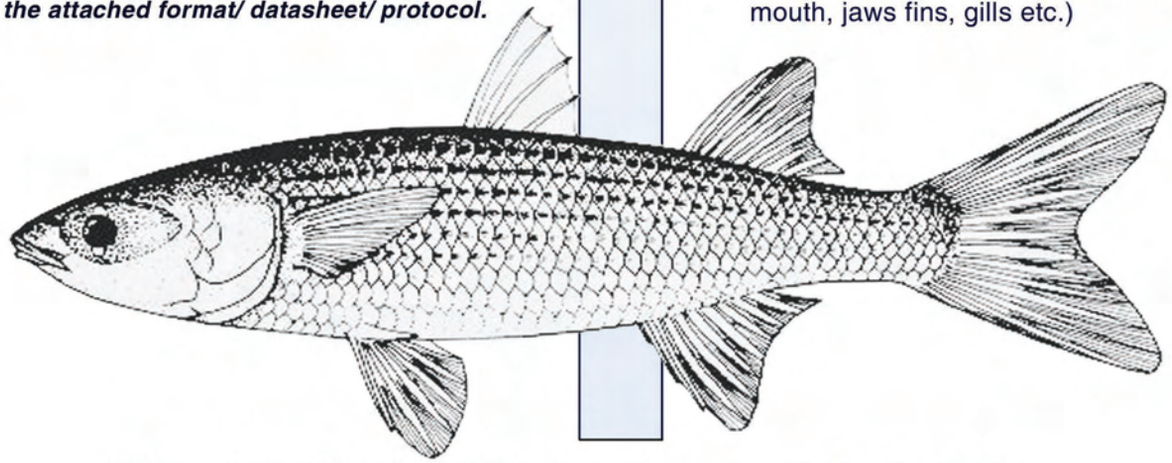
Recently there was a report on the presence of tumors in oil sardines (*Sardinella longiceps*) and great barracuda (*Sphyraena barracuda*) from the south-east coast of India (Parangipettai, Cuddalore and Nagapattinam) (*Journal of Fish Diseases* Vol. 34, 881–885, 2011).

Need for observation

In the light of these observations, there is a need to monitor and collect information on such conditions (tumors/ warts/ lumps/ abnormal growth/ morphological conditions) in fishes.

Fishes arriving at various landing centers as well as samples taken for analysis under the various projects should be monitored.

If any such cases/conditions are observed, it should be reported and samples are to be taken as per the attached format/ datasheet/ protocol.



The specific location of the tumor on the body can be marked in the diagram provided in the attached datasheet

What to do ?

Collecting basic information

- Date of collection
- Landing center/Geographic location
- Type of Gear used

  Affected fish species
- Morphometric measurements & weight of the affected fish
- Number of fishes affected
- Total catch of the particular lot
- Prevalence
- Average length of the fish in the lot

Collecting detailed information of the tumors/abnormal conditions

- Shape (rounded, unilobed, multilobed, lump, wart-like, cauliflower-like etc.)
- Colour (translucent, white, reddish or others)
- Texture (soft, hard, bony or jelly-like)
- Size - diameter (in mm)
- Affected organ/area (body & skin, head, mouth, jaws fins, gills etc.)