

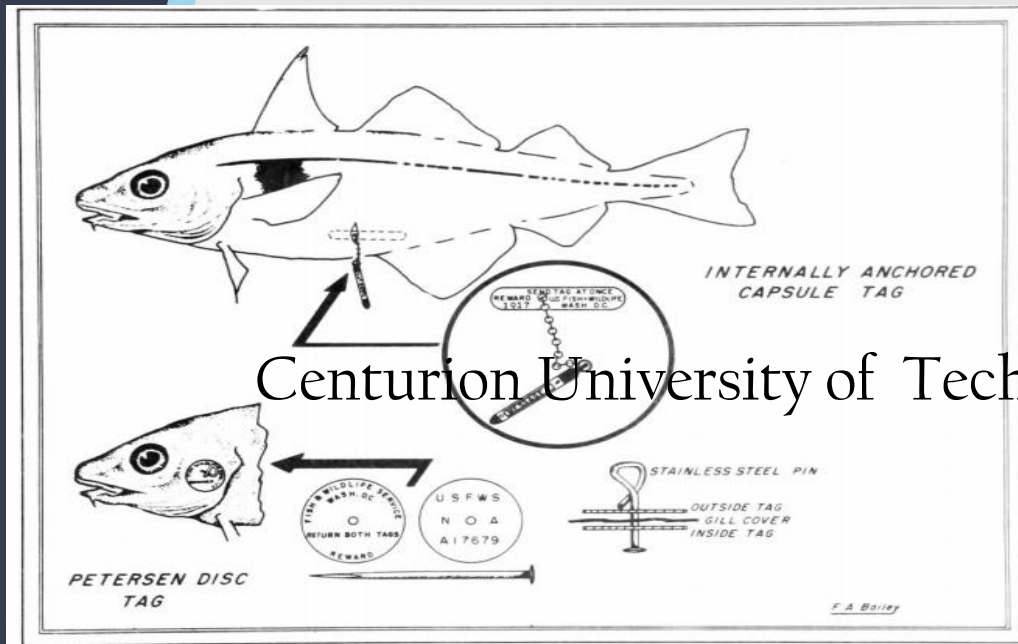


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Marking Techniques in Fishes

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Group Marking Techniques in Fishes

Any procedure or technique that makes fish identifiable either as an individual or as a member of the batch is termed as marking.

Fish marking and tagging programs are vital as fishery manager's tools for assessing fish populations.



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Purpose of marking and tagging

- To study the population parameters such as density, mortality rate, survival rate, rate of exploitation, rate of recruitment.
- To study the migratory pattern – direction, speed, distance, purpose of migration
- To study the return of anadromous and catadromous fishes to their natal environment and to understand the parent – stream theory.
- To study the age and growth of fishes.
- To study the survival and growth of transplants.



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Fin clipping

A part of the fin is cut by using scissors - most popular - easy to perform and - regeneration is uncommon.

Pelvic fins - usually selected for fin clipping.

Disadvantages

Suitable only for short term marking

Fin may regenerate

Opercular and fin punch

Chances of getting infected.

- A hole is made in opercular bone or fins using a punching machine.



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Branding

Hot or very cold rods are used to brand the fish.

It is done below the dorsal fin or caudal peduncle region.

Hot Branding

It is done using a heated pencil or electrically heated wire.

Cold Branding

It is done using a mixture of ethanol and dry ice or acetone and dry ice or liquid nitrogen or solid CO_2



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Tattooing

The pigments are implanted just below the skin by using a needle or vibrator.

Silver Nitrate marking

- Different shapes of marks can be made on opercular region using silver nitrate pencils.



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Subcutaneous Injection

Materials are injected just below the skin
(subcutaneous injection) by using a syringe.



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Injection with Liquid latex

Coloured latex is injected just below the dorsal fin. This is useful for transparent bodied fishes.

Injection with vital stain

This is used to study the organogenesis.

Injection with fluorescent materials

Fluorescent material like tetracycline is injected into the fish body where cephalothorax and the abdominal region join. This technique is used for invertebrates (Crustaceans).



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Elastomer dye marking

The visible fluorescent elastomer implant provides externally visible, subcutaneous marks. The needles are inserted below skin on ventral surface of the fish and elastomer is injected subcutaneously.



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Individual Internal Marking Technique in Fishes



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Individual Internal Marking Technique in Fishes

Individual organisms are given a separate number or code to identify them by tagging.

Tagging is a process of attaching foreign objects bearing a number or code to the body of the fish to make them identifiable.



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Internal Marking Technique

A metal or plastic coded material will be inserted inside the body and the inserted material can be identified by X-ray method or by radioactive method or by magnetic principle.

Passive integrated transponder tags

Glass encased electronic transponder tags are inserted into the peritoneal cavity of fish. Each tag has an individual code which can be read by a battery-powered reader held close to fish.



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Individual External Marking Technique – I



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T – Bar Tags

These are numbered plastic tags with a 'T' shaped head.

These tags are cost effective and popular on fish, crustacean species.

T-bar tags are convenient even in some shellfish species where large numbers of fishes may need to be tagged in a short space of time and/or holding time is critical for fish survival.



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Plastic tipped dart tags

These tags are very popular with recreational fish tagging programs for a wide variety of species due to ease of use & lower unit cost of applicators compared to T-bar tags.

The large dart tags are used on finfish and sharks with a size of about 60 cm including tuna, barramundi, tarpon and king mackerel.



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Stainless steel head dart tags (SSD)

These are used for marking large fishes like billfish and sharks which cannot be easily brought aboard.

The tag head is specially ground and sharpened to anchor smoothly in firm tissue or muscle.



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Body cavity tags

Body cavity internal anchor tags have extremely long term tag retention. Hence, they can be used for the estimate of population size or exploitation rate.

The tag is designed in such way that the anchor lies parallel with the inside abdomen wall and the external marker lies backwards.



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Self locking "cinch-up" loop tags

These tags are suitable for certain species in recreational or aquaculture fish tagging programs, particularly if user skill in tagging fish is not high.

These tags are popular for use on macrophytic algae and are also being tried as a "wrap-around" carapace and claw tag on crabs and as a band tag on marine turtles.



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Individual External Marking Technique II



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Individual External Marking Technique II

Plastic head intra-muscular tags – Game fish tag

- These are suitable for tagging large game fish that cannot easily be brought on board.
- They are not suitable for tagging sharks due to the toughness of their skin.



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Polyethylene Streamer Tags

Extremely popular with researchers for a wide variety of finfish and crustaceans especially shrimp, lobster and juvenile fish.



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Fingerling tags

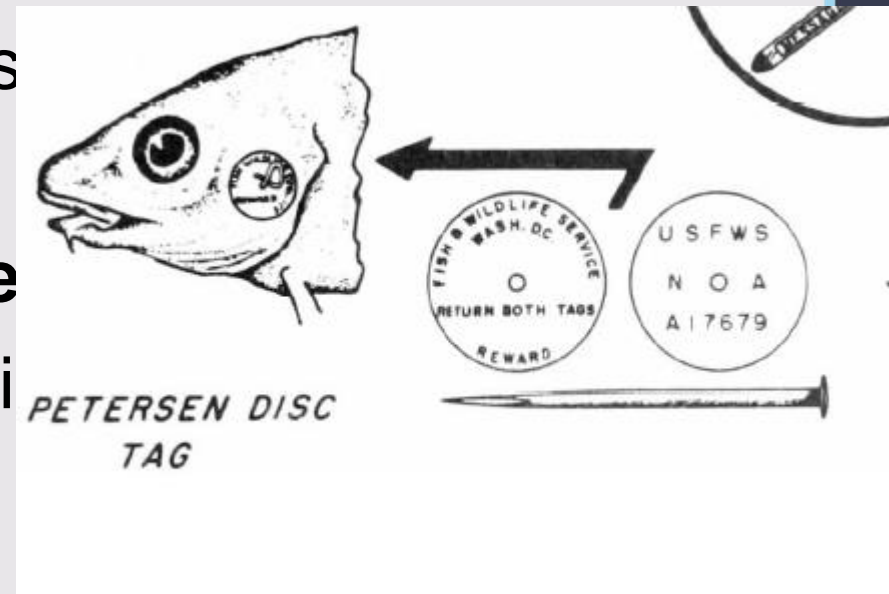
- Small numbered plastic tags of different colours are attached to a thread and which is passed through the body above lateral line on upper portion of caudal peduncle or through muscle at base of dorsal fin rays and tied over the top of fish.

Disc and Button tags

- These are disc and button s

Petersen disc tag with wire

- These are widely used for fi
- crustaceans and molluscs.





Carlin Disc

- These are larger numbered plastic tags of different colours with two threads and which is through the muscle at base of adjacent dorsal fin rays of the fish using a needle and make a knot on the other side of fish body to secure tags.

Food-safe ruggedized RFID PIT tags

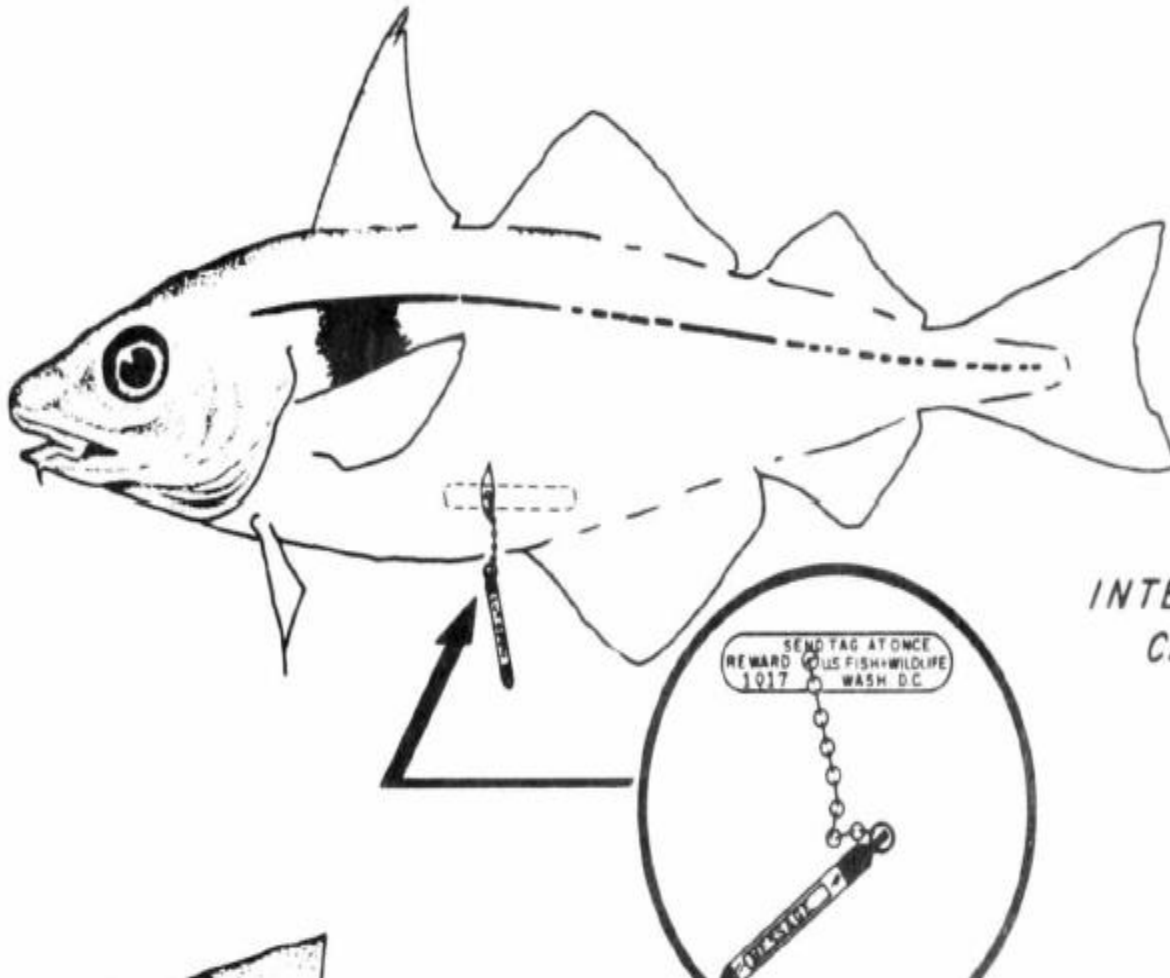
- Completely embedded and encapsulated in surgical plastic, food grade resin, and acrylic and withstand extreme temperature, pressure and shock.
- These tags are compatible with most RFID scanners.
- They bond quickly with tissue and do not need additional coatings to prevent the migration of tag in fishes.



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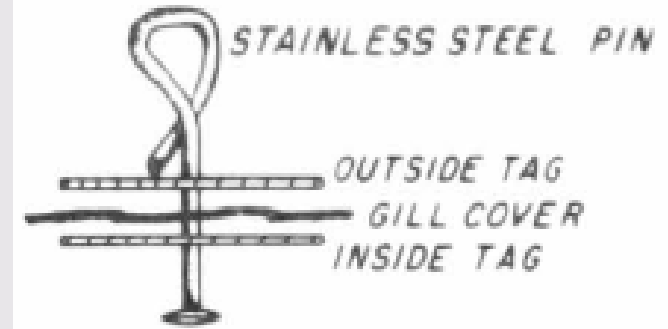


INTERNALLY ANCHORED
CAPSULE TAG



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Information to be printed on tags

- Organization Name
- Organization Address
- Phone Number
- Reward Announcement
- Other Information
- Tag Number



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Release information

Species

Location of tag release

Date of tag release

Length

Weight

Biological Sample (scales, otoliths)

Other Information



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Species

Location of tag recapture

Date of tag return

Length

Weight

Biological Sample (scales, otoliths)

Recapture gear

Disposition (harvested, re-released)

Other Information

Recapture information



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Tagging programme contact information

- Program Name
- Contact Person
- Organisation
- Telephone Number
- E-mail
- Street Address
- City/State/Zip/Postal Code
- Fax Number
- Web Site



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Necessary qualities of a tag

Durable;

high retention rate;

small;

visible;

cheap;

easily available;

should not affect the movement and behaviour of the fish;

harmless to fish.

THANK
YOU!

