



NATIONAL AQUACULTURE  
TRAINING INSTITUTE

# Physiological Basis of Maturation and Spawning



SRI LANKA  
EXPORT DEVELOPMENT  
BOARD



National Aquaculture Development Authority of Sri Lanka  
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இலங்கை தேசிய நீர் உயிரினவளர்ப்பு அபிவிருத்தி அதிகார சபை



## Artificial Reproduction

- The most important milestone in Fish Breeding and Farming



## Main Benefits of Induced Breeding

1. Being able to reproduce species away from their naturally conducive habitats
2. Timing the reproduction according to market demand
3. Avoiding production gluts during breeding seasons
4. Ability to streamline growing cycles in farms based on a production program
5. Obtaining higher productivity under controlled hatchery systems





## Reproductive Stages of a fish



1. Juvenile



2. Mature



3. Breeder

## Stages of Ova Development

### 1) Stage I

Ovaries are yellow in color. Ova unseen by naked eye and are transparent. Minimal diameter depending on the species

### 3) Stage III

Ovaries are yellow in color. Eggs with large diameter are clearly seen in white color

### 4) Stage V

Eggs are in Flowing condition and ready for fertilization. Vesicle is close to the egg membrane or already broken

### 2) Stage II

Ovaries are yellow in color. Ova with larger diameter can be seen with the naked eye Egg diameter depends on species

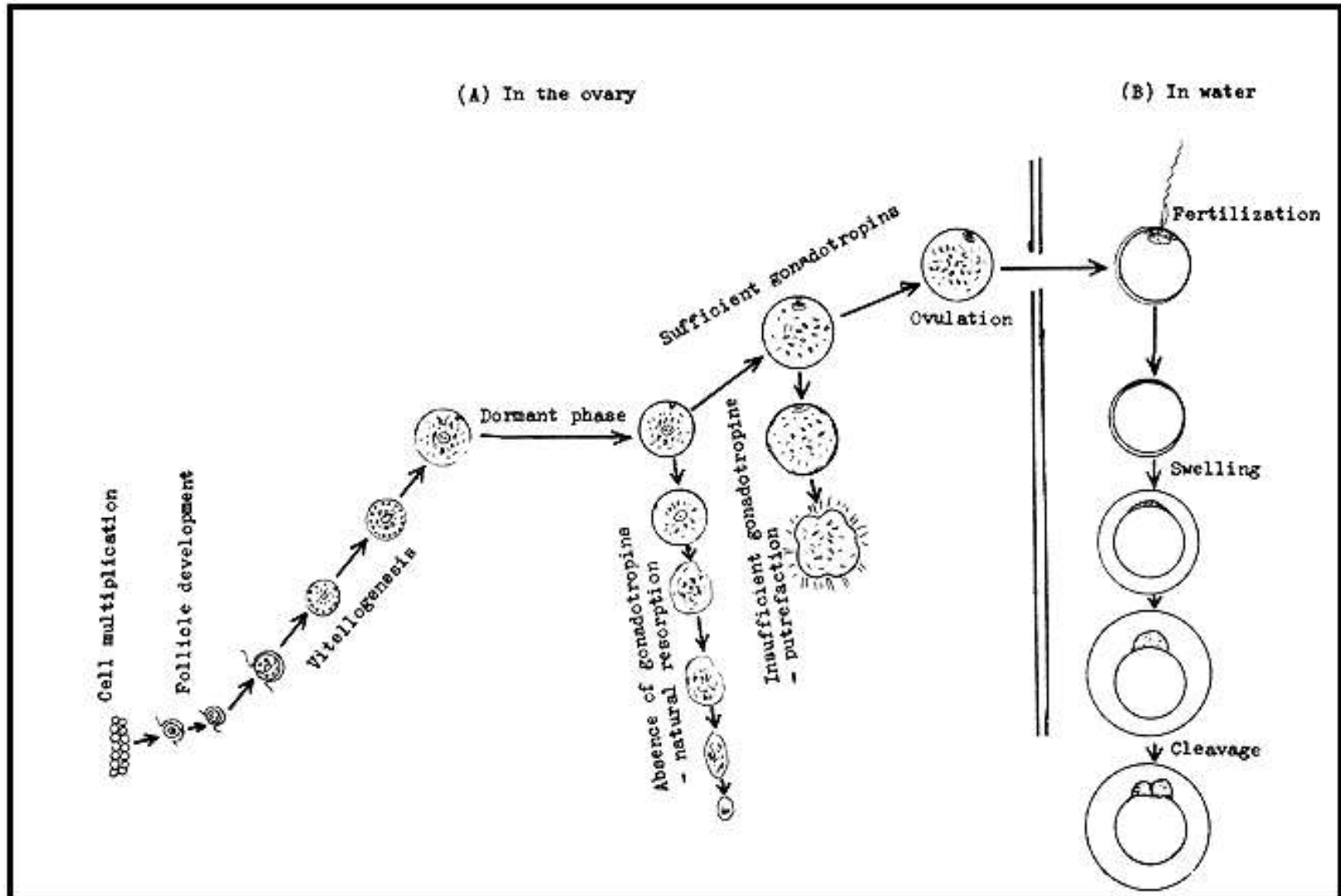
### 4) Stage IV

Eggs are large and pigmented. Easily detached from the ovarian tissues. The vesicle is in the center of the ova.

### 4) Stage VI

Spent. Going back to stage II

# Egg Maturation and Spawning



## Environmental Factors

- Fish spawning occurs when optimum survival of the fry can be guaranteed.
- This depends on environmental factors





## Environmental Factors

- Temperature
- Photo period
- Rainfall
- pH
- Salinity
- Flow Rate / Depth
- Food Availability
- Partner Availability
- Spawning Substrate





## Sensory Organs

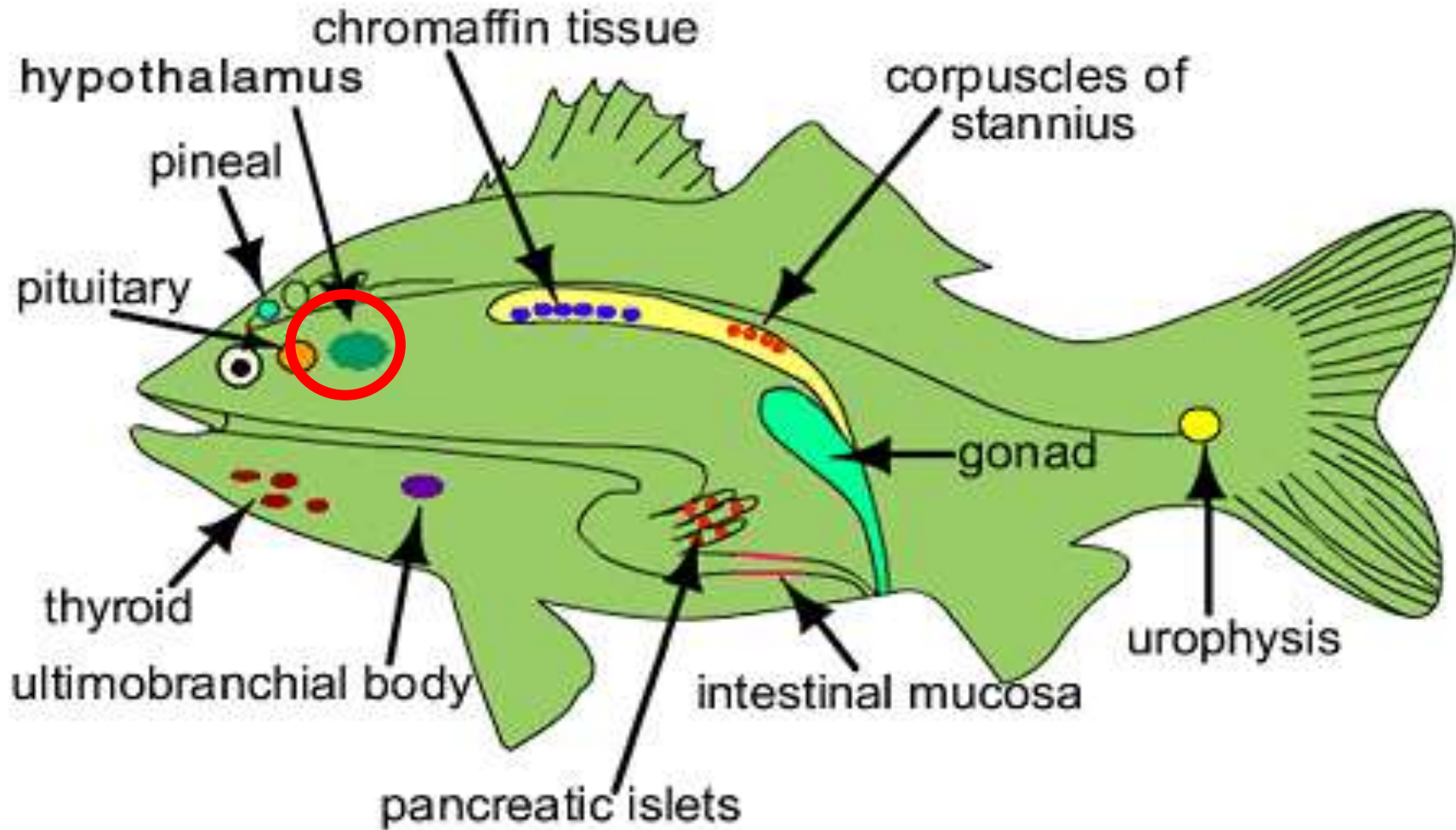


Pineal Gland  
Eyes

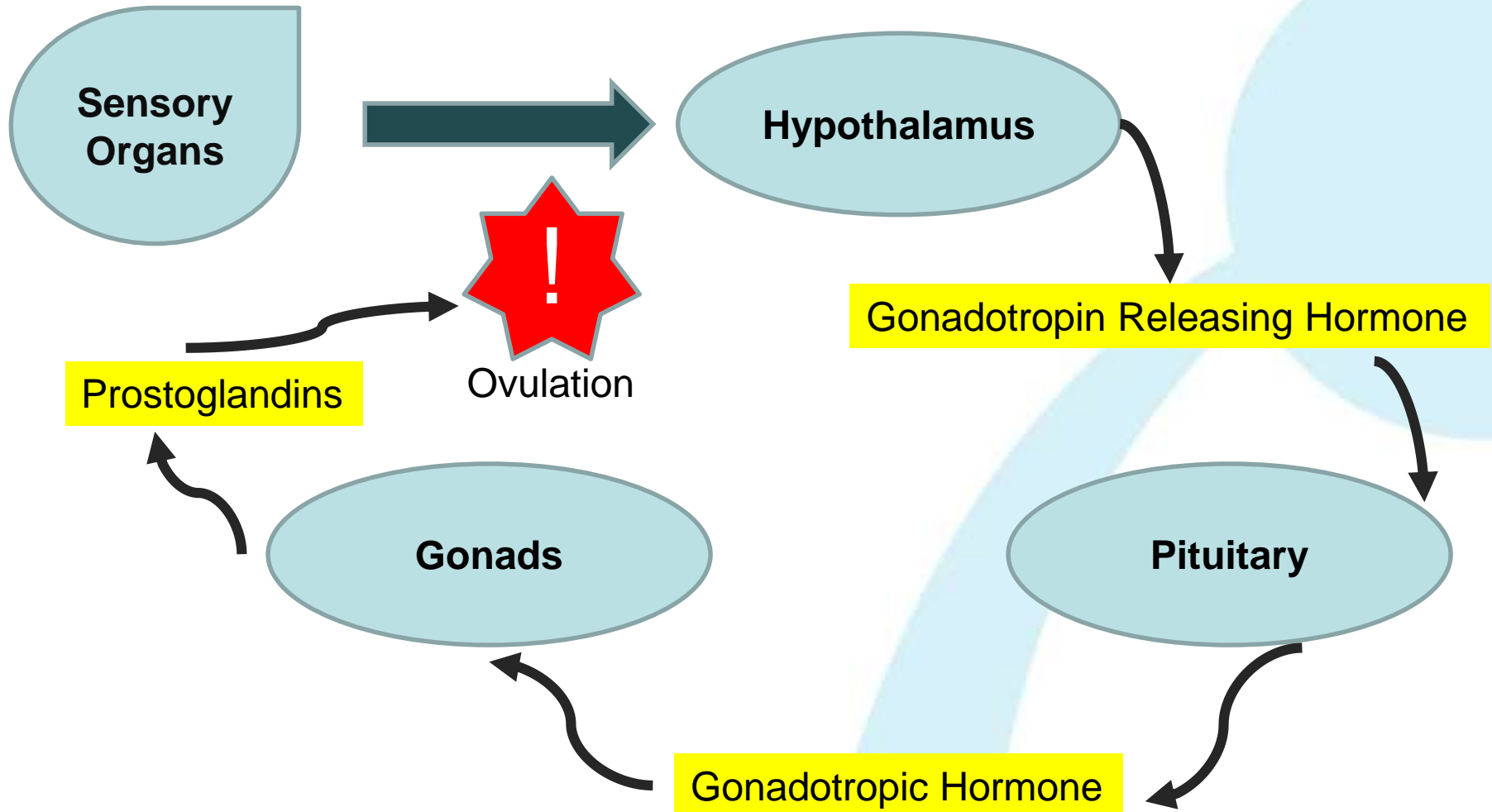
Olfactory  
Organs  
&  
Taste Buds

Lateral Line

## Chemical Messengers



## Chemical Messengers – the Hormones



## Strategy 1: Environmental Stimulation

- Increased feeding
- Rapid increases in water depth
- spraying water (rainfall),
- A 50% water change
- 4°C drop in water temperature
- presence of spawning substrate





## Strategy 2: Hormone Injections



Intra Peritoneal



Intra Muscular

Generally 2 doses are given:

- 1) Preparatory -10% of full dose
- 2) Decisive – 90% of full dose
- 3) around 8-12 hours between injections

## Types of Hormones

- Gonadotropin Releasing Hormone

LHRH + Dopamine Antagonist

- Gonadotropin

1. *Human Chorionic Gonadotropin*

2. *Pituitary Extract*



A photograph showing a person's hands pouring water from a clear plastic bag into a large, reflective metal bowl. The scene is set outdoors, possibly in a laboratory or training facility. The background is slightly blurred, showing some equipment and a wooden surface. The text 'Thank You' is overlaid in the center of the image.

**Thank You**