

# LIFE E-NEWSLETTER



Dear Readers,

Welcome to the latest edition of the Zoology Newsletter, where we journey into the captivating world of human-animal interactions.

From the dawn of humanity, our bond with animals has been profound, influencing not only our daily lives but also the very fabric of our cultures, societies, and our understanding of the world.

Throughout history, animals have been much more than just sources of sustenance; they have been our companions, protectors, and muses, inspiring art, literature, and spiritual beliefs. Whether it's the loyal dogs and cats that share our homes or the awe-inspiring creatures of the wild that captivate our imaginations, animals have played pivotal roles in shaping human life. However, our interactions with them are not without complexities. As human expansion increasingly encroaches upon natural habitats, we are faced with conflicts and ethical dilemmas, challenging us to rethink our relationship with the animal kingdom.

In this issue, we delve into the fascinating phenomenon of morphosis – the remarkable bodily transformations that some animals undergo. We'll explore a variety of species that exhibit unique and astonishing changes as part of their life cycle.

We hope you enjoy this exploration into the wonders of morphosis and the incredible diversity of life on our planet.

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# TINY POLYPS TO OCEAN DRIFTERS

BY- Owais Khan (FYBSc)

Jellyfish (*Aurelia aurita*) are ancient marine creatures, over 500 million years old, belonging to the Phylum Cnidaria, which also includes corals and sea anemones. Composed mainly of water, jellyfish have a simple anatomy featuring a bell-shaped body, tentacles for capturing prey, and oral arms for feeding. Despite lacking a brain or heart, they have a basic nerve net to sense their environment.

Their life cycle includes four stages:

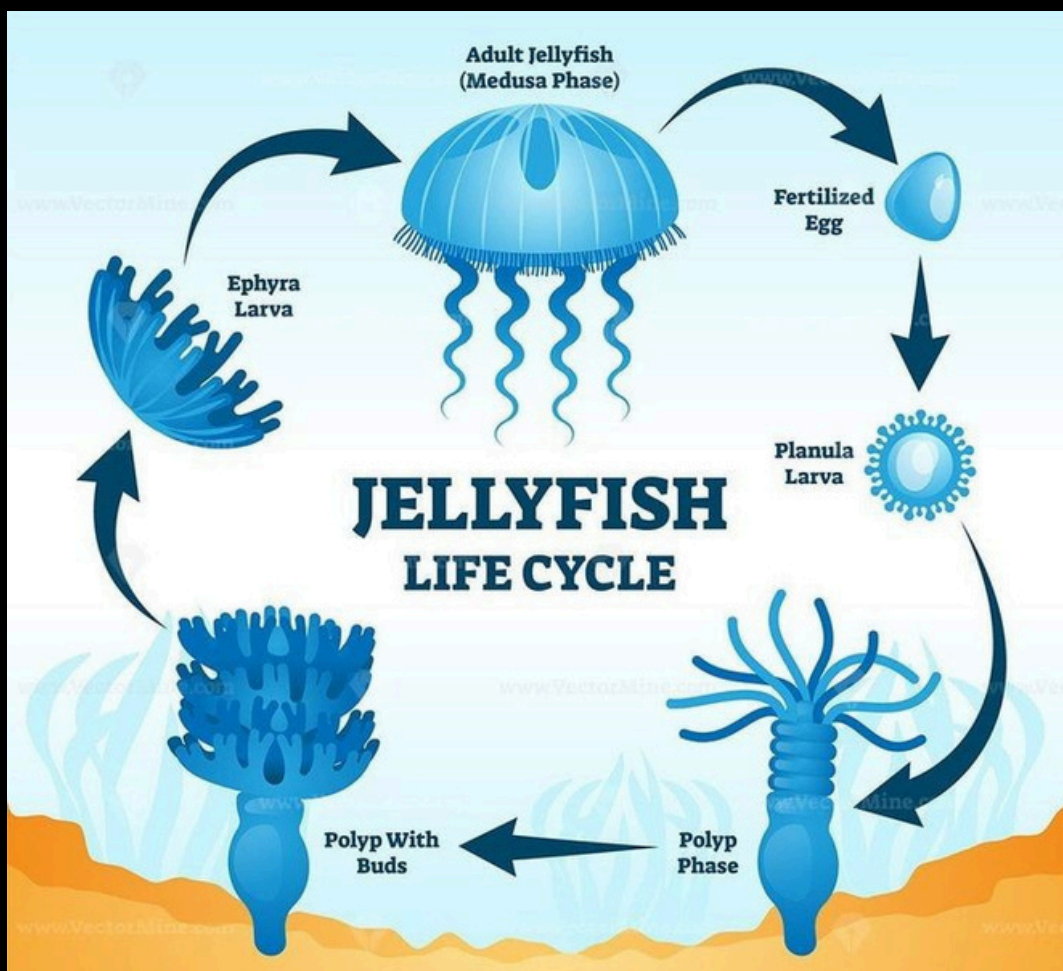
1. Planula Stage: The life of a jellyfish begins as a tiny, free-swimming larva called a planula. This stage is the result of sexual reproduction, where sperm from a male jellyfish fertilizes the eggs of a female jellyfish.

2. Polyp Stage: The planula eventually settles on a hard surface, where it develops into a polyp.

This stage is a sessile, tube-like structure that resembles a small sea anemone. The polyp can reproduce asexually, creating identical clones of itself through a process called budding.

3. Ephyra Stage: Through a process called strobilation, the polyp produces multiple ephyrae, small, disc-shaped larvae that eventually develop into adult jellyfish. Each ephyra is released into the water column to grow independently.

4. Medusa Stage: The ephyra grows into the adult medusa, the familiar, bell-shaped form most people recognize as a jellyfish. The medusa is the sexually mature stage, capable of reproduction, thus completing the life cycle.



## Growth and Development

Jellyfish growth varies depending on the species and environmental conditions. They typically grow by absorbing nutrients from their environment, which fuels their development. The medusa form of the jellyfish grows by enlarging its bell and developing longer tentacles and oral arms. As jellyfish grow, they continue to feed on plankton, small fish, and other marine organisms, using their tentacles to capture prey.

In recent years, jellyfish populations have surged due to factors like climate change, overfishing, and pollution. Additionally, jellyfish have been key in scientific discoveries, such as the green fluorescent protein (GFP), which is crucial in molecular biology.

# MASTER OF DISGUISE

BY-Nida Mohammad Yusuf Khan (FYBSc)



The Asiatic golden cat (*Catopuma temminckii*) is a wild cat found in Arunachal Pradesh, Assam and Sikkim in India and other nations of Southeast Asia. The shy creature lives in forests, savannahs, grasslands and in mountains as well as plains.

This wide variation in the type of habitat it lives in, could be the reason why the cat displays such variation in its coat colour too, believe the scientist who were part of the study. It enables them to occupy different habitats at different elevations — from wet tropical lowland forests to alpine scrubs — and provides camouflage while hunting different prey such as tropical pheasants or Himalayan Pika (a small mountain-dwelling rabbit-like mammal).

What is of more interest to science is how this remarkable feature takes place in the cat and how quickly this adaptation occurs to help it adapt to the changing environment. In a world where climate change is quickly transforming habitats for so many species, this trait of the cat can be the pivotal characteristic that allows it to survive. The IUCN (International Union for Conservation of Nature) remarks that residential and commercial developments, water management, logging, and poaching are already threats that the animal is facing in its habitat.

Dr. Sahil Nijhawan, the lead author and British Academy Fellow at ZSL's Institute of Zoology. He discovered morphosis in this animal.

We now know Dibang Valley hosts the world's most diverse range of colour morphs of a wild cat species ever reported in one site, but we are only just starting to understand this rare ecological phenomenon. We need more studies that shed light on such unique adaptations and the benefits they provide to species, especially in a world where they must adapt quickly.”

# MORPH, ADAPT, SURVIVE

BY- Priya Bharti (SYBA)

Octopuses undergo a complex transformation from larvae to adults, marked by dramatic changes in body structure, function, and behavior. This process is crucial for their adaptation and survival in various environments.

## Key Stages and Features:

- 1. Larval Settlement:** Octopus larvae settle on a substrate and undergo metamorphosis, developing a distinct body shape and eight flexible arms.
- 2. Arm Development:** The octopus develops eight versatile arms, essential for crawling, swimming, and manipulating objects.
- 3. Camouflage and Color Change:** Octopuses develop chromatophores, specialized cells that allow them to change color and texture to blend with their surroundings.
- 4. Intelligence:** As they mature, octopuses exhibit advanced problem-solving abilities, learning, and memory.
- 5. Radical Body Transformation:** Octopuses transition from a bilaterally symmetrical larva to a radially symmetrical adult.
- 6. Regenerative Abilities:** They can regrow lost arms and repair tissues, a unique and not fully understood feature.
- 7. Short Lifespan:** The rapid and efficient morphosis process corresponds with their relatively short lifespan of one to five years.



## Historical Contributions:

- Aristotle observed octopus development early on.
- Antonie van Leeuwenhoek and Karl von Baer described octopus larvae and metamorphosis.
- Thomas Huxley studied cephalopod anatomy and development, contributing to our understanding of octopus morphosis.

These aspects highlight the remarkable and complex nature of morphosis in octopuses, enabling them to thrive in their ecological niches.

# THE EXTRAORDINARY

## LIFE OF KOBUDAI

BY- Tanishq Balakrishnan (SYBSc)

The Kobudai (*Semicossyphus reticulatus*) also known as the Asian sheephead wrasse, is a remarkable fish found in the coastal waters of Japan, Korea, and China, known for its ability to change sex from female to male. This process, called protogyny, is a survival strategy crucial for the species' reproduction.

In Kobudai society, a single dominant male mates with multiple females. If this male dies or is removed, the largest female undergoes a dramatic transformation to become the new male, ensuring the continuation of the group's reproductive activities. This change is triggered by environmental and social cues that lead to a hormonal shift, where estrogen levels drop and androgens, such as testosterone, rise.

The transformation involves significant physical changes: the head swells, the lips thicken, and the body becomes more robust, reflecting the new male's role. These changes are essential for asserting dominance and attracting females. Behaviorally, the fish adopts the aggressive, territorial actions typical of a male, patrolling its territory and courting females.



The entire transformation process can take weeks to months, after which the new male assumes its role, maintaining the social structure and fertilizing the group's eggs. This ability to change sex is a powerful example of nature's adaptability, allowing the Kobudai to thrive despite environmental challenges, and demonstrating the intricate balance between biology, behavior, and environment in the ocean's ecosystem.

# SPIKES TO SPHERES

BY- Akanksha Das(SYBSc)

Beneath the waves, sea urchins — nature's spiny wonders — undergo a remarkable transformation, evolving from tiny, drifting larvae into formidable, armor-clad adults that shape marine ecosystems.

Morphosis in sea urchins is the transformative process where a free-swimming larva becomes a sedentary adult. This process begins with fertilization, leading to the development of a bilateral pluteus larva. Inside the larva, a structure called the "rudiment" forms, containing the precursors of adult features like spines and the hard shell, known as the test. As metamorphosis progresses, the larva's bilateral symmetry shifts to the adult's fivefold radial symmetry. Finally, the larva settles on the ocean floor, reabsorbing its larval structures and emerging as a juvenile sea urchin ready for a benthic lifestyle

The study of morphosis in sea urchins was significantly advanced by scientists like Theodor Boveri and Hans Driesch in the late 19th century. Boveri's work on chromosomes and Driesch's experiments on embryonic development highlighted the unique regenerative capabilities and symmetry changes during sea urchin morphosis.

## Key Features

1. **Symmetry Shift:** Transition from bilateral larval symmetry to radial adult symmetry, unique among animals.
2. **Rudiment Formation:** The rudiment, a unique internal structure, develops into adult features during metamorphosis.
3. **Environmental Cues:** Larvae rely on environmental signals to trigger settlement and complete their transformation.





# THE CHRYSALIS ROUTE

BY- Kedar Ghewade (SYJC)



**In nature's dance, a tale unfolds,  
Of transformation, secrets untold.  
From caterpillar to butterfly, a wondrous sight,  
A journey of change, from day to night.**

**Metamorphosis, a magical art,  
A shift in form, a brand new start.  
From chrysalis to wings that soar,  
A story of beauty, forevermore.**

**Gender and sex, a spectrum wide,  
Identity's journey, a heartfelt guide.  
Like butterflies, we too transform,  
In colors unique, our truths conform.**

**So embrace the change, the shift within,  
Like butterflies, let your true self begin.  
In the dance of life, we find our way,  
In growth and rebirth,  
we brightly display.**

# PHOTO GALLERY



**COMMON TREE  
FROG**

BY-Joann Fernandes(TYBSc)



**COMMON CROW  
BUTTERFLY(PUPA)**

BY-Joann Fernandes(TYBSc)



**BLUE TIGER  
BUTTERFLY**

BY-Akanksha Das(SYBSc)



**CALOTES  
(GARDEN LIZARD)**

BY-Akanksha Das(SYBSc)

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