

# PHOTO GALLERY



Catching this guy waking up is bliss!- RED PANDA---BY JESENTHA SELWYN (TYBSc)



BY SNEHALATHA KATTIMANE ( TYBSc).



Scarce Evening Brown, camouflaging at its best! -BY SNEHALATHA KATTIMANE ( TYBSc).



Sniff the daisy and do not care about what's going on in the world! SNEHALATHA KATTIMANE ( TYBSc).



It's impossible to get tired of this pink beauties, Juggling with hunger, craving for food – FLAMINGO - BY JESENTHA SELWYN(TYBSc)



The vibrant Carrot Sea Anemone! - BY KRUSHI DAGHA (SYBSc)



## FROM THE EDITOR'S DESK

-Krushi Dagha

SYBSc – B

“ Somewhere, something incredible is waiting to be known.”

- CARL SAGAN

Since the past 7 years, our newsletter has dealt with various topics as a theme, ranging from 'NATURE' to 'INDIAN WOMEN SCIENTISTS'. But this year, the theme of our newsletter deals with one of the most researched and debated topic, the one which is the hot potato in recent times – 'ASTROBIOLOGY'.

Astrobiology is a branch of biology concerned with the origins, early evolution, distribution and future of life in the universe. Astrobiology research mainly focuses on 3 basic questions: How does life begin and evolve? Does life exist elsewhere in the universe? What is the future of life on earth and beyond? Over the past 50 years, Astrobiologists have uncovered a myriad of clues for answering these big questions!

So, presenting to you the first edition of the year 2018-19 which talks about the possibility of existence of life in space; animal adaptation for survival of the fittest; and for the very first time , LIFE: E-NEWSLETTER is introducing the award winning poems and some stunning photographs.

HAPPY READING!

TARDIGRADE: ANIMALS IN SPACE!

Tardigrade, commonly known as 'water bears' or 'moss piglets', are first animals to be known to survive in space. They show high adaptive features, which enables them to survive in various environmental extremities, where very few organisms can live. They tend to tolerate boiling water, extreme desiccation, freezing temperatures, and even harsh conditions of space. But how do they do that?

Water bears are microscopic, eight-legged, segmented animals. They show great abilities to adapt to many environments, hence they can be found everywhere even in deep seas and mud volcanoes. They have a life span of 3-4 months, for some species its at most 2 years, but they are known to live for decades in dormant state. They show morphological change in order to cope up with extreme environments.

The environment of space is very fatal to many organisms. Intense pressure, vacuum, harmful radiations, extreme desiccation, etc. are various factors which inhibit life in space. Tardigrades can survive most of these conditions. On September 2007, Kristianstad University, Sweden, launched 2 species of dried up tardigrades aboard ESA's FOTON- M3 mission. After 10 days, satellite returned to earth and the tardigrades were retrieved and rehydrated. Only handful of the specimens revived but it was the first time an animal had survived a trip to space. Earlier only lichens and bacteria were able to live in vacuum and space radiations.

Tardigrades lose up to 97% of their body water to go into a dormant stage. This ability is known as cryptobiosis. Even the metabolic rate is reduced to great extent. In this state they can endure extreme temperatures and pressures.

Radiations in space are very harmful, cosmic rays can damage DNA and cause mutations. But tardigrades are found to be resilient to radiations too! About 17.5% of their DNA comes from different species of organisms like viruses, bacteria, fungi and even plants. Their genome exhibits high amount of flexibility. They produce a special protein, DSUP (damage suppressor), which suppresses radiation damage as well as damage due to desiccation. In addition to DSUP, the genome contains 16 copies of anti-oxidants and 4 copies of DNA repair genes. These proteins,

mainly DSUP, shields the DNA from radiation, preventing damage to DNA. This explains how tardigrades are able to survive deadly radiation of sun. Water bears can also tolerate and withstand pressures up to 6000 atm.

Scientists believe tardigrades have very important application in biotechnology. The proteins that prevent desiccation can be used in preservation of cells and tissue indefinitely without freezer or incubators. DSUP may also help human DNA withstand damage of radiation. Research on tardigrades can be very helpful for astronauts and astrological work. When it comes to survival, these creatures have great significance. They have endured five mass extinction events over the period of half a billion years. They are said to survive astrophysical events like gamma ray bursts or meteorite strike.

Tardigrades have proved their significance by being the first animal to be able to tolerate and even survive outside earth's atmosphere.



- Oankar .Varde,  
- Shruti : Sriram,  
-Mansi. Kurkute.  
(SYBSc )

STORY OF RED MOINA

*Moina*, a crustacean commonly referred to as water flea, belongs to Phylum Arthropoda. *Moina* are often misunderstood with *Daphnia* which are bigger in size with a more pointed snout unlike *Moina* which has a blunt snout.

Culture of *Moina* can be easily made and maintained. This can be achieved by maintaining a tank of dechlorinated water with some initial number of *Moina* in it and feeding it everyday with one or two drops of milk. In order to check at what concentration of milk *Moina* grows well, we maintained 6 cup cultures of 300ml capacity. We added 200ml dechlorinated water in each cup

and tested 1 drop of milk in 2 cups, 3 drops of milk in next 2 cups and 6 drops of milk in other 2 cups cultures.

In the cup culture containing 1 drop of milk, growth was initially slow. The best concentration in which *Moina* was growing faster, was at 3 drops of milk, so if we want to grow *Moina* for longer duration this is the best concentration. Cup culture having 6 drops of milk turned red on 7<sup>th</sup> day.

Why does *Moina* turned red?

*Moina* turns red in oxygen depleted environment (anoxic condition) because of excess hemoglobin production to compete with increased oxygen demand when we add more drops of milk bacteria they can outgrow *Moina* and use more amount of oxygen.

Because of epigenetic factors, increased haemoglobin levels, is a wonderful way by nature of not altering the genetic code itself but cause favourable changes in an organism to survive under unfavorable conditions.

Histones are proteins around which DNA can wind for compaction and gene regulation. Histone the binding of epigenetic factors to histone tails to extent to which DNA is wrapped around histones and availability of genes in DNA to be activated.

Methyl group is an epigenetic factor that can tag DNA and activate or repress gene DNA methylation takes place.

Now that gene is activated it can produce a hormone named erythropoietin which will lead to more red blood cell production as *moina* has a transparent covering change can be easily detected by colour change hence it is called as an easily scorable trait.

This way *Moina* can be used as a model organism to study epigenetic factors. It is a very economically beneficial and easily culturable organism. It can also be used as a good feed for fries and *Hydra*.



White Moina



Red Moina

Pictures by Sheetal Shetty

SERVE TO CONSERVE

Mangroves stand in salty pools all day,  
With their tangled roots they keep the soil at bay.  
They barricade treacherous waters which dare to come in.

They are nature's soldier's keeping us safe within.

These mangroves are cleared for our needs,  
We will surely pay for our deeds,  
So let's save our mangroves from harm,  
Before nature raises a nasty alarm!

- Anushka Das  
SYBSc

LEOPARD - THE MAJESTIC ROBUST

Seen in jungle's wild  
Known to be oldest pride,  
Strongest climber of them all  
Agile swimmer while they crawl.

Pale yellow, bright chestnut  
Sharp, pointed claws for a cut;  
Big head with rounded ear  
Long body with curled tail near.

Bright dilated eyes in dim light  
Are window to the soul for delight,  
Lurking in dense reverine bush  
Growling, moving with a push.

Ambushing its prey  
Dispatching it away,  
Emitting a coughing call;  
Hunting at night while they scrawl.

Rosette patterns spread all over  
Dark, prominent acts as rover,  
Wilderbeast, deer, gazelle, impala are their favourite diet

Monkeys, rodents and even birds make their hunger ignite.

Better than others as predator and scavenger  
Better than others as nocturnal silent killer;  
Needs to be conserved, needs to be saved

Let's avoid road kills, let's avoid it's usage  
Let's make it a better place for them and us to be safe

Let's make it a better place for human-leopard interaction not to be ended in grave.

- Deepika Negi  
TYBSc