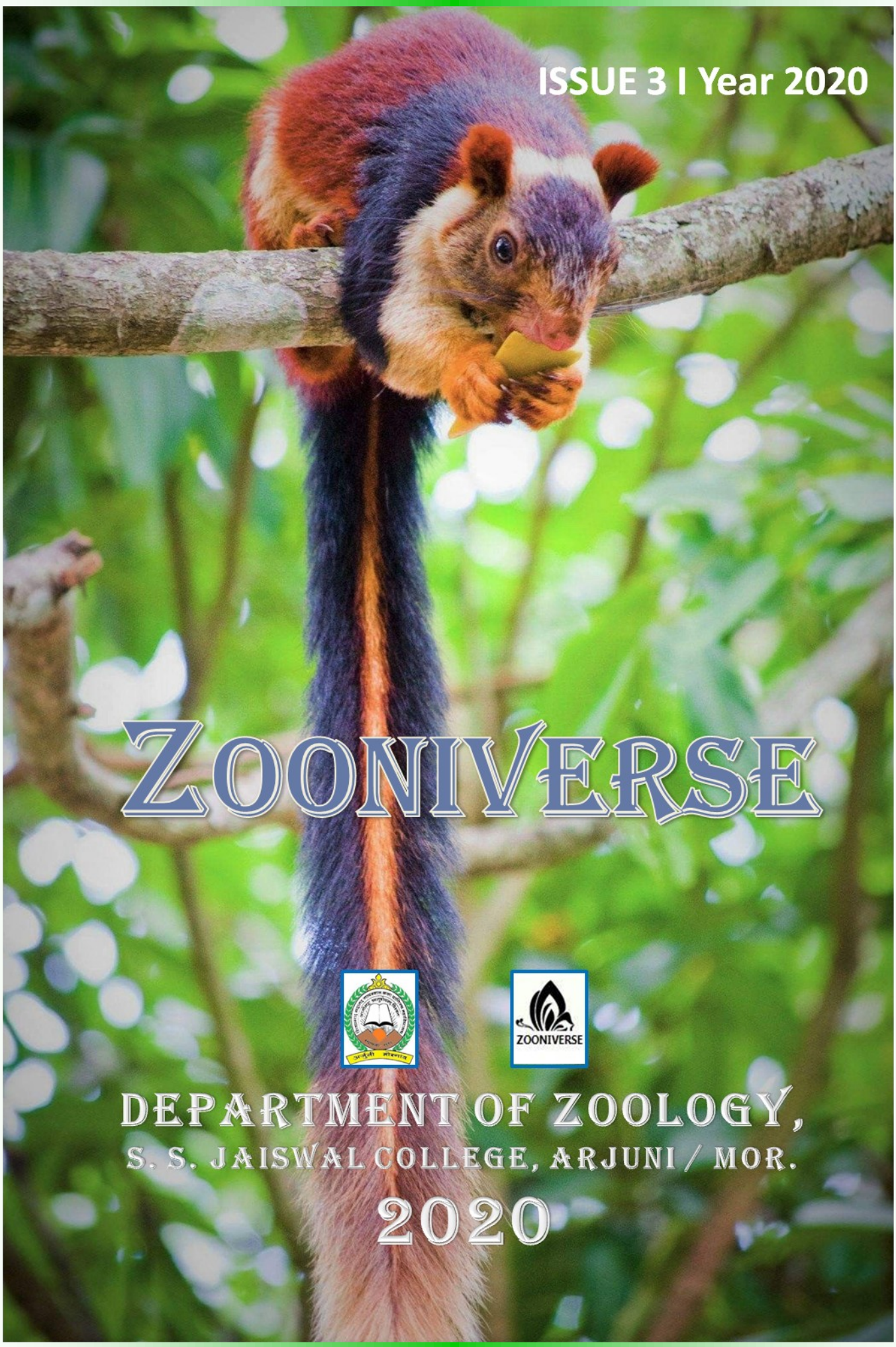

ISSUE 3 I Year 2020

ZOONIVERSE

DEPARTMENT OF ZOOLOGY,
S. S. JAISWAL COLLEGE, ARJUNI / MOR.

2020

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Compiled and Designed by : Dr. Manoj K. Bangadkar

Front cover : The Indian Giant Squirrel, *Ratufa indica,* The State Animal of Maharashtra State (Photo courtesy : Google)

Back cover : Dedicated to Australia's Massive Bushfire 2019-2020 (Photo courtesy : Google)

ZOONIVERSE

Department of Zoology,

S. S. Jaiswal College, Arjuni / Mor.

2020

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VISION

"Envisions to inculcate the greatest values of life, science education, respect for nature and concern for ethical values among students through good and scientific educational practices"

MISSION

- *To impart to the students the contemporary advancement in life sciences*
- *To impart a global perspective and such skills among students that*

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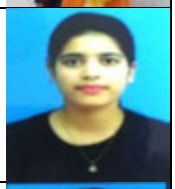
12.	Trupti N. Chandewar	"Chandrayaan 2" – Indias Second Mission to Moon	
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Editorial

Dr. Gopal T. Paliwal
(Editor)

Dr. Manoj K. Bangadkar
(Co-editor)

Dear Readers,

Greetings to you….

Very few have fully realised the wealth of sympathy, kindness and generosity hidden in the soul of child. The effort of every academician should be to unlock that treasure. Shivprasad Sadanand Jaiswal College is an excellent example where everyone strives indefatigably for this. This institution has been nurturing young minds of this area for the past 30 years with the belief that "The heart of education is the education of the heart."

So here you have "ZOONIVERSE" the long awaited magazine for the session 2019-20. This magazine gives an insight into real way of life, their creativity and activities. It is a platform for the young minds that exhibits the skills and innovative ideas of the students and teachers. ZOONIVERSE presents the hard work and dedication of the students and contribution of teachers.

We would like to thank all our editorial team members for their help to pull this through. We express our considerable appreciation to all the authors of the articles in this magazine. Their contributions have required a generous amount of time and efforts. It is the willingness to share the knowledge concerns and special insights with fellow things that has made this magazine possible.

Thank you all...

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M. Lothe

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Principal's Message

Dr. D. U. Kakade
Principal

I have great pleasure to write a few words with regard to the publication, ZOONIVERSE from the Department of Zoology. It is the continuous best practice of the Department in collaboration with students of Zoology and their maximum participation of the students. The Department provides the students an opportunity to express their creativity through the ZOONIVERSE.

Students are the centre point of the ZOONIVERSE in which their creati ve writings, their achievements, activity, projects, tours, seminars, photos of meritorious students are highlighted. The outgoing students will always carry the memories of their campus life forever in life. Through different activities, Zoology Department is one the vibrant department of the institution.

I wish to congratulate all the students of Zoology and the Head of the Department and staff members of the department for the task of publishing, ZOONIVERSE of the academic session 2019-20. I hope this academic session's ZOONIVERSE is also reflecting the creativity and innovations of the students.

Once again I wish all the best to the publication, ZOONIVERSE.

Dr. D. U. Kakade
Principal

DEPARTMENTAL REPORT 2019-20

The Zoology department was started in college from session 2008-09 with the introduction of science faculty (UG level). The department was grown consistently. The student strength was improved from 18 students in 2008-09 batch to 180 students in 2018-19 batch. The department have 01 well equpped laboratory, 01 staff room and many sophesticated instruments required for academic and research purposes. Department have 03 teaching faculty members and 01 non teaching faculty member. A saperate departmental library and museum is available for students. Every year many students of the department were went out for higher studies in reputed institutions.

The academic session of 2019-20 started on 16th June 2019. Regular teaching started from 5th July 2019. From 5th July 2019 to 12th July 2019 "Bridge Course" was organised for Semester I students.

B. Sc. Semester V students along with Dr. G. T. Paliwal and Dr. M. K. Bangadkar visited Government Fish Seed Production Centre Shivnibandh Dist Bhandara as a part of their Educational Tour on 7th August 2019. Students observed fish breeding operations of Indian major carps. They studied Breeding Ponds, Breeding Happas and Chinese Circular hatchery system. Shree Marbate, fisheries officer guided the students about various activities carried out at the centre. Students collected material from the farm for the laboratory.

On the same day students also visited Krushi Vigyan Kendra, Sakoli. Dr. Pramod Parwate, Programme Co-ordinator of the centre guided the stuents on various research activities and also gives information on modern technologies used in agricultural field. Mr. Layant SRF from the centre explained the system of Meterology department held at the centre. He also explained the working and the use of meterological data for the farmers.

Wildlife week was celebrated during 1st to 7th Oct 2019. Professor Ajay raut delivered a lecture on common birds.

On the occasion of world wetland day a study tour was organised for semester IV students to study and observe wetland biodiversity and its importance. During this visit students reported 25 different aquatic bird species from Shrungarband wetland.

Students of semester VI were assigned a various projects for study. Students were saperated in different groups to study 'Plant diversity of college campus', 'Number of books available in central library'.

During semester V a powerpoint seminar compitation was organised. In this competition all the students of semester V were participated and presented a seminar. The best seminars were awarded by a prize.

On 28th February 2020 a "National Science Day" was celebrated on birth anniversary of Dr. C. V. Raman to commemorate him.

TOP 10 WEIRDEST INSECTS IN THE WORLD

Neha G. Parshuramkar

With more than 1 millions known species, insects are the most diverse group of animals in the world. It‟s hard to know energy single known species of insect on earth. So it‟s really fascinating to learn about some of the weirdest insects in the world.

1. Scorpionfly

The tail of the male scorpionfly curled upword like a scarpiant but unlike scarpion, this insec doesn‟t sting with their tail

2. Hercules Beetle

Native to rainforest of centrol America Hercules beetles are among the largest insects in the world. It measures up to 1.8 cm in length. It is the lonest beetle in the world .

3. Assassin Bug

It is efficient predatory insect. There are about 7000 species of assasian bugs. The bite from assassin bugs is also very painful .

4. Hummingbird Moth

One of the most wonderful and useful insects in the world. It is actually a moth. These amazing moths are found in the wormer regions of Southern Eurrope and Norther Africa. An adult hummingbird moth has a wingspan of 1.6 – 1.8 inches.

5. Gaint Weta

It is one of the largest insect in the world. An adult weta weights up to 35g and length of 4 inches. This large insect is endemic to Newzealand. They don't have lungs & breathe through holes in their exoskeleton.

6. Astralian Walking Stick

It is a large curve-bodies insect native to Australia. Adult Australian walking sticks measure 3 to 8 inches in length. Females are larger than males. It is a free-dwelling insect especially on eucalyptus trees.

7. Filbert Weevil

Filbert weevil is one of the most unusual and beautiful insects in the world. Despite the a Hractivenss filbert weevils are harmful. They feed on acorn of Oak trees.

8. Titan Beetle

Growing up to 6.6 inches in length titon beetle is the largest beetle in the world. They live in the tropical rainforest of south America. The larvae of titan beetles feeed on decaying woods. They are not aggressive. They hiss and bite if threatened.

9. Leafhopper

It is a small yet colorful insect that found an a wide range of plants around the world. It does not grow more than 15mm. It can cause severe damage to trees & plants They feed on the plants sap a vital fluid of plants.

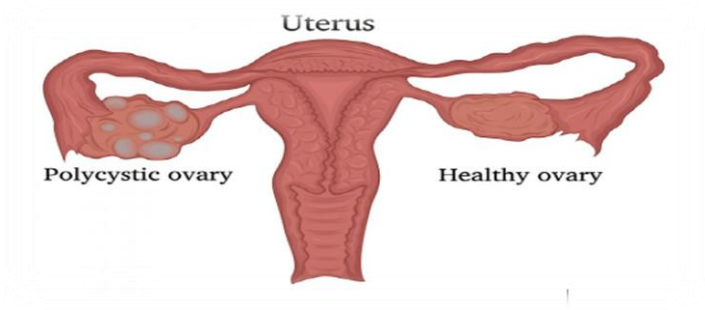
10. Gaint Water Bug

Gaint water bugs are one of the largest insects in the world. Found in ponds & streams. Grown up to 4 inches in length. They have large yet powerful pincers.

POLYCYSTIC OVARY SYNDROME (PCOS)

Shivani N. Gahane

Polycystic ovary syndrome (PCOS) is the most common hormonal disorder in the women of reproductive age or childbearing age. PCOS also referred as a PCOD Polycystic ovary disease. It is very large issue in hormonal imbalance due to this imbalance of hormones irregular periods and others problems are occurred. The disorder is PCOS disturb a women endocrine system and grow many small cysts on their ovaries. The cyst themselves not harmful but lead to hormone issue. PCOS usually happen when hormone LH from pituitary gland or level of insulin (from pancreas) are too high which then causes the ovaries to make extra amounts of testosterone.



High level of Insulin affects ovaries hormone. Women who have PCOS have higher levels of male hormone and are also less sensitive to insulin or insulin resistance as a these result women can be higher risk of Diabetes, Heart disease, Sleep apnea, Uterine cancer. More than one million cases per year. It is chronic can last for year or be lifelong.

Symptoms

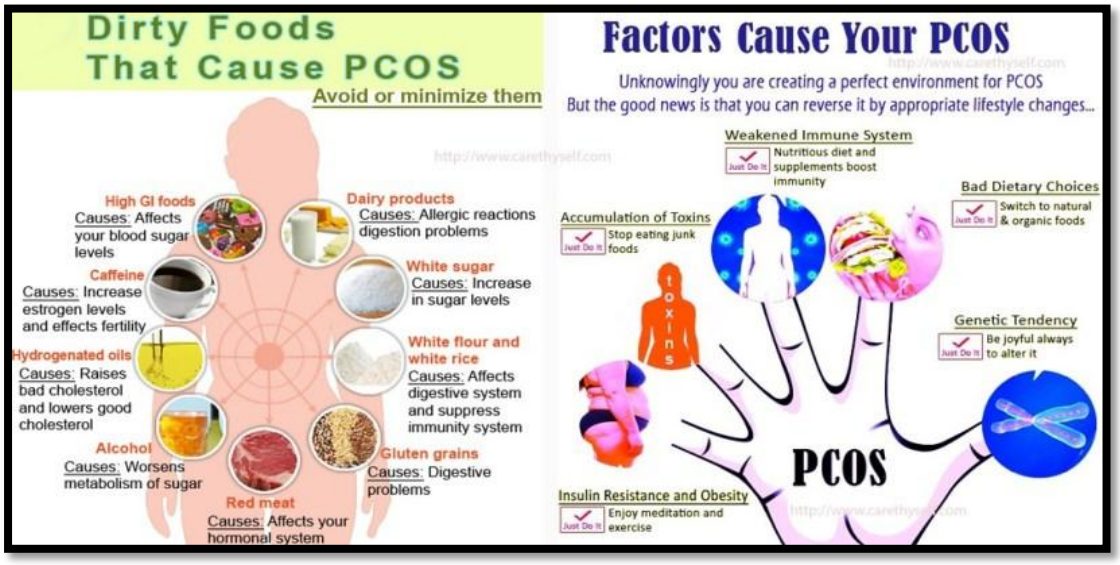
- **Menstrual:** Menstruation late. Upto 45 days. Abnormal menstruation, absence of me menstruation, irregular menstruation, short and light menstruation, or spotting.
- **Weight:** Obesity, overweight, or weight gain.
- **Skin:** Acne or oily skin
- **Also common:** Depression, increase the male hormones, infertility, loss of scalp hair or unwanted hairs.

Treatment

- Treatment include birth control pills to regularize periods
- Medication called metformin to prevent diabetes.
- Satins to control high cholesterol hormone to increase fertility and procedures to excess hair.

Self-care

Physical exercise, Weight loss, Fertility drugs, Antidiabetic food, Medication statin, Contraceptive pills to regularize the Period.



ROSY STARLING

Alfiya K. Sheikh

Scientific Name : *Pastor roseus*
Family : Passeriformes
Category : Starling mynas
Food : Berries, Flower nectar, Grains, Insects.

The rosy starling (Pastorroseus) is a passerine bird in the starling family. The species was recently placed in its own monotypic genus.

Rosy starling is highly gregarious birds, and often form large, noisy flocks, which can on occasion be a pest for growers of cereal crops. The birds are strongly attached to flowering trees. However, they can also greatly beneficial to farmers as they prey on pest. Such as locusts and grasshoppers thereby limiting theirs numbers.

The birds breed in tight colonies in a very short breeding season limited. This are colonial breeders, like other starling, is highly gregarious forming large winter flocks. It‟s also share other species omnivorous diet although it prefers insects.

Black area have paler feather edges which get worn away as well as black becoming more glossy in the breeding season. Feathers of the back of the neck form a crest, which although larger in the male, can be erected in both sexes. Female have short crest than male. Female has a duller colorization than the male while both the adults male and female. Female appear adults outside of the breeding season during the summer.

Nesting and breeding season is between May to July. They builds nest in holes and crevices, such as gaps between rocks in scree slopes or abandoned holes made by other species, occasionally nests are exposed. Nests are made of grass and twigs with a lining of feathers and finer grass. Eggs 3 to 6 number and blue in colour. Incubation period is between 13 to 16 days. Both sexes incubated eggs. After hatching the chicks remain in the nest for about 25 days, fed by both adults.

The song is a typical starling mixture of squeaks and rattles, given with much wing trembling. In xinjiang china farmers used to insecticide to eliminate locust which is costly and polluting. In the 1980s expert found that rosy starling which fly to xinjiang form and feed on locusts could be used for control instead.

Experts being to build artificial nests to attract rosy starlings. One effort reported to de so successful that the number of locusts was insufficient feed the birds. Causing many juveniles die for hungen. By the 2000s many xinsjiang forms greatly decreases the usage of insecticide.

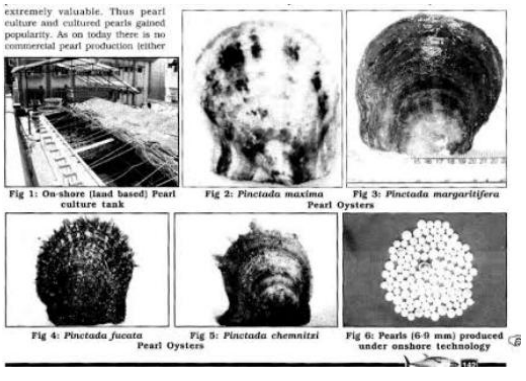
PEARL CULTURE

Bhavita P. Raut

Pearl is known to human being since ancient times. A pearl due to its delicate appearance and shine has retained its position as a costly ornamental object. Pearl is of animal origin and is obtained from pearl oyster. It was Mr.Mikimoto, Japanese, who for this first time discovered the art of cultivating the pearl oysters. The first pearl produced in 1984 by artificially employed techniques were not up to the standard. But due to constant and endeavouring labour he could achive his goal in 1913 and produced pearl by culture.

I. Selection of culture site

In any farming activity, culture site selection is of paramount importance. Technological & economic considerations play a major role in the selection process. A careful appraisal of the habits of the organism to be cultured would give a resonable level of confidence on the tolerance limits within which the various environmental parameters can vary. Due consideration has to be given to possible effects of fluctuating water flow, primary production, siltation, etc. in order to obtain the optimum level of growth and production of high quality pearls. Unsuitable levels of environmental factors such as salinity, water temperature, cold water currents and other factors such as red tides, hydrogen sulphide and pollution by industrial and domestic effluents are serious hazards to pearl culture.



II. Environmental conditions

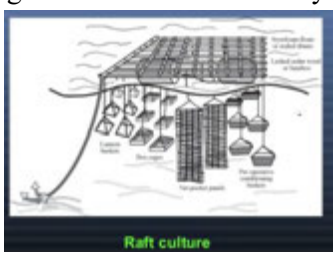
1) **Temperature:** - They plays important role] in the biological activities of pearl oysters. It grows best at temperature range 20-25°C. The temperatures below 13°C cause hibernation & below 6°C oyster die.
2) **Salinity: -** Pearl oysters tolerate a wide range of salinity from 24–50 % for a short duration of 2–3 days. Salinities of 14 % and 55 % may cause a 100 % mortality among the oysters.
3) **Bottom: -** Gravelly bottoms are suitable for pearl oyster farming, while sandy or muddy bottoms should be avoided.
4) **Depth: -** The optimum depth for farming pearl oysters is around 15

m. At greater depths, even if the rate of nacre deposition is slower, pearls of high quality with a pinkish colouration are obtained.

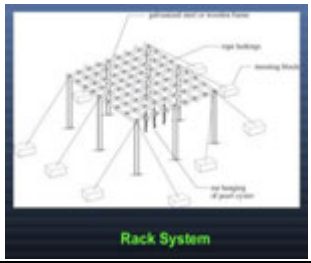
5) **Water current: -** Culture sites should be naturally sheltered against strong winds and waves. In strong water currents the formation of the pearl layers is usually fast, but the quality of pearls produced is affected.
6) **Primary Productivity: -** The condition of a specific culture ground depends primarily on the chemical constitution of the seawater and on the species and amount of plankton present.
7) **Supply of oyster:**In pearl oyster farming, oysters collected from the natural beds or reared from naturally collected or cultured spat are used. In the Gulf of Myanmar, several pearl banks are distributed off Tuticorn at a distance of 12–15 km and at depths of 12–15 cm.

III. Rearing methods

1) **Raft culture: -** Raft culture is considered to be one of the most suitable farming methods in sheltered bays A raft of 6×5 min size can be easily constructed and float with logs of teakwith 4 buoys capacity to be suitable for Indian conditions Rafts are usually constructed with logs of teak, venteak or casuarina wood, of chosen length with the bottom of about 10 cm diameter tapering 6 cm diameter at the tip. These requirement and lashed ropes.It is depth of water is 5m& more.


Raft culture

2) **Rack culture-** The water depth is less than 5m, the rack system can be followed. In the teak poles are driven into the sea bottom at intervals of 1m and horizontal poles are lashed with coirropes above the seawater level. Culture cages are suspended into the water from the horizontal poles.


Rack System

3) **Onshor tank culture-** Large concrete tanks constructed on the shore with the holding capacity ranging from 75 to 150 tons of seawater can also the used for rearing the oysters. The depth of the water is 3m to get the normal growth in oyster**.**

IV. Rearing containers

1. **Juvenile Culture:** - Juveniles pearl oyster are reared in net cages.net cages made of synthetic fabric of velon screen cover side of cage. The juveniles of size 3-20 mm. The velon screen net bags are replaced periodically. Juveniles grow, number of juveniles in the cages are reduced to obtain fast growth.
2. **Culture of mother oysters:-** Box cages, measuring 40×40×15 cm, are used to rear mother pearl oysters. The size of the mesh varies with the size of the oysters to be reared. The frames of the cages are made up of 6 mm mild steel rods, coated with anticorrosive paints or coal tar. Box-cages are useful in general mother oyster culture.
3. **Culture of nucleated oysters:-** The nucleated oysters are reared in box Cages in the case of rearing of mother oysters. In the velon netting is Provided inside the net cages so that the rejected nuclei can be retrieved.

V. Nucleus Implantation

The number and size of the nuclei to be used in the Implantation is the decided for the oysters to be operated Upon. Double and multiple implantations can usually be carried out if small pearls of the size 2 – 3 mm. Nuclei of 5-6 mm are generally used in single implantation. Nuclei of 4-6 mm are used in double implantation a large and a small

nucleus can be used. Oysters with partially spend and spent gonad should be use for nucleus implantation. The side of implantation is the ventral portion of the gonad.

VI. Implantation through the byssal groove

Implanting of nuclei of 3-4 mm can be done through the byssal groove. The byssal threads along with their base can be pulled out and a passage is made with the needle as is done from the base of the foot, upto the gonad. The graft and the nucleus can be inserted through this passage.

VII. Post- operative Care and Culture

The operated oysters are kept in a flow-through system where a gentle flow of water replaces the water in the container. If no flow through system is available, the water should be changed frequently. The oyster slowly overcomes the effect of narcotization and resumes its normal function of opening and closing the valves. The oysters are kept in the laboratory for 3-4 days with the supply of clean, filtered water, under observation.

The operated oysters are taken to farm in suitable cages for further rearing. During the post-operative culture, the density of the oysters should be low. They should not be disturbed frequently. They must be suspended at greater depths. The culture duration from 3-12 month for the nuclei of 2-5mm.

VIII. Pearl Harvesting and Grading

Harvesting of culture pearl is usually done manually. The pearl are extracted by cutting and separating the two valves, making and incision on the gonad and squeezing the pearl out. In case the oysters are to be reused, the pearls are carefully removed by opening the pearl-sac through the gonad taking care not to damage or give stress to the oysters. After these oysters used for production of pearls fora second time. The harvested pearls are washed in distilledwater, polished with refined salt and again washed in distilled water. They are sorted according to size, colour, shape, lustre, iridescence and other external characteristics.

IX. Marketing of pearls

Buyers directly buy pearls directly from the pearl farmers from the farming site. Some farmers can also directly market pearls. Jewellers as many of these buyers will have direct business contact or relation. Most farmers sell pearls in lots while few shell individual pearls in the market. They can be of pearl of similar size and quality and some lots can be based on complete harvest yield.

Harvest of Different Pearls.

CAGE CULTURE

Heena C. Lanjewar

Fish can be cultured in one of four culture systems- ponds, raceways, recirculating systems or cages. Cage Culture is an Aquaculture Production system where fish are held is floating net pens. Cage culture or fish utilize existing water resources but encloses the fish in a cage or basket which allows water freely between the fish and the pond permitting water exchange and waste removal into the surrounding water.

Cages are used to culture several types of shell fish and finfish species in fresh, brackish and marine water. Cage in freshwater are used for food fish culture and for fry to fingerling rearing.

Four different types of Cage culture

1. Fixed: A fixed Cage is essentially a net bag supported by posts which are anchored to the bottom of a river or lake. Although they are inexpensive, there use is limited to shallow, protected water with soft substrates.

2. Floating: Floating Cages are made from netting supported by a buoyant collar or a stable frame. This is the most widely used method of cage aquaculture because the cages can be made any size or shape.

3. Submersible: These cages are built with a rigid frame and because they are submersible, they can be moved up and down in the water column to take advantage of water condition. If the weather is rough, the cage is lowered to calmer water, but in calm conditions the cage remains near the surface.

4. Submerged: These cages are the least common and are permanently kept under the water. They consist of a frame with slates for openings and are anchored to the substrate in flowing water.

Advantages of Cage Culture over Traditional Fish Culture

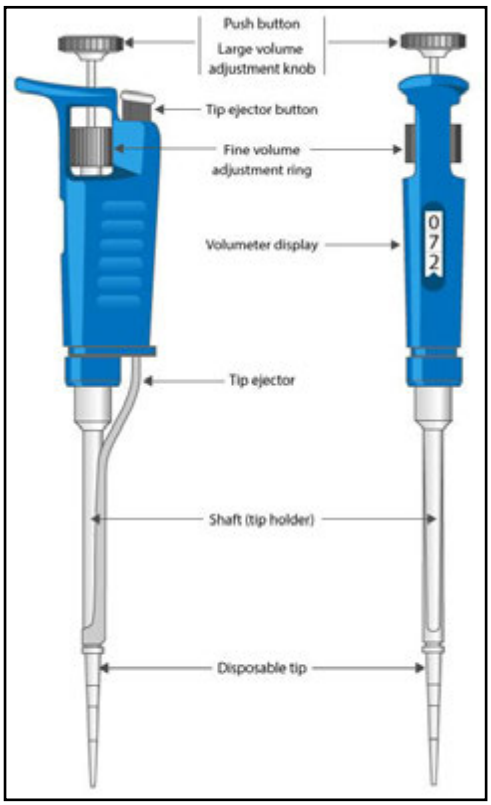
- Many types of water resources can be used, including lakes, reservoirs, ponds, strip pits, streams and rivers which could otherwise not be harvested.
- Large water bodies could be utilised better for fish culture.
- The flowing water could be better utilised for fish culture.
- Free exchange of water is possible in cages.
- Oxygen depletion cannot be found in cages.
- Monitoring growth of the stock, disease, etc is easy.
- With cage culture, the animal protein production can be increased.

MICROPIPETTE: A BASIC LABORATORY EQUIPMENT

Chabbu Y. Bagade

Introduction :

The micropipette was invented in 1957 at university of Marburg, Germany by Postdoc Heinrich Schnitger. Frustrated by repetitive pipetting of small volume using glass. Micropipettes, Schnitger developed a prototype with a spring-loaded piston and a removable plastic tip for containing liquid.



- The micropipette is a continuously adjustable with key purpose for sampling & dispensing accurate microscopic liquid sample such as in the procedures of microinjection & patch clamping.
- The micropipette operates on the air displacement principle best work with dispensable tips.
- The range of the pipette covers a volume range from 0.5 pi to 5 ml.

Principle:

A plunger is depressed by the thumb and as it is released liquid is drawn into a disposable plastic tip, when the plunger is pressed again the liquid as dispensed.

Pipette operation volume setting:-

1. Press the operating button.
2. Dip the tip under the surface of the liquid in the reservoir about 1 mm in deep & slowly released the operating button. This action will fill the tip – withdraw the tip from the liquid touching it against the edge of the reservoir to remove excess liquid.

Recalibration procedure : Place the calibration tool into the holes of the calibration adjustment lock (under the thumb button).

AMBERGRIS – WHALE VOMIT'S

Geethashree U. Chandewar

Whale Vomit's or ambergris is a wax that originate as a secretion in the intestine of the sperm whale and is used to manufacture perfumes.

Ambergris or grey amber is a solid waxy and flammable substance of a dull grey or brackish color produced in the digestive system of sperm whales freshly produced ambergris has a marine fecal odor. However it acquire a sweet, earthy scent as its ages commonly likened to the fragrance of rubbing alcohol without the vaporous chemicals astringency.

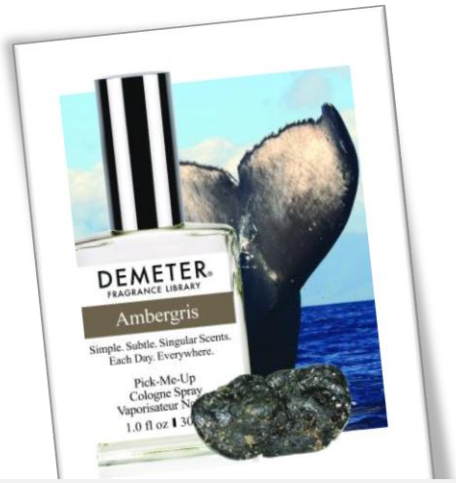
Ambergris has been very highly valued by perfumers as a fixative that allows the scents to last much longer although it has been mostly replaced by synthetic ambroxan. Dogs are known to be attracted to the smell of ambergris and are therefore sometime used by ambergris searchers. During the middle ages, Europeans used ambergris as a medication for headaches, colds, epilepsy, and other ailments.

Formation:

Ambergris is formed from a secretion of bile duct in the intestine of the sperm whale and can be found floating on the sea. It is also sometime found in the abdomen of dead sperms whale. Ambergris is usually passed in the fecal matter. It is speculated that an ambergris mass too large to be passed through intestine is expelled via the mouth leading to the reputation of ambergris as primarily coming from whale ambergris is rare once expelled by a whale it often floats for year before making landfall, the very small change of finding ambergris and the legal

ambiguity involved led perfumes makers away from ambergris and led chemist on a quest to find viable alternatives.

Ambergris is primarily found in the Atlantic Ocean and on the coast of South Africa, Brazil, china, Japan, India, Australia, New Zealand etc. Fossilized ambergris from 1.75 million year ago has also been found.



Products of Ambergris

Legality:

International whaling commission 1982 moratorium from the 18th to the mid-19th century the whaling industry prospered. By some reports, nearly 50,000 whales including sperm whale were killed each year. Throughout the 1800s "millionsof whales are killed for their oil, whalebone, and ambergris to fuel profits, and soon become endangered as a species as a result. Due to studies showing that the whale population werebeing threatened the international whaling commission instituted a moratorium on commercial whaling in 1982. Although ambergris is not harvested from whales, many countries also ban the trade of ambergris as part of the more general ban on hunting and exploitation of whales.

Illegal:

Australia –Under federal law the export and import of ambergris for commercial purposes is banned by the environment protection and Biodiversity conservation act 1999. The various states and territories have additional laws regarding ambergris.

United States–The possession and trade of ambergris is prohibited by the endangered species act of 1973.

LYMPH CANCER

Harshali H. Patankar

Cancer is a group of disaease involving abnormal cell growth with the potential to invade or spread to others part of the body. They from a subset of neoplasms. A neoplasm that have undergone unregulated growth and will often from a mass or lump. But may be distributed diffusely. All tumor cells show the six hallmarks of cancer.

Lymphoma:

The lymph system is a series of lymph nodes and vessels that move lymph fluids through the body.

Lymph fluids contain infection fighting white blood cells. Lymph node act as a filters, capturing and destroying bacteria and viruses to prevent infection from spreading.

Doctors classify more than 70 cancer types as lymphomas. Lymphomas can affected any portion of the lymphatic sysmteincluding:

a. Bone marrow b. tonsils c. Thymus. d. Lymph nodes e. Spleen

Symptoms:

Lymphoma may not always causes symptoms in its early stagesInstead, a doctors may be discoverer enlarge lymph nodes during a physical examination. These may feel like small soft nodules under the skin. A person may feel the lymph nodes in the

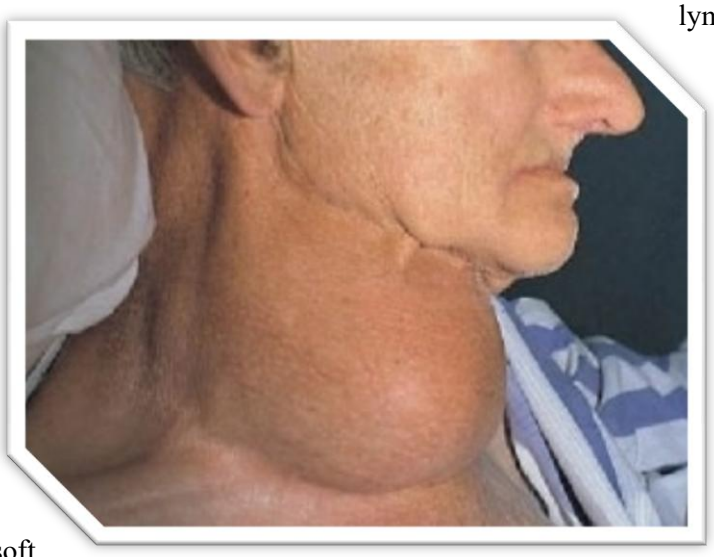
1. Neck
2. Upper chest
3. Stomach
4. Grain

Likewise may of symptoms of early lymohoma are not specific that males them easy to overlook. These common early symptoms of lymphoma include bone pain, cough, fever, stomach pain, unexpected weight loss, pain when drinking alcohol.

Because the symptoms of lymphoma are often easily overlooked it can be difficult to detect and then diagnose it in early stage.

Treatment :

1. Lymphoma treatment depends upon the cancer's stage. Doctors will stage a tumor to signify how far the cancerous cells may have spread.
2. A stage I tumor is limited to a few lymph nodes while a stages IV tumor has spread to other organs. Such as the lungs or bone marrow.



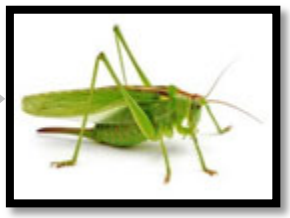
AGRICULTURAL PESTS

Harshavi S. Tarone

Insects, weeds, Nematodes and disease Pathogens blemish, damage or destroy more than 30 % of crops worldwide known as " Ecologically Based Pest Management" or simply " Ecological Pest Management" this approach threats the whole farm as a complex system.

1. Grasshoppers

Grasshoppers are medium to large Insect. Adult length is 1 to 7 cm. Depending on the species like their relatives the „Katydids" and „Crickets" they have chewing mouth parts, two pair of wings one narrow the other wide and flexible and long hind legs for jumping.



2. Red cotton Bug

Dysdercus cingulatus is a species of true bug in the family pyrrhocoridae commonly known as the Red cotton Steiner it is the serious Pest of Cotton crops, the adults and older nymphs feeding on the emerging bolls and the cotton seeds as they mature, transmitting cotton staining fungi as they do so.

3. Gram pod borer

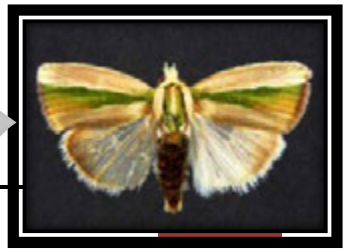
It is a Polyphagous lablab, safflower, chillies, groundnut, tobacco, cotton etc. Egg, spherical, yellowish eggs are laid singly on tender parts and buds of plants. The egg period lasts for 2-4 days.

4. Cotton Pink Bollworm

The pink bollworm (*Pectinophoragossypiella*; *Spanish ; lagarta* Rosado) is an insect known for being a pest in cotton laming. The adult is a small, thin, gray moth with fringed wings. The female moth lays eggs in a cotton boll and when the larde emerge from the eggs, they inflict damage through feeding.

5. Cotton Spotted Bollworm

Bollworm is the common term for a moth larva that attacks the fruiting bodies of certain crops, especially cotton. The most common moths known as bollworms are spotted bollworm, *Eariasfabio*. Spotted bollworm, *Eariasvittella*.



THE GANGRENE DISEASE

Kalyani S. Gahane

Gangrene happens when a lack of Oxygen-rich blood causes tissue to die in some part of the body, often the hands or feet. It is a serious condition that can result in amputation of a limb or death. It needs urgent treatment to halt the spread of tissue death as rapidly as possible.

Diabetes is linked to gangrene. Diabetes affects the small arterial vessels and they become insufficient to supply the extremity. Other risk factors are smoking and condition such as Raynaud‟s disease.

Causes:

All forms of Gangrene happen because of a loss of blood supply to a certain area. This deprives tissue of Oxygen and nutrients, causing the tissue to die.

Symptoms:

- Loss of colour in the affected body part: The area will become discoloured and eventually turn dry and dark. The colour will change from Red to Black in dry Gangrene, or it will become swollen and foul-smelling in wet Gangrene. Gas Gangrene will produce particularly foul-smelling, brownish plus.
- Shiny appearance to the skin and the shedding of skin, with a clear line forming between affected and healthy skin.
- Pain that is later followed by loss of sensation and an inability to move the part.

Diagnosis:

A doctor will carry out a physical examination and take a medical history, to find out about symptoms and potential exposure to infection or trauma.
Test includes:

- An x-ray to reveal gas bubbles in muscle tissue.
- MRI and CT scans to determine the extent of muscle involvement.

Treatment:

Treatment depends on the type, location and extent of diseased tissue. Treatment may involve the following emergency measures:

- Intravenous antibiotics.
- Surgical removal of dead tissue, including amputation of an extremity or a limb to halt the wider spread. Reconstructive surgery may be possible, including skin grafting and other techniques.

Prevention:

Measures to help people who are susceptible to Gangrene reduce their risk include:

- Looking daily for cuts, sores, redness, swelling, skin breaks or discharge on the feet.
- Having a medical foot health check once a year.
- Avoiding home-use chemical preparations for corns, calluses and in growing toenails.
- Watching out for signs of frostbite if exposed to prolonged cold.

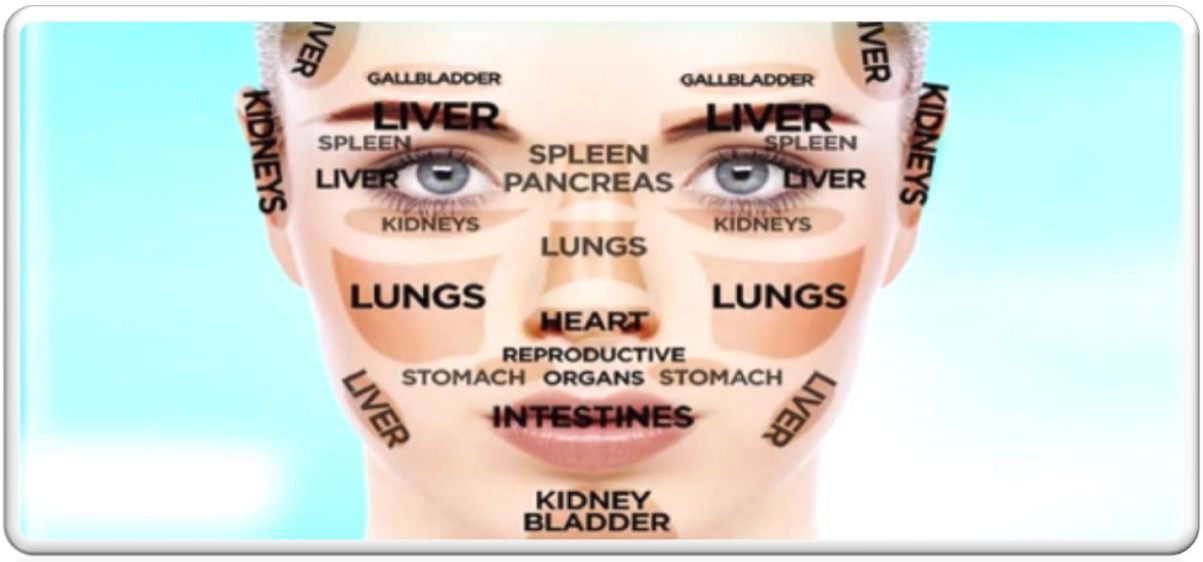
Avoiding walking outside barefoot or wearing shoes without socks.

VITAL ORGANS

Kanchan M. Lanjewar

Humans have five vital organs that as essential for survival.

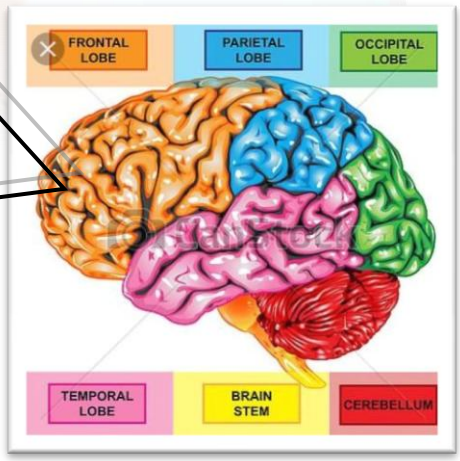
1. Brain, 2. Heart, 3. Kidneys, 4. Liver, 5. Lungs

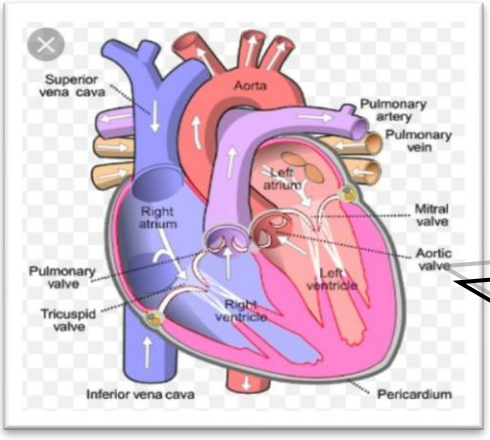


1. Brain

The brain works like a big computer. Brain is protected with skull since it controls vital function such as breathings, swallowing, digestion, eye movement and heartbeat there can be no life without it.

The Brain receives information through our five senses. Sight, smell, touch, taste and hearing often many at one time. The cerebrum, the large, outer of the brain, controls, reading, thinking, learning, speech, emotions and planned mussel movements like walking.





2. Heart

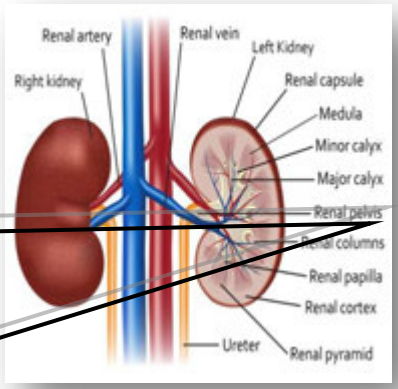
In humans the heart is located between the lungs in the middle compartments of the chest.

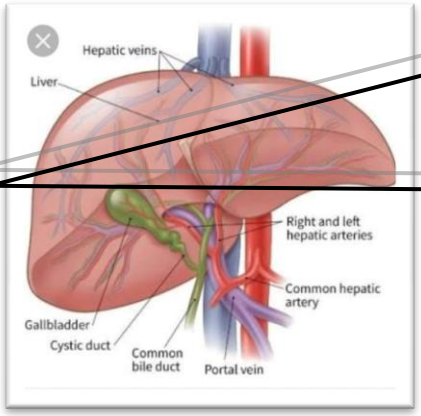
It is an organ that pumps blood throughout the body via circulatory system, supplying oxygen and nutrients to the tissues. If that oxygen – rich blood doesn‟t circulate as it should a person could die. The left side of your heart sends that oxygen – rich blood out of the body.

3. Kidneys

They are located just below the rib cage one an each side of your spine. Healthy kidneys filter about a half cup of blood every minute, removing wastes and extra water to make urine.

The kidneys are powerful chemical factories. Because they remove waste products from the body, balance. The body‟s fluids and so on. The production of urine involves highly complex step of exertion and re-absorption. This process is necessary to maintain a stable balance of body chemicals.





4. Liver

The liver is a large meaty organ that sits on the right side of the belly. Weighing about 3 pounds. The liver is reddish-brown in colour and feels rubbery to the touch.

Normally you can‟t feel the liver, because it‟s protected by the rib cage. It is only found in vertebrates.

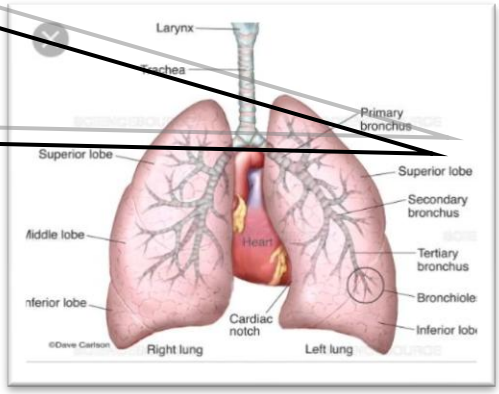
The liver produces proteins that are important in blood clothing. It plays a central role in all metabolic processes in the body. In fat metabolism the liver cells break down fat and produce energy.

5. Lungs

Each of your lungs contains bout 300 million balloons like structures called alveoli. Which replace the carbon dioxide waste in your blood with oxygen. A person usually breathes an average of 13 pints of air every minute.

In respiration oxygen from incoming air enters the blood and carbon dioxide, a waste gas from the metabolism leaves the blood.

The right lung is larger than the left lung. The lungs float on water. An average person breathes in around 11,000 litres of air every day.

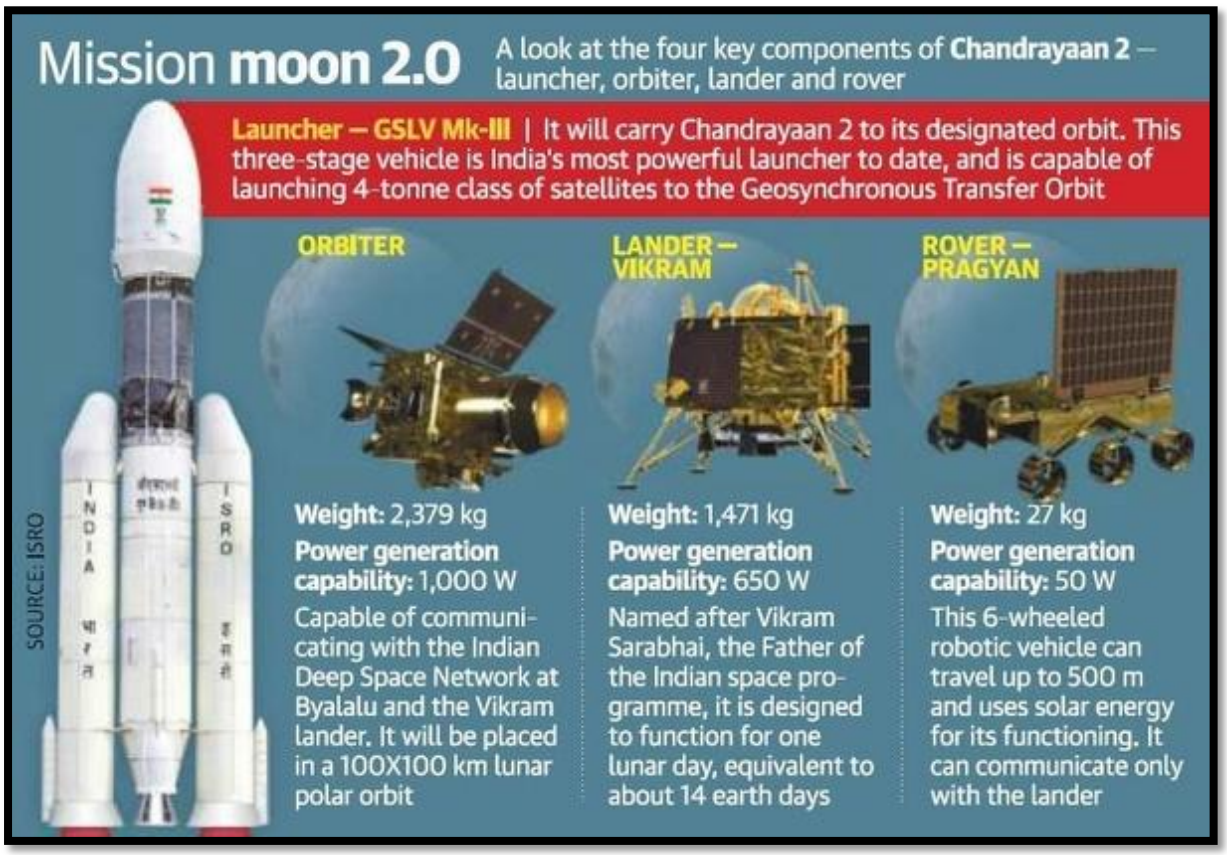


"CHANDRAYAAN 2" - INDIAS SECOND MISSION TO MOON

Trupti N. Chandewar

Chandrayaan-2 is an Indian lunar mission that will boldly go where no country has ever gone before. It consists of an orbiter and a soft lander carrying a rover, scheduled to launch to the Moon in July 2019.The primary objective of Chandrayaan 2 is to demonstrate the ability to soft-land on the lunar surface and operate a robotic rover on the surface. The orbiter will have a scientific payload comprising a visible terrain mapping camera, a neutral mass spectrometer, a synthetic aperture radar, a near infrared spectrometer, a radio occultation experiment, a soft X-ray spectrometer and solar X-ray monitor.

The lander, named Vikram, has a mass of 1471 kg (including the rover), and can



Scientific goals include studies of lunar topography, mineralogy, elemental abundance, the lunar exosphere, and signatures of hydroxyl and water ice.

Spacecraft and Subsystems

The Chandrayaan 2 orbiter is a box-shaped craft with an orbital mass of 2379 kg and solar arrays capable of generating 1000 W power. The orbiter communicates with the Indian Deep Space Network and the lander. generate 650 W of solar power. The lander can communicate directly to the Indian Deep Space Network, the orbiter, and the rover. The lander will carry a camera, seismometer, thermal profiler, Langmuir probe, and a NASA-supplied laser retro reflector.

The rover, Pragyaan is a 6-wheeled vehicle with a mass of 27 kg that runs on 50 W of solar power and can travel up to 500 m at a speed of 1 cm per second. The rover

communicates directly with the lander. The rover will hold cameras, alpha-proton X-ray spectrometer, and a laser-induced ablation spectroscopy experiment.

Mission Profile

Chandrayaan 2 was launched on 22 July 2019 at 2:43 p.m. Indian Standard Time from SatishDhawan Space Center on Sriharikota Island on an ISRO Geosynchronous Satellite Launch Vehicle (GSLV) Mark III. The lander-orbiter pair went into an initial elliptical (170 x 40400 km altitude) Earth parking orbit, followed by a trans-lunar injection on 14 August. The pair entered lunar polar orbit on 20 August. The lander and orbiter separated on September 2. The orbiter evolves into a 100 km altitude circular polar orbit and the Vikram lander maneuvered into a 30 x 100 km orbit with a plan to land on the surface in the high latitude areas near the South Pole, between two craters, Manzinus C and Simpelius N, on 7 September between about 1:30 and 2:30 a.m. (Indian local time). Contact was lost during the descent at an altitude of about 2.1 km, the data are being analysed. The orbiter portion of the mission is planned to last 1 year. The rover was to be deployed using a ramp shortly after landing. The lander and rover portions of the mission were planned for 14-15 days, one period of lunar daylight.

Interesting facts about "Chandrayan 2"

1. The total weight of the Chandrayaan-2 is 3,850 kg (8,490 lb).
2. The total cost of the mission is approximately US$141 million.
3. The objective of Chandryaan-2 is to map the location and abundance of lunar water.
4. The total weight of the Chandrayaan-2 is 3,850 kg (8,490 lb).
5. The total cost of the mission is approximately US$141 million.
6. The main objective of Chandryaan-2 is to map the location and abundance of lunar water.
7. It consists of three components: **the Orbiter, the Lander (Vikram) and the Rover (Pragyaan)**.
8. Chandrayaan 2's algorithm is wholly developed by India's scientific community.
9. **The mission life of Chandrayaan-2's Orbiter** will be one year whereas the mission life of lander (Vikram) and rover (Pragyan) will be one Lunar day which is equal to fourteen earth days.
10. Chandrayaan-2 will attempt to soft-land the lander -Vikram and rover- Pragyan in a high plain between two craters, **Manzinus C and Simpelius N, at latitude of about 70° south**.
11. Chandrayaan-2 has several science payloads to expand the lunar scientific knowledge through a detailed study of **topography, seismography, mineral identification and distribution, surface chemical composition and composition of the tenuous lunar atmosphere.**
12. The Chandrayaan-2 mission is a **precursor to the ambitious Gaganyaan project**, which aims to place **three Indians in space by 2022**.

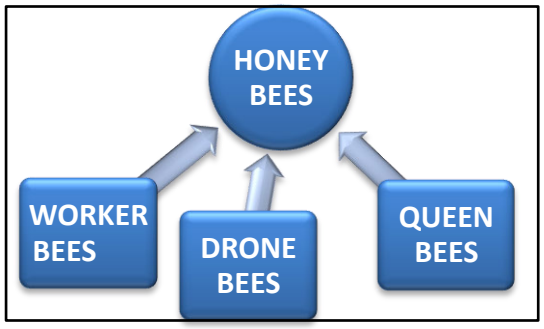
SOCIAL BEHAVIOUR OF HONEY BEES

Sneha D. Khune

Honey bees are flying insect and close relatives of wasps and ants. Genus *Apis* found in family apidaeof class insecta.

- Kingdom: Animalia
- Phylum: Arthropoda
- Class: Insecta
- Order: Hymenoptera
- Family: Apidae
- Genus: *Apis*

A honey bee is a social flying insect only seven species of honey bees recognised with a total 44 subspecies. They are known for constructions of perennial colonial nests from wax for the large size of their colonies. The best known of Honey bees is the western Honey Bees. Honey bee centre forage for nature and Pollen form flowering plant. Honey bees are distributed in a three section.



A. Worker Bees :

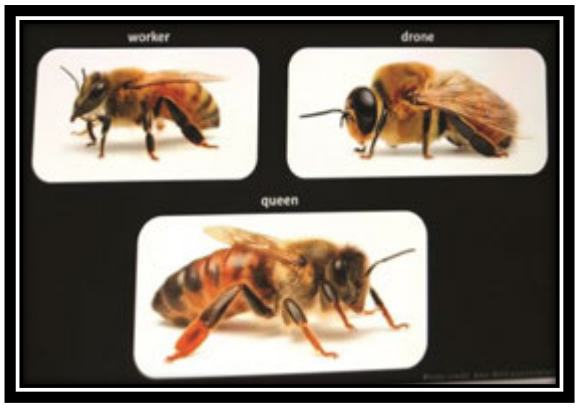
1. Worker Bees are the most Familiar looking member of the honey bees hive or they make up about 99% of colony"s populations.
2. The worker bees are all female.
3. From birth to her death 45 day later.
4. The worker bees are given different worker to do during different stages of her life.
5. The worker Bee are responsible for everything from feeding the Larva attending to the Queen to cleaning the hive to collecting food to grading the colony is building Honey Comb.

B. Drone Bees :

1. Male bees are called drones.
2. Their job is to mate with queen from other hives.
3. If they do get the opportunity to make they die immediately afterwards.
4. If they do not mate they can be live up to the 90 days.
5. The drones in hive by their big round bodies and large eye.

C. Queen Bees:

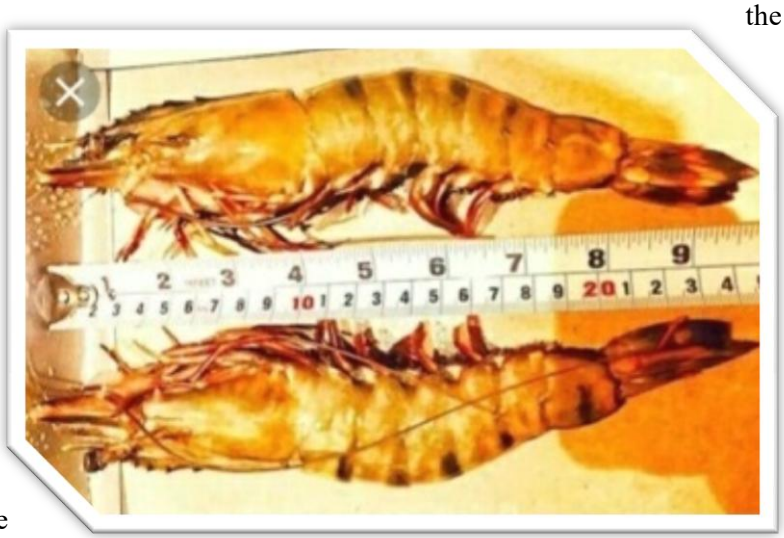
1. There is one queen bee per hive. She is the mom of all the other bees.
2. She is the only fertile member of the colony and lays about 4500 egg a day during spring and summer.
3. Queen bees are distinguished from the other members of hive by their long abdomens and small wings.
4. Soon after birth queen bees will go out and wild weeked where they mate with 15 or more drones.
5. A three day period before retiring to hive to lay egg.



THE LARGEST PRAWN IN WORLD

Dipali D. Rokade

The tiger prawn is found in local waters and is the largest prawn in the World. If can grownup to 33cm and can be easily distinguished by easily the light and dark Stripes on its tail the teochews nicknamed them as glao chap hei,which is a reference to Their distinctive stripes.



Wild caught jumbo tiger prawns are prized by which in connoisseurs generally farmed ones are wet markets shunnsd at the you can in Singapore, variety spot the wild usually very easily as they are a variety of large and they come in from greenish-black to colours that con range farmed ones are usually rusty brown. The bluish-grey in colour. uniform in size and is very meaty and The jumbo tiger prawn the lange ones can be flavourful the meat of properly they are tough if not handled frjing, BBQ or even for excellent for deep- If costs around $38 to impressing your quests. one of the most $45/kg which makes it market the farmed tiger expensive prawns in the cheaper. Most of the prawns ar considerably themselves In selling fishmongers who pride sell them. quality seafood will not However, because they are farmed prawns,you can see them being sold live at seafood restaurants the colour of the farmed tiger prawns are usually more intense than

MEDICINAL PLANTS

Kirti C. Akare

1. TULSI

There are four types of Tulsi mentioned in Ayurvedic texts ie Rama, Krishana,Vana & Kapoor Tulsi. For over the centuries Tulsi has been known for its remarkable healing properties. Tulsi is taken as the herbal Tea. The oil extracted from the karpoora Tulsi is mostly used in the herbal toiletry. Its Oil is also used against the insects and bacteria.

2. ALOE VERA

The Aloe Vera grows only under the Sun with well drained dry are most soil although the plant tastes like turd it"s still edible. The sap from Aloe Vera is extremely useful to speed up the healing and reducing the risk of infection for. Aloe Vera is the oldness medicinal plant ever known and the most applied medicinal plant worldwide.

3. NEEM

Azadirachta indica commonly known as Neem tree on Indian liac is a tree in the Mahogany family meliaceae. it is one of two species in the genus Azadirachta and is native to the Indian subcontinent, i.e. India, Nepal and Pakistan. Ayurveda have documented this plant as one of the most valuable Herb.

4. GARLIC

Garlic is a member of the onion family. It is uses in many countries in various dishes. Garlic is also popular herb. It can heal wide range of diseases. It is low in calories and rich in Nutrients. Garlic contains Vitamin C, Vitamin B6, Manganese and fiber.

5. TURMERIC

The Scientific name of Turmeric *curcuma longa*. Natural Plant products have been used throughout human history for various purposes. Having CO-evolved with Animal life, many of the plants from which these Natural products are derived are billions of years old. Turmeric is the plant that has a very long history of medicinal use, dating back nearly 4000 year.

6. LEMON

The origin of Lemon is unknown, though lemons are thought to have first grown in Assam, Northern Burma or China. A genomic study of the lemon Indicated it was a hybrid between bitter orange and citron. They were later introduce to Persia and then to Iraq and Egypt around 700 AD.

AZURA KINGFISHER

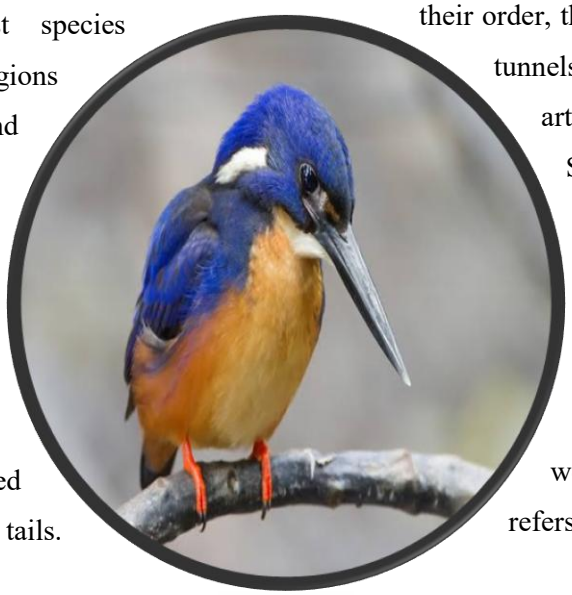
Priti R. Ramteke

- Kingdom :- Animalia
- Phylum :- Chordata
- Class :- Ayes
- Order :- Coraciiforms
- Suborder :- Alcedines
- Family :- Alcedinidae
- Genus :- *Alcedo*

Most species have bright plumage with only small differences between the sexes. Most species are tropical in distribution and a slight majority are found only in forest. They consume a wide range of prey usually caught by swooping down from a perch.

Description

Alcedinidae is a family of small to medium- sized, brightly coloured birds in the order coracciformes includes Kingfisher. They have a cosmopolitan distribution, with most species found in the tropical regions of Africa, Asia, and Oceania. The family contains 114 species and is divided into three subfamilies and 19 genera. All Kingfisher have large heads, long, sharp, pointed bills, short legs, stubby tails.



While Kingfishers are usually thought to live near rivers and eat fish, many species live away from water and eat small invertebrates. Like other member of their order, they nest in cavities, usually tunnels dug in to the natural or artificial banks in the ground. Some Kingfishers nest in arboreal termite nests. A few species, principally insular forms, are threatened with extinction. In Britain, the word “Kingfisher” normally refers to the common Kingfisher.

THE RED DATA BOOK

Monali G. Kolhe

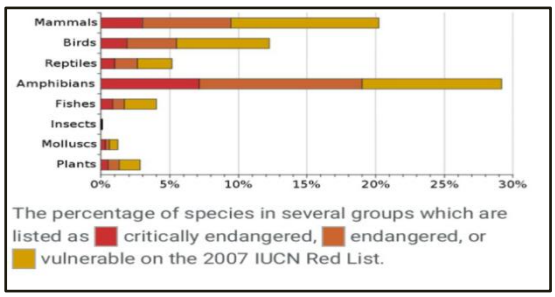
The International Union for conservation of Nature and Natural Resources (IUCN) maintains a Red Data Book in which endangered species of plants and animal are reported.

It is established in 1964, The international union for conservation of nature‟s red list of threatened species has evolved to become the world‟s most comprehensive information source on the global conservation status of animal, fungi and plants species.

The IUCN Red List is a critical indicator of the health of the world‟s bio diversity**.**

Concept of endangered species

The species or organisms whose number has been reduced to a critical level or whose habitats have been adversely affected so that they may become extinct if not given special protection are called endangered species. They are also called threatened species.



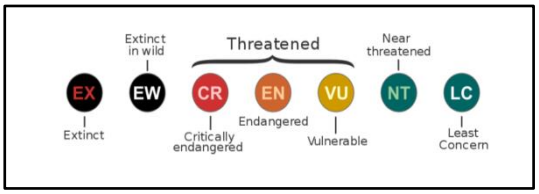
The IUCN red list are divided into following categories

- Extinct (EX)
- Extinct in the wild (EW)
- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)
- Data Deficient (DD)
- Not Evaluated (NE)
- Least Concerned (LC)

Now 105,732 species assessed where 160,000 is the goal 0f 2020, 470 days remaining for 54,268 species.

The IUCN system uses a set of five quantitative criteria to assess the extinction risk of a given species. In general, these criteria consider:

1. The rate of population decline



2. The geographic range.
3. Whether the results of a quantitative analysis indicate a high probability of extinction in the wild.
4. Whether the species already possess a small population size.
5. Whether the species is very small or lives in restricted area.

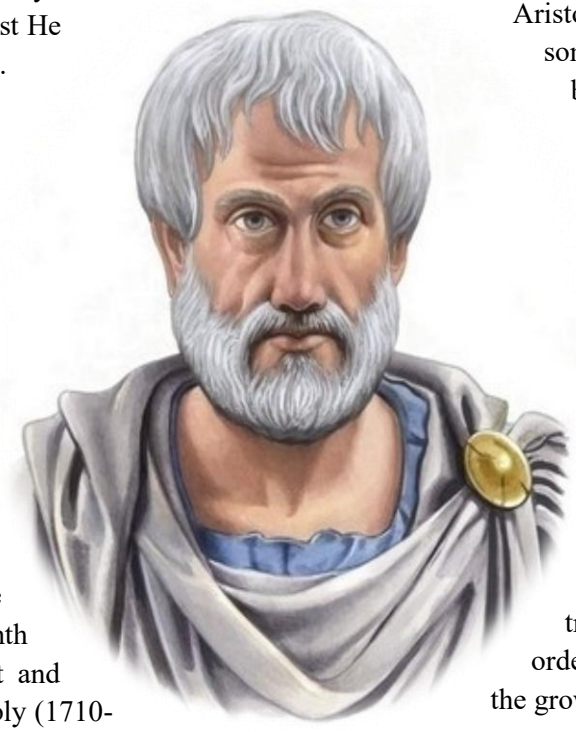
After a given species has been thoroughly evaluated, it is placed into one of several categories. In addition, three of the categories (CR, EN and VU) are contained within the broader notion of „‟threatened‟‟. The IUCN RED List of Threatened Species recognizes several categories of species status.

ARISTOTLE: FATHER OF ZOOLOGY

Nutan T. Kapgate

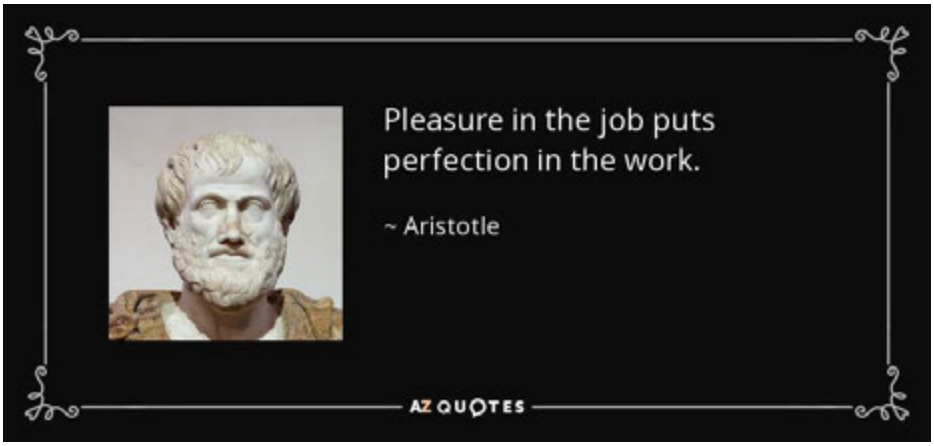
Greek Philosopher AndScientist Aristotle(384-322 B.C.E.) Is Considered the "Father Of Zoology". His Contributions To The Field Include Vast Quantities Of Information About The Variety , Structure And Behaviour Of Animals The Analysis Of The Parts Of Living Organisms And The Beginnings Of The Science Of Taxonomy During Aristotle‟s Time Only 500 Spices Were Know – A List He Divided Into Eight Classes.

Swiss naturalist Konrad von Genre is often credited as the "Father of Modern Zoology". In the 1551 he wrote the first volume to this three volume Histories Animalism (The History of Animals) that served as a standard reference work throughout Europe in the sixteenth and seventeenth centuries. Swiss naturalist and philosopher Abraham Trebly (1710-1784) is considered the founder of the experimental Zoology. Much of this research involved studying the regeneration of hydras.



Aristotle‟s methods and theories seem a little primitive to modern humanity, with its its genome codes, microbiology and medicine, but his work was a quantum leap in the building of Human knowledge. Aristotle‟s Zoology is something that every modern biologist should study perfect example of how to build up a store of knowledge based upon careful observation.

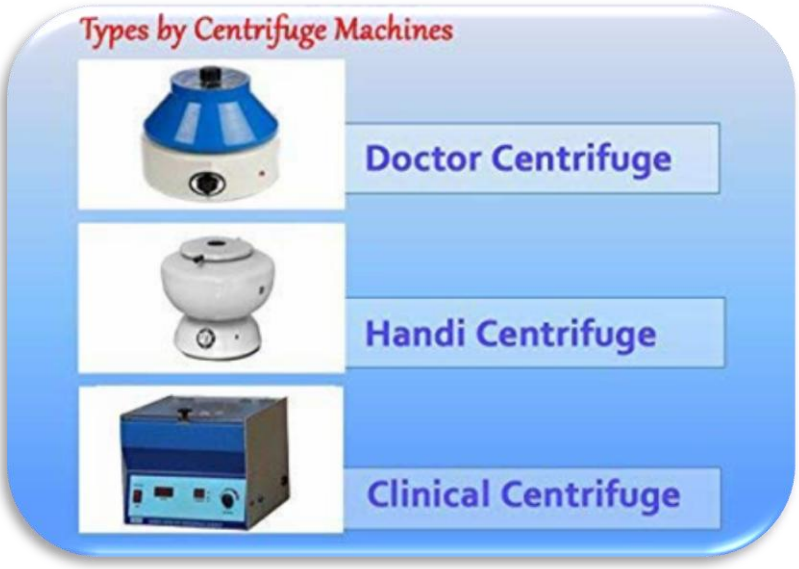
In a fine early example of an early observational biology experiment, Aristotle dissected birds eggs at various stages of development trying to understand the order in which the organs of the growing embryo developed.



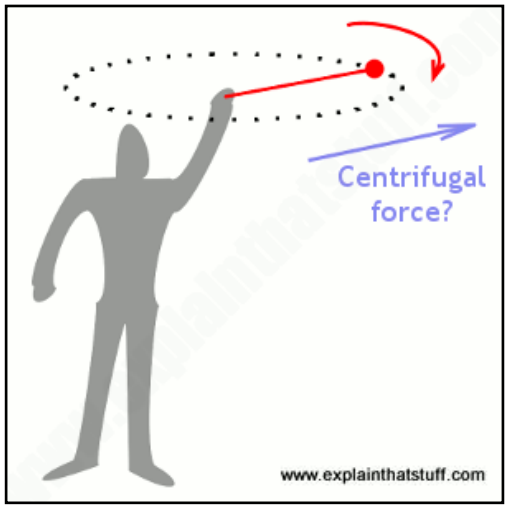
CENTRIFUGE: THE BASIC LABORATORY INSTRUMENT

Pallavi A. Khandale

Centrifugation is in importance technique introduced by Svedberg in (1984-1971) and is responsible for the tremendous advancement of biochemistry especially in the field of proteins and nucleic acids. It is the technique of Centrifugation of solution at very high speed, the Centrifugal force being many thousands of times stronger than force of gravity (g) and at a very low temperature and preferably in vacuum. The rotor revolves at high speed say, 60000 times per minutes giving Centrifugal force of the order of 500,000 times g. The Centrifuge is having refrigeration to offer low temperature. Glass or quartz cells could be used and volume of solution less than even 1 ml. Could be used for analysis.



There are different types of ultra-Centrifuges like 1. The preparative 2. Analytical models. The Centrifugal force depends on the angular velocity of the Centrifuge and the distance of the particals from the axis. Rate of movement of the partials depends 011 the Centrifugal force, shape, size and density of the particles and the density and viscosity of the medium. Homogenous solute moves as a sharp boundary. This movement is called sedimentation which is defined as the transport of mater in a mixer due to external field in particular, that due to gravity or Centrifugal force.



SCRUB TYPHUS

Heena V. Chandewar

"Scrub typhus" also known as bush typhus is a form of typhus coursed by the intracellular parasite orientia tutsugamushi, a gram – negative proteobacterium of family Rickettsiaceae first isolated and identified in Japan**.** The Word "Scrub" was applied because of the type of Vegetation that maintains the Chigger-mammal Relationship even Though other reasons also support rodents and tites. Most cases of "SrubTyphus" Occur rural area of south east Asia, Indonesia, China, Japan, India and Northern Australia and also reported in several states- Haryana, Jammu, Assam, Maharashtra, Kerala and Tamilnadu.

HOW IT IS TRANSMITTED

It is transmitted to Human from the bite of an infected chigger-Larva of the mite. Rodents are the most common carriers followed by squirrels, Field mouse and bandicoots. Infected with "Scrub Thyphus" In most often self-limiting but can occasionally be severe and even fatal. It is not transmitted from Human to Human.

SYMPTOMS

- Headache
- Caugh
- Nousea
- Vomiting
- High fever

- Mental Changes
- Abdominal pain
- Difficulty in Breathing
- A black Spots at the site of Chigger feeding

TREATMENT

At early stages, certain antibiotics are given to control infection. "Scrub Typhus" should be treated with the antibiotics doxycycline. Doxycycline can be used in person of any Age. Antibiotics are most effective if even soon after symptoms begin. People who are treated early with doxycycline usually recover quickly. The chloromphenicol and macrolides is also effectives, these antibiotics are also used.

PREVENTIVE MEASURES

Ensure these are Horodents in or around the house. Pets should be cleaned regularly. Keep your skin covered properly if you visit Jungle or area where there are lots of Shrubs. Get blood test done for Scrub Typhus if these are undiagnosed fever for over a weed.

FIGURE 193.—Poster urging preventive measures against scrub typhus.

DIGITAL pH METER : THE BASIC LABORATORY INSTRUMENT

Yukta D. Faye

Introduction

The pH meter is a scientific instrument that measures the hydrogen ion activity in water based solution including its acidity or alkalinity expressed as pH. The pH meter measure the difference in electrical potential between a PH electron and a reference electron.

Digital pH meter contain two major components. Most important and essential component is the electrode which records the pH value. Second component is the display unit and processor. In display unit and processor readings of the electrode are processed and shows on the digital meter.

Principle

pH meter measures the voltage between two electrodes and display the result. Converted in to the corresponding pH value. They comprise a simple electronic amplifierand a pair of electrodes or alternatively a combination electrodes.

Digital pH meter used for measuring of pH of sample. The P^H of the sample is measured as follow:

1. The pH meter is switched on three minutes before use.
2. The electrodes are introduced into a buffer solution of known pH.
3. The meter will show PH of the buffer solution if the reading is different the knob is adjusted till the meter show the PH of the buffer solution.
4. Then the electrodes are removed and raised in distilled water.
5. The water droplets present on the electrodes are removed with the help of filter paper. Now the electrodes are immersed is the water sample taken in a beaker.
6. The meter reading show the PH of the water sample.
7. The PH of the second sample can be measured after rinsing the electrodes in distilled water.

AMAZING FIREFLY

Dewangana M. Lothe

Kingdom	:	Animalia
Phylum	:	Arthopoda
Class	:	Insecta
Order	:	Coleoptera
Superfamily	:	Elateroideae
Family	:	Lampyridae
Genus	:	*Photuris*
Species	:	*Pyralis*

Introduction

The lampyridae are a family of insects in the beetles order Coleoptera with over 2000 described species. They are soft bodies beetles that are commonly called as fireflies or lightning bug for their conspicuous use of bioluminescence during twilight to attracts mates or prey. Fireflies produced a "cold light" with no infrared or ultraviolet frequencies. This chemically produced light from the lower abdomen may be yellow, green or pale red with wave length from 510 to 670 nm. Most fireflies are nocturnal although some species are diurnal.

Habitat

Fireflies live in various habitats. Many species thrive in field or the margins between them. Some live in more arid areas but they typically follow the rainy season. Fireflies are found all over world form North and South America to Europe and Asia these insects live in a variety of warm environment , as well as in more temperate region and are familiar sight on summer evenings. Fireflies love moisture and often live in humid region of Asia and America ponds, streams, rivers; marshy area and even a small depression full of water are all good habitats for fireflies.

Morphology

Fireflies are soft - bodies beetle s that range from 5 to 25mm in length. The flattened, dark brown or black body often marked with orange or yellow. Some adults fireflies do not eat. Whereas many feed on the pollen and nectar. In a few species female are predators on male of others fireflies species.

Anatomy

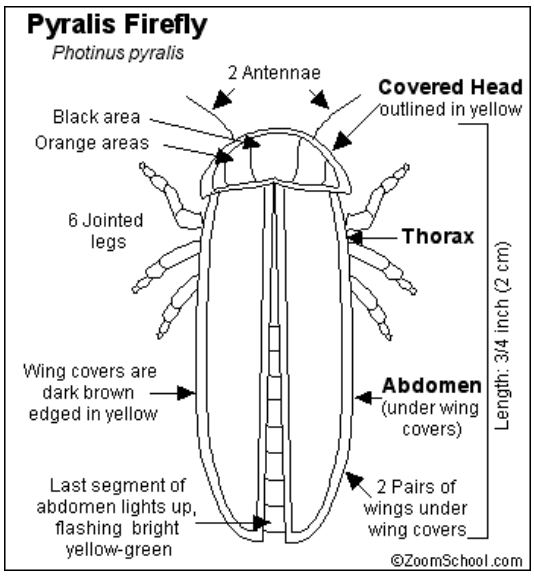
Like all insects it has a hard exoskeleton, six joined leg, two antennaes, compounds eye's and a body divided into three part head, thorax and abdomen. It is mostly black with two ted spots on head covers and line in yellow. The antennae, long protrusion form head, enable the insects to sense the world around it. An insect also has a thorax with six legs, which is the muscle centre to the body. And it has a unique abdomen that emits light chemically.

Flashing and Mating

Each species of fireflies sends different mating signals. Typically the male fireflies fly around flashing and looking for who wait on the ground. Each species has its own flashing pattern, and when a female seen one she like answers with flashes of her own. She choose a male not only by pattern but also by how brightly he flashes are. Because the male with best flashing pattern are usually the strongest and biggest, her choice help to insure the best father for her offspring.

Reproduction

Fireflies flash to find a mate using a species- specific pattern to located compatibleindividuals of the opposite sex. Typically the Male flies low to the ground, flashing a signal with light organ on its abdomen and a female resting on vegetation returns the male communiqué. Fertilization are internal abdomen'sizations.



Females deposits their fertilized egg in the ground which is where larvae developed to adulthood. Underground larvae feed on worm and slugs by injected them with a numbering fluids.

Life cycle of fireflies

Like all beetle, the fireflies have a complete life cycle consisting of four stages: Egg, Larva, Pupa and Adult. The adults female lay their egg in mid- summer. Fireflies grow by a four stage process called complete metamorphosis. After mating female fireflies lay their egg on the ground or under mulch or logs in midsummer.

Egg

The fireflies life cycle begins with in an egg. In midsummer, mated females will deposits about 100 spherical egg , singly or in the cluster in the soil or near to soil surface fireflies prefer moist soil and will often choose to place their egg under mulch or leaf where soil is less likely to dry out. Some fireflies will deposits egg on vegetation rather than directly in soil. Fireflies egg usually hatch in three to four week.

Egg incubate for approximately three week before they hatch into larvae

Larvae (larval stage)

After about two to three the egg hatch and larva emerged the larva as well as wingless females are referred to glow-worms. The larva are flattened with 10 segmented abdomen. The head is small, usually retracted with curved mandibles.

As with many beetles, lightning bug larvae look somewhat worm like. The dorsal segments are flattened and extend to black and sides like overlapping plates. Fireflies larvae produced light and sometimes called glow worms

Firefly larvae usually live in soil. At night they hunt slugs, snails, worms and other insects. When it capture prey the larvae will injects its unfortunate victims with digestive enzyme to immobilize. Larvae emerge from their egg in late summer and live through the winter before pupation in springs. In some species the larval stage lasts well over years with the larva living through two winters before pupating.

The larva will the repeatedly molt to its exoskeleton, replacing it with a larger cuticle each time. Just before pupating the fireflies larva measure about three-quarter of an inch in length.

Pupa (Pupal/Resting stage)

When the larva is ready to pupate usually bin late spring it constructs a mud chamber in soil and settles inside it. In some species the larva attaches itself to a tree's bark hanging upside down by the hind end and pupated while suspended (similar to a caterpillar).

Regardless of which position the larva assume for pupation, a remarkable transformation take place between during the pupal stage. In a process called Histolysis. The larva body is broken down and special groups of transformative the cell are activated. These cell group called histoblasts, trigger biochemical process that transform the insect form a larva into its adult form.

When metamorphosis is completed, the adult fireflies is ready to emerged, usually about 10 day to several week after pupation.

Adult

The fully formed adult that we might recognized by its flashing- light behaviour emerges from the pupa in early to mid-summer. Adults fireflies are approximately half an inch long with brownish hard wing casing called elytra. The light emitting part of firefly is at the end of its abdomen. As thefireflies flies main goal to find a mate and reproduction.

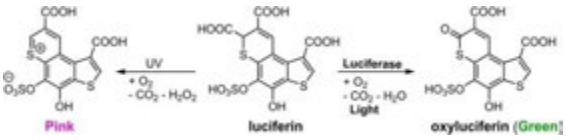
When the adult fireflies emerged, it has only one real purpose to reproduce. Fireflies flash to find a mate using a species-species pattern to located compatible individuals of opposite sex.

Bioluminescence in fireflies

You may have seen the sparkle of fireflies on a summer night. The fireflies produced light through the chemical reaction in their glowing abdomen a process known as bioluminescence. Bioluminescence is produced and emission of light by a living organisms. It is form a chemiluminescence.

In general sense the principal chemical reactions in bioluminescence involved some light emitting molecules and an enzyme, generally called as luciferin and the luciferase, respectively. In all characterized cases the enzymes catalyses the oxidation on luciferin.

Reaction of Bioluminescence



WOODPECKER

Neha P. Ramteke

Kingdom	-	Animalia
Phylum	-	Chordata
Subphylum	-	Vertebra
Division	-	Ganthostomata
Class	-	Aves
Subclass	-	Neorinuthes
Order	-	Pictermes
Genus	-	*Dinopium*
Species	-	*benghalense*

1. Introduction

Woodpecker are part of the family pacidae a group of near passerine birds that that also consist of pictures, wrynecks and sapsuckers. Member of this family are found worldwide, except for Australia, New Zealand, New Guinea, Madagascar and the extreme polar region. Must species live in the forest or Woodland habitats, although a few species are known that live in trees less areas such as rocky hillsides and deserts and the Gila Woodpecker specialises in exploiting cacti

2. General Characteristic

Woodpeckers range from tiny pictures measuring no more than 7 cm (2.8 in) in length weight 7 g (0.25 oz) large woodpeckers which can be more than 50 cm (20 In) length. The largest serving species is the great slaty woodpecker which weight 350 – 563: but probably the extinct imperial woodpecker and ivory – billed woodpecker were both larger.

The plumber of woodpeckers varies formdrob to conspicuous. The colour of many species are based in on alive and brown and some or pied. Woodpeckers have strong bills for drilling and drumming on trees and long stick tongues for extracting food.

3. Habitat

Overall woodpecker are arboreal birds of wooded habitats .they reach their greatest diversity in tropical rainforest, but occur in almost all suitable habitats including woodlands scrublands, and bamboo forest even grassland and deserts have been colonised by various species. These habitats are more easily occupied where a small number of trees exit or in the case of desert species like the Gila woodpecker tail cocti are available for nesting.

4. Behaviours

The majority of woodpecker live solitary, lives but the spectrums of behaviour ranges from highly antisocial species that are aggressive towards their own kind to species that live in group. Solitar species will defend such feeding rescues as a termite colony oraway other conspectcsamd returning frequently until the resources is executed aggressive behaviours including the bill pointing and jabbing, head shaking wing flicking chasing drumming and Vocalisation Ritual actions do not usually result in contract and birds may freeze for a while before they

resume their dispute the coloured patches may be flouted and in some instance these antagonistic behaviours resemble courtship rituals.

5. Diet and feeding

The majority of woodpecker species live up to their name and feed on insects and other invertebrates living under bark and other but overall the family is characterize by its directory flexibility with many species being both highly omnivorous and opportunistic. The diet include ants, termites beetles and their larvae, caterpillars , spices other orthopods,

bird eggs hetling, small ordinets, lizards fruit , nuts and ordents , lizards fruits nuts. And sap. Many insect and their grubs are trees form living and dead trees by excavation. The birds firm inside the timber indicating where it will be productive to create a hole other means are also used to garner prey.

6. Breeding

All members of the family picidae nest in cavities, nearly always in the trunks and branches of tree well away from the foliage. Where possible an area of rotten word surrounded by sound timber is used. Where trees are in short supply the gilded flicker and ladder blacked woodpecker excavate holes in catches and the and flicker and ground woodpecker dig holes in earth banks. The campo flicker sometimes chooses termite mounds the refocus woodpecker prefers to use ants nests in trees and the bamboo woodpecker specialises in bamboos. Woodpecker also excavate nest holes in residential and commercial structures as well as modern utilise poles.

BUTTERFLIES

Pallavi R. Zole

Kingdom	:	Animalia
Phylum	:	Arthropoda
Class	:	Insecta,
Order	:	Lepidoptera
Superfamily	:	Papilionoidea

The macrolepidopteran clade Rhopaloc era from the order Lepidoptera, which also includes moths. Adult butterflies have large, often brightly coloured wings, and conspicuous, fluttering flight. The group comprises the large superfamily Papilionoidea, which contains at least one former group, the skippers (formerly the superfamily "Hesperioidea"), and the most recent analyses suggest it also contains the moth-butterflies (formerly the superfamily "Hedyloidea"). Butterfly fossils date to the Paleocene, which was about 56 million years ago.Butterflies have the typical four-stage insect life cycle. Winged adults lay eggs on the food plant on which their larvae, known as caterpillars, will feed. The caterpillars grow, sometimes very rapidly, and when fully developed, pupate in a chrysalis. When metamorphosis is complete, the pupal skin splits, the adult insect climbs out, and after its wings have expanded and dried, it flies off. Some butterflies, especially in the tropics, have several generations in a year, while others have a single generation, and a few in cold locations may take several years to pass through their entire life cycle. Butterflies are often polymorphic, and many species make use of camouflage, mimicry and aposematism to evade their predators. Some, like the monarch and the painted lady, migrate over long distances. Many butterflies are attacked by parasites or parasitoids, including wasps, protozoans, flies, and other invertebrates, or are preyed upon by other organisms. Some species are pests because in their larval stages they can damage domestic crops or trees; other species are agents of pollination of some plants. Larvae of a few butterflies (e.g., harvesters) eat harmful insects, and a few are predators of ants, while others live as mutualists in association with ants. Culturally, butterflies are a popular motif in the visual and literary arts.

Caterpillar larva

Butterfly larvae, or caterpillars, consume plant leaves and spend practically all of their time searching for and eating food. Although most caterpillars are herbivorous, a few species are predators: *Spalgisepius* eats scale insects,[42] while lycaenids such as *Liphyrabrassolis* are myrmecophilous, eating ant larvae

Pupa

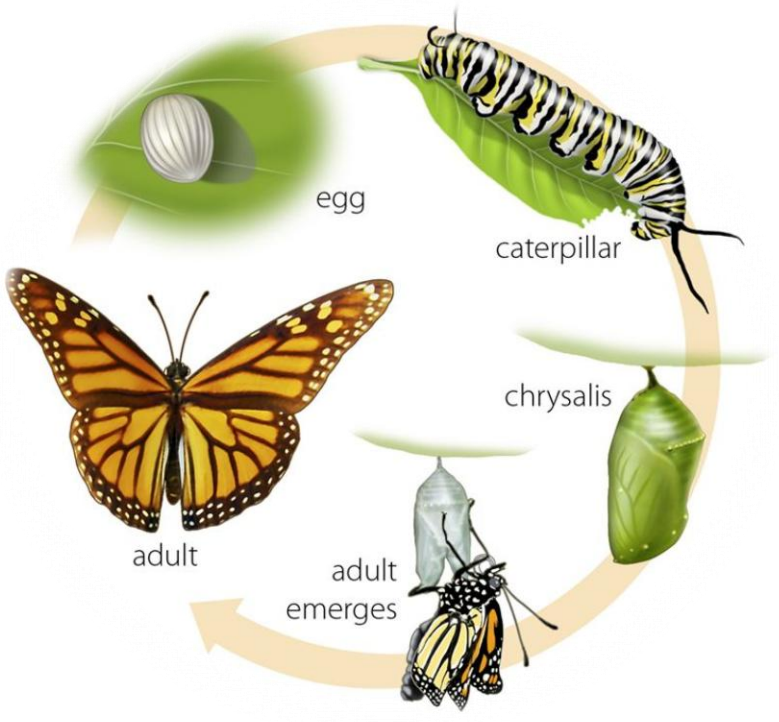
When the larva is fully grown, hormones such as prothoracicotropic hormone (PTTH) are produced. At this point the larva stops feeding, and begins "wandering" in the quest for a suitable pupation site, often the underside of a leaf or other concealed location. There it spins a button of silk which it uses to fasten its body to the surface and moults for a final time.

Adult

The reproductive stage of the insect is the winged adult or imago. The surface of both butterflies and moths is covered by scales, each of which is an outgrowth from a single epidermal cell. The head is small and dominated by the two large compound eyes. These are capable of distinguishing flower shapes or motion but cannot view distant objects clearly. Colour perception is good, especially in some species in the blue/violet range. The antennae are composed of many segments and have clubbed tips (unlike moths that have tapering or feathery antennae)

Behavior

Butterflies feed primarily on nectar from flowers. Some also derive nourishment from pollen, tree sap, rotting fruit, dung, decaying flesh, and dissolved minerals in wet sand or dirt. Butterflies are important as pollinators for some species of plants. In general, they do not carry as much pollen load as bees, but they are capable of moving pollen over greater distances. Flower constancy has been observed for at least one species of butterfly.



WILDFIRE IN AUSTRALIA : A GLOBAL WARMING EFFECT

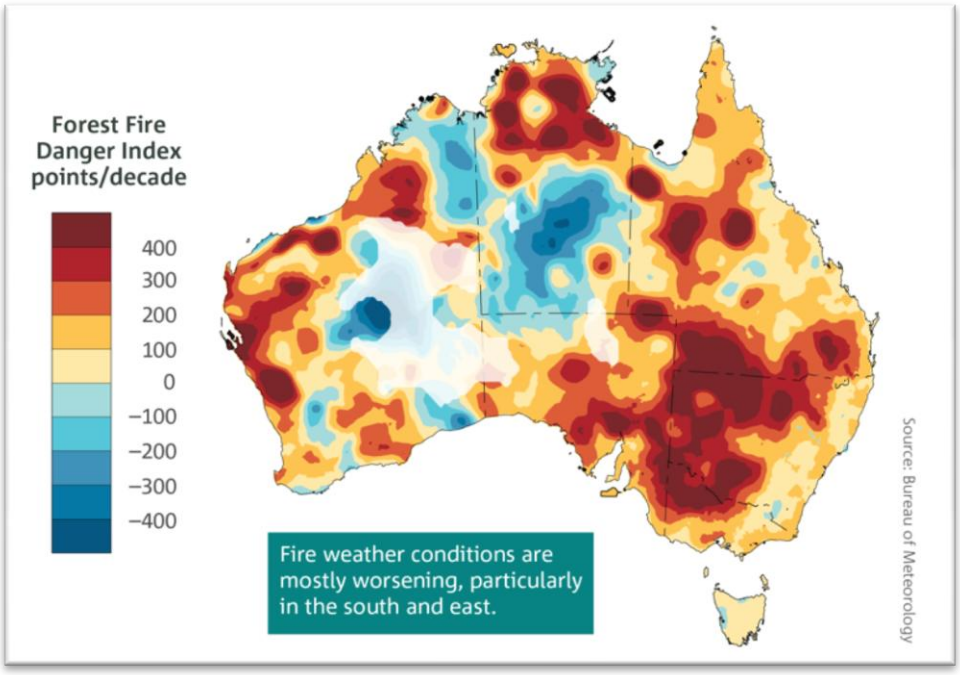
Kumar M. Yelam

This article is about Climate change that occur when changes in earth‟s climates system. Scientist have identified many episode of climate change during Earth global history; more recently since the industrial revolution the climate change has increasingly been affected by human activities during Global warming.

The climate system receives nearly all of its energy from the sun. the climate system also gives of energy to outer space. The balance of incoming and out coming energy and the passage of the energy through the climate system , determines Earth energy budget. 1) When the incoming energy is greater than the outgoingenergy, earth energy budget is positive and the climate system is warming. 2) If more energy goes out, the energy budget is negative and extra experiencing cooling.

Climate change is a long term, sustained trend of change in climate; such changes can be the result of

A) INTERNAL VARIBILITY -Exa. Variation in Ocean basins such as the pacific decadal oscillation and Atlantic Multi decadal oscillation.



B) EXTERNAL VARIBILITY - includes solar output and volcanism climate change has various consequences of Sea level changes, plant life , mass extinction‟s and also affect human societies etc.

Since the

beginning of the 20th Century in Australia increase of nearly 1 degree Celsius in average annual temperature, with worming occurring at twice the ret over the past 50 Years then in the previous 50 years. Rainfall in south-western Australia has decrees by 10-20 % since the 1970s, Water sources in the South areas of Australia have depleted due to increasing population in urban areas with climate change factors. Which is caused by Greenhouse gas emission Global Warming will negatively impact the environmental, Economy and communities.

Recently the report find that across the Australia over 10 million hectors of Austrian land has been burned to the ground over 1 billion Animal have lost their lives so for, including thousands of Koalas (8400), Kangaroos, Wallabies, Birds and other Iconic wildlife. Human support is needed to care for wild-life and restore their homes by Go Green the Earth and decreases the various type of minor-major pollution which are Hazardous to future life Go Green 1. Do keep this world clean. 2. for sustainable living. 3. Make change for climate. Let‟s act together to control climate Change.

LAC CULTURE: A AGROBASED COTTAGE INDUSTRY

Prachi P. Dongare

Lac is nature‟s gift to Mankind and the only known commercial resin of animal origin. It is the hardened resinous exudation from the body of female lac insect. Since Vedic period, it has been used in India. Its earliest reference is found in Atherva Veda. There the insect is termed as „Lacsha‟ and its habit and behaviour are described. The great India epic Mahabharata also mention a Lacsha Graha, an inflammable house of Lac, community constructed by kavraves through their architedpurocha, „Pandavas‟ alive. The Lac insect was used in Ayurveda and siddha systems of medicine and with increasing universal environment awareness the importance of Lac has assumed special relevance in the present are being an eco-friendly biodegradable and self-sustaining natural material it is also a source of livelihood of trial and inhabitant forest and Sub-forest areas.

The first scientific name given to it was techardialacca following the name of French missionary father hacharidia it was later changed to lacifer loccifer loocakerr the other name given to has been kerria lac Kerr.

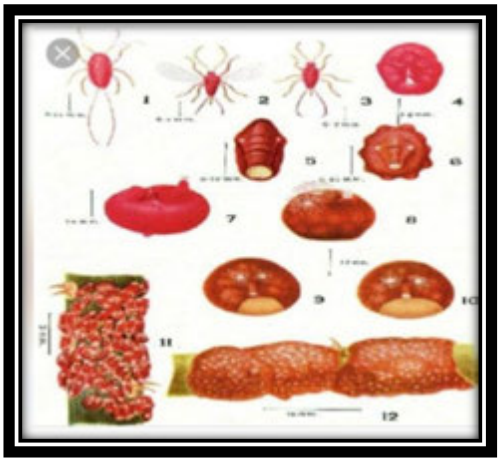
1) Kusumi

The Kusumi strain is grown on kusum or on the other host plants using kusumibrood: in case of kusumi strain, two Crops (i) Jethwi (June/July) Aghani (Jan/Feb)

2) Rangeeni

The rangeeni strain thrain thrives on host plants other than kusum the life cycle of lac insects take about six months, the lac encrustations are removed from twinges of host plant by scraping. The raw lac thus obtained is known as raw when this happens the female has oviposit a large number of egg in the space called ovisac. The ovisac appears orange due to crimson fluid called lac dye, is a mixture of antroquinoid derivatives it is traditionally used wool, silk .

Lac Wax



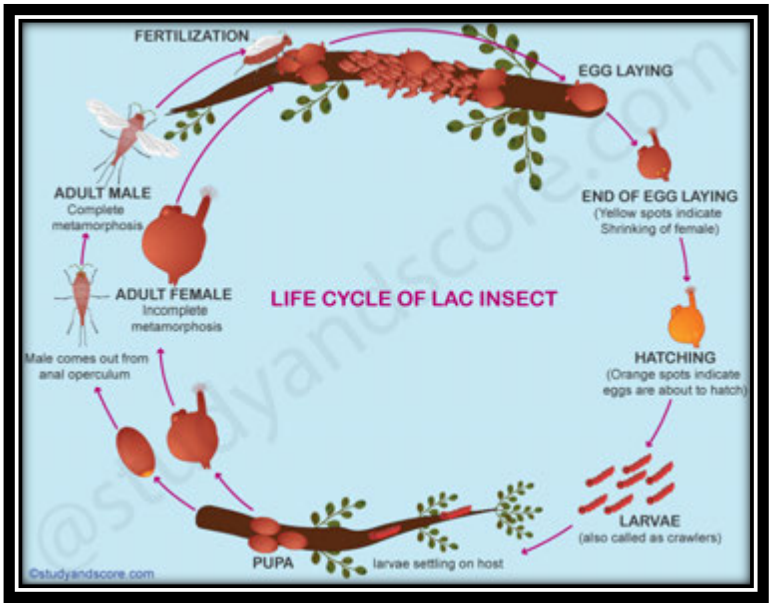
Lac wax is a mixture of higher alcohols, acid and their esters it is used polish shoes, floor.

Shellac

Shellac is a natural gum resin. It natured, nontoxic psychologically harmless and edible resign. It was fruit coating chocolate primers, finishes, insulation, capping lamination binder for grinding wheels bleached shellac.

LIFE CYCLE OF LAC INSECT

The life cycle of lac insect mainly depends on the ecological factors of the region like the temperature, humidity and the host plant species. It includes four stages namely, Egg, Nymph instars, Pupa and adult. The egg reached the adult stage within six months. The following are the stages involved in the reproduction of lac insects,



Fertilization

Lac insects are ovoviviparous types. The females get attached to the host plant inside the resinous mass. The male insect comes out of its resinous mass by pushing the operculum of the anal opening and then walks over the resinous covering of the female. This walking fertilizes the female within. One male lac insect is capable of fertilizing many females.

Egg-laying

After the fertilization, the female grows rapidly until it begins to lay eggs. By the time female starts to lay the eggs, its body contracts on the ventral side and gradually vacating the place for the eggs to be accommodated inside the resin cell. After laying the eggs the female secrets the lac resin at a faster rate. After about 14 weeks, female completes shrinks in size allowing the light to pass into the cell and onto the eggs.

At this stage, two yellow spots appear at the rear end of the resin cell. These spots gradually enlarge and turn orange in colour. This indicates the completion of egg-laying by the female lac insect. After laying the eggs the female lac insect dies. Now the resin cell with eggs is called as ovisac. The ovisac appears orange in color due to the crimson fluid called the lac dye. This indicates that eggs are about to hatch in a week.

SARUS CRANE

Shital D. Kore

The sarus crane is a larger non migratory crane fainted in part of Indian subcontinent, southeast Asia and Australia. The tallest of the flying birds, standing at the high up to 1.8 m , they are conspicuous spices of open wetlands in south Asia and eucalyptus dominated woodlands and grassland in Australia.

The adult Sarus crane is very large with grey wings and body, a bare red head and part of the upper neck. A greyish crown and long neck is had strength.

The bare red skin of the adult head and neck is brighter during the breading season. The skin is rough and covered by papillae, and narrow area around the behind the head is covered by black bristly feathers.

The sexes do not differ in plumage although male are on average larger then female, males of the Indian population can attain maximum height around 180 cm. The world tallest extant Flying bird. The weight of nominate race, individuals is 6.8-7.8 kg. While five adult.

The body mass in Australian Sarus Cranes was found to average 6.68 kg in male and 2.25 kg in female with a range for both sexes of 5.0 to 6.9 kg.

Habitat

The species has historically been widely distributed on the lowlands of Indian along the genetic plains extending south to Godavari River. The species is longer bread in the state. A responsibly sized population of over 150 Cranes has recently been discovered breeding in rice in the Ayeyarwadidatam Myanmar with additional Cranes confirmed in the state Cochin and Rakhina.

Habits and Lifestyle

Sarus cranes are regarded as the least social crane species. Especially when nesting, they can be very protective, and are aggressive towards intruders. They can therefore be considered a territorial species. Breeding pairs remain close by areas which have ample water supply. Pairs that are non-breeding flock together in bigger wetland areas. Although breeding pairs are territorial, sarus cranes form bigger flocks in the non-breeding season. The size of a flock usually depends on the wetland area. Within flocks, the cranes feed and roost. Sarus cranes are active during the day and sleep at night. They are known for dancing to attract mates. Characteristic loud trumpeting sounds may accompany these dances.

Diet and Nutrition

Sarus cranes are omnivorous, and eat a wide range of food, such as aquatic plants like sedge

tubers, seeds, rice and other grains, crustaceans, snails, large insects such as grasshoppers, amphibians, reptiles, small vertebrates and fish.

Mating Habit

Sarus cranes are monogamous birds and pairs mate for life, however, "divorce" cases and mate replacement take place. The breeding season for these cranes is typically during the rainy season, from June to September. The birds perform courtship dances to attract attention and impress their mate. All age groups typically dance, from young fledglings which are developing their motor skills to bonded pairs displaying courtship. These birds nest on the ground. A bulky nest is formed from wetland vegetation. Females usually lay two eggs, occasionally three, and incubation lasts for around 31 to 34 days, and is mainly done by the female, while the male defends the site of the nest. Chicks can follow the adults from the day they hatch, and they fledge 85 to 100 days from hatching, when they are able to make their first flight.

Population

- **Population threats**

Sarus cranes are threatened mainly by loss of habitat throughout their range, due to drainage of wetlands, agricultural expansion and human development, which degrades their habitat. The use of pesticides, as well as collisions with wires, are important threats. These cranes are also commonly targeted by humans hunting and egg collecting. Sometimes eggs are stolen, and the chicks raised for food.

- **Population number**

According to the IUCN Red List, the total population size of the Sarus crane is 19,000-21,800 individuals, including 13,000-15,000 mature individuals. There are also specific estimates of this species in these regions: India, Nepal and Pakistan - 8,000-10,000 cranes; Cambodia, Laos and Vietnam - 800-1,000 cranes, Myanmar 500-800 cranes and 10,000 breeding adults in Australia. Overall, Sarus cranes‟ numbers are decreasing today and they are classified as vulnerable (VU) on the list of threatened species.

- **Ecological niche**

As a predator of small invertebrates and vertebrates, Sarus cranes have an important role in controlling these populations. The abundance of their eggs also influences food sources for their natural predators. They also help control vegetation.

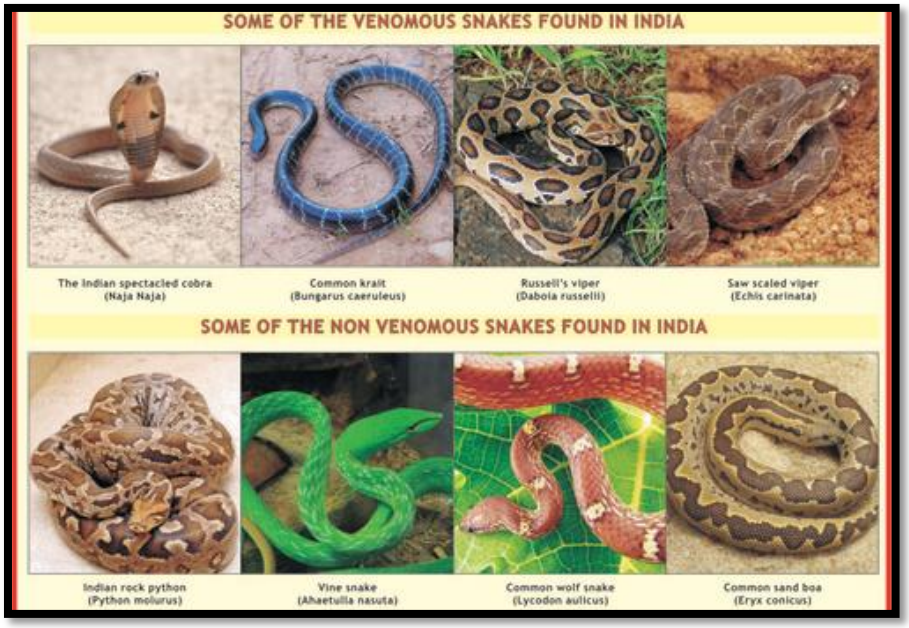
Interesting Facts about Sarus crane

- Sarus cranes utter loud, high-pitched calls. In courtship displays, the female gives two calls while the male gives only one.
- Sarus cranes fly with a straight neck, and their long legs trailing behind. They beat powerfully with their wings, and are good fliers.
- During the breeding season, the red legs, head, and neck of the sarus crane turn brighter.
- If a sarus crane lays two eggs, there is a 48- hour gap between the first and second egg.
- The legs and feet of a crane move in conjunction with its beak.
- With the death of one partner, other will sacrificed its life. It shows love between them.

SNAKES AND SNAKE BITE

Prajakta R. Dahiwale

About 7,000 venomous snakes bite Trusted Source cases are reported every year in the United States. A bite from a venomous snake is rarely deadly about 6 fatalities are reported every year, but it should always be treated as a medical emergency. Even a bite from a harmless snake can be serious, leading to an allergic reaction or an infection. Venomous snake bites can produce an array of symptoms, including localized pain and swelling, convulsions, nausea, and even paralysis.

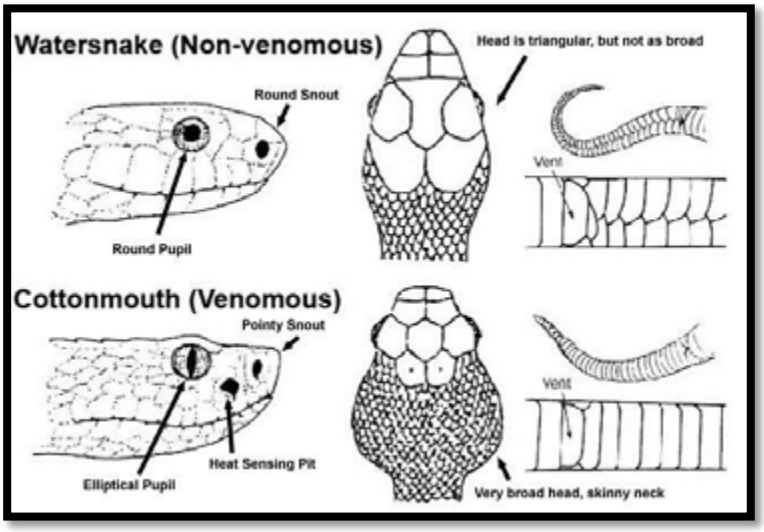


First aid steps you can take after a snake bite occurs include cleaning the wound, remaining calm, and immobilizing the affected area. However, it's essential to get to a medical facility immediately for emergency treatment. If treated in time, the outlook for recovery is good.

Identifying venomous snakes

If you are unfamiliar with the different types of snakes and unable to distinguish between venomous and non-venomous ones, it can be difficult to know how to respond in the event of a bite. Always treat a snake bite as if it's venomous.

While most snakes in the U.S. are not venomous, several types do contain venom. In the U.S., all of the venomous snakes, except for the coral snake, are pit vipers. Pit vipers are distinguishable by a noticeable depression between the eye and nostril. This pit is the heat-sensing area for the snake. While all pit vipers have a triangular head, not all snakes with a triangular head are venomous.



If you or someone you are with has been bitten by a snake, you will know immediately. It‟s possible, though, for the bite to happen quickly and for the snake to disappear.

To identify a snake bite, consider the following general symptoms:

- Two puncture wounds
- Swelling and redness around the wounds
- Pain at the bite site
- Difficulty breathing
- Vomiting and nausea
- Blurred vision
- Sweating and salivating
- Numbness i n the face and limbs

First aid for snake bites

Should you be bitten by a snake, it‟s essential to get emergency treatment as quickly as possible. However, there are some tips that you should also keep in mind:

- Call 911 immediately.
- Note the time of the bite.
- Keep calm and still as movement can cause the venom to travel more quickly through the body.
- Remove constricting clothing or jewellery because the area surrounding the bite will likely swell.
- Don‟t allow the victim to walk. Carry or transport them by vehicle.
- Do not kill or handle the snake. Take a picture if you can but don‟t waste time hunting it down.

Treatment for snake bites

The most important thing to do for a snake bite is to get emergency medical help as soon as possible. A doctor will evaluate the victim to decide on a specific course of treatment. In some cases, a bite from a venomous snake is not life-threatening. The severity depends on the location of the bite and the age and health of the victim. If the bite is not serious, the doctor may simply clean the wound and give the victim a tetanus vaccine.

If the situation is life threatening, the doctor may administer antivenom. This is a substance created with snake venom to counter the snake bite symptoms. It‟s injected into the victim. The sooner the antivenom is used, the more effective it will be.

Prevention of snake bites

Snake bites can be prevented in many cases. It‟s best to refrain from approaching or handling snakes in the wild. Avoid typical places where snakes like to hide, such as patches of tall grass and piled leaves, and rock and woodpiles. If you encounter a snake, give it space to retreat and let it take cover. When working outside where snakes may be present, wear tall boots, long pants, and leather gloves.

GLOSSOWING BUTTERFLY

Ujjwala P. Shivankar

Introduction

Greta ota is a species of brush-footed butterfly and member of the subfamily Danainae tribe Jthomini and sub tribe Goodiridina. It is knownby the common name Glass owing butterfly for its unique transparent wings that allow it to camouflage without extensive coloration. in Spanish speaking regions, it may also be reformed to as espejitos meaning “little Mirror” because of it transparent wings.

Habitat

The butterfly is mainly found central and northern region of South America with sighting as for North as taxes and as for South as chile. It addition to its Unique wing physiology the butterfly is known for behaviours such as long migration and liking among male.

Morphology

The adult glasswing butterfly can be identified by its transparent wings with opaque dark brown borders tinted with red or orange. Their bodies area dark brown colour. The butterflies are 2.8 to 3.0 cm (1.1 to 1.2 inch) in length and have a wingspan of 5.6 to 6.1 cm (2.22 to 2.4 inch)

Life cycle

- **Egg**

Eggs are typically laid on plant of the genus cestrum a member of the night shade family of plant which serves as a food source for later life stages.

- **Larva**

The caterpillers of the glasswings butterfly have green bodies with bright purple and red stripes. They are found on the host plant of genus senstrum. The Larvae are cylidrical in shape with dorsal projection that are smooth with filaments.

- **Pupa**

The Pupae are silver in colour during the fifth in star stage, the pupa producced a silk pad on the lower surface of leaves through four spinning movement on to which it attaches. the silk fibers are important is providing greater flexibility to the pupa attachment the cremaster a hooked bristle like structure on the pupa attaches to these silk pad by a series of lateral movements of the pupa's posterios abdomen. The Pupa attachment to have high tensile strength and toughness.they prevent the pupa from being pulled by predators

- **Adult**

The adult glass wing butterflies can be identified by its transparent wings with opaque dark brown borders. tinted with red or orange their bodies dark brown colour.

- **Life span**

There is an average life span of a butterflies. It is usually about 1 month although the smallest butterflies that you can usually spot feasting on the flower in you are front yard will usually only live about one week.

INSECTIVOROUS PLANTS

Rekha V. Pustode

"Insects are one of the most common prey items for most Carnivorous plants. They are sometimes called insectivorous Plants".

Charles Darwin wrote insectivorous plants. The first well known treatise on Carnivorous plants In 1875. Insectivorous plants feeds on insects Leaves are modified into structure that help to trap insects. Carnivorous plants are plants that derive some or most of their nutrients from trapping and other arthropods. Insectivorous plant are not parasite. Carnivorous plants have adopted to grow in places where the soil is thin or poor in nutrients, especially nitrogen, such as acidic bogs. Carnivorous plants have the most bizarre adaptations to low nutrient by trapping and digestive various invertebrates and occasionally even small Frogs and Mammals. It is not surprising that the most common habitat of these plants is in bogs and fens, where Nutrient concentration are low but water and sunshine seasonally abundant. As many as thirteen species of Carnivorous plants have been found in a single bog. Most plants absorb nitrogen from the soil through their leaves specially modified as traps.

Example:- Pitcher plants, Venus fly trap, drosera, uticularia.

1. **Pitcher Plants**

In a Pitcher plant the leaf is modified to from a pitcher like structure when any insect sits on the pitcher, the lid is closed. It is then digested by the secretion of enzyme. Pitcher plant, leaves are in the form of a Container or pitcher with a lid to cover the mouth.

2. Venus Fly Trap

Venus Fly Trap has leaves that are like boxes with hinges. When an insect touches the hair, the leaf snaps shut, trapping the creature inside.

BT COTTON

Pooja T. Gajbe

What is BT Cotton?

BT cotton has been genetically modified by the insertion of one or more genes from a common soil bacterium, Bacillus thuringiensis. These genes encode for the production of insecticidal proteins and thus genetically transformed plants produce one or more toxin as they grow. The genes that have been inserted into cotton produce toxin that are limited in activity almost exclusively to caterpillar pests (Lepidoptera) however other strain of Bacillus thuringieses have genes that encode for toxin with insecticidal activity on some beetles (Coleoptera) and flies (Diptera). Some of these genes are being used to control pests in other crops.

What insects does it control ?

In 1996, Bollgard cotton (Trademark of Monsanto) was the first Bt cotton to be marketed in the united states. The original Bollard cotton produce a toxin called cry 1 AC that has excellent activity on tobacco budworm and pink bollworm. These two inserts are extremely important caterpillar pests of cotton and both are difficult and expensive to control with traditional insecticides. Consequently Bt cotton was widely adopted by growers in the western cotton belt for pink bollworm and by grower sin the midsouth and southeast, primarily for tobacco budworm.

How does BT cotton affect insect pest management?

BT cotton eliminates the need to treat for infestations of tobacco budworm (or pink bollworm in areas with this pest). Prior to bloom the need to treat for bollworm is greatly reduced. However, the level of bollworm control provided by bollard cotton may not be sufficient once a cotton has begun to bloom.

Can insects develop resistant to Bt Cotton?

It seems likely that some cotton pests could develop resistance BT crops if they extensively used. Insects such as the tobacco budwarm are well known for their ability to develop resistance to many insecticides associated with the use of Bt cotton that are intended to prevent or delay the development of resistant. The primary resistant management strategy is the mandatory planting of a non- Bt cotton refuge. The refuge serves as a source of susceptible insects that would potentially breed with any resistant insects generated Bt cotton fields.

Is BT Cotton safe?

BT toxins are highly specific. The toxin produced by Bt cotton and corn are toxin to a select number arthropod species. Because cotton is primarily a fibre crop, the contamination of food with toxins from cotton is highly unlikely. However extensive testing indicates a very low public health risk from the use, including ingestion of food product that utilise currently available BT crops.

WOODPECKER

Manisha R. Balbuddhe

Kingdom	:	Animilia
Phylum	:	Chordata
Class	:	Aves
Order	:	Pisiforms
Inforder	:	Picides
Family	:	Picidae

Woodpecker are part of the family Picardie a group of near passerine birds that also consists of picults, wrynear and sapsuckers. Member of this family are found worldwide except for Australia, New Guinea New Zealand. Madagascar and the extreme polar regions. Most spices live in forests or woodland habitats, although a few species are known that live in treeless areas, such as rocky hillsides and deserts and the Gila woodpecker specialises in exploiting cacti.

Member of family are chiefly known for their characteristic behaviour. They mostly forage for insect prey on the trunks and branches of trees, and often communicate by drumming with their beak, producing a reverberator sound that can be heard at some distance. Some species vary their diet with fruits, birds‟eggs, small animals and tree sap. They mostly nest and roost in holes that they excavate in tree trunks, and their abandoned holes are of importance to other cavity nestling birds. They sometimes come into conflict with human when they make holes in buildings or feed on fruit crops but perform a useful service by their removal of insect on trees.

AZOLLA : A BIOFERTILIZER

Rita D. Raut

Azolla is a genus of seven species of aquatic ferns in the family salviviaceae. They are extremely reduced in for, and specialized, looking nothing like other typical ferns but more resembling duckweed or some mosses.

As a green manure Azolla is grown alone for two or three weeks in flooded fields. After wards, water is drained out and Azollafern is incorporated in the field before transplanting of paddy. Otherwise 4-5 gm of fresh Azollais applied in standing water one week after planting of paddy. Azolla can be used as an animal feed, a human food, a human food, a medicine and water purifier. It may be used for the production of Hydrogen fuel, the control of mosquitoes and the reduction of ammonia Volatilization which accompanies the application of chemical Nitrogen fertilizer Azolla is useful in aquaculture practices primarily as a Nitrogenous bio fertilizer. It is high decomposition rates also makes it a suitable substrate for enriching the detritus for food chain or for microbial processing such as compositing prior to application in ponds. Further Azolla can serve as an ingredient of supplementary feed and as forage for grass carp too.

Azolla is a new aquaculture input with high potentials in both fertilisation and tropic enrichment. Studies are also being made with regard to reduction of land requirement and production cost through in sita cultivation in shallow zones or floating platform in fish ponds, use of organic inputs like biogas slurry. The cost may be reduced farther if the Azolla culture system is managed by the farmer or by his household members. The technology would pave the way for economic, eco-friendly and environment conserving fertilization in aquaculture.

Bio fertilizer plays an important role in improving soil fertility and boosting crop field. Food in addition to its traditional cultivation as a bio fertilizer for wetland paddy, Azolla is finding increasing use for suitable production of livestock feed. Azolla is rich in protein; it has essential amino-acids, Vitamins and minerals. Feeding Azolla to dairy cattle, pigs ducks and increases the milk production.

Azolla floats on the surface of water by means of numerous small closely overlapping scale like leaves. They form a symbiotic relationship with the cyanobcterium Anabaena Azollae, which fires atmospheric nitrogen giving the plant access to the essential nutrients.

Azolla has been used for at least one thousand year in rice paddies as companion plant because of the presence of nitrogen fixingcyanobacteria in symbiosis with Azolla and its tendency to block out of light to prevent any completion from other plants. Azolla is use as an ingredient of supplementary food. It has nitrogen fixation property. Also it can be used as water purifier, bio fertilizer and as medicine also.

HONEY AND ITS BIPRODUCTS

Neha G. Mungmode

I. Honey

Honey prepared from the nector of a single flower sources is called unifloral honey, while honey prepared from nectar of several sources is called multifloral honey. Honey is extremely variable in its properties and composition. It has characteristics flavours and aromas depending on the plant source.

Average composition of the ripened Indian honey is as follows:

Water 20.89 % (Apiary honey)
Dextrose (Glucose) 35 %
Sucrose 1.9 %

- **Uses:** 1.A major part of the production is presently consumed as food ingredients. 2. Honey is potential dietary to counter reactive free radicals.

II. Beeswax

Beeswax is a metallic product of the honeybees. Rockbee wax is usually dark yellow to brownish in a color. The melting point of rockbees is 59.6^{o}C.

- **Uses:** 1. Beeswax is used in preparation of candles. In metal casting and modelling because due to its plasticity. 2. Beeswax is used by beekeepers for the making of wax fecundating, which are given to the bees as a guide for construction of their combs.

III. Royal Jelly

Royal jelly is a special liquid food, rich in protein, hormones, vitamins, organic acids and minerals. It is secreted by the hypo pharyngeal gland of young worker bees. The lipid function consists of free fatty acids. The major mineral salts are K, Ca, Na, Zn, Fe, Cu and Mn.

- **Uses:** 1. Royal jelly improves immune response and general body function. 2. Probably the largest use of royal jelly is in cosmetics and dermatological preparation.

IV. Pollen

In India, rock bees collect enormous quantity of pollen. Pollen is sold as tablets, capsules mixed with honey. The major components are protein and amino acids, lipids and sugars.

- **Uses:** 1. The major use of pollen today is as a food or food supplement. 2. Pollen has only recently been included in some cosmetic preparation with claim of rejuvenating and nourishing effects for the skin.

V. Propolis

Propolis is a mixture of the beeswax and the resins collected by honeybees from plants. Propolis ranges from yellow to dark brown in color at temperature of 25 -45^{o}C.

- **Uses:** 1. It has been incorporated in special varnishes. 2. In sub-saharan Africa, propolis is still used today in herbal medicines.

VI. Bee Venom

Honey bee venom is clear, watery liquid and odourless. About 88 % of venom is water. The glucose, fructose content of venom are similar to those in bees blood.

- **Uses:**1. Bee venom has long been used in traditional medicines for treatment of various kinds of rheumatism. 2. It is used in cure of the disease, like arthritis, chronic pain, etc.

A REPORT ON WORLD WETLAND DAY

Harshada T. Janbandhu

Name : Harshada Tatoba Janbandhu
Class : B. Sc. Semester IV
Subject : Zoology
ID No. : 716553

Project Name : Bird identification and counting on World Wetland Day
Date of submission: 02/02/2019

World wetland day accrues annually on February 2 making the date of the adoption at the convention on Wetland on February (1971).

When a small group of environmentalist signed an international agreement at the Ramsar convention in Iran. Established to raise awareness about the value of wetland for humanity and the planet WWD was celebrate for the first time in 1997 and has grown since then.

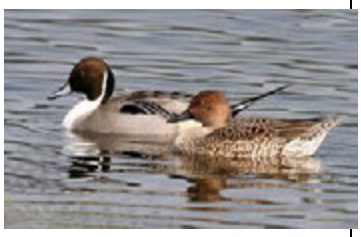
Each year Government agencies non-governmental organisations and group of citizenship at all level of community have under take advantage of the opportunity to the take undertake action aimed at the rising public awareness of Wetland value an d benefit such as conservation some of these benefits includes biologically diverse ecosystem that provide habitat for many spices serve as buffers on the coast again storm and flooding and naturally filter water by breaking down or transforming harmful pollutants.

We have visit to the wetland day special in Srungarbandh and Navegaon National park in 2nd Feb 2019. 32 birds were identified.

Sr. No	Name of Birds	Photograph	Status	Description
1.	Greylag Goose		Winter Migratory	They are herbivorous Nestling on ground
2.	Great cormorant		Common Migratory	Indian cormorant is smaller than great cormorant.

3.	Little carmarant		Common Migration	Found in small pond fresh water birds such as river & lake
4	Snake Birds/Indian		Common Migration	Nest tree surrounding water several parls may nest close to each other
5	Median Egret		Common migration	Hunt & live in both saltwater & freshwater marsh
6	Grey heron		Winter migration	The bird often perch in tree but spend much time on ground
7	Black nock strok		Regional migration	Largest population occur in agriculture landscapes
8	Purple heron		Winter migration	Smaller then gray heron carnivorous

9	Pond heron		Common migration	Breed season begins with the onset of monsoon
10	Bee eater		Irregular migration common migration	The nest are burrow dug on the ground
11	Little ring plover		Winter migration	The nest on ground on stone with little or no plant growth
12	Black headed ibis		Winter migration	It is very versatile being able to use a large verity of natural & man made habitats.
13	Open bill stork		Common migration	The adult have a group bet arch upper mandible and required lower mandible but young one borne with gap.
14	Munia (Silver beak)		Common migration	They are commonly found in paddy field.

15	Pintail		Winter migration	The pintail feed by dabbing & upending in shallow water plant food
16	Common coot		Winter migration	This is noisily bird with a wide repertories of crackling exptesius or trumpeting wall aften given at night.
17	Bronze winged Jacana		Common migration	Sedentary making local movement as necessary
19	Lesser whistling duck		Winter migration	They are nocturnal feeder
20	Pied kingfisher		Common migration	It need perches close to water as trees.

TOUR REPORTS

1. GOVERNMENT FISH SEED PRODUCTION CENTRE SHIVNIBANDH DIST BHANDARA

B. Sc. Semester V students along with Dr. G. T. Paliwal and Dr. M. K. Bangadkar visited Government Fish Seed Production Centre Shivnibandh Dist Bhandara as a part of their Educational Tour on 7th August 2019. Total 50 students of semester V were participated. Students observed fish breeding operations of Indian major carps. They studied Breeding Ponds, Breeding Happas and Chinese Circular hatchery system. Shree Marbate, fisheries officer guided the students about various activities carried out at the centre.Students collected material from the farm for the laboratory.





2. KRUSHI VIGYAN KENDRA SAKOLI

B. Sc. Semester V students along with Dr. G. T. Paliwal and Dr. M. K. Bangadkar visited Krushi Vigyan Kendra, Sakoli Dist Bhandara as a part of their Educational Tour on 7th August 2019. Total 50 students of semester V were participated. Dr. Pramod Parwate, Programme Co-ordinator of the centre guided the stuents on various research activities and also gives information on modern technologies used in agricultural field. Mr. Layant SRF from the centre explained the system of Meterology department held at the centre. He also explained the working and the use of meterological data for the farmers.

MERITORIOUS STUDENTS

Congratulations for securing 75 % and above marks in Zoology for semester- V session 2018-19 in R.T.M. Nagpur University Examination...!!

Ms. Dewanga M. Lothe
134/150

Ms. Shivani N. Gahane
131/150

Ms. Geetashree U. Chandewar
127/150

Mr. Rohit B. Neware
127/150

Ms. Alfiya K. Sheikh
126/150

Ms. Trupti N. Chandewar
124/150

Ms. Aparna R. Borkar
124/150

Ms. Pranati R. Parwate
118/150

Ms. Chhabu Y. Bagade
117/150

Ms. Prachi P. Dongare
114/150

Harshada T. Janbandhu
113/150

Ms. Heena V. Chandewar
113/150

Ms. Kanchan M. Lanjewar
113/150

CLASSROOM ACTIVITIES

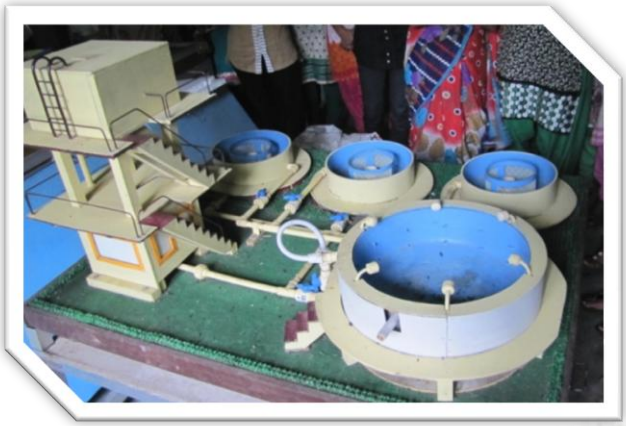

MICROTOMY


CLASSROOM SEMINARS


DISSECTION

TITRATION

STUDY TOUR TO FISH SEED PRODUCTION CENTER, SHIVNIBANDH



CELEBRATION OF WORLD WETLAND DAY AT SHRUNGARBANDH, NAVEGAONBANDH AND ITIADOH

CELEBRATION OF WORLD WETLAND DAY AT SHRUNGARBANDH, NAVEGAONBANDH AND ITIADOH

GLIMPSES OF ANNUAL GATHERING CULTURAL ACTIVITIES 2019-20

EXCELLENCE IN SPORTS, CULTURAL AND ACADEMIC ACTIVITIES

OTHER ACTIVITIES

Students of B. Sc. Semester VI, Session 2019-20 with Principal Dr. D. U. Kakade,
Dr. G. T. Paliwal and Dr. M. K. Bangadkar

STOP

Global warming

BETTER LATE THAN NEVER