B.Sc. ZOOLOGY

I YEAR – I SEMESTER

COURSE CODE: 7BZOA1

ALLIED COURSE - I – GENERAL & APPLIED ZOOLOGY

Unit - I

1. General classification of animal kingdom.
2. Unicellular, multicellular, radiate, bilateria, acoelomate, pseudocoelomata, coelomate.
3. Classification of invertebrata with Indian examples.
4. Outline classification of Phylum Chordata – Primary & Secondary Characters.

Unit - II

1. Malarial parasite – Types & Life cycle – prevention & control.
2. Corals & its importance.
3. Ascaris & Filarial worm Life cycle.

Unit - III

1. Insect pests [Paddy & Coconut] – Reasons for outbreak & control.
2. Beneficial insect – Silkworm.
3. Vermiculture & Apiculture

Unit - IV

1. Local food fishes – identification and food value of any 3 edible fishes.
2. Snakes – identification, venom & its action – biting mechanism – first aid – poiso... & non- poisonous snakes any 2 for each.

Unit - V

1. Poultry & its economic importance.
2. Animal husbandry & its economic importance.
3. Rearing of pig & its economic importance.

Text books:

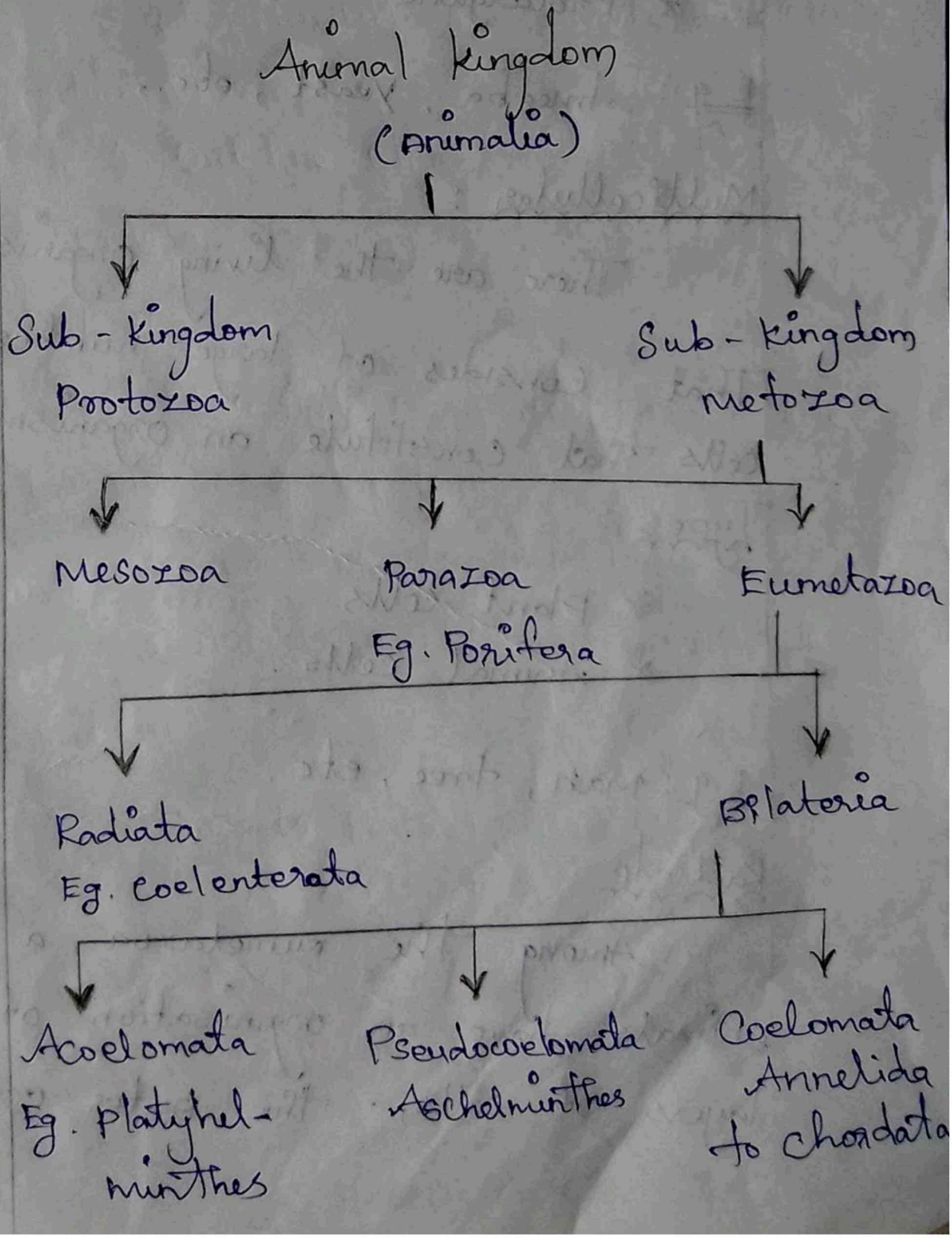
1. Ekambaranatha Ayyar & T.N.Ananthakrishnan (1992) Manual of Zoology Vol – I, Part I & II S.Viswanathan Pvt. Ltd. Chennai.
2. Jordan.E.L & Verma.P.S. "Invertebrate Zoology" S.Chand & Co. New Delhi.
3. Ekambaranatha Ayyar & T.N.Ananthakrishnan (1992) Manual of Zoology Vol – I, Part I & II S.Viswanathan Pvt. Ltd. Chennai.
4. Jordan.E.L & Verma.P.S. "Chordate Zoology" S.Chand & Co. New Delhi

M. Muni
B.Sc. Zoology Allied

UNIT-I

General classification of animal kingdom

All the animals of the biosphere are included in a large group called Animal kingdom or Animalia. The animal kingdom is subdivided into two Sub-kingdoms, namely Protozoa and Metazoa.



Unicellular:

There are the living organisms that are made up of only one cell. Also called single - called organisms.

Types: Eukaryatic cells
Procaryatic cells

E.g: Ameeba, Yeast, etc.,

Multicellular:

There are the living Organisms that Consides of large number of cells that constitute an organisms.

Types: Plant cells.
Animal cells.

E.g: Man; tree, etc.,

Radiata:

Among the eumetozoa a few animals have an organisation of two layers of cells, the outer ectoderm and inner endoderm, separated by a jelly like mesoglea.

They are radially Symmetrical and are diploblastic.

Bilateria :

The eumetazoans other than Radiata, show organ level of organization and are bilaterally symmetrical and triploblastic. The grade Bilateria includes two taxonomic levels called Division.

E.g : planty- helminthes to chordata.

Acoelomata :

In this group of animals, a coelom (cavity lying between the gut and the body wall) is absent.

E.g : planty helminthes

Pseudocoelomata :

In this group of animals a false coelom (cavity not laid with coelomic epithelium) is present.

E.g : Aschelminthes

Coelomata :

In this group of true Celom is Present.

E.g : Annelida to Chordata.

The Bilateria is further decided into two groups namely proterostomia and Deuterostomia.

Proterostomia :

In this group of animals the blastophore develops into the mouth.

E.g : platy helminthes to molles.

Deuterostomia :

In this group of animals the blastophore develops into the anus.

E.g : Echinodermata and chordata.

Classification of Invertebrates with Indian Examples:

Animals are broadly classified into two groups namely Invertebrates and Vertebrata. The animals which lack a no-tochord are called Invertabrate

Ameeba, Sponges, Hydro, worms, insects, Snails, Star fishes, etc.

Table 1: Table showing the strength of species in different phyla.

S. No	Phylum	No. of Species
1.	Protozoa	20,000
2.	Porifera	5,000
3.	Coelenterata	10,080
4.	Platyhelminthes	10,000
5.	Aschelminthes	12,000
6.	Annelida	8,700
7.	Arthropoda	8,91,000
8.	Mollusca	45,000
9.	Echinodermata	5,500
10.	Minor phyla	7,130
11.	Chordata	70,000

The invertabrates constitute the main bulk of the animal kingdom Out of the one million (10 lakhs) Species of animals, 98.5% constitute invertabrate and only 1.5% constitute Vertebrates.

Sallent Features of Invertebrates

Invertebrates are characterised by the following salient features.

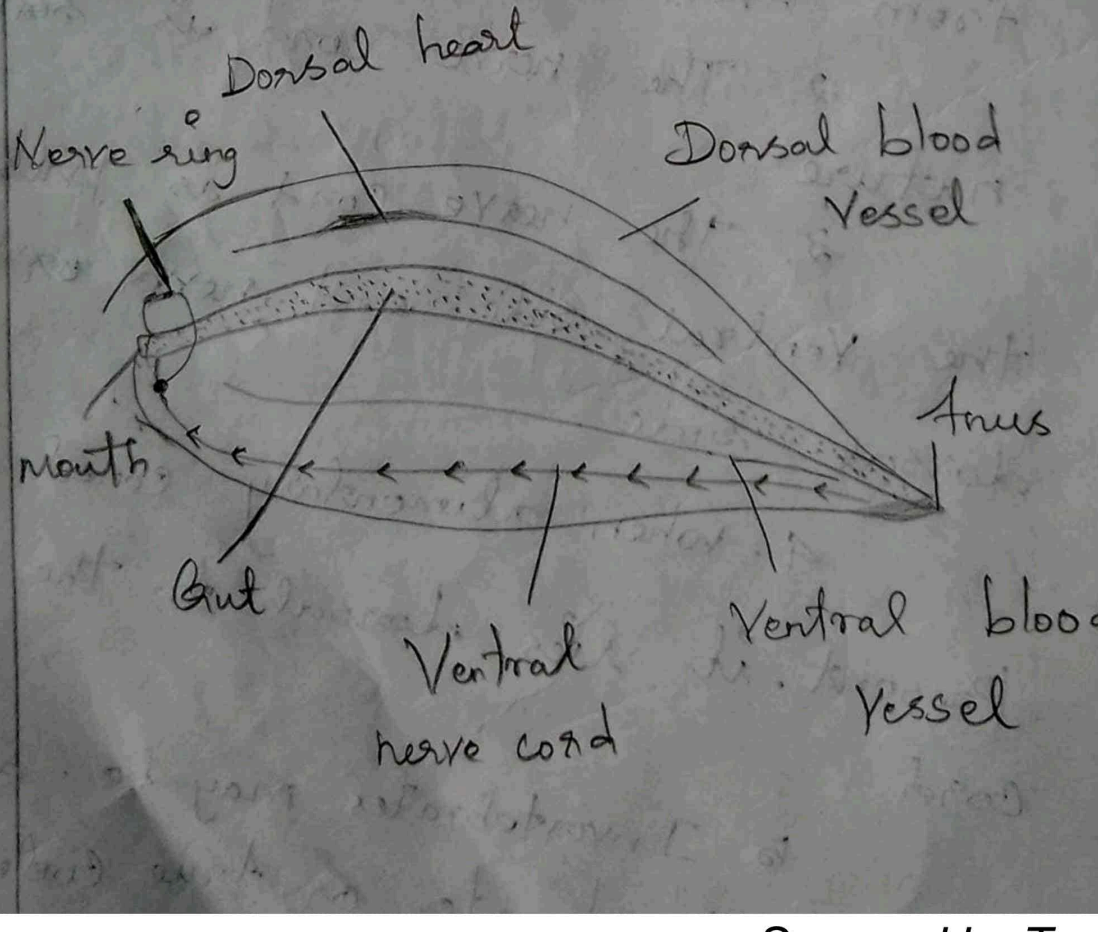
1. The Vertebral column is absent from invertebrates.
2. The nerve cord is soild in nature
3. The nerve cord is present on the Ventral side and never on the dorsal side.
4. when alimentary canal is Present. it lies dorsal to the nerve cord.
5. Invertebrates may be. acoelomate or Pseudocolomate or True coelomate.

6. They have either asymmetry of radius symmetry or bilateral symmetry.

7. The circulatary system is open type or closed type.

8. They have different grades of organization.

9. They exhibit all possible types of production.



Major and Minor phyla

The invertebrates are grouped into about 30 phyla. These phyla are of two types, namely major phyla and minor phyla. The major phyla contain many number of species and they are successful. There are 9 major phyla and about 21 minor phyla. They are as follows.

Major phyla

1. Protozoa
2. Porifera
3. Coelenterata
4. Platy helminthes
5. Asthelminthes
6. Annelida
7. Arthropoda
8. Mollusca and
9. Echinodermata.

Minor phyla

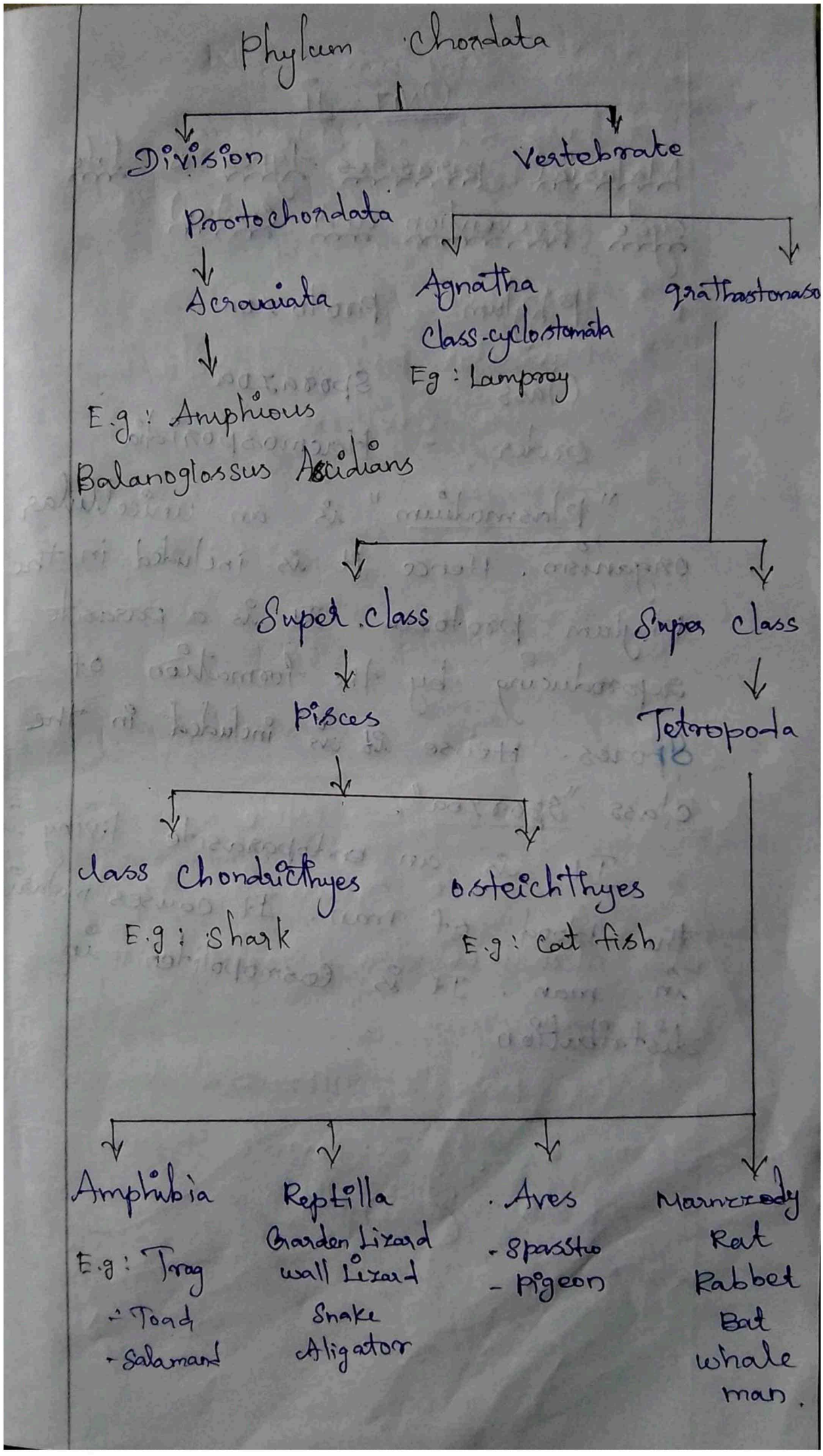
1. Mesozoa
2. Nemertinea
3. Endoprocta
4. Acanthocephala.

6. Gastrotricha
7. Kinorhyncha
8. Nematomorpha
9. Ectoprocta
10. Brachiopoda
11. phoronida
12. chaetognatha
13. priapulida
14. Sipunculida
15. Echuroidea
16. Pogonophora.

Define chordata:

A chordata is an animal of the phylum chordata During Some period of their life cycle chordata passes a notochord a dorsal nave cord phayngeal slite and post and tail these four anatomical features define this phylum.

chordata are also bilaterally symmetric and have a chelom, metamels segmentation and circulastory system.



1. General characters of chordates:

Meaning: The animals containing a notochord, a dorsal tubular nerve cord and gill slits are called chordates.

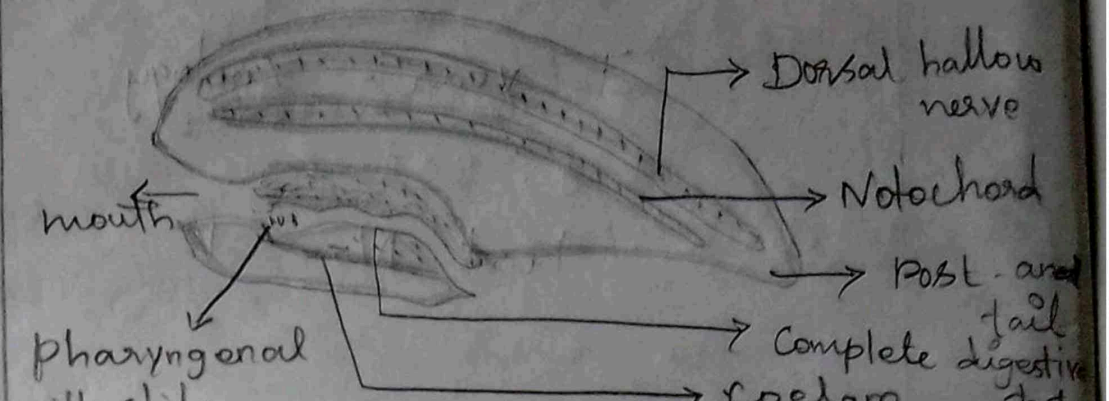
Primary chordates

Notochord: A dorsal longitudinal skletal rod is located beneath the nerve cord. It is made up vacuolated it is surround or replaced by a vertebral column.

Nerve cord: A single, tabular (hollow) nerve cord is located dorsal to the alimentary canal. In the Invertebrate - phyla, the nerve cord is often paired, solid and ventral to the alimentary canal.

Pharyngeal gill-slits: Paired openings are present on either side of the pharynx.

Post-anal tail: It is present at some stage of the cycle. May or may not persist in the adult.



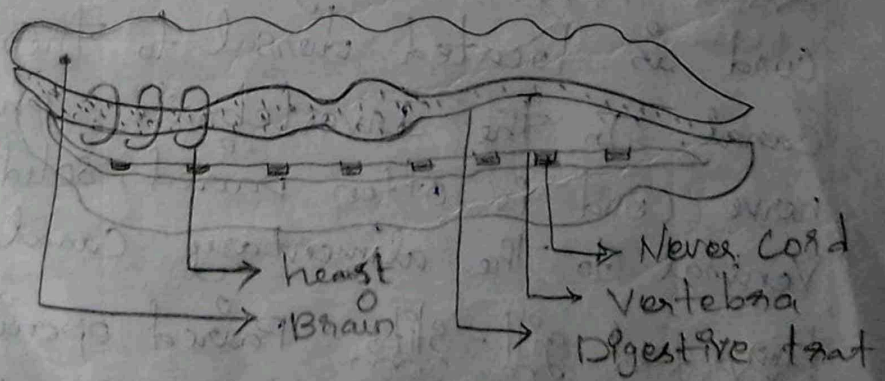
Secondary Cordata

Closed Vascular System :-

The blood never comes out of the blood and it contains capillaries.

Haemoglobin :- Haemoglobin is Present in the RBC.

Ventral heart :- The chordate heart is located on the ventral side of the body.



Direction of blood Flow :

In chordates the blood is Pumped anteriorly, then dorsally and Posteriorly.

Hepatic portal system: The Food laden blood from the alimentary canal is carried to the liver through a hepatic Portal Vein.

Bilateral Symmetry: All chordates are bilaterally symmetrical at least in the embryonic stage.

cephalization: In bilaterially symmetrical animals there is a concentration of nervous tissue and sense organs in.

metamerism: Certain structures that are repeated one after another are said to be metameric e-g some nerves, blood vessels, vertebrae, ribs, muscles et.

Coelom: All chordates have a true body cavity lined entirely with mesoderm.

UNIT - II

Malarial parasites types & Life cycle prevention and control.

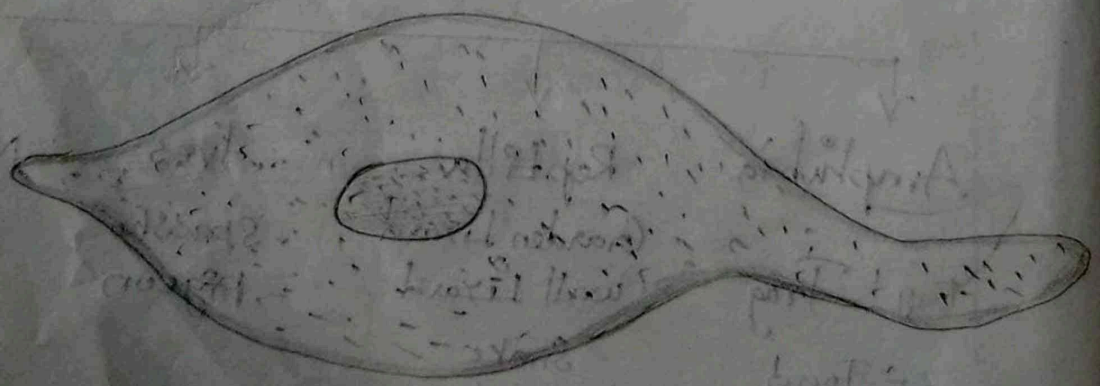
Phylum - Protozoa

Class - Sporozoa

order - Haemosporidia

"Plasmodium" is an unicellular organism. Hence it is included in the phylum protozoa. It is a parasite reproducing by the formation of spores. Hense it is included in the class "Sporzoa".

It is an endoparasite living in the blood of man. It causes malaria in man. It is cosmopolitan in distribution.



Life cycle in Man (cycle of golgi)

The life cycle of plasmodium in man is called by cycle of golgi. It occurs in three stages. They are,

1. pre - erythrocytic cyclic
2. Exo - erythrocytic cyclic
3. Endo - erythrocytic cyclic

Pre - erythrocytic cyclic

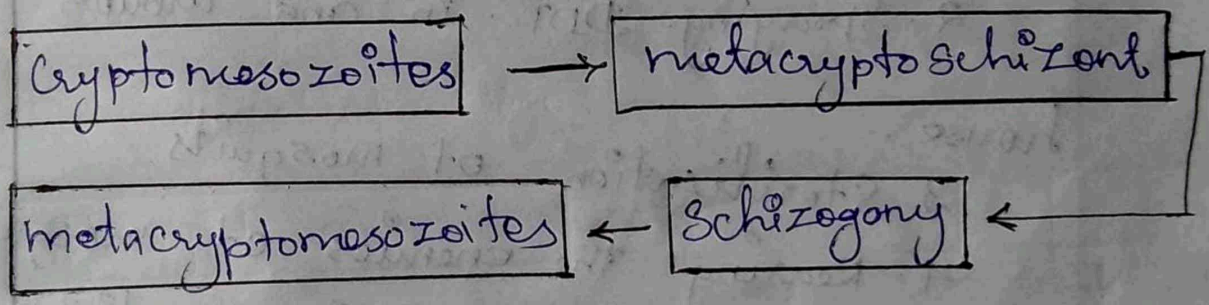
This cycle occurs in the liver, it introduces the parasite into the blood of man.

the parasite introduced is called sporozoite. It is spindle shaped and is covert with pellicle.

The Sporozoite entre the liver cells. its became Spherical shape. The parasite in this stage is called cryptosh cryptoshizont.

Exo erythrocytic cycle:

This cycle occurs in the liver. The cryptomerozoites enter fresh liver cells. the size increase. the parasite in this stage is called metacryptoschizont



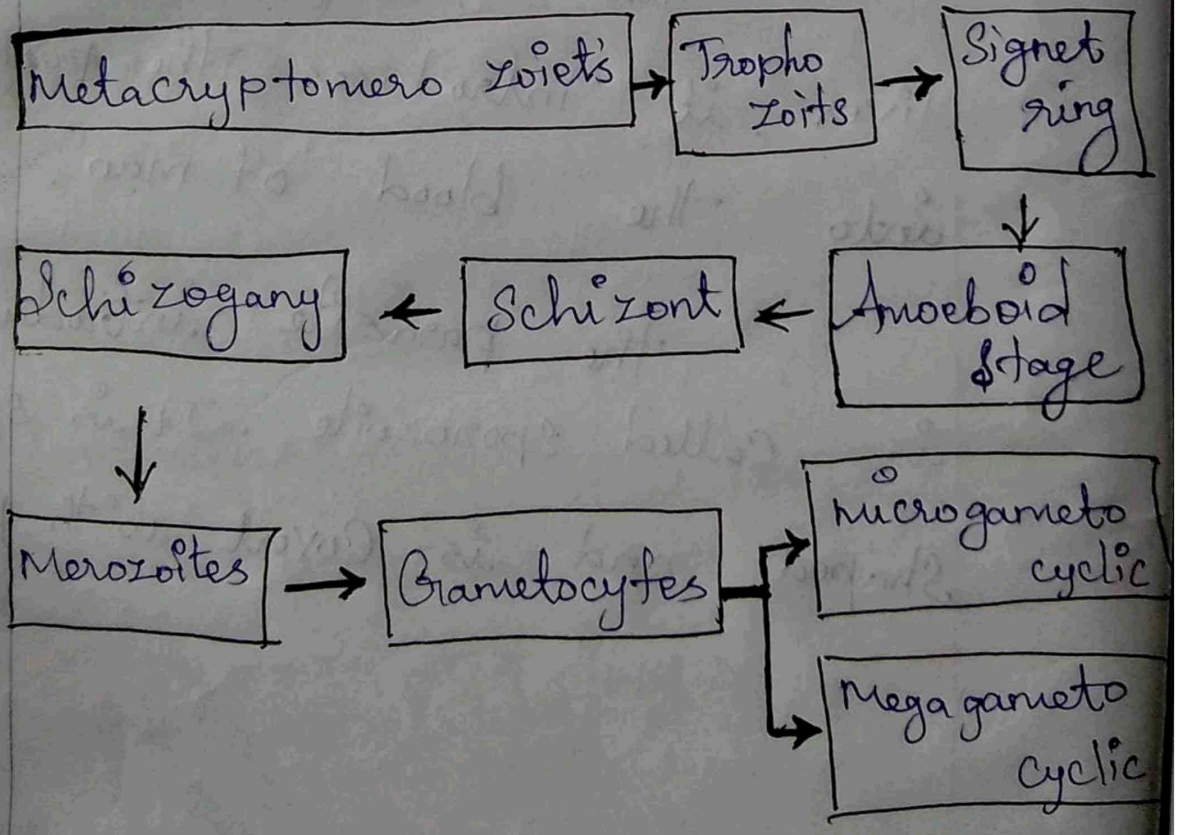
Erythrocytic cycle (or) Endoerythrocytic cycle

* This cycle occrs within the RBC
* The metacryptomerozoitea penetrate the RBC. Inside the RBC the parasite becomes rounded. this stage of the parasite is called "trophozoite".

* It grews and increases in size.

* It becomes ring like and its called Signetring. It has a Vacvole inside

After some time the Vowole dissappiars and the Parasite develops many pseudopodia. At this time the parasite is in the "amoeboid stage".



Malaria:

It is a kind of Fever caused by plasmodium and transmitted by the female Anapheles mosquito.

Malaria Symptoms:

* Loss of appetite
* Nausea
* Constipation
* Headache
* Muscular pain and ache in joints.
* Shaking chillness
* Sweating
* Rise in body temperature as high as 106 'F at the interval of 48 hour.
* Anamia

Control and prevention of malaria

Malaria can be controlled and preventen by the following methods.

1. Destruction of mosquito and its larva
2. Spraying DDT in and around the house.
3. Sterilization of mosquitos
4. Rearing the enemies of musquito and its larva like larvivorous fishes, ducks, drogen flies etc. This method is called "biological control".
5. Constructing mosquito proof houses
6. using mosquito nets.
7. Applying anti mosquito creas on the surface of the body.

Treatment:

Malaria can be treated with the following drugs. quinine, Paraprim, Chloro-quine, paludrine, plasmoquine etc.

Corals

"Corals are calcareous skeletons of certain coelenterates. They are secreted by polyps. The corals secreted by the polyps are something like external shells. The polyps live inside the corals. The coral of each polyp is called a corallite. Thousands of corallites fuse together to form a large coral stone called coralliam".

Types of Corals:

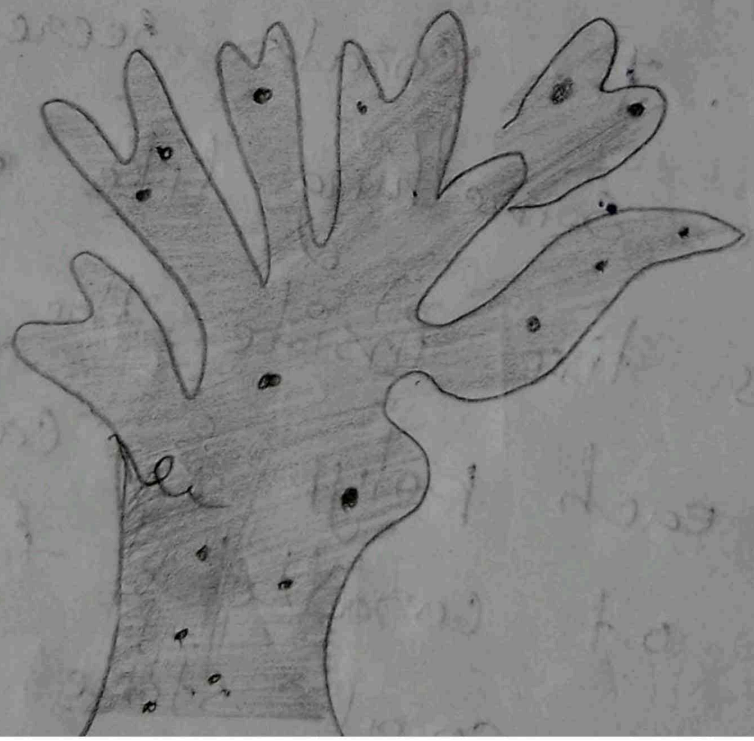
Corals are produced by two classes of coelenterates namely Hydrozoa and Anthozoa.

Hydrozoan Corals:

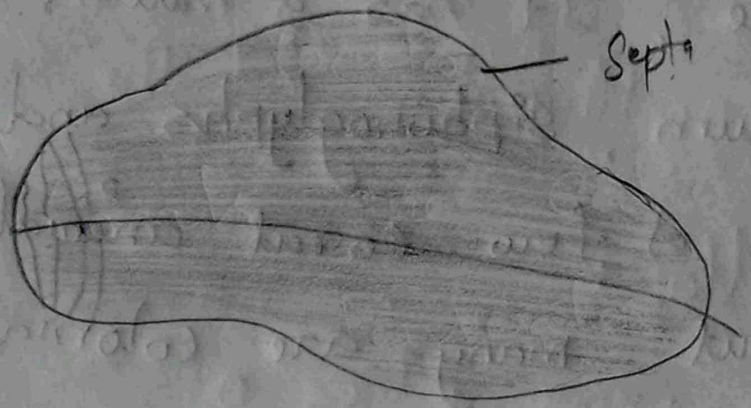
The hydrozoan corals are called hydrocorallum. They corals are produced by only a few animals like millepora, Stylasterina etc.

Millepora :

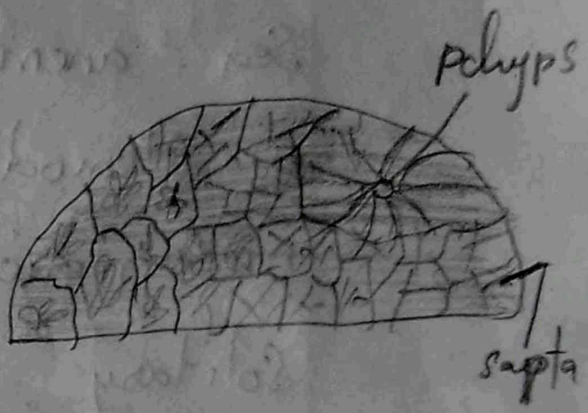
It is a branched coral. It has two types of pores namely larger gastropores and smaller dactyl-pores.



The coral is formed of many Septa Connected together by calcarous rods Synapticula.



Fungia



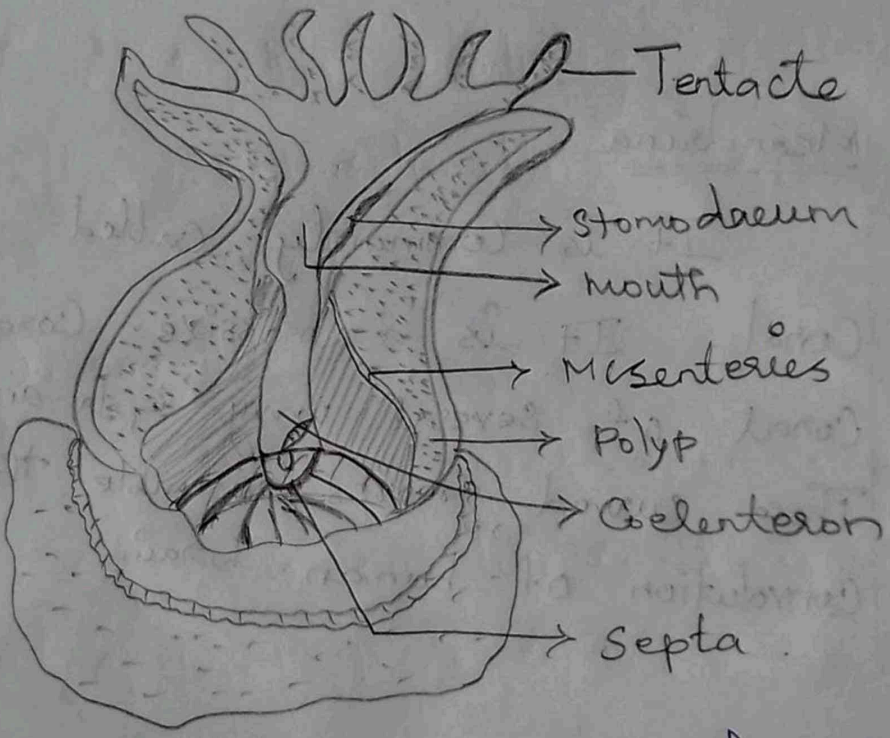
Astraea

Meandrina :

It is commonly called brain Coral. It is a massive Coral. Each Coral of several wavy Septa and groover. These curved grooves resemble the Convolution of human brain

Structure of a Coral - Polyp

The coral is produced by coral polyps. A coral polyp is similar to a sea - anemone. It has a mouth, tentacles, a stomodaeum, siphonoglyphs and mesenteries. A few coral animals are solitary, but many are colonial.



Coral is secreted by the coral polyp. It is secreted by the ectoderm of the basal region. The ectoderm cells secreting the coral are called calicoblasts. The formation of coral requires the following steps.

① Basal plate:

First of all a basal plate is secreated between the base of the polyp and the substratum.

② Septa:

On the basal plate a number of vertical ridges called septa are secreted.

③ Growth of Septa:

These Septa incre in hight pushing the polyp upwards.

④ Theca:

The outer edges of the septa fuse together to form a theca.

⑤ Epitheca:

Another calcareous covering is formed around this. This is called epitheca.

⑥. Costae :

The Theca is connected with the epitheca by plates called costae. Costae are the outward continuations of the Septa.

⑦. Columella :

The inner edges of the Septa fuse together producing a calcareous pillar called columella in the centre of the coral.

⑧. Corallite :

Thus the coral appears as a cup. This cup like coral is formed of a basal plate, Septa, a theca, an epitheca and a central columella. This cup-like coral of a single polyp is called corallite.

⑨. Corallum :

Thousands of such corallites fuse together to form a large coral stone called corallum. Thus a whole of thousands of polyps of a colony.

Significance of coral Reefs

(importance of corals)

⇒ They protect the Sea-Shore from erosion.

⇒ Coral fragments are used for decorating houses aquaria and rock gardens

⇒ Stones carved out from the coral reefs are used for constructing buildings and for paving roads.

⇒ Coral reefs provide an ideal habitat for various masine animals and thus they form a paradise for animal collectors.

⟹ Corals produce islands. The coral islands form habitats for human beings and land animals.

eg. Laccadive, maladive

⟹ Certain brilliantly coloured corals are used to make or naments like neck-laces.

UNIT-3

1. Insects pests [paddy & coconut]

Pests:

Pests are insects which affect the comforts, health, conveniences and profits of man. They cause damage to cultivated plants, stored grains, clothing, books, furnitures, domestic animals, etc.

They pests are of three types

1. pests on plants
2. pests on animals and
3. House hold pests

1. pests on plants:

Insect; pests destory field crops, fruit, trees and timber trees. They more destructive insects are locusts, grasshoppers, beetles, caterpillars, aphids, leaf-insects, bugs etc.

pests of paddy

A number of insects live as pests on paddy. A few are given below

1. Leptocorisa varicornis (Rice bug)
2. Tryporeya incertulas (paddy stem borer)
3. pachydiplosis oryzae.

Triporeya incertulas (paddy stem borer)

* It is a pest on paddy
* It is a moth.
* The Female is larger than the male.

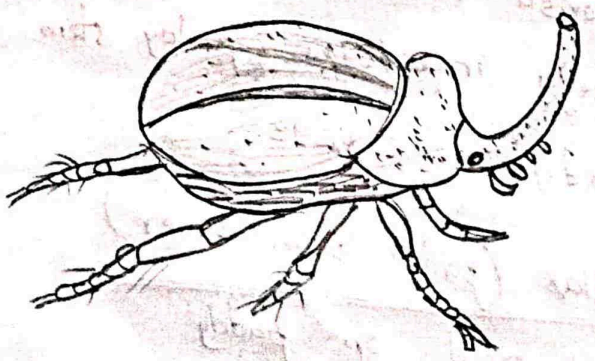
* The female lays the eggs on the leaves in batches of 50 each.
* The caterpillars bore into the stem. They feed on the shoot. The grow and develop into pupae inside the stem.
* The causes dead hearts in young paddy and white ears in old plants.
* This pest can be controlled by spraying parathion during the growth period at an interval of 15 days.

Pests of coconut

The insects living on coconut as pests are the following.

1. Oryctes rhinoceros:

* It is a pest on coconut.
* It is commonly called rhinoceros beetle.
* It has a pointed born on the head resembling that of rhinoceros and hence the name rhinoceros beetle. The horn is longer in the male.
* The eggs are laid in decomposing manure.
* The eggs are hatched into grubs.
* The grub reaches a length of 4 inches, It is white in colour and carved ventrally



Rhinoceros beetle

* It develops into a pupa which becomes the adult.
* The adult beetles bore through the unopened tender leaves and chew up the tender portions. when the leaves open, a series of holes are seen.
* This beetle is controlled by killing them and by not affording any breeding ground for the young ones.

2. Rhynchophorus (Red palm weevil)

* It is a pest on coconut.
* It is commonly called red palm weevil.
* It measures about 3 cm in length.
* It is reddish brown in colour with six dark spots on the thorax.
* The adult weevil makes small holes in the tender parts of the coconut tree and lays the eggs.
* The eggs hatch into grubs.
* The grubs are dangerous and they feed on the soft tissues of the coconut.
* They construct a cocoon made of fibres and develop into pupa.
* It is controlled by preventing the weevil from laying eggs on the coconut. It is treated by monochrotophos and Sulphos.

Honey Bee and Apiculture

Honey bees are valuable domesticated insects. They give valuable products such as honey and wax. Rearing honey bees for producing honey is called apiculture or bee keeping.

Species of Honey bees:

They are four main species of honey bees in India.

They are

(a). Apis dorsata
(b). Apis Indica
(c) Apis florea
(d) apis mellifera

Honey Extraction:

Honey is stored in combs of super frames. It is extracted from the comb by a simple machine called honey extractor.

Location of Apiary:

* The hives should be set in places where there are plenty of flowering plants.
* They should be placed in shady places
* They place should be neat and clean and free from any abnoxious smell.
* There should be clean drinking water near by because each bee colony requires two glasses of water per day for their survival.

protection:

* Honey bees should be protected from garden lizard and snakes.
* Black ants steal honey. So wates should be placed at the base of the stand.

* Wasps kill honey bees. So protection should be provided against wasps.
* wax-moth damages the combs. So the combs must be protected from wax moths.

Honey:

Honey is a viscous, sugary fluid formed from the nectar within the stomach of the honey bee.

Formation of Honey:

The bees visit flower, suck the nectar, store it in the stomach and return to the hive. In the stomach the nectar is processed. It is regurgitated and swallowed repeatedly from about 240 times. This processed nectar is called unripe honey (or) green honey. It contains about 80% water. The honey in the unsealed cell is unripe.

Chemical composition of Honey:

Honey contains nearly 80 different substances of importance to human beings.

* It contains a large amount of glucose or fructose.
* It contains proteins as well as fats.
* The vitamins present in honey are A, B_1, B_2, B_3, B_6, C E and K.
* It contains a variety of minerals like Ca, Na, K, mg, Fe, d, p, S etc.

Value of Honey:

* Honey is a valuable food and Medicine.
* As it has high content of Sugar it is used as a sweetner until last century.
* Honey has a high colorific value.

one kilogram of honey has 3,350 calories.

* Honey is used to heal wounds.
* It is used to cause free urination.
* It is used as a means of easing the belly.
* It is a good tonic for ulcer.
* It facilitates digestion and improves appetite.

Bee-wax

Bee-wax is secreted by the abdominal gland of Bees. It is used for the construction of comb. It is an yellowish solid insoluble in water. It is used extensively in engineering industries, railways, textiles, leather industries etc.

Bee venom

Bee venom is secreted by the poison glands of sting. It is used to treat rheumatism.

* It is used to cure skin diseases like tuberculosis of the skin.
* The cholesterol level in blood falls by the treatment of bee venom.
* Bee venom controls blood pressure.

Silk worm and Sericulture

Silk is a valuable natural protein - Fibre, produced by the caterpillars of certain insects. They are called silk worms.

Silk worms are the larvae of silk moths. The rearing of silk worm for the production of silk is known as Sericulture.

Silk worms

Four species of silk worms are extensively used in sericulture. They are as follows:

1. Mulberry silk worm — Bombyx mori
2. Eri silk worm — Attacus ricini
3. Tasar silk worm — Antheraea paphia
4. Muga silk worm — Antheraea assama

Types of silk

Silks are classified into two groups, namely mulberry silk and non-mulberry silk.

1. Mulberry silk

It is produced by silk worms feeding on mulberry plants. Bombyx mori produces this type of silk.

2. Non-Mulberry silk

It is produced by silk worms feeding on plants other than mulberry plants.

The non-mulberry silk is of three types.

a. Eri Silk

It is produced by Attacus rechinii. It feeds on ca leaf.

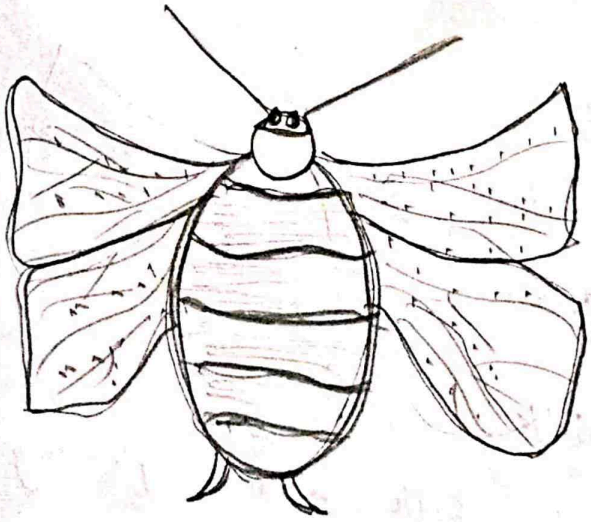
b. Tasar Silk:

It is produced by Antheraea paphia. It feeds oak and fig trees.

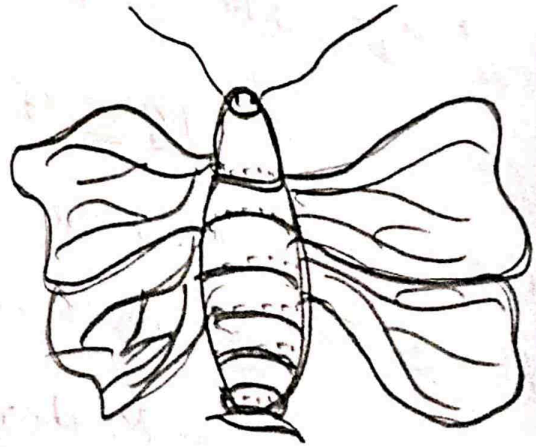
c. Muga silk: It is produced by Antheraea assama. It feeds on Machilus plants.

Biology of silk worm

The silkworm is a holometabolous insect. It passe through four distinct stages, namely the egg, the larva, pupa and the adult during its life cycle. The durat of life cycle may last 6 to 8 weeks.



Female



Male

Egg:

The female moth lays 300 to 500 eggs at a time. The eggs are sticky. The eggs are first yellowish white and become darker later on.

Larva:

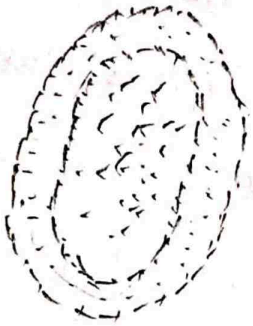
The egg hatches into a larva called caterpillar. The body is divided into a head, the thorax and an abdomen. The head consists of six segments fused together and provided with mandibulate Month parts. There are nine pairs of Spiracles or ostia for respiration.

During voraciously on mulberry leaves and grows very fast. the larva period, it casts off its skin known as moulting or ecdysis four times. The larval period is therefore divided into five stages or instars. In the fourth ~~stage~~ instar, a pair of silk glands develop. They secrete the silk to build the cocoon. The larval period lasts for 20 to 24 days.

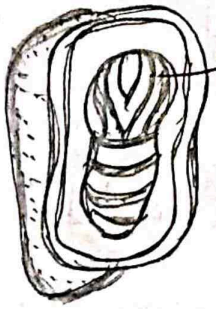
Pupa:

After passing through four moults it reaches the fifth instar where it attains the maximum weight. At the end of the final instar, it stops feeding. The mature larva produces a continuous filament of silk-thread to form an oval cocoon.

The silk is made up of a protein fibroin and the threads are held together by a gummy substance, sericin. A cocoon is built in 2 to 3 days. A single caterpillar is said to produce nearly 1000 to 1500 metres of silk thread. The pupal period lasts for 10 to 12 days.



Cocoon



Cocoon cut-open

Imago and Adult:

During the pupal period, active metamorphic changes take place. The pupa transforms into an adult moth. The adult secretes a fluid which softens the cocoon. It pierces the cocoon and comes out. Soon after emergence the moths mate, lay eggs and die within 2 or 3 days.

Mulberry silkworms are classified:

(i) Univoltine race
(ii) Bivoltine race
(iii) Multivoltine race

B.Sc., ZOOLOGY

I YEAR – I SEMESTER

COURSE CODE: 7BZOA1

ALLIED COURSE - I – GENERAL & APPLIED ZOOLOGY

Unit - I

1. General classification of animal kingdom.
2. Unicellular, multicellular, radiate, bilateria, acoelomate, pseudocoelomata, coelomate.
3. Classification of invertebrata with Indian examples.
4. Outline classification of Phylum Chordata – Primary & Secondary Characters.

Unit - II

1. Malarial parasite – Types & Life cycle -- prevention & control.
2. Corals & its importance.
3. Ascaris & Filarial worm Life cycle.

Unit - III

1. Insect pests [Paddy & Coconut] – Reasons for outbreak & control.
2. Beneficial insect – Silkworm.
3. Vermiculture & Apiculture

Unit - IV

1. Local food fishes – identification and food value of any 3 edible fishes.
2. Snakes – identification, venom & its action – biting mechanism – first aid – poisonous & non- poisonous snakes any 2 for each.

Unit - V

1. Poultry & its economic importance.
2. Animal husbandry & its economic importance.
3. Rearing of pig & its economic importance.

Text books:

1. Ekambaranatha Ayyar & T.N.Ananthakrishnan (1992) Manual of Zoology Vol – I, Part I & II S.Viswanathan Pvt. Ltd. Chennai.
2. Jordan.E.L & Verma.P.S. "Invertebrate Zoology" S.Chand & Co. New Delhi.
3. Ekambaranatha Ayyar & T.N.Ananthakrishnan (1992) Manual of Zoology Vol – I, Part I & II S.Viswanathan Pvt. Ltd. Chennai.
4. Jordan.E.L & Verma.P.S. "Chordate Zoology" S.Chand & Co. New Delhi

M. Muni
II.Sc. Zoology Allied

Unit - IV

Local food fishes - identification and food value of any 3 ediole fishes.

Food Fishes:

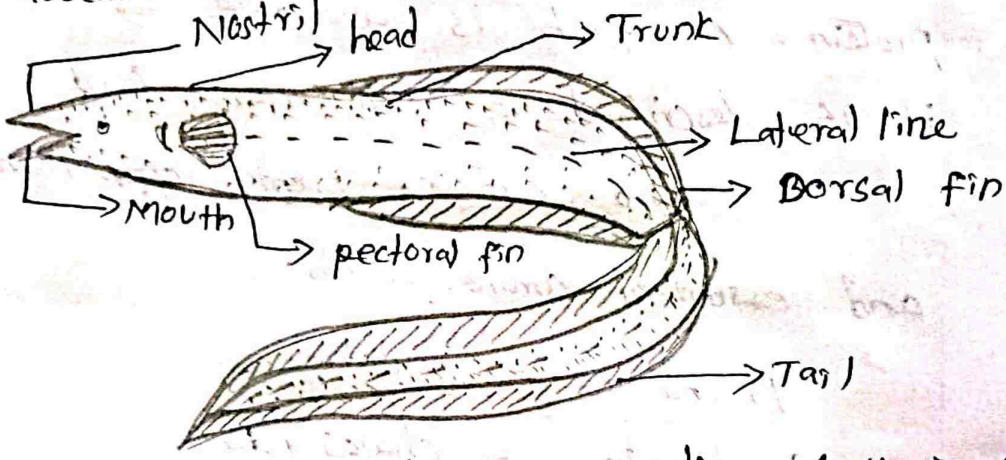
Fishes is a valuable food. It contains high class protein and less fat. As fat present in lesser amount fish is said to be a lean protein. As fish is available at a cheaper rate it is described as poor-man's food.

food contains plenty of vitamins, minerals and essential amino acids.

Trichiurus	-	Valaimeen
Sardinella	-	Chalai meen
Scoliodon	-	Chura meen
Cybium	-	Ney meen
Anguilla	-	Vilaangu meen
Tilapia	-	Tilapia
Catla	-	Kendai
Saccobranchus	-	Theley
Ophiocephalus	-	Viral meen
mystus	-	Kelaru meen
mugil	-	Chally meen
Anchovis	-	Nethaly

Anguilla (Eel)

* It lives in freshwater and brackish water.
* It has a snake-like body with dark brown colour.
* Scales are minute and are present inside the skin
* The dorsal and ventral fins are long and are continuous with the caudal fin.
* The pectoral fins are small. The pelvic fins are absent.



* It's skin is involved in respiration both in the air and water.
* It is capable of catadromous migration.
* After spawning, both the male and the female die in the sea.
* Its life history includes two larval forms namely the Leptocephalus larva and the elvers larva. They live 3 years in the sea and then march towards fresh water.
* It's flesh has a pleasant taste and a high medicinal value.

Cat fish

* It is a freshwater fish
* Its head and tail are vertically compressed.
* The head is covered with bony plates dorsally and ventrally.
* Scales are absent.
* The head bears 4 pairs of barbels around the mouth, the barbels function as feelers.
* The eyes are reduced in size.
* The dorsal and ventral fins are long.
* Caudal fin is rounded.
* The pectoral fins are provided with spines.
* It contains an air bladder and accessory respiratory organs in the form of arborescent organs.
* It can live for a long time outside water. Hence it is called a live fish.

Labeo rohita (Rohu, carp)

* It is an Indian major carp
* It is a freshwater fish living in rivers and streams.
* Its head is scaleless.
* It's body is covered with thick scales.
* It has a pair of small barbels in the upper jaw.
* It has dorsal, ventral, pectoral and pelvic fins.
* The caudal fin is forked and symmetrical
* It is an excellent food-fish.

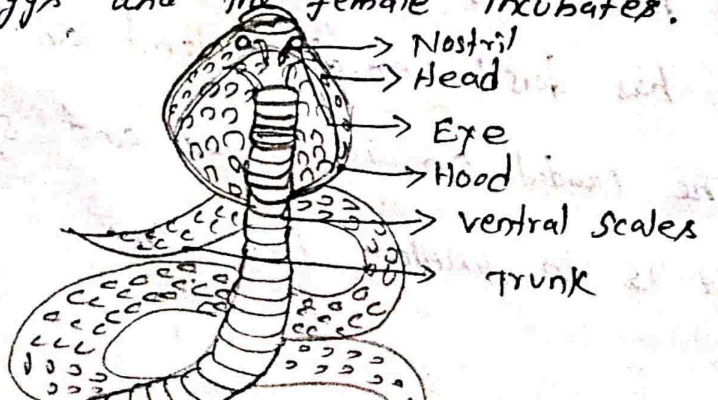
Poisonous Snakes

Naja Naja

Common Indian cobra

Phylum : Chordata
class : Reptilia
Subclass : Diapsida
order : Squamata
Suborder : Ophidia

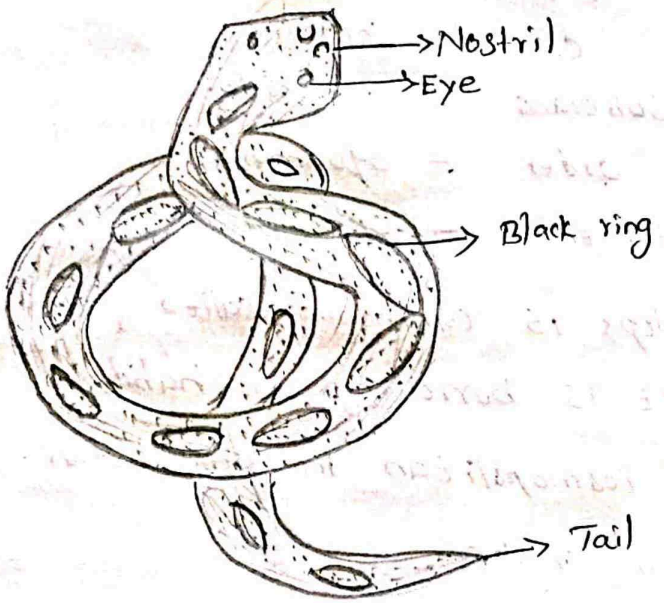
* It lives in burrows, deserted hills of termites, heaps of stones and stacks of woods.
* It is brown or black in colour and grows to a length of 6 feet.
* It feeds on frogs, lizards, rats and small birds.
* The head is not distinct from the body
* The head is covered by shields. The 3rd supralabial shield touches the eye and the nostril.
* It has two poison glands and two fangs.
* The ventrals are enlarged and the sub-caudals are double.
* Cobras are oviparous. The female lays 12-13 soft shelled eggs and the female incubates.



Vipera russelli

Russel's viper - Kannadi Virian

Phylum – chordata
class – Reptilia
Subclass – Diapsida
order – squamata
Suborder – ophidia



* It is highly poisonous and the poison is a haemotoxin
* It is nocturnal in habit
* It grows to a length of five feet.
* It is brown in colour with three longitudinal rows of diamond-shaped spots on the dorsal side.
* The head is distind and is triangular in shape.
* The head is covered with scales.
* The head bears a distinct V-shaped mark with the point of "V" looking forwards.

* ventrals are broad
* Sub- caudals are double.
* It is viviparous giving birth to 20-40 young ones at a time.

Non - poisonous snakes

Typhlops

phylum - chordata
class - reptilia
Subclass - Diapsida
order - Squamata
Suborder - ophidia

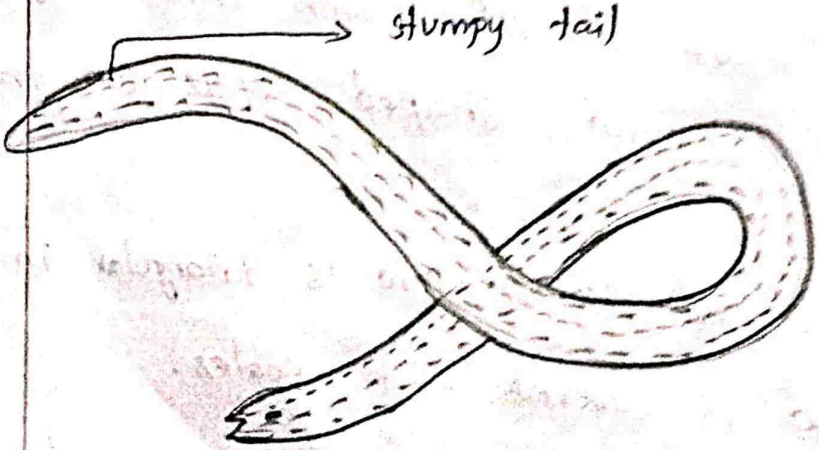
Typhlops is commonly called blind snake.

It is borrowing in habit.

It is cosmopolitan in distribution. It is a non poisonous snake.

It has a worm-like body. The body is covered with scales.

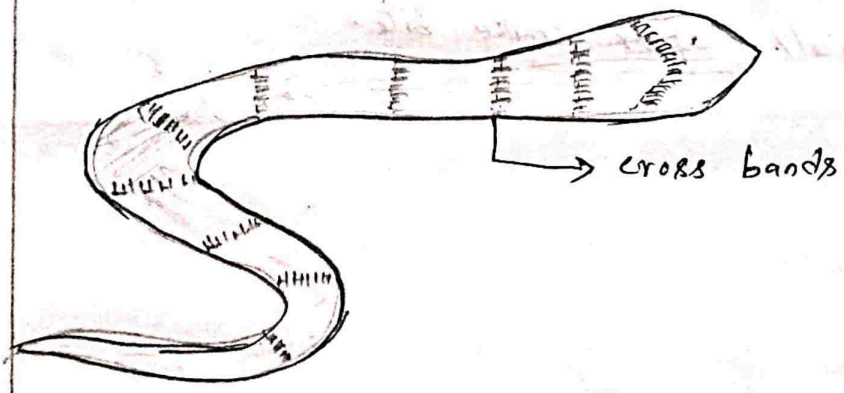
The pelvic girdle is vestigial. The head is indistinct. The eyes are small and covered by scales. It is carnivorous in habit. It is oviparous.



Lycodon

phylum - chordata
class - Reptilia
sub class - Diapsida
order - Squamata
suborder - ophidia

* Lycodon is locally called vellikkol varian. It is the wolf snake.
* It mimics krait in its colouration.
* It is brown in colour with white cross bars.
* The cross bars are distinct in the anterior region and it fades towards the tail.
* In krait the cross bands are distinct in the tail region and it fades towards the head. It feeds on skinks.



First Aid:

* The first and foremost first-aid given to a man, bitten by a snake is encouragement. he should be freed from all fears. There are cases where the victims died only out of the fear and emotional upset. The emotional upset increase the rate of heart beat and it accelerates the spreading of venom.

* The snake is then identified. It can be achieved by seeing the bite-mark on the victim. Or if the snake is nearby, it is identified by directly examining it.

* The victim should not be allowed to move. This will reduce the rate of spreading of the venom in the body.

* The snake-bite is washed with any antiseptic agent like potassium permanganate.

* The venom is neutralized by injecting antivenine of the venom. They are specific antisera for all the ~~* the venom is~~ venoms. So if the snake is identified the treatment will be more specific.

* Herbal medicine is the best for snake bite. A bunch of leaves of the plant 'Sirianangi' or 'perianangi' should be chewed and swallowed immediately after snake bite.

UNIT- V

ANIMAL HUSBANDRY

Animal husbandary is the branch of agriculture concerned with animals that are raised for meat, fibre, milk, eggs or other products. It includes day-to-day care, selective breeding and the raising of livestock.

Husbandry has a long history, starting with the Neolithic revolution when animals were first domesticated, from around 13,000 BC onwards, antedating farming of the first crops. By the time of early civilisations such as ancient Egypt, cattle, sheep, goats and pigs were being raised on forms.

I. Milch breeds (or) Dairy breeds :

The cows of this group are high milk yielders with extended lactation periods. The bullocks are of poor draught qualities. These cattle are well built with strong limbs. e.g Deoni, Gir, Sindhi and Sahiwal. The cows in domestic usage for milk are non-descriptive types.

1. Sindhi (Red Sindhi, Red Karachi) :

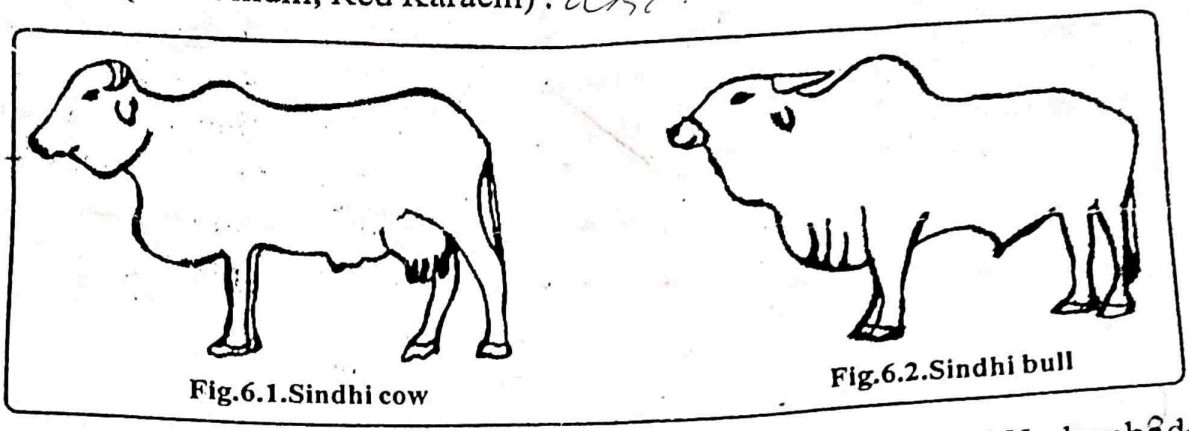


Fig.6.1.Sindhi cow

Fig.6.2.Sindhi bull

Origin and distribution : The home of this breed is Karachi and Hyderabad.

Distinguishing characters : Medium size and compact body. Thick horns emerging laterally and ending in blunt points. They have intelligent facial expression. Deep dark red colour. Bulls are darker than the cow. They have hump and the udder is large with medium sized teats. The animals are docile and quiet. Bullocks are steady workers, suited for road and field work.

Sindhi cows are hardy and have high degree of resistant to heat and ticks. These are the most economical milk producers among the dairy breeds of India.

Milk production :- Yields as high as 5,443 kg per lactation period.

2. Gir (Kathiawarhi, Surti) :-

Origin and distribution : The breed originated from the Gir forest of South Kathiawar. Impure forms of Gir breeds are found in Baroda and some parts of Maharastra.

Distinguishing characters :(The colour is not always entire.) Most of these cows have spotted skin. It is usually red, black and red, red and white or white with red spots. The body is well built with clear cut lines. The pure breed has a majestic appearance. Ears are long like a leaf. Tail is long and whip like. Legs are long and well built. Udder is large with matching teats. Bullocks are heavy, powerful and good for draught.

Milk Production : Gir cows are good milk yielders. In some, the maximum yield is 3,715 Kg per lactation period.

II. Dual purpose breeds :

This breed of cattle are meant for both milk yield and draught works. The cows are fairly good milkers and the bullocks are sturdy and are useful in draught works like ploughing the field, transport, cart pulling etc. Important examples are Hariana and Ongole.

1. Ongole : Nellore

Origin and distribution :- Ongole tract of Andra Pradesh, Guntur, Narasaraopet, Venukonda, Kandukur taluks of Nellore.

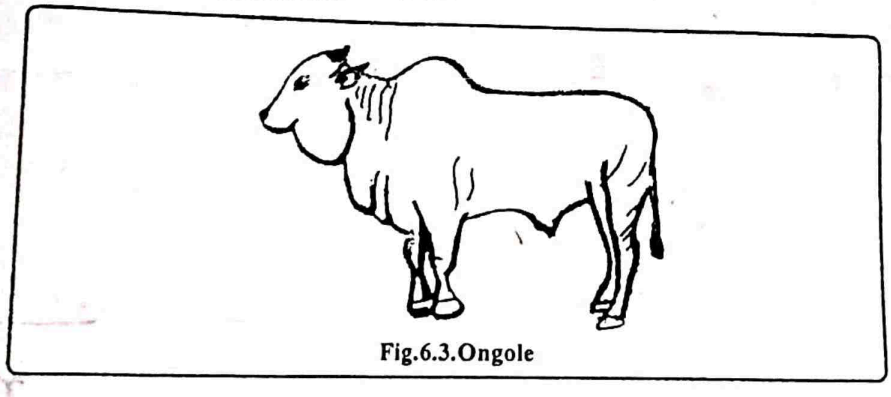


Fig.6.3.Ongole

Distinguishing characteristics : This breed is a larger form. The matured male weighs about 700Kg and female weighs about 400 Kg. Ongole breed is usually white in colour with grey marking. Males are dark grey at extremities. Hump is well developed and erect. The horns are stumpy and they grow outwards and inwards. Bullocks are powerful and suitable for cart and road work but are not fast.

Productions : Cows are good yielders, yielding from 1700 kg to 3500kg per lactation period.

are Amritmahal, Kangayam, Malvi,

1. Kangayam (Kanganad, Kongu) :-

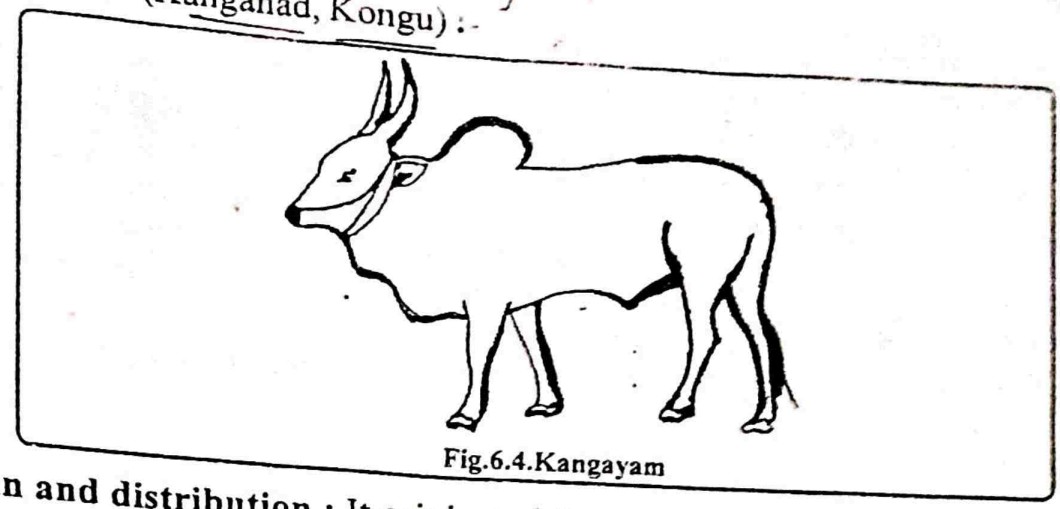


Fig.6.4.Kangayam

Origin and distribution : It originated from Kangayam divisions of Dharapuram taluk of Coimbatore district in Tamilnadu. The breed is also found in Udumalapet, Palladam, Pollachi and in other parts of South India.

Distinguishing characters : The cattle of this breed are of moderate size and the colour of the body is white or grey with black markings. The horns are strong and are curved upwards and outwards. The head is short with prominent forehead. Neck is shorter and thick and the ears are smaller and pointed. They have moderate sized hump, wide muzzle, strong limbs, fine skin and a fine tail. The udder is medium sized with small teats. The bulls are excellent type for hard work.

Production : The cows are poor milkers, yielding about 666 kg per lactation.

2. Hallikar

Origin and distribution : Commonly found in the South Indian States, predominantly in Karnataka. Hassan and Tumkur regions of Karnataka are the home places of this breed.

Distinguising characters : Body is dark grey in colour, some times almost black. The animals are of medium size. The head is usually long with a bulging forehead and a prominent furrow in the middle. The face is long with small ears. The long horns emerge out, slant backwards in a graceful sweep and then curve upwards to terminate in a sharp point. The hump is moderately developed. The udder is medium sized with small teats. The Hallikar bullocks are draught breeds. They are used for heavy ploughing, transport and other field works.

Production : The cows are poor milkers.

Exotic breeds of cattle : Many milk yeilding breeds of cattle are imported and reared in India. The exotic breeds are successfully crossed with indigenous breeds to obtain cross breeds, which have sufficient desirable characters. European breeds are the first kind of exotic breeds introduced in India about 90 years back. Important ones are short horned Ayreshire, Jersey, Brown swiss, Holstein Friesean, Guernsy and Red Danc.

Jersey : Jersey is one of the oldest dairy breed. It originated from Jersey island adaptable to wide range of climatic conditions and heat. The colour of the breed ranges from white to dark grey, and it is broken and found as patches. Jerseys are nervous and sensitive animals. Jerseys have good udders with large teats. The lactational yield is 4,950 kg with milk fat 5% . The milk has a characteristic yellow colour because of high carotene content. The bulls are vicious than other breed. Cross breeding of Jersey and indigenous Sindhi and Hariyana produced excellent cross breeds with more than 2000 kg of milk yield per lactation period.

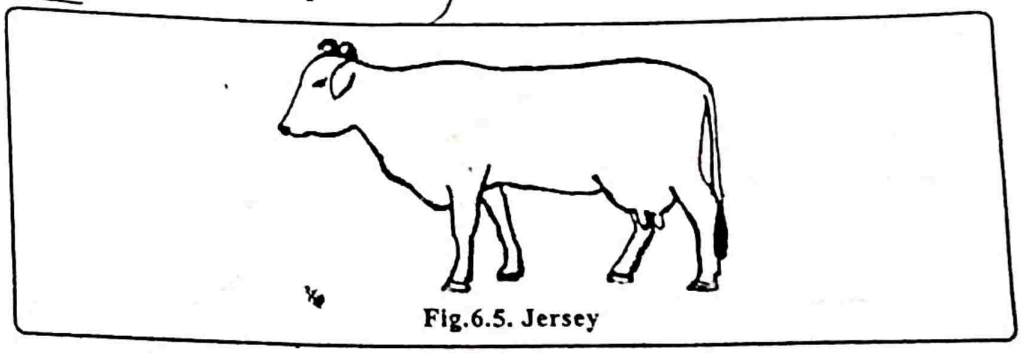


Fig.6.5. Jersey

Common diseases and control : Cattle are subjected to a large number of diseases. Cattle in normal health appear bright, alert and active in their movements with a shiny coat. They also enjoy normal appetite and sleep. Cattle in ill health appear dull, restless and change posture frequently with a drop in milk yield.

Contagious diseases : The diseases which spread easily by various modes are called contagious diseases. These diseases are of bacterial or viral origin. The bacterial diseases are **anthrax, haemorrhagic septicemia, mastitis and tuberculosis**. The viral dieases are **cow pox, foot and mouth disease** and **rinderpest.**

1. Anthrax : Anthrax, a bacterial disease is due to β anthracis which causes sudden death in cattle.

Symptoms : High temperature (41-41.5°c), swelling of the neck, thorax, flanks and lumbar regions which are neither hot nor painful. Blood discharges from natural openings, the affected animal dies in 10 to 36 hrs.

Control : Vaccination with spore vaccine at the age of 6 month and then annually. Affected animals are to be segregated, contaminated place to be disinfected and the carcasses to be burried deep.

2. Cow pox is a contagious viral disease attacking cows and buffaloes.

Symptoms : Retarded rumination, swelling of udder and teats, rise in temperature, eruptions on skin and udder and teats developing into vesicles, pustules and scabs by stages ultimately leading to mastitis and loss of milk.

Prevention : Segregation of affected animal, giving sloppy food for swallowing and digestion, fomenting udder with warm disinfectant solution, giving saline laxative and diuretics, treating lesions with mild antiseptic ointment. Cow shed should be kept clean.

3. External parasitic diseases : Common ectoparasites are flies, ticks, mites, fleas and lice. They are directly involved by sucking the blood from cattle and become an irritant. They are also indirectly involved in transmitting bacterial, viral and protozoan diseases.

4. Internal parasitic diseases : Hook worm, round worm, tape worm and flukes are some of the intestinal parasites causing diarrahoea, dysentry and some other complications.

Non-contagious diseases : The diseases which does not spread by external modes but are caused by physiological or genetical means is known as non contagious diseases.

1. Milk fever : Milk fever is common in high milk producing cows and buffaloes during the early part of the lactation. It is due to inability of the animal to assimilate calcium from the feed, leading to demineralization in the bone. The serum Ca and P levels become low and the sugar level gets increased.

Symptoms : Staggering, loss of appetite, temperature becoming below normal, pulse rate becoming high, restlessness and remaining inactive.

Precaution and first aid : Feeding jaggery along with lime water, few days prior to calving and giving soft nutritious and easily digestible food for a few days after calving prevents milk fever. Cleaning the udder with warm cloth and preventing infection from the floor. Pumping clean air into the udder and massaging are other measures to be adopted.

2. Constipation : Constipation is severe due to over eating of coarse fibrous roughages, inadequate intake of water and lack of exercise. It leads to lack of appetite, lack of rumination or chewing and dull appearance.

Precaution and first aid : The affected animals can be given wheat bran meal or rice gruel and succulent fodder. Plenty of drinking water with jaggery or salt, evacuating the rectum by giving warm soap water enema and massaging the abdomen are the other measures of treatment.

Techniques adopted in cattle

A. Out breeding : Out breed [illegible] related or unrelated animals. The individuals involved do not have a common ancestor in the preceeding 4-6 generations.

B. Cross breeding : Cross breeding is mating of animals of different breeds. It is valuable as a means of introducing desirable characters into new breed in which they have not existed formerly. The cross breeds exhibit increased growth and vigour by the blend of desirable dominant genes from two breeds in the first generation.

C. Artificial insemination : Artificial insemination is the deposition of male reproductive cells (spermatozoa) in the female reproductive tract by mechanical means rather than by natural mating. The semen is collected from the male by artificial means. The semen is inseminated into the female by placing a portion of it either in a collected or in a diluted form into the cervix of the uterus by mechanical methods at the proper time and under most hygienic condition.

It helps to eliminate the need for maintenance of herd sire, permits long distance transport of semen by air, avoids spreading of genital diseases, and increase the rate of conception. Further this method helps better recording, permits use of semen from injured and old bulls and provides a chance of detecting any genital abnormalities or pathological infection and inflammation in cows.

Poultry

The term poultry refers to the rearing and breeding of avian species such as chicken, ducks, turkeys, geese and guinea-fowls which have been domesticated. They are the best converters of feed into animal protein compared to other livestock. Chicken are the most common poultry enterprises. Chicken alone occupy 90% of the total poultry.

Breeds

There are more than hundred breeds and more varieties of fowls. The fowls are classified based on their utility to man. They are meat type, egg type, dual type and games and ornamental type. Based on their origin there are four major exotic breeds of fowls. They are American breeds, Asiatic breeds, English breeds and Mediterranean breeds. In addition to the above many of the indigenous breeds are also reared.

I. American breeds:-

Most of the American breed of fowls are dual purpose forms giving meat and egg. These breeds are characterized by yellow feathers, red ear lobes and many of them lay brown-shelled eggs. **Rhode island reds, Plymouth rock, New hampshire** and **Wyandotte** are some of the important breeds of American class.

a. Plymouth rock. Plymouth rock is the oldest and most popular [illegible]. The birds are single combed with long and deep body . The breed produces good [illegible] eggs. The plumage is generally greyish white. The female looks darker in colour than males. This colour feature is used to distinguish the sex of the birds. The females usually have black spots on the shanks.

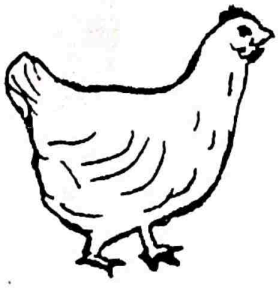


Fig.6.2.1. Plymouth Rock Hen

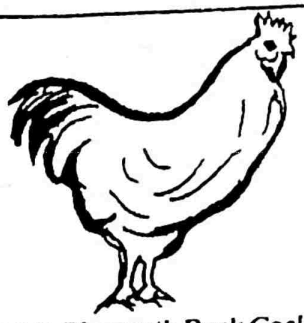


Fig.6.2.2. Plymouth Rock Cock

b. White plymouth: The white plymouth rock has white plumage throughout the body and it is commonly used in broiler production. Standard weights of cock, 4.3kg; hen 3.4kg; cockerel,3.6kg; pullet, 2.7kg.

II. Asiatic breeds:

The breeds of this class belong to Asian continent. They are characterised by large body with heavy bones, feathered shanks, red ear lobes and yellow skin. They are used for egg and meat purpose. The egg shells are light to dark brown in colour. The important breeds of this class are Brahma, from Brahmaputra valley in India, Cochin and Langshan are from China.

Brahma : Brahma breed is well known for its massive body with heavy bones, well - feathered and proportionate body. Peacomb is one of important breed character. Light, Dark Brahma are of two common varieties of Brahma .

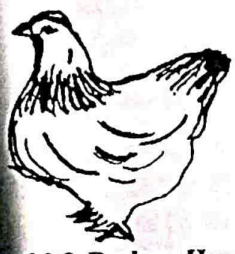


Fig.6.2.3. Brahma Hen

Fig.6.2.4. Brahma Cock

Light Brahma :- It has light grey to white colour and the hackle feathers are black. The beak and legs are light yellow coloured. Standard weights of light Brahma are, cock 5.4 kg; hen 4.3 kg; cockerel 4.5kg; and pullet 3.6 kg .

Dark Brahma:- Dark brahmas are light black or steel grey coloured with greenish hackle. standard weight of dark Brahma are, cock 4.9 kg; hen 3.9 kg; cockerel 4.0 kg; and pullet 3.1 kg.

III. English breeds:

All the breeds of this class originated from England. Presence of white plumage and pink coloured earlobes are the characters of the breed of this class. Most of them lay brown shelled eggs. Sussex, Orpington, Australorp and Corinsh are some of the important breed of this class.

IV. Mediterranean breeds:

Breeds of this class originated from European countries which are by the side of Mediterranean sea. The important breeds of this class, Leghorn and Ancone originated from Italy whereas Minorca originated from spain. The breeds are light bodied with non feathered shanks. The fowls of this class lay white shelled eggs and they are non-sitters.

Leghorn:- The white leghorns are the most popular and commercial breed in India, Colours of plumage may be white, brown or black. The fowls of this breed are small, compact with single comb and wattles. Though the leghorns are adapted to most of the climates, they are thriving well in dry areas. They mature early and they begin to lay eggs at the age of 5or 6 months. Hence, the breed is economically important and preferred in commercial forms. The standard weight of the cock is 2.7kg; hen 2.0kg; cockerel 2.3kg; and pullets 1.8kg.

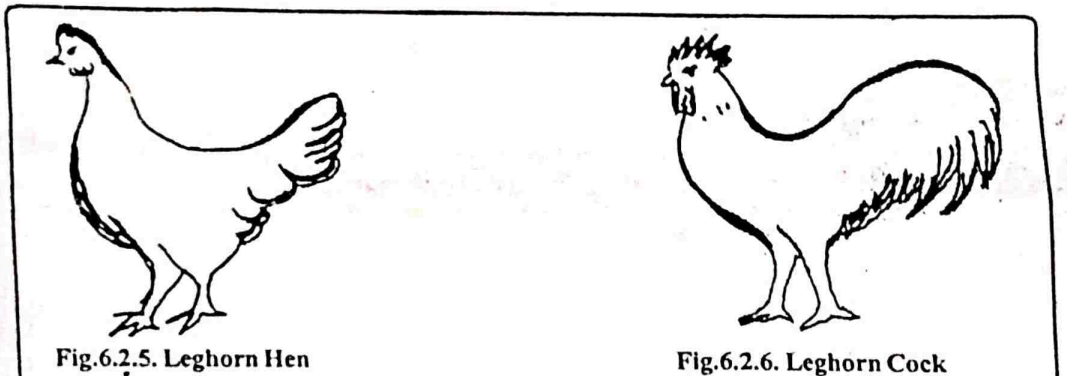


Fig.6.2.5. Leghorn Hen

Fig.6.2.6. Leghorn Cock

V. Indigenous breeds of fowls:

The common country hen of India is known as 'Desi' which is the best mother for hatching. Some of the Indian fowls resemble the leghorn, but have poor laying qualities. Chitagong, Aseel, Karaknath and Busra are four breeds of indigenous fowl in India.

a. Aseel:- Aseel is noted for its pugnacity. The colour of the breed is white or black. The hens are not good egg layers but are excellent sitters. Aseel breed is found in almost all states of India, but abundant in Andhra Pradesh.

b. Chittagong:- Chittagong breed is largely found in West Bengal. The plumage colour varies, but the popular shade is golden or light yellow. The beak is light and yellow in colour, the ear lobes and wattles are small and red in colour. They are good egg layers and are delicious.

c. ***Karaknath:-*** It is a fowl with black flesh. It is abundant in Madhya Pradesh and bred by tribals and the eggs are light brown in colour. The adult plumage varies from silver and gold-sprangled to bluish- black. The comb, wattles and tongue are purple in colour,

d. ***Busra:-*** This is a small to medium sized bird found in some parts of Gujarat and Maharashtra. They are light feathered with wide variation in body colour.

Farming methods

Poultry farming has now become very popular. It is recoginzed as an organised and scientifically based industry with tremendous employment potential. It plays an important part in the rural economy of India. It provides a ready source of income to the cultivator. Besides meat and eggs, poultry supplies feathers and rich manure.

The following factors are being taken into consideration for the growth of poultry farming 1) small initial investment 2) availability of quality chicks 3) short generation interval 4) quick, assured and better returns compared to other livestock species 5) availability of trained man power 6) better understanding and knowledge of the improved and scientific methods of feeding 7) management and health control.

Rearing involves the following stages:

Selection of eggs, incubation and hatching of eggs, brooding or care of new borns, housing of poultry, feeding of poultry are the important steps in rearing of chicken.

1. Selection of eggs:

Eggs meant for hatching and rearing must be selected very carefully. The following points should be considered during selection of eggs.

(1)The egg should be fertile (2) Over-sized and small sized eggs should not be selected instead medium sized should be preferred (3) Dark-brown shelled eggs hatch earlier than light-brown shelled eggs (4) Freshly laid eggs are preferred for rearing.

2. Incubation and hatching:

The fertilized hen's egg undergoes development during incubation and hatching processes. The fully formed bird emerges out of egg after a hatching period of 21-22 days. During this period the egg must obtain optimum temperature, humidity and ventilation etc. The maintanance of newly laid eggs in optimum condition till hatching is called **incubation.**

The incubation is of two types namely **natural incubation** and **artificial incubation.** In the natural incubation method, the eggs are subjected to the care of mother. Only a limited number of eggs can be incubated by a mother hen. In artificial incubation the eggs are maintained in a chamber(incubator) which stimulates the optimum environmental condition. In artificial incubation more number of eggs can be incubated than natural incubation

Brooding :- Brooding is the care and management of young chicks for four to six weeks immediately after hatching. Like incubation, brooding also has the natural and artificial methods. In the former, day-old chicken are left to the care of mother and in the latter temperature controlled artificial brooder is used.

Factors involved in brooding :

Temperature :- The hatched chicks are kept inside the incubator for about 36 hours and then transfered to artificial brooder. The optimum temperature is 33°c during the first week. During the subsequent weeks of brooding the temperature is reduced by 3°c each week till it reaches 21°c.

Ventilation :- Fresh air movement is important for good health and proper growth of the chicks. Poor ventilation results in the accumulation of carbon monoxide, ammonia and water vapour which may lead to microbial infection.

Floor space :- Adequate floor space is to be provided for the proper development of chicken. Minimum 500sq.cm of floor space per chicken is to be provided. Crowding of chicken leads to poor growth and induces cannibalistic tendencies amongst the birds.

Litter :- The floor of the brood house is layered by beds of hay, rice husk or saw dust and this is called **litter**. The litter bed should be 5 to 7.5cm thick and it must be kept dry.

Light :- To keep the brood house free from infectious germs, the brood house must be well ventilated. Evenly distributed sunlight promotes proper growth of the birds and formation of vitamin D.

4. Housing of poultry :

Open sided poultry is popular in our country. The primary objective of providing housing to poultry is to protect them from sun, rain and predators and to provide comfort. Poultry house should be well ventilated. It should be kept cool in summer and warm in winter. The floor of the poultry house should be moisture-proof, rat proof, free from cracks, easily cleanable and durable.

Poultry feeding :- Feeding of poultry bird is an important part of rearing. The diet of chickens must contain adequate amount of water, carbohydrates, proteins, fats, vitamins and minerals. The food stuffs such as maize, barley, sorghums, wheat, oil cake, rice etc are to be given in standard requirements.

Poultry byproducts

Poultry and poultry products are highly perishable. Hence, due attention has to be paid to the problems relating to processing, preservation and marketing of poultry and poultry products for the benefit of producers, processors and consumers. In a poultry processing unit, raw materials go as waste in the form of blood, feathers, heads and feet. Hatchery waste includes infertile eggs, dead embryos, and hatchery unstable

(2) → Economic Importance

ANIMAL HUSBANDRY- the need and importance

It is important for us to know why animal husbandry is very important to us.

Man depends on animals, largely for food and work. Animals provide milk, meat and eggs as food. They also do lot of heavier work for man. In order to get better outputs, the domestic animals have to be looked after properly and better high yielding breeds of the animals have to be developed.

All this is possible only through proper study of animal husbandry. Thus, the study of animal husbandry is important because of the following reasons:

- To increase the production of milk
- To increase the production of eggs
- To increase the production of meat
- To increase the production of fish
- To utilize the animal wastes properly.

Effect of feed on milk yield

In order to get better yields of milk, the milch cattle must be supplied quantities of the right kind of feed. The poor quality of feed is an important reason for the low yield of milk in our country. Although cattle population of our country constitutes one-fourth of total cattle population of the world, yet we produce only about 5 per cent milk of the total production of the world. In our country, the average yield of milk for cow is only about half a litre per day and for a buffalo is about 1.5 litres per day. In contrast a cow in some of the advanced countries yields 8 to 11 litres of milk per day. The main reasons for the low milk yield of animals in our country are as discussed under:

1. The milk yield of an animal is largely dependent upon the kind of feed given to it. In our country the feed available to the animals is of poor quality. In many cases the feed is not even available in sufficient quantities. The poor quality and the insufficient quantity of the feed is an important reason for the low yield of milk in our country.

2. The milk yield of an animal also depends upon its breed. In our most of the indigenous breeds of cows and buffaloes are bit high yielding breeds. This factor is also responsible for the low milk yield in our country.

Thus, if we want to increase the milk yield, the cattle must be given right kind of feed. Secondly, we must develop high milk yielding breeds.

Importance of poultry and poultry products Poultry & it's economic Importance

Poultry plays very important role for mankind through food supply, income and employment generation, providing raw materials to some industries, facilitating research works etc. The direct or

Advantages of the pig farming: Economic Importance of Pig Farming

- The pig has highest feed conversion efficiency i.e. they produce more live weight gain from a given weight of feed than any other class of meat producing animals excepts broilers.
- The pig can utilize wide variety of feed stuffs viz. Grains, forages, damaged feeds and garbage and convert their into valuable nutritious meat. However, feeding of damaged grains, garbage and other unbalanced rations may result in lower feed efficiency.
- They are prolific with shorter generation interval. A sow can be bred as early as 8-9 months of age and can farrow twice in a year. They produce 6-12 piglets in each farrowing.
- Pig farming requires small investment on buildings and equipment's.
- Pigs are known for their meat yield, which in terms of dressing percentage ranges from 65-80 in comparison to other livestock species whose dressing yields may not exceed 65%.
- Pork is most nutritious with high fat and low water content and has got better energy value than that of other meats. It is rich in vitamins like thiamin, Niacin and riboflavin.
- Pig manure is widely used as fertilizer for agriculture farms and fishponds.
- Pigs store fat rapidly for which there is an increasing demand from poultry feed, soap, paints and other chemical industries.
- Pig farming provides quick returns since the marketable weight of fatteners can be achieved with in a period of 6-8 months.
- There is good demand from domestic as well as export market for pig products such as pork, bacon, ham, sausages, lard etc.

indirect contribution of poultry industry is summarized below:

Poultry - Economic Importance

a) As a source of food:

1) Poultry meat and eggs are good source of vitamins and minerals.

2) Poor people can get meat and eggs easily from their reared poultry than from other sources.

3) Poultry meat and eggs supply rich protein and easily cooked dishes to human.

4) Human directly consumes poultry meat and eggs. e.g., Meat as curry, meatball, roast, toast etc. or with other food products like chicken chips, chicken rolls etc. Egg is consumed directly as eggs omelet, poased eggs etc. or with products like egg salad, beverages etc.

b) Industrial use:

1) Eggs: In vaccine preparation, inedible eggs used as animal feed and fertilizers.

2) Egg white: Used in pharmaceuticals, paints, varnishes, adhesives, printer's ink, photography, bookbinding, leather tanning, semen preservation, wine clarification and textile dyeing.

3) Egg yolk: Used in making cake mixed, soap, paints, shampoos, leather finishing and bookbinding.

4) Feathers: Used in animal feed, fertilizers, millinery goods, pillows, cushions, mattresses, dusters and as insulating materials.

5) Endocrine glands: Used in many biological products.

6) Egg shell: Used in mineral mixed, fertilizers, decoration, mosaic works and animal feed.

c) Ornamental and exhibition.

d) For mosaic by the shell of egg.

e) In research purpose: Cheap, readily available and large number of chicks hatched, at a time is advantageous favoring successful research carried out upon them.

f) For making vaccines

g) By products

h) Fertilizer: Eggshells, feathers and inedible parts of the carcass are used as fertilizer.

i) Feathers are used to make broom and others playing implements.

j) Source of income:

1) Poultry rearing and poultry farming is a good source of income.

2) Contribution of livestock sub sector (including poultry) to GDP is about 3.1%.

3) Village women can earn extra cash by selling poultry and poultry products.

Advantages of pig farming:-

⇒ Available for supply of table of pigs.

⇒ The ability to deal with manure or other outputs from the pig operation.

⇒ Local beliefs or traditions, including religion.

⇒ The breed or type of pig available to the farm.

⇒ Local disease or conditions that affect pig growth or fecundity.

⇒ Local requirements, including government Zoning and/or land use laws

⇒ Local and global market conditions and demand

⇒ Traditional farming styles and method.