

"Jai Sai Gurudev"

Saindichurhanagiri first Grade College  
Channarayapatna 573116



Date: - 10/11/2023

Circular

Department of Zoology

Sub:- Planning to visit to Belasindha  
As mentioned in the above Subject, Students  
of V Semester must visit a nearby field to  
collect and study the Invertebrates in their  
natural habitat according to their syllabus  
we, the Zoology department faculty have  
therefore planned to visit Belasindha part on  
18/11/2023. On this occasion of field Trip  
of Non chordates Ex: Insects, Shell, worms etc.

Dr. Nirepama M.

Radhamma K.m

H.O.D. of Zoology

S. A. F. G. College

Channarayapatna-573116

Inform to V<sup>th</sup> Semester Students.

10/11

|| JAI SRI GURUDEV ||

# Sri Adichunchanagiri First Grade College



Channarayapatna-573116

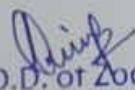
Department of Zoology

Date: 18.11.2023

## Report on field visit to Belasindha and Hemavathi park

In compliance with the syllabus pattern of the 5th semester NEP scheme BSC (Zoology), the Department of Zoology organised a field visit to Belasindha and Hemavathi park on November 18, 2023, with permission from Principal Dr. Manjunath M. K. and HOD of Zoology Dr. Nirupama M. along with all of the III and V semester students and faculties. We arrived at the park by 11:00 am and were greeted by an abundance of arthropods, including various insects, grasshoppers, ants, and spiders. Then, by 2 o'clock, we had safely made it to the college campus after visiting Hemavathi Park, where we saw colonies of honey bees as well as numerous insects, termites, etc.



  
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Principal  
Sri Adichunchanagiri First Grade College  
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Field visit to Belasindha and Hemavathi park, Date: 18.11.2023



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H.O.D. of Zoology  
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Principal  
Sri Adichunchanagiri First Grade Collage  
Channarayapatna-573 116





Field visit to Belashindha Park.

Saathi

Sl. No.	Name	Semester	Signature	Feed back.
01	Komal.G.K	VI	Komal G.K	Good
02	SUHAS.S.L	VI	Suhas S.L	Memorable
03	Jayalakshmi.A.G	VI	Jayalakshmi A.G	Good
04	Purthe Gowda K.D	VI	Purthe Gowda K.D	Good
5	Karthik Kumar	VI	Karthik	Good
6	Keerthana H.S	VI	Keerthana H.S	Good
7	Nischitha.B.S	VI	Nischitha	Good
8	Nisarga.M.B	VI	Nisarga	Not bad
9	Sona B.N	VI Bsc(C2)	Sona B.N	Good
10	Bend K	VI Bsc(C2)	Bend K	Good
11	Suchi thara	VI	Suchi	Good
12	Shambhavi Y.S	VI B.Sc(C2)	Shambhavi	Good
13	Yogitha. R	VI B.Sc(B2)	YR	Good
14	Sindhurhee S	VI B.Sc(B2)	Sindhu	Good
15	Shubha.SL	VI Bsc(B2)	Shubho	Good
16	Amrutha.HS	VI Bsc(B2)	Amrutha	Excellent
17	Ramya.HR	VI Bsc(B2)	Ramya	Good
18	Sushmitha.KR	VI Bsc(B2)	Sushmitha	V. Good
19	Rashmitha.KR	VI Bsc(B2)	Rashmitha	Man jealous
20	Nisarga.D	VI Bsc(B2)	Nisarga	Fantastic
21	Abhilesha.cm	VI Bsc(C2)	Abhilesha.cm	Not Bad.
22	Pooja.H.K	VI Bsc(C2)	Pooja	Good
23	Saraswathi.C.N	VI Bsc(C2)	Sara	Good
24	Jayalakshmi.A.G	VI Bsc(C2)	Jayalakshmi	Good
25	Ranjitha.C.N	VI Bsc(C2)	Ranjitha	Good
26	Spandana K.K	VI Bsc(C2)	Spandana	Good

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**Government of Karnataka**



**Model Curriculum**

Program Name	<b>B.Sc.</b>	V Semester	
Course Title	<b>Non-Chordates and Economic Zoology (Theory)</b>		
Course Code:	<b>ZOO C-9</b>	No. of Credits	<b>4</b>
Contact hours	<b>60 Hours(4 hrs/week)</b>	Duration of SEA/Exam	<b>2 hours</b>
Formative Assessment Marks	<b>40</b>	Summative Assessment Marks	<b>60</b>

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

Course Outcomes (COs) / (POs)	ZOO C9T	ZOO C10P	ZOO C11T	ZOO C12P	ZOO C13T	ZOO C14P	ZOO C15T	ZOO C16P	ZOO C17T	ZOO C18P
I Core competency	X									
II Critical thinking	X									
III Analytical reasoning	X									
IV Research skills	X									
V Team work	X									

**Course Pre-requisite(s):**

**Course Outcomes (COs):** After the successful completion of the course, the student will be able to:

- CO1. Group animals on the basis of their morphological characteristics/ structures.
- CO2. Demonstrate comprehensive identification abilities of Non-Chordate diversity.
- CO3. Explain structural and functional diversity of Non-Chordates
- CO4. Develop understanding on the diversity of life with regard to protists, non-chordates and chordates.
- CO 5. Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree.

Contents	60 Hrs
<b>Unit-I</b>	<b>15</b>
<b>1. Protozoa to Coelenterate</b> <ul style="list-style-type: none"> <li>• Protozoa-<i>Paramecium</i> (Morphology and Reproduction)</li> <li>• Porifera-<i>Sycon</i> (Canal System)</li> <li>• Coelenterata – <i>Obelia</i> (Morphology and Reproduction)</li> </ul>	
<b>1.Ctenophora to Nematheiminthes</b> <ul style="list-style-type: none"> <li>• Ctenophora – Salient feature</li> <li>• Platyhelminthes- <i>Taenia</i> (Tape worm) (Morphology and Reproduction)</li> <li>• Nematelminthes-<i>Ascarislumbricoides</i> (Morphology and Reproduction)</li> </ul>	
<b>Unit-II</b>	<b>15</b>
<b>3. Annelida</b> <ul style="list-style-type: none"> <li>• Annelida – <i>Hirudinaria</i> (Leech) (Morphology and Reproduction)</li> </ul>	
<b>4. Arthropoda</b> <ul style="list-style-type: none"> <li>• Arthropoda – <i>Palaemon</i> (Prawn) Morphology, Appendages, Nervous System and Reproduction)</li> </ul>	
<b>Unit-III</b>	<b>15</b>
<b>6. Mollusca to Hemichordata</b> <ul style="list-style-type: none"> <li>• Mollusca – <i>Pila</i> (Morphology, Shell, Respiration, Nervous System and Reproduction)</li> <li>• Echinodermata – <i>Pentoceros</i> (Morphology and Water Vascular System)</li> </ul>	
<b>Unit-IV</b>	<b>15</b>
<b>7. Economic Zoology : Vectors and Pests</b> <ul style="list-style-type: none"> <li>• Life cycle and their control of following pests: Gundhi</li> <li>• Bug. Sugarcane leafhopper, Rodents. Termites and Mosquitoes and their control</li> </ul>	
<b>8. Economic Zoology: Lac-culture, Vermiculture and Poultry</b>	

<b>Formative Assessment for Theory</b>	
Assessment Occasion/ type	Marks
Attendance	10
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	10
Class room Performance/Participation	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	



Course Title	<b>Non-Chordates and Economic Zoology (Practical)</b>	Practical Credits	<b>2</b>
Course Code	<b>ZOO C10-P</b>	Contact Hours	<b>4 hrs/week</b>
Formative Assessment	<b>25 Marks</b>	Summative Assessment	<b>25 Marks</b>

**Course Outcomes (COs):**

At the end of the course the student should be able to:

1. Understand basics of classification of non-chordates.
2. Learn the diversity of habit and habitat of these species.
3. Develop the skills to identify different classes and species of animals.
4. Know uniqueness of a particular animal and its importance
5. Enhancement of basic laboratory skill like keen observation and drawing.

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

Course Outcomes (COs)/(POs)	ZOO C9T	ZOO C10P	ZOO C11T	ZOO C12 P	ZOO C13T	ZOO C14P	ZOO C15T	ZOO C16P	ZOO C17T	ZOO C18P
I Core competency		X								
II Critical thinking		X								
III Analytical reasoning		X								
IV Research skills		X								
V Team work		X								

## Practical Content

1. Preparation and observation of protozoan culture.
2. **Protozoa:** Systematics of *Amoeba*, *Euglena*, *Noctiluca*, *Paramecium* and *Vorticella* (Permanent slides).
3. **Porifera:** Systematics of *Sycon*, *Euplectella*, *Hyalonema*, *Spongilla* and *Euspongia* (Specimens). Study of permanent slides of T.S of *Sycon*, spicules and gemmules.
4. **Cnidaria:** Systematics of *Aurelia* and *Metridium* (Specimens). Slides of *Hydra*, *Obelia*-polyp and medusa, and *Ephyra* larva, T.S. of *Metridium* passing through mesenteries.
5. **Study of Corals-***Astraea*, *Fungia*, *Meandrina*, *Corallium*, *Gorgonia*, *Millepora* and *Pennatula*.
6. **Helminthes:** Systematics of *Planaria*, *Fasciola hepatica* and *Taenia solium*, *Ascaris*- Male and female (Specimens). Slides of T.S. of *Planaria*, T.S of male and female *Ascaris*.
7. **Annelida:** Systematics of *Nereis*, *Heteronereis*, *Sabella*, *Aphrodite* (Specimens). Slide of T.S. of Earth worm through typhlosole.
8. **Arthropoda:** Systematics of *Panaeus*, *Palaemon*, *Astracus*, Scorpion, Spider, *Limulus*, *Peripatus*, *Millipede*, *Centipede*, Praying mantis, Termite Queen, Moth, Butterfly, Dung beetle/Rhinoceros beetle (Any six specimens). Slide of Larvae- Nauplius, Zoea, Mysis.
9. **Mollusca:** Systematics of *Chiton*, *Mytilus*, *Aplysia*, *Pila*, *Octopus*, *Sepia* (Specimens) and Glochidium larva (Slide).
10. **Shell Pattern-***Unio*, *Ostrea*, *Cypria*, *Murex*, *Nautilus*, *Patella*, *Dentalium*, Cuttle bone.
11. **Echinodermata:** Systematics of Sea star, Brittle star, Sea Urchin, Sea cucumber, Sea lilly (Specimens). Slides of Bipinnaria larva, Echinopluteus larva and Pedicellaria.
12. **Harmful Nonchordates:** Soil Nematodes. Agricultural, veterinary and human pests of Arachnida and Arthropoda.
13. **Beneficial Nonchordates:**
  - **Sericulture:** Life cycle of *Bombyx mori*, Uzi fly, Cocoon, Raw silk.
  - **Apiculture:** Any 2 Species of honey bee and bee wax.
  - **Pearl Culture:** Pearl Oyster and Natural Pearls.
14. **Virtual Dissection/Cultured specimens:** Earthworm – Nervous system, Leech- Digestive System
15. **Virtual Dissection/Cultured specimens:** Prawn - Nervous system.  
Cockroach- Salivary Apparatus and Digestive system.

**Pedagogy:** Lectures, Presentations, Videos, Assignments and Weekly Formative Assessment Tests



<b>Formative Assessment for Practical</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Attendane	05
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Class room Performance/Participation	05
<b>Total</b>	<b>25 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

<b>References</b>	
1	Barnes, R.S.K.; Calow,P.; Olive,P.J.W.; Golding,D.W.; Spicer, J.I.(2002) The Invertebrates: Synthesis, Blackwell Publishing.
2	Hickman,C.; Roberts,L.S.; Keen,S.L.; Larson, A. and Eisenhour, D. (2018) Animal Diversity, McGraw-Hill.
3	Holland, P.(2011) The Animal Kingdom: A Very Short Introduction, Oxford University Press.
4	Kardong, K.V.(2006) Vertebrates: Comparative Anatomy, Function, Evolution (4thedition), McGraw-Hill.
5	Barrington, E.J.W. (1979) Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
6	Boradale, L.A. and Potts, E.A. (1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
7	Bushbaum, R.(1964) Animals without Backbones. University of Chicago Press.

Government of Karnataka



**Model Curriculum**

Program Name	<b>B.Sc.</b>	Semester	<b>V</b>
Course Title	<b>Chordates and Comparative Anatomy (Theory)</b>		
Course Code:	<b>ZOO C-11-T</b>	No. of Credits	<b>4</b>
Contact hours	<b>60 Hours(4 hrs/week)</b>	Duration of SEA/Exam	<b>2 hours</b>
Formative Assessment Marks	<b>40</b>	Summative Assessment Marks	<b>60</b>

<b>Course Pre-requisite(s):</b>
<b>Course Outcomes (COs):</b> After the successful completion of the course, the student will be able to:
CO1. To demonstrate comprehensive identification abilities of chordate diversity
CO2. Able to explain structural and functional diversity of chordate diversity
CO3. To understand evolutionary relationship amongst chordates
CO4. To take up research in biological sciences.
CO5. To realize that very similar physiological mechanisms are used in very diverse organisms.
CO6. To Get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

<b>Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)</b>										
Course Outcomes (COs)/(POs)	ZOO C9T	ZOO C10P	ZOO C11T	ZOO C12 P	ZOO C13T	ZOO C14P	ZOO C15T	ZOO C16P	ZOO C17T	ZOO C18P
I Core competency			X							
II Critical thinking			X							
III Analytical reasoning			X							
IV Research skills			X							
V Team work			X							

Contents	60 Hrs
<b>Unit-I</b>	<b>15 hrs</b>
<p><b>Chapter 1: Chordates:</b> Origin of Chordates. Basic characters of chordates and classification upto classes.</p> <p><b>Chapter 2: Hemichordata:</b> Type Study of <i>Balanoglossus</i> – Habit and Habitat, Morphology, Coelom. Tornaria larva and its affinities. Affinities and systematic position of Hemichordata.</p> <p><b>Chapter 3: Urochordata :</b> Type Study of <i>Herdmania</i>-Habit and Habitat, Morphology, Ascidian tadpole- structure and its retrogressive metamorphosis.</p> <p><b>Chapter 4: Cephalochordata :</b> Type Study of <i>Branchiostoma (Amphioxus)</i>-Habit and Habitat, Morphology, Digestive system, Feeding mechanism, excretory and circulatory system.</p> <p><b>Chapter 5: Agnatha</b> General characters of Agnatha and classification upto classes. Salient features of Cyclostomata and Ostracodermi with orders and examples. Ammocoete larva and its significance.</p>	
<b>Unit-II</b>	<b>15</b>
<p><b>Chapter 6: Vertebrates:</b> General characters and Classification of different classes of vertebrates (Pisces, Amphibia, Reptilia, Aves, Mammalia) up to the order with five characters for each order citing examples. General characters of Chondrichthyes and Osteichthyes. Interesting features and evolutionary significance of Dipnoi. Salient features of Placodermi with examples. Interesting features of <i>Sphenodon</i>, crocodile and <i>Archaeopteryx</i>. Salient features of Ratitae and Carinatae with examples. Interesting features of mammalian orders (Insectivora, Carnivora, Chiroptera, Cetacea, Proboscidea, Ungulata – Perissodactyla and Artiodactyla, and Primates –Platyrrhini and Catarrhini) with examples.</p>	
<b>Unit-III</b>	<b>15</b>
<p><b>Chapter 7. General account of Chordates:</b> Types of caudal fins, scales and swim bladder in fishes. Origin of Amphibia. Neoteny and Paedogenesis. Adaptive radiation in extinct reptiles with suitable examples. Temporal fossae in reptiles. Poison apparatus and biting mechanism in snakes. Parental care in Pisces and Amphibians. Flight adaptations in birds. Dentition in mammals. Evolution of molar tooth. Migration in Pisces, Birds and Mammals.</p>	



<b>Unit-IV</b>	15
<b>Comparative Anatomy of Vertebrates:</b>	
<b>Chapter 8. Integumentary System:</b> Structure of skin and its derivatives.	
<b>Chapter 9. Skeletal System</b>	
<ul style="list-style-type: none"> <li>• Comparative account of Axial Skeletal system in vertebrates; Skull- Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).</li> <li>• Comparative account of Appendicular skeletal system in vertebrates-Pectoral and Pelvic girdles of Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).</li> </ul>	
<b>Chapter-7 Respiratory system</b>	
<ul style="list-style-type: none"> <li>• Comparative account of respiratory system in vertebrates: Pisces (Scoliodon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).</li> </ul>	
<b>Chapter-8 Circulatory System</b>	
<ul style="list-style-type: none"> <li>• Comparative account of heart and aortic arches in vertebrates: Pisces (Scoliodon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).</li> </ul>	
<b>Chapter-9 Excretory System</b>	
<ul style="list-style-type: none"> <li>• Succession of kidney in vertebrates.</li> </ul>	
<b>Chapter-9 Nervous system</b>	
<ul style="list-style-type: none"> <li>• Comparative account of brain in vertebrates: Pisces (Scoliodon), Amphibian (Frog), Reptiles (Lizard), Aves (Pigeon) and Mammals (Man).</li> </ul>	

Course Title	<b>Chordates and Comparative Anatomy Zoology (Practical)</b>	Practical Credits	<b>2</b>
Course Code	<b>ZOO C12-P</b>	Contact Hours	<b>4 hrs/week</b>
Formative Assessment	<b>25 Marks</b>	Summative Assessment	<b>25 Marks</b>

**Course Articulation Matrix: Mapping of Course Outcomes (COs) with Program Outcomes (POs)**

Course Outcomes (COs) / (POs)	ZOO C9T	ZOO C10P	ZOO C11T	ZOO C12 P	ZOO C13T	ZOO C14P	ZOO C15T	ZOO C16P	ZOO C17T	ZOO C18P
I Core competency				X						
II Critical thinking				X						
III Analytical reasoning				X						
IV Research skills				X						
V Team work				X						

## Practical Content

1. **Protochordata:**  
 Balanoglossus and its T. S through proboscis  
 Ascidian/ *Herdmania* and *Amphioxus*, T.S. of *Amphioxus* through pharynx and intestine.
2. **Cyclostomata:**  
 -*Petromyzon*, Ammocoete larva and *Myxine*.
3. **Pisces:**
4. Cartilaginous Fishes – *Narcine*, *Trygon*, *Pristis*, *Myxobatias*
5. Bony Fishes – Zebra fish, Hippocampus, Muraena, Ostracion, Tetradon, Pleuronectus, Diodon, Echeneis. (Any six).
6. **Ornamental fishes:**  
 -Siamese, Koi, Oscar, Betta Sp., Neon tetra, Guppies, Gold fish, Angle fish, Rainbow fish, Mollies (Any four).
7. **Accessory respiratory organs** – *Saccobranthus*, *Clarias* and *Anabas*.
8. **Amphibia:**  
 -*Rana*, *Bufo*, *Ambystoma*, *Axolotl* larva, *Necturus* and *Ichthyophis*.
9. **Reptilia:**  
 -Turtle, Tortoise, *Mabuya*, *Calotes*, Chameleon, *Varanus*.  
 snakes –*Dryophis*, Rat snake, Brahmini, Cobra, Krait, Russell’s viper and *Hydrophis*;
10. **Aves:** Beak and feet modifications in the following examples: Duck, Crow, Sparrow, Parrot, King fisher, Eagle or Hawk.
11. **Mammalia:**  
 Mongoose, Squirrel, Pangolin, Hedge Hog, Rat and Loris.
12. **Virtual Dissection/Cultured specimens:**  
 Shark/Bony fish: Afferent and efferent branchial systems, glossopharyngeal and vagus nerves.
13. **Virtual Dissection/Cultured specimens:**  
 Rat: Dissection (only demonstration) – Circulatory system (arterial and venous), urinogenital system.
14. **Skeletal System in man:** Skull, vertebrae, girdles and limb bones ( Except hands and feet)
15. **Comparative account** of skin in shark, frog, calotis, pigeon and Man.
16. **Comparative account** of heart in shark, frog, calotis, pigeon and Man.
17. **Comparative account** of brain in frog, calotis, pigeon and Man.

### Formative Assessment for Theory

Assessment Occasion/ type	Marks
Attendance	10
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	10
Classroom Performance/Participation	10
<b>Total</b>	<b>40 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

<b>Formative Assessment for Practical</b>	
<b>Assessment Occasion/ type</b>	<b>Marks</b>
Attendane	05
House Examination/Test	10
Written Assessment/Presentation/Project/Term Papers/Seminars	05
Class room Performance/Participation	05
<b>Total</b>	<b>25 Marks</b>
<i>Formative Assessment as per guidelines are compulsory</i>	

<b>References</b>	
1	Colbert <i>et al</i> : Colbert's Evolution of the Vertebrates: A history of the backboned animals through time. (5 <sup>th</sup> ed 2002, Wiley – Liss).
2	Hildebrand: Analysis of vertebrate Structure (4 <sup>th</sup> ed 1995, John Wiley)
3	Kenneth V. Kardong (20015) vertebrates: Comparative Anatomy, Function, Evolution McGraw Hill
4	McFarland <i>et al.</i> ,: Vertebrate Life (1979, Macmillan publishing)
5	Parker and Haswell: Text Book of Zoology, Vol. II (1978, ELBS)
6	Romer and Parsons: The Vertebrate Body (6 <sup>th</sup> ed 1986, CBS Publishing Japan)
7	Young: The Life of vertebrates (3 <sup>rd</sup> ed 2006, ELBS/Oxford)
8	Weichert C.K. and William Presch (1970). Elements of Chordate Anatomy, Tata McGraw Hills