



**Thiagarajar College::Madurai – 625 009**  
Reaccredited with A Grade by NAAC (3<sup>rd</sup> Cycle)  
44<sup>th</sup> Ranking in NIRF

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**NATIONAL CENTRE OF EXCELLENCE  
IN STATISTICAL AND MATHEMATICAL MODELLING  
IN BIORESOURCES MANAGEMENT**

(UNDER FAST SCHEME)

**REPORT**

Submitted to

**MINISTRY OF HUMAN RESOURCE DEVELOPMENT  
GOVERNMENT OF INDIA  
NEW DELHI – 110 001**

139 – 140, Kamarajar Salai, Teppkulam  
Madurai – 625 009, Tamilnadu  
[thiagarajarncoe@gmail.com](mailto:thiagarajarncoe@gmail.com)  
9194434 75759, 9177080 9177



**THIAGARAJAR COLLEGE::MADURAI – 625 009**  
**NATIONAL CENTRE OF EXCELLENCE IN STATISTICAL AND**  
**MATHEMATICAL MODELLING IN BIORESOURCES MANAGEMENT**  
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**Email.[thiagarajarncoe@gmail.com](mailto:thiagarajarncoe@gmail.com)**

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About the Centre

The CoE has been established as a nodal centre to promote multidisciplinary research among the researchers, academicians and students through teaching, training and research with the following objectives

- To provide an integrated multidisciplinary inventorying and monitoring systems for sustainable utilization and conservation of bioresources
- To gain knowledge on bioresources at Regional, National and Global scales
- To develop skills for analysis, modelling, simulation and evaluation of bioresources management
- To draw attention to modern innovative ways of generating income through bioresources
- To establish a 'Regional Bioresources Monitoring Facility' for the benefit of students, researchers, stakeholders and policy makers

**AREAS OF FUNCTIONING OF THE CoE (MHRD)**  
**AS GIVEN IN THE DETAILED PROJECT REPORT**

- I. Research
- II. Training
- III. Teaching

**I. RESEARCH**

**RECOGNIZED MULTI DISCIPLINARY RESEARCH CENTRE:**

The Centre has been recognized as Full time Research Centre to carryout multidisciplinary Research leading to Ph.D., Degree by Madurai Kamaraj University. Scholars from Bioresource Management, Zoology, Botany and Mathematics are carrying out research work leading to Ph.D degree

### RESEARCH SCHOLARS:

S.No	Name	Designation	Com.	Wef	Subject
01	Mr. S. Murali Krishnan	Senior Research Fellow	OBC	09.04.18	Bioresource Management
02	Mr. K. Marimuthu	Project Fellow	SC	10.11.17	Zoology
03	Mr. K. Sonaimuthu	Project Fellow	OBC	10.11.17	Zoology
04	Mr. E. Shanmugam	Project Fellow	OBC	10.11.17	Mathematics

### OTHER STAFF:

The following staff have been appointed to carryout activities of the centre

S.No	Name	Designation	Com.	Wef
01	Mr. P. Madhan	Field Assistant	SC	10.11.17
02	Mr. M. Balamurugan	Office Assistant	OBC	10.11.17

### PUBLICATIONS IN JOURNALS/CONFERENCE PROCEEDINGS:

- Kubendran, T., Murali Krishnan, S., Selvakumar, C, C., Sidhu, A. K. and Akhil N. (2018). Composition and trophic categorization of aquatic insects and biomonitoring potential of selected hill streams of Western Ghats, India. *International Journal of Ecology and Environmental Sciences* 44 (1): 103-110
- S. Murali Krishnan, N. Arun Nagendran, D. Pandiaraja, Akhil Nair and T. Kubendran 2017. Avifaunal diversity and water quality analysis of an Inland pond, Kondagai Village, Sivaganga District, South India. *International Journal of Current Microbiology and Applied Science*. 6(7):4437-4452
- T. Kubendran, C. Selvakumar, Avatar KaurSidhu, Akhil Nair and S. Murali Krishnan 2017. Baetidae (Ephemeroptera: Insecta) Biological Indicators of Environmental Degradation in Tamaraparani and VaigaiTiver Basins of Southern Western Ghats, India. *International Journal of Current Microbiology and Applied Sciences*. 6(6): 558-572.
- T. Kubendran, C. Selvakumar, Avatar KaurSidhu, S. Murali Krishnan and Akhil Nair 2017. Diversity and distribution of Baetidae (Insecta: Ephemeroptera) Larvae of Streams and River of the Southern Western Ghats, India. *Journal of Entomology and Zoology Studies*. 5(3):613-625.
- Murali Krishnan, S., ArunNagendran, N., Pandiaraja, D. and VinayagaMoorthi, P 2017. Isolation and characterization of Amylase Production and optimization of Enzyme Production 2017. *International Journal of Development Research*. 07(12)18128-8134.

### MANUALS PUBLISHED FROM THE CENTRE:

- N. Arun Nagendran, S. Kulandaivel, S. Murali Krishnan,, R. Rohini, (2017) **Manual of Kinetics of Marine Microbial Products**, National Centre of Excellence.
- P. Anitha Margret, S. Kulandaivel, Dr. K. Renuka Devi, Dr. C. Balachandran, S. Murali Krishnan (2017) **Manual of Molecular Techniques**, National Centre of Excellence.
- Dr. K. Renuka Devi, Dr. C. Balachandran, S. Kulandaivel, P. Anitha Margret, S. Murali Krishnan (2017) **Manual of Bioinformatics and Drug Designing**, National Centre of Excellence.
- Pandiaraja, D., **Proceedings of National Conference on Recent Developments on Emerging fields in Pure and Applied Mathematics.**
- Nagendran, N.A., Kulandaivel and Saranya, N. 2016. **Manual on UV Spectrophotometric Techniques**, NCoE, MHRD, New Delhi.
- Nagendran, N.A., Kulandaivel, S., Muralikrishnan, S and Rohini, R. 2016. **Manual on Kinetics of marine microbial products**. NCoE, MHRD, New Delhi.

### PROJECTS CARRIED OUT BY POST GRADUATE STUDENTS

S.No	REG. No.	NAME	GUIDE	TITLE
01	16SPBT01	ARUN KUMAR, K	AM	Evaluating the antidepressant competence of vital phytochemicals in edible mushroom by GC-MS and in silico assay
02	16SPBT02	KISHORE, P	RA	Nutraceutical analysis in <i>cocosnucifera</i> (young shoot)
03	16SPBT04	CHITRAKALA, U	KS	Screening of suitable microorganisms for polythene degradation
04	16SPBT05	HEMAA, N.R	NAN	Characterization and optimization of Riboflavin production by Bacteria associated with Earthworm gut ( <i>Iseniafoetida</i> )
05	16SPBT06	MAREESWARI, R	AM	Determination of L-Tryptophan and its derivatives from selected edible mushrooms to target depression and facilitate drug delivery
06	16SPBT07	MEENAKSHI, V	SKV	Formulation of novel media for the plant tissue culture of selected explant
07	16SPBT08	NAGARANI, V	CBR	Isolation identification and characterization of keratinolytic organism from feather waste
08	16SPBT09	PUVINA, T	CBR	Study of heavy metals concentration in water sediment and fish from vandiyur lake, Madurai, Tamilnadu and their environmental significance
09	16SPBT11	SAHAYA SHILPA DALVI, A	KRD	Analysis and comparison of heavy metals and lactose in cow's milk from different regions
10	16SPBT12	SELVAPRIYA, S	KS	Preparation of microbial culture medium from selected plant wastes
11	16SPBT13	SHANMUGA PRIYA, A	CR	Bioactivity and phytochemical analysis of the

				marine macro algae <i>Sargassumilicifolium</i>
12	16SPBT14	SHEGANAZ, S	KRD	A study on the phytochemical, Antibacterial and Antioxidant activity of seed extract of <i>Swieteniamahagoni</i>
13	16SPBT15	SIVAPRATHA, A	TSRL	Comparative analysis of Biofuel extracted from <i>Pongamiapinnata</i> and <i>Swieteniamahagoni</i> seeds
14	16SPBT16	SUBHASHINI, M	NAN	Molecular docking of bacterial proteins with selected natural dye compound and assessment of antimicrobial activity
15	16SPBT17	VASUUPRADHAA, R	BR	Biochemical characterization of Lysozyme in <i>Channapunctate</i>
16	16SPBT18	YOGESHWARI, V	KRD	Purification and heavy metal analysis of drinking water by using natural coagulant of <i>Moringaoleifera</i> and <i>Strychnopotatorum</i> seeds

## II. TRAINING

### TRAINING PROGRAMMES ORGANIZED

Training Programmes organized by the Centre participated by students of various institutions of Southern Tamilnadu		
Programme	Dates	Participants
Hands on training on Chromatographic techniques	07.10.17 to 08.10.18	UG/PG Biology students
Hands on training on Basics of Bioinformatics	07.10.17 to 08.10.18	UG/PG Biology students
Winter School on Bio entrepreneurship and IPR	23.11.17 to 28.11.17	UG Biology students
Winter School on Molecular Techniques	23.11.17 to 28.11.17	UG/PG Biology students
Winter School on Bioinformatics and Drug Designing	23.11.17 to 28.11.17	PG Biology students
Winter School on Biostatistics and Mathematical Modelling	23.11.17 to 28.11.17	PG Biology and Mathematics students

### TRAINING PROGRAMMES ATTENDED BY STAFF, SCHOLARS & STUDENTS IN OTHER INSTITUTIONS:

Programme	Date	Participant(s)
Internship training in the Department of Human Genetics and Molecular Biology, Bharthiar University, Coimbatore	05.06.17 to 16.06.17	K. Arunkumar, N.R. Hema, V. Nagarani, M.Sc., Biotech students
Biosafety and Viral Diagnostic Methods at Viral Research and Diagnostic Laboratory (VRDL), Institute of Microbiology, Madurai Medical College.	12.09.17 & 13.09.17	V. Meenakshi, V. Nagarani, M.Sc., Biotech students
	11.07.17	S. Muralikrishnan,

Wildlife Conservation and Monitoring training Organized by Zoo Outreach Organization, Coimbatore, TN In collaboration with Society for Wildlife Interface and Forestry Training SWIFT, TN Forest Department, Coimbatore, VANAM, Theni Hosted by Tamil Nadu Forestry Training College, Sponsored by US Fish and Wildlife Service Tamilnadu Forest Training College, Vaigai Dam	to 14.07.17	Research Scholar as Resource person
A Recent trends in Life Science Research with special reference to Molecular Imaging, Proteomics and Metabolomics, Department of Animal Science, Bharathidasan University, Tiruchirappalli.	12.02.18 to 16.02.18	K. Marimuthu Research Scholar
Annual Waterfowl count in Pong Dam Wildlife Sanctuary, District Kangra, Himachal Pradesh, Jointly organized by High Altitude Regional Center, Zoological Survey of India and Department of Forest, Himachal Pradesh held at ZSI-HARC, Solan, Himachal Pradesh	07.03.18 to 28.03.18	S. Muralikrishnan, Research Scholar
Capacity Building workshop on Long-term monitoring of Himalayan Biodiversity for Stakeholders of Himalayan Region, Organized under the NMHS programme of MoEF & CC, Government of India Jointly by: Zoological Survey of India, Botanical Survey of India and G. B. Pant National Institute of Himalayan Environment & Sustainable Development held at ZSI-HARC, Solan, Himachal Pradesh	23.03.18 & 24.03.18	S. Muralikrishnan, Research Scholar
Hands on training on ELISA and Molecular methods at Viral Research and Diagnostic Laboratory (VRDL), Institute of Microbiology, Madurai Medical College.	05.04.18	M.M. Karthiga Devi, I. Nivetha K.V. Shalini Mai D. Uma Maheshwari MSc Biotech Students

### III. TEACHING

#### M.Sc., BIOTECHNOLOGY COURSE

- The Centre is offering M.Sc., Biotechnology Course from the academic year 2015 affiliated to Madurai Kamaraj University
- Introduction of Diploma in Quality Control in Biology from the academic year 2018

#### Science Club:

Lecture series	Month	Speakers
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01	August – 2017	M. Subhashini, II MSc Biotech L. Anjali Devi, I MSc Biotech
02	September – 2017	R. Vasuupradhaa, II MSc Biotech
03	October – 2017	M. Sukanya, I M.Sc., Biotech
04	January – 2018	V. Meenakshi, II MSc Biotech
05	February – 2018	E. Subalakshmi, I MSc Biotech
06	March – 2018	V. Nagarani, II MSc Biotech
07	April – 2018	M. Elakkiya, I MSc Biotech

### **STUDENTS / STAFF PARTICIPATION IN VARIOUS ACTIVITIES**

<b>Programme</b>	<b>Date</b>	<b>Participant(s)</b>
Inauguration of Science Club in the Centre – Presentation of lectures by students of Biotechnology	31.08.17	M.Sc., Biotechnology students
Inter collegiate Talent exposure, Dept. of Biotechnology & Biochemistry, JJ College of Arts & Science, Pudukottai	08.09.17	04 students
Participation in Zoofest – 2017 at Vivekananda College	18.12.18	06 students
Intercollegiate competition on Nurture our Nature, VVV College for Women, Virdhunagar	20.12.18	23 students

**THIAGARAJAR COLLEGE: MADURAI – 625 009**  
**NATIONAL CENTRE OF EXCELLENCE**  
**IN BIORESOURCE MANAGEMENT (MHRD)**

**SURVEY OF BIRDS IN SELECTED PONDS**

**Table. 1. List of Birds in Koonthankulam Birds Sanctuary, Tirunelveli District**

<b>S.No</b>	<b>Family</b>	<b>Zoological Name</b>	<b>Common Name</b>
01	Accipitridae	<i>Accipiter badius</i>	Shikra
02	Accipitridae	<i>Milvus migrans</i>	Black Kite
03	Alaudidae	<i>Mirafra cantillans</i>	Singing Bush Lark
04	Alcedinidae	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher
05	Alcedinidae	<i>Alcedo atthis</i>	Common Kingfisher
06	Anatidae	<i>Anas poecilorhyncha</i>	Spot-bill Duck
07	Apodidae	<i>Tachymarptis melba</i>	Asian palm-Swift
08	Ardeidae	<i>Egretta garzetta</i>	Little Egret
09	Ardeidae	<i>Bubulcus ibis s</i>	Cattle egret
10	Ardeidae	<i>Ardeola grayii</i>	Indian Pond-heron
11	Ardeidae	<i>Casmerodius albus</i>	Great Egret
12	Ardeidae	<i>Egretta intermedia</i>	Median Egret
13	Artamidae	<i>Artamus fuscus</i>	Ashy Woodswallow
14	Charadriidae	<i>Charadrius dubius</i>	Little ringed plover
15	Charadriidae	<i>Vanellus indicus</i>	Red-wattled Lapwing
16	Charadriidae	<i>Vanellus malabaricus</i>	Yellow-wattled lapwing
17	Ciconiidae	<i>Anastomus oscitans</i>	Asian Openbill
18	Columbidae	<i>Columba livia</i>	Rock Pigeon
19	Columbidae	<i>Streptopelia chinensis</i>	Spotted Dove
20	Columbidae	<i>Streptopelia decaocto</i>	Eurasian collared dove
21	Columbidae	<i>Streptopelia sengalensis</i>	Laughing Dove
22	Coraciidae	<i>Coracias benghalensis</i>	Indian roller
23	Corvidae	<i>Corves splendens</i>	House Crow
24	Corvidae	<i>Corves macrorhynchos</i>	Jungle Crow
25	Cuculidae	<i>Centropes sinensis</i>	Greater Coucal
26	Cuculidae	<i>Eudynamys scolopacea</i>	Asian koel
27	Cuculidae	<i>Clamator jacobinus</i>	Pied Cuckoo
28	Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo
29	Dicruridae	<i>Dicrurus leucophaeus</i>	Ashy Drongo
30	Lybiidae	<i>Stactolaema olivacea</i>	Green barbet
31	Meropidae	<i>Merops philippinus</i>	Blue-tailed Bee-eater
32	Monarchidae	<i>Terpsiphone paradise</i>	Asian Paradise Flycatcher
33	Motacillidae	<i>Motacilla maderaspatensis</i>	White-Browed Wagtail

34	Motacillidae	<i>Anthus rufulus</i>	Paddyfield Pipit
35	Muscicapidae	<i>Saxicoloides fulicata</i>	Indian Robin
36	Muscicapidae	<i>Luscinia brunnea</i>	Indian Blue Robin
37	Nectariniidae	<i>Nectarinia asiatica</i>	Purple Sunbird
38	Nectariniidae	<i>Nectarinia zeylonica</i>	Purple-rumped Sunbird
39	Oriolidae	<i>Oriolus oriolus</i>	Eurasian Golden Oriole
40	Passeridae	<i>Passer domesticus</i>	House Sparrow
41	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little Cormorant
42	Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl
43	Picidae	<i>Dinopium benghalense</i>	Black-Rumped Flameback
44	Psittacidae	<i>Psittacula krameri</i>	Rose-Ringed Parakeet
45	Pycnonotidae	<i>Pycnonotus cafer</i>	Red-Vented Bulbul
46	Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen
47	Sturnidae	<i>Acridotheres tristis Linnaeus</i>	Common Myna
48	Threskiornithidae	<i>Threskiornis melanocephalus</i>	Oriental White Ibis
49	Upupidae	<i>Upupa epops</i>	Common Hoopoe
50	Anatidae	<i>Anas querquedula</i>	Garganey
51	Anatidae	<i>Anas crecca</i>	Common Teal
52	Motacillidae	<i>Motacilla maderaspatensis</i>	White-Browed Wagtail
53	Podicipedidae	<i>Tachybaptus ruficollis</i>	Little Grebe
54	Rallidae	<i>Gallinula chloropus</i>	Common Moorhen
55	Rallidae	<i>Fulica atra</i>	Common Coot
56	Anhingidae	<i>Anhinga melanogaster</i>	Darter
57	Threskiornithidae	<i>Platalea leucorodia</i>	Eurasian Spoonbill
58	Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy ibis
59	Threskiornithidae	<i>Pseudibis papillosa</i>	Black Ibis
60	Anatidae	<i>Anas acuta</i>	pintail
61	Estrildidae	<i>Euodice malabarica</i>	Indian silverbill
62	Leiothrichidae	<i>Turdoides striata</i>	Jungle babbler
63	Scolopacidae	<i>Tringa nebularia</i>	Common greenshank
64	Pelecanidae	<i>Pelecanus philippensis</i>	Spot-billed pelican
65	Pelecanidae	<i>Pelecanus onocrotalus</i>	Great white pelican
66	Ciconiidae	<i>Mycteria leucocephala</i>	Painted stork
67	Anatidae	<i>Sarkidiornis sylvicola</i>	Comb duck
68	Anatidae	<i>Anas arcuata</i>	Whistling duck
69	Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged stilt
70	Strigidae	<i>Athene brama</i>	Spotted owl
71	Rallidae	<i>Porphyrio porphyrio</i>	Purple moorhen
72	Anatidae	<i>Anser indicus</i>	Bar-headed goose
73	Scolopacidae	<i>Calidris alpina</i>	Sandpiper
74	Accipitridae	<i>Haliastur indus</i>	Brahminy kite

**Table. 2. List of Birds in Mandela Nagar pond, Madurai district**

<b>S.No</b>	<b>Family</b>	<b>Zoological name</b>	<b>Common name</b>
01	Aalaudidae	<i>Mirafra cantillans</i>	Singing bush lark
02	Accipitridae	<i>Milvus migrans</i>	Black kite
03	Accipitridae	<i>Accipiter badius</i>	Shikra
04	Alcedinidae	<i>Alcedo atthis</i>	Common kingfisher
05	Alcedinidae	<i>Halcyon smyrnensis</i>	White breasted kingfisher
06	Anatidae	<i>Anas crecca</i>	Common teal
07	Anhingidae	<i>Anhinga melanogaster</i>	Darter
08	Apodidae	<i>Tachymarpis melba</i>	Asian palm swift
09	Ardeidae	<i>Mesophoyx intermedia</i>	Median egret
10	Ardeidae	<i>Casmerodius albus</i>	Great egret
11	Ardeidae	<i>Ardeola grayii</i>	Indian pond heron
12	Ardeidae	<i>Bubulcus ibis</i>	Cattle egret
13	Ardeidae	<i>Egretta garzetta</i>	Little egret
14	Artamidae	<i>Artamus fuscus</i>	Ashy wood swallow
15	Charadriidae	<i>Vanellus indicus</i>	Red watted lapwing
16	Ciconiidae	<i>Anastomus oscitans</i>	Asian openbill stork
17	Columbidae	<i>Streptopelia decaocto</i>	Eurasian collared dove
18	Columbidae	<i>Columba livia</i>	Rock pigeon
19	Columbidae	<i>Streptopelia engalensis</i>	Laughing dove
20	Columbidae	<i>Streptopelia chinensis</i>	Spotted dove
21	Coraciidae	<i>Coracias benghalensis</i>	Indian roller
22	Corvidae	<i>Dentrocitta vagabunda</i>	Rufous treepie
23	Corvidae	<i>Corves macrorhynchos</i>	Jungle crow
24	Corvidae	<i>Corves splendens</i>	House crow
25	Cuculidae	<i>Cuculus poliocephalus</i>	Lesser cuckoo
26	Cuculidae	<i>Eudynamys scolopacea</i>	Asian koel
27	Cuculidae	<i>Clamator jacobinus</i>	Pied cuckoo
28	Cuculidae	<i>Centropes sinensis</i>	Greater coucal
29	Dicruridae	<i>Dicrurus leucophaeus</i>	Ashy drongo
30	Dicruridae	<i>Dicrurus macrocercus</i>	Black drongo
31	Estrildidae	<i>Lonchura punctulata</i>	Scaly breasted munia
32	Monarchidae	<i>Terpsiphone paradise</i>	Asian paradise Flycatcher
33	Motacillidae	<i>Anthus rufulus</i>	Paddyfield pipit
34	Motacillidae	<i>Motacilla maderaspatensis</i>	White browed wagtail
35	Muscicapidae	<i>Luscinia brunnea</i>	Indian blue robin
36	Muscicapidae	<i>Saxicoloides fulicata</i>	Indian robin
37	Nectariniidae	<i>Nectarinia zeylonica</i>	Purple rumped sunbird
38	Nectariniidae	<i>Nectarinia asiatica</i>	Purple sunbird
39	Oriolidae	<i>Oriolus oriolus</i>	Eurasian Golden oriole
40	Passeridae	<i>Passer domesticus</i>	House sparrow
41	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little cormorant
42	Phasianidae	<i>Pavo cristatus</i>	Indian peafowl
43	Picidae	<i>Dinopium benghalense</i>	Black rumped flameback
44	Podicipedidae	<i>Tachybaptus ruficollis</i>	Little grebe
45	Psittacidae	<i>Psittacula krameri</i>	Rose ringed parakeet
46	Pycnonotidae	<i>Pycnonotus cafer</i>	Red vented Bulbul
47	Rallidae	<i>Fulica atra</i>	Common coot
48	Rallidae	<i>Gallinula chloropus</i>	Common moorhen

49	Rallidae	<i>Amaurornis phoenicurus</i>	White breasted waterhen
50	Scolopacidae	<i>Actitis hypoleucos</i>	Common sandpiper
51	Sturnidae	<i>Acridotheres tristis</i>	Common myna
52	Threskiornithidae	<i>Pseudibis papillosa</i>	Black ibis
53	Threskiornithidae	<i>Threskiornis melanocephalus</i>	Oriental white ibis
54	Upupidae	<i>Upupa epops</i>	Common hoopeea
55	Accipitridae	<i>Haliastur indus</i>	Brahminy kite
56	Cuculidae	<i>Cacomantis passerinus</i>	Indian plaintive cuckoo
57	Meropidae	<i>Merops philippinus</i>	Blue-tailed Bee-eater
58	Scolopacidae	<i>Limosa lapponica</i>	bar-tailed godwit
59	Ardeidae	<i>Nycticorax nycticorax</i>	Night Heron
60	Lybiidae	<i>Stactolaema olivacea</i>	Green barbet
61	Charadriidae	<i>Vanellus malabaricus</i>	Yellow-wattled lapwing

NCOE-MHRD

**Table. 3. List of Birds in Chitrankudi and Kangerankulam Village pond, Ramanathapuram District**

S.No	Family	Zoological Name	Common Name
01	Accipitridae	<i>Spilornis cheela</i>	Crested serpent eagle
02	Accipitridae	<i>Accipiter badius</i>	Shikra
03	Accipitridae	<i>Milvus migrans</i>	Black Kite
04	Alaudidae	<i>Mirafra cantillans</i>	Singing Bush Lark
05	Alcedinidae	<i>Alcedo atthis</i>	Common Kingfisher
06	Alcedinidae	<i>Halcyon smyrnensis</i>	White-breasted Kingfisher
07	Anatidae	<i>Anas crecca</i>	Common Teal
08	Anatidae	<i>Anas querquedula</i>	Garganey
09	Anhingidae	<i>Anhinga melanogaster</i>	Darter
10	Ardeidae	<i>Egretta garzetta</i>	Little Egret
11	Ardeidae	<i>Casmerodius albus</i>	Great Egret
12	Ardeidae	<i>Bubulcus ibis</i>	Cattle egret
13	Ardeidae	<i>Ardeola grayii</i>	Indian Pond-heron
14	Ardeidae	<i>Butorides striatus</i>	Striated heron
15	Ardeidae	<i>Ardea cinerea</i>	Grey heron
16	Ardeidae	<i>Dupetar flavicollis</i>	Black bittern
17	Burhinidae	<i>Esacus recurvirostris</i>	Great stone curlew
18	Ciconiidae	<i>Anastomus oscitans</i>	Asian Openbill
19	Ciconiidae	<i>Mycteria leucocephala</i>	Painted stork
20	Columbidae	<i>Streptopelia sengalensis</i>	Laughing Dove
21	Columbidae	<i>Columba livia</i>	Rock Pigeon
22	Columbidae	<i>Streptopelia chinensis</i>	Spotted Dove
23	Corvidae	<i>Corves splendens</i>	House Crow
24	Corvidae	<i>Corves macrorhynchos</i>	Jungle Crow
25	Corvidae	<i>Dentrocitta vagabunda</i>	Rufous treepie
26	Cuculidae	<i>Cuculus poliocephalus</i>	lesser cuckoo
27	Cuculidae	<i>Centropes sinensis</i>	Greater Coucal
28	Cuculidae	<i>Clamator jacobinus</i>	Pied Cuckoo
29	Dicruridae	<i>Dicrurus macrocercus</i>	Black Drongo
30	Dromadidae	<i>Dromas ardeola</i>	Crab plover
31	Monarchidae	<i>Terpsiphone paradise</i>	Asian Paradise Flycatcher
32	Motacillidae	<i>Motacilla maderaspatensis</i>	White-Browed Wagtail
33	Motacillidae	<i>Anthus rufulus</i>	Paddyfield Pipit
34	Muscicapidae	<i>Saxicoloides fulicata</i>	Indian Robin
35	Muscicapidae	<i>Luscinia brunnea</i>	Indian Blue Robin
36	Muscicapidae	<i>Copsychus saularis</i>	oriental magpie-robin
37	Nectariniidae	<i>Nectarinia asiatica</i>	Purple Sunbird
38	Nectariniidae	<i>Nectarinia zeylonica</i>	Purple-rumped Sunbird
39	Oriolidae	<i>Oriolus oriolus</i>	Eurasian Golden Oriole
40	Pandionidae	<i>Pandion haliaetus</i>	Osprey

41	Passeridae	<i>Passer domesticus</i>	House Sparrow
42	Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little Cormorant
43	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great cormorant
44	Phasianidae	<i>Pavo cristatus</i>	Indian Peafowl
45	Picidae	<i>Dinopium benghalense</i>	Black-Rumped Flameback
46	Podicipedidae	<i>Tachybaptus ruficollis</i>	Little Grebe
47	Psittacidae	<i>Psittacula krameri</i>	Rose-Ringed Parakeet
48	Pycnonotidae	<i>Pycnonotus cafer</i>	Red-Vented Bulbul
49	Rallidae	<i>Gallinula chloropus</i>	Common Moorhen
50	Rallidae	<i>Fulica atra</i>	Common Coot
51	Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted Water hen
52	Scolopacidae	<i>Gallinago gallinago</i>	Common snipe
53	Scolopacidae	<i>Actitis hypoleucos</i>	Common sandpiper
54	Sturnidae	<i>Acridotheres tristis</i>	Common Myna
55	Threskiornithidae	<i>Threskiornis melanocephalus</i>	Oriental White Ibis
56	Threskiornithidae	<i>Pseudibis papillosa</i>	Black Ibis
57	Threskiornithidae	<i>Platalea leucorodia</i>	Eurasian Spoonbill
58	Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy ibis
59	Turdidae	<i>Zoothera wardii</i>	Pied Thrush

**THIAGARAJAR COLLEGE: MADURAI – 625 009**  
**NATIONAL CENTRE OF EXCELLENCE**  
**IN BIORESOURCE MANAGEMENT (MHRD)**

**WINTER SCHOOLS (23.11.18 – 28.11.18)**

**BIOENTREPRENEURSHIP AND IPR**  
**MOLECULAR TECHNIQUES**  
**BIOINFORMATICS AND DRUG DESIGNING**  
**STATISTICAL AND MATHEMATICAL MODELLING**



**INAUGURATION – Dr. D. PANDIARAJA, PRINCIPAL & DIRECTOR**



**INAUGURATION – Prof. R. UDHYAKUMAR, GANDHIGRAM RURAL INSTITUTE**



**BIOENTREPRENEURSHIP & IPR – MUSHROOM PRODUCTION**



**BIOENTREPRENEURSHIP & IPR – VALUE ADDED PRODUCTS FROM MILK**



**MOLECULAR TECHNIQUES – AGAROSE GEL ELECTROPHORESIS**



**MOLECULAR TECHNIQUES – DNA AMPLIFICATION BY PCR**



**BIOINFORMATICS & DRUG DESIGNING**



**BIOINFORMATICS & DRUG DESIGNING**



## BIostatistics & MATHEMATICAL MODELLING



## BIostatistics & MATHEMATICAL MODELLING



**VALEDICTORY FUNCTION – FEED BACK**



**VALEDICTORY FUNCTION – DISTRIBUTION OF CERTIFICATES**

**THIAGARAJAR COLLEGE: MADURAI – 625 009**  
**NATIONAL CENTRE OF EXCELLENCE**  
**IN BIORESOURCE MANAGEMENT (MHRD)**

**HANDS ON TRAINING (07.10.18 & 08.10.18)**

**CHROMATOGRAPHIC TECHNIQUES**  
**BASIC TOOLS IN BIOINFORMATICS**



**INAUGURATION – Dr. D. PANDIARAJA, PRINCIPAL & DIRECTOR**



**INAUGURATION – Mr. S. KULANDAIVEL, COORDINATOR**



**CHROMATOGRAPHIC TECHNIQUES**



**CHROMATOGRAPHIC TECHNIQUES**



**BASIC TOOLS IN BIOINFORMATICS**



**BASIC TOOLS IN BIOINFORMATICS**



**VALEDICTORY FUNCTION – CERTIFICATE DISTRIBUTION**



**VALEDICTORY FUNCTION – PARTICIPANTS**

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**M.Sc BIOTECHNOLOGY**

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**RURAL AND ENTREPRENEURIAL BIOTECHNOLOGY**  
**(MUSHROOM CULTURE, SERICULTURE & VERMICULTURE)**  
**TRAINING AT VIVEKANANDA COLLEGE – 04.01.18**

Report by M.Sc., Biotechnology students

Observation of different species of silkworm Then we had the opportunity to gain the knowledge about sericulture processing where different species of silkworm such as muga and ori were shown with their lifecycle, culture conditions, disease affecting and entrepreneur properties.



Then, we had a visit to the mushroom cultivation farm where we saw the cultivation of oyster mushrooms. There we gained step by step knowledge about the straw preparation, seedling of span about the mushroom cultivation. This information will guide us to cultivate

the mushroom even at home which may help us to become an entrepreneur.

We visited the vermicompost unit where the organic waste materials produced inside the campus were recycled by earthworms which may helps us to earn high income using waste materials.



We had a chance to know the information about dairy farm and its maintenance where there are more than 100 cows including young once, calves and milk yielding cows which were kept in separate compartments and thus become easy to maintain them.



On the whole approximately 500 liters of milk were collected and used for college catering purpose and also for outside sale. Paddy straws were collected from their own agricultural fields, chopped with machineries and given as fodder for calves.

All the cows were provided hospitality with highly sophisticated

methods. They were maintained by tail to tail contact to avoid any uncomfortable behavior among them. The cow dung produced by the dairy industry were utilized by the vermicomposting unit for organic manure preparations.



NCOE-MHRL

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