Vol: 1, Issue I, Year 2018, Month: March

J.B. BIOTECHNIQUE

Voice of Advance level Institutional Biotech Hub, J.B. College, Jorhat




The first issue of J.B. Biotechnique is an annual Newsletter of the Institutional Biotech Hub, J.B. College, Jorhat displaying the facilities and activities of the hub. The hub is actively associated with enlightening the young minds of students with the scope of biological science and interdisciplinary nature of the subject. The hub is dedicated to provide necessary teaching and awareness facilities to nearby schools and colleges to fulfill their curricular and co-curricular activities. The hub also provide research facilities to the host and nearby institutes by providing consultancy and laboratory service.

From the Desk of Principal

Dr. Bimal Barah
Principal,
Jagannath Barooah College
Jorhat

The effective centre of any kind of activity is normally designated as a hub and is used for different context. A Biotech hub is also such a centre where the research activities pertaining to biology or life science is carried out. In 2009, the department of Biotechnology, Govt. of India has initiated the process of establishing biotech hubs specially for the North-Eastern region of India for promoting education and research in the aforesaid fields. It is really a matter of pride that J.B. College (Autonomous), Jorhat, has got an opportunity to get involved in this scheme and in the year 2010, a significant amount for creation of basic infrastructure had been received. With these incentives from the ministry, the College is moving ahead and the associated faculties have been relentlessly working to give a new dimension to the hub. Research activities have been intensified covering a variety of new fields of research. Students are also actively involved in research activities. The most striking achievement is that our students are able to receive awards for their presentation at National and International level seminars.

From the Desk of Coordinator

Nilave Bhuyan
Associate Professor, Dept. of Zoology
Coordinator, Advance Level
Institutional Biotech Hub, J.B. College

It is a matter of immense pleasure that the first issue of Newsletter from Advance Level Institutional Biotech Hub facility at Jagannath Barooah College is going to be published shortly. It is going to showcase the combined efforts of all the people involved in successful implementation of the project over the last seven years.

In this inaugural issue, we will focus on the infrastructure facilities available in the hub and on the activities being carried out utilizing these facilities soon after its inception in 2010.

I believe our efforts will help the students to explore new opportunities in biological sciences and will motivate them for pursuing higher studies in the related fields.

People:
The team, with the utmost dedication of whom, the hub is seeing success are -

Coordinator	- Nilave Bhuyan, Dept. of Zoology
Assistant Coordinator	- Dr. Gautam Kalita, Dept. of Chemistry
SRF	- Dr. Sourabh Kr Das
Laboratory Attendent	- Ajoy Dutta

Editor	- Nilave Bhuyan
Sub-Editor and Graphic Design	- Dr. Sourabh Kr. Das
Technical Support and Print	- Asian Printings, Jorhat

Biochemistry and Molecular Genetics

- The Molecular Biology Laboratory is well equipped with facilities for DNA extraction and PCR based genetic variability studies
- Students of host institution and nearby colleges are utilizing the facility to fulfil their curricular dissertation activities. Moreover, Students from Gauhati University and Assam Agricultural University are also utilizing the hub facility for their research activities.
- Recently, the laboratory has published the Cox1 Gene sequence of *Chilobrachys assamensis* at NCBI with Accession Number MG765456
- Moreover, one International level and two National Level awards were won through research activities done at this laboratory.

Microbiology

- The Microbiology Laboratory is equipped with facilities for isolation of microbes from soil, water, air, food & beverages
- Students of host institution, Dibrugarh University and of Assam Agricultural University are also utilizing the hub facility for their research activities, including Ph.D work
- Using this facility, two publications were made. Moreover, two awards were won through research activities being carried out at this laboratory.

Students Achievements by using the Hub Facilities

1. Alo Saha, Sagar Sarma, Jigyasa Somani, Sourabh Kr. Das, Nilave Bhuyan (2018). *Identification and Molecular Characterization of wild sericigenous insects of Assam*. Presented at IIT Guwahati Research Conclave, March 08-11, 2018; it was awarded the best poster presentation award.
2. Shravanika Mahanta, Jyotishmoyee Boruah, Mousumi Rajkumari, Runjun Gogoi Rajkumari, Sourabh Kr Das, Nilave Bhuyan (2017). *Isolation and Characterization of Hydrocarbon Degrading Microorganisms*. Presented at National Conference on Interdisciplinarity: Prospects & Challenges, 7th April 2017. Awarded Best Students Research Presentation award at Maitrayee College by DBT Star College Scheme
3. The same work was awarded 2nd Best Poster at IIT Guwahati Research Conclave, March 16-19, 2017
4. Jyoti Daga, Shradha Shandilya, Sourabh Kr Das, Nilave Bhuyan (2017). *Standardization of a non-lethal DNA extraction method in Antheraea assamensis.* Presented at IIT Guwahati Research Conclave, March 16-19, 2017; it was awarded the 3rd best poster presentation award.
5. Neelakshi Borah, Sangeeta Borchetia, Sourabh Kr Das, Nilave Bhuyan (2012). *Molecular identification of indigeneous and exotic carp species of Assam.* In the 18th International Conference, IASST-Perspective and challenges in Chemical and Biological sciences: Innovation crossroads. 28th-30th Jan 2012, pp 249. Won the Best Poster presentation award.

Trainings Imparted

Since inception, the IBT Hub has organized a number of Hands on Trainings and Workshops for the host as well as nearby educational institutes. The prime target group of these trainings have been the students as well as the teachers of the Biological Sciences.



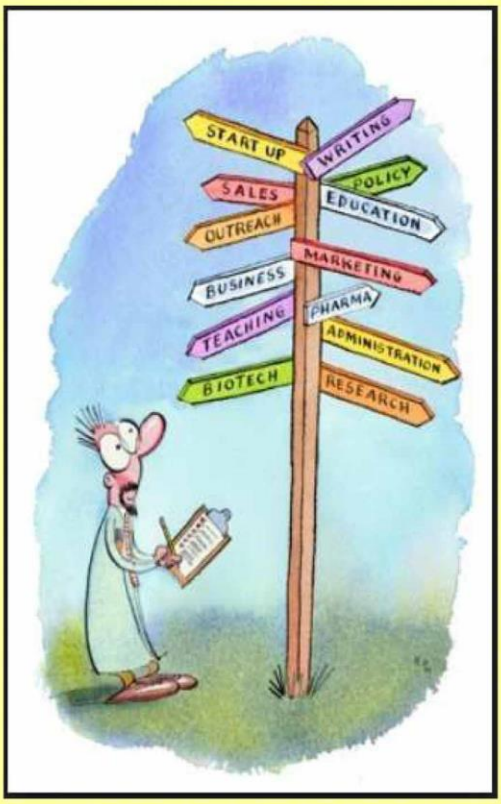



Sl. No.	Title of the training programme	Duration	No. of participants	Level of participants
		2013 - 2014		
1	Training on DNA extraction from Rice varieties and its PCR amplification.	5 days, June 07-11, 2013	1	Ph.D Scholar
2	Students Training Programme on Molecular Biology	4 days, Mar 11-14, 2014	28	B.Sc
		2014-2015		
1	Training on DNA extraction from Rice varieties and its PCR amplification.	6 days, Feb. 03-08, 2014	1	Women Scientist
		2015 - 2016		
1	Training Program on DNA isolation and PCR based amplification for phylogenetic analysis	30 days, Dec 01-30, 2015	8	B.Sc
		2016 - 2017		
1	Hands on Training on Basic Techniques in Biotechnology and Biochemistry	6 days, Dec 05 - 10, 2016	3	B.Sc
2	Advanced Hands on Training on Microbiology and Molecular Biology	6 days, Dec 09 - 24, 2016	7	B.Sc
3	Basic Training on DNA and RNA estimation and Bioinformatics	6 days, Feb 20 - 25, 2017	30	B.Sc
4	Basic Hands on Training on Microbiology	6 days, Mar 06 - 11, 2017	12	B.Sc
		2017 - 2018		
1	Hands on Training on how to prepare a scientific presentation and present in front of Audience	5 days, Oct 09-13, 2017	25	B.Sc
2	Hands on Training on Techniques to Study Chromosomal details in Plant and Animal Cells	5 days, Oct 16-20, 2017	25	B.Sc
3	Hands on Training on Basic Chromatographic Separation Techniques	5 days, Nov 06-10, 2017	25	B.Sc
4	Hands on Training on DNA Extraction and PCR Techniques	5 days, Feb 12-16, 2018	31	B.Sc and Ph.D
	Total	**89 days**	**196**	

Workshops Conducted



Sl. No.	Title of the Workshop	Duration	No. of participants	Level of participants
		2011 - 2012		
1	Hands-on-workshop in "Bioinformatics Applications for Sequence Analysis"	5 days, July 26-30, 2011	16	College Teachers
2	Workshop on "Principles and Basic Techniques in Biotechnology	5 days, Nov. 03-12, 2011	11	B.Sc. Student
		2012 - 2013		
1	Students Workshop on -Fundamentals of Bioinformatics Data mining tool	6 days, Jan. 28 - Feb. 02, 2013	13	B.Sc Student
2	Students Workshop on -Glimpses of the living world	4 days, Mar. 22-25, 2013	16	School Students
		2013 - 2014		
1	Hands on Students Workshop in Basic Laboratory Techniques in Microbiology	4 days, Feb.13-16, 2014	27	B.Sc Student
		2014 - 2015		
1	Hands on Students Workshop in Basic Biotechnology and Bioinformatics	5 days, Feb. 25-Mar.01, 2015	41	B.Sc Student
2	Hands on Students Workshop in Basic Laboratory Techniques in Microbiology	5 days, Mar 10-14, 2015	11	B.Sc Student
3	Students workshop in Biophysical Techniques and their application	5 days, Mar 27-31, 2015	17	B.Sc Student
		2015 - 2016		
1	Students Workshop in Basics Of Isolation and Estimation of Nucleic Acids & Protein	5 days, July 11 – July 15, 2015	14	B.Sc Student
2	Hands On Students Workshop in Basic Biochemistry and Cell Biology	5 days, July 20 – July 24, 2015	12	B.Sc Student
		2016 – 2017		
1	Workshop and Hands on Training on DNA isolation, PCR based amplification and Sequencing	6 days, June 20 - 25, 2016	12	B.Sc Student
2	Workshop on Principles of Genetics and Plant Breeding	6 days, July 25 - 30, 2016	12	B.Sc Student
		2017 - 2018		
1	Workshop on Basic Microbiological Techniques	4 Days, Dec 04 - 08, 2017	15	B.Sc Student
2	Workshop on Bioinfomatics, DNA extraction and Biochemical detection of DNA & RNA	5 Days, Feb 26- Mar 02, 2018	58	B.Sc Student
3	Workshop on Core Course X ZOOM Practicals	2 days, Mar 03 - 09, 2018	37	Teachers and B.Sc Student
4	Workshop on Techniques and technologies of Seri-biotechnology	5 Day, Mar 27- Apr 02, 2018	37	B.Sc Student
	Total	**77 days**	**339**	



Career in Science: where do we stand?

Scientists are the pilots of the future India, so we should produce talented and promising scientists to shape our country as a leader of science in the world. But, how can we achieve this goal? Our majority of students are not attracted to take science as a career. After class 10th, a student may choose any of the available streams. In class 11th and 12th, those who take science, learn the basics of Physics, Chemistry, and Biology and/or higher Mathematics. After completion of Class 12, majorities of brilliant students opt for a professional career such as BE / B. Tech and MBBS and later on opt for MBA and Civil Service which is an attractive career in India. Then, who will do science in real sense. Our seniors, parents and society give less weightage to a scientist /professor rather than a bureaucrat, doctor or an engineer. These types of attitude never encourage a student to choose the science as a career.

Time has come, we should change our way of thinking and give equal weightage to all and we all should work for the country. India's science academies and policy-makers have been expressing great concern about school science education, and have launched several new schemes. At present, we are simply not producing young scientists of adequate quality and in sufficient numbers. In other words, the school science that leaves the majority of students bored also fails in its primary (unstated) aim of producing scientists.

While these efforts are welcome, much more needs to be done. We must acknowledge that the prevalent model has failed, both from the wider perspective of education and its aims, and from the narrow one of producing scientists. It is very important to move to a new model of school science education, in which science is not alien, but in nature linked to children's experiences. The processes of science have to be given due importance, and children have to be given opportunities to do things "hands-on." Above all, science should emerge as something alive, infallible, and therefore exciting. Such a model may meet the wider aims of science education, and at the same time is more likely to encourage promising scientists to desire to study science.

Higher education, particularly in science discipline is offered by universities, institutions and colleges located in various parts of the country. Majority of universities in India train a large number of graduate and post graduate students. Due to issues like infrastructure and qualified quality faculties, majority of the students find it difficult to fine-tune themselves with the intricacy of science at this level. Similarly, research and developmental activities in science discipline have not yet gained much distinction. The government has established several research centers throughout the country including universities and assigned various projects to perform research work. However, the standard of science is not as per expectations. We are not able to produce a Nobel laureate for a decade. Many factors involves including hidden and many open secret reasons.

Creating enthusiasm among students to learn science should be the most widespread activity in India. The government is popularizing the discipline by means of popular science articles, organizing lectures, many different developmental schemes, through various scholarship schemes and through the establishment of science centers etc. Efforts in this direction should come from both individuals and from institutions. There are several organizations and institutions both public and private trying to change the scene of science education in India. Still, we need to do more and change the scenario in the society, so that brilliant students aim for doing science as a passion.

Contributed By -

Dr. Mahananda Chutia
CMER&TI, Lahdoigarh

Polymerase Chain Reaction

Polymerase chain reaction (PCR) was developed in 1983 by Kary B. Mullis, an American biochemist who won the Nobel Prize for Chemistry in 1993 for his invention. PCR is a technique used to make numerous copies of a specific segment of DNA quickly and accurately. The polymerase chain reaction enables investigators to obtain the large quantities of DNA that are required for various experiments and procedures in molecular biology, forensic analysis, evolutionary biology, and medical diagnostics.

To carry out a PCR experiment, the target DNA is mixed with Taq DNA polymerase, a pair of oligonucleotide primers, and a supply of nucleotides. The amount of target DNA can be very small because PCR is extremely sensitive and will work with just a single starting molecule. The primers are needed to initiate the DNA synthesis reactions that will be carried out by the Taq polymerase. They must attach to the target DNA at either side of the segment that is to be copied; the sequences of these attachment sites must therefore be known so that primers of the appropriate sequences can be synthesized.

The reaction is started by heating the mixture to 94 °C. At this temperature the hydrogen bonds that hold together the two polynucleotides of the double helix are broken, so that the target DNA becomes denatured into single- stranded molecules. The temperature is then reduced to 50–60 °C, which results in rejoining of the single strands of the target DNA, but also allows the primers to attach to their annealing positions. DNA synthesis can now begin, so the temperature is raised to 72 °C, the optimum for Taq polymerase. In this first stage of the PCR, a set of 'long products' is synthesized from each strand of the target DNA. These polynucleotides have identical 5′ ends but random 3′ ends, the latter representing positions where DNA synthesis terminates by chance. When the cycle of denaturation-annealing- synthesis is repeated, the long products act as templates for new DNA synthesis, giving rise to 'short products' whose 5′ and 3′ ends are both set by the primer annealing positions. In subsequent cycles, the number of short products accumulates in an exponential fashion (doubling during each cycle) until one of the components of the reaction becomes depleted. This means that after 30 cycles, there will be over 250 million short products derived from each starting molecule. In real terms, this equates to several micrograms of PCR product from a few nanograms or less of target DNA.

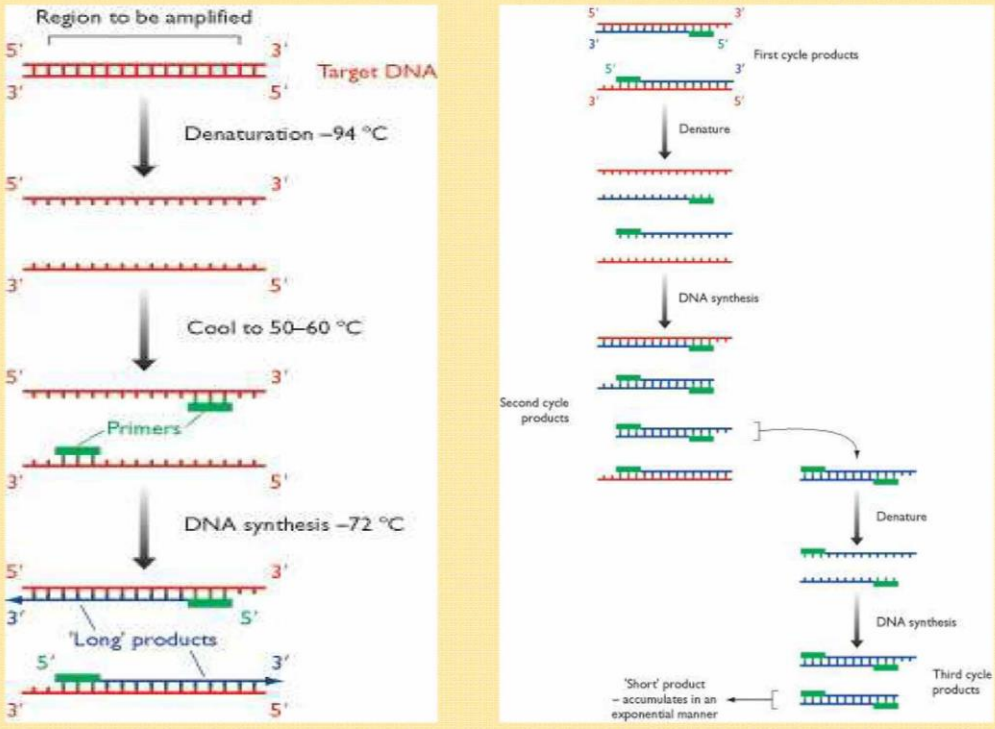


Figure : The first stage of a PCR produces two long products. The next cycle of denaturation-annealing-synthesis leads to four products, two of which are identical to the first cycle products and two of which are made entirely of new DNA. During the third cycle, the latter give rise to 'short' products which, in subsequent cycles, accumulate in an exponential fashion.

Outreach Programmes conducted during 2017 - 2018





Outreach Programmes to nearby schools and colleges to motivate the students to study biological sciences is a major thrust area of the Hub

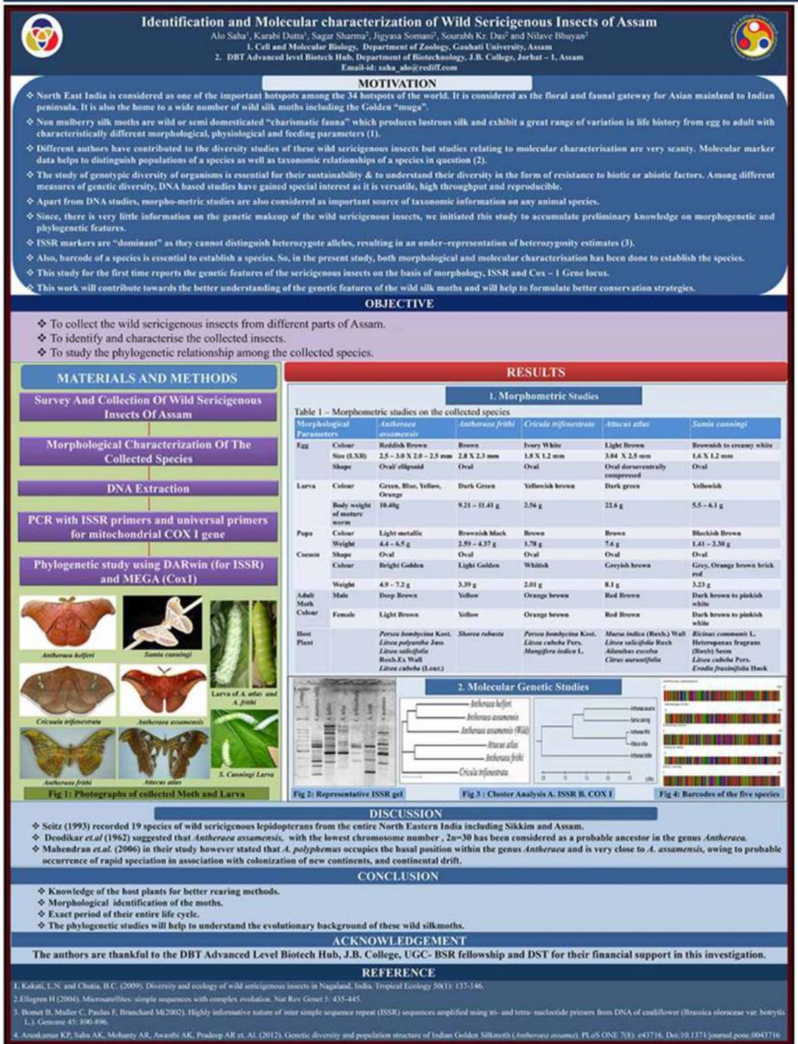
School Students visit to the Biotech Hub


Time to time School students from nearby areas visit the laboratories of the hub

Students Visit to Hoolongapar Gibbon Wildlife Sanctuary


The hub also supports motivational tours to wildlife sanctuaries for giving exposure to wildlife genetics and application of biotechnology in formulating conservation strategies

Students Presentation at National Level Seminar



Identification and Molecular characterization of Wild Sericigenous Insects of Assam

Alo Saha[1], Karabi Dutta[1], Sagar Sharma[2], Jigyasa Somani[2], Sourabh Kr. Das[2] and Nilave Bhuyan[2]
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MOTIVATION

- North East India is considered as one of the important hotspots among the 34 hotspots of the world. It is considered as the floral and faunal gateway for Asian mainland to Indian peninsula. It is also the home to a wide number of wild silk moths including the Golden "muga".
- Non mulberry silk moths are wild or semi domesticated "charismatic fauna" which produces lustrous silk and exhibit a great range of variation in life history from egg to adult with characteristically different morphological, physiological and feeding parameters (1).
- Different authors have contributed to the diversity studies of these wild sericigenous insects but studies relating to molecular characterisation are very scanty. Molecular marker data helps to distinguish populations of a species as well as taxonomic relationships of a species in question (2).
- The study of genotypic diversity of organisms is essential for their sustainability & to understand their diversity in the form of resistance to biotic or abiotic factors. Among different measures of genetic diversity, DNA based studies have gained special interest as it is versatile, high throughput and reproducible.
- Apart from DNA studies, morpho-metric studies are also considered as important source of taxonomic information on any animal species.
- Since, there is very little information on the genetic makeup of the wild sericigenous insects, we initiated this study to accumulate preliminary knowledge on morphogenetic and phylogenetic features.
- ISSR markers are "dominant" as they cannot distinguish heterozygote alleles, resulting in an under–representation of heterozygosity estimates (3).
- Also, barcode of a species is essential to establish a species. So, in the present study, both morphological and molecular characterisation has been done to establish the species.
- This study for the first time reports the genetic features of the sericigenous insects on the basis of morphology, ISSR and Cox – 1 Gene locus.
- This work will contribute towards the better understanding of the genetic features of the wild silk moths and will help to formulate better conservation strategies.

OBJECTIVE

- To collect the wild sericigenous insects from different parts of Assam.
- To identify and characterise the collected insects.
- To study the phylogenetic relationship among the collected species.

MATERIALS AND METHODS

Survey And Collection Of Wild Sericigenous Insects Of Assam

Morphological Characterization Of The Collected Species

DNA Extraction

PCR with ISSR primers and universal primers for mitochondrial COX I gene

Phylogenetic study using DARwin (for ISSR) and MEGA (Cox1)

Antheraea helferi · *Samia canningi* · *Cricula trifenestrata* · *Antheraea assamensis* · Larva of *A. atlas* and *A. frithi* · *Antheraea frithi* · *Attacus atlas* · *S. Canningi Larva*

Fig 1: Photographs of collected Moth and Larva

RESULTS

1. Morphometric Studies

Table 1 – Morphometric studies on the collected species

Morphological Parameters		*Antheraea assamensis*	*Antheraea frithi*	*Cricula trifenestrata*	*Attacus atlas*	*Samia canningi*
Egg	Colour	Reddish Brown	Brown	Ivory White	Light Brown	Brownish to creamy white
	Size (LXB)	2.5 – 3.0 X 2.0 – 2.5 mm	2.8 X 2.3 mm	1.8 X 1.2 mm	3.04 X 2.5 mm	1.6 X 1.2 mm
	Shape	Oval/ ellipsoid	Oval	Oval	Oval dorsoventrally compressed	Oval
Larva	Colour	Green, Blue, Yellow, Orange	Dark Green	Yellowish brown	Dark green	Yellowish
	Body weight of mature worm	10.40g	9.21 – 11.41 g	2.56 g	22.6 g	5.5 – 6.1 g
Pupa	Colour	Light metallic	Brownish black	Brown	Brown	Blackish Brown
	Weight	4.4 – 6.5 g	2.59 – 4.37 g	1.78 g	7.6 g	1.41 – 2.38 g
Cocoon	Shape	Oval	Oval	Oval	Oval	Oval
	Colour	Bright Golden	Light Golden	Whitish	Greyish brown	Grey, Orange brown brick red
	Weight	4.9 – 7.2 g	3.39 g	2.01 g	8.1 g	3.23 g
Adult Moth Colour	Male	Deep Brown	Yellow	Orange brown	Red Brown	Dark brown to pinkish white
	Female	Light Brown	Yellow	Orange brown	Red Brown	Dark brown to pinkish white
Host Plant		*Persea bombycina* Kost. *Litsea polyantha* Juss *Litsea salicifolia* Roxb.Ex Wall *Litsea cubeba* (Lour.)	*Shorea robusta*	*Persea bombycina* Kost. *Litsea cubeba* Pers. *Mangifera indica* L.	*Muesa indica* (Roxb.) Wall *Litsea salicifolia* Roxb *Ailanthus excelsa* *Citrus aurantifolia*	*Ricinus communis* L. *Heteropanax fragrans* (Roxb) Seem *Litsea cubeba* Pers. *Erodia fraxinifolia* Hook

2. Molecular Genetic Studies

Antheraea helferi · *Antheraea assamensis* · *Antheraea assamensis* (Wild) · *Attacus atlas* · *Antheraea frithi* · *Cricula trifenestrata*

Fig 2: Representative ISSR gel

Fig 3 : Cluster Analysis A. ISSR B. COX I

Fig 4: Barcodes of the five species

DISCUSSION

- Seitz (1993) recorded 19 species of wild sericigenous lepidopterans from the entire North Eastern India including Sikkim and Assam.
- Deodikar *et.al* (1962) suggested that *Antheraea assamensis*, with the lowest chromosome number , 2n=30 has been considered as a probable ancestor in the genus *Antheraea*.
- Mahendran *et.al.* (2006) in their study however stated that *A. polyphemus* occupies the basal position within the genus *Antheraea* and is very close to *A. assamensis*, owing to probable occurrence of rapid speciation in association with colonization of new continents, and continental drift.

CONCLUSION

- Knowledge of the host plants for better rearing methods.
- Morphological identification of the moths.
- Exact period of their entire life cycle.
- The phylogenetic studies will help to understand the evolutionary background of these wild silkmoths.

ACKNOWLEDGEMENT

The authors are thankful to the DBT Advanced Level Biotech Hub, J.B. College, UGC- BSR fellowship and DST for their financial support in this investigation.

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Awarded Best Poster at IIT Guwahati Research Conclave, March 08-11, 2018

Student representing the IBT Hub at IIT Guwahati

Studies on Antimicrobial Activities of Some of the Indigenous Herbs Against *Aureimonas altamirensis*, an Opportunistic Human Pathogen Associated with Cotton Fabric

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MOTIVATION

- The inherent properties of the textile fibers provide scope for growth of various forms of microorganisms and causes loss of strength, elongation, discoloration and changes in appearance of the fabric.
- *Aureimonas altamirensis* was recently isolated from used clothes and was reported to be associated with cotton fabric deterioration. This also raises potential scope for the microorganism to enter into the elementary canal of the user from cotton fabrics.
- *A. altamirensis* is an aerobic Gram-negative bacillus, which is found to be associated with cotton fabrics and is a potential opportunistic pathogen of humans, causing inflammation of the peritoneum.
- Plants as a source of medicinal compounds have continued to play a dominant role in the maintenance of human health since ancient times.
- The use of plant extracts and phytochemicals is a cost effective and readily available method for common people to cope up with microbial contaminants.
- Nowadays people are very conscious about hygiene and cleanliness. Obnoxious smell from the inner garments such as socks, spread of diseases, staining and degradation of textiles are some of the detrimental effects of bad microbes.

OBJECTIVE

- To evaluate antimicrobial properties of 22 locally available plants against A. *altamirensis* .
- Evaluation of antimicrobial properties by treated fabrics, after wash.

MATERIALS AND METHODS

250 µl of Pure Culture of *Aureimonas altamirensis* @ 100 cells/100 µl

- Added to Petri plates and spread it by spreader evenly, dried it.
- After that holes were made by using 5mm cork borer.
- Each hole was filled with 150 µl of plant extract (methanol).
- Incubated for 24 hours @ 37°C

The zone of inhibition was recorded and the best plant extract against the bacterium was identified.

Cotton fabric (5 mm) were immersed in the 100% methanol plant extract along with 6% citric acid as cross-linking agent (5 hrs)

- Added to Petri plates with cultures of *A. altamirensis* .
- Incubated for 24 hours @ 37° C and Zone of Inhibition was recorded

Fig 1- Methodology followed

RESULTS AND DISCUSSION

Fig 2- Representative Photographs of Antimicrobial activity

Table 1 – Zone of Inhibition displayed by different herbal extracts

Sl. No	Botanical Name	Local Name	Zone of inhibition (cm)	
			Extract	Treated fabric
1.	*Azadirachta indica*	Neem	2.8±0.2	1.3±0.2
2.	*Phyllanthus fraternus*	Bhui amla	3.1±0.1	2.2±0. 3
3.	*Ageratum conyzoides*	Goat weed	1.6±0.4	-
4.	*Curcuma longa*	Turmeric	2.6±0.2	1.2±0.4
5.	*Nycanthus arbor-tristis*	Night jasmine	2.5±0.4	0.6±0. 8
6.	*Cymbopogon citratus*	lemon grass	2.0±0.2	-
7.	*Hibiscus sabdariffa*	Red sorrel	2.5±0.3	2.5±0.3
8.	*Withania somnifera*	Aswangandha	1.5±0.2	-
9.	*Murraya koenigli*	Curry leaf	2.1±0.4	2.1±0.4
10	*Amaranthus spinosus*	Hati khutura	1.8±0.4	-
11	*Euphorbia hirta*	Asthama weed	1.5±0.3	-
12	*Withania somnifera*	Aswagandha	1.3±0.7	-
13	*Calendula officinalis*	Marigold	1.6±0.2	-
14	*Syzygium cumini*	Jamun	3.2±0.1	2.3±0.4
15	*Trigonella graecum*	Fenugreek	1.2±0.3	-
16	*Phlogacanthus thyrsiformis*	Tita phul	1.7±0.5	-
17	*Curcuma aromatica*	Jangli haldi	2.3±0.2	0.8±0.4
18	*Curcuma caesea*	Black haldi	2.7±0.7	1.2±0.2
19	*Bamboosa tulda*	Bamboo	1.6±0.2	-
20	*Chromolaena odorata*	Siam weed	1.6±0.3	-
21	*Adhatoca vasica*	Malabar nut	1.2±0.2	-
22	*Achyranthes aspera*	Prickly chaff	1.6±0.4	-

CONCLUSION

Syzgium cumini and *Phyllanthus fraternus* showed the best results against the pathogenic bacterium *A. altamirensis*. It was also found that the antimicrobial properties of the two plant extracts can remain till 11 washes and laundering procedures.

ACKNOWLEDGEMENT

Authors would like to thank the Department of Biotechnology, Government of India for their generous support through the Institutional Biotech Hub program.

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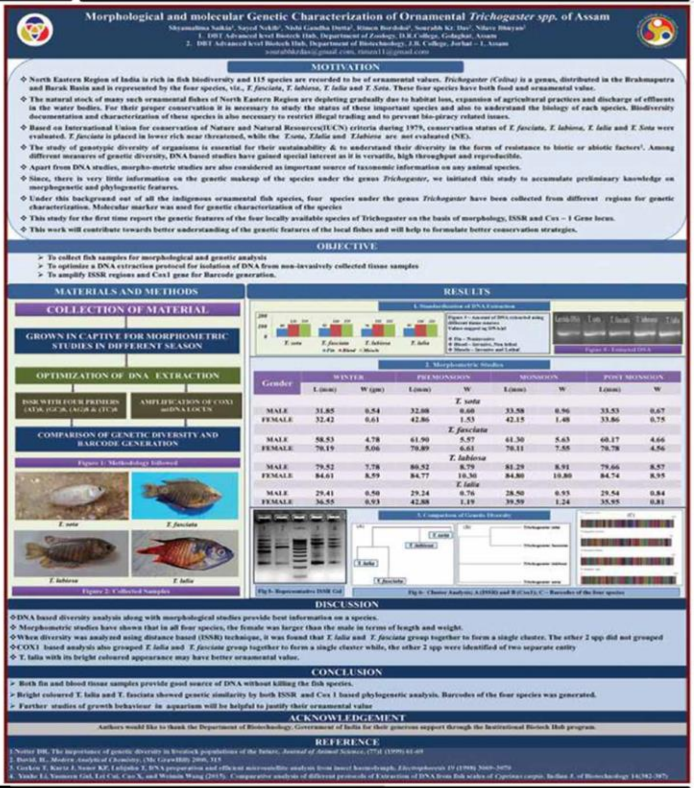

Morphological and molecular Genetic Characterization of Ornamental *Trichogaster spp.* of Assam

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MOTIVATION

- North Eastern Region of India is rich in fish biodiversity and 115 species are recorded to be of ornamental values. *Trichogaster (Colisa)* is a genus, distributed in the Brahmaputra and Barak Basin and is represented by the four species, viz., *T. fasciata, T. labiosa, T. lalia* and *T. Sota*. These four species have both food and ornamental value.
- The natural stock of many such ornamental fishes of North Eastern Region are depleting gradually due to habitat loss, expansion of agricultural practices and discharge of effluents in the water bodies. For their proper conservation it is necessary to study the status of these important species and also to understand the biology of each species. Biodiversity documentation and characterization of these species is also necessary to restrict illegal trading and to prevent bio-piracy related issues.
- Based on International Union for conservation of Nature and Natural Resources(IUCN) criteria during 1979, conservation status of *T. fasciata, T. labiosa, T. lalia* and *T. Sota* were evaluated. *T. fasciata* is placed in lower rick near threatened, while the *T.sota, T.lalia* and *T.labiosa* are not evaluated (NE).
- The study of genotypic diversity of organisms is essential for their sustainability & to understand their diversity in the form of resistance to biotic or abiotic factors[1]. Among different measures of genetic diversity, DNA based studies have gained special interest as it is versatile, high throughput and reproducible.
- Apart from DNA studies, morpho-metric studies are also considered as important source of taxonomic information on any animal species.
- Since, there is very little information on the genetic makeup of the species under the genus *Trichogaster*, we initiated this study to accumulate preliminary knowledge on morphogenetic and phylogenetic features.
- Under this background out of all the indigenous ornamental fish species, four species under the genus *Trichogaster* have been collected from different regions for genetic characterization. Molecular marker was used for genetic characterization of the species
- This study for the first time report the genetic features of the four locally available species of Trichogaster on the basis of morphology, ISSR and Cox – 1 Gene locus.
- This work will contribute towards better understanding of the genetic features of the local fishes and will help to formulate better conservation strategies.

OBJECTIVE

- To collect fish samples for morphological and genetic analysis
- To optimize a DNA extraction protocol for isolation of DNA from non-invasively collected tissue samples
- To amplify ISSR regions and Cox1 gene for Barcode generation.

MATERIALS AND METHODS

COLLECTION OF MATERIAL

GROWN IN CAPTIVE FOR MORPHOMETRIC STUDIES IN DIFFERENT SEASON

OPTIMIZATION OF DNA EXTRACTION

ISSR WITH FOUR PRIMERS (AT)8, (GC)8, (AG)8 & (TC)8 · AMPLIFICATION OF COXI mtDNA LOCUS

COMPARISON OF GENETIC DIVERSITY AND BARCODE GENERATION

Figure 1: Methodology followed

T. sota · *T. fasciata* · *T. labiosa* · *T. lalia*

Figure 2: Collected Samples

RESULTS

2. Morphometric Studies

Gender	WINTER L (mm)	WINTER W (gm)	PREMONSOON L(mm)	PREMONSOON W	MONSOON L(mm)	MONSOON W	POST MONSOON L(mm)	POST MONSOON W
T. sota								
MALE	31.85	0.54	32.08	0.60	33.58	0.96	33.53	0.67
FEMALE	32.42	0.61	42.86	1.53	42.15	1.48	33.86	0.75
T. fasciata								
MALE	58.53	4.78	61.90	5.57	61.30	5.63	60.17	4.66
FEMALE	70.19	5.06	70.89	6.61	70.11	7.55	70.78	4.56
T. labiosa								
MALE	79.52	7.78	80.52	8.79	81.29	8.91	79.66	8.57
FEMALE	84.61	8.59	84.77	10.30	84.80	10.80	84.74	8.95
T. lalia								
MALE	29.41	0.50	29.24	0.76	28.50	0.93	29.54	0.84
FEMALE	36.55	0.93	42.88	1.19	39.59	1.24	35.95	0.81

DISCUSSION

- DNA based diversity analysis along with morphological studies provide best information on a species.
- Morphometric studies have shown that in all four species, the female was larger than the male in terms of length and weight.
- When diversity was analyzed using distance based (ISSR) technique, it was found that *T. lalia* and *T. fasciata* group together to form a single cluster. The other 2 spp did not grouped
- COX1 based analysis also grouped *T. lalia* and *T. fasciata* group together to form a single cluster while, the other 2 spp were identified of two separate entity
- T. lalia with its bright coloured appearance may have better ornamental value.

CONCLUSION

- Both fin and blood tissue samples provide good source of DNA without killing the fish species.
- Bright coloured T. lalia and T. fasciata showed genetic similarity by both ISSR and Cox 1 based phylogenetic analysis. Barcodes of the four species was generated.
- Further studies of growth behaviour in aquarium will be helpful to justify their ornamental value

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