

T.A.M. Jagadeesh Ram

Scientist D

Botanical Survey of India, Andaman and Nicobar Regional Centre, Port Blair

- Date of Joining: 9.4.2001 as JRF in AICOPTAX Project and continuously worked as SRF and RA in BSI SHRC, Gangtok; ERC Shillong; CRC, Allahabad
- Research scheme: AICOPTAX (2001-2010)
- Name of Project Collaborator: Dr. G.P. Sinha, Scientist E & HoO BSI, CRC, Allahabad
- Name of Project Co-ordinator: Dr. K.P. Singh, Ex Additional Director & Emeritus Scientist, BSI, CRC, Allahabad
- Title of Ph.D. thesis: Investigation on the Lichen Flora of Sundarbans Biosphere Reserve, West Bengal
- University: Gauhati University, Guwahati
- Area of Specialization: Lichen Taxonomy

Annual Action Plan Projects Under AICOPTAX Scheme (2001-2011) (BSI, SHRC, Gangtok; ERC, Shillong and CRC, Allahabad)

1. Lichens of Sundarbans Biosphere Reserve, West Bengal (2001-2006)

167 species were recorded in 56 genera and 25 families.

This includes 10 new species, 2 new generic and 31 specific records.

The work was published as book in 2012.

Its review was appeared in 'The Lichenologist' (British Lichen Society, London) and International Association for Lichenology News Letter (USA). Widely appreciated as a detailed account of lichens on a Mangrove reserve in the world and suggested for such studies in other mangrove reserve s of the world.

2. Lichens of Nora Valley National Park, West Bengal (2006-2010)

150 species were recorded under 60 genera and 34 families.

This includes 6 new species and 10 new records for India.

3. Lichens of Darjeeling Himalaya, West Bengal (April 2010- Dec 2010)

Literature survey carried out and 516 species listed.

One field tour was undertaken.

BSI Annual Action Plan Projects (2011- onwards)

Date of Joining : 10.01.2011 as Scientist C

1. Follicolous Lichens of the Andaman Islands (2011-2014)

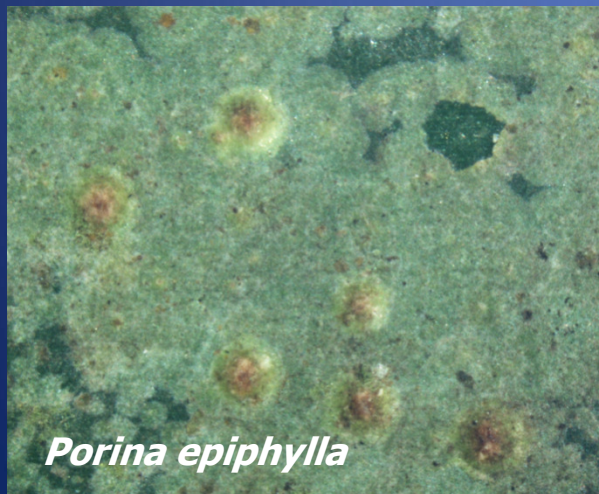
5 major field tours were undertaken and over 3000 lichen specimens including over 900 foliicolous specimens were collected.

87 species of foliicolous lichens in 27 genera and 13 families were identified.

Recognized 407 species of lichens in 92 genera 31 families for the Andaman Islands.

Discovered 15 species as new to science

18 species as new records for India.



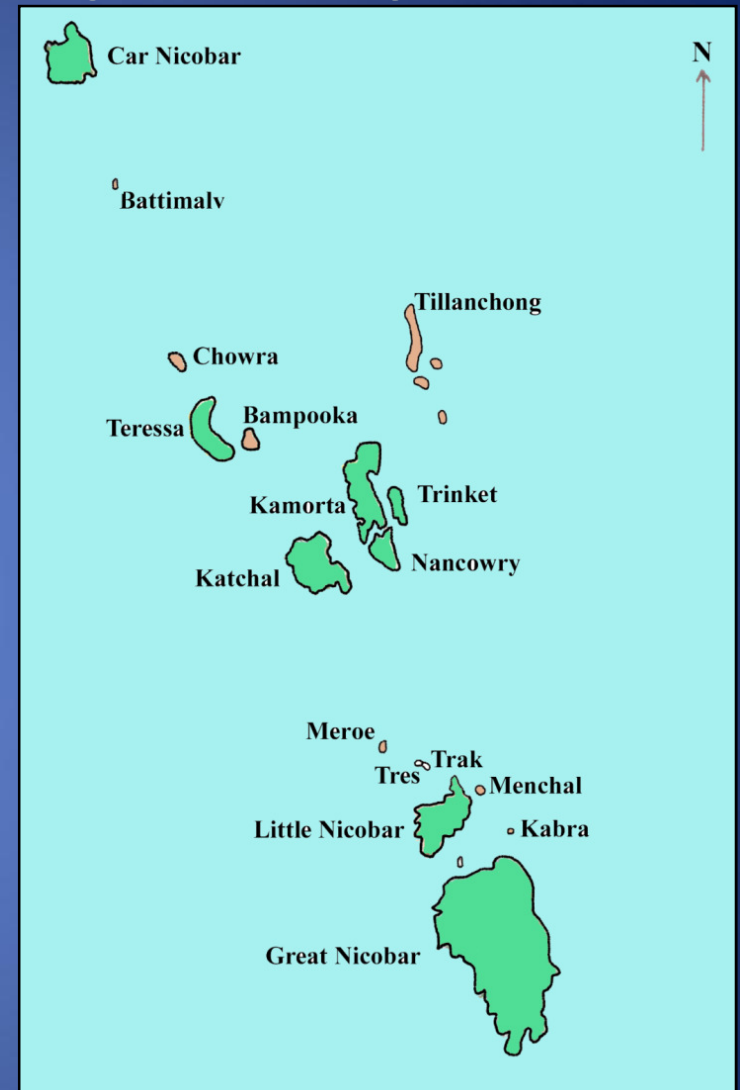
2. Lichens of the Nicobar Islands (2014-17)

The Nicobar Islands consists of 24 islands with a land mass of 1841 sq km.

It has three main clusters, Car Nicobar in the north, Camorta, Nancowry and Katchal in the middle, and Little and Great Nicobar in the south.

Because of the geographical isolation, these Islands were lichenologically poorly explored .

Only **33 species in 16 genera were reported** before the present study (Sethy & Patwardhan 1987; Makhija & Patwardhan 1989; Makhija & Adawadkar 1999, 2005; Sharma et al. 2012).



Lichens of the Nicobar Islands

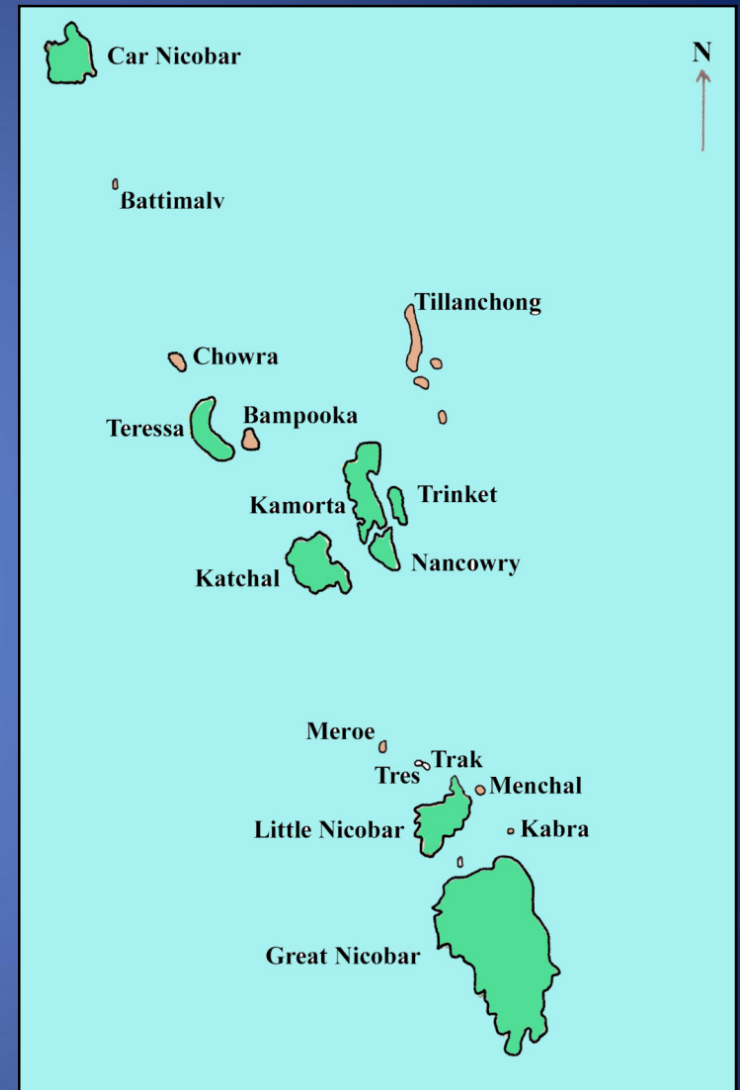
Four field tours were undertaken to Car Nicobar, Kamorta, Nancowry, Katchal, Teressa, Trinket, Kondul, Little Nicobar and Great Nicobar Islands.

A total of **1763 Field Numbers** were collected.

All of them were processed and kept in herbarium packets and **labelled with field data**.

Morphological anatomical and chemical Investigation of the specimens resulted into **161 species in 56 genera and 20 families**.

Manuscript will be submitted in March 2017.



Lichens of the Nicobar Islands

Floristic composition

Families	No. of Genera	No. of Species
Arthoniaceae	5	14
Arthopyreniaceae	1	1
Caliciaceae	2	8
Coccocarpiaceae	1	6
Collemataceae	2	4
Coenogoniaceae	1	2
Gomphillaceae	1	1
Graphidaceae	13	47
Hygrophoraceae	1	1
Monoblastiaceae	2	9
Pannariaceae	2	6
Parmeliaceae	4	4
Physciaceae	1	2
Pilocarpaceae	4	7
Porinaceae	1	9
Pyrenulaceae	2	11
Ramalinaceae	1	1
Roccellaceae	9	23
Thelenellaceae	1	1
Trypetheliaceae	3	4

Lichens of the Nicobar Islands

Genera and number of species

<i>Acanthothecis</i>	1	<i>Cresponea</i>	2	<i>Ocellularia</i>	1
<i>Alyxoria</i>	1	<i>Cryptothecia</i>	8	<i>Opegrapha</i>	9
<i>Anisomeridium</i>	8	<i>Dictyomeridium</i>	1	<i>Pallidogramme</i>	1
<i>Anthracotheccium</i>	1	<i>Dictyonema</i>	1	<i>Pannaria</i>	1
<i>Arthonia</i>	1	<i>Diorygma</i>	3	<i>Parmeliella</i>	5
<i>Arthopyrenia</i>	1	<i>Dirinaria</i>	3	<i>Parmotrema</i>	1
<i>Aspidothelium</i>	1	<i>Dyplolabia</i>	1	<i>Phaeographis</i>	1
<i>Astrothelium</i>	1	<i>Enterographa</i>	2	<i>Platygramme</i>	1
<i>Bacidia</i>	1	<i>Fissurina</i>	11	<i>Porina</i>	9
<i>Bactrospora</i>	2	<i>Graphis</i>	18	<i>Pyrenula</i>	10
<i>Badimia</i>	1	<i>Hemithecium</i>	2	<i>Pyxine</i>	5
<i>Bulbothrix</i>	1	<i>Herpothallon</i>	2	<i>Relicina</i>	1
<i>Calenia</i>	1	<i>Lasioloma</i>	2	<i>Relicinopsis</i>	1
<i>Calopadia</i>	2	<i>Leiorreuma</i>	2	<i>Sagenidiopsis</i>	1
<i>Carbacanthographis</i>	1	<i>Leptogium</i>	3	<i>Sarcographa</i>	3
<i>Chiodecton</i>	1	<i>Loflammia</i>	2	<i>Stirtonia</i>	2
<i>Chroodiscus</i>	2	<i>Mazosia</i>	3	<i>Syncesia</i>	1
<i>Coccocarpia</i>	6	<i>Monoblastia</i>	1	<i>Thelotrema</i>	2
<i>Coenogonium</i>	2	<i>Myriostigma</i>	1		
<i>Collema</i>	1	<i>Myriotrema</i>	2		

Lichens of the Nicobar Islands

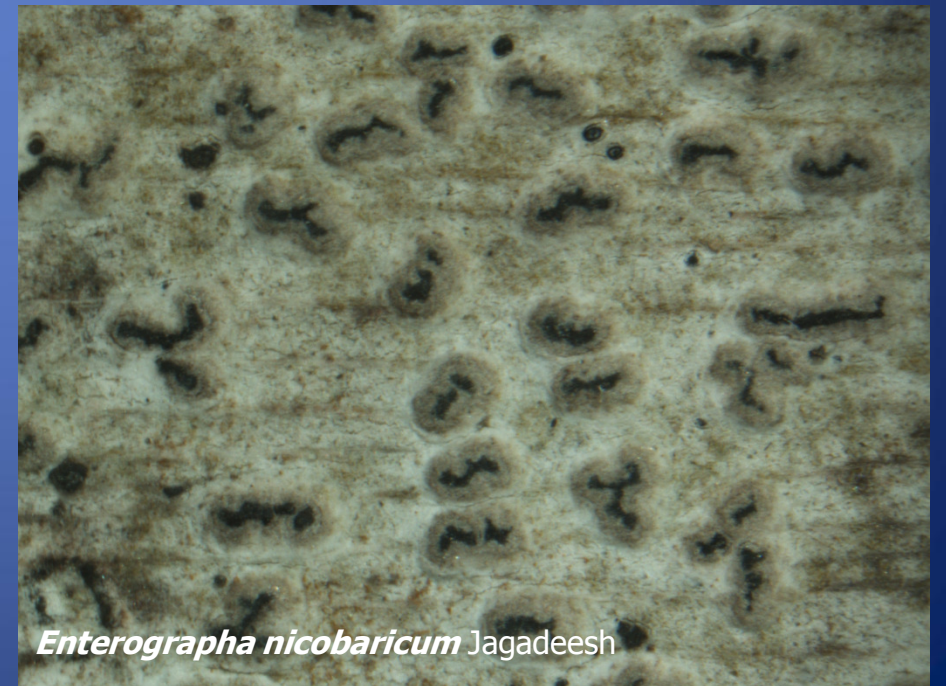
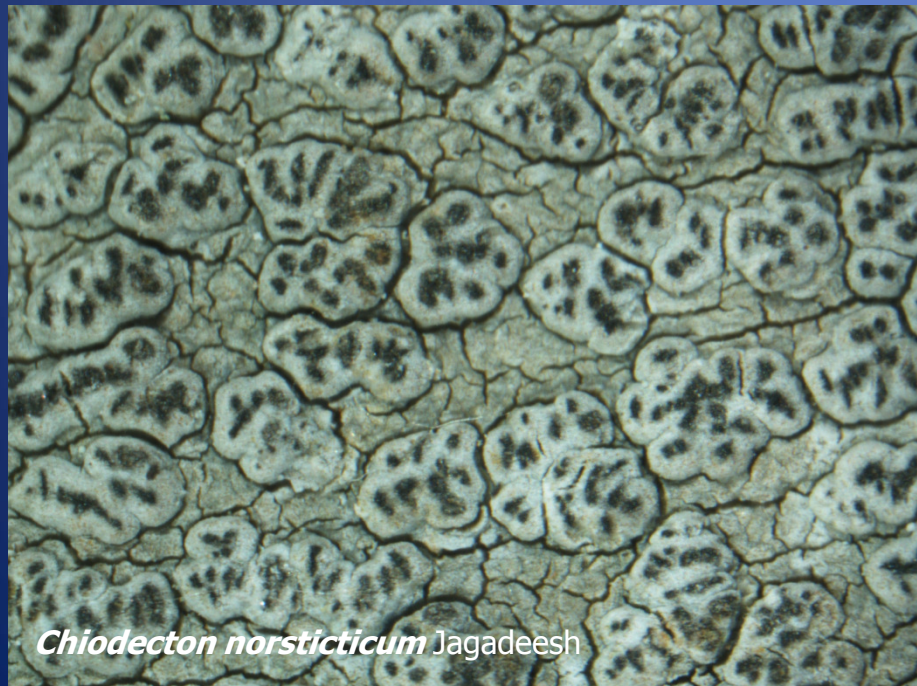
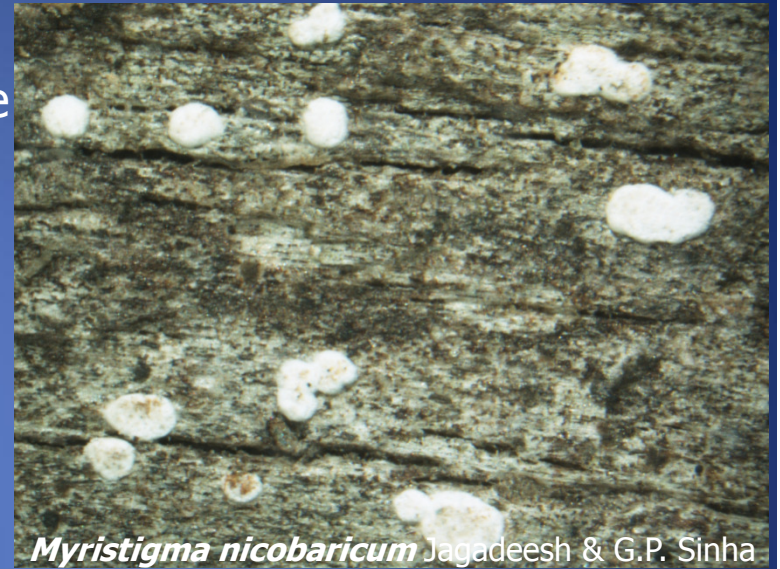
Achievements/ Novelties

11 species have been discovered as new to science

9 new records for India

22 new records for Andaman and Nicobar Islands

128 additions to the Nicobar Islands

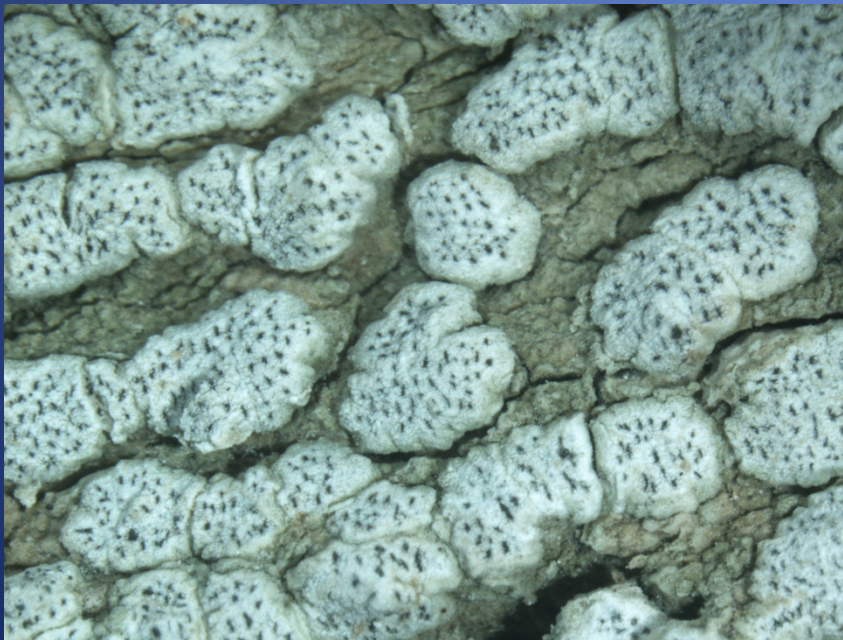


Summary on the Lichen Inventories of the Andaman and Nicobar Islands (2011-2017)

Recognized 488 species in 93 genera and 32 families

26 species have been discovered as new to science (17 published)

32 new records for India

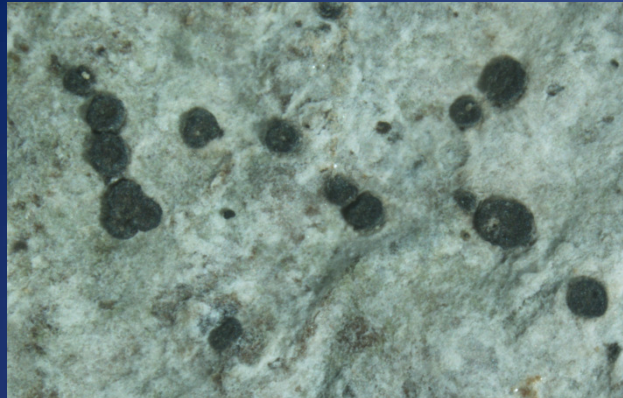


Chiodecton andamanicum Jagadeesh

Published New species:

- Herpothallon coralloides* Jagadeesh
- Herpothallon globuliferum* Jagadeesh
- Herpothallon lutescens* Jagadeesh
- Herpothallon minutum* Jagadeesh
- Heiomasia pallescens* Jagadeesh
- Bactrospora littoralis* Jagadeesh
- Bactrospora medians* Jagadeesh
- Chiodecton andamanicum* Jagadeesh
- Sagenidiopsis atroalba* Jagadeesh
- Chiodecton norsticticum* Jagadeesh
- Enterographa nicobarica* Jagadeesh
- Gyrographa nigrofusca* Jagadeesh
- Cryptothecia albomaculans* Jagadeesh & G.P. Sinha
- Cryptothecia elata* Jagadeesh & G.P. Sinha
- Cryptothecia elongata* Jagadeesh & G.P. Sinha
- Cryptothecia superphyllinica* Jagadeesh & G.P. Sinha
- Myriostigma nicobaricum* Jagadeesh & G.P. Sinha

New species



Bactrospora littoralis Jagadeesh



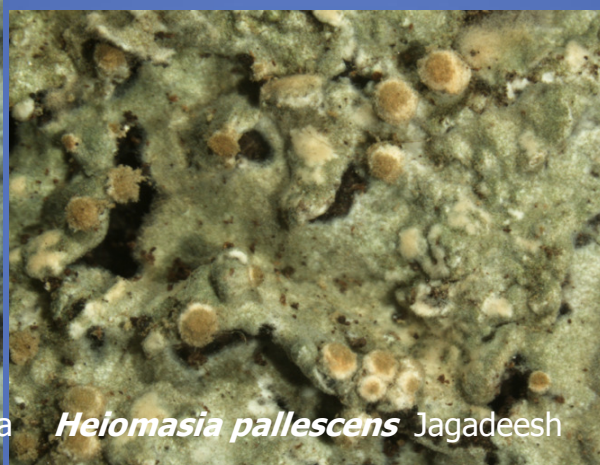
Cryptothecia albomaculans Jagadeesh & G.P. Sinha



C. elata Jagadeesh & G.P. Sinha



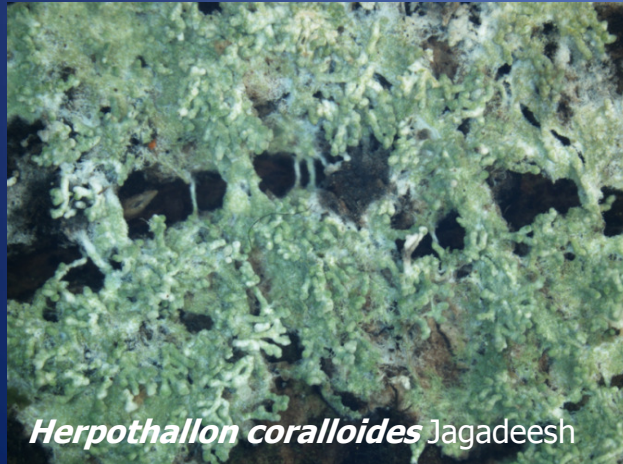
C. superphyllinica Jagadeesh & G.P. Sinha



Helomasia pallescens Jagadeesh



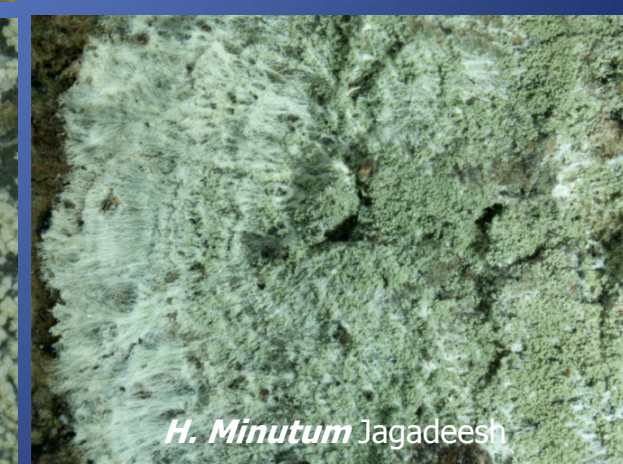
Gyrographa nigrofusca Jagadeesh



Herpothallon coralloides Jagadeesh



H. globuliferum Jagadeesh



H. Minutum Jagadeesh

Overall Summary of Achievements (2001-2017)

No of Projects carried out	:	5 (3 + 2)
Books Published	:	1
Books Manuscripts submitted:	:	1
Research papers published	:	42 including 17 in Impact Factor Journals
New taxa published	:	40 species
New records for India	:	85 species including 6 genera
New records for states	:	Assam, West Bengal, Sikkim and Andaman & Nicobar Islands

Besides the assigned projects, worked on the genus *Herpothallon* in India. *Cryptothecia* and *Myriostigma* at world level and identification keys were published at level.

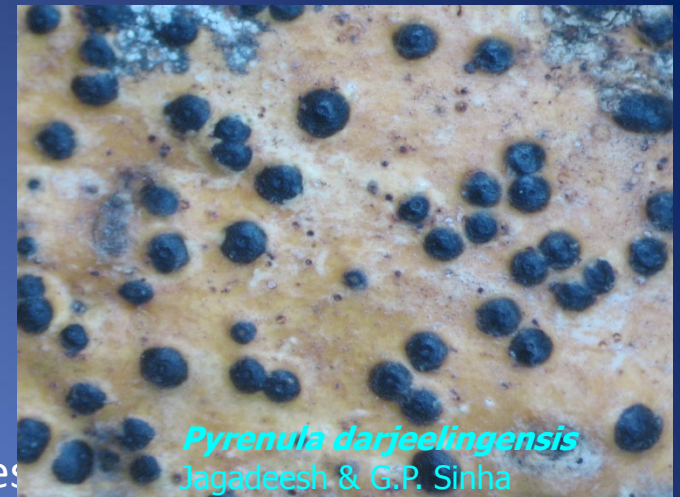
Total field experience along with details

Sl. No.	Name of the project	No. of field trips	No. of field days	Collections
1	Lichens of Sikkim (Training) (2001)	1	4	72 Field Numbers
2	Lichens of Arunachal Pradesh (Training) (2001)	1	10	265 Field Numbers
3	Lichens of Sundarbans Biosphere Reserve, West Bengal (2001-2006)	4	111	1805 Field Numbers
4	Lichens of Assam (2007)	1	10	205 Field Numbers
5	Lichens of Neora Valley National Park, Darjeeling District, West Bengal (2007-2010)	3	41	810 Field Numbers
6	Lichens of Darjeeling, West Bengal (2010)	1	18	318 Field Numbers
7	Lichens of Andaman Islands	8	88	2909 Field Numbers
8	Lichens of Nicobar Islands	4	54	1763 Field Numbers
	Total	23	336	8147 Field Numbers

Future Plan

Revision of the lichen family Pyrenulaceae in India (2017-2022)

- over 2500 species of lichens in 305 genera and 74 families are known from India (Singh & Sinha 2010; Sinha 2014).
- Majority of the larger genera were revised.
- **Pyrenulaceae** (Pyrenulales of Ascomycota) is the third largest genera (*Anthracothecium*, *Lithothelium*, *Pyrenula* and *Pyrgillus*) and 123 species.
- *Pyrenula* Ach. is the largest genus with 90 species, *Anthracothecium* Hampe ex A. Massal. (24 species), *Lithothelium* Müll. Arg. (7 spp.) and *Pyrgillus* Nyl. (2 spp.).
- The *Pyrenula* comprises c. 745 named taxa worldwide (Aptroot 1991), this includes the taxa now excluded from the genus as well as many synonyms.
- As such *Anthracothecium* (155 taxa), *Lithothelium* (30 taxa) and *Pyrgillus* (10 taxa). Aptroot (1991) monographed *Lithothelium* and *Pyrgillus*.
- The genera *Anthracothecium* and *Pyrenula* had never been monographed, but , more recently Aptroot (2012) followed the generic concept of Harris (1989, 1995) made an attempt and keyed out the species world-wide. Several taxa described from India were treated under synonymy even not examining the types.
- In this context, the family Pyrenulaceae is proposed for taxonomic revisionary studies.



Future Plan.....

Molecular Systematics in Lichenology

Last 10 years tremendous changes happened in Lichenology based on molecular analyses.

**Several orders, families, genera and species were created.
Several established families, genera and species were merged.**

Rearrangement of species in various genera and genera in various families taken place.

Circumscriptions and delimitations for genera and families have been changed.

Several unrecorded sterile species were recorded.

**For publishing new genera in peer reviewed / impact factor journals
Molecular analysis became mandatory and widely accepted
by Lichenologists.**

What needs to be done/ lacuna in Indian Lichenology

Applying Molecular Characters/ markers in Systematics

5 Genes (Molecular Markers) are extensively used:

- ITS - internal transcribed spacer of rDNA
- nuLSU - Nuclear larger subunit of rDNA
- mtSSU - Mitochondrial smaller subunit of rDNA
- RPB1 - the largest subunit of the RNA polymerase II gene
- RPB2 - second largest subunit of RNA polymerase II gene

Methodology

DNA extraction from freshly collected materials or herbarium specimens.

PCR amplification of the genes

Purification of the amplified DNAs

Sequencing the purified DNAs

Analyze the data by Single gene analysis and Combined gene analysis

Phylogenetic analysis by cladistic analysis using softwares: Standard Multiple alignment program, Clustal X, Clustal V, Clustal W, PAUP, B/MCMC, MrBayes 3.1.1 program, RAxML v8.1.11, etc.

Administrative works

DDO

2011-12	131 days
2012-13	228 days
2013-14	193 days
2014-15	86 days
2015-16	319 days
2016-17	301 days

In-charge

2015-16	42 days
2016-17	43 days

Chairman, Purchase committee (2015 – till date)

In-charge, Library (2011- till date)

In-charge, Estates (2011-2013)

Assisting HoO for preparation of all kinds of reports

Thank you!

