





Journal of the Andaman Science Association

The official Journal of Andaman Science Association Volume 27 (Special Issue) 2022

About Andaman Science Association (ASA)

Andaman and Nicobar Islands which are situated at Latitude 6°- 14° N and Longitude 92°-94° E, consists of 836 green emerald islands, islets and rocks. Almost all the islands are oriented in the north-south direction like an arc and stretch over a length of about 1912 km. Most of the islands are originated due to volcanic eruption in the sea, while few of them originated by coral reef formation. All the islands are biological and geological paradise having indigenous biota of flora & fauna and geological wonders which are yet to be unearthed. To conduct research in these small and fragile islands, there are several scientific organizations that have been doing focused research in different areas. However, there was no platform for them to present their research works which had local importance. Andaman Science Association (ASA) was established in 1984 at CARI, Port Blair with an objective to promote research and development in the unique Island ecosystem. Journal of the Andaman Science Association, published by ASA, is a unique journal that provides platform for those associated with tropical and island agriculture, horticulture, fisheries, animal science, oceanographic and marine biological studies, disaster management, issues related to science and technology, environment, forest etc. ASA intermittently organizes National and International seminars, conferences, knowledge sharing meets etc.

- Dr. Eaknath B. Chakurkar

President

Patrons

Dr. M.S. Swaminathan Prof. R.B. Singh

Prof. M.G.K. Menon

Dr. S. Ayyappan

Dr. N.T. Singh

Patron (ex-officio)

Dr. Eaknath B. Chakurkar Director, ICAR - CIARI, Port Blair

Executive Council

President

Dr. Eaknath B. Chakurkar Director, ICAR-CIARI, Port Blair

Vice-president

Dr. Jai Sunder ICAR-CIARI, Port Blair

Dr. C. Sivaperuman ZSI-RO, Port Blair

General Secretary

Dr. T. Sujatha ICAR-CIARI, Port Blair

Technical Secretary

Dr. Pooja Bohra ICAR-CIARI, Port Blair

Joint Secretary

Dr. I. Jaisankar ICAR-CIARI, Port Blair

Dr. S. Venu Pondicherry University

Treasurer

Dr. T. Subramani ICAR-CIARI, Port Blair

Submission of Manuscript

Authors should submit their articles to the Journal of Andaman Science Association through email / online to facilitate quicker and more efficient processing.

Email: secretaryasa84@gmail.com

Website: jasa-islands.org

Editorial Board

Chief Editor:

Dr. A. Velumurugan, ICAR-CIARI, Port Blair

Associate Editor:

Dr. D. Bhattacharya, ICAR-CIARI, Port Blair

Managing Editors:

Dr. A. K. De, Sr. Scientist ICAR-CIARI, Port Blair

Dr. K. Saravanan, Scientist ICAR-CIARI, Port Blair

Co-Editors;

Plants and Agricultural science Dr. Ajit Arun Waman, Scientist,

ICAR-CIARI, Port Blair

Dr. Shrawan Singh, Sr. Scientist ICAR-IARI. New Delhi

Animal Science

Dr. S. B. Barbuddhe, Director ICAR- NRC on Meat, Hyderabad.

Dr. P. Perumal, Scientist ICAR-CIARI

Marine and Fisheries Science

Dr. Srikanth G.B., Scientist ICAR – CCARI. Goa

Dr. Venu, Associate Professor, Pondicherry University

Ecology/ Environmental science/ Biodiversity Conservation

Dr. C. Siva Peruman, Scientist – E, & Officer – in - Charge, ZSI, Port Blair

Dr. C. Murugan, Joint Director, BSI, Kolkata

Anthropology/ Ethno Botany/ Ethno Zoology/ Social Science

Dr. Santosh S.Mane, Scientist, Central Ayurveda Research Institute, Patiala

Dr. T. Sujatha, Sr. Scientist, ICAR-CIARI, Port Blair

Editors (Special Issue- UHGRCU)

Prof. Dr. Sisir Kumar Mitra Dr. Pooja Bohra Dr. Desh Beer Singh Dr. Ajit Arun Waman

Councillors, Andaman Science Association

Dr. Kailash Chandra (ZSI, Kolkata)

Dr. A.B. Mondal (CRIJAF, Kolkata)

Dr. Lal Ji Singh (ANRC, BSI, Port Blair)

Dr. C. Raghunathan (ANRC, ZSI, Port Blair)

Dr. N.V. Vinithkumar (ANCOST- NIOT, Port Blair)

Dr. H. D. Pradeep, FSI, Port Blair

Dr. R. Mohan Raju (PUC, Port Blair)

Dr. T. Sathish (ANCOST- NIOT, Port Blair)

Dr. S. K. Chaturvedi (JNRM, Port Blair)

Dr. Santosh S. Mane (AYUSH, Port Blair)

Dr. B. Gangwar (New Delhi)

Dr. B. Gangaiah (CIARI, Port Blair)

Dr. R.K. Gautam (CIARI, Port Blair)

Dr. S.K. Zamir Ahmed (CIARI, Port Blair)

Dr. Nagesh Ram (CIARI, Port Blair)

Dr. I. Jaisankar (CIARI, Port Blair)

Dr. T.P. Swarnam (CIARI, Port Blair)

Dr. V. Baskaran (CIARI, Port Blair)

Dr. P.K. Singh (CIARI, Port Blair)

Dr. A. Anuraj (CIARI, Port Blair)

Copyright Information and Guidelines to the Authors

Ownership & Distribution rights © 2013 Andaman Science Association, Port Blair

All rights are reserved no parts of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by means, without written permission of the publishers.

Copyright Information

For Authors

As soon as an article is accepted for publication, authors will be requested to assign copyright of the article (or to grant exclusive publication and dissemination rights) to the publisher (ASA). This will ensure the widest possible protection and dissemination of information under copyright laws

For Readers

While advice and information in this journal is believed to be true and accurate at the date of its publication, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may have been made. The publisher (General Secretary, ASA on behalf of the President Andaman Science Association) makes no warranty, express or implied, with respect to the material contained herein.

General Information (ASA)

All rights reserved to the Andaman Science Association. All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (eg. offprints), as well as translation rights. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from the Andaman Science Association. Enquiries concerning publication of any part of published article in JASA or any proceedings of ASA should be address to the President, Andaman Science Association, at the address give below.

@ Andaman Science Association 2013

Address for Correspondence: The President, Andaman Science Association, C/o Central Island Agricultural Research Institute Post Box No. 181, Garacharma, Port Blair -744 101 (A & N Islands) India



National Advisory Board for JASA

- 1. Prof. (Dr). S.K. Bhatnagar
- 2. Dr. N. K. Krishna Kumar
- 3. Dr. T. V. R. S. Sharma
- 4. Dr. M. Sanjappa
- 5. Dr. S. Senani
- 6. Dr. Anstice Justin
- 7. Dr. S. Jayakumar
- 8. Dr. P. Krishnan
- 9. Dr. Lalji Singh
- 10. Dr. P. S. Easa
- 11. Dr. W. Sivakumar
- 12. Dr. Nilanjan Khatua
- 13. Dr. R. Mohanraju
- 14. Dr. N. V. Vinithkumar