



# BIO NEWS

Quarterly e-newsletter of the Institute of Biology, Sri Lanka

Volume 1 | Issue 3 | August 2021

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2020/2021

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## CURRENT ISSUE

INSTITUTE OF BIOLOGY SRI LANKA

Biology Webinar Series 2021

**Antimicrobial Peptides against Multidrug Resistant Bacteria**

Prof. Mahanama De Zoysa

College of Veterinary Medicine, Chungnam National University

Date: 14<sup>th</sup> July 2021 (Wednesday)  
Time: 4:00 PM via ZOOM

Join Zoom Meeting  
<https://bit.ly/20shHdJ>

Join Zoom Meeting  
<https://www.facebook.com/iobysrilanka>

Sri Lankan Journal of Biology

Volume 6, Number 2, June 2021

**2 - C4 Rice**

xo-Glutamate

Published by the Institute of Biology, Sri Lanka

## BLACK PRINCE

*Rohana parisatis* (Westwood, 1850)



### DESCRIPTION

The Black prince, is a species of butterfly of the family Nymphalidae found in Sri Lanka.

**Male Butterfly** Dark black in color and anal angle of the hindwing is extended.

Females have a golden orange top side. Near the apex, there are a few little white dots.

In both sexes antennal tips are

### HABITAT & DISTRIBUTION

This species uncommon in the highest elevations.

However, they are found in the lower elevations, particularly around streams where their larval feeding plants grow. It has a small population in the Monaragala mountain range.

### THREATS

- Habitat loss
- Destruction of larvae feeding plants caused by humans
- Pesticides released into the environment
- Prolonged droughts and over-predation
- Removal of very young trees for firewood, fences and other uses

### SUGGESTIONS TO SAVE THE SPECIES

- Establishment of butterfly gardens in urban and non-urban areas.
- Promote the idea of butterfly gardens by organizing seminars, workshops and publications.
- More funding opportunities should be created for butterfly conservation projects.
- Implement projects to conserve the larval food-plant.

GROW THIS PLANT - SAVE THE SPECIES

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# A greeting from the Editorial Team

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Dear Members,

Welcome to the 3rd issue of BIONEWS, the official e-newsletter of Institute of Biology, Sri Lanka (IOBSL). BIONEWS will reach you as a quarterly newsletter bringing biology articles, IOB news and events.

We are pleased to invite you to contribute to BIONEWS with relevant articles, innovations, discoveries you wish to share with the fellow members.

Please send your articles by e-mail to the Editor via [iobslnewsletter@gmail.com](mailto:iobslnewsletter@gmail.com).

The IOBSL is encouraging its members to apply for Chartered Biologist (C.Biol.), the IOB Chartered status that could be applied for by fellows and members who have been with the IOB for more than five (5 years).





# IOB Membership

Followings are the new Life members, Chartered Biologists (C.Biol.) and Fellowships joint with the IOBSL since the AGM held in 2020.

## **Life members**

Dr. E.P.N. Udayakumara - Sabaragamuwa University of Sri Lanka

Dr. D.N.N. Wijayawardene - Qujing Normal University

Dr. R. M.S. L. Ranaweera - University of Kelaniya

Dr. T.C. Jeyaseelan - University of Jaffna

Dr. M.M.K. Peiris

Miss. H.G.T.P. Samarawickrama - Board Of Investment

Dr. Y. Mathangasinghe - University of Colombo

Dr. D.A.D.A. Daranagama - University of Kelaniya

Dr. L.T.R.K.M. Thambugala - University of Sri Jayewardenepura

Dr. L.M. Rankoth - University of Peradeniya

Dr. D.K. Hettiarachchi - Rajarata University of Sri Lanka

Mr. S.S.K. Madage - Industrial Technology Institute

Miss. D.U. Rajawardana - Industrial Technology Institute

## **Chartered members**

Dr. P.P.S.L. Pathirana - Institute of Biochemistry, Molecular Biology and Biotechnology (IBMBB)

## **Fellow members**

Dr. P.W.H.K.P. Daulagala - The Open University of Sri Lanka

Dr. L.K.R.R. Jayakody - The Open University of Sri Lanka

Prof. Dr. rer. agr. B.D. Rohitha Prasantha - University of Peradeniya

Please visit IOBSL website (<http://www.iobsl.org/membership/how-to-join-the-institute>) for further information on joining the IOBSL or becoming a Chartered Biologist.



## Sri Lankan Journal of Biology (SLJB)

Sri Lankan Journal of Biology (SLJB) published by the Institute of Biology, Sri Lanka, is a biannual journal with January and June issues. All articles carried DOI numbers and were licensed under a Creative Commons Attribution 4.0 International License.

The volume 6 issue 2 of SLJB was published on 23<sup>rd</sup> June 2021. The articles can be accessed from the link <https://sljb.sljol.info>

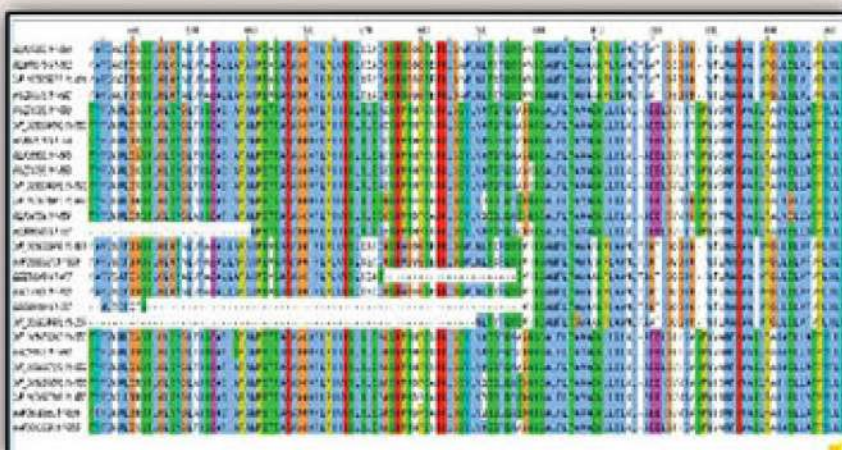
All are invited to submit articles for the January and June issues of 2022.

ISSN: 2550-3340 (online)

# Sri Lankan Journal of Biology

Volume 6 Issue 2  
June 2021

## 2 - C4 Rice xo-Glutarate







## Highlights of the webinars held in 2021

### Antimicrobial Peptides against Multi-drug Resistant Bacteria

**Prof. Mahanama De Zoysa**

**College of Veterinary Medicine, Chungnam National University, Republic of Korea.**

The emergence of multi-drug resistant (MDR) pathogens is continuously increasing in worldwide and considered as a global health threat. Misuse and over use of antimicrobials are the main drivers in the development of drug resistant pathogens including bacteria, fungi, and viruses. MDR bacteria “ESKAPE” (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter species*) are designated under high priority status. To control such MDR bacteria, it requires urgent actions to develop effective and alternative therapeutic agents such as antimicrobial peptides (AMPs). The AMPs are host defense peptides, which play major role in the innate immune system. Generally, AMPs are positively charged (cationic), short chain polypeptides (<50 amino acids), and having an amphiphilic (hydrophilic and hydrophobic) nature with small molecular weight (<10 kDa). Naturally, gene encoded AMPs are synthesized by ribosomal translation of mRNA in all species. The non-ribosomal origin of AMPs are mainly produced in bacteria. AMPs consist of  $\alpha$ -helical,  $\beta$ -sheet or peptides with extended coil structures. Most of AMPs display a wide spectrum of biological activities including antimicrobial, anti-biofilm, anti-tumor, anti-inflammatory, wound healing, immunomodulatory, etc. Mechanisms of AMPs are described with multiple modes of action, such as disruption of membrane and metabolic inhibition of DNA, RNA, protein synthesis, and bacterial wall synthesis. Hence, there is less chance for pathogens to develop resistance against AMPs. Therefore, AMPs have a great potential to solve the problem of MDR microbial infections by slowing the emergence and the spread of MDR bacteria. In this lecture, I summarize our research studies on specific AMPs named as Octopromycin and Octominin against *A. baumannii*.

**Keywords:** antimicrobial peptides (AMPs); multi-drug resistant (MDR); Octopromycin; Octominin



Listen to the talk



# Highlights of the workshop

## **workshop on “Arthropod-borne diseases (non-mosquito)/ infestations and identification of their parasites and vectors”**

Department of Parasitology, Faculty of Medicine, University of Kelaniya successfully conducted a workshop on **“Arthropod-borne diseases (non-mosquito)/ infestations and identification of their parasites and vectors”** in collaboration with the Institute of Biology Sri Lanka.

This was conducted as a three-day workshop from 9-11 August 2021 under strict health guidelines due to the COVID-19 pandemic limiting the number of participants to ten this time. The workshop covered lectures and practical sessions covering disease epidemiology, clinical presentation, treatment, diagnostic options, identification of parasites and vectors of Scrub typhus, Flea-borne diseases, Lyme disease, Leishmaniasis, Scabies, Pediculosis, diseases transmitted by lice, Human Trypanosomiasis, Onchocerciasis, Loiasis and Mansonelliasis.

Certificate distribution was held on the last day under the patronage of Prof. Janaki Hevavisenthi, Dean/Faculty of Medicine, University of Kelaniya, Prof. (Mrs). L.D Amaerasinghe, President/ Institute of Biology, Sri Lanka and Prof. Nayana Gunathilaka, Head/Department of Parasitology & Workshop Coordinator, Faculty of Medicine, University of Kelaniya.

[Read more](#)







## Getting the ethical clearance for your biology-related projects

The Institute of Biology has established an Ethics Review Committee (ERC IOBSL) for granting ethical clearance to Biology-related projects. The ERC IOBSL will grant ethical clearance for biology-related research projects involving animals both in the laboratory and in the field. Where research involves human subjects, NO ethical clearance will be granted for clinical research. 'Clinical research' here is defined (but is not limited to) as research involving the taking of live samples by the researcher, directly from a human subject, and using an invasive procedure.

Guidelines and the application form are available at

**<https://www.iobsl.org/ehitcal-review/ethical-review-committee>**





## Sri Lanka wins a Bronze Medal at International Biology Olympiad held in Portugal

The 32<sup>nd</sup> International Biology Olympiad (IBO) 2021 was conducted from Lisbon Portugal from July 18-23. Due to COVID-19 global pandemic, this competition was held as an online examination. Theoretical and practical examinations of this competition was held at University of Sri Jayewardenepura on 19<sup>th</sup> and 21<sup>st</sup> July 2021.

Ms. Sumadu Senadeera (St Joseph's Balika, Keglle), Ms. Methma Wijesinghe (Sangamittha Balika, Galle), Mr. Pamoda Perera (Ananda College, Colombo) and Ms, Ruchini Niwarthana (Pushpadana Girls' College, Kandy) were selected to represent Sri Lanka by Institute of Biology Sri Lanka based an Island wide Examination held in September last year among Advanced Level (2020 intake) students.

Among Ms. Sumadu Senadeera of St. Joseph's Balika college Kegalle won a Bronze Medal at International Biology Olympiad Competition for Sri Lanka.

Prof Hiran Amarasekera, Prof Nissanka De Silva and Prof. M. J. S. Wijeyaratne participated as Jury members while Professors from University of Sri Jayewardenepura, Colombo and Kelaniya trained the students for the competition.

The IBO is the premier high school biology student competition worldwide, and students from 70 countries participated this competition. The IBO aims to inspire and empower the next generation of leaders in the life sciences.



Photograph from the left

- 1) Ms. Sumadu Senadeera - St.Joseph's Balika Kegalle
- 2) Ms. Methma Wijesinghe - Sanghamittha balika vidyalaya,Galle
- 3) Ms. Ruchini Niwarthana - K/Pushpadana Girls' College, Kandy
- 4) Mr. Pamoda Jayasanka Perera - Ananda College, Colombo





# Announcements

## Inter-University Biology Challenge

Inter-University Biology Challenge was organized for the 2<sup>nd</sup> time by the IOB targeting the undergraduate students in the biological sciences stream of state universities in Sri Lanka. The whole competition was conducted via online mode due to the current pandemic. The theme of the IOB Challenge 2021 was “Save-the-Species”, which was an “Eye-opening” e-poster competition. There were 141 submissions from 14 state universities in the country. Interestingly, the students have designed posters based on 26 plant/animal categories. The judging panel included an independent group of members outside the state universities having expertise in various aspects of biology. The 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> places were secured by N.M.D.N.K. Nawarathne from University of Peradeniya, Umesha Abeysuriya from University of Colombo and P.L. Kodikara from University of Peradeniya respectively. Cash awards and certificates were awarded to the winners of the competition. Further, Dinara Aluthge, M. Amritha Gunawardena, Thusila Edirisinghe & S.A.K. Udayanga from University of Colombo, G. Hasith Nirmala Gunasekara from University of Jaffna, G. Maathangi & R.M.U.G.N.M. Rajanayaka from University of Peradeniya, P.H. Udari Sankalpani De Silva from University of Ruhuna, Kavindya Thilakarathna from Uva Wellassa University and O.K.T. Nimesh Dananjana from Wayamba University of Sri Lanka received the merit awards. The cash awards were sponsored by Quolikem International Pvt Ltd.

### Winners



1<sup>st</sup> Place

N.M.D.N.K. Nawarathne  
Faculty of Agriculture  
University of Peradeniya



2<sup>nd</sup> Place

Umesha Abeysuriya  
Faculty of Science  
University of Colombo



3<sup>rd</sup> Place

P.L. Kodikara  
Faculty of Agriculture  
University of Peradeniya







## Research highlights from our eminent scientists

### A molecular genetic approach to understand the Sri Lankan identity

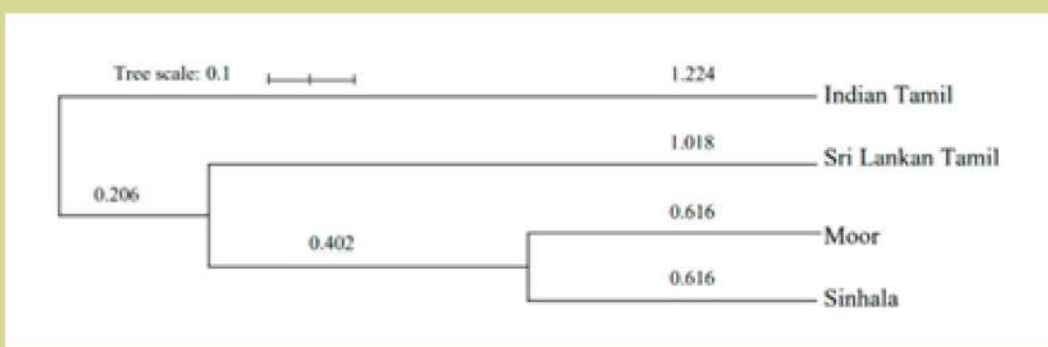
Dr. Gayani Galhena

Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo

Sri Lanka is home to more than 15 different ethnic groups with diverse origins. Interestingly, except for Veddhas (aboriginals) who are confined to a small group of 10,000 individuals, all other ethnic groups have descended from foreign settlers who came to Sri Lanka for various purposes during historical times. However, despite this huge diversity, an approximate 99.5% of the 20 million population living in the country today, consists only of four ethnic groups; Sinhalese, Sri Lankan Tamils, Moors, and Indian Tamils. Owing to their complex demographic history and unique patterns of geneflow, the genetic position occupied by each of these ethnic groups, both at local and global scales is highly ambiguous. Untangling these strings of genetic affinities which binds us together as Sri Lankans can provide new insights that shift our ethnic bearing to a different paradigm.

The recent advancements in molecular techniques have made available a wide variety of molecular markers. This offers the opportunity to infer the genetic affinities among populations with much more accuracy and reliability than those made several decades back. Population geneticists have attempted the use of markers located on various genomic elements including autosomes, X chromosome, Y chromosome as well as mitochondrial DNA to make their analysis. Each of these marker types are having specific advantages of its own and important in elucidating different aspects of the interpopulation relationships that existed throughout the historical times. For example, Y chromosome based markers can reveal the paternal line of ancestry, while markers on mitochondrial DNA reflects the maternal history. Likewise, the markers on autosomes are useful in illustrating the common biparental ancestry. In contrast, X chromosome markers carry the advantageous features of both autosomal and uniparental biomarkers, and consequently have a proven utility in tracing the sex biased demographic history among populations with complex admixture and geneflow patterns.

Even though the autosomal, Y chromosomal and mitochondrial DNA based markers had been utilised earlier to analyse the demographic history of Sri Lankans, the first X-chromosome based population genetic study was undertaken only recently. The study has tested 838 unrelated Sri Lankans using 16 genetic markers, making it the largest genetic study that has been conducted for Sri Lankans so far. The findings of the research revealed several interesting facts on ethnic relationships of ancient Sri Lanka, which have not been surfaced earlier either with autosomes or with other uniparental biomarkers. As per the findings of this research, the Indian Tamils in Sri Lanka are having a subtle but statistically significant genetic subdivision from Sinhalese and Moors while Sinhalese, Sri Lankan Tamils, and Moors are closely related. In addition, the genetic relatedness between Sinhalese and Moors are much closer compared to the relatedness between Sinhalese and Sri Lankan Tamils as opposed to the general belief (see figure).



Relationship among the four Sri Lankan ethnicities based on X chromosome analysis



These findings agree with historical data on the early settlement of the four ethnic groups in Sri Lanka. The Sri Lankan Tamils arrived in Sri Lanka from various parts of the Indian subcontinent and subsequently united with the Sinhalese through matrimonial bonds. Indian Tamils on the other hand were brought to Sri Lanka to work in estates during the British colonization and had minimum mixing with the native Sinhalese or with Sri Lankan Tamils. In contrast, Sri Lankan Moors have descended exclusively from Muslim male merchants who came to Sri Lanka for trading. They have settled in Sri Lanka and espoused local women, who were either Sinhalese or Sri Lankan Tamil. Thus, it is not surprising to see this Sinhalese female ancestry reflected among Moors *via* the X chromosome analysis as observed in this study.



This research has also shed light on the controversy of the origin of Sri Lankan Moors. While the majority believes they represent Arabic merchants who settled in Sri Lanka, an opposing view holds them to be descendants of Indians with the Islamic faith. The results of this new study have provided evidence to support the latter view by illustrating an Indian origin for the Sri Lankan Moors.

Since X chromosome spends two third of its lifetime within females, it tends to reflect more of the maternal blood line of a population. In this light, the findings based on mitochondrial DNA are of much relevance to understand the full picture of our ethnic relationships. Similar to X chromosome markers, they too have identified a much closer relationship among Sinhalese and Sri Lankan Tamils, in comparison to that among Sinhalese and Indian Tamils. On the contrary, autosomal marker analysis have failed in detecting a similar genetic subdivision among the four ethnic groups. Collectively, these results suggest a sex-biased demographic history for Sri Lankan ethnicities.

Finding the genetic position of Sri Lankan ethnicities in the global ethnic database is also of much interest to the Sri Lankans. When the genetic relationship of the four Sri Lankan ethnicities is compared with global populations, Sri Lankans were grouped not only with South Asians as per the general expectation, but also with Europeans. Indian Tamils occupies a place towards the periphery of this main group, while Southeast Asians, East Asians, and Africans are placed at a distance, outside the main group. These observations align well with the historical claims of population movements in ancient Eurasia. Sinhalese are believed to be descended from Indo- Aryans, who set forth from the borders of the Caspian and Black sea towards Europe and South Asia, early in the third millennium BC. Accordingly, European and South Asian civilizations of today share a common genetic background reflecting their Bronze Age common ancestors. Tamils on the other hand are believed to have descended from the indigenous people of the Indian subcontinent. However, Sri Lankan Tamils have mixed with Sinhalese over nearly two millennia, unlike the Indian Tamils, which might explain their relative genetic positions observed with X chromosome markers.

These attempts to elucidate the historical and demographic characteristics of numerous ethnic groups is a fundamental part of reconstructing the recent human history. At the same time, it opens up a new avenue of thoughts in the context of our Sri Lankan identity and ethnic harmony. As a nation that had suffered several decades of ethnic tension and its devastating repercussions, it is time for us to revisit our mental image on our actual biological relationships. The scientific framework of molecular genetics as exemplified here has provided means to achieve this long-sought goal.

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