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Notice for the PhD Viva Voce Examination

Mr Balu M Nair, Registration Number: 2090237, PhD Scholar at the Department of Life Sciences, School of Sciences, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Wednesday, 18 March 2026 at 11.30 am in Room No. 628, 6th Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Taxonomic Assessment, Diversity Analysis of Calliphoridae and Sarcophagidae from Kerala Using Morphological and Spectroscopic Techniques**
Discipline	:	**Zoology**
External Examiner - I	:	**Dr M Ramachandra Mohan** Professor Department of Zoology Bangalore University Bengaluru - 560056 Karnataka
External Examiner - II	:	**Dr M Madhavi** Professor Department of Zoology Osmania University Hyderabad - 500007 Telangana
Supervisor	:	**Dr Majesh Tomson** Assistant Professor Department of Life Sciences School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva–voce examination.

Place: Bengaluru
Date: 11 March 2026

Registrar (Academics)

ABSTRACT

The order Diptera, commonly referred to as the true' or two-winged flies, is one of the diverse insect orders, comprising nearly 1,60,000 known species worldwide. Two families in this order, Calliphoridae and Sarcophagidae, hold predominant importance due to their role in ecology, forensics, and public health. The present study aims at documenting the diversity and abundance of Calliphoridae and Sarcophagidae across three regions of Kerala and to assess the influence of climatic factors such as temperature and humidity on fly population dynamics. The investigation led to the identification of six Calliphoridae and four Sarcophagidae species, wherein Chrysomya megacephala and Sarcophaga albiceps were the most abundant representatives of their respective families. The effect of environmental parameters is analysed with the help of redundancy analysis (RDA), where the results showed that the temperature was the crucial factor determining the abundance of the fly population. RDA revealed a positive correlation between temperature and fly abundance, with an adjusted R2 value of 0.64 indicating the model's significance.

Furthermore, in addition to traditional taxonomic identification, this study also emphasises new techniques like SEM and spectroscopic tools like ATR-FTIR for species identification. These novel approaches helped in overcoming the limitations of conventional methods, providing faster, accurate, and reproducible approaches for species determination. SEM analyses revealed detailed diagnostic features such as minute hairs, sensillae, and intersegmental spines, which proved critical for accurate species discrimination which are otherwise difficult to identify under stereo microscopy. Furthermore, the present study made use of cuticular hydrocarbons (CHCs) for species identification using spectroscopy techniques, showing prominent results where the data showed that the fingerprint regions (1000 cm−1-500 cm−1) and stretching regions (3500 cm−1-2500 cm−1) can be crucial in the identification of species. Spectroscopic data analysed using Principal Component Analysis (PCA) and Orthogonal Partial Least Squares Discriminant Analysis (OPLS-DA) were able to successfully discriminate between species. Additionally, the vector potential of the dominant fly, C. megacephala, was analysed, as this fly remains in close association with humans and animals. This study reports bacteria species like Pseudomonas aeruginosa, Enterococcus faecalis, and Leclercia adecarboxylata from the gut of the fly. The study also reports the first report of L. adecarboxylata from C. megacephala, offering new insights into the species' potential role in pathogen transmission. The findings of the current study lay significant groundwork in revealing the pattern of diversity and abundance of Calliphoridae and Sarcophagidae, along with new techniques to enhance taxonomic clarity.

Keywords: *Calliphoridae, Sarcophagidae, SEM ultrastructure studies, L.adecarboxylata, PCA, OPLS-DA*

Publications:

1. **Nair, B. M.**, & Tomson, M. (2024). Molecular and Morphological Analysis of Forensically Important Sarcophaga albiceps Meigen. Indian Journal of Entomology, 1110-1114. DOI: https://doi.org/10.55446/IJE.2024.1637
2. **Nair, B. M.**, & Tomson, M. (2024). Gut Microbiome Characterisation of Chrysomya megacephala: Isolation,Identification, Antibiotic Profiling, and Initial Documentation of Leclercia adecarboxylata from the Fly. Journal of Pure & Applied Microbiology, 18(4).2446-2461. DOI: 10.22207/JPAM.18.4.17