

Final Report

Establishment of National Avian Forensic Laboratory at SACON for National Certification to Prevent Illegal Trafficking of Birds

January 2022

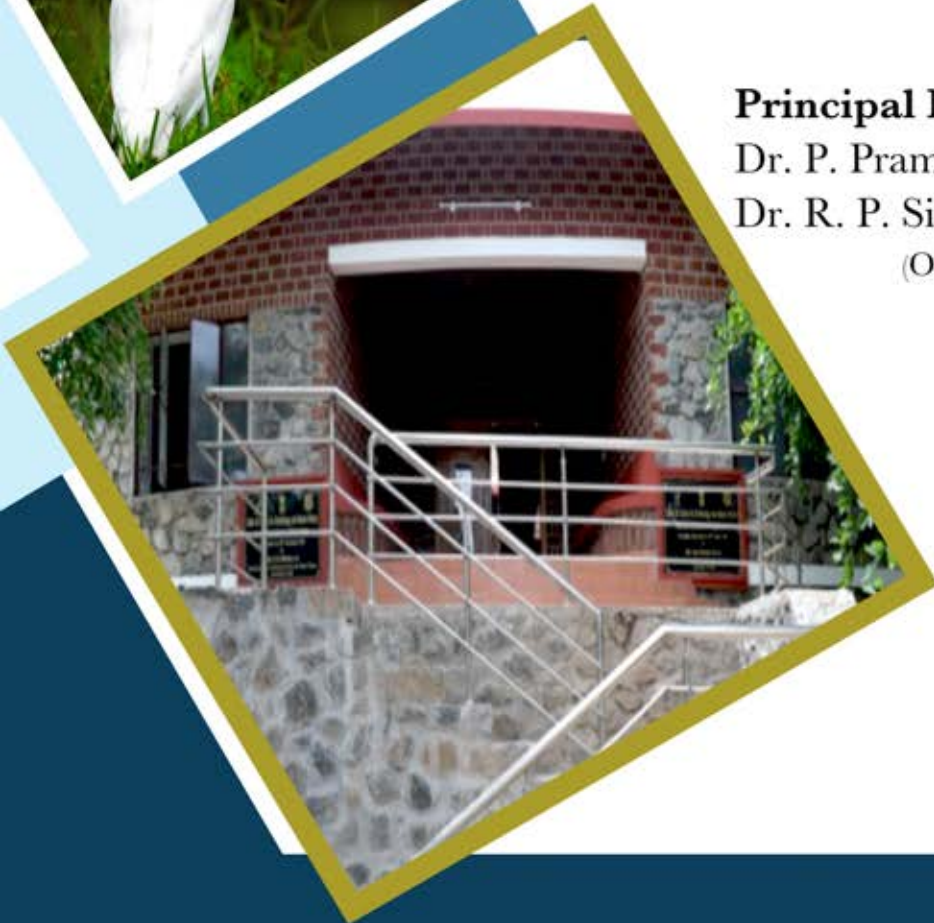
Project Period
(October 2017 - March 2021)

Principal Investigator

Dr. P. Pramod, Senior Principal Scientist

Dr. R. P. Singh, Senior Scientist

(October 2017 - June 2021)



Sálim Ali Centre for Ornithology and Natural History

(A Research Centre of the Ministry of Environment, Forest and Climate Change, Government of India)

Anaikatty P.O., Coimbatore - 641108, Tamil Nadu

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(SACON Report No: PR-217)

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Dated:

Dr. P. Pramod
Senior Principal Scientist &
Principal Investigator

EXECUTIVE SUMMARY

- The objective of the project was to develop a state-of-the-art avian forensic laboratory with infrastructure for bird body part analysis; having a repository of tissue/blood and feather reference materials, to help identify avian species from their remains. This was intended to facilitate the Wildlife Crime Control Bureau and other law enforcement agencies in controlling illegal trafficking.
- A fully furnished State-of-the-Art Avian Forensic Laboratory (NAFL) has been established at SACON and dedicated to the nation on 28th December 2018 by Shri. C. K. Mishra, IAS, Secretary, MoEF&CC in the presence of Dr. T. Chandni, Advisor, MoEF&CC, and other Governing Council members of SACON.
- The NAFL has procured sophisticated as well as common laboratory equipment viz. Next Generation DNA Sequencer, Sanger DNA Sequencer, Covaris Fragment Analyzer, Homogenizer, Horizontal and Vertical gel electrophoresis, Centrifuge, Gel-Documentation system, Deep Freezer (-80°C), Cryocans, Biosafety Cabinet, Thermal Cyclers,, etc. NAFL has engaged one project scientist and three research fellows to carry out the establishment work. Besides, two MSc dissertation students and five interns were also engaged in the lab for the work.
- Initial research works demonstrated the potential of the laboratory in doing service to the nation. For forensic analysis of bird remains for species identification, sex determination, and analysis of the microstructure of bird feathers.
- Sample collection for reference sample repository employed opportunistic as well as systematic sampling. Under opportunistic sampling, the team carried out road surveys in Tamil Nadu, Maharashtra, Assam and collected road-kill of birds. However, considering the very low probability of getting a random road-kill bird, the team focused on systematic biological sample collection from various Zoos, rescue centers, museum specimens, and targeting mist-netting of birds at the SACON campus.
- Collected about 1300 biological samples (blood/tissue/feather/DNA) of 150 bird species and preserved them in our Avian Biobank. Of these, species-specific barcodes have been

generated for about 113 species using CoI and ND2 genes by means of Sanger sequencing.

- Sequenced whole genomes of eight select species of Indian birds, - a first attempt in the country.
- Developed feather catalog for 17 species of birds with 15 microstructure parameters.
- Bird feather cataloging lead to the discovery of a new type of feather barb termed as ‘sub-plumulaceous’ from the dorsal body contour feathers of Indian Pitta (*Pitta brachyura*).
- Developed a novel method for molecular sexing in birds using CHD and CHW gene-specific primers.
- Extended species identification and molecular sexing services to various government agencies such as Wildlife Institute of India, Arignar Anna Zoological Park, Chennai, and Indian Air Force, and successfully solved 6 cases (9 Samples) of bird species identification and 2 cases (8 Samples) of molecular sexing for these institutes /agencies.
- One of the intriguing cases that NAFL has solved Mig-21 crash in Bikaner, Rajasthan on 9th March 2019. NAFL identified the bird species that hit the fighter jet from the wreckage of the plane.
- Identified illegal trade markets and areas in Tamil Nadu, Maharashtra, and Assam, and attempts were made to obtain biological samples of illegally traded bird species. Also conducted systematic surveys of local markets and pet shops in Chennai and Bengaluru.
- Conducted systematic surveys of local markets and pet shops in Chennai and Bengaluru and observed that a few restricted birds such as Rose-ringed Parakeet and Java Sparrow are being traded through back door selling in the garb of pet bird trade.
- Provided hands-on biological sample collection/preservation training to over 120 forest guards/rangers at Tamil Nadu Forest Academy (TNFA) and Sathyamangalam Tiger Reserve, Erode, Tamil Nadu.
- Published four research articles in reputed peer-reviewed journals and over ten research manuscripts are under preparation.