

2023 PCSU POST-DOCTORAL FELLOWSHIP AT UNIVERSITY OF HAWAI‘I AT MĀNOA

Advancing mosquito suppression techniques through targeted Bti larvicide application to protect Hawaiian Forest Birds

Summary:

There is an urgent need to significantly reduce the threat of avian malaria on Hawaiian forest bird species of greatest conservation need by developing tools to control the mosquito vector, *Culex quinquefasciatus* (*Culex*). Efforts are ongoing to develop an incompatible insect technique (IIT) using the cytoplasmic endosymbiotic bacteria *Wolbachia* to address the threat of avian malaria at the landscape scale. However, large-scale deployment of IIT in Hawai‘i is likely at least 2 years away. Meanwhile, the biolarvicide *Bacillus thuringiensis israelensis* (*Bti*) has been used for more than three decades as an environmentally safe and effective larval control agent in sensitive habitats, including aerial application to water ways. However, it has not yet been applied aerially in Hawai‘i. [Pacific Cooperative Studies Unit](#) (PCSU) seeks a post-doctoral associate to help us develop successful protocols to apply this larvicide in selected areas on Kaua‘i and Maui, while researching its efficacy as a mosquito control tool in these environments as well as ecological requirements of the *Culex* larvae. The objectives of this project are to:

- 1) Compare the efficacy and cost-effectiveness of helicopter application to hand applications across sites on Kaua‘i that represent different moisture levels and habitat types. Metrics assessed will include penetration of Bti through vegetation to those habitats, the rate of larval kill, and changes in adult abundance.
- 2) Investigate the larval distribution and habitat requirements of *Culex* in space and time on both Kaua‘i and Maui.
- 3) Use aerial application of Bti to control larval mosquitoes across landscapes on Kaua‘i and Maui.
- 4) Conduct outreach in support of mosquito control.

The post-doctoral associate will:

- 1) Oversee project activities including research, conservation management, field work and logistics, budget tracking, permitting, regulatory compliance, coordination with partners, and report writing, in coordination with supervisory staff at [Kaua‘i Forest Bird Recovery Project](#) (KFBRP) and [Maui Forest Bird Recovery Project](#) (MFBRP).
- 2) Study efficacy of Bti deployment and research ecological requirements of larval *Culex*, including a) design, plan, coordinate, and participate in the sampling of Bti post-aerial application, b) design, plan, coordinate and participate in the monitoring and collection larval and adult mosquitoes pre- and post-application, c) obtain, manage and map data, including in geographic information systems (GIS), to support planning of Bti applications and larval surveys.
- 3) Take the lead in analysis of field data. Presents and publish scientific papers for presentation at meetings and in peer-reviewed journals. Analyze and interpret application and monitoring data in reports. Oversee the development and management of a standardized database for all project data; this includes data entry and Quality Assurance/Quality Control (QA/QC) procedures.
- 4) Help prepare a communication plan and communications materials, and participate in public outreach.

- 5) Work with the KFBRP and MFBRP managers to oversee acquisition and procurement of supplies, equipment, training, and transportation needed to aerially apply Bti in forest bird habitat in Kaua'i and Maui. Develop protocols and regularly coordinate the aerial application of Bti on Kaua'i and Maui.

The fellowship will include \$65,000 for one (1) year and it is expected to begin sometime in January, 2023, although an earlier start date may be possible on request (*Location*: Kaua'i, with frequent travel to Maui).

Applications for this award should be sent to (crampton@hawaii.edu) in electronic format as a PDF file. They are due by 5 pm HST December 9, 2022. No late submissions will be accepted. Please put PCSU POSTDOCTORAL AWARD-[APPLICANT LAST NAME] in the subject line of the email.

Eligibility:

Applicants must have a Doctoral Degree from an accredited college or university in Entomology, Agriculture, Biology, Zoology, Conservation Biology, Ecology or related fields. Three to five (3-5) years of experience designing, leading, conducting and analyzing biological field research in entomology, invasive species management, or conservation management. The applicant must have working knowledge in the principles and techniques of conservation management, remote field operations, and invasive species biology. Working knowledge of natural history relevant to native Hawaiian wildlife, or similar environments. Proficient knowledge of techniques used to inventory and monitor insects and wildlife, and other natural resource assets, including experimental design, databases, GIS, and statistical data analysis. Knowledge of rules and regulations relating to field operations, and pertinent laws, regulations, licensing and permitting requirements related to program. Able to conduct and lead statistical and spatial data management and analysis, and demonstrated ability in publishing peer-reviewed scientific papers and in making presentations for scientific and public audiences.

Please include:

1. A CV of the applicant (3 pages maximum), including date of Ph.D. receipt.
2. A statement (3 pages maximum), describing any contribution the applicant has made to diversity in the sciences while also speaking on the following points:
 - Organizational ability to plan, lead, and execute logistically complex field operations.
 - Strong ability to solve logistical problems and problems related to biological threats.
 - Ability to conduct and lead statistical and spatial data management and analysis.
 - conduct and lead statistical and spatial data management and analysis,
 - Ability to lead a field crew and work as a team member for safe and efficient field operations.
 - Ability to provide guidance, motivate, and engage field crews through effective communication and leadership.
3. Two letters of recommendation, including one from the applicant's primary Ph.D. advisor.

Please contact crampton@hawaii.edu with questions. Please send all documents (excepting references, which may be sent separately) as a single PDF to crampton@hawaii.edu. Please title the PDF as [APPLICANT LAST NAME] PCSU POSTDOCTORAL.