HR EXCELLENCE IN RESEARCH

IRTA IS SEEKING A PhD STUDENT GRANTED BY THE EUROPEAN UNION.

IRTA is interested in contracting a PhD student for its Centre CReSA which is going to be granted by the European Union.

Title of the project in which the PhD student will be involved

Earth observation service for preventive control of insect disease vectors

Concept and approach of the project

Problem to be solved: World Health Organization (WHO) estimates that vector-borne diseases account for more than 17% of all infectious diseases, with more than half of the world's population at risk. Every year, more than one billion people are affected, of which a large proportion is due to diseases transmitted by mosquitoes. Non-native species cost the EU €12 billion per year in damage and control costs. In the last decades several species of disease carrying mosquitoes have invaded Europe through the transport of goods, increasing international travel and climate change5.
Efficient surveillance is essential to prevent the spread and establishment of pests. Collecting adult mosquitoes can provide vital information to health authorities. When traps are set at specific locations over a period of time, increases in the mosquito population can be detected. Once these mosquitoes are identified, Vector Control Technicians can find the breeding source and take the appropriate and directed control measures. How are mosquitoes monitored and controlled? Insect detection and counting is typically performed by means of traps, which are regularly collected and manually analyzed. Even using the most efficient traps available in the market for mosquito surveillance, the main problem is that the manual inspection is very expensive in terms of human time, representing >95% of surveillance costs. Also, a lag is created between the time the trap is placed and inspected. This lag may only be a week, but in the case of mosquitoes this can be more than half their adult life span, and therefore the dynamics of pest population in the field cannot be accurately and timely monitored.

How our solution will solve the problem: Integrated Pest Management (IPM) relies on the accuracy of pest population monitoring. Without gathering information of population dynamics, and related ecological factors, it is almost impossible to execute the appropriate control at the right place and time. Mosquitoes are usually spread across large areas and boundaries, and it is inefficient to use traditional IPM, strongly dependent on human labor for efficient large scale monitoring. Fully automatic remote monitoring is the key. What do specialists say they need to improve their surveillance programs? A method that would provide timely answers to all the questions like: 'What is the spatial/temporal distribution of endemic mosquito species in a certain area? What are the relative abundances of nuisance species? When is the best time to start with

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mosquito control? Is mosquito abatement effective and sufficient? Where do disease-carrying species occur and are they spreading? What geographical areas are high risk areas of mosquito-borne disease outbreaks due to high densities of potential mosquito vectors? Unfortunately, such a method doesn't exist. A real opportunity exists, as VECTRACK will provide an answer to all these questions.

General objectives of the project

The Main Technical Objective is to a**c**hieve a good problem-solution fit, to jump-start product adoption, and bridge innovators (R&D Centres) with early adopters (our professional client base). We will develop a service chain to ensure continued input to vector spatio-temporal modelling, and bridge innovators (SmartSenZ) with early adopters (VECMAP users). We will train the optoelectronic sensor with relevant mosquito species in laboratory and test it in field trials.

To achieve the main objective of the project, the following general objectives will be pursued:

1. Sentinel 3A VI and LST processing chain
2. Benchmarking with respect to other satellite sources
3. Field-collecting immature stages of relevant vector and/or nuisance mosquitoes, lab-rearing them to adults, to be used in the training of the optoelectronic sensor to identify and distinguish these species
4. Advanced design of ground sensors: trap station with optoelectronic sensor
5. Implementation of WSN-Wireless Sensor Network of ground sensors
6. Development of a standards based interoperable cloud application for ground sensors
7. Integration and field trials and pilots of the VETCRACK prototype system

PhD thesis project

PhD student will be mainly involved in the objectives 3 and 4 and cooperate in task 7.

Duration

The duration of the PhD student contract will be for 3 years (36 months).

Remuneration

The financial remuneration will be of €1,185.47/gross per month (€20,582.04/gross per annum) for the first and second year. For the third year the remuneration will be of €1,270.15/gross per month (€ 21,901.44/gross per annum).

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Requirements:

Candidate profile: Degree in Biology, Veterinary, Biotechnology, or similar; and master in biology, Veterinary or similar.

Any prior experience in research and laboratory work, will be viewed positively.

Other requirements: High English level.

Persons interested, please, contact by email to Dra. Sandra Talavera (sandra.talavera@irta.cat), sending her/his CV together with a letter of presentation and including the medium note of his/her academic record.

Deadline: September 30, 2019

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