

Global Mosquito Alert

Building a worldwide network to leverage citizen science in the fight against mosquito-borne disease

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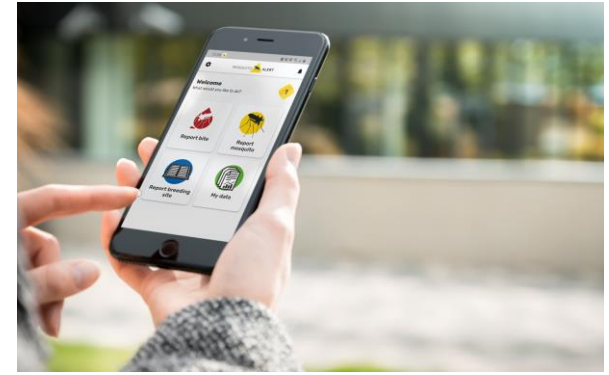
Global Mosquito Alert (GMAC)



Protocol 1



Protocol 2



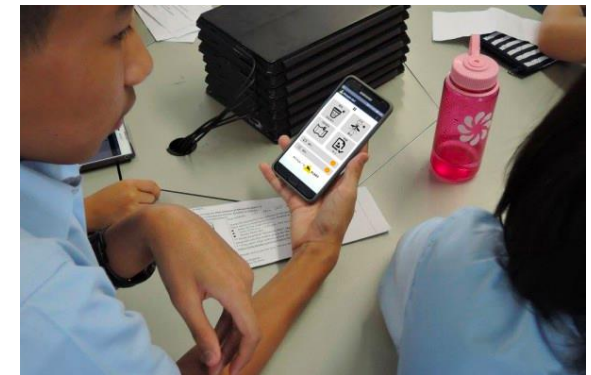
Mosquito Alert V1 (Barcelona)



Protocol 3



Protocol 4



Mosquito Alert V2 (Hong Kong)

Launched in 2017, **The Global Mosquito Alert Consortium (GMAC)** is a network of citizen science mosquito-monitoring projects.

Consortium members work together to 1) exchange data, 2) collaborate on data standards and common protocols, and 3) foster a community with mutual learning resources.

The Four Pillars

Data

Each project collects and stores local data

Select information is pushed to the UN's Environment Live data portal.
Data is accessible via APIs, downloads, or visualizations.

Data and Metadata Standards

Data and metadata standards support a set of core protocols for monitoring activities. Projects may augment core protocols to fit local needs. Each protocol is supported by 1 or more open source data collection technologies.

Protocol 1

Real time adult
vector mosquitos

Example Projects:
Mosquito Alert,
iNaturalist mosqui-
to project

Protocol 2

Larvae and
breeding sites

Example Projects:
GLOBE Mosquito
Habitat Mapper

Protocol 3

Bites and nuisance

Example Projects:
Zanzamapp,
Muggen Radar

Protocol 4

Biodiversity
specimens/ DNA

Example Projects:
Mueckenatlas,
Invasive Mosquito
Project

Protocol 5+

Additional
Protocols

New protocols will
be added as needs
and technologies
evolve*

A Common Community and Supporting Platform

Global Mosquito Alert is a community of scientists, policymakers, vector control specialists, educators, and public volunteers interested in leveraging citizen science to track and combat mosquito-vector disease. Participating projects contribute resources to a platform and secretariat supporting (1) a toolkit of good practices for working with diverse stakeholders; (2) standardized protocols and processes for data collection and validation; (3) a directory of participating projects; and, (4) a directory of individual experts.

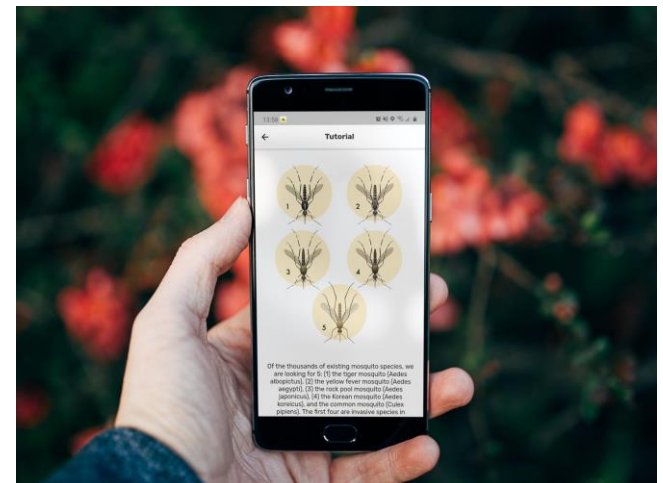
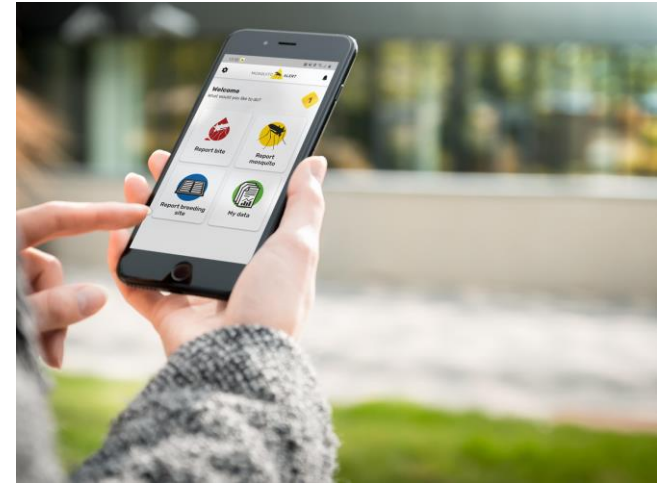
Mosquito Alert

Who: Mosquito Alert Team, CEAB-CSIC, CREA, and UPF.

What: Expert-validated citizen science system focusing *Ae. albopictus*, *Ae. aegypti*, *Ae. japonicus*, *Ae. koreicus*, and *Culex*. We facilitate citizen scientists' reporting of adult mosquitoes, mosquito bites, and mosquito breeding sites.

Why: GMAC offers a set of tools that anyone can draw on to adapt citizen science to local needs in the global fight against disease vector mosquitoes.

Hopes for the Future: A robust world-wide network of coordinated disease-vector projects that blend citizen science, traditional surveillance tools and new technologies.



Zikathon

Who: Zikathon Team, MakerBay, Chinese Foundation Secondary School

What: Focused on early detection & increased data capture of mosquito vector presence by involving community-at-large around Hong Kong.

Why: Raise awareness of issues and empower societal mindset that individuals can contribute towards solutions.

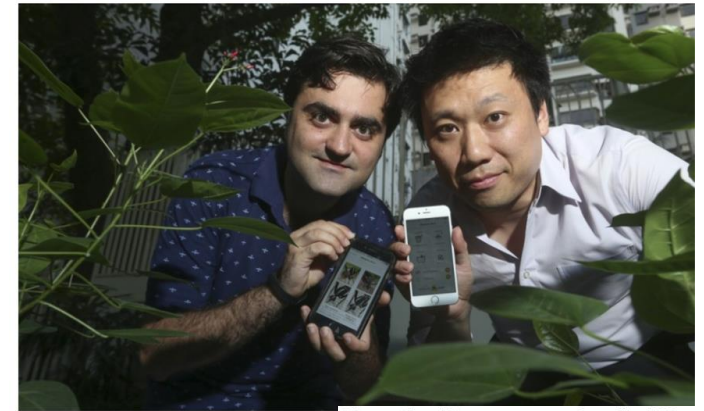
Hopes for the Future: More engagement from general public and policy makers to leverage citizen science data to address potential threats in mosquito vectors.

Hong Kong citizen scientists localise mosquito tracking app to let people report sightings of the disease carriers

The Mosquito Alert app, which creates a database of the insects' breeding areas, was recently shown to the UN in Geneva, and should make up for lack of information from the Hong Kong government

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[COMMENTS](#)



Mosquito Alert goes to school in HK

In an Education Bureau (EDB) seminar in June discussing STEM-related activities in Hong Kong school context, the teachers from The Chinese Foundation Secondary School (CFSS) recommended the introduction of "Mosquito Alert" app into the curriculum to principals and teachers as it can both meet an educational purpose as well as the promotion of citizen science.

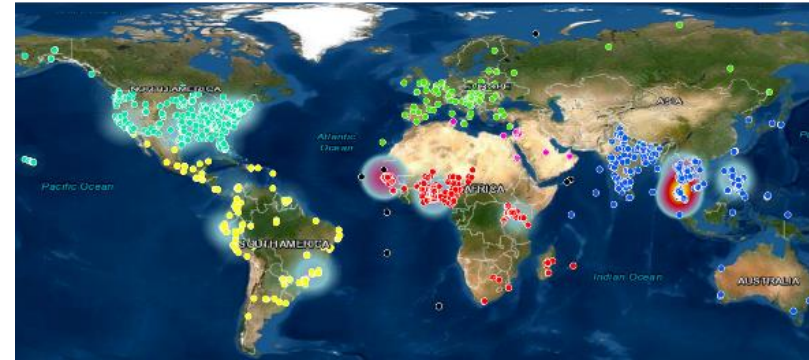


GLOBE Observer Mosquito Habitat Mapper

Who: NASA GLOBE Observer Mosquito Habitat Mapper Team, R. Low Science Lead

What: app reports breeding site, larva counts, ID, source reduction, promotes coincident collection with Land Cover tool. 12 languages!

Why: NASA satellite data used for modeling future disease outbreaks. App geolocates breeding sites as landscape elements and associates larvae observations.



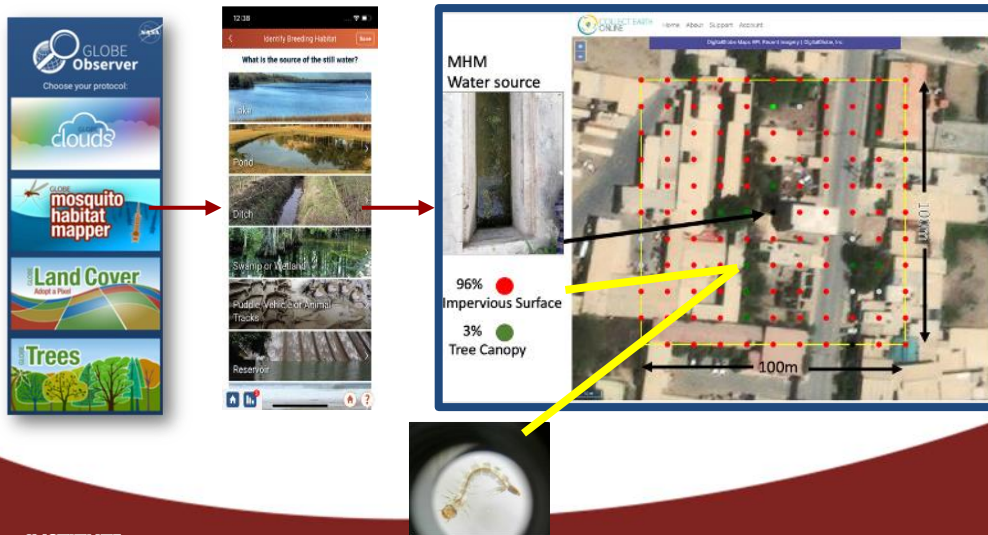
99% source reduction reported!
74 countries, 24K observations

Hopes for the Future:

database enrichment using satellite data to increase geospatial reliability

research grade, analysis-ready data, plus data cleaning tools, user dashboard

7000+ photos await AI for validation





Mosquitoes in Hawai`i *an iNaturalist driven project*

Who: Durrell D. Kapan, California Academy of Sciences



What: Build community awareness and mosquito knowledge by sharing and identifying georeferenced mosquito photographs

Why: We focus on building community agency around mosquito-borne disease as well as building a database of observations to improve human and wildlife health.

Hopes for the Future: Build into GMAC the iNaturalist model of community data curation: a scalable method to simultaneously enhance data quality and improve automated species identification with computer vision by leveraging community expertise across geographic and linguistic barriers.

Citizen science for malaria control in Rwanda

Who: PhD projects of Domina Asingizwe and Marilyn Murindahabi of Wageningen University & University of Rwanda.

What: A year-long collection of mosquitoes with self-made traps and reporting levels of mosquito nuisance by over a hundred volunteers in rural Rwanda revealed when and where malaria risks were the highest. Both volunteers and non-volunteers gained knowledge and skills about controlling malaria.

Why: In Rwanda, the number of cases increased from 1.1 million in 2012 to 4.7 million in 2016.

Hopes for the Future: That governments and scientists actively involve society in mosquito and malaria control at large scale to reduce the disease burden.



Who: Angeliki F Martinou, The Three Mosquiteers project, Joint Services Health Unit, British Forces Cyprus

What: Mosquito research surveillance & control & The Three Mosquiteers a raising mosquito awareness programme for children <https://alien-csi.eu/dissemination-materials>

Why: Mosquitoes know no borders and they are such complex organisms. Having a global network of scientists and informed, active citizen scientists will definitely improve scientific efforts

Hopes for the Future: Engaging teen agers in citizen science and mosquitoes as much as we can. Mosquito Alert and The Three Mosquiteers going global



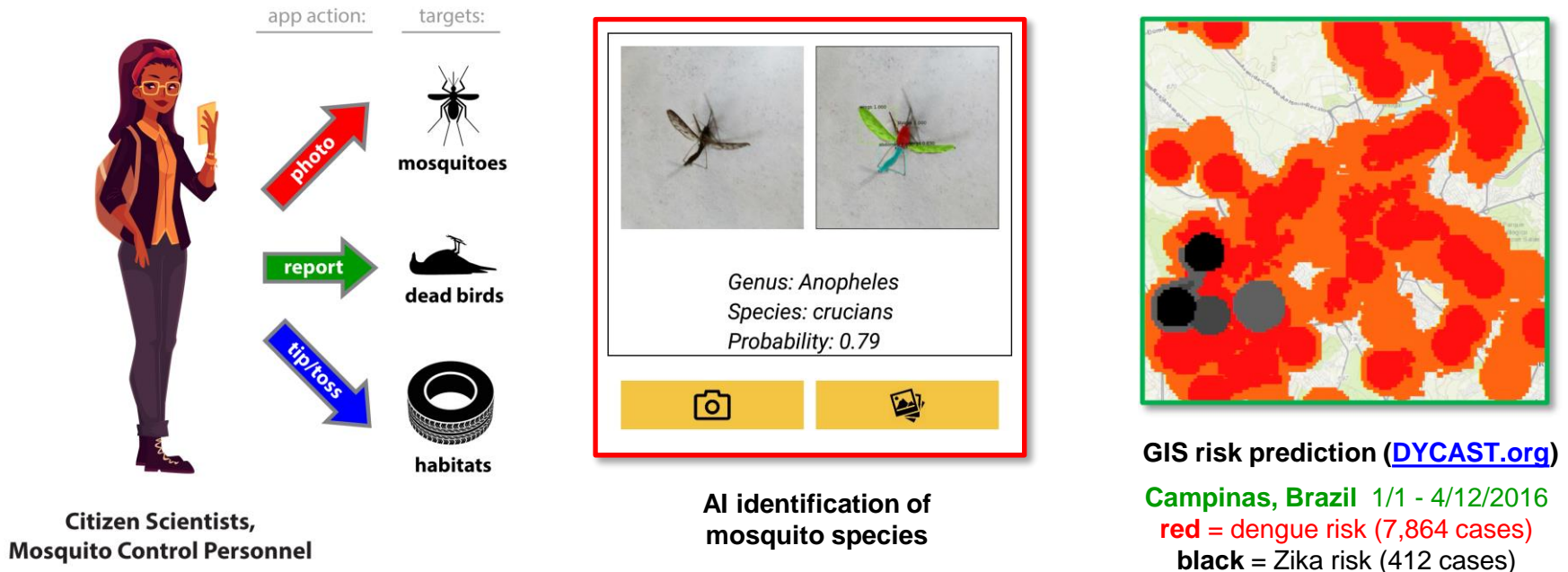
Automated Species Identification and Spatiotemporal Modeling

Who: Ryan Carney, Sriram Chellappan, Anne Bowser, Russanne Low

What: Upcoming 4-year NSF-funded project to identify larval and adult mosquitoes using AI and citizen-generated smartphone images, and to create species distribution and disease risk maps

Why: To provide real-time data useful to local mosquito control and global research

Hopes for the Future: Integration with GMAC network; interested students and postdocs are invited to apply: ryancarney@usf.edu, sriramc@usf.edu

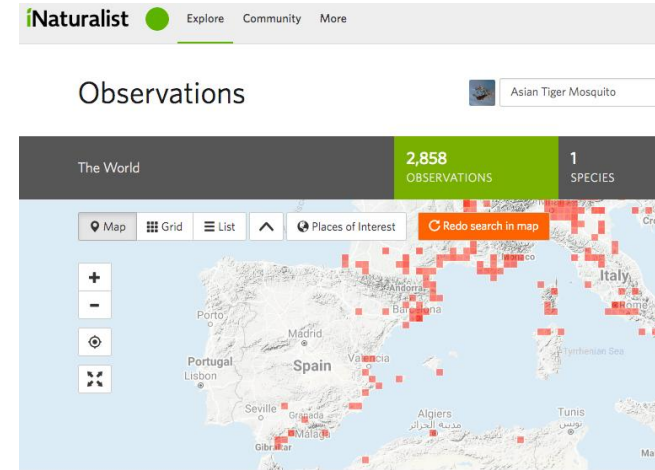


Citizen Scientists,
Mosquito Control Personnel

AI identification of
mosquito species

GIS risk prediction (DYCAST.org)
Campinas, Brazil 1/1 - 4/12/2016
red = dengue risk (7,864 cases)
black = Zika risk (412 cases)

Global Mosquito Alert (GMAC)



- (1) How to strengthen this initiative (by building on what we have accomplished)
- (2) Reflections on citizen science collaborative networks
- (3) New partners and directions for future work (anne.bowser@wilsoncenter.org)



MakerBay

