VectorMap: A web-based platform providing access and visualization of global vector distribution data

VectorMap is a unique resource for collection records, distribution models, and geospatial data of arthropods of biomedical importance, designed to inform risk assessments of vector-borne diseases. Comprising ~0.7 million collection records and over 500 ecological niche and disease risk models, VectorMap also hosts environmental and climate data related to vector ecology.

VectorMap contributes to the global knowledge of vector-borne disease threats by standardizing collection data and making it publicly available. In addition to high-quality collection data, VectorMap also routinely updates and hosts environmental variables used for modeling vector distributions and disease transmission. Currently, there is no other single resource that provides this same level of transparency and quality control.

Data are routinely added to VectorMap from ongoing biosurveillance, digitization of museum holdings, and scientific literature. The same rigorous curation principles practiced as part of managing the National Arthropod Collections are applied to data curation. Collection data are not only evaluated for taxonomic and geospatial accuracy and precision, but contain over 90 fields of additional information, such as identification and pathogen screening methodologies. Users can access trustworthy data that can be easily evaluated for use based on individual user needs.

This invaluable resource provides instant access to actionable data that can be used for rapid responses to emerging vector-borne disease threats around the globe.

WHAT WE DO

- Curate and standardize global vector distribution data

- Develop and host vector distribution models

- Gain insights into vector taxonomy and ecology by accumulating observations over time
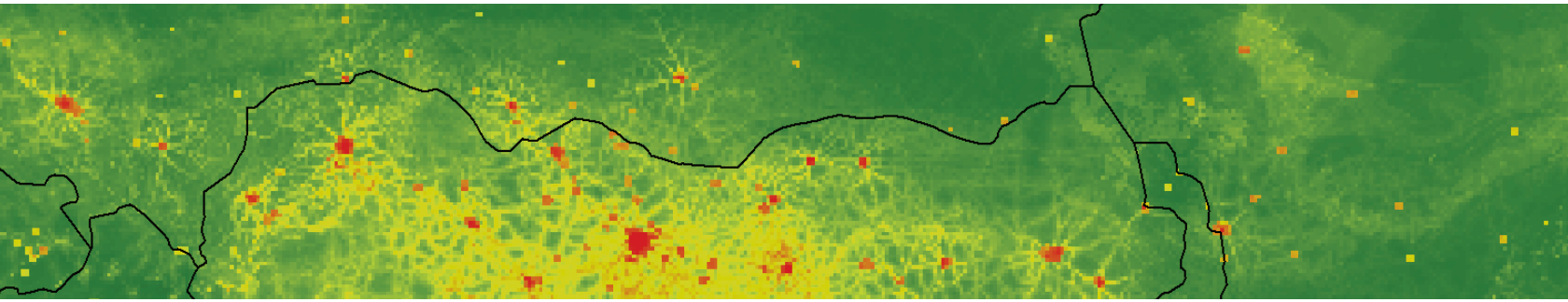
- Rapidly respond to emerging vector-borne disease threats and outbreaks around the world

Data held in VectorMap have also been used to guide biosurveillance planning, forecast vector activity, and to gain insights into the bionomics of cryptic vector taxa.
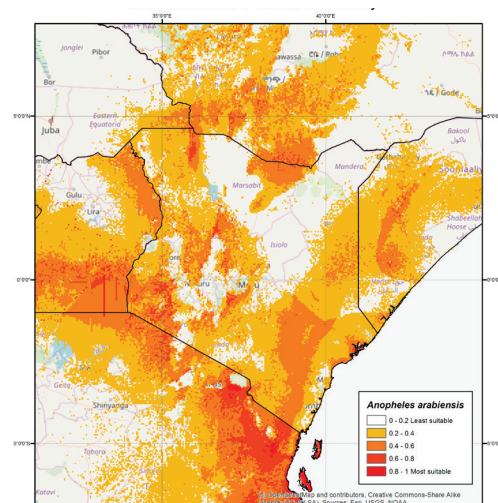
VectorMap: Habitat suitability map, *Anopheles arabiensis*.

KEY VECTORMAP FEATURES

- Collection records for mosquitoes, sandflies, ticks, biting midges, fleas, mites, and hosts/reservoirs

- Species niche models that predict where ecological conditions are most likely to support vector populations

- Near-real-time remotely-sensed environmental data, such as consistently above- or below-average rainfall

- Tools for managing and reporting entomological surveillance data

VECTOR HAZARD REPORTS

Vector hazard reports (VHRs) combine information from VectorMap and other WRBU web-products to generate targeted entomological intelligence for specific countries, or regions of interest. VHRs have been developed in response to U.S. military deployments, detection of invasive vector species, and outbreaks of vector-borne diseases.

COMING IN 2020

VectorMap will launch a new map service to host and visualize vector genomic data. This powerful new tool will allow users to explore genetic diversity within mosquitoes in the context of geography. Applications include investigating origins of invasive species introductions, diffusion of insecticide resistance, and mapping evolutionary adaptations that impact vector capacity.

DATA MANAGEMENT

Ideally, all vector surveillance data should be preserved, managed, and made available on a timely basis at a central source. Readily available data are critical to modern biosurveillance programs, allowing continual updates of vector borne disease risk assessments. Collecting, handling, compiling, formatting, and presenting vector collection data is time-consuming, and prone to errors. Continued assimilation of information beyond each collection event—including identifications and pathogen screening results, requires simplified and standardized procedures for the collection of critical metadata in the field.

The VectorMap team has established a standardized data entry schema of over 90 fields of information based on Darwin Core standards. This schema can be used to organize collection data and ensure all records have a key set of minimum essential attributes. It can also be adapted for use on a number of platforms, including data entry forms for use on mobile devices.

For more information about minimum essential data collection requirements and mobile data entry systems, see the *WRBU Best Practices Guide to Entomological Surveillance Data Management and Reporting*; copies are available upon request.

MAKE YOUR DATA COUNT; CONTRIBUTE TO VECTORMAP TODAY

All data published on VectorMap (vectormap.si.edu) are fully attributed to the submitter and easily searchable within the data portal. For more information about accessing or contributing data, contact us at nmnh-wrbu@si.edu.