

Enhanced Mosquito Surveillance for *Aedes* spp. in Santa Cruz County, Arizona

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Objective

The objective of this work is to develop an efficient community-based strategy to enhance mosquito surveillance for *Aedes* spp., vector for chikungunya and dengue viruses, in Santa Cruz County on the U.S.-Mexico border. We aim to determine vector presence, distribution, and seasonality by using ovitraps maintained by community members.

Introduction

Since 2003 some Arizona counties have followed mosquito surveillance protocols to trap the West Nile Virus vector, *Culex* spp., using CO₂ traps. Despite low sensitivity of these traps to detect *Aedes* spp., one out of seven CO₂ traps deployed in Santa Cruz County detected *Aedes aegypti* in 2014. Enhancing surveillance for *Aedes* spp. in this region is critical, given that local transmission of dengue has occurred across the border in Nogales, Sonora. Limited resources in Santa Cruz County have previously inhibited efforts to enhance mosquito surveillance¹. To broaden the reach of county surveillance, we implemented a community participatory project by engaging residents to conduct ovitrapping, a non-technical trap that attracts *Aedes* spp.²

Methods

Multiple strategies were employed to recruit community members to conduct the ovitrapping. Key groups approached included high school science clubs, International Baccalaureate programs, and senior citizen groups. During the sessions, program staff reviewed the project and the importance of enhancing *Aedes* spp. surveillance. Volunteers were instructed on the ovitrap use including how to make a hay infusion, put together the ovitrap, identify eggs, and store and transport specimens for identification. Protocols for ovitrapping were developed jointly by the BIDS program, the University of Arizona, and National Center for Atmospheric Research. Recruitment of participants began in March 2015. Traps were placed as individuals were recruited and data was collected on a weekly basis. Tracking of the frequency of reporting from the community participants was conducted. As samples were sent in, the county reported positive traps to the state and eggs were reared and identified to species. All trap locations were mapped and the presence of *Aedes* spp. was noted for each collection period.

Results

As of August 3, 2015 a total of 43 trapping sites were set and maintained by community members. These 43 sites supplemented 11 county-maintained sites, seven of which were housed at fire stations. Participants included community members from senior citizen groups (n=24), local high schools (n=12), and other local residents (n=7). The geographic trap distribution included 17 sites in the Nogales area closest to the border, two in the central Patagonia area, and 24 in the Tubac area approximately 25 miles north of the border. Traps were kept in participants' backyards. Of the 43 community participants,

72% (n=31) collected data systematically and according to the protocol. Participation rates varied among community members. While senior citizen groups had regular participation rates, a barrier to retaining high school participation was the overlap of summer vacation with the surveillance season.

Conclusions

By recruiting community members to maintain ovitraps, we tripled the county's surveillance capacity for *Aedes* spp. Citizen science projects are challenging, but strong protocols and an engaging educational component can harness community labor and gather baseline vector data within a county. Data acquired through this project will allow epidemiologists to anticipate and prevent possible outbreaks at the border.



Ovitrap distribution in Santa Cruz County

Keywords

aedes spp. surveillance; ovitraps; citizen science; mosquito

References

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