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Down Under and Back Again: The Florida Mosquito Control Association Personnel Exchange Program with the Mosquito Control Association of Australia

by Michael T Riles

Fighting Aedes aegypti in the California Desert

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Skeeter Wars: Autocidal Gravid Ovitraps for Vector Control

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From Where I Sit: Notes from the AMCA Technical Advisor

by Joe Conlon

About the Cover Mike Mueller, medical entomologist and mosquito control director of the Brisbane City Council, dips for Aedes vigilax larvae at Brisbane Salt Flats. Michael Riles, entomologist at Beach Mosquito Control District, Panama City, FL, spent a busy fortnight in Australia in February 2016, visiting mosquito control agencies across the continent, as part of a revived personnel exchange program between the Florida Mosquito Control Association and the Mosquito Control Association of Australia. Photo by Michael Riles.
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Stepping off the plane and onto the tarmac of the Brisbane International Airport was surreal. The bright, hot sun touched my face and the jetlag of the 14-hour flight from San Francisco to the location where I would advance my vocation finally settled in on my mind. I realized that this was actually real and I was standing on another continent across the other side of the planet to study mosquito control methodology the Aussie way. In Fall 2015 I was selected to represent the Florida Mosquito Control Association (FMCA) to rejuvenate the organization’s relationship with the Mosquito Control Association of Australia (MCAA) via a personnel exchange program once considered a staple for travel and knowledge during the 1990s. My charge was to collect information and experience the world of mosquito control in Australia. My travels during February 2016 took me to five coastal cities.

The mosquito species I identified were extremely different from the mosquitoes I am accustomed to identifying in the United States. The phenotypic expressions of colors, bands, scutal markings and integument shading were spectacular, new, and exciting for me. Darran Thomas, City of Gold Coast pest management research officer, and technician Jamie Gleadhill, who worked in the city’s entomology section, were highly engaging, not only in regard to what they had to offer, but also because they were interested in Florida mosquito control methods. We had many discussions on topics such as *Aedes albopictus, Ae japonicus*, container-inhabiting species, oviposition trapping, rearing mosquitoes, identification and sampling techniques, differences and similarities of arboviruses within both countries, and of course, beer and coffee. I spent time with technicians Matt Turner and Graham Wilson, touring the outlying saltmarsh islands of Gold Coast. Though basically dry, the islands provided a perspective on the large treatment zones required to control saltmarsh mosquitoes, as well as just how problematic *Ae vigilax*, a pestiferous saltmarsh species that harbors arbovirus, truly is to the area.

I had the opportunity to speak with the Gold Coast mayor during a media event about Zika virus and mosquito control, which was eye opening for me, as it was my first major media excursion where multiple TV, radio and newspapers were onsite. Multiple reporters asked me about Zika virus, *Ae aegypti* and my assessment...
of Gold Coast mosquito control methods (Council blitz 2016). I gave the program a five-star report based on their proactive approach to targeting container-inhabiting species with BG-Sentinel mosquito traps and ovitraps. I was able to share technology, like the John W Hock rotary trap for aerial surveillance and Map Vision®, our map-based real-time database system designed by Leading Edge Inc.

**BRISBANE, QUEENSLAND**

Mike Mueller, the medical entomologist and mosquito control director of the Brisbane City Council, was my host in Brisbane. Mike – and no offense to all the great folks that hosted me – was one of my favorite people in Australia! He had a sense of class that I had never experienced before. I was quickly swept up into his daily routine of hard work, great coffee, food, quality wine and delicious beer. His knowledge of taxonomy could have kept me busy for months if I only had the time to pick his brain, but alas, I had other opportunities to attend to, such as an aerial application of *Bacillus thuringiensis israelensis* (Bti) to the surrounding saltmarshes. *Aedes vigilax*, the bane of mosquito control in Australia, was present in great abundance here. The application involved 4 days of pre-treat surveillance, actual larvicide application, and post-treat surveillance. This was the one of the most amazing applications I had ever been a part of, truly a well-oiled machine perfected over time. Mike’s attention to detail, time tables for tidal surveillance and arrangement of McDermott Aviation for helicopter and pilot availability was awesome, and the 2-day application went off without a hitch. The level of professionalism I witnessed was amazing, and something I could set as a threshold for my own work ethic.

Mike made cookies from scratch and had hot Aussie coffee for everyone involved to boot, providing yet another standard I have set my sights on attaining.

Well, Brisbane wasn’t all coffee, cookies and Bti, as my tenure here was a blur of biosecurity surveillance, meeting with researchers, and fieldwork collecting traps and identification. There were a variety of topics covered, ranging from peridomestic surveillance, which was hot, since most surveillance in Australia is saltmarsh based, to the...
introduction of *Ae albopictus*, as well as the impact of source reduction and waste management. More specifically, we discussed how surveillance in Australia would change and the impacts *Ae albopictus* would have on councils and districts, not only on funding, but personnel and training as well. I noted the level of biosecurity they have in place at their seaports and airports, and was able to tag along with Ian from Brisbane City Council and Dallas from Queensland Health Hospital to inspect lethal ovitraps placed around and throughout Port of Brisbane, the city’s international seaport. The biosecurity team had tire and BG traps in place to monitor for invasive mosquitoes that may have survived disinsection treatments in shipping containers or ship hulls. I was thoroughly impressed with the measures taken to keep *Ae albopictus* out of the country. I was able to lend a hand and give constructive thoughts on trap placement and possible alternate *Ae albopictus* habitats. I also learned about FTA (fast technology for analysis of nucleic acids) cards, manufactured by Whatman International Ltd, another hot topic and tool used for arbovirus surveillance. The sugar-baited FTA cards are placed into light traps, collected weekly, and sent to state labs to test for the presence of arbovirus. I was sad to leave Brisbane, but experienced so much in a short amount of time, not only from a professional perspective, but also from a social perspective. Mike Mueller is truly a gem among entomologists!
TOWNSVILLE, QUEENSLAND

Each city I had visited so far had its own unique transition and Townsville, QLD did not disappoint! Townsville City Council vector control coordinator Darren Alsemgeest was my host and I was able to enjoy time with his family; he had two children in school, so the hustle and bustle around his home was bright and enjoyable. The heat and the sun were grueling in northern QLD and I had to keep up my sunscreen on an hourly basis! I did not spend too much time within the actual district, although I was able to perform inland saltmarsh inspections with Ian Goldsen, a Brit with a sense of class and great work ethic, who showed me around while we dipped multiple salt pools and found tons of larvae: once again, *Ae vigilax*.

Most of my time in Townsville was spent controlling dengue virus. Geoff Wilson, field trial manager, Eliminate Dengue Program, allowed me to join in on their daily routine and go out with two of their technicians to experience door-to-door dengue surveillance for the *Wolbachia*-strain release program. The program is based on community involvement using special release containers termed “Mozzie Boxes,” which contain eggs of *Wolbachia*-strain reared *Ae aegypti*; see [http://www.eliminatedengue.com/au](http://www.eliminatedengue.com/au). The team had set out over 200 BG traps to monitor urban mosquito species and I collected trap nets and subsequently identified *Ae aegypti* and *Ae notoscriptus*. The next day I met with state medical entomologist Scott Lyons of Queensland Health Hospital. The team’s objectives consisted of surveillance and control measures when dengue was present, and while peri-domestic surveillance for dengue was a state, rather than a district issue, the district would assist in the event of an epidemic. I participated in interior residual sprays (IRS) utilizing bifenthrin, targeting homes that had positive dengue virus cases. I helped conduct...
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exterior home inspections, looking for larvae and assisting the technicians on finding locations that could support container-inhabiting species. I also assisted with source reduction and the removal of larval habitats and generally enjoyed the day working hard with like-minded individuals. The process that they utilized for dengue control was an eye-opening experience for me. The design is simple and effective. State health employees perform IRS to all homes within a 100-yard circumference from any positive human dengue case, as well as source reduction and Townsville City Council mosquito control technicians perform source reduction within an additional 100-yard exterior buffer area. This past year was the lowest number of cases for dengue virus in Townsville, with a 90% reduction rate from previous years.

I attended state meetings for council and district surveillance issues, including a Zika information meeting where Townsville Public Health Unit physician Dr Stephen Donohue gave a lecture to health officials about Zika, its symptoms and testing procedures. I met with other public health professionals including Dr Morton Bell, a state epidemiologist; we discussed ticks, Rickettsia, Lyme disease, case studies and the broad brush usually used when thinking about tick surveillance, as well as the possible encroachment of Japanese encephalitis. I attended a state video conference call on Zika virus, peridomestic surveillance and how control strategies could be implemented. I also gave my first of many talks concerning digital mapping databases with professionals from 3-4 different groups within the Townsville public health infrastructure, and how control methods are performed at Beach Mosquito Control District (BMCD) in Panama City Beach, FL as well as many other Florida districts. I learned much about Townsville administrative procedures, as Darren introduced me to council administrators to discuss technologies, waste management and GIS.
management, source reduction and other variables concerning *Ae albopictus*, all efforts to prevent the gained establishment of this invasive mosquito in a community where dengue virus is endemic. On another note, Darren also introduced me to Bundaberg rum, a sweet dark rum distilled Aussie style. Thanks Darren!

**PERTH, WESTERN AUSTRALIA**

Dr. Peter Neville, the medical entomologist for all of Western Australia, was my host here in Perth, and what a host he was! He was a gracious and highly intelligent Aussie gentleman who had a love for good food, libation, music and, of course, public health. We got along famously and it felt like we already knew each other; hanging out with Peter in Perth was amazing. The state is separated into two sections for surveillance and control: northern WA uses sentinel chickens to survey for the presence of Murray Valley virus, which is endemic, and trapping *Culex annulirostris* is performed during the summer months; southern WA utilizes FTA cards and light traps targeting *Ae vigilax*. I missed out on the northern field trip and would strongly recommend anyone going to Australia to study mosquitoes to include this in their itinerary. My general focus was council visits in and around the vicinity of Perth, Bayswater and Mandura, WA.

My visit to Bayswater City Council was informative to say the least, where environmental health technical officer Don Sorensen and his technician Van gave me a primer on how they performed surveillance and control of *Ae vigilax*, utilizing methoprene, Bti and an ARGO. An ARGO is an all-terrain amphibious vehicle used throughout Australia; its tracks are considered environmentally favorable to salt-marshes, areas highly protected and regulated throughout the entire country. A granular spreader is mounted to the vehicle for applying larvicide, but the Council also uses a homemade methoprene slow-release system. Methoprene briquets are affixed to a piece of UV-resistant low-density polystyrene; an attached cable tie is placed over a bamboo stake placed in the ground, which permits each briquet to float up and down as tides come in and out, providing a residual effect over time for control. Systems like these are eye-opening, especially when you think about the control achieved versus time management, as Don had only himself and Van to cover the entire district.

![Figure 16: Darren Alsemgeest and the author having a blast at Wal-laman Falls in north Queensland.](image16.jpg)

![Figure 17: Queensland state public health meeting concerning Zika virus and domestic mosquito surveillance.](image17.jpg)

![Figure 18: Methoprene briquets are affixed to polystyrene, part of a slow-release delivery system used in Bayswater WA.](image18.jpg)
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My next stop was the City of Mandura, WA, where I had the awesome opportunity to meet Scott Severn, senior mosquito operations officer. Saltmarsh flats surround the territory and the Council has limited personnel to handle a wide area for control of *Ae. vigilax*. They are also challenged by random tides that are difficult to judge for proper control, a lack of mangroves in their salt flats, and Ross River virus, which is endemic in this area and can quickly rise to epidemic levels. We discussed the statistical modeling of the random tides in his area and how he is seeking knowledge from anyone available concerning this issue. We toured Lake Goegrup and the Creery Wetlands, salt flats dominated by dense stands of salt-tolerant plant species known collectively as samphire. Scott definitely has his hands full and the City of Mandura has the right man on the job.

Peter was mentoring Ram Lamichhane, a graduate student working on a master’s degree in Public Health and I was included in his project, a door-to-door survey on container-inhabiting mosquitoes. They both warned me that their success rate of acceptance into private dwellings was fairly low beforehand, but with my infectious smile it was easy to access the yards and we found many positive sites, giving Ram the edge he needed to finish his project on time. Peter told me later that they needed to have a poster of my smiling face on a pole when they went out, so people would let them in their yards! Ha, awesome!

Peter kept me fairly busy with meetings in most places we visited, and I had the opportunity to attend and speak at the quarterly Contiguous Local Authority Group meeting where 5 local council coordinators gave reports on the comings and goings of public health matters. Topics of conversation included citizen complaints, updates on tidal gauges, media opportunities, trapping coordination, and biosecurity and invasive mosquitoes.
Also discussed was a DNA study on larval exuvia of container-inhabiting species to determine the presence of invasive “mossies,” and the medical entomology database, a new innovative system being designed, part of the Western Australian Department of Health’s Atlas of Environmental Health.

I delivered a 2-hour talk on BMCD’s digital mapping database and general information on how we perform mosquito control in Panama City Beach. This meeting was very informative and gave me a window into administrative discussion on public health topics of interest.

SYDNEY, NEW SOUTH WALES

My stay in Sydney was short compared to my other 7-day intervals in other cities during my journey. Time was short and Dr Cameron Webb, hospital scientist (Westmead Hospital) and clinical lecturer (University of Sydney), was a very busy man. Showing me the Aussie attitude towards hospitality, he still made time for a visit to his lab and to sites in and around Sydney’s Olympic Park. The Park is a special tax district funded by car parks and parking meter fees in and around the Olympic village, which is surrounded by saltmarsh and mangroves. We discussed aerial applications in this area and the encroachment of domestic and commercial properties, requiring helicopters to keep a certain distance from dwellings when treating areas within the park. They are testing applications by drones to correct the issue, and also considering replacing helicopters entirely with smaller vehicles such as drones. I had the opportunity to visit Cameron’s lab and observe the hustle and bustle of the morning duties, as all lab technicians were fairly busy. Field collected sugar-baited FTA cards were delivered, mosquitoes were identified (which I had a hand in) and general discussions of the daily routine occurred throughout the lab. He gave me a tour of his insectary, where we...
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discussed pesticide resistance, blood meal analysis, mosquito species and taxonomy. I appreciate Cameron taking time out of his very busy schedule to accommodate me on my visit and I wish I had more time to hang out; though the lunch of burgers, beer and *Ae albopictus* was greatly appreciated!

Well, in conclusion, I will say this: I worked my tail off. I deserved a much-needed break and took a walking tour of Sydney. I started out with a water taxi and enjoyed the outskirts of the city where I entered from the river. I walked though Old Town, enjoyed good beer, great coffee and the general electricity that comes from an international city. There is a diverse culture in Sydney and I only saw a very small amount of it. I hope at some point I can return and dive into Sydney in the proper way.

The FMCA-MCAA personnel exchange program was a great opportunity and once-in-a-lifetime event. I was honored to accept the responsibility to represent FMCA in this manner and launched into Aussie methodologies with unmatched fervor. I feel I represented Florida mosquito control, and all the dedicated technicians employed within the Association, by working as hard as I could, asking questions, giving and taking advice, sweating and busting my butt, all to show the Aussies that we work hard and are energized about public health control strategies as much as they are.

REPRESENTATION CITED


**Note:** A substantial portion of this paper previously appeared in *Mosquito Bites* magazine (Riles 2016), an official publication of MCAA.

**Figure 25:** Cameron Webb surveys the mangroves at Sydney Olympic Park NSW.

**Figure 26:** The author and off-shore kite boarders, along a beach on the Indian Ocean.

**Figure 27:** The author enjoys a pint of beer in Old Town Sydney on his last day in Australia.

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Although invasive Aedes mosquitoes were discovered in California in 2011, the mosquitoes were not found in the Coachella Valley until May 9, 2016. During the winter of 2015-2016, the managers and supervisors at the Coachella Valley Mosquito and Vector Control District (VCD) spent time asking other mosquito and vector control districts about their Aedes programs. Staff from Greater Los Angeles County VCD, San Gabriel Valley Mosquito VCD, Consolidated Mosquito Abatement District, San Mateo Mosquito VCD, and Delta VCD each provided us with information on how their programs were set up, how data were collected, and what had and had not worked in their areas. Using this information, Coachella Valley Mosquito VCD (the District) drafted an Invasive Mosquito Species Response Plan. The District is partially geographically isolated from other districts, with the San Jacinto and Santa Rosa Mountains to the west, the Little San Bernardino Mountains to the north and east, and the Salton Sea to the southeast; see Figure 1. This isolation led the managers and supervisors to believe it might be possible to eradicate invasive mosquitoes from the District jurisdiction if they were detected.

On May 9, 2016 Aedes aegypti were detected at a residence in Coachella after one of the District’s technicians requested an inspection for their home following a training for staff regarding invasive mosquitoes. The District distributed door hangers in the immediate area to alert residents to the presence of Ae aegypti and to inform them that staff would be coming by to conduct an inspection of their property; see Figure 2. Two-person teams were deployed to each residence. After gaining permission from the property owner or resident, the team began examining the property from opposite ends, looking for any potential larval sources. The team would then record their findings, discuss them with the resident, and make an appropriate treatment. Barrier applications were made to vegetation and items, provided that they were not food plants. Applications were made initially with a mix of Demand® CS (lambda-cyhalothrin) and VectoBac® WDG (Bti), and later with Onslaught® (esfenvalerate) and NyGuard® (pyriproxyfen).

District surveillance staff used BG-Sentinel and CO2 traps to monitor the adult mosquito population. The BG traps were modified slightly, in that a piece of Velcro® was glued to the top of the trap; see Figure 3. Velcro was also placed on the shipping containers that the District used for dry ice for its regular CO2 traps, so that the shipping container could be attached directly to the BG trap. We have not found a difference in the numbers of mosquitoes caught between the two types of traps, but this could be because of the low numbers of mosquitoes in the area.

Despite our door-to-door inspections and treatments, we continued...
to find *Ae aegypti* larvae and adults, and conducted adulticide applications with a truck-mounted ultra-low volume (ULV) fogger. Applications were made with either Duet™ (prallethrin, sumithrin and PBO) or Scourge® 18+54 (resmethrin and PBO) in the early morning. Applications were conducted just before dawn because our sequential trapping showed mosquito activity during this time and there was minimal human activity, which we had hoped would allow for us to make applications with the fewest interruptions. We evaluated the efficacy of the applications by placing caged 3-day old adult *Culex quinquefasciatus* in the front and back yards at houses.

We found the best control in the front yard of the house on the downwind side and did see some control in the back yard of that house and in the back yard of the house behind it. Not surprisingly, mosquito mortality was lowest in the front yard of the house on the upwind side, as it received the least amount of the spray.

We discovered that the area where *Ae aegypti* mosquitoes were located encompassed nearly 800 acres, and decided that the appropriate treatment method was an aerial larvicide application using VectoBac WDG. For this, we consulted with Valent BioSciences on how applications were made for other areas. We determined we could make the application using our contracted pilot at Salton Sea Air Service with a Hiller 12E helicopter equipped with 2 Micronair AU 6935 electric ULV atomizers and 2 Micronair AU 7000 propeller-driven ULV atomizers. We worked with the Federal Aviation Administration (FAA) and Salton Sea Air Service to file a Congested Area Flight Plan (CAFP) to make the application. The CAFP required that we provide information on the aircraft, the pilot, the application conditions, and our plan for emergency response. We also provided them with plan for notifying the public.

Prior to our application on June 30, 2016, we submitted a press release that was distributed to our local television news stations, radio stations, and newspapers. Flyers were distributed to each residence within the spray block. Notification of the operation was also sent to city officials; county health, agriculture, police, and fire departments; state and federally elected officials; a local school board; and residents and agencies who have subscribed to an...
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electronic notification mailing list. The larvicide application was also posted on the Mosquito Control Activities page of the District website, www.cvmvcd.org/controlactivities.htm.

In an effort to be transparent and educate the public about our work to control this mosquito, we set up a staging area for members of the media to view and record the application; see Figure 4. The staging area was set up east of the application zone so that the sun was behind the cameras during the spray operation, offering the best visuals for the media. Desert and city officials were also on site for interviews to explain the operation. Two local television crews attended the event, providing live coverage, and stories ran on five stations throughout the day. The result was positive and factual stories about the aerial application. The District received less than a half dozen calls from residents in the area asking about the application. All of those who called confirmed that they had received the flyer notifying them of the operation and many had heard about it on the news.

Initially, applications were made to a 100 acre section of the city to ensure success. We selected 20 residences within the spray block and 5 outside of the area as our evaluation sites. At each residence, a plastic cup was placed in one of four habitats – 0%, 25%, 50%, and 100% vegetation coverage. The placement of these cups was meant to allow us to see if the product would drift into hidden, hard-to-treat areas in residents’ yards; see Figure 5. One hour after application the lids were placed on the cups, which were picked up and returned to the lab. The exterior of the cups were washed to ensure no residual product was on the outside; then approximately 100 ml water and 15 third-instar Cx quinquefasciatus larvae were added, and the mosquitoes were fed. Mosquito mortality was first observed four hours later; we inspected the cups at 4, 24, and 48 hours after larvae were added to the cups. At 48 hours, cups placed in the open area (0% coverage) had the highest larval mortality, approximately 90%, while cups placed in the hard-to-reach areas (100% coverage) had 72% mortality. A second application was made to the 100 acre section on July 7, 2016, and mortality ranged from 90% in the hard-to-reach areas to 99% in the open areas.
With some success under our belts, we expanded the application area to the entire 800 acre area where we had found or suspected that *Ae aegypti* were present. We re-notified everyone using the above tactics with one change: we modified our flyer to inform residents that the applications would be made for several weeks. Applications were scheduled weekly for the first four weeks, and then every other week. Because of the size of the area, we initially split the application area into two zones. Fifteen residences within each application area were selected as evaluation sites, while the untreated control area was moved to the District to ensure that it would be far enough outside of the application area. After initial applications on July 21-22 and July 28-29, applications were conducted August 5 and 12, and then on August 27 and September 10 and 24.

At the time of this writing, applications were scheduled to take place every two weeks through mid-November 2016. Each application cost the District $21,000 in larvicide and helicopter time, or about $24.75 per acre.

While we continued examining product efficacy using the cups, we also continued setting traps for adult mosquitoes in the area. At the time this was written, *Ae aegypti* had not been detected in the area of concern for 7 weeks; see Figure 6. Since then, inspections and traps have not turned up any living *Ae aegypti*. On a Saturday following the August 5 aerial treatment, one of our teams was able to convince a resident that they needed to inspect her backyard. She had over 20 buckets of standing water, and in those buckets were dead *Aedes* and *Culex* larvae – not a single living larva was found.

We have continued to monitor for *Ae aegypti* throughout our District since beginning our aerial larvicide campaign. We have detected the species within another one of our cities, and are currently working to control them there. As the current distribution is small, we have not yet moved to aerial larvicide there, but are working to prepare to do that if necessary. The use of aerial larvicide is an important tool to consider; however, it takes time to prepare the FAA CAFP and to discuss plans with stakeholders, in order to ensure their support of our efforts. It was 53 days from our initial detection to our initial flight, and to get to that point took a lot of dedicated, focused work by our team. We believe that if we are to break the transmission cycle of *Aedes*-borne arboviruses in the Coachella Valley, aerial larviciding is an important tool in our Integrated Vector Management arsenal.

**ACKNOWLEDGMENTS**

The author thanks her colleagues for their dedication to this work. This project would not have been possible without the support of the District’s Board of Trustees. The author thanks the rest of the Coachella Valley Mosquito VCD staff, in particular Jeremy Wittie, Rod Chamberlain, Jill Oviatt, Ed Prendez, Mike Martinez, Olde Avalos, Bobbye Dieckmann, Greg White, Chris Cavanaugh, Gaby Perezchica-Harvey, Gerald Chuzel, Melissa Snelling, Art Gutierrez, Marc Kensington, Mike Esparza, Charles Rodriguez, Jazmin Valop, Alan Montenegro, and Tony Molina. The District received funding from the US Centers for Disease Control and Prevention for one application of VectoBac WDG. We also thank the Valent BioSciences team for their support, in particular Peter DeChant, Banu Kesavaraju, and Stephanie Whitman. Thank you also to Dino Candito from Adapco.

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![Figure 6: Average number of mosquitoes captured per trap by week within the 800 acre treatment area.](image-url)
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Skeeter Wars: Autocidal Gravid Ovitrap for Vector Control
by Alyssa Branca

In May 2016 the US Centers for Disease Control and Prevention (CDC) published results of a serosurvey, reporting that the use of the Autocidal Gravid Ovitrap (AGO) not only reduced the *Aedes aegypti* population density by 80%, but also decreased chikungunya infections by 50% (Lorenzi et al 2016); see Figure 1. This was the first long-term epidemiological study of the use of ovitraps as a vector control strategy on their own. These results suggest that similar deployments of the AGO could help control Zika and dengue, since *Ae aegypti* also vectors these viral diseases as well.

The CDC set up field trials specifically to test the AGO’s efficacy as a stand-alone vector control method. While the CDC made an effort to reduce larval sites by emptying containers and larviciding and oiviciding in the study locations, no adulticiding took place before or during the studies (Barrera et al 2014a; Barrera et al 2014b). The initial study commenced in 2011 with monitoring adult mosquito populations in La Margarita and Villodas, Puerto Rico, using modified BG-Sentinel traps (Biogents AG, Regensburg, Germany) (Barrera et al 2014a). After a nine-week monitoring study to establish a baseline for comparison between the two communities, AGOs were deployed in La Margarita, while Villodas served as the untreated reference (control). Following a one-year intervention, the average density of female *Ae aegypti* was reduced by 70% compared to the reference area. In 2013, Villodas received AGOs, and two new reference communities, Arboleda and Playa, were established (Barrera et al 2014b). Sentinel AGOs were used throughout the reference and intervention (treatment) communities to monitor adult mosquito populations. Similarly, this study demonstrated the AGO was capable of controlling *Ae aegypti*. Mosquito density decreased by 79% in the new AGO intervention area, Villodas, compared to the reference area one year after this second intervention, and mosquito density in the original intervention area, La Margarita, remained suppressed.

**OVITRAPS AND VECTOR CONTROL**

There has long been a quest for the holy grail of ovitraps — so why is the AGO the first to be linked with both entomological and epidemiological control of *Ae aegypti* over a long term? Ovitraps have been suggested as a means of monitoring *Aedes* species as early as the mid-1960s, with the creation of the CDC ovitrap (Fay and Eliason 1966). Within a few years, modified versions were being tested as a method of *Aedes* population control in Singapore and the US (Chan et al 1977; Cheng et al 1982). A renaissance for lethal ovitraps began in the late 1990s, and by the early 2000s, multiple lethal ovitrap variations existed; see Table 1. Tailored to different mosquito species and locations, many researchers tested ovitraps have shown varying degrees of success as a vector control method. Still, the ideal ovitrap for controlling mosquitoes remained elusive. This trap would effectively reduce the adult mosquito population, prevent the next generation from developing into adults, be inexpensive enough to compete with more traditional vector control treatments, and require minimal maintenance. Most lethal ovitraps meet the first two criteria, but the latter two criteria have been harder to attain.

High cost is the crux of the problem. A large number of traps may be handmade for field studies, but when it comes to the numbers needed for vector control in a widespread area, the handcrafted approach is not tenable. Neither ordering thousands of handmade ovitraps nor having personnel construct them is as cost-effective as applying adulticides or larvicides, even though those products may not be able to reach and control mosquitoes that hide in protected spots under decks and inside houses. Even if the initial purchase is affordable, the field maintenance required for thousands of ovitraps can drive the cost sky-high. New personnel may be required, or existing personnel may have to refocus their activities, potentially to the detriment of other projects. Additionally, the ovitrap mode of action can add to the cost. Traps using pesticides can be more effective at vector control than pesticide-free traps, but insecticides can be expensive. Moreover, pesticide resistance is a very real threat when using an insecticide, and both the labor and processing associated with rigorous insecticide resistance monitoring will increase the overall costs of the program.
The CDC’s AGO circumvents the issue of insecticide resistance by relying on a sticky glue board to capture female mosquitoes. The original, handmade design successfully controlled *Ae aegypti* populations in the field with minimal maintenance requirements; users had to replace the glue board and the attractant infusion only once every two months. One final hurdle, however, had to be overcome: to deploy the trap in sufficient numbers for vector control, it had to be able to be mass-manufactured at an affordable cost.

**DEVELOPMENT OF THE AGO FOR MASS-MANUFACTURE**

In July 2015, the CDC partnered with SpringStar® Inc, a Seattle-based manufacturer of arthropod traps, to begin development of a mass-producible version of the AGO. A successful trap design requires three components: it must be attractive to mosquitoes, easy to manufacture, and user friendly. Initial development efforts entailed making a 3-D design of the hand-built ovitrap; see Figure 2. The 3-D model allowed SpringStar to identify components that needed reworking for mass production and to create new designs for each of those components.

The model also informed both the method of production and materials for construction. SpringStar worked with consultants in academia and

<table>
<thead>
<tr>
<th>Ovitrap name</th>
<th>Lethal mechanism</th>
<th>Study location</th>
<th>Study period</th>
<th>Authors</th>
<th>Year</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified AO</td>
<td>Screen</td>
<td>USA Houston, TX</td>
<td>1 year</td>
<td>M Cheng <em>et al</em></td>
<td>1982</td>
<td>Bull World Health Organ 60(2): 291-96</td>
</tr>
<tr>
<td>Lethal ovitrap (LO)</td>
<td>Deltamethrin</td>
<td>Brazil</td>
<td>3 months</td>
<td>Perich <em>et al</em></td>
<td>2003</td>
<td>Med Vet Entomol 17: 205-10</td>
</tr>
<tr>
<td>1.2 L bucket LO</td>
<td>Sticky or bifenthrin</td>
<td>Australia</td>
<td>1 month</td>
<td>Montgomery <em>et al</em></td>
<td>2005</td>
<td>Arbovirus Res Aust 9: 268-73</td>
</tr>
<tr>
<td>LO</td>
<td>Deltamethrin</td>
<td>Colombia</td>
<td>2 years</td>
<td>Ocampo <em>et al</em></td>
<td>2009</td>
<td>Biomédica 29(2): 282-97</td>
</tr>
<tr>
<td>Modified LO</td>
<td>Deltamethrin</td>
<td>Pakistan</td>
<td>2.5 months</td>
<td>Jahan <em>et al</em></td>
<td>2011</td>
<td>Biologia (Pakistan) 57(1&amp;2): 7-13</td>
</tr>
<tr>
<td>BG-Sentinel trap</td>
<td>Suction</td>
<td>Brazil</td>
<td>17 months</td>
<td>Degener <em>et al</em></td>
<td>2014</td>
<td>J Med Entomol 51(2): 408-20</td>
</tr>
<tr>
<td>MosquiTRAP</td>
<td>Sticky, Bti</td>
<td>Brazil</td>
<td>17 months</td>
<td>Degener <em>et al</em></td>
<td>2015</td>
<td>Mem Inst Oswaldo Cruz 110(4): 517-27</td>
</tr>
</tbody>
</table>

Table 1: A brief history of ovitraps field-tested use for vector control use, in chronological order of publication.
industry to select the best materials and techniques. The various methods of mass-producing plastic devices, such as blow molding, injection molding, and vacuum forming, are each optimal for different design types. Similarly, some plastics may work in one method of production but not another, and all vary in rigidity and durability. For the AGO, we opted for injection-molded high density polyethylene (HDPE). This plastic is resistant to cracking under prolonged exposure to hot, humid field conditions, and because it is less flexible than other common plastics, it can be used with tighter tolerances, an important factor considering *Ae aegypti* can fit through very small holes.

Concurrently, design changes were tested to ensure that the manufactured version was as good as or better than the hand-built version. We “asked the bugs if they liked it” by testing each iteration in laboratory and outdoor cage trials with adult *Ae aegypti*, in collaboration with our research partners at Tulane University. If the bioassays showed that mosquitoes were less attracted to the new design, we rolled back the change and continued redesigning. Once a feature was approved, our consultants evaluated the design for ease of manufacture, and suggested modifications. Anything that could not be mass produced was redesigned and retested.

Following the mosquito bioassays, SpringStar assessed the trap components for ease of use by field personnel. If components were both attractive to mosquitoes and moldable, we selected the most user-friendly option, based on feedback from both field researchers and people unfamiliar with the trap. These reviewers were of various nationalities and languages, and provided helpful feedback on the clarity of the simple visual instructions on the trap. Any markings showing how to assemble the trap needed to be as clear as possible, no matter the user’s native tongue.

Ultimately, all the components were approved by mosquitoes, manufacturing experts and potential users, and field-tested by CDC entomologists; see Figure 3. The focus then became the production cost: the cost of the mold, price per part molded, and lifetime of the mold itself. Steel molds last an extremely long time but are more expensive to produce, while aluminum molds are cheaper but lose definition faster and need maintenance or replacement sooner. There may also be a set-up fee for the mold, and as the cost of the raw plastic varies with supply, so the true price per part can be somewhat nebulous. Shipping also comes into play, especially when the item occupies a large volume of space like the AGO, as shipping costs increase with volume. The final thing we considered was the turnaround time; in general, expenses increase as time decreases from the initial mold order to parts rolling off the line.

SpringStar took a multiphase approach to AGO production. Prototypes of the capture chamber were 3-D printed for lab and semi-field assays, and for early field trials, we outsourced the initial injection molding to a company that specializes in small runs of parts. Following successful field tests, we increased our production capacity by commissioning a multiple chamber mold, which rapidly produces large numbers of parts. To reduce shipping costs, we contracted with local manufacturers to minimize the distance between where the AGOs are produced and where they will be deployed.

**CONCLUSION**

The process of refining an ovitrap from a research prototype to a commercial product is lengthy and complicated, even when there are no pesticides involved. After multiple years of research and development, the commercial version of the AGO is just making its debut into the world. Thousands of AGOs are currently being deployed to
New Jersey Mosquito Control Association

calls for papers for the 104th Annual Meeting

“Women in Mosquito Control”

March 15 - 17, 2017

Bally’s Hotel, Atlantic City

www.njmca.org/convention
help control the Zika virus outbreak in Puerto Rico. However, with commercial goods, the design process is never complete, and new features may be incorporated based on further field study results. The design might be modified to ship more efficiently, look sleeker, or otherwise meet marketing demands – as long as those changes are mosquito approved, of course. The AGO's commercialization process demonstrates why so few ovitraps have successfully made the jump from the research world to the consumer market, for to produce a low cost ovitrap for a wide audience, significant investments of time and money are required.

ACKNOWLEDGMENTS

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REFERENCES CITED


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From where I sit... The emergence and rapid spread of Zika virus in the western hemisphere earlier this year prompted the American Mosquito Control Association (AMCA) president, Dr Stan Cope to organize a Zika Task Force, comprised of a number of recognized mosquito control experts to serve as a cadre uniquely positioned to meet the needs of a public health community under pressure to address the epidemiological anomaly of Zika virus. To set the table for their active participation, at the direction of the AMCA Board, I penned a letter to Dr Thomas Frieden, Director of the US Centers for Disease Control and Prevention (CDC), requesting funding in the amount of $1.75 million for a national training and certification program in the control of peridomestic mosquitoes.

I also requested $2 million for a national public education effort along the line of the "buckle up for safety" seat belt, “only you can prevent forest fires” Smoky the Bear, and “don’t be a litterbug” campaigns - but in this case directed toward making it socially unacceptable for citizens to be producing peridomestic mosquitoes on their premises. Although the CDC saw merit in the proposal, they felt that it should be implemented as a federal-level initiative, being far beyond the public relations capabilities of AMCA to implement.

Additionally, I requested $1.25 million for research into operational surveillance and control for container-inhabiting Aedes (Stegomyia). In particular, the request encompassed the purchase, distribution, field efficacy validation and data collection for: lethal ovitraps/autodissemination stations, attractive toxic sugar baits, attractants/pheromones “spatial repellents”/vapor phase bite protection, and genetic manipulation of mosquitoes: sterile insect technique (SIT), release of insects with a dominant lethal gene (RIDL), or Wolbachia-infected males. This was also deemed more appropriately funded through other federal channels.

The rationale I used in the funding requests rested on a cognizance of the federal commitment to ensuring the health of its citizenry and subsequent treatment for victims of mosquito-borne disease. In addition, I emphasized that keeping mosquito-borne disease outbreaks to a minimum would save enormous health care costs, often in the millions of dollars per case. Furthermore, establishing sustainable training and research programs for vector-borne disease surveillance and control would ensure a robust capacity to identify and contain outbreaks of Zika and other arthropod-borne viruses yet to reach our shores. The inclusion of “other” was intended to emphasize the need to look beyond Zika and provide training for the prevention and control of a wider spectrum of mosquito-borne diseases such as Mayaro, Oropouche, O’nyong-nyong, Rift Valley Fever, and countless other arboviruses not yet discovered that will eventually reach our shores through travel, trade and tourism. These diseases can exert enormous impacts on the federal tax benefits to be accrued through tourism and trade. These impacts, in turn, may profoundly influence the comity of our government’s relations with countries suffering economic stresses from decreases in tourism and trade due to these diseases.

Evidently, Dr Frieden was convinced enough to direct CDC to offer a contract to AMCA for $1.6 million in Fiscal Year 2017, with the potential to award an additional $1.2 million in FY 18.

Bill Schankel, AMCA Executive Director, did an incredible job working through some very delicate negotiations with CDC contract personnel. Indeed, this evolution broke new ground for both organizations and AMCA learned a great deal about both the federal contracting process and the diligence with which CDC shepherds federal resources. Kudos to Bill for a job well done! Dr Isik Unlu, chosen to spearhead this training initiative, spent an enormous amount of time identifying strategies and training resources to be brought to bear and is due a massive amount of credit.

The contract specifies that AMCA develop and deploy a targeted mosquito surveillance and control training program using Best Management Practices for Integrated Mosquito Management modified to address peridomestic mosquitoes in US state and protectorate institutions responsible for conducting mosquito control. In fulfillment of the contract particulars, AMCA was assigned these 6 tasks:

— TASK 1 —

The first task was to establish a Panel of Experts. In developing this program, AMCA has engaged nine geographically diverse, nationally recognized experts from academic institutions, government agencies and highly effective mosquito abatement districts.

The subject matter experts accepting the challenge are:

Chris Barker, Associate Adjunct Professor, Department of Pathology, Microbiology & Immunology, UC Davis School of Veterinary Medicine, Davis, CA;
Roxanne Connelly, Professor, University of Florida, Florida Medical Entomology Laboratory, Vero Beach, FL;

Mustapha Debboun, Director, Mosquito and Vector Control Division, Harris County Public Health, Houston, TX;

Kenn K Fujioka, Manager, San Gabriel Valley Mosquito and Vector Control District, West Covina, CA;

Christopher Lesser, Assistant Director, Manatee County Mosquito Control District, Palmetto, FL;

Sarah R Michaels, Entomologist, New Orleans Mosquito, Termite and Rodent Control Board, New Orleans, LA;

Kirk Smith, Laboratory Supervisor, Vector Control Division, Maricopa County Environmental Services, Phoenix, AZ;

Isik Unlu, Superintendent, Mercer County Mosquito Control, Trenton, NJ; and

Graham White, Visiting Scientist, Mosquito and Fly Research Unit, USDA Center for Medical, Agricultural and Veterinary Entomology, Gainesville, FL.

— TASK 2 —

Using expert panel recommendations on best industry practices for effective control of mosquito borne arboviruses of public health importance, develop a student training manual and train-the-trainer (TTT) classroom workshop materials for delivery in high-risk areas.

To assist in this, AMCA has assigned a professional instructional system designer to work with the expert panel to obtain background information on the target audience characteristics and “real life” examples of the best industry practices to develop a greater knowledge of the training needs and enhance that training. To this end, AMCA, in conjunction with the instructional system designer, will create a course “Plan of Instruction” (POI). The POI provides the description of the intended training. It will include the course goals and objectives, overall course design, schedule, and description of the content and instructional methodology for each of the major content areas. The POI will also describe the process for evaluating the performance of the course participants.

— TASK 3 —

Develop and deliver comprehensive, interactive TTT workshops in geographically diverse locations (approximately 10 locations, with an estimate of 50 to 75 participants per site) throughout the United States to ensure a national scope to the TTT workshops.

— TASK 4 —

Develop and deliver comprehensive web-based training materials, a reference manual, and certification testing in Best Management Practices for Integrated Mosquito Management with emphasis on practices to control *Ae aegypti* and *Ae albopictus* in addition to insecticide resistance testing.

— TASK 5 —

Develop a knowledge-based testing program and certification process to evaluate primary participant knowledge showing that the participant has satisfactorily completed the training and is deemed to have high competency in best management practices in integrated mosquito control.

— TASK 6 —

Evaluate TTT training effectiveness.

Daunting tasks, indeed. The panel of 9 experts will develop the student training manuals and TTT classroom workshops for delivery at 10 hubs throughout the United States in areas with high-risk for Zika transmission and other areas with potential for mosquito-borne disease transmission. In addition, the AMCA team will develop and deliver a comprehensive web-based training course, reference manual and certification test.

There is an enormous amount of work to be done to bring this vital initiative to a successful fruition. Much will depend on the cooperation of district managers and others whose resources may be called into play. This may be our only opportunity to formulate a lasting legacy to our fellow citizens. Let’s make the most of it, for I feel it is most unlikely to occur again in the foreseeable future. But, make no mistake, the ultimate effects of this training will save lives – it’s that important.

CDC has recognized the considerable expertise that AMCA, as the world’s premier vector control community, brings to the table and has taken the initiative to fund this training for mosquito control professionals that will further protect public health far into the future. They are certainly to be congratulated on their commitment to our citizenry’s health. This critical initiative will go a long way toward raising the capability of mosquito control on a national scale to successfully meet current and future disease threats and protect the public health.
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