



SOVE

Society for Vector Ecology

SOVE Newsletter

President's Message



Lyle R. Petersen, MD, MPH

Dear SOVE members,

This has been an amazing and very challenging year for so many of us. I know many of you were disappointed that we did not get to connect at the 2020 SOVE Conference, which was cancelled due to COVID-19. Although the pandemic has put many SOVE activities on hold this year, we are eager to resume connecting at conferences and other in-person events and we would value your input on how to do this better. In this era of social distancing, we continue to explore other ways to enhance our network and foster connections. We hope you enjoy our quarterly newsletters with updates from the SOVE regions as other email communications.

Despite COVID-19, 2020 has been eventful for SOVE. We were able to successfully transition the executive directorship from Major Dhillon to

Michelle Brown. This was a huge step as Major has been a driving force behind SOVE for many years. Another milestone was the very generous gift of \$50,000 from Mir Mulla, which sponsors a named lecture at the SOVE annual meeting. With considerable input from Major and Lal Mian, we were able to completely overhaul the SOVE website, giving it a whole new look and increasing its functionality. We also conducted the first ever SOVE membership survey, whose results have helped the SOVE Board's future planning while considering the sentiment of the entire SOVE membership. Another first resulting from COVID-19 is the SOVE Board videoconference meetings. A Board subcommittee has been meeting regularly to update SOVE's by-laws, an unexciting but vital task necessary for SOVE's continued development as an organization. —**President's message** *cont'd on p. 11*

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NORTH CENTRAL US

Nicole Achee

Regional Director

Dear Colleagues and Friends,

First, and perhaps most important – I will open with a repeat statement from the previous newsletter in hoping all of you, your friends and family are continuing to stay healthy during the COVID19 pandemic.

I'll recap the 2020 mosquito- and tick-borne disease surveillance data reported to the Centers for Disease Control (CDC) in the Spring, but as of October 2020, a total of 9 confirmed cases of eastern equine encephalitis (EEE) have been reported, of which 5 cases were from our Regional states: Michigan-2, Wisconsin-2, and Indiana-1. We can also expect cases of St. Luis encephalitis (SLE), La Crosse and West Nile viruses, as well as Lyme Disease. For more information, and to access all graphics and educational material at your leisure, visit: <https://www.cdc.gov>.

Our Region is now in full winter swing, but forecasts for the upcoming 2021 tick season indicate a potential for increased risk of Lyme disease [Kansas City Star, Jul 2020] – Why? 2020 was a 'huge acorn year' according to Richard Ostfeld of the Cary Institute of Ecosystems Studies. The abundance of acorns may enhance survival and propagation of rodents and deer that depend on this food source and serve as hosts for ticks (read full story at <https://www.caryinstitute.org>).



Do your part now to bring awareness to your family, friends and community on how to protect themselves from mosquito and tick exposure this coming Spring, especially as we can expect COVID-19 to continue next year and our national health authorities to encourage outdoor activities where social distancing can be more easily maintained.

Also related to COVID-19, perhaps someone has asked you if mosquitoes or ticks can spread the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) – a great question in fact. At this time, the CDC has no data to suggest the coronavirus responsible for the 2020 pandemic is transmitted through this mechanism, but encourage those you know to reach out with such questions, we can all contribute to educating others about arthropod-borne diseases (see <https://www.nature.com/articles/s41598-020-68882-7>).

I hope you find the additional highlights below from our Regional family informative. Have a safe and wonderful holiday season, looking forward to seeing everyone in 2021!

In Memoriam and Retirements from our Region, Daniel Strickman passed away October 28, 2020 at age 67, succumbing to cancer after a 7-month fight. Dan's impressive career spanned across military, academia and non-governmental organizations. Although his connection to our Region was minimal (studying under Dr. William Horsfall for his master's and Ph.D. at University of Illinois at Urbana-Champaign) Dan's leadership and long-standing dedication to the field of entomology and mentorship was far-reaching. We extend our condolences to Dan's family and friends, he will be missed. Please visit the InMemori webpage for Dan, where you can post and view others' photos, tributes and memories.

Please reach out to share notable passings and retirements from our Region so I can acknowledge in upcoming newsletters!

—————**Nicole** cont'd on p. 11



Steve Presley

Regional Report

SOUTH CENTRAL USA

Steve Presley

Regional Director

Dear Colleagues,

Is it really, finally December of 2020? Since SARS-CoV-2 fully established itself across the U.S. in March of 2020, I have contemplated whether we were in a temporal loop repeating the same day over and over, or was time really progressing. Even though COVID-19 new case numbers are skyrocketing across the U.S., especially in a few of the South Central Region states with incidence rates of >5% and case fatality rates >2%, it is somehow reassuring to know that January 2021 is just days away.

I ask your indulgence as I realize that everyone is tired of hearing, reading and thinking about the COVID-19 pandemic. Along with its anxiety-inducing effects associated with adapting to teaching/learning and meeting virtually, wearing a mask in public, and numerous other inconveniences, there are some interesting unanticipated effects related to vector-borne diseases of public health concern.

Although not vectored by arthropods, the COVID-19 pandemic has significantly influenced both the potential for human infection with pathogens that cause Lyme disease, Powassan, St. Louis encephalitis, and West Nile fever/neuro-invasive disease. The pandemic has also affected the capacity of local public health vector control agencies to conduct surveillance and control operations. During the extended self-isolation/"lock-down" periods many people were at home and

spent more time outdoors in their yards gardening, exercising, recreating, or just relaxing. The increased amount of time spent outdoors also increased their likelihood of being bitten by infective arthropods – at least intuitively. As COVID-19 incidence rates increased dramatically in many communities through the summer and early fall, public health vector control resources (i.e., personnel and funding) were diverted to support pandemic response efforts. This diversion of resources in many areas, particularly rural communities, resulted generally in a reduced focus on the surveillance for and control of vector-borne diseases.

Interestingly the number of vector-borne disease cases reported across the U.S. during 2020 has not been greater than during previous years, there has actually been fewer reported cases. Whether that is due to people more vigilantly using insect repellants and more closely adhering to the Four D's to avoid mosquitoes, or because those public health vector surveillance and control resources that remained on the job were highly effective in their efforts. I like to think it is the latter.

As we move forward into 2021 let us remember our colleagues and friends that our Society for Vector Ecology lost during 2020, and remain vigilant in our efforts to better understand the ecology and biology of arthropod vectors of disease-causing pathogens and the means to control them. Best wishes for a happy 2021.

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SOUTHWESTERN USA

Lal S. Mian

Regional Director

ported 10 cases of WNV (down from 174 with 19 deaths in 2019), 1 chikungunya, 5 dengue, 6 SLE, 12 malaria, 4 Lyme disease, 23 Rocky Mountain spotted fever, 1 tularemia, and 1 babesiosis. The New Mexico Health Department (nmhealth.org) in 2020 reported 1 case each of dengue, WNV, bubonic plague, septicemic plague (fatal) and Hantavirus human case plus 3 animal cases (1 cat, 2 dogs). According to the Nevada Department of Health and Human Services (dhhs.nv.org), there were 2 cases of dengue, 2 SLE and 46 WNV (2 fatal) in 2019. The Hawaii Health Department (health.hawaii.org) has reported 5 cases of dengue.

The year 2020 was also not merciful to our SOVE Region. To my knowledge, we have lost four notable colleagues and friends: David Sullivan passing on March 12; Minoo Madon on August 13; Bill Walton on October 18; and Dan Strickman on October 28. All four were dedicated friends of SOVE and served the Society in various ways—David as the US Northwestern regional director and strong SOVE supporter; Minoo as secretary, 1988-president, editor of Newsletter and Bulletin, distinguished service award recipient; Bill as 2013-president, distinguished service award recipient; and Dan a tested supporter of SOVE and Life-time achievement award recipient. All four were related to the region by birth or professional service.

Finally, I would like to remind all our regional members to please forward to me any news about your employment, grants, professional awards, or anything significant achievement you see published in the newsletter.

Please stay healthy and safe!

Cordially,

Lal

Dear Colleagues and Friends,

We started 2020 with high hopes and mega plans to accomplish, not knowing that with the COVID-19 pandemic we would end up experiencing some unprecedented times of our lives. As California and New York have taken turns in human morbidity and mortality, according to the Centers for Disease Control and Prevention (CDC; www.cdc.gov), nationwide human cases of COVID-19 have surged to new highs, 19,232,843 cases, including 334,029 deaths, as of December 23, 2020, with California leading in 2,187,221 human cases and 24,526 deaths. With a devastation of this magnitude, the pandemic has certainly impacted all acts of our life, including vector-borne disease surveillance in the US Southwestern Region.

According to CDPH (California Department of Public Health [www.cdph.ca.gov], as of 12/18/2020, West Nile virus (WNV) has resulted in 192 human cases with 341 dead birds, 2628 test-positive mosquito pools, 143 seropositive sentinel chickens, and 20 horse cases. The 192 human cases are lower than 225 cases reported last year against 425 cases as a 5-year average. Of the 62 cities/counties, 38 had WNV activity in 24 showing human cases. Other diseases reported by CDPH included 5 cases of SLE, 49 dengue (travel-related), 4 chikungunya (travel-related), and 4 typhus. Moreover, of the two invasive mosquito species, *Aedes aegypti* and *Ae. albopictus*, the former has been reported in 21 counties, from Shasta county in the north to Imperial county in the south. The latter species has been found in San Diego, San Bernardino, Los Angeles, Orange, and Shasta counties. The Arizona Health Department (azdhs.gov; 12/29/2020) re-



Dear Colleagues and Friends,

I could not be happier to welcome to the SOVE Board **Filiz Gunay** (Fig. 1) who was elected as the new Director for the European SOVE Region and will be serving our society for the next three years. Filiz has been a well-respected and much-loved member of the Euro-SOVE family for more than 10 years during which time she tirelessly supported the society by participating in multiple committees, organizing workshops and leading scientific sessions. For those of you who do not know Filiz, she is a researcher at the Hacettepe University in Ankara, Turkey, where she works on sand fly and mosquito bio-ecology, while her primary research interest is mosquito biodiversity in the Palearctic region. Filiz has a strong international research background and multiple collaborators across the world. One of her most recent collaborations at IRD, Montpellier, France resulted in the creation of a computer-aided identification key for mosquitoes in Europe, North Africa and Middle East, named MosKeyTool. In addition to her significant research contributions in the ecology and taxonomy of mosquitoes she has been very active in promoting our science through networking activities and communication initiatives. When I asked her about her role as the scientific communication manager of the *Aedes* Invasive Mosquitoes COST Action (<https://www.aedescost.eu>), Filiz said *"We strive to improve communication and dissemination of all related knowledge. This year, despite the restrictions due to covid, the action has managed to perform a transboundary surveillance activity 'AIMSurv' using VECMAP® of AviaGis and enriched by a citizen science approach by the Mosquito Alert platform. It's quite an ac-*

EUROPEAN SOVE

Alexandra Chaskopoulou

Regional Director

complishment." Please, join me in welcoming Filiz! West Nile virus (WNV) detection in birds and mosquitoes (<https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2020.25.40.2001704>) with subsequent human cases was reported for the first time in the Netherlands. Ecological investigations within a large research project allowed for early detection in birds and mosquitoes and awareness in the clinic with dedicated reference laboratory and virology support in public health department that led to the detection of human cases. West Nile virus circulation and infections (humans, animals) are mostly reported in the south/southeastern parts of Europe but the distribution of the virus has been gradually expanding towards the north creating new challenges for local public health departments and vector control operators. Currently the Netherlands is investigating proactive measures towards improved monitoring and targeted interventions. One of the actions towards improved future planning and preparedness was the organization of a virtual WNV Expert Consultation Meeting organized by Marieta Braks, National Institute of Public Health and the Environment (RIVM) in collaboration with Arjan Stroo, Center for Monitoring of Vectors, National Reference Center (Netherlands Food and Consumer Product Safety Authority). Experts on WNV surveillance and control from Italy, Spain, Greece, Germany and the Netherlands exchanged their experiences on the efficacy and sustainability of currently applied WNV surveillance and management tools. Challenges and gaps in knowledge were highlighted and informed suggestions were made for improving surveillance and control capacities in the Netherlands for the 2021 season.

-----Alex cont'd on p. 12

Students' Corner



Kara Fikrig
Student Director

One of the many challenges that graduate students face is figuring out what they want to do after they graduate. This can be especially difficult because non-academic job options do not always present as obvious potential career paths. Opportunities for students to interact with medical entomologists in non-academic positions can be sparse. This is one of the benefits of student attendance at the SOVE annual meetings – the SOVE membership includes people in both academic and non-academic roles. Because we had to cancel the meeting this year in order to keep everyone safe, our student members are missing the opportunity to hear about and get to know medical entomologists outside of academia. So, this newsletter will feature a recently graduated student who took a less conventional path – Talya Shragai.

If you had the opportunity to attend the 2019 annual meeting, you may recall Talya's presentation in the student symposium, in which she discussed the spread of dengue following the construction of public transport in Medellín, Colombia. Her graduate research also included a larval survey and an investigation of diapause behavior of *Aedes albopictus* in Long Island, New York and an analysis of *Ae. albopictus* oviposition behavior in Colombia.

In order to model the historical spread of dengue in Medellín, Talya worked closely with the department of health, La Secretaría de Salud de Medellín. She became enthralled with the process of analyzing the large amounts of data available to her and loved the

applied nature of the work. The success of this modeling project and her extensive experience working in the field set her up perfectly for the last step of her Ph.D. – an internship with the CDC Dengue Branch in Puerto Rico. She worked with the epidemiology team to create a data processing system for a randomized control trial to assess the efficacy of novel mosquito control techniques to reduce the incidence of dengue. She assisted in the analysis of the data, using the skills that she had gained through the modeling project in Medellín in order to assess the impact of human mobility on the intervention success.

Talya decided that she loved this type of applied work and that it was a better fit for her than academic research. She applied to the Epidemiological Intelligence Service (EIS) at the CDC and was accepted as the only entomology Ph.D. student in her cohort. She was recruited to the Emergency Response and Recovery Department, where the team was eager to utilize her medical entomology expertise to help with the malaria programs around the world. However, COVID-19 has taken center stage at the CDC and has been the focus of Talya's work since she started in July. She recently had the opportunity to travel to South Sudan to help the government set up a COVID-19 surveillance system. While her entomology skill set was not applicable to this particular project, her experiences from her Ph.D. taught her how to collaborate with government officials and how to negotiate with complex actors to achieve goals for data analysis.

It has been just months since Talya graduated with her Ph.D., but I think that her story might provide inspiration for our student members who might be interested in finding ways to apply their expertise outside of academia. Make sure to find projects that will help you to develop a widely applicable skill set and to seek out opportunities that will diversify your experience whenever possible.

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Shaun Dergousoff

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**Agriculture and Agri-Food
Canada**

Greetings from Canada,

I think it's been quite a while since the last update from here, so I intend to provide some information on the current state of surveillance activities and vector-borne pathogen and disease occurrence, as available, throughout Canada. Several surveillance programs are related to human and animal health; some are national and many are provincially run. I don't have any insider information, so I will provide a general update with publicly available data.

A significant amount of the surveillance effort is focused on monitoring Lyme disease and the tick vectors throughout the country. The majority of cases occur in the southern parts of the provinces of Ontario, Québec, and Nova Scotia. *Ixodes scapularis* first became established in Ontario in the 1970's, and over the last couple of decades became established in Québec, New Brunswick, Nova Scotia, and Manitoba. Provincial tick surveillance programs help monitor this range expansion, and public health professionals in provinces outside of the current endemic areas, such as in Saskatchewan, are watching for signs of establishment of new populations.

The latest publicly available data on the national incidence of Lyme disease are from 2018, when 1,487 cases were reported, down from a yearly peak of 2,025 in 2017. In British Columbia, the B.C. Centre for Disease Control monitors human vector-borne diseases. Here the vector of *Borrelia burgdorferi* is *Ixodes pacificus*, which occurs in the western-most part of the province. The rate of Lyme disease is lower than in eastern Canada, and only 9 cases were diagnosed in 2018, and there were 162 cases in total from 2009 to 2018.

The provincial surveillance programs provide tick and Lyme disease data to the Public Health Agency of Canada (PHAC), which compiles and reports the data and areas of risk and across the country (<https://www.canada.ca/en/public-health/services/diseases/>

[lyme-disease/risk-lyme-disease.html#a3](https://www.canada.ca/en/public-health/services/diseases/lyme-disease/risk-lyme-disease.html#a3)).

Several provincial passive tick surveillance programs have moved from a system accepting physical tick submissions to a system receiving digital photo submissions. The recently developed "eTick" (<https://www.etick.ca/>) platform is now used in Québec, Ontario, New Brunswick, Nova Scotia, and Saskatchewan. Additional provinces are also looking at the possibility of using this method for their programs.

Targeted monitoring also occurs for additional tick-borne pathogens that occasionally cause human disease in Canada, including Powassan virus, *Borrelia miyamotoi*, *Anaplasma phagocytophilum*, and *Babesia microti*. Human anaplasmosis and babesiosis cases have been reported over the last several years in most provinces where the deer tick is endemic. For example, 6 cases of anaplasmosis and 1 case of babesiosis were reported in 2019 in Manitoba, where the western limits of *Ixodes scapularis* geographic range occurs.

Cases of Rocky Mountain spotted fever were also reported in British Columbia, where *Dermacentor andersoni* is the vector. From 2009 to 2018 (the last year with public available records), 31 cases were recorded.

Targeted mosquito and mosquito-borne virus surveillance takes place in some provinces and mainly focuses on West Nile virus. This is a collaborative effort among human, wildlife and equine veterinary organizations. Local and Provincial health departments carry out mosquito surveillance and virus testing, the Canadian Wildlife Health Cooperative coordinates wild bird testing, and the Canadian Food Inspection Agency is responsible for monitoring WNV in horses. The testing involves many animal health professionals, provincial veterinary laboratories, and the National Microbiology Laboratory. Data from these programs, in addition to human clinical cases, are compiled by the Public Health Agency of Canada and reported to the public (<https://www.canada.ca/en/public-health/services/diseases/west-nile-virus/surveillance-west-nile-virus/west-nile-virus-weekly-surveillance-monitoring.html>).

—————Shaun cont'd on p. 12

The need for greater engagement of public health entomologists in addressing the problem of emerging tick-borne diseases in the U.S.

C. Ben Beard, Division of Vector-Borne Diseases, CDC, Fort Collins, CO

When I first transferred to CDC's Division of Vector-Borne Diseases in 2003 to provide leadership to CDC's Lyme disease program, each year I would travel to a different part of the country on a "road trip" to familiarize myself with the local issues surrounding Lyme disease and other tick-borne arboviral illnesses. Some of my most memorable experiences include a three-hour neighborhood meeting with chronic Lyme disease sufferers in Greenwich, CT, a townhall gathering in Wausau, WI where I heard dozens of stories of tick-borne maladies from local citizens, discussing the challenges of Lyme disease surveillance and reporting with state and local health officials in Boston, MA, and having coffee with vector control professionals at a local mosquito control district in Minneapolis, MN. All these meetings provided great learning experiences for me, but the meeting with mosquito control staff in Minneapolis was among the most enlightening.

When I asked the highly experienced vector control staff in Minneapolis about their activities related to tick control, they responded that they currently were not engaged in any tick control work, even though they were located in one of the nation's perennial Lyme disease hotspots. When I asked them why, they responded that if they had effective products and methods, they would be glad to do this, but at the present time, they had neither. In a recent article (Eisen, 2020), Lars Eisen reviews the current situation related to tick control in the U.S., pointing out the need for a paradigm shift in how we look at this topic. There are mosquito control districts across the U.S., but when it comes to tick control, the responsibility is largely, if not solely, shouldered by individual homeowners. While studies have shown that tick-borne illnesses often are acquired in backyard settings (Mead et al., 2018), the deer that serve as hosts for the tick vector and the numerous rodent and avian species that are reservoirs for the Lyme spirochete, move actively across property lines and political boundaries. Consequently, as research studies have shown, successful reduction in disease transmission based on treating individual properties can be highly challenging (Hinckley et al, 2016).

In truth, choosing between investments in mosquito control versus tick control is not a simple issue of priorities. Both are of great importance, and mosquito surveillance and control should not be compromised in the wake of a rising tide of tick-borne illness across the U.S. Going back to the discussion with the vector control professionals in Minneapolis, it is a significant point that the lack of effective products and methods is much more apparent when it comes to tick control. Still, there are a number of commercial pest control companies that offer residential tick control services, using various products and approaches, from area-applied acaricides to bait boxes that kill ticks on rodents. To be certain, these interventions need further evaluation, but clearly there is more that can be done than is currently being done.

I have often thought that in many settings across the Lyme disease endemic regions of the country, in the same way that communities support *Neighborhood Crime Watches*, they could launch *Neighborhood Lyme Watches*. The process could be coordinated through homeowner associations (HOAs) and begin with an eco-epidemiological assessment to determine where deer are moving and rodents living and identifying key tick habitat.

—————**Ben cont'd on p. 13**

A TRIBUTE TO



Daniel A. Strickman

1953 - 2020

The field of Medical Entomology has lost a valued entomologist, contributor, colleague, and friend. I have personally lost a close friend whom I have spent years with discussing pressing challenges in mosquito biology and control. I first met Dan when we both were graduate students with Professor William R. Horsfall at the University of Illinois at Urbana-Champaign. Dan earned his MS in 1976 and Ph.D. in 1978. We both worked on floodwater mosquitoes. Dan and I used to jokingly argue who processed more dirt from Allerton Park on the Sangamon River floodplain looking for eggs and oviposition sites. We both learned operational mosquito control as entomologists for the Macon Mosquito Abatement District in Decatur, Illinois. Dan was a quiet man with a unique sense of humor coupled with an outstanding logic for problem solving. He was naturally inquisitive and definitely not dogmatic. He was open and loved to discuss well thought out mosquito and vector control challenges, especially when based on data, observation, or documented information.

Dan was interested in insects and arthropods at an early age and began his pursuit towards his future professional career as a biologist/entomologist at Dartmouth College and received his Bachelor of Science degree at the University of California-Riverside in 1974. During his career, Dan has worked in a broad scope of professional responsibilities including medical entomology, operational pest and vector control, research, and management. His career spanned areas from a field researcher to administrative positions in the U.S. Military as Chief of Department of Entomology at Walter Reed Army Institute of Research and the U.S. Department of Agriculture where he held the position of National Program Leader for Veterinary Medical and Urban Entomology and the Acting Director of Overseas Biological Control Laboratories. Although, his dominant research focused on mosquitoes, he also worked and contributed knowledge from his studies of tabanids, chiggers, and rodents. His expertise on the parasites and insect vectors causing rickettsia (typhus), malaria, and dengue were also key areas and research challenges that intrigued him. His contributions made significant impact to our knowledge of these vectors regarding both their biology and control. He authored 115 peer-reviewed articles, 16 book chapters, and four books.

Dan cont'd on p. 14

In Memoriam



William E. Walton

1956- 2020

The Department of Entomology, the University of California, and the field of vector ecology have lost one of their most dedicated, productive, and beloved scientists. Dr. William E. (Bill) Walton, Professor of Entomology, passed away at the UC Irvine Medical Center on October 18, 2020 from B Cell Lymphoma. He was 64 years old.

Bill was born in Connecticut to Edward, an administrator at the University of Bridgeport, and Ruth, an elementary school teacher. Bill especially enjoyed swimming and paddling a canoe on the lake near his home as he was growing up. His father served as a scout and official team historian for the Boston Red Sox, and Bill remained a loyal and lifelong Red Sox fan. Bill graduated with a B.S. in Zoology from the University of Rhode Island (URI) in 1978. A key early mentor was Nelson Hairston Jr. at URI. Bill was a star student in Hairston's limnology class and soon participated in collecting trips to local ponds and worked in the Hairston laboratory. This launched Bill into a career as an aquatic ecologist with fascinating studies at URI on copepod evolution and diapause. One of Bill's first studies with Hairston was published in the Proceedings of the National Academy of Sciences, an amazing and certainly auspicious beginning for an undergraduate. Bill also later worked with Hairston at Cornell University on fish vision and prey selection.

Bill obtained his M.S. (1982) and Ph.D. (1986) in Zoology/Aquatic Ecology from the University of Maryland where he worked with the famous aquatic ecologist J. David Allen. This sound foundation in aquatic ecology served Bill well his entire career. He first turned his skills toward medical entomology as a postdoc from 1987 to 1990 working on mosquito ecology with Mir Mulla at UCR, a towering figure in the field of mosquito control. Bill's ability and willingness to bring his superb basic science skills to bear on applied problems in medical entomology were important factors in his being hired on the UCR Entomology faculty in January 1995.

Mosquitoes are critically important vectors of disease agents such as West Nile virus, and they can be serious biting pests as well. Mosquito control in arid regions, such as southern California, hinges on strategic management of water sources where the immature mosquitoes are found. These sites often are man-made, ranging from storm drains and catchment basins to large, managed marshes. The latter provide wildlife habitat, human recreation, and encourage natural microbial degradation of pollutants in wastewater and thus improve water quality. Bill created a specialized niche addressing mosquito production issues as related to water quality and management in these anthropogenic sources. He and a number of graduate students worked with colleagues with different areas of expertise, such as environmental health or engineering, and from different agencies. Bill's many publications addressing the complex ecology and variable designs of these wastewater management systems as they relate to mosquito control are absolute classics in that field. —————**Bill cont'd on p. 14**

President's message *cont'd from p. 1:*

Finally, SOVE has taken a more active advocacy stance in the United States by joining the Vector-Borne Disease Network, which consists of 21 organizations advocating for increased federal support of vector-related issues. This advocacy has resulted in the passage of the Kay Hagan TICK act, which authorizes \$30 million for vector-borne disease prevention and control activities.

I would also like to congratulate Alex Chaskopoulou as the incoming SOVE Vice President and to Isik Unlu, who will assume the SOVE presidency on January 1. I am wishful that the COVID-19 pandemic ends early next year so we can meet in person at the 2021 SOVE annual meeting. It has been an honor to serve you as SOVE president this year and I thank you for your continued support of SOVE.

Nicole *cont'd from p. 3:*

New Member of SOVE? Finding unexpected time on your hands? Or thinking of fun and informative activities to engage your friends, neighbors, children? – Offer your passion and expertise to develop innovative church, school or neighborhood programs in collaboration with a local university, state and/or local government agency in your area.

Please share your outreach experiences with me for posting in upcoming newsletters!

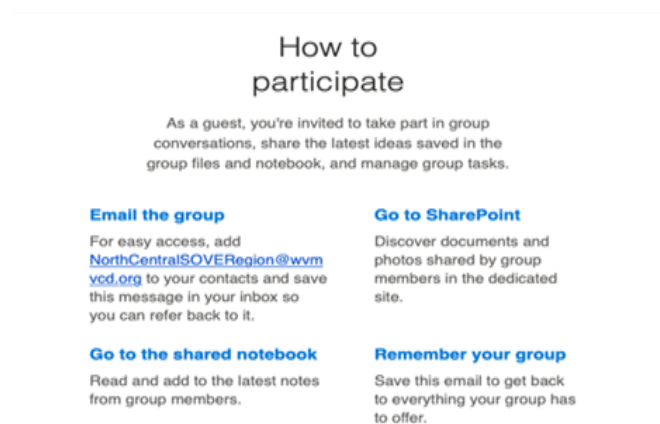
Need a ready-resource for guiding on which personal repellent is right for you (a family member, neighbor)? Use the EPA's repellent online search tool! Simply answer the prompted questions and a summary of EPA safe and efficacious registered products for consideration will be shown! (see <https://www.epa.gov/insect-repellents/find-repellent-right-you>).

LET'S GET CONNECTED! Thanks to our SOVE Executive Director, Michelle Brown, we now have our very own North Central SOVE Region group email distribution list - NorthCentralSOVERegion@wvmvcd.org- and SharePoint site to share news, collaborate on content, manage shared files, and track site activities with other SOVE members associated with our region.

Check out the details below and begin to participate, I look forward to hearing from you!

Sincerely,

Nicole



Alex *cont'd from p. 5:*

For more information on the 2020 WNV transmission season in Europe, please, go to:

<https://www.ecdc.europa.eu/en/west-nile-virus-infection>.

Two reports were recently published on the status of surveillance and control of important mosquito vectors in Europe: 1) A questionnaire-based survey of surveillance and management of *Aedes* invasive mosquito species in Europe, AIM COST Questionnaire Report (for more information go to https://www.aedescost.eu/sites/default/files/2020-08/AIMcOSTQuestionnaire_Full_Report_postedV4.pdf) 2) Vector control practices and strategies against West Nile virus (for more information go to <https://www.ecdc.europa.eu/en/publications-data/vector-control-practices-and-strategies-against-west-nile-virus>)

I hope that you all continue to stay healthy and safe during these difficult times and I look forward to better days when we can all meet in person once again,

Alex



Fig. 1. Filiz Gunay

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Shaun *cont'd from p. 7:*

In 2020 (up to October 24), 86 human infections were reported to PHAC, mostly from Ontario and Québec. 15,945 pools of mosquitoes had been tested from 4 provinces (Saskatchewan, Manitoba, Ontario, and Québec), and 198 were NWV-positive. One hundred dead birds were tested, with 41 positive throughout Canada (mainly in Ontario and Québec), and a total of 6 equine cases were reported (1 in Alberta, 1 in Saskatchewan, 2 in Ontario, 1 in Manitoba, and 1 in Québec).

Instances of vector-borne diseases of veterinary concern included 2 cases of equine infectious anemia (1 in Saskatchewan and 1 in the Yukon) this year. Also, 8 cases of eastern equine encephalitis were reported in horses, all of which were in Ontario. Vector surveillance programs are also monitoring for invasive species, such as the Asian longhorned tick, the lonestar tick, *Aedes aegypti* and *Ae. Albopictus*, along with range expansion of endemic vector species into new areas of the country. This includes *Ae. japonicus*, which has established populations in eastern and western Canada, and *Ae. albopictus* in Ontario.

Over the last nine months or so, COVID-19 has dramatically affected the capacity of most organizations to carry out vector laboratory and field research, surveillance, and diagnostics. Much of these activities were halted while protocols to work together safely were being developed, or were considerably scaled back, with budgets and work hours redirected to COVID-19 diagnostics. With winter upon us, most places in Canada get a reprieve from many of the issues related to vector-borne diseases, but planning for surveillance and research activities in the upcoming year will be an interesting challenge for all of us.

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Ben con'd from p. 8:

Additional entomological and epidemiological queries could define the specific locations and activities that place residents at greatest risk for exposure to the bites of infected ticks. Then, perhaps, a combination of interventions might be selected (bait boxes, 4-poster deer devices, landscaping, and acaricides) as components of an integrated tick management plan that is custom designed for the neighborhood, with the goal of gaining a pre-defined optimal level of homeowner participation within the HOA.

Each year hundreds of thousands of persons are diagnosed and treated in the U.S. for a tick-borne illness. Over 300,000 cases alone of Lyme disease are estimated to occur annually (Hinkley et al., 2013; Nelson et al., 2015). Clinical trials are currently underway to evaluate a new Lyme disease vaccine. Given the plethora of emerging tick-borne pathogens, however, a safe and effective Lyme disease vaccine will still only address one component of a rapidly emerging public health problem. Until such a time when vaccines against all the major tick-borne illnesses in the U.S are available and adequately utilized, protection against the bites of infected ticks will be of paramount importance in preventing tick-borne illness.

So, I will conclude with my list of the five most important reasons why public health entomologists should be increasingly engaged in efforts to prevent and control tick-borne diseases:

1. Tick-borne diseases are a huge public health problem in the U.S. resulting in hundreds of thousands of diagnosed and treated cases each year.
2. Tick-borne diseases cause significant morbidity and mortality in the U.S., with deaths occurring annually from Rocky Mountain Spotted Fever, Lyme carditis, and Powassan virus encephalitis.
3. Tick-borne diseases are increasing in numbers and distribution each year, and without effective interventions these trends are likely to continue and even worsen.
4. There is a significant commercial market and need for tick-borne disease prevention and control in the U.S. and a place for the larger mosquito control community to engage and contribute.
5. Tick-borne diseases have attracted the attention of Congressional and civic leaders resulting in significant legislation and other political action and must be of increasing interest and concern to public health entomologists.

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Dan cont'd from p. 9:

During his career, an example of his valued expertise is illustrated in the breathe of positions he held beginning with the U.S. State Department (Peace Corps), the US military (22 years in the Air Force and Army), mosquito abatement (Santa Clara County, California), the US Department of Agriculture - Agricultural Research Service (National Program Leader for Veterinary, Medical, and Urban Entomology and Director of Overseas Laboratories), and finally the Bill & Melinda Gates Foundation (Senior Program Officer, Malaria and Neglected Tropical Diseases). Even in retirement Dan drive to his entomological roots by volunteering his expertise to the Burke Museum of Natural History, University of Washington working to curate and examine the museums collection of fossil insects. Hobby for Dan.

During his career, he spent 10 years in countries outside of the United States, including Latin America, Southwest Asia, East Asia, and Europe. His awards reflect the quality and contributions including the US military's Legion of Merit and Bronze Star, the US EPA Bronze Medal, the Presidential GreenGov award, the American Mosquito Control Association's John Belkin Award, and the Society for Vector Ecology's Lifetime Achievement Award. Dan was instrumental in supporting the Society of Vector Ecology's annual student competition as our Gates Foundation representative. Dan served on the Editorial Board of the Journal of the American Mosquito Control Association for 13 years.

His most recent book is *Mosquitoes of the World*, to appear in print in 2020 (D. Strickman, R.C. Wilkerson, and Y.-M. Linton, Johns Hopkins University Press). This final work by Dan will be published posthumously. A tribute for a true medical entomologist, a vector control specialist and biologist. He will be missed by many. We have lost a dedicated scholar, colleague, and friend of the Society for Vector Ecology.

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Bill cont'd from p. 10:

His laboratory also produced many publications on interactions between mosquitoes and natural enemies. Some of the more recent work exposed the fascinating fact that mosquitoes both detect and avoid semiochemicals produced by a key predator, the widely used mosquitofish, *Gambusia affinis*. This has obvious potential applications for management. At the operational level, larval mosquitoes are controlled primarily using bacterial larvicides, notably *Bacillus thuringiensis israelensis* (Bti) and *Lysinibacillus sphaericus*. With UCR entomologist Dr. Margaret Wirth (a Staff Research Associate in Bill's lab) and noted insect pathologist Dr. Brian Federici, a tremendous series of papers was produced delving deeply into the modes of action of bacterial larvicides and the evolution of resistance. These are also classics. Recently Bill's laboratory had been working intensively on surveillance and on autodissemination of growth regulators and entomopathogenic fungi for mosquito reduction in hard-to-reach storm drain systems. David Popko, who received his M.S. with Bill, served as a superb technician in Bill's lab for many years and was first author on some of those studies. This illustrated Bill's management style: he had patience and great faith in his people and was happy for them to take credit for the tremendous work accomplished as part of his team. No matter how busy he was, he would always make time for his students and lab members who might need to talk with him right away. Bill possessed an impressive ability to multitask and, although extremely busy, he always seemed to prioritize their needs. He readily embraced and steadfastly encouraged.

Bill cont'd on p. 15

Bill cont'd from page 14: and supported interesting and sometimes diverse ideas his students or staff generated, utilizing techniques from fields as wide-ranging as water chemistry, microbiology, botany, or molecular biology. Bill thus was both able and eager to branch out beyond the narrow focus that characterizes research in many laboratories. This itself is the hallmark of a great ecologist.

Bill's research activities in aquatic ecology and mosquito control at UCR resulted in over 130 refereed scientific publications, conference symposia, and review articles, plus comprehensive and influential book chapters and position papers. Bill was known and appreciated for his excellent, sustained collaborative work with mosquito abatement districts over his entire career, particularly those in the southern California region. They held him in high esteem and he reciprocated that feeling. He believed in and supported their mission, crossed the line between basic and applied science with natural ease, and thus exemplified the ideal agricultural experiment station scientist.

Bill was a remarkably effective and dedicated teacher and taught several classes, most notably Insect Ecology (ENTM 127), Introductory Ecology and Evolution (BIOL 5C), and Aquatic Insects (ENTM 114). The latter was designed together with Brad Mullens as the kind of intensive field ecology course that is rarely taught these days. It featured numerous afternoon or weekend field trips, completion of an extensive insect collection, and participation in a group aquatic bioassessment project using the aquatic insect community and a wide variety of water and physical habitat metrics to assess stream health and water quality in upper and lower reaches of the Santa Ana River, the largest river system in southern California. The project required the class to function as a research team and each student had to provide a detailed write-up in scientific paper format. Students were specifically warned the first day of classes that, if they were looking for an easy class or to be anonymous, they should drop it immediately. And they for sure were going to get wet. Despite its intensity, both the students and instructors especially loved that class. Bill's efforts were greatly appreciated by both students and colleagues, and Bill was specifically recognized for his exceptional teaching prowess through several very prestigious teaching awards. These included being a National Academies Education Fellow in the Life Sciences (2013) and receiving the Outstanding Teaching Award on the UCR campus (2017), from USDA-NIFA (2018) and from the Entomological Society of America (2018). The Entomology graduate students awarded him the Faculty Mentor Award in 2010, which he valued greatly. Bill trained many excellent graduate students and postdocs who have gone on to make major contributions themselves to the fields of vector ecology and medical entomology. Several of his students or postdocs are research leaders in the public health agencies and mosquito control districts with which Bill regularly interacted.

Bill's service to entomology and vector ecology is truly remarkable. The service record is too voluminous to list in its entirety here, but includes serving on an immense variety of university and departmental committees and professional committees and editorial boards. One consistent theme was his unflagging support for student activities, particularly student symposia at annual meetings of the Society for Vector Ecology. He participated very actively in the California Mosquito and Vector Control Association for his entire career. Bill was very prominent in and served as president both of the Society for Vector Ecology (2013) and the American Mosquito Control Association (2018). Bill served on the Editorial Board of the Journal of the American Mosquito Control Association for seven years, including last two years as Chair of the Board. He received the Distinguished Service Award from the Society for Vector Ecology in 2017. He enjoyed a close personal relationship with a number of national and international colleagues at these meetings, including regular participation in a wine-tasting group "meeting" in the evening after the business was done. He recently was instrumental in forming and was serving as co-Director of the Pacific Southwest Center of Excellence in Vector-borne Diseases. This center has the goals of coordinating medical entomology training (and offering training grants) and fostering research efforts between scientists in the region and many partners in the vector control community.

—————Bill cont'd on p. 16.

Bill cont'd from p. 15:

Bill also served ably for many years as the UCR Department of Entomology Vice-Chair and as such helped guide the department's teaching missions and student funding efforts. He was a critical part of the glue that held the department together, ensuring the high research and teaching productivity that resulted in the UCR entomology department being ranked as one of the best in the world. The void left by his passing will not be easy to fill.

Bill enjoyed wine tasting and good conversation with friends and colleagues, hiking, biking, and kayaking with his family. Bill leaves behind his wife of 28 years, Peggy Walton (retired Research Scientist), and their son Tyler (mechanical engineer). He also is survived by his mother Ruth D. Walton, his sister Susan and her husband Bud Peck, two nephews and a niece, all of whom are living in Arizona. The family requests that their privacy be respected at this very difficult time. Due to COVID restrictions, no memorial service is planned at this time. In lieu of flowers and gifts, please consider a contribution to the [Dana Farber Bing Center for Waldenstrom's Macroglobulinemia](#). Bill's ready smile and laugh, optimism, and genuinely friendly, helpful demeanor will be long remembered and sorely missed by so many of his colleagues, students, and friends. May he rest in peace.

Bradley A. Mullens and Alec C. Gerry

Department of Entomology

University of California, Riverside, CA;

Major S. Dhillon, Past-President, American Mosquito Control Association and
Executive Director Emeritus, Society for Vector Ecology, Ontario, CA, USA.

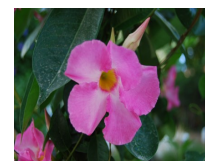
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CALENDAR

There will be a Keystone Symposium on February 15-18, 2021 in Colorado, on the topic of Vector Biology: Emerging Concepts and Novel Technologies. Here is the link : <https://www.keystonesymposia.org/ks/Online/Events/2021Q6/Details.aspx?EventKey=2021Q6> (reports Adriana Costero-Saint Denis, acos-tero@niaid.nih.gov).

The University of Idaho Center for Health in the Human Ecosystem (CHHE) is hosting its annual Biology of Vector-borne Diseases six-day course, Sunday through Friday, June 20-25, 2021, on the UI campus in Moscow, Idaho. This course provides accessible, condensed training and "knowledge networking" for advanced graduate students, postdoctoral fellows, new faculty and current professionals to ensure competency in basic biology, current knowledge and cutting edge technology for U.S. and global vector-borne diseases of plants, animals and humans. This course seeks to create an enduring community of participants and instructors who understand the biological connections across diverse vector-borne diseases to expand the impact and sustainability of integrated solutions to their control in complex human ecosystems. Applications will be reviewed starting December 1, 2020, and applicants will be notified of their acceptance for the course in Spring 2021.

For more information, contact Anna Duron (aduron@uidaho.edu).



Annual Meeting, Mosquito and Vector Control Association of California, Virtual
Format, February 1—3, 2021.

—————Calendar cont'd p. 17

Calendar (cont'd. from p. 16)

Annual Meeting, American Mosquito Control Association, Virtual Format, March 2-5, 2021

Resources

BEI Resources for Vector Biology Research NIAID's BEI Resources program (www.beiresources.org) provides Vector Biology resources for free to registered, approved researchers in domestic and foreign institutions with appropriate facilities and containment procedures for vector research. Our widely requested holdings include LIVE arthropod vectors of human disease, including anopheline and culicine mosquitoes, reduviids, ticks and sand flies, associated reagents and genomic materials for entomological research, along with insectary protocols. For the cost of nothing, recipients are only required to acknowledge the use of the individual resources in publications and presentations of the research in which the materials are used.

BEI Resources arthropod colonies are made available by the deposit contributions of investigators throughout the world. Deposited materials undergo review by NIAID prior to acceptance. Please notify BEI Resources through the Suggest A Reagent Form if you have a request for inclusion or the Deposit Inquiry Contact Form if you have a unique strain for consideration.

Vector Biology resources available through BEI Resources will remain available throughout the current coronavirus pandemic. Orders and/or shipping of certain live vectors may be delayed or temporarily on hold depending on the current operating status of individual insectaries for mosquitoes, ticks, reduviids and sand flies. BEI Resources is pleased to announce the upcoming availability of black fly life stages through a partnership with the University of Georgia Black Fly Rearing and Bioassay Laboratory, which has operated the only known colony of black flies (Diptera: Simuliidae) for over 20 years. Since its establishment, the *Simulium vittatum* colony has been used for a variety of research projects, including vector transmission studies, environmental monitoring, vector control and larval feeding studies. For more information contact:

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<https://www.niaid.nih.gov/research/vector-bio>

Job Opportunity

California State University San Bernardino Department Chair Position

The Department of Health Science & Human Ecology at California State University, San Bernardino (CSUSB) invites applications from a diverse group of qualified applicants for a tenure-track position of Department Chair, tenured, at the rank of Associate or Full Professor to begin August 2021. The Department grants four BS degrees: Environmental Health Science, Health Services Administration, Public Health, and Nutritional Science and Dietetics. The Department also offers two master's degrees: a Master of Public Health (MPH) and a Master of Science in Health Services Administration (MSHA).

A PhD, MD, DrPH or other terminal degree in Health Sciences or a related field is required by time of appointment. Preference will be given to applicants in the areas of Environmental Health Science, Health Services Administration, Health Care Management, Nutritional Science and Dietetics, Global Health, Public Health Services Management, Biostatistics, Public Health Nutrition and/or Public Health. Candidates should be capable of appointment at the level of Associate or Full Professor.

Review of applications will begin January 11, 2021, and will continue until the position is filled. Salary is commensurate with experience. For a detailed job description, please visit the link at: <https://careers.pageuppeople.com/873/sb/en-us/job/498036/health-science-department-chair-tenured-at-the-rank-of-associate-or-full-professor>.

If you are interested in this opportunity, we invite you to apply by using this CSU Recruit hyper-link at: <https://secure.dc4.pageuppeople.com/apply/873/gateway/Default.aspx?c=apply&sJobIDs=498036&SourceTypeID=803&sLanguage=en-us&lApplicationSubSourceID=11248>

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About SOVE

The Society for Vector Ecology is a nonprofit professional organization formed in 1968 by a group of individuals involved in vector biology and control programs in California. The membership has since grown to represent an amalgamation of diverse research, operational, and extension personnel from all over the world. The Society is committed to solving many complex problems encountered in the field of vector biology and control. Among these are the suppression of nuisance organisms and disease vectors through the integration of various control options, such as environmental management, biological control, public education, and appropriate chemical or non-chemical control strategy.

The Society publishes the biannual Journal of Vector Ecology that contains research and operational papers covering many phases of vector biology, ecology, and control. The Society also issues a quarterly newsletter and holds an annual conference in September/October.

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