Volume 8, Issue 3

TWS WILDLIFE DISEASES WORKING GROUP

Fall 2014

The Vector

The Newsletter of The Wildlife Society Wildlife Diseases Working Group

Special points of interest:

- **Board Elections & Bylaw Changes**
- **Student Travel Grant Winner**
- **Student Article**

The Vector Timeline

Winter (Vol. 8, Iss. 4)	Spring (Vol. 9, Iss. 1)
Submissions Due 2 Dec. 14	Submissions Due 2 Mar. 15
Publication Date 24 Dec. 14	Publication Date 30 Mar. 15

The editors of The Vector welcome your contributions. If you wish to submit an article, but suspect you will not quite make the deadline, please contact Samuel M. Goldstein or Michelle Rosen.

Inside this issue:

Your WDWG membership can only be obtained by joining and renewing your annual TWS Membership each year. At the time that you join simply indicate that you want to be a member of this working group on the application. Membership dues are $5.

Call for Written Contributions to The Vector

WE NEED YOUR HELP!

Each year the WDWG distributes The Vector, our quarterly newsletter, showcasing the wonderful work of our students, ongoing research, and current topics in the wildlife disease realm. We need your help!! This is an opportunity for you to share information on a topic you find important and valuable to our members.

Please consider providing a short article about your profession or path to becoming a wildlife disease expert, major projects, research findings, or a hot topic in the wildlife disease field. Senior-level professionals may feel free to share lessons learned in their career to benefit students and early career professionals. Please encourage your students or technicians to do the same. Articles need not be long or formal. We encourage you to submit a few photos to accompany your writing.

Inquiries and articles can be submitted at any time to Sam Goldstein (Samuel.M.Goldstein@aphis.usda.gov) or Michelle Rosen (Rosenm@michigan.gov).

WDWG Student Travel Grant Award Winner

The Wildlife Disease Working Group has awarded its first student travel grant to Lenora Dombro from Auburn University. Lenora will receive a $500 travel grant to help support her travel to the 2014 Wildlife Society Conference in Pittsburg, PA. At the conference, Lenora will be making an oral presentation of her MS research "Impacts of Insecticide Plague Treatment on Populations of Deer Mice on Prairie Dog Colonies" in the Monday (Oct 27th) morning session on Conservation and Management of Mammals. Lenora will report on her research to investigate the effects of deltamethrin insecticide on deer mice using prairie dog colonies at Wind Cave National Park and Custer State Park in South Dakota. Her study compares the effects of deltamethrin application on 6 pairs of treated and untreated study sites. Lenora has also been a student member of the working group for the previous 2 years and presented a poster at TWS as an undergraduate. Her research on blood parasites in Blanding's turtle was featured in The Vector in 2013. If you know Lenora or get an opportunity to meet her at TWS in October please congratulate her.

From the Chair:

Recently, I had the chance to see the Ken Burns PBS special titled "The Roosevelts: An Intimate History." It was a great documentary that gave viewers a detailed look at the life and times of three of my heroes: Teddy, Franklin, and Eleanor Roosevelt. One of the quotes that really hit home with me was some life and work philosophy given to TR by his father. He told Teddy that he should *"Get action. Do things. Be sane. Don't fritter away your time; create, act, take a place wherever you are and be somebody."* Teddy made that his life philosophy. As Wildlife Biologists and Veterinarians working in the arena of wildlife diseases this seems a fitting professional charge and a bold statement for our Work-

(Continued on page 8)

Student Paper:

Pathogen Prevalence and Ectoparasites of the Federally-endangered Amargosa Vole

By Caitlin Ott-Conn

Articles are in-progress reports by students & young professionals. If you wish to cite this information, please contact the author directly for a personal communication or formal citation.

Federally-endangered Amargosa vole captured in the Mojave Desert, Inyo County, California.

Over time, the California vole (*Microtus californicus*) has diversified into 17 recognized subspecies throughout the state. One subspecies of particular concern is the federally-endangered Amargosa vole (*M. californicus scirpensis*). Geographically removed from all other subspecies, the Amargosa vole now depends on highly fragmented, rare habitat in the Amargosa River basin of the Mojave Desert. What ten thousand years ago was lush habitat sustained by the flow of the Amargosa River has become a formidable desert with seasonally extreme temperatures and minimal precipitation. The Amargosa River still flows through the basin that the voles inhabit; however, it is largely underground and can only be seen near river-fed pools that dot the valley. Dependent on a constant source of fresh water, these patchy pools and their surrounding vegetation constitute the only habitat for the Amargosa vole. The expanses of barren land make dispersal very risky and with an estimated population of no more than 500 individuals (U.S. Geological Survey, unpublished data), population vulnerability is an important concern. The Amargosa Valley serves as a stopping site for migratory birds and people seeking recreation in hot spring pools who are often accompanied by their pets. These visitors can increase stress, mortality, and introduce novel pathogens to the Amargosa vole.

For my master's research, I conducted a study of the Amargosa vole to obtain initial prevalence estimates of key parasites and pathogens to establish baseline information that may be used in determining if infectious agents could be limiting population growth. We captured voles, removed ectoparasites, obtained blood and a small amount of ear tissue, weighed, measured, sexed, and released them at their capture site. Recaptured individuals were only resampled if at least one month had elapsed between sampling times. Additionally, we obtained tissue, blood, and ectoparasites (ticks and fleas) from collaborators to allow for expanded diagnostic testing. We tested voles for exposure to and infection with a suite of zoonotic and vector-borne pathogens that potentially cause disease in voles, indicate connectivity with disease from within and outside the Amargosa ecosystem, or are zoonotic. Using TaqMan real-time polymerase chain reaction (PCR), we screened DNA-extracted blood samples for active infection with *Yersinia pestis*, relapsing fever group (RFG) *Borrelia* spp., *Rickettsia* spp., *Anaplasma phagocytophilum*, *Francisella tularensis*, and *Toxoplasma gondii*. PCR was also used to test for active infection with *Borrelia sensu lato* (SL) spp. in DNA-extracted tissue. Indirect immunofluorescent assays (IFA) were used to detect antibodies indicative of prior exposure to *A. phagocytophilum*, *T. gondii*, *R. prowazekii*, *R. rickettsii*, and RFG *Borrelia* spp. using blood serum. A commercially available agglutination test was used in place of IFA for *F. tulaernsis*. Due to limited volumes of samples we were unable to test both IFA and PCR for each pathogen and prioritized based on test expense and availability.

We trapped for four-day trapping periods in December 2011, February 2012, October 2012, and November 2012, with trap number and site determined by accessibility, patch size, and expected vole presence. We trapped a total of 10 unique transects, finding voles at only 4. There were 116 total captures of voles, representing 71 individuals. There were 45 recaptures, with five being in later sessions and thus reassessed for parasites and infection.

We found two ectoparasites of particular interest and potential concern: *Ixodes minor* and *Neotrombicula microti*. *Ixodes minor* is a tick species known only from the southeastern United States and Central America, making it an unexpected finding in the Amargosa River basin. Of the 71 voles we assessed, ticks were found on 8%. We collected most ticks from voles in February 2012 (infestation prevalence 37%). We could not evaluate trapping period and prevalence statistically for all ticks collected because specific dates of collection were not provided by collaborators. Presence of *I. minor* shows that there is potential connectivity to other ecosystems. It is our current hypothesis that infested migratory birds introduced the ticks to the Amargosa River basin (Foley et al. 2014).

The chigger *N. microti*, a species of mite, typical-

Infestation with Trombiculid mites and associated tissue swelling and necrosis of the ear pinnae. Photograph by Caitlin Ott-Conn and Judy Palmer.

(Continued on page 4)

Brief Communication:

Wildlife Services' Use of the dRIT for Enhanced Rabies Surveillance in the U.S.

By Jordona D. Kirby and Richard B. Chipman

If you wish to cite this information, please contact the author directly for a personal communication or formal citation.

Enhanced rabies surveillance is a cornerstone of effective wildlife rabies management. Enhanced surveillance includes testing sick or strange-acting rabies vector species within close proximity to established oral rabies vaccination (ORV) zones or in other areas where rabies research and management is conducted (Figure 1). Samples that involve a human or domestic animal exposure are tested by public health officials using the direct, fluorescent antibody (dFA) method. Enhanced surveillance, in concert with public health surveillance, helps provide comprehensive spatial-temporal distributions of specific rabies virus variants to facilitate science-based management decisions. Current wildlife rabies management programs in the U.S. delineate zones for ORV distribution based on the distribution of rabies cases and the expected direction of disease spread. The ultimate measure of rabies management success is the absence of rabies cases in target species beyond previously established zones.

The Centers for Disease Control and Prevention (CDC) developed the direct, rapid immunohistochemical test (dRIT) for rabies diagnosis that allows for real-time virus detection and reduced costs associated with the dFA. The USDA, APHIS, Wildlife Services (WS), National Rabies Management Program (NRMP) has conducted the dRIT since 2005 in cooperation with the CDC to improve sample turnaround time and reduce the burden of increased enhanced surveillance samples on the public health system. The dRIT is used in the U.S. exclusively for en-

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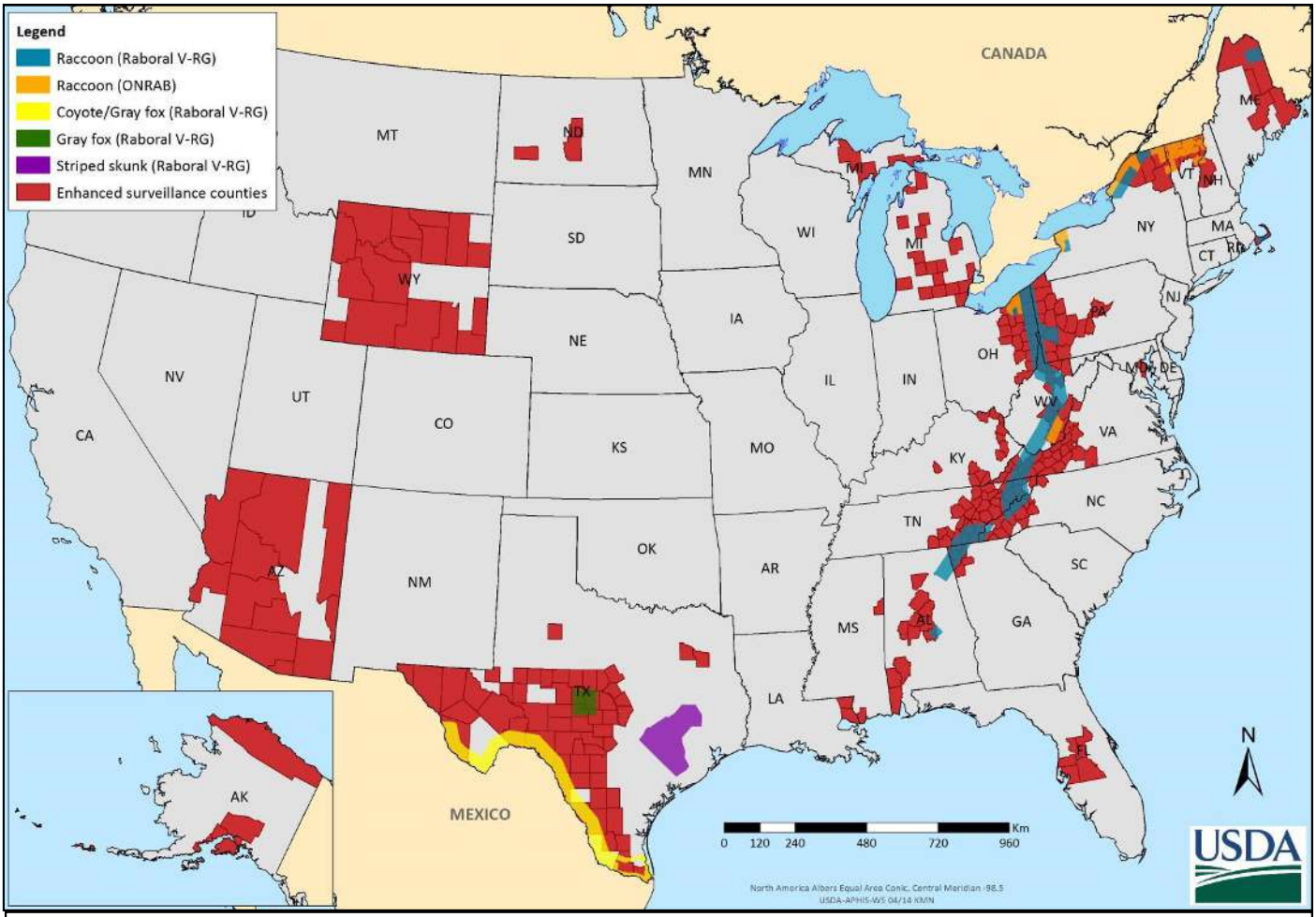

Figure 1. Current cooperative oral rabies vaccination (ORV) zones and Wildlife Services enhanced rabies surveillance counties in the United States, 2013 (Texas includes 2014 ORV).

Special Supplement to JWD: Author Solicitation

Project Title: Special Supplement to JWD: Advances and Improvements in Wildlife Health and Welfare

Project Contact and Special Supplement Editor: Kevin Castle, Secretary, American Association of Wildlife Veterinarians (aawvsecretary@gmail.com)

Primary Collaborators and Associate Editors:
Peregrine Wolff, President AAWV
Sonia Hernandez, Vice-President, AAWV
Colin Gillin, Past President, AAWV
Anne Justice-Allen, WDA-WVS
Nadine Lamberski, WDA-WVS
Dan Mulcahy, Research Wildlife Veterinarian, United States Geological Survey, Alaska

The American Association of Wildlife Veterinarians and the WDA Wildlife Veterinary Section are soliciting manuscripts for a special supplement to the Journal of Wildlife Diseases (JWD), titled: *Advances and Improvements in Wildlife Health and Welfare*. As a recognized expert in working with and improving the health and welfare of free-ranging wildlife, **we would like to invite you to submit a manuscript** to

(Continued on page 7)

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ly found on the ear pinnae, was associated with marked swelling and tissue loss. Mites were also attached to the mammae and genitalia with no apparent clinical lesions. Related mites commonly infest small mammals such as *M. californicus*; however, clinical signs of infestation in Amargosa voles appear to be more severe than described in other *M. californicus* voles. Tissue loss and inflammation may have an impact on individuals by increasing their risk of secondary infection or decreasing their ability to reproduce. Active mite infestation was greatest (18.4%) during December 2011 ($P = 0.002$). Accounting for individuals with active infestation as well as individuals showing sign of past infestation as determined by scaring and tissue loss, *N. microti* prevalence was 37%.

We tested 76 sera samples (71 individuals, with 5 resampled) with IFA and found antibodies against *A. phagocytophilum* (3%), *R. rickettsii* (13%), RFG *Borrelia spp.* (40%), and *T. gondii* (80%). We had sufficient sera to test 43 individuals for agglutination with *F. tularensis* and found no positives. We tested extracted blood and ear tissue of 55 and 80 (9 provided by collaborators) voles respectively for current infection with pathogens. We found *T. gondii* (13%) and *Borrelia* SL spp. (21%). Exposure (IFA) to *Borrelia* SL was higher for voles sampled in 2012 (33%) than those sampled in 2011 (6%; $P = 0.003$). Additionally, infection (PCR) with *Borrelia* SL spp. (40%; $P = 0.021$) was higher in October 2012 than any other trapping session. Cross-reactivity, unavailable species-specific controls, and unknown antibody persistence are potential concerns of our IFA results and may explain the discrepancies between prevalence of active infection and past exposure. Through further PCR extraction and sequencing we hope to flush out strain-specific pathogens.

Caitlin Ott-Conn is a recent graduate from U.C. Davis where she received her Master of Science in Comparative Pathology. Since earning her degree she has worked as a seasonal technician for the Michigan Department of Natural Resources, Wildlife Disease Lab and is currently working as a laboratory technician on a large predator-prey dynamics study out of Mississippi State University. She is interested in obtaining a career position in a laboratory focused on wildlife health and diseases. She can be reached via email at cnottconn@gmail.com.

Overlook of Amargosa vole habitat in the Mojave Desert, Inyo County California.

Of the pathogens found, *T. gondii* has the greatest potential to negatively impact the population. Earlier studies described *Toxoplasma* cysts in the brain resulting in death in *Microtus* spp. (Findlay and Middleton 1934), and rats infected with *T. gondii* showed altered behavior that made them more susceptible to predation (Berdoy et al. 2000, Vyas et al. 2007). Definitive hosts of *T. gondii* include the cat (*Felis catus*) and bobcat (*Lynx rufus*), which are both present in this system and are not only effective predators of the vole, but also have the potential to shed *T. gondii* oocytes into the environment. Since my work constitutes the first pathogen survey of this population, it is unknown how long *T. gondii* has been in the system and the degree to which *T. gondii* infection impacts vole survival or population growth.

Adding to the knowledge of the limited population size, of the 4 transects at which we found voles, approximately 80% of all captured individuals inhabited one hot spring pool. Furthermore, collaborative research at University of California (U.C.), Berkeley, Museum of Vertebrate Zoology found what appears to have been a near complete loss in genetic variability among those eighty percent. Our hope is that through combined research efforts we can increase our knowledge, public education and awareness, and

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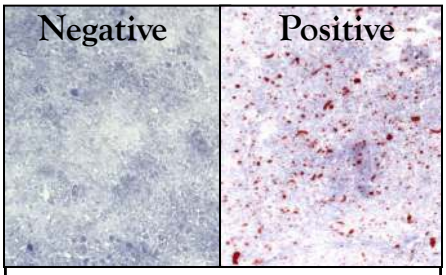

Figure 2. Bright red rabies virus inclusions on a dRIT-positive slide compared to a negative with bluish-purple neuronal background. (Photos courtesy of Michael Niezgoda, CDC)

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hanced rabies surveillance. The total sample processing time is approximately 52 minutes, and the use of simple light microscopy allows this test to be applied under remote field conditions. Rabies virus inclusions in prepared brainstem tissue stain bright red against a bluish-purple neuronal background under light microscopy (Figure 2). Preliminary field testing of the dRIT was conducted in Tanzania from 2002-2004, and the dRIT was 100% comparable in specificity and sensitivity to the "gold standard" dFA test (Lembo et al. 2006). The NRMP, CDC, and Global Alliance for Rabies Control are currently working on a similar retrospective comparative study of dRIT field testing in the U.S.

To date, 66 WS personnel from 21 states have been trained and certified at the CDC to use the dRIT. A total of 21 states and Puerto Rico tested animals for rabies using the dRIT from 2005-2013. All samples diagnosed as rabies positive were later confirmed by CDC using the dFA test and were typed to the specific rabies variant. From 2005 through 2013, WS personnel tested approximately **63,316** enhanced rabies surveillance samples using the dRIT, representing 82% of all USDA-collected enhanced surveillance specimens during that time. Fifteen of the 21 states identified **1,172** rabid animals that would not likely have been tested through rabies exposure-based public health surveillance. Positive cases comprised 1.8% of all samples tested with dRIT. In 2013 alone, an estimated 5,462 samples were collected and tested using the dRIT and 142 positives were confirmed. Enhanced surveillance samples tested by WS using dRIT comprise approximately 6-8% of all rabies surveillance specimens tested in the U.S. annually. Current efforts focus primarily on sick or strange-acting raccoons and skunks, but coyotes, foxes, and more than 20 other species have been tested as well. The dRIT method will continue to be a critical tool used by the NRMP for enhanced rabies surveillance in order to make key management decisions.

Citation: Lembo, T., M. Niezgoda, A. Velasco-Villa, S. Cleaveland, E. Ernest, and C. Rupprecht. 2006. Evaluation of a direct, immunohistochemical test for rabies diagnosis. Emerging Infectious Diseases 12(2):310-313.

Note: Enhanced rabies surveillance numbers cited from WS Management Information System (MIS), Accessed 4/03/2014.

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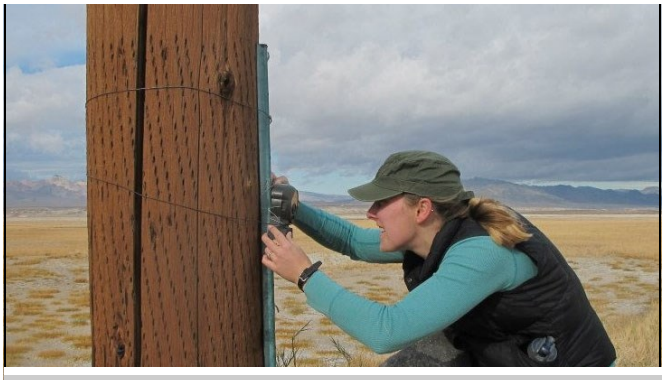
increase habitat protection.

I was exceptionally fortunate to have the opportunity to work with an endangered subspecies, collaborate with local, state, and federal agencies, and be on the leading edge of a large effort to conserve the Amargosa vole and its habitat. Work is ongoing through the joint efforts of California Department of Fish and Wildlife, Bureau of Land Management, U.S. Geological Survey, U.C. Davis, U.C. Berkley, and the Amargosa Conservancy.



Author sets a camera to monitor carnivores in the study site. Photo credit: T. Conn

Berdoy, M., Webster, J.P., and D.W. Macdonald. 2000. Fatal attraction in rats infected with *Toxoplasma gondii*. Proceedings of the Royal Society B 267:1591–1594.

Findlay, G.M., and A.D. Middleton. 1934. Epidemic disease among voles (*Microtus*) with special reference to *Toxoplasma*. Journal of Animal Ecology 3:150–160.

Foley, J., Ott-Conn, C., Worth, J., Poulsen, A., and D. Clifford. 2014. An *Ixodes minor* and *Borrelia carolinensis* enzootic involving a critically endangered Mojave Desert rodent. Ecology and Evolution. 4(5):576–581.

Ott-Conn, C.N., Clifford, D., Branston, T., Klinger, R., and J. Foley. In Press. Pathogen infection and exposure, and ectoparasites of the federally endangered Amargosa vole (*Microtus californicus scirpensis*), California, USA. Journal of Wildlife Diseases.

Vyas, A., Kim, S-K, Giacomini, N., Boothroyd, J.C., and R.M. Sapolsky. 2007. Behavioral changes induced by *Toxoplasma* infection of rodents are highly specific to aversion of cat odors. Proceedings of the National Academy of Sciences of the United States of America 104: 6442–6447.

TWS WDWG Meeting Announcements

The WDWG supported the following 3 symposiums, workshops, etc. through proposals that were submitted to the Board for the upcoming TWS meeting. Our support of these events did not involve any financial contribution; we provided endorsement and a letter of support for each one.

1. Half-Day Symposium: "Understanding the social, biological, ecological, and economic aspects of captive cervid breeding in North America" (co-organizers D. Miller and J. McDonald).

Symposium

26. Understanding the social, biological, ecological, and economic aspects of captive cervid breeding in North America.

Monday, Oct 27, 2014, 8:30 AM -12:20 PM

2. Half-Day Symposium: "Genetic applications to deer management: insights into populations, movements, and disease" (co-organizers J.A. Blanchong, R.W. DeYoung and W.D. Walter).

Symposium

34. Genetic Applications to Deer Management: Insights into Populations, Movements, and Disease.

Monday, Oct 27, 2014, 1:30 PM - 5:20 PM

3. Full-Day Associated Meeting: "Research and Management of Novel Infectious Diseases of Reptiles and Amphibians" (co-organizers K.M. Andrews, A.E. Savage, T.M. Norton, M.C. Allender and V.R. Titus). This is a unique meeting in that it is organized as a full-day Associated Meeting involving presentations, roundtable discussion, and task group break outs.

Workshop

9. Research and Management of Novel Infectious Diseases of Reptiles and Amphibians.

Saturday, Oct 25, 2014, 8:00 AM - 5:00 PM

Other sessions of interest:

Contributed Paper Session 15

Wildlife Diseases and Toxicology

Sunday, Oct 26, 2014, 8:30 AM -12:20 PM

Contributed Paper Session 65

Wildlife Diseases and Toxicology

Wednesday, Oct 29, 2014, 1:30 PM - 5:20 PM

Working Group Meeting

Wildlife Diseases Working Group

Tuesday, Oct 28, 2014, 7:30 AM - 9:30 AM

The Wildlife Society 2014 Annual Conference will take place October 25-30, 2014 in Pittsburgh, PA. For more details, check The Wildlife Society webpage at http://www.wildlife.org/ or http://www.wildlife.org/conferences.

WDWG Board Elections and Bylaw Changes

Voting is open from September 5th through October 20th!

https://www.surveymonkey.com/s/QVRTKWL

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be considered for inclusion in this Special Supplement to JWD.

Animal welfare has become an increasingly important topic of discussion among wildlife disease investigators, managers and the public at large. Recent changes to legislation and regulation dictate that wildlife research must adhere to the highest standards of animal care, yet most of the welfare standards available have been extrapolated from domestic species. Recent studies have been devoted to developing and implementing advances in techniques that specifically address the impact(s) of research and management of wildlife species. This Special Supplement will collect the most relevant work, from a special session at the 2014 WDA Annual International Conference, and through direct author solicitation, and make it widely available to the WDA readership.

Proposed outcomes:
The Special Supplement, to be published in October 2015, will serve as a cohesive reference of real-world, cutting edge guidance and techniques from leading experts in the field on how to identify and ameliorate impacts to wildlife health and welfare during all phases of capture and handling. The publication that results from this work will be of benefit to all WDA members and wildlife professionals in all countries who deal with wildlife health and welfare issues. The papers included in the publication will provide detailed information that is not available through the WDA conference proceedings, and the Supplement will be a valuable resource for Institutional Animal Care and Use committees and others who are tasked with making decisions about wildlife welfare.

Timeline:

WDA Conference (Wildlife Welfare Session)	July 2014
Manuscript submission deadline	January 15, 2015
Publication and distribution	October 2015

Manuscript Guidelines:

The submission deadline is **January 15, 2015**. You may send your manuscript now or up until the deadline. Please submit manuscripts or questions to:

Dr. Kevin Castle, Special Supplement Editor: aawvsecretary@gmail.com

If you have an idea for a manuscript but are unsure of whether it may be appropriate or not, we encourage authors to send a short abstract or tentative title to the Special Supplement Editor in advance (aawvsecretary@gmail.com).

Authors interested in presenting a **review** of a particular aspect of wildlife health and welfare are encouraged to contact the Special Supplement Editor to discuss.

Formatting, manuscript length, and editorial process will follow JWD guidelines for authors of full-length articles. For specific Instruction to Authors, please click here. Dr. Kevin Castle will oversee the peer-review process with the help of associate editors and subject matter experts. Page charges and open-access charges will be paid through WDA Small Grant Program funds and matching funds obtained by the collaborators listed above. **Authors will not be responsible for page charges, nor for providing open access to the supplement.**

Submission will not guarantee acceptance; however, significant consideration will be given to well-written manuscripts based on research that addresses one or more of the following topics in free-ranging wildlife (including fish). Research involving captive animals may be acceptable if it provides information applicable to improving health and welfare of free-ranging wildlife.

* Measuring stress or applying methods to relieve/decrease stress
* Improvements in field surgical techniques, including placement of marking or monitoring equipment
* Improvements or innovation in field anesthetic and anesthetic monitoring protocols (e.g., Benefits of measuring blood gases and other parameters)
* Assessment and alleviation of pain
* Improvements in field euthanasia
* Research that tests how animal welfare is impacted during any of the following components of an event:
    * Pursuit
    * Capture
    * Handling/manipulation
    * Recovery
    * Transport/release
    * Post-release
* Researcher and public perceptions and expectations regarding wildlife welfare
* Defining and measuring a successful handling event (e.g., can post-release mortality inform us of the success of immobilization, or should we really be looking at long-term survival and reproduction?)
* Defining costs/benefits of sedation for activities that do not require general anesthesia
* Assessing the appropriate level of immediate post-immobilization recovery monitoring (i.e., stay with the animal or leave it?)

The **Fifth International Meeting on Emerging Diseases and Surveillance** (IMED 2014) is to be held in Vienna, Austria from October 31 to November 3, 2014. Now established as a fixture for those whose work deals with threats from infectious agents, IMED 2014 will once again bring leading scientists, clinicians and policy makers to Vienna to present new knowledge and breakthroughs and discuss how to discover, detect, understand, prevent and respond to outbreaks of emerging pathogens.

V^TH INTERNATIONAL WILDLIFE MANAGEMENT CONGRESS

JULY 26–30, 2015 IN SAPPORO, JAPAN

From the Chair: (continued)

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ing Group. Get action, do things and create (and be mostly sane!) is what this Working Group has been about from its inception and this year was no exception. We have "taken a place wherever we are" as one of the more involved Working Groups in TWS. We continue to look for ways to be further engaged with the broader professional society. Once again we are co-sponsoring sessions at the annual meeting and for the first time have set up a Wildlife Disease Working Group student travel grant for a deserving student so they can attend the meeting and present their research. These actions move the needle in a positive direction in terms of our understanding of wildlife diseases as well as to help facilitate the communication of the science in support of wildlife disease management. We have truly become an active and activist Working Group and I hope we will continue this trend in 2015. Let's keep the momentum going by having a spirited discussion at the annual meeting so that our Working Group will continue to "create" and "act!" Our annual meeting is scheduled for Tuesday October 28 from 7:30 to 9:00 in Room 307. There will be ample time on the agenda for people to bring forward ideas and issues for the Working Group to tackle next year. Hope everybody has safe travels.

Current Research in Wildlife Disease

Ramey, A.M., Walther, P., Link, P., Poulson, R.L., Wilcox, B.R., Newsome, G., Spackman, E., Brown, J.D., and Stallknecht, D.E. 2014. OPTIMIZATING SURVEILLANCE FOR SOUTH AMERICAN ORIGIN INFLUENZA A VIRUSES ALONG THE UNITED STATES GULF COAST THROUGH GENOMIC CHARACTERIZATION OF ISOLATES FROM BLUE-WINGED TEAL (ANAS DISCORS). Transboundary and Emerging Diseases. doi: 10.1111/tbed.12244. Relative to research focused on inter-continental viral exchange between Eurasia and North America, less attention has been directed towards understanding the redistribution of influenza A viruses (IAVs) by wild birds between North America and South America. In this study, we genomically characterized 45 viruses isolated from blue-winged teal (*Anas discors*) along the Texas and Louisiana Gulf Coast during March of 2012 and 2013, coincident with northward migration of this species from Neotropical wintering areas to breeding grounds in the United States and Canada. No evidence of South American lineage genes was detected in IAVs isolated from blue-winged teal supporting restricted viral gene flow between the United States and southern South America. However, it is plausible that blue-winged teal redistribute IAVs between North American breeding grounds and wintering areas throughout the Neotropics, including northern South America, and that viral gene flow is limited by geographical barriers further south (e.g. the Amazon Basin). Surveillance for the introduction of IAVs from Central America and northern South America into the United States may be further optimized through genomic characterization of viruses resulting from coordinated, concurrent sampling efforts targeting blue-winged teal and sympatric species throughout the Neotropics and along the United States Gulf Coast.

(Continued on page 9)

Wildlife Diseases
The Wildlife Society
Working Group

Mission Statement

The mission of the Wildlife Diseases Working Group is to promote better scientific understanding of the causes and consequences of disease in ecosystems and wildlife populations; to apply the principles of wildlife science, ecology, and epidemiology to the prevention and management of diseases in wildlife; to foster education and transfer of information on diseases to wildlife management professionals and the public; and to apply this knowledge to enhance the health and conservation of wildlife populations and their interactions with humans and domestic animals.

(Continued from page 8)

Gortazar, C., L.A. Reperant, T. Kuiken, J. de la Fuente, M. Boadella, B. Martínez-Lopez, F. Ruiz-Fons, A. Estrada-Peña, C. Drosten, G. Medley, R. Ostfeld, T. Peterson, K. VerCauteren, C. Menge, M. Artois, C. Schultsz, R. Delahay, J. Serra-Cobo, R. Poulin, F. Keck, A.A. Aguirre, H. Henttonen, A.P. Dobson, S. Kutz, J. Lubroth, A. Mysterud. 2014. CROSSING THE INTERSPECIES BARRIER: OPENING THE DOOR TO ZOONOTIC PATHOGENS. PLoS Pathogens, 10(6), art. no. e1004129. doi: 10.1371/journal.ppat.1004129. Identifying the factors allowing pathogens to cross interspecies barriers is essential to mitigate burdens of known and future emerging zoonotic pathogens. The interspecies barrier, by its nature, involves ecological processes driving animal and human population dynamics and interspecies contact. Prior attempts to define these factors or drivers started as early as 1992. Recent contributions in this field underlined the importance of landscape change and ecological alteration. Here, we build on these earlier studies to focus on identifying the factors affecting the interspecies barrier from a more holistic perspective, with the aim of developing a simple framework that classifies factors into a limited number of mutually exclusive categories acting at distinct spatial and temporal scales.

Swirski, A.L., D.L. Pearl, M.L. Williams, H.J. Homan, G.M. Linz, N. Cernicchiaro, and J.T. LeJeune. SPATIAL EPIDEMIOLOGY OF ESCHERICHIA COLI O157:H7 IN DAIRY CATTLE IN RELATION TO NIGHT ROOSTS OF STURNUS VULGARIS (EUROPEAN STARLING0 IN OHIO, USA (2007-2009). Zoonoses and Public Health 61:427-435. doi: 10.1111/zph.12092. The goal of our study was to use spatial scan statics to determine whether the night roosts of European starlings (Sturnus vulgaris) act as point sources for the dissemination of Escherichia coli O157:H7 among dairy farms. From 2007 to 2009, we collected bovine faecal samples (n = 9000) and starling gastrointestinal contents (n = 430) from 150 dairy farms in northeastern Ohio, USA. Isolates of E. coli O157:H7 recovered from these samples were subtyped using multilocus variable-number tandem repeat analysis (MLVA). Generated MLVA types were used to construct a dendrogram based on a categorical multistate coefficient and unweighted pair-group method with arithmetic mean (UPGMA). Using a focused spatial scan statistic, we identified statistically significant spatial clusters among dairy farms surrounding starling night roosts, with an increased prevalence of E. coli O157:H7-positive bovine faecal pats, increased diversity of distinguishable MLVA types and a greater number of isolates with MLVA types from bovine-starling clades versus bovine-only clades. Thus, our findings are compatible with the hypothesis that starlings have a role in the dissemination of E. coli O157:H7 among dairy farms, and further research into starling management is warranted.