UCDAVIS VETERINARY MEDICINE

Poultry Ponderings

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A quarterly newsletter detailing poultry related work, research, and events in California

Inside this issue:

Questions or Comments?

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Chickens and Outer Space:
Using Remote Sensing to Track Waterfowl
(the Primary Reservoir for Avian Influenza)

To put it mildly, Avian Influenza Virus (AIV) is the harbinger of doom for chickens. As natural reservoirs, waterfowl such as ducks, geese and swans can be carriers of LP (low pathogenic) and/or HP (highly pathogenic) AIVs that are shed (aka pooped) into bodies of water along migration routes. Habitat loss has led waterfowl to roost and feed closer to more urbanized areas, increasing possible interaction with poultry or contamination of a water source used by poultry.

For commercial and small-scale (poultry) producers alike, the presence of infected waterfowl most likely increases the risk of an outbreak of disease in domestic poultry. Therefore, understanding where waterfowl are located would be a useful tool. As federal budget cuts continue to impact various government programs, AIV monitoring in the contiguous US has been largely discontinued.

The California Waterfowl Tracker, a new web-app, created in collaboration with University of Delaware, USGS and University of California Davis uses a combination of remotely sensed techniques including NEXt generation RADar (NEXRAD), MODerate Reso-

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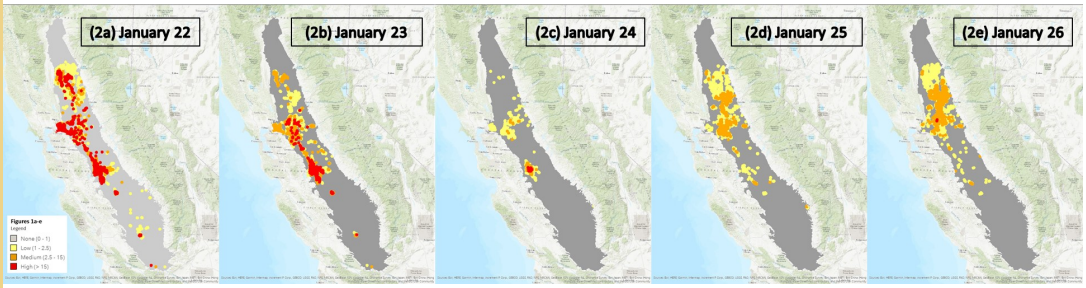

Image 1. Image sequence from the California Waterfowl Tracker illustrating the daily predictions of waterfowl density for January 22 (2a) through January 26 (2e) during the 2019 study period. Colored circles represent the predicted density for High, Medium, and Low density predictions for waterfowl in the California Central Valley.

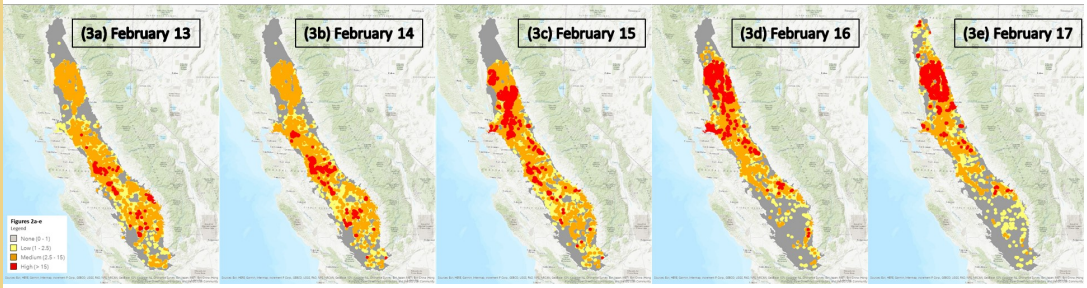

Image 2. Image sequence from the California Waterfowl Tracker illustrating the daily predictions of waterfowl density for February 13 (3a) through February 17(3e) during the 2019 study period. Colored circles represent the predicted density for High, Medium, and Low density predictions for waterfowl in the California Central Valley.

Chickens and Outer Space:
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(the Primary Reservoir for Avian Influenza) *cont.*

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-lution Imaging Spectroradiometer (MODIS) satellite imagery and ground based climate measurements for predicting waterfowl distribution and density in near-real time in the Central Valley of California. The remotely sensed data was integrated into a previously developed model that can be visualized as part of the dynamic California Waterfowl Tracker web-app, which allows producers and other stakeholders to visualize predicted waterfowl distribution and density in relation to point based geographical data (e.g. commercial poultry farms). In short, daily predictions in the California Central Valley are available for anyone hoping to monitor waterfowl activity in their area.

Features of the California Waterfowl tracker including location search and 30-day information extraction in order to help you understand the presence/absence of waterfowl in your given region of the Central Valley of California. For those with many premises that need to be monitored, an easy to use feature that allows you to drop in a csv file with geocoded location information allows for large scale monitoring is available. Assistance with the web-app through UC Davis is available for those who need any help using the website or have any questions regarding the hosted data. Utilizing new technologies to have available data for stakeholders, producers, or backyard poultry enthusiasts can play an important role in the biosecurity of the central valley, decreasing the risk of an outbreak and protecting our food systems. To visit the California Waterfowl tracker click here.
If you need assistance with the waterfowl tracker, please contact Maurice Pitesky, mepitesky@ucdavis.edu

- Sarai Acosta and
Maurice Pitesky

Identifying Sources of Lead Contamination in Backyard Chickens

In 2018, Dr. Pitesky's lab at UC Davis School of Veterinary Medicine, in collaboration with several CE advisors, collected eggs from 344 non-commercial backyard chicken coops throughout California. Out of these 344 locations, 27 premises (7.8%) produced eggs with lead levels exceeding the FDA's recommended threshold for children's daily consumption of lead (3 micrograms). Four of the 344 sites (1.2%) had more than 12.5 micrograms of lead per egg, which is the FDA's recommended threshold on adult's daily consumption of lead. While this data was helpful for identifying backyard chicken eggs as a source of lead exposure, it remained unclear as to how eggs were becoming contaminated with lead.

Using the data from the 2018 study, the Cooperative Extension Poultry Lab designed a study to identify the environmental risk factors associated with leaded chicken eggs. This past summer, researchers visited 21 of the 27 sites with eggs exceeding the FDA lead threshold, and 23 sites that produced eggs with the lowest lead levels in the 2018 study (<0.7 micrograms). Each site visit consisted of environmental testing and a survey of the backyard chicken owner. Soil, water, and paint samples were collected from the area accessible to the chicken and tested for lead at UC Davis. Also, study participants were asked questions regarding the environmental history of their property, their husbandry practices, and information regarding the frequency of their backyard egg consumption.

Lead levels above the FDA threshold for children's consumpt-

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Identifying Sources of Lead Contamination in Backyard Chickens *cont.*

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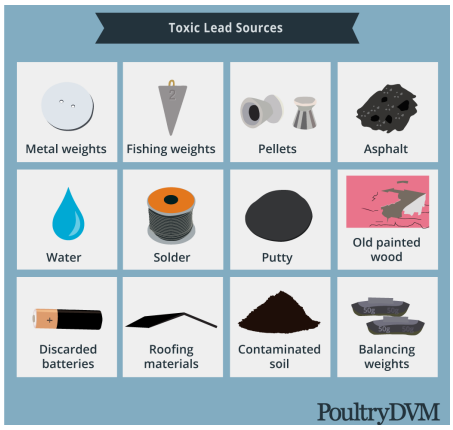


-ion of lead were associated with the following environmental risk factors:

- High lead levels in paint (greater than 600 parts per million, which is the federal threshold)
- Quarter-mile proximity to one or more of the following potential legacy lead contamination sites: operational or non-operational railroad yards, large parking lots, illegal dumping sites, gas stations, freeways, auto repair shops, and/or machine shops

High lead levels in eggs were not associated with the following environmental risk factors:

- High lead levels in water (greater than 15 parts per billion, which is the US EPA threshold)
- High lead levels in soil (greater than 400 parts per million, which is the US EPA threshold)
- The presence of old vehicles on the property
- The firing of leaded shots
- Soil remediation
- If the chickens had access to the entire backyard or were confined to their coop
- The presence of wildfire ash on the property
- If the pipes were installed prior to 1986, which is when leaded pipes were banned by the US EPA under the Safe Drinking Water Act.

Furthermore, although high lead in soil was not related to high lead in eggs in this study, all of the sites with greater than 44 parts per million lead in the soil produced eggs with lead levels exceeding the FDA threshold for children's consumption of lead. In other words, none of the sites with greater than 44 parts per million lead in soil produced eggs with less than 3 micrograms of lead. This could potentially suggest that there is some relationship between lead levels in eggs and lead levels in soil, but more data is needed before any conclusions can be drawn.

The best way to determine if your eggs contain unsafe levels of lead is simply to send a few eggs (2 to 6 should suffice) to a laboratory for testing. The California Animal Health and Food Safety Laboratory System (CAHFS) has locations in Davis, Turlock, Tulare, and San Bernardino, and can test your backyard eggs for a variety of heavy metals. Furthermore, if your house, garage, fence, or coop was built or painted before 1978 (the year that the federal government banned paint with more than 600 parts per million lead), we recommend testing the paint on your structure before consuming eggs in the backyard, particularly if you have small children. Also, before setting up your coop, it may be worthwhile to spend a little bit of time researching the environmental history of your area. And finally, any concerns regarding your personal lead exposure are best answered by your personal physician. Please visit our website to learn more about heavy metal contamination:

http://bit.ly/byp_hvm

- Maurice Pitesky, Todd Kelman, Maryse Suppiger

2019 One Health Symposium

The UC Davis Cooperative Extension Poultry lab had an opportunity to present data on antimicrobial resistance in backyard poultry during the 2019 One Health Symposium. This 6th annual symposium was held at the UC Davis School of Medicine and was hosted by the Students for One Health and UC Davis One Health Institute. The conference included speakers from various research backgrounds, including animal health, environmental health, and public health. Attendees had the chance to participate in role play workshops and discussion groups to better understand new scenarios and problems that may arise within different research fields.

The extension lab presented the results on a yearlong study of antimicrobial resistance in backyard poultry. The study included a survey of backyard poultry owners from California with the goal of analyzing resistance in common foodborne pathogens. Samples were collected from 32 different locations. The study utilized a citizen science approach, where participants were chosen through initial surveys and given supplies and instructions to collect samples from their flocks. Samples were sent during four different periods between 2018 to 2019. The samples were then analyzed by CDFA for common foodborne pathogens including *E. coli* and *Salmonella.* Results showed that 100% of samples tested positive for *Enterococcus,* 5.88% were positive for *Campylobacter*, 3.78% positive for *Salmonella,* and 89.08% positive for *E. coli.* While *E. coli* and *Enterococcus* were found at higher percentages, these microbes are often found in the gut of most animals and are typically not harmful to their hosts or to human health.

The symposium provided an opportunity for the Extension Poultry lab to discuss their ongoing work with surveillance of antimicrobial resistance with attendees, in addition to its impact on public health. Participants from different research emphases discussed connections between their fields. The symposium provides a chance for people to learn more about new and interesting research.

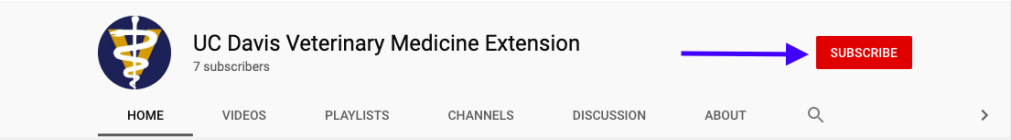
- Odette Clamp, Maurice Pitesky, Sarai Acosta, Macie Tanaka

UC Davis Veterinary Medicine Cooperative Extension is on YouTube!

Did you know UC Davis Veterinary Medicine Cooperative Extension has a YouTube Channel? We are always looking for new ways to increase outreach efforts, and our newest addition takes advantage of the popular video sharing platform.

What is it?

YouTube is a free web platform where users can upload videos for the public to see. It is a great place for discovering new ideas and spreading information! As a viewer, you can share videos you find useful with other people and use the "Comments" section to connect with others and engage in discussions.



What videos do we post?

On our YouTube channel, you'll be able to see videos explaining what our Cooperative Extension specialists are working on. You can learn about their current projects and find out how you can help as a citizen scientist. We also post videos of recorded workshops and other events hosted by UC Davis Veterinary Medicine Cooperative Extension.

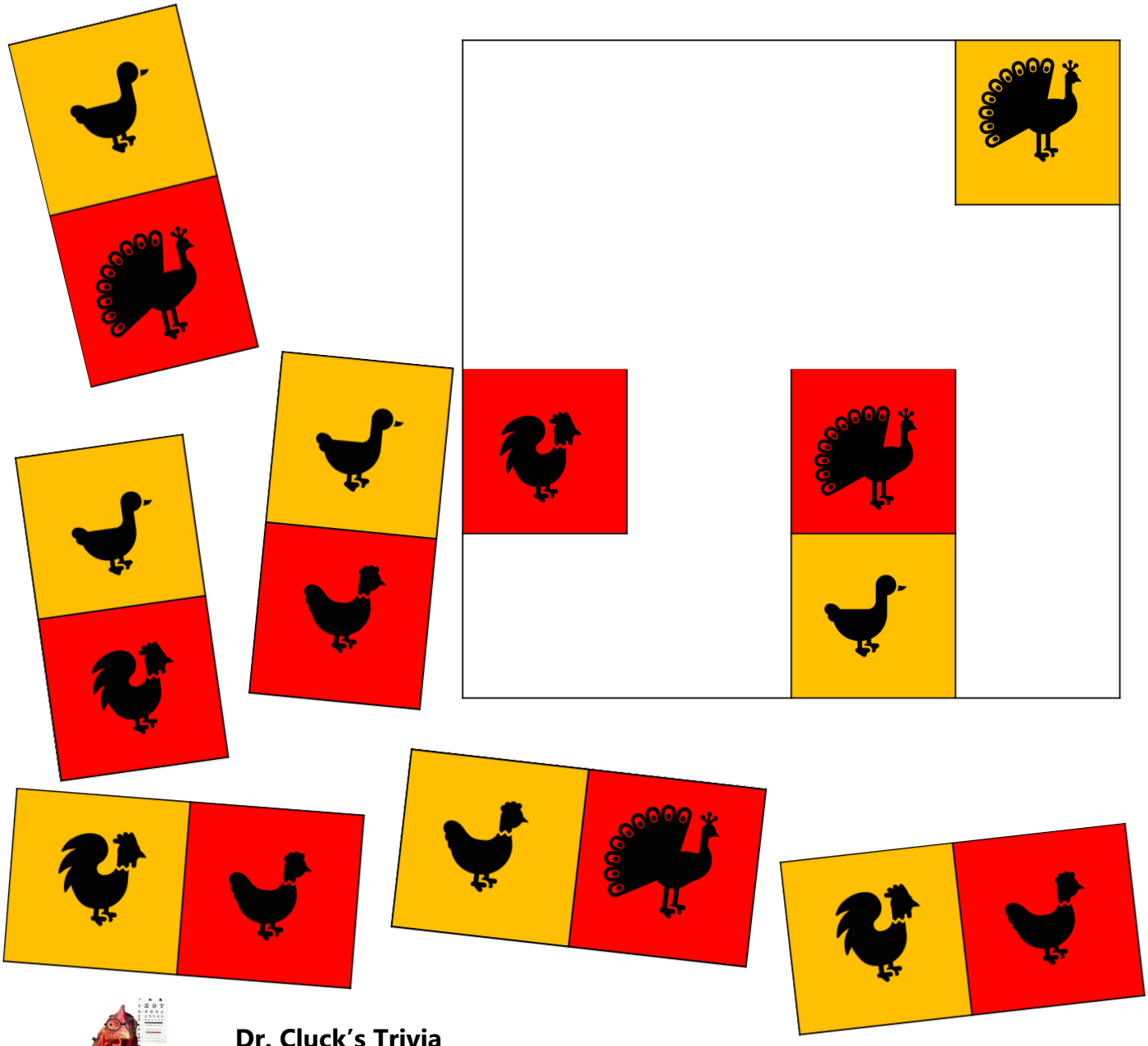
Should you I subscribe?

Absolutely! You can subscribe to our YouTube channel free of charge. Subscribers will receive notifications when new videos are posted, so you can be up to date on the latest news and projects from Cooperative Extension.

Here's the link to our YouTube channel: https://www.youtube.com/channel/UCP_1xWyE9U3JxjpsL9W-Crg

Dr. Cluck's Puzzle

Help Dr. Cluck solve this puzzle! These birds need to be organized in the pasture based on bird type and color. Each row and column must contain 2 squares of each color (2 red, 2 yellow) and 1 of each bird type.



Dr. Cluck's Trivia

Last quarter's trivia: ***What was the first country to require eggs to be washed before being sold?***

Answer: United States. Washing eggs is required as a method of avoiding bacterial contamination and for food safety. However, this method requires eggs be continuously stored at low temperatures. While most other countries don't require eggs be washed by producers, these eggs are generally not refrigerated.