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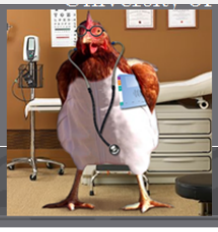
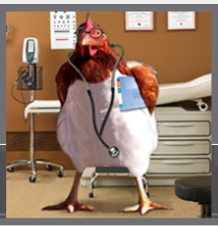


POULTRY PONDERINGS



A QUARTERLY NEWSLETTER SUMMARIZING POULTRY RELATED WORK AT UC

Hand-Moveable Chicken Coops for Small Scale Egg-Production

Jake Parkhurst, Raeita Mehraban, Teymouri, Deb Niemeier, Ph.D.,
UC Davis School of Engineering

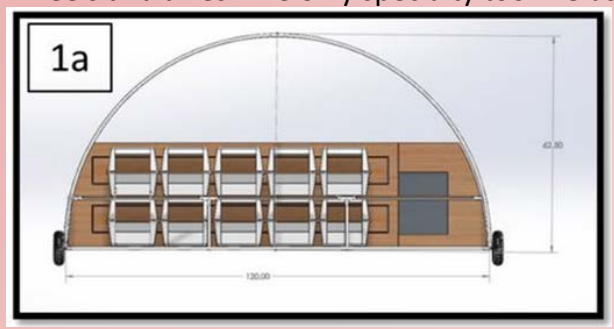
Small farms can benefit from the secondary revenue produced by selling eggs. However, start-up capital costs to add layers can be high. In some situations mobile coops could be used to house hens to allow for convenient grazing on different parts of a farm. However, there are both cost and design limitations. Current mobile coops are often designed either for 5-10 birds or several hundred; the number of smaller coops needed to house a profitable sized flock is too cumbersome to move, and the larger coops require the use of a tractor or 4-wheel drive truck. Medium sized mobile coop designs, housing on the order of 25-50 birds, are scarce. Therefore, we have designed a medium sized mobile coop that is moveable by hand and thereby allows the coop to be transported to any part of the farm without the use of a tractor. In addition to being hand portable, our prototype is simply built with readily available materials and inexpensive enough to be cost accessible to small farms.

Basic Needs

Our current prototype (Figure 1a and 1b) houses 45 layers, providing 1.8 square feet per bird and one nest box for every 5 birds. The roosting bars are 20 inches off the ground, with 10 inches of perch length per bird. Feed and water are provided by stand-alone containers, but future research will look at integrating the feed and water systems into the structure. The coop is designed to be enclosed within a fenced area (e.g., easily moved electric netting) and can be equipped with an automatic door.

Simply Built

The coop uses only materials that can be bought at most hardware stores, with the exception of the wheels and axles. The only specialty tool we used was a pipe bender. *Cont on next pg.*



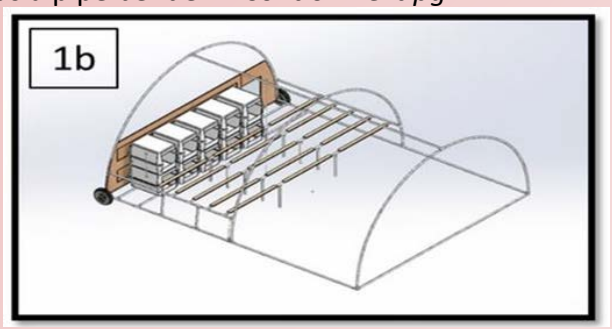


Figure 1a and 1b: Schematic representation of mobile coops. The physical prototype is currently being built and will be used for the next UC Davis Pastured Poultry Flock.

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For the prototype, we had access to the UC Davis machine shop, but we found a tool that will create the right bend for $54. Two other tools that are more common, but maybe not in everyone's garage or tool shop, are a pipe cutter (~$25) and a table vise (~$60).

Portability

The biggest design constraint was to reduce the weight to ensure the ability to easily move the coop. Initially, we wanted to use wood because it is a common material in many back yard materials piles, which could offset the initial capital cost. However, in order to incorporate nest boxes and other basic husbandry needs, wood was determined to be too heavy. After considering other lighter materials which met our weight constraints, we selected ½" EMT aluminum tubing for the structural components. The aluminum tubing was selected over other materials including PVC pipe due to it's superior durability (i.e. it won't degrade in the sun) and ease of disassembly (everything is bolted, not glued). The current design is approximately 120 lbs and uses 13" wheels; future improvements may use bicycle wheels, which are less expensive and roll better on soil.

Future research

In addition to integrating the feeding and watering systems and considering bicycle wheels, one important area of research we would like to continue is improving the ergonomics of collecting the eggs. Currently, the farmer has to kneel to reach into each nest box to collect the eggs. A lightweight rollaway nest box at waist length would make collection easier. Another area for improvement is protection from the weather: our prototype currently provides limited shelter from rain, although it uses 80% shade cloth for wind and sun protection. Lastly, we plan to explore lighting systems and necessary retrofitting of the coop to improve egg production.

We are always looking for new ideas, so if you have some ideas you'd like for us to explore or ideas to improve our design, please follow this link. We'd love to hear from you.

Updates on diagnostic services for backyard flock owners

Asli Mete, CAHFS

For over a decade, the California Animal Health and Food Safety (CAHFS) laboratories in San Bernardino, Tulare, Turlock and Davis have been providing diagnostic services to backyard flocks (chickens, turkeys, squabs or waterfowl from flocks with less than 1000 birds) at no cost. The provided services on deceased or diseased birds consist of performing autopsies and finding the cause of demise or diseases as well as surveillance for highly contagious and deadly diseases such as Exotic Newcastle Disease (END) and the Highly Pathogenic Avian Influenza (HPAI). We have learned much about backyard chicken diseases, and a number of research publications have come out of this effort, including novel information about poultry diseases and trends in Backyard poultry including Marek's disease and lead toxicity (see the publication section for relevant articles). *Cont on next pg.*

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During the last year, we have also implemented surveillance for lead content for free for every case, due to the public health problems associated with lead exposure from eggs and meat. Our toxicology resident, Dr. Arya Sobhakumari has been working on this project, and will report the findings after its completion in October, 2016.
Although CAHFS remains committed to helping backyard chicken enthusiasts, it is no longer economically possible for our laboratories to provide those diagnostic services at no cost. As of October 1 2016, submission of 1-2 backyard birds from a single location will cost $20 at time of submission (additional mailing fees will apply to owners for shipping). Tests included in this fee will be gross observations, histopathology, HPAI and END testing. The list of additional tests and fees, submission forms and process can be viewed on our website give: http://www.cahfs.ucdavis.edu/

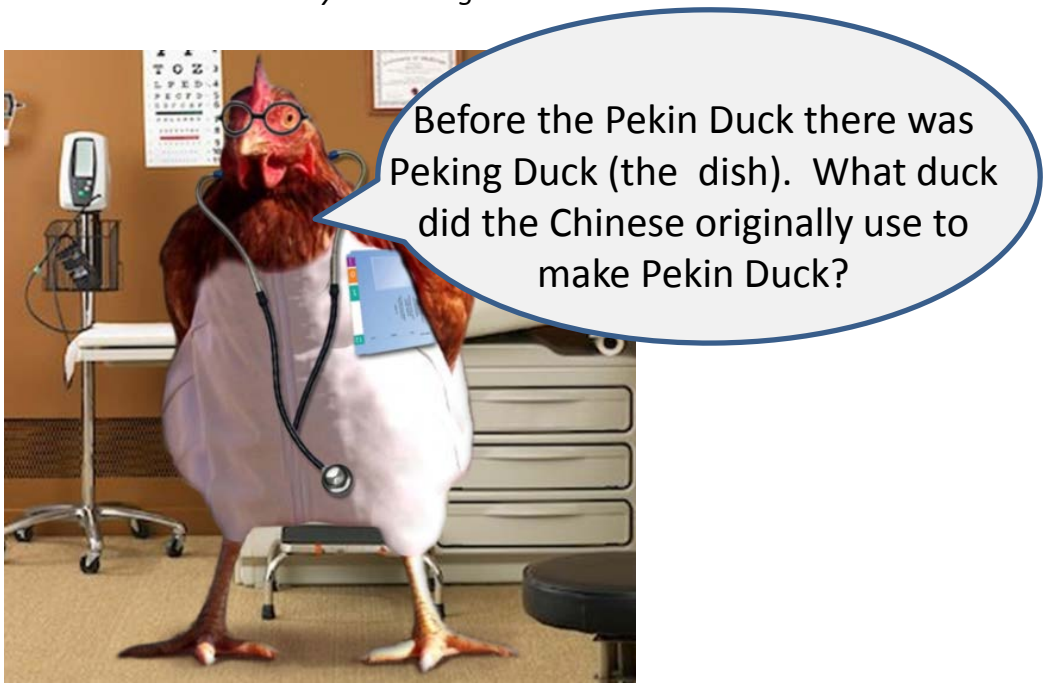
Mitigating Feed Waste in a Free Range Poultry Setting

Alison Thorngren , Anny Huang & Maurice Pitesky
UC Davis, Pastured Poultry Farm

Regardless of the scale of your free-range flock, a common problem for poultry producers is the amount of money wasted on feed that isn't consumed. This often occurs due to chickens scratching feed out of their feeders and onto the ground. Although some feed may be eaten off of the ground, feed is invariably wasted resulting in both financial losses and risk with respect to attracting wildlife. The UC Davis Pastured Poultry Farm designed an experiment to help determine the best way to minimize this problem by looking at both feed texture (i.e. crumbled vs pelleted) and feeder design. With respect to feeder design we compared standard 20kg poultry feeders (Fig. 1) with a "No Waste" feeder design (Fig. 2) adapted from "mypetchicken.com" We found that both feed texture and feeder design play a role in feed waste. Specifically, the hens wasted significantly more crumbled feed compared to pelleted feed when using the standard feeder. In contrast, no differences in feed waste were noted when using the "no waste" feeder. However, the hens ate significantly less feed when using this feeder.

This was most likely due to the adaptation the hens needed to make as 50 week old layers to the new feeders. We also noted a significant corresponding drop in egg production (measured by hen-day egg production) during the same time which most likely reflects a lack of proper nutrition during that transition to the new feeders. Additionally, while the amount of feed waste increased with the introduction of the crumbled feed, we also found that the amount of feed eaten (measured by the average feed eaten per shift) also increased. However, there was no significant increase in egg production, and thus we tentatively conclude that the use of pelleted feed in place of crumbled feed may significantly decrease the amount of feed wasted while maintaining the same rate of egg production and hence a lower feed conversion ratio.

Future research will focus on the ergonomic design of the "no waste" feeder and on long-term studies using both feeders in a case-control experimental design where identical flocks can be compared against each other for the life of the flocks with feeder design as the difference,



Last quarters trivia: The "corpus callosum" (i.e. a band of nerves joining the two hemisphers of the brain) is an anatomical feature that the human brain has but the avian brain does not have

Backyard Poultry Practices and Respiratory Disease antibody Profile

Theodore Derksen, Rodrigo Gallardo
UC Davis School of Veterinary Medicine

Owning backyard chickens is a hobby that has been growing in recent years and most likely will continue to grow. As this trend continues, the potential for disease transmission between backyard flocks and commercial poultry is raising more interest and concern. Unfortunately, there has been very little research on backyard poultry health with respect to understanding the risk associated with infectious disease transmission. In order to address this question we have been conducting a survey and serological studies to determine common biosecurity practices and antibody profiles to selected respiratory infectious diseases for backyard chickens in California.

With respect to diseases tested, blood was collected for ELISA tests looking for antibodies against the following respiratory diseases: *Mycoplasma gallisepticum (MG), Mycoplasma synoviae*, Infectious Bronchitis, Newcastle Disease,
Infectious Laryngotracheitis (ILT), *Ornithobacterium rhinotracheale* (ORT), and Avian Influenza.

Preliminary results showed areas for improvement in biosecurity for backyard flock owners including the use of dedicated clothing. Prelimary ELISA results show that ILT and MG antibodies are commonly found in backyard chickens that are close (<4 miles) to a commercial poultry facility and that ORT antibodies are found more commonly in chickens that are far (>4 miles) from a commercial poultry facility. In conclusion, our preliminary results show that, backyard poultry are exposed to pathogens known to cause morbidity and mortality in commercial poultry facilities.Knowledge of these specific risks and improved biosecurity are necessary to mitigate disease transmission.

Useful Information on Highly Pathogenic Avian Influenza information and prevention be found at: http://www.cdfa.ca.gov/ahfss/Animal_Health/Avian_Influenza.html

Backyard Poultry Fly Control

Caleb Hubbard and Amy Murillo,
Dept. of Entomology, UC Riverside

Poultry manure provides developmental sites for nuisance flies that can plague backyard chicken flocks. Two major fly species that can cause problems are the house fly (*Musca domestica*), and the little house fly (*Fannia canicularis*). In addition to being annoying, flies in excess can leave behind fly spots (defecation or regurgitation sites) on resting areas, which can be unsightly to homeowners and neighbors alike. In addition, flies can also transmit human and animal disease agents.

While looking at piles of dead flies may not seem rewarding it is an essential task toward understanding their life cycle and reproductive success in different environments. The fly species aforementioned breed in moist environments provided by the almost constant supply of fresh manure produced by chickens. Under ideal conditions, a single female house fly can lay up to 300 eggs at a time, and with development from egg to adult taking as little as seven days, it is important to be diligent in the management of larval habitats.

The most efficient and effective way to control flies is to properly remove or manage manure. This may be accomplished in the following ways:

a. Collect and dispose of manure regularly in sealed trash bags

b. As often as possible spread the manure in a thin layer in an area that will get direct sunlight causes drying of the manure, therby making it uninhabitable for fly eggs and larvae. Once manure is dry, it can either be disposed of or used as a fertilizer for the garden where it is a great source of Nitrogen and other macro and micro-nutrients). If you are using manure as fertilizer, it should be incorporated into the soil so flies cannot use it to lay eggs on.

With respect to composting manure, you should ensure proper compost turning as the composted material goes through heat cycles. If you are allowing chickens “free range” access to the manure, chickens will pick through the manure and feed on maggots, which not only will allow for reduced maggot numbers but will also provide a nice treat and supplemental protein source for the chickens.

Inevitably, flies will be able to develop to adulthood even with the best of prevention measures. More familiar control methods for adult flies include: Fly traps, sticky cards or tape, fly baits, insecticides , UV light traps and fly swatters which is the only method flies will never develop resistance against)

For more information on fly management visit veterinaryentomology.ucr.edu

Useful Information on Highly Pathogenic Avian Influenza information and prevention be found at: http://www.cdfa.ca.gov/ahfss/Animal_Health/Avian_Influenza.html

UC Davis Pastured Poultry Farm Responds to Stakeholder's Increased Interest in Commercial Pastured Poultry

Myrna Cadena and Maurice Pitesky
UC Davis School of Veterinary Medicine-Cooperative Extension

Over the past year the UC Davis Pastured Poultry Farm has served as an education center and resource for various poultry stakeholders including pastured poultry producers, California Farm Academy students, regulators, veterinarians, undergraduate and graduate students and 4-H leaders.

As an example, 4-H staff and leaders, and Future Farmers of America (FFA) who attended the 2016 4-H Animal Science Symposium at UC Davis learned about poultry health, behavior and welfare from various CE faculty including Richard Blatchford and Maurice Pitesky. As part of the symposium organized by Martin Smith from UC Davis, attendees visited the Pastured Poultry Farm and learned about basic management practices and challenges in pastured poultry and similar free-range systems.

During the summer, in collaboration with the California Farm Academy's Farm School, the UC Davis Farm co-hosted a poultry workshop for beginning farmer students on poultry husbandry. Lecture topics included poultry diseases, mixed species and crop considerations, and the husbandry, behavior and welfare of pastured poultry.

During the fall, Deb Niemeier from the school of Engineering and Maurice Pitesky spoke at a workshop at UC Davis that included speakers and members of the American Pastured Poultry Producers Association. Topics included, coop design, light and soil sensors, *Salmonella* control and the use of black soldier fly larvae as a nutritional supplement.

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Other training activities that have occurred include hands-on training on Marek's vaccination administration as part of the 2016 Tour de Cluck in Davis.

In addition to all the off-campus stakeholder training, Dr. Rodrigo Gallardo from the UC Davis School of Veterinary Medicine takes students from the poultry block to the farm to learn more about poultry health and husbandry. Additionally, undergraduate students have learned similar skills while gaining academic credit as part of a 199 course.

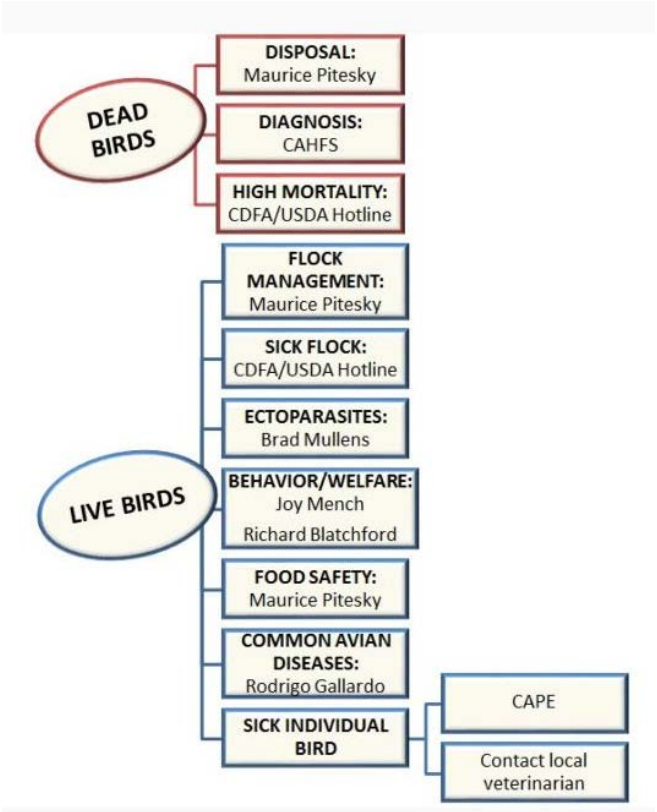
In addition, to the above events, the farm has donated over 1,600 dozen table eggs and over 150lbs. of meat to the Yolo Food Back. Overall, it was an eggcellent year for the UC Davis Pastured Poultry Farm!

Getting Ready to Hatch …

January 7th and 8th UC Davis Winter Conference including CE on Backyard Poultry (in person or Adobe Connect)

Conact Maurice Pitesky at mepitesky@ucdavis.edu for further information

Remember Who to Call if You Have Poultry Questions



The web address for the this flow chart along with individual contact information is at:
http://ucanr.edu/sites/poultry/

2016 Poultry Related Peer Reviewed Publications from UC Faculty*

In order to better summarize UC's academic efforts in poultry related areas, we will annually list peer reviewed articles from faculty. The following is a non-exhaustive list from faculty that responded to our query. Feel free to reach out to the first or last author of the following publications.

Comparative analysis of Campylobacter spp. isolated from wild birds and chickens using MALDI-TOF, 16S rDNA PCR/sequencing, and conventional biochemical testing, JVDI, 2016. Samantha Lawton, Barbara A. Byrne, Heather Fritz, Conor Taff, Andrea Townsend, Asli Mete, Sarah Wheeler, Walter M. Boyce.

Marek's disease in backyard chickens, a study of pathological findings and viral loads in tumorous and non-tumorous birds, Avian Diseases, 2016. Aslı Mete, Radhika Gharpure, Maurice E. Pitesky, Dan Famini, Karen Sverlow, John Dunn.

Operational Challenges and Opportunities in Pastured Poultry Operations in the United States Elkhoraibi C, Pitesky ME, Dailey N, Niemeier D.. Journal of Poultry Science (in press).

Descriptive survey and *Salmonella* surveillance of pastured poultry layer farms in California. Journal of Poultry Science Dailey N, Niemeier D, Elkoraibi C, Sentíes-Cué GC, Pitesky ME. (in press).

A Serosurvey of the Greater Sage-Grouse (Centrocercus Urophasianus) in the Great Basin. Sinai NL, Coates PS, Anderle KM, Sentíes–Cué GC, Jefferis C, Pitesky ME. Journal of Wildlife Disease (in press).

Variability Assessment of California Infectious Bronchitis Virus Variants. Gallardo RA, Aleuy AO, Pitesky ME, Sentíes–Cué G, Abdelnabi A, Woolcock PR, Hauck R, Toro H. Avian Diseases, Jun;60(2):424-9.

Assessing Salmonella Typhimurium Persistence in Poultry Carcasses Under Composting Conditions. Vadella V, Pitesky ME, Cao W, Shi J, Pandey P. Journal of Poultry Science 00:1-10, 2016.

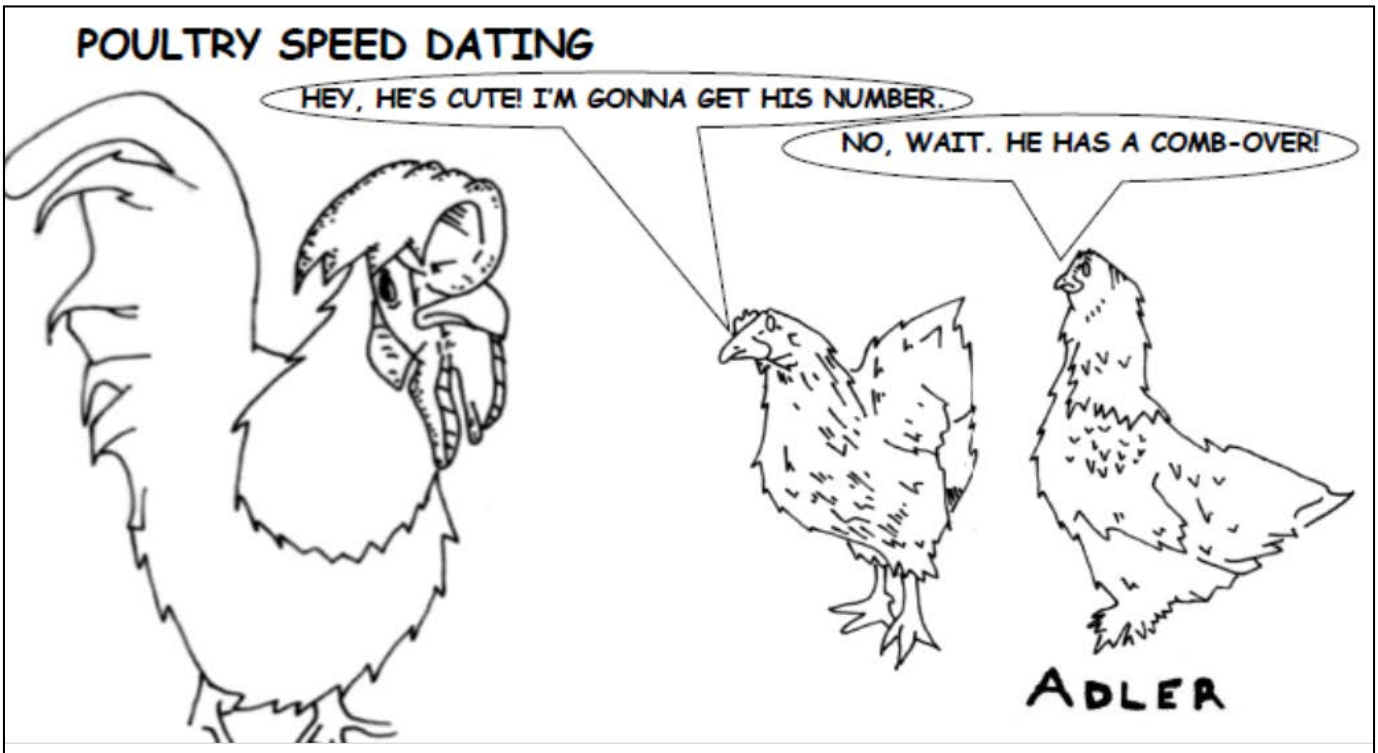
Evaluation of Protection Induced by Riemerella anatipestifer-E. coli O78 Bacterin in White Pekin Ducks. Stoute S, Sandhu ST, Pitesky ME. Journal of Applied Poultry Research. 0:1-7, 2016.

A Novel Technique for Ectoparasite Control in Poultry Systems Murillo, A. and B. Mullens. 2016. Sulfur Dust Bag:. Journal of Economic Entomology. doi: 10.1093/jee/tow146.

*Diatoms and Diatomaceous Earth as Novel Poultry Vaccine Adjuvants*Nazmi A., R. Hauck, A. Davis, M. Hildebrand, L.B. Corbeil, R. A, Gallardo. . *Poultry Science*. doi: 10.3382

*A Coronavirus Associated with Runting Stunting Syndrome in Broiler Chickens*Hauck R., R. A. Gallardo, P. R. Woolcock, H. L. Shivaprasad.. *Avian Diseases*. 60:528-534, 2016.

Avian Encephalomyelitis in Layer Pullets Associated with Vaccination Senties-Cue G., R. A. Gallardo, N. Reimers, A. A. Bickford, B. R. Charlton, H. L. Shivaprasad.. *Avian Diseases*. 60:511-515, 2016.



"Fowl Play" is written by Dr. Evan Adler

Enroll your Backyard Flock in the California Poultry Census!

Get alerts!
Get involved in UC Davis Projects!
Have your flock included!

http://ucanr.edu/sites/poultry/California_Poultry_Census/

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http://www.cdfa.ca.gov/ahfss/Animal_Health/Avian_Influenza.html

PLEASE CONTACT MAURICE PITESKY AT MEPITESKY@UCDAVIS.EDU OR 530-752-3215 WITH QUESTIONS, COMMENTS OR TO GET ON OUR MAILING LIST FOR POULTRY PONDERINGS