

Insect Updates

Mode of resistance in cattle ticks uncovered

Researchers at the University of Glasgow have identified the genetic basis for one of the forms of pesticide resistance in the cattle tick, *Rhipicephalus microplus*. Some populations of this tick species have developed resistance to Amitraz, a widely used acaricide for controlling ticks.

About 80% of cattle worldwide are exposed to the cattle tick, mostly in the tropics and subtropics, with a global cost of tick-borne diseases and control measures estimated to

be more than \$6 billion annually.

Resistance is found in 20% of Australian tick populations and 50% of Mexican tick populations.

Researchers were able to describe the evolution of amitraz resistance in ticks from the field. They were also able to demonstrate a close association between resistance to amitraz and a specific allele of the β -adrenergic octopamine receptor gene, which is

proposed to confer resistance.

Tick populations were tested against amitraz and spinosad in different rotations.

With DNA tests, they were able to find treatment efforts with amitraz increased the frequency of a particular gene mutation while increasing the prevalence of amitraz-resistance.

This research can lead to new genetic tests for resistance to assist farmers in making tick-control decisions and understanding the mode of resistance.



Imported fire ants the cause of death in Texas

Most people are very aware of the nuisance red imported fire ants cause people in the south but few recognize the life-threatening danger these small pests pack with their bites and their stings.

Unfortunately a Texas teen recently feel victim to these tiny pests while playing football. The teen had a severe allergic reaction to the fire ant bites, this is rare but when it occurs quick thinking and response is necessary.

Fire ant stings can result in serious medical problems, even in people with normal immune systems. Most people can tolerate stings and severe allergic reactions can occur in less than 1% of the human population.

Although it is a low percentage of incidences, when the victim is someone of significance to you, the urgency of control will arise.

Many times fire ant mounds can go unnoticed, especially during

and after a drought and during the winter. The ants will move their mounds further into the ground for survival purposes.

It is important to treat yards, pastures and playing fields regularly with fire ant baits. Many are labeled to work for six months before they need to be reapplied. To prevent the return of fire ants, bait should be applied twice a year, every year even if fire ant mounds are not visible.

APHIS grants conditional approval of Rift Valley Fever vaccine

The Animal and Plant Health Inspection Service (APHIS) has issued a conditional license to Zoetis for the manufacture and distribution of the Rift Valley Fever Vaccine, Modified Live Virus.

This license was issued on the basis that the licensee

demonstrated the product has a reasonable expectation of efficacy.

Several safety studies have established the product to be safe and the conditional license will be good for 2 years.

Rift Valley Fever, although not

here, is a viral zoonotic disease that occurs in livestock. The virus is spread by mosquitoes and is found primarily in Sub-Saharan Africa.

Rift Valley Fever can cause elevated abortion and death to livestock.



Cattle Care Injection site basics

Giving dairy and beef cows injections for vaccines, antibiotics and other medicines is a necessity but individuals giving these injections need to be sure to use the right sized needles and proper techniques.

Injections need to be given correctly to prevent bacterial infection, nerve paralysis or muscle soreness. In addition, injection-site lesions and

abscesses have been estimated to cost the US beef industry \$4.2 million annually.

Basic principles to follow:

1. Follow label directions for injection sites.
2. Use neck for intramuscular injections.
3. Follow label for maximum volume per injection sites.
4. Follow dosing schedule.

5. Use a new needle and syringe or clean between uses.
6. When using modified-live vaccines, always use a new syringe and needle, no disinfectant.
7. Check temperature of the refrigerator.
8. Discard unused mixed modified live vaccines.
9. Observe expiration dates.
10. Check fridge temps with a thermometer.

“Seems like a laundry list of some real basic points, but if not followed correctly we can lose the benefit of the animal health products we use or, in some cases, actually cause more harm.”

Common-sense antibiotic use

Antibiotics are a powerful and important tool in human and animal medicine, and proper use will keep them effective. Since their introduction in the 1940s along with vaccines and improved sanitation, there have been fewer deaths from infectious diseases.

Overuse of antibiotics can add

risk of resistance pathogens emerging but society must balance the risk of using them in animal agriculture with the need for food.

To minimize the risk of antibiotic-resistant pathogens:

- Use only when indicated
- Use the least broad-spectrum

products first

- Use for least time possible
- Use adequate therapeutic doses
- Use antibiotics not important to human medicine when possible
- When using ‘crossover drugs’ use for least impact to human health
- Appropriately monitor cultures

Cattle respond to covered pens

Pratt Feeders assessed the cost/benefit of shade on cattle already stressed by drought with the assistance of Kansas State University.

Results showed a good difference in packing plant performances that generally favored the cattle in the shade.

The final calculations showed a net grid premium of \$43.01 for no shade and \$58.48 shade.

Bovine reproductive and respiratory vaccine

Beef and dairy producers now have the ability to vaccinate pregnant cows and nursing calves of pregnant cows against bovine reproductive and respiratory diseases with Vista.

Reproductive diseases account

for economic losses of \$1 billion annually and bovine respiratory disease (BRD) is the most prevalent disease in calves older than 30 days.

Approved by the USDA, this adds another level of protection and management flexibility to

Vista.

This will provide both reproductive protection for cows and respiratory protection to calves. The nursing calf claim allows producers to vaccinate calves pre-weaning for respiratory diseases.

Human & Animal Disease & Health

Protect cattle against bacterial diseases

Two of the most contagious and costly disease of cattle – bovine tuberculosis (TB) and Johne’s disease – are caused by mycobacteria, *M. bovis* and *M. avium* subspecies *paratuberculosis* (MAP), respectively.

Scientists at the ARS National Animal Disease Center in Iowa are drawing up new battle plans to help control both diseases by developing and improving diagnostic tests, vaccines and other technology.

Bovine TB still persists in wildlife and can be transmitted to cattle and cattle from Mexico can be infected, all which counteracts US efforts to eradicate. The current skin test is not sensitive enough, takes 72 hours and still the whole herd must be euthanized. Scientists are working on more effective tests that would allow producers to identify and remove infected cattle keep TB-free animals.

In addition to the new tests, a century-old vaccine, Bacillus Calmette-Guerin (BCG), is being tested in deer and may provide a missing piece of the puzzle in eradicating

bovine TB. So far it appears to be safe for deer.

Johne’s is also a priority. It can cause diarrhea, reduced feed intake, weight loss, and sometimes death. Annual losses in the dairy industry alone exceed \$220 million.

Microbiologist John Bannantine has been able to discover an antibody that is 100% specific in detecting MAP. Now tests are being developed to diagnosis the presence of Johne’s disease bacterium.

Global cost of FMD

Although foot and mouth disease (FMD) is only talked about when an outbreak occurs in countries that are classified as FMD free but it is endemic in over 100 countries worldwide.

Researchers have estimated the annual cost of FMD in terms of visible production losses and vaccination in endemic regions alone to be between \$6.5 and \$21 billion. An outbreak in FMD-free

countries and zones cause additional losses estimated at greater than \$1.5 billion per year.

These losses are especially severe in some of the world's poorest countries where a large percentage of the population is directly dependent on livestock.

Countries that have ongoing FMD-control programs, costs are ongoing

and long-term. Outbreaks in FMD-countries have enormous economic impacts.

The ease with which FMD can spread means control requires coordination within and between countries. Equipping poor countries with the tools needed to control FMD will involve long-term development state veterinary services.

TAHC adopts rules for animal disease traceability and brucellosis

Texas Animal Health Commission has adopted new rules that went into effect on Oct 7, 2013 regarding animal disease traceability and brucellosis.

Chapter 50, Animal Disease Traceability: the new rule is to establish standards for

facilities which must be approved by TAHC to identify livestock as part of the federal disease traceability program. The rule specifically establishes requirements for approved tagging sites.

Chapter 35, Brucellosis: The commission

added post entry test requirements for sexually intact cattle entering Texas from the Brucellosis Designated Surveillance Area within the states of Idaho, Montana and Wyoming, because Brucellosis is prevalent in bison and elk of those areas.

USDA works to protect livestock from foreign animal disease

USDA researchers at the Plum Island Animal Disease Center are working to ensure that the US is prepared to protect livestock against exotic animal diseases that threaten livestock production.

The facility, now operated by the Department of Homeland Security, offers a safe and

secure site for developing vaccines, diagnostic tests and other technology to help prevent animal disease outbreaks and to respond to outbreaks that might occur.

The diseases that are being investigated are swine fever, foot-and-mouth disease (FMD), and recently African swine fever.

FMD is considered the most economically devastating livestock disease in the world and was eradicated from the US in 1929. It is still in other countries and authorities want to keep it out at all cost.

Vaccines have been developed for swine and cattle already but more is being done.



"These are just a few example of the important research being undertaken by ARS scientists at Plum Island."

Anthrax case in Texas, sable antelopes

TAHC has confirmed that anthrax was detected in two sable antelopes in Edwards County near Barskdale, TX. This is the first confirmed case for 2013 and it was posted on Oct 1.

The site only had exotic animals, so no livestock were involved. The carcasses are being properly disposed of by burning before the site is released of quarantine.

Anthrax is a bacterial disease cause by *Bacillus anthracis*, which occurs naturally worldwide, including Texas. It is not uncommon to have cases of it every year in the southwestern part of the state.

Anaplasmosis prevention

Anaplasmosis is transmitted by horse flies and ticks. Biting flies are only a minor vector in the transmission and ticks do it the rest of the year.

The anaplasmosis organism can also be carried by needles, dehorers,

castration knives, ear taggers, or another other implement that draws blood.

A popular means of preventing is by using mineral mixes that contain chlortetracycline (CTC). When fed at a rate of 0.5 mg/lb. of body weight CTC will

prevent anaplasmosis infections. Another control factor is the elimination of carriers.

Recovered animals will be carriers and need to be cleared of the organisms with antibiotics.

Special Topics of Interest

Livestock economist confident for 2014 cattle

Although the future of domestic beef is unknown, there are many positive factors in the US and abroad for cattle producers to look forward to 2014; one economist says it's time to rebuild the herd.

A University of Missouri livestock

economist says corn prices are expected to dip, easing the heavy burden of high feed costs producers have had to carry through drought years.

Scott Brown says "The outlook for 2014 is a lot different than anything we've seen in

a long time."

Brown notes that the current future feeder calf prices in 2014 are going to be \$50 higher per hundred weight than four years earlier and he is forecasting an increase in fed cattle prices.

FDA proposes new rules for animal food and feed

The proposed rule focuses on manufacturers of animal food or feed, but not farms that manufacture food for their own animals or other food facilities not required to register under section 415 of the Federal Food Drug and Cosmetics Act.

Under the proposed rule for preventive controls for food for animals, facilities

manufacturing, processing, packing, and holding animal food, both domestically and abroad, would be required to put into place procedures to minimize or prevent hazards reasonably likely to occur, as well as to follow new current good manufacturing practices (CGMPs).

The FDA says the new rules moves

towards a comprehensive, risk-based regulatory framework to keep all animal foods safe.

Three public meetings were set on the Proposed Rule for Preventive Control for Animal Food Facilities one on Nov 21 in Maryland, another Nov 25 in Chicago and Dec 6 in Sacramento.

Emergency management planning for livestock operations

After the blizzard in northern Great Plains has left many people realizing that livestock producers are unprepared and asking themselves "How do you prepare for a disaster?"

Beef quality assurance (BQA) training includes disaster planning and emergency management, but not all

producers implement these tools.

More than half of all feedlots surveyed in 2011 claimed to not have a written contingency plan for feeding and watering livestock in response to a utility outage. Most large operations are more likely to have a plan in place.

An Emergency Action Information form is

available from the BQA program at <http://go.unl.edu/psw3> and additional planning for catastrophic mortality disposal can be found on the Livestock and Poultry Environmental Learning Center's at <http://www.extension.org/pages/28022/livestock-and-poultry-mortality-composting#.UmaBxhblbXw>.

Smartphones play a crucial role in the future of rural America

Smartphones, tablets and apps connect friends and family and it has been discussed how these advances in technology can grow rural populations.

According to a founder of the Delphi Group, the new norms in communication redefine community

and could lead to a "mass exodus" of future generations away from cities.

He states that urbanization occurred because people found it necessary to gather in large numbers to conduct commerce and communicate but that isn't true anymore.

It was also pointed out that younger generations looking for a better quality of life will realize they can find it outside of America's major cities.

Many extension educators are learning to tailor efforts through each community to attract younger generations.

Journal Reviews

Amplified fragment length polymorphism used to investigate genetic variability of the stable fly (Diptera: Muscidae) across North America. 2013. Kneeland et al. J Med Entomol. 50: 1025-1030.

Stable flies are a major pest of cattle throughout the US that cost annually \$2 billion. Understanding population genetics of stable flies could provide information on population dynamics, outbreak origins, and geographic patterns of insecticide resistance.

All this could result in a tactical advantage for developing management strategies.

Results showed that stable flies have a high level of gene flow on a continental scale, with limited isolation.

The Impact. Looking into gene amplification of stable flies is an alternative means of looking to control these pestiferous flies that have a huge impact on the US cattle industry.

Effects of compaction and wetting of laterite cover soil on development and survival of *Musca domestica* (Diptera: Muscidae) immatures. 2013. Tahir and Ahmad. J Med Entomol. 50: 999-1002.

Rearing medium was tested as loose dry soil, loose wet soil, compacted dry soil, and compacted wet soil on all immature stages of house flies.

treatments, but third instars were more resilient. Wet soil treatments of both kinds resulted in significantly reduced pupal survival, but increased survival of eggs.

Egg and pupa survival to adult was significantly affected by cover soil

Compacted wet soil did significantly

reduce adult emergence from buried eggs but some were able to survive.

The Impact. Although this is a preliminary test, it shows that house fly larvae survival can be impacted by placement within soil medium.

Control of the chewing louse *Bovicola* (Werneckiella) *ocellatus* in donkeys, using essential oils. 2013. Ellse et al. Med Vet Entomol. 27: 408-413.

Lice infestations can cause a significant issue in the management of large animals. There is a limited range of insecticides for lice control and a large need to explore alternative louse management options.

The essential oils of tea tree and lavender were tested on donkey chewing lice. Results of contact and vapor bioassays showed that 5% tea tree and lavender oils resulted in >80% louse mortality after 2 hrs of exposure.

The Impact. These findings indicate that tea tree and lavender essential oils can provide useful control in clinical applications but there is hope for using them in grooming routines.

Movement of male *Dermacentor andersoni* (Acari: Ixodidae) among cattle. 2013. Lysyk. J Med Entomol. 50: 977-985.

The movement *Dermacentor andersoni* males was examined among 54 cattle during a 3 year period. Male tick number declined at a rate independent of the initial level of infestation; females

were found to have an increased decline based on infestation levels.

Movement was variable but found to be greater during April and interactions between the number of males on the

animals was an indicator of movement.

The Impact. This project and data provide a regression model to use for monitoring tick movement among populations.

Prevalence and species of ticks on horses in central Oklahoma. 2013. Duell et al. J Med Entomol. 50: 1330-1333.

Ticks are common on horses but their prevalence and species present have not been looked at in a very long time.

The researchers took tick and blood samples from 73 horses in OK during May, June and July of 2010. A total of 1721 ticks were recovered and

antibodies for *Ehrlichia*, *Anaplasma*, and *Borrelia burgdorferi*.

The tick species represented were *Amblyomma americanum*, *Dermacentor variabilis* and *A. maculatum*; as well as one *Ixodes scapularis* & *D. albipictus*.

The Impact. This data shows a collective look at the tick species infesting horses in OK. This would be similar to TX but not the same. The most commonly found was the Lone Star tick, which is the most prevalent species in Texas as well.

Off-Host collection methods of the *Otodius megnini* (Acari: Argasidae). 2013. Niebuhr et al. J Med Entomol. 50: 994-998.

Female *Musca domestica*, house flies, were collected for a year from several dairies in three different states.

The researchers examined and dissected the house flies to check for muscalure levels, pterin levels, fly age, gonotrophic development and parity, and sperm load.

Older flies were found to have more muscalure. It was also found that females mated in early-intermediate stages of egg development.

These results show a comparison to laboratory raised house flies and natural flies. The natural flies need more time

to develop eggs and this is due to suboptimal diets compared to laboratory reared flies.

The Impact. Without the necessary limiting resources available, house fly development will be delayed or nonexistent.

Survival of host blood proteins in *Ixodes scapularis* (Acari: Ixodidae) ticks: A time course study. 2013. Laskay et al. J Med Entomol. 50: 1282-1290.

Ixodes scapularis, black legged ticks, were fed a known source of blood and then tested at various time intervals after molting. The test conducted were to identify the type of mammalian proteins

within the nymphal ticks.

Albumin was found to be present for 85 days, transferrin for 29 days and hemoglobin for 309 days postmolting.

The Impact. The presence of presence of these proteins for long periods of time provides a host detection device that might be necessary in disease vectoring circumstances.

Isolation of "*Candidatus Rickettsia andeanae*" (Rickettsiales: Rickettsiaceae) in embryonic cells of naturally infected *Amblyomma maculatum* (Ixodida: Ixodidae). 2013. Ferrari et al. J Med Entomol. 50: 1118-1125.

A novel spotted fever group rickettsia, "*Candidatus Rickettsia andeanae*," has begun to appear in the US, Chile, Argentina and Peru, where it was first identified.

This novel group is under-researched and little is known about it. The authors began working with infected ticks and methods to isolate the pathogens from ticks with PCR and microscopy.

The Impact. The isolation of "*Ca. R. andeanae*" will promote further investigation into the significance of this tick-associated rickettsia.

Identification of bloodmeal sources and *Trypanosoma cruzi* infection in triatomine bugs (Hemiptera: Reduviidae) from residential settings in Texas, the United States. 2013. Kjos et al. J Med Entomol, 50: 1126-1139.

Chagas disease, caused by the hemoflagellate protozoan parasite, *Trypanosoma cruzi*, is the most important parasitic disease on the American continents. It accounts for an estimated 8 million human infections but little is known about the peridomestic transmission cycles.

In this study, bloodmeal sources were

determined for adult and immature bugs collected from residential settings in central Texas. Cytochrome *b* DNA was sequenced to identify the bloodmeal source.

Nine vertebrate hosts and one invertebrate host were identified. This indicates high host diversity and potential movement between settings. Dogs appear to be a key in the

maintenance of peridomestic transmission cycles. A high rate of *T. cruzi* infection was found among the bugs collected from inside houses, outside houses, and dog kennels (69, 81 and 82%).

The Impact. This suggests a current risk of Chagas disease vector-borne transmission for humans and domestic animals in residential settings of Texas.

Sonja L. Swiger, PhD
 Assist. Professor
 Livestock Extension
 Entomologist

1229 North US Hwy 281
 Stephenville, TX 76401

CELL:
 (239) 220-0168

PHONE:
 (254) 968-4144

E-MAIL:
 SLSwiger@ag.tamu.edu

Livestock/veterinary
 website
<http://livestockvetento.tamu.edu>

Livestock Veterinary
 Entomology on [facebook](#)

Alphitobius diaperinus (Coleoptera: Tenebrionidae) susceptibility to *Cunila angustifolia* essential oil. 2013. Do Prado et al. J Med Entomol. 50: 1040-1045.

The lesser mealworm, *A. diaperinus*, lives in poultry houses and can cause economic losses to producers at high numbers. Control is conducted with insecticides but with little effect.

evaluate the influence of *C. angustifolia* oil on larvae and adults. In the lab results showed 100% efficacy to both life stages; in the field numbers were reduced compared to the control.

significant piece of information from this paper is that there is an alternative product available for combating lesser mealworms in the poultry house except for traditional insecticides. The best results were achieved when there was double application in the study period.

The aim of this study was to

The Impact. The most

Prevalence of *Dirofilaria immitis* (Spirurida: Onchocercidae) infection in *Aedes*, *Culex*, and *Culiseta* mosquitoes from North San Joaquin Valley, CA. 2013. Huang et al. J Med Entomol. 50: 1315-1323.

Canine heartworm is one of the most serious infections primarily affecting domestic dogs in the US. Mosquitoes were evaluated for their potential to transmit dog heartworm.

Culex pipiens and *C. tarsalis* were found to have the highest number of infections and collectively accounted for 67% of all positive pools, followed by *Aedes*.

heartworm transmission and although these two species are not as prevalent in Texas, their cousin *Culex quinquefasciatus* (West Nile virus transmitter) is and could be the main vector.

The Impact. *Culex* mosquitoes appear to have a central role in dog

Attractive toxic sugar baits: Control of mosquitoes with the low-risk active ingredient dinotefuran and potential impacts on nontarget organisms in Morocco. 2013.

Khallaayoune et al. J Med Entomol. 50: 1040-1045.

The efficacy of attractive toxic sugar baits (ATSB) were tested in lab and in the field with the active ingredient dinotefuran against mosquito populations and non-target insects.

Results significantly reduced *Culex quinquefasciatus* and *Aedes aegypti* mosquitoes with little to no effect on non-target organisms.

The Impact. The ATSB are designed to attract just sugar seeking males and females of mosquitoes and using dinotefuran provides significant reduction in populations.

Potential for mosquitoes (Diptera: Culicidae) from Florida to transmit Rift Valley Fever virus. 2013. Turell et al. J Med Entomol. 50: 1111-1117.

A preliminary evaluation was conducted to test various mosquito species for their potential ability to vector Rift Valley Fever virus (RVFV). RVFV, currently not in the US, is a disease of ruminants and humans that can cause devastation to the sheep and cattle industry. It results in abortion of pregnant animals and new-born animal

infections are nearly always fatal.

In humans, most infections result in undifferentiated febrile illness; 1% result in hemorrhagic complications and are fatal.

The Impact. Several species were found to be competent vectors (*Ae. atlanticus*, *Ae. vexans*, *Co. perturbans*, *M. dyari* & *P.*

ferox). This is not a complete list for the whole US and environmental locations could be a factor in vector competence. More is still unknown but this is the beginning in preparing for the unknown but expected arrival of RVFV.

