

REPORT OF THE COMMITTEE ON PARASITIC DISEASES

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The Committee met on October 24, 2012 at the Greensboro Sheraton Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. in the Pebble Beach Room. There were 17 members and 27 guests present.

Presentations

Industry Measures to Address the Threat of Exotic Ticks Associated with Imported Reptiles

Bill Brant

The Gourmet Rodent

Heartwater is a pernicious and frequently fatal disease of livestock and wild ungulates caused by the rickettsial bacterium *Ehrlichia ruminantium*. The bacterium is widespread in sub-Saharan Africa where it is vectored by several species of bont ticks (*Amblyomma* spp., Ixodidae), and has been introduced to three islands in the Lesser Antilles. The southeastern United States is considered a high risk area for Heartwater. In 1999, leopard tortoises (*Geochelone pardalis*) imported from Africa to Florida for the reptile trade were found to be infested with *A. variegatum*, a prominent Heartwater vector. Subsequently, the national reptile industry implemented voluntary best practices, accompanied by the development of effective acaricides, which substantially reduced the incidence of imported ticks. In November 2011, *A. variegatum* were found on Savannah monitors (*Varanus exanthematicus*) from West Africa, leading to quarantines in several locations. In response, the major US reptile importers met with USDA and the Florida Department of Agriculture and Consumer Services to explore improved best management practices for imported reptiles. The reptile industry developed a tick interception protocol that 1) all reptiles must be inspected for ticks in the exporting country; 2) all wild harvested Savannah monitors and ball pythons (*Python regius*) must be treated with an acaricide even if no ticks are discovered; 3) a health declaration signed by a veterinarian in the country of origin must accompany all shipments; 4) certain tick-prone species must be isolated and inspected on import; 5) shipping containers and packing materials must be treated; 6) if ticks are discovered on imported reptiles, all animals in a shipment must be isolated and treated; 7) USDA must be notified within 24 hours of any ticks found on imported reptiles; and 8) ticks will be preserved by the importer and submitted to USDA for identification.

Update on ARS Screwworm Research Activities

Steven R. Skoda

USDA-ARS

Screwworm myiasis is devastating to warm blooded animals. Eradication of the screwworm from mainland North America using the sterile insect technique is an unprecedented achievement; reinvasion is prevented by maintenance of a barrier at the Panama – Colombia border. Molecular genetic techniques are providing an understanding of the genetic diversity of screwworms sampled from across their current range. Transgenic techniques are being used to develop a males-only, genetic sexing strain of screwworms. Potassium permanganate has been shown useful in reducing ammonia production from larval developmental media and to be a viable replacement for formaldehyde as an antimicrobial in the larval diet. SRU recommended updates to navigation and dispersal equipment have been installed on the aircraft that disperse sterile screwworms in the barrier zone; more efficient placement of flies will result. Volatiles that attract female screwworms have been identified from wounds of animals. Research has been initiated to develop a chemically defined diet for screwworm larvae; this will allow for economical substitutes to be identified for use in mass rearing screwworms. The SRU has consistently reached research milestones established in the interest of providing updated or novel answers to critical questions posed by the Panama – US Commission for Eradication of Screwworms.

Update on ARS Tick and Biting Fly Research Activities

Steven R. Skoda

USDA-ARS

Ticks and biting flies cause tremendous economic damage to the US livestock industry while also being a health concern to humans. Research on their biology and control is done at the Knippling-Bushland US Livestock Insects Research Laboratory, Tick and Biting Fly Research Unit with scientists located in Kerrville, Texas and the Cattle Fever Tick Research Laboratory near Edinburg, Texas. The current five-year research cycle emphasizes research on the

biology and control of ticks of veterinary and human importance, mining the genome of *Rhipicephalus microplus* to develop novel control technology and vaccines, and molecular biology and physiology of biting flies affecting livestock. Four talented scientists were added to the research team this past year. We documented the positive effect of Ravop[®] on tick strains resistant to organo-phosphates, identified and reported resistance of ticks to fipronil, and reported the value of ivermectin for tick control when added to molasses feed supplement. Vaccines developed against cattle ticks were tested and shown effective. Activities were expanded towards completion of the tick genome project. Work progressed to determine the physiology of tick resistance to insecticides while analysis of doramectin levels in cattle serum showed that the current recommended treatment regimen is valid. The potential was demonstrated of the growth inhibitors pyriproxyfen and buprofezin as well as a novel benzoylphenyl urea pesticide (novaluron) in fly management programs. Improvements were developed to bait stations used to apply tick control on local deer populations and activities initiated to determine the potential for dogs to be trained to detect cattle fever ticks. Methods to accurately sample native tick populations were investigated while also working to determine the areas of favorable tick habitat in the quarantine zone and develop methods to control invasive plants that contribute to tick survival. Finally, we described vulnerabilities induced by changes in the global society that necessitate retooling and fully integrating the approach to the cattle fever tick eradication effort.

Florida Screwworm Training Exercise and Response Planning

Thomas J. Holt

Florida Department of Agriculture, State Veterinarian

The New World Screwworm was successfully eradicated from the United States, Mexico, and other countries north of Panama utilizing a sterile fly production and release program. Importations of live animals from South America and the Caribbean continue to occur annually bringing infested animals into the United States. Thus far, such introductions have not resulted in a reemergence of this devastating pest. A training exercise with state, federal, and industry representatives was held in Florida to acquaint responders with the biology of the screwworm and to improve understanding of surveillance and response measures, should a reintroduction and establishment occur.

The exercise highlighted the need to improve planning at both the state and federal levels. The decision during the past year to discontinue USDA support for the screwworm production plant in Tuxtla Gutierrez raises concern about the availability of flies that could be used to gain control of established flies circulating again in North America. It is very questionable whether the single plant in Panama can produce enough flies to maintain the barrier zone and respond to a future outbreak.

USDA Screwworm Sterile Fly Production and Distribution in a US Outbreak

John Shaw

USDA-APHIS-International Services (IS)

New World Screwworm (NWS) is still present in five islands of the Caribbean and most countries of South America. NWS spread north to Central and North America. It is prevented by a sterile fly barrier in the country of Panama, a program in which APHIS-IS is a principal partner. The Panama program includes the only remaining laboratory for the production of sterile NWS flies. Introduction of the pest to the US is extremely infrequent (23 detections in the 30 years since eradication, with 12 of the 23 inside Federal quarantine). Those interceptions found outside quarantine are usually pets (dogs and cats) or people, all of which are most likely to be detected early. Never the less, APHIS-IS and VS must be prepared to partner with the states to detect, investigate, control and eradicate any infestation of cattle screwworm in the US. Projections show that there is sufficient "surge capacity" in the routine Panama programs as well as in extra production capacity in the Panama laboratory to provide the US with sufficient sterile flies to eradicate a US infestation. APHIS-IS is prepared to provide the sterile flies and technical expertise in the case of a US outbreak. APHIS-VS is prepared to conduct the surveillance and analysis necessary to assist the states in detecting a screwworm infestation, in the design of an appropriate response, and in the logistic planning to mount an eradication.

South Texas Tick Surveillance Project Overview

Joseph Corn

Southeaster Cooperative Wildlife Disease Study (SCWDS), University of Georgia

Dr. Corn gave a report on SCWDS Arthropod Surveillance. The SCWDS, in collaboration with the USDA-APHIS-VS, conducts surveys for exotic arthropods on free-ranging wildlife in the southeastern United States. Past surveillance has been focused on detection of exotic ectoparasites on wildlife in Florida and mapping the distribution of *Culicoides* vectors of bluetongue virus and epizootic hemorrhagic disease virus in the Southeast. Examples of exotic ticks and other arthropods found in the southeastern United States were given. The current objectives of SCWDS surveys are to determine the wildlife host range of *Amblyomma cajennense* and other possible equine piroplasmis vectors in South Texas; to determine if wildlife currently serve as hosts for *Rhipicephalus (Boophilus) annulatus* and *R. (B.) microplus* in South Texas; and to continue to map the distribution of *Culicoides* vectors of bluetongue virus and epizootic hemorrhagic disease virus in the Southeast. Preliminary results from the initial tick collections in Texas were discussed.

Texas Cattle Fever Tick Eradication Program Update

Kevin Varner

USDA-APHIS-VS

During FY 2012 the Cattle Fever Tick Eradication Program (CFTEP) continued to see elevated tick activity along the Texas – Mexico border. At the same time the overall trend lines were in the positive direction as the overall number of infested pastures continued to decline.

This trend was most dramatic in the free area of Texas as the number of infested pastures dropped from 86 in 09/09, to 26 in 09/10, to 22 in 09/11, to 11 at the end of September 2012. The location of the infested free area pastures also shifted towards the permanent Quarantine zone. With at least half of the current infested free area pastures located directly adjacent to the permanent Quarantine line.

The number of infested pastures in the permanent quarantine zone remains elevated and has been essentially unchanged for the past four years: 43 in 09/09, to 51 in 09/10, to 43 in 09/11, to 37 at the end of September 2012.

In FY 2012 the CFTEP worked with the Texas Animal Health Commission (TAHC) and USDA, Agricultural Research Service (ARS) to introduce two new technologies into the program:

Ivermectin Tubs: FDA approval requires the completion of pasture studies that treat at least 200 head. The CFTEP has two study pastures in progress and has identified the third and final study pasture. Additionally, in August and September 2012 the CFTEP began to employ the tubs in the field under the Investigational New Animal Drug (INAD) designation that FDA provided for the product. The INAD designation allows the CFTEP to begin to treat entire infested neighborhoods with the product. The Ivermectin tubs allow the cattle to self-medicate and we anticipate that their use will encourage the retention of cattle on infested pastures.

Vaccine: In FY 2012 ARS conducted successful tests of Gavac anti-tick vaccine. Unfortunately, since this vaccine is manufactured in Cuba, the more widespread use of the product by the CFTEP proved very difficult. During 2012 TAHC, VS and ARS worked with a US-based major pharmaceutical company to produce a similar vaccine that could be more easily deployed in the program. By year's end, an agreement had been reached between ARS and the company. Pen trials of the new vaccine began in October 2012. The "vaccine vision" of the CFTEP is to deploy a product that can be used to boost the immunity in cattle throughout the permanent quarantine zone on an annual basis.

Report on Efficacy of Ivermectin-Molasses Cattle Supplement for Control of Cattle Fever Ticks

Dan R Baca

USDA-APHIS-VS

The Cattle Fever Tick Eradication Program (CFTEP) and the Texas Animal Health Commission (TAHC) partnered with a commercial feed company to conduct field studies to assess the efficacy of an ivermectin-molasses product for the control of cattle fever ticks (CFT). The Food and Drug Administration (FDA) granted approval for implementation of a protocol to carry out the study with the objective of obtaining a restricted-use label limited to use by the CFTEP on CFT infested and high risk premises.

The protocol required a significant level of infestation, defined as at least ten CFT per animal on average within the herd. The product was required to be used as a stand-alone treatment over a period of nine months duration. Proof of efficacy was defined as $\geq 95\%$ reduction in CFT counts. The FDA required a 48 day withholding period for treated cattle prior to slaughter. Evaluation of the product was required for both species of CFT, *R.boophilus annulatus* and *R.boophilus microplus*.

The initial study herd, infested with *R.boophilus microplus*, began treatment in September 2011. Follow-up inspections were conducted at 28 day intervals for three subsequent dates, then at 42 day intervals for the duration of the study period. Greater than 95% reduction in CFT counts were observed by Day 56, and 100% reduction by Day 210 of the study, and remained at eradication levels for the remainder of the study period.

The second study herd, infested with *R.boophilus annulatus*, began treatment in April 2012. Follow-up inspections were conducted on the same schedule as the initial herd. Greater than 95% reduction in CFT counts were observed by Day 128 and maintained at Day 170. Follow-up inspections are scheduled for the duration of the study period which expires in January 2013.

The FDA also granted the company an Investigational New Animal Drug (INAD) permit to allow use of the product in other infested and high-risk herds outside of the formal study. Under terms of the INAD, the CFTEP could employ other approved acaricides in conjunction with the test product to evaluate its efficacy in an integrated pest management format. The CFTEP implemented limited use under the INAD in September 2012, to treat select herds with a combination of Coumaphos and the test product under conditions approved by the TAHC.

Preliminary results indicate the product demonstrates a high level of efficacy with reduced costs to producers compared to standard treatment with Coumaphos or Doramectin alone.

National Cattle Fever Tick Program Update

Matthew Messenger

USDA-APHIS

Dr. Messenger gave a series of updates, which included finalization of the cooperative agreement to fund an identification guide to ixodid tick larvae in the US, and technical updates to the Bovine Babesiosis section (Part 72) of the Code of Federal Regulations. In addition, updates were given regarding current progress on formal consultations with the US Fish and Wildlife Service for the Cattle Fever Tick Eradication Program river trail patrols, the SCWDS tick surveys, and the Tick Control Barrier.

In addition, an update on the potential recognition of two Mexican States (Sonora and Baja California) as being free of cattle fever ticks was given during the presentation. The regulatory work plan is underway to recognize both states, and publication of the final rule after the public comment period is expected during 2013. A formal review of the tick eradication program for the State of Chihuahua was conducted during July 2012, and completion of the risk assessment document is currently underway. Finally, the Mexican government has proposed a new National Tick Agreement, which will replace the current tick campaign regulations that were published in 1994. The proposed agreement allows for federal control of movement, inspection, and treatment for control, eradication, and cattle fever tick-free areas of Mexico.

Tick Acaracide Update

Matthew Messenger
USDA-APHIS

Dr. Messenger gave an update on currently available acaricides for potential use against cattle fever ticks. Coumaphos remains the only approved acaricide for the Cattle Fever Tick Eradication Program; however, macrocyclic lactones are currently being evaluated on both cattle and white-tailed deer in south Texas. There are other commercially available organophosphates labeled and currently available for use against ticks on cattle and other livestock. These products contain phosmet, tetrachlorvinphos, malathion, dichlorvos, and diazinon. There are over 180 commercially available products that contain pyrethroid formulations. Commercially available macrocyclic lactone products contain ivermectin, doramectin, eprinomectin, moxidectin, and abamectin. There is one product available that contains permethrin and diflubenzuron, an insect growth regulator. Finally, amitraz remains registered within the United States, but the manufacturer is currently re-evaluating the registration and future business options.

Geospatial Approaches for the Analysis of the Distribution of the Cayenne Tick

Angela James
USDA-APHIS-VS

The cayenne tick, *Amblyomma cajennense*, is a new vector of equine piroplasmiasis and currently established in Texas. The natural range of the cayenne tick in the United States likely follows the coastline of the southern United States based on a preliminary habitat overlay analysis. The cayenne tick maybe moved via equine and cattle movement throughout the southeastern US-based on host preferences of this tick species however, host movement data sources are not currently readily available to determine the tick risk associated with this movement.

Equine Piroplasmiasis – Texas Update

Andy Schwartz
Texas Animal Health Commission

The epidemiological investigation of the 2009 index case of Equine Piroplasmiasis (EP) on a south Texas ranch was completed two years ago. Since that time, movement testing has led to the disclosure of 64 affected horses. The majority of these horses fall into two primary categories: Those imported prior to the change of entry test requirements in 2005; and Quarter Horse racehorses. Risk assessment and subsequent testing in south Texas has led to the discovery of an additional 17 affected ranch horses. Though none of these horses are directly linked to the index ranch, some of them may have commingled with horses that had been on the index ranch in years past and likely exposed to EP.

Currently, Texas requires a negative test for *Theileria equi* (within the past 12 months) for horses entering racetracks. An EP test is not required for state entry. Testing for EP must be conducted under direct veterinary supervision. The TAHC EP laboratory test document must be completed and submitted with samples to the testing laboratory. Affected horses are permanently quarantined, and must be identified by a 74P brand, a microchip, or unique tattoo approved by the Texas Animal Health Commission (TAHC). Artificial insemination of affected mares is permitted, but not live cover. Negative horses being moved from affected premises must be isolated for 30 days in a tick-free environment, and tested negative at least 30 days after any possible exposure.

Treatment of affected horses is one option available for owners. Treatment, which consists of a series of intramuscular injections of imidocarb dipropionate, is conducted by an accredited vet, and follows a protocol approved by the TAHC (follows the outline in USAHA 2011 Resolution #21). All affected horses remaining on the index ranch have been treated: Almost half are now negative on all tests.

The procedure for moving negative horses from premises where a positive horse was found involves spraying the horse for ticks, and isolation in a tick free environment for at least 30 days. The horse to be released must be tested negative for EP 30 days after possible exposure. This procedure is followed in all parts of the state, though ticks are believed to be a factor in transmission of EP in only a few counties in south Texas.

In 2011, epidemiological investigation of a positive stallion implicated horses in a communal pasture in Kenedy County. Tests on 55 horses in the pasture disclosed nine positive horses, all with different owners. Because these horses were used on local ranches, Kennedy county was declared high risk for EP. All 159 horses in the county were tested, and eight additional positive horses were found on two ranches. Horses on both of these ranches and on the communal pasture were heavily infested with *Amblyomma cajennense* ticks, believed to be the major in disease transmission in this area of the state.

Testing of horses in the surrounding area, where there are established populations of *A. cajennense* ticks will be conducted as agency resources allow.

Committee Business:

There was one resolution passed encouraging USDA-APHIS-Veterinary Services to develop and distribute written response plans for the distribution of sterile flies needed to control any future screwworm incursions into the US.