REPORT OF THE COMMITTEE ON PARASITIC DISEASES

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The Committee met on Wednesday, October 24, 2007 at John Ascuaga's Nugget Hotel, Reno, Nevada. At least 45 persons were in attendance, including nine members of the Committee. Reports were provided on a number of parasitic disease issues of interest.

Dr. John E. George, Knipling-Bushland U.S. Livestock Insects Research Laboratory, Agriculture Research Service (ARS), United States Department of Agriculgure (USDA), noted that in South Texas the foundation principles on which the Cattle Fever Tick Eradication Program (CFTEP) operates in 2007 have changed little since the days the national campaign began 101 years ago. The major differences are that: 1) white-tailed deer have been added to the list of hosts that must be treated, and 2) the pasture vacation method as traditionally implemented has been invalidated -- deer must be treated after cattle are removed. Major eradication program issues in 2007 are similar to those of the past few years and include: 1) widespread acaricide resistance in Mexico and the diagnosis of resistant populations of *Boophilus microplus* in South Texas, 2) continued ingress of fever ticks from northeastern Mexico on cattle, equines, white-tailed deer, nilgai, American elk, bison, and axis deer, 3) maintenance and spread of cattle fever ticks by the white-tailed deer in Texas and growing risks from exotic ungulate species, 4) growth of "game ranch" operations, and 5) regulatory conflicts between animal health and wildlife interests.

When a premise is determined to be infested with *Boophilus microplus* or *B. annulatus* a rancher may go through the process of removing cattle and treating deer on the property or may elect to leave the cattle in place and gather them every 14 days for up to nine months for a treatment with coumaphos. Based on results of experiments by ARS, an eradication treatment of cattle with injections of doramectin every 25 to 28 days has been approved and will decrease the number of treatments needed by 50 percent. On many large ranches the cost and difficulty of gathering cattle is prohibitive. Acaricide formulations that are long-acting or which could be administered without gathering the cattle would have great value to the eradication program. Research by scientists at the ARS laboratories in Kerrville and Moore Field, Texas has produced injectable ivermectin microspheres that can protect a treated animal for four months or more with a single injection; and a formulation of liquid molasses that can be consumed ad libitum and protect cattle long enough to accomplish tick eradication. New long-acting injectable formulations of macrocyclic lactones, such as Ivomec Gold®, are being tested and may be marketed in the future. These kinds of products would reduce to only three or four the number of treatments needed by cattle in a herd to eradicate an infestation of *Boophilus* ticks. For more than a decade cattle fever ticks have been eradicated from white-tailed deer by systematically feeding them ivermectin-medicated corn.

In Mexico, demonstrated resistance of *B. microplus* to organophosphate, pyrethroid, amidine (amitraz), and phenylpyrazole (fipronil) acaricides is widespread. There is now preliminary evidence of populations of the tick that are resistant to ivermectin. In addition to increasing pressure in Mexico for selection of resistance to ivermectin by the use of inexpensive generic formulations, the intense use of ivermectin formulated as Ivomec Gold® in northeastern Mexico for the eradication of *B. microplus* and *B. annulatus* is likely to lead to problems with

ivermectin resistance that will compromise the effort. As explained above, ivermectin and related macrocyclic lactone endectocides are essential tools of the CFTEP in Texas. The spread of ivermectin resistant ticks into Texas could have drastic effects on the continuing success of the CFTEP. Preserving the future of macrocyclic lactones for both Mexico and the United States is vital.

Dr. Mat Pound, Knipling-Bushland U.S. Livestock Insects Research Laboratory, USDA-ARS, gave an update on white-tailed deer and cattle fever ticks. During the early years of the CFTEP (1907-1943), a paucity of white-tailed deer in the Southeastern United States minimized their importance as alternative hosts for the ticks. Later, however, changes in wildlife management regulations and land usage has resulted in dense populations of white-tailed deer throughout the Southeastern states, included within the Permanent Fever Tick Quarantine Zone and the adjacent Free Area along the Texas-Mexico Border from Del Rio to Brownsville, Texas. In addition, many ranchers in the area are choosing to switch from ranching cattle to rearing the much more lucrative white-tailed deer. Not only does this practice increase densities of deer, but perhaps more importantly because regulations require cattle within the Quarantine Zone to be inspected for fever ticks before movement out of the Zone, a reduction in cattle within the Zone also reduces their function as sentinels in discovering and remediating new fever tick infestations.

As a result, in the last few years the incidental examination of deer has indicated an increased potential for deer-related fever tick infestations, and more recently, the intentional capture and examination of deer for fever ticks at selected locations has demonstrated high percentages (50-82 percent) of fever tick infested deer. In addition to infested deer being observed within the Permanent Quarantine Zone, heavily infested deer have been found in association with two of the three Temporary Blanket Quarantines that now total over 1,116 square miles.

Currently, there are four methods to reduce the influence of deer on the Eradication Program, systematic treatment of cattle in infested premises by dipping in coumaphos or injecting with doramectin, depopulation of deer, feeding of macrocyclic lactone-medicated whole kernel corn, and use of '4-Poster' Deer Treatment Bait Stations to apply topical acaricide to deer. With fewer cattle present and the relatively high cost to ranchers of repeatedly gathering and treating the animals, systematic treatment is relative rare and ranchers are also reluctant to depopulate deer herds from which they gain significant royalties from hunting leases. Medicated corn is used extensively by program personnel, however by agreement with the Food and Drug Administration (FDA); it can only be deployed for six months during the year to allow for a two month withdrawal period to avoid tissue residues in the venison during hunting season. While the '4-Poster' system has proven quite efficacious against the three-host blacklegged and lone stars ticks, it has not been specifically demonstrated against the one-host cattle fever ticks. In addition, initial deployments in south Texas have occasionally been obstructed by detrimental effects of javelina and feral hogs on the devices. Researchers are nearing completion of two very promising hog exclusion systems that should obviate the effects of these animals. Thus currently, the only feasible, though expensive and labor intensive, method for controlling fever ticks on white-tailed deer is the medicated corn, and it is only authorized for use for six months of the year. Considering that regulations governing systematic treatment cattle and pasture vacation require up to nine months, use of the '4-Poster' or some other topical treatment method that does not cause residues in the venison must be employed to extend treatment of deer to at least nine months.

Dr. Bob Hillman, Texas Animal Health Commission (TAHC), and Dr. Paul Ugstad, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), USDA, gave an update on the Cattle Fever Tick Eradication Program. Cattle Fever Ticks (*Boophilus microplus* and *Boophilus annulatus)* are tiny pests, but they cause a very big problem. Fever ticks can carry the protozoa, *Babesia bovis* or *B. bigemina,* the causative agents for Bovine Babesiosis, which is also known variously as cattle tick fever, Texas cattle fever, Spanish fever, splenic fever or murraine fever.

The defenses of the United States against reintroduction or reestablishment of fever ticks into the tick's former habitat consist of the Fever Tick Quarantine Line, the USDA Tick Force, Port

Veterinarians and TAHC inspectors and veterinarians. In 1906 the range of the fever ticks extended from south Texas north and eastward to Maryland and Pennsylvania, including all of the southern states and southern California. In the late 1930s a permanent quarantine area was established along the Rio Grande from Del Rio, Texas to the Gulf of Mexico. This Fever Tick Eradication Quarantine Area, ranging from a few hundred yards to several miles wide was created as a barrier to continuous re-introduction of fever ticks from Mexico, where both the ticks and bovine babesiosis are prevalent. Fever ticks were eradicated from the United States, except for a small area in central Florida, by 1943. The Fever Tick Eradication Quarantine Area and the men and women who work in the tick program are the barriers to re-establishment of fever ticks in their historic range.

Each year incursions of fever ticks are identified in the Fever Tick Eradication Quarantine Area. The number of cases varying with climactic conditions, numbers of tick infested stray or smuggled livestock, budget constraints, wildlife hosts and fever tick efforts in northern Mexico. During the last four years, fever tick infestations have been much higher than historic infestations. At the end of September 2007 there were sixty-seven fever tick infested premises in the state of Texas. Forty-two of these were located within the Fever Tick Eradication Quarantine Area. The other twenty-five were located in the Free Area. The number of fever tick infestations in the Free Area has been cause for concern. In order to contain infestation in the Free Area of Texas, the TAHC, with concurrence from USDA established three Temporary Preventive Quarantine Areas around tick infestations or exposures in the Free Area. The three Temporary Preventive Quarantine Areas include a portion of Starr County (July 3, 2007), parts of Maverick, Dimmit and Webb Counties (August 2, 2007) and a portion of Zapata County (August 29, 2007). These Temporary Preventive Quarantine Areas were established to enable the agencies to contain and eradicate the fever tick outbreaks and to prevent the movement of infested livestock from these newly infested premises. As of October 6, 2007 there were 20 infested premises in the Maverick, Dimmit and Webb Temporary Preventive Quarantine Area and six infested premises in the Zapata County Temporary Preventive Quarantine Area.

USDA and TAHC have detailed staff to work these quarantine areas. Duties include scratch inspection and treatment of cattle, horses and other livestock on infested premises, exposed premises and for movement. Over 10,000 head of livestock have been inspected and treated since creation of the Temporary Preventive Quarantine Areas. In these areas animals that are hosts for fever ticks must be scratch inspected, treated and permitted for movement from or within the quarantine area. Cattle on infested premises must be treated every seven to fourteen days with coumaphos or every twenty-eight days with doramectin for six to nine months. Horses or other susceptible livestock must also be treated as directed by the TAHC to eliminate fever ticks. Horses are allowed to move into and out of the quarantine areas if treated every fourteen days and moved on a fourteen day pass.

Whenever fever tick infestation is discovered outside the Fever Tick Eradication Quarantine Area a major concern is the possibility that fever ticks were moved to other areas of Texas or to other states prior to identification of the infestation. TAHC and USDA staff has determined that 783 cattle were moved from the area, which is now the Maverick, Dimmit, Webb County Temporary Quarantine Area, prior to identification of infestation in the area. Four hundred and fifty nine of these cattle have been traced. Tracing activities are ongoing for the remainder of the cattle. There were movements of potentially tick infested cattle to Kansas, Colorado, Oklahoma and Wyoming. To date, none of the traced cattle have been tick infested.

Wildlife hosts for fever ticks are a special concern. There is ample evidence which shows that white-tailed deer, elk, red deer and nilgai antelope can all serve as effective hosts for fever ticks. The recent discovery of fever ticks on an axis deer suggests that this species may also be a fever tick host. There is clear evidence that these wild and exotic species are capable of maintaining fever ticks in the absence of cattle. TAHC rules require treatment or removal of wild and exotic hosts that are present on fever tick infested premises. Treatment options are very limited for free-ranging species. These options include feeding of ivermectin medicated whole kernel corn and the utilization of the 4-Poster treatment system, which utilizes a pyrethrin to control ticks. TAHC rules require treatment of hides and capes of animals harvested on infested premises.

As result of the significant increase in fever tick infestations outside the Fever Tick Eradication Quarantine Area TAHC and Texas-VS requested that USDA conduct a needs assessment for the fever tick program. This assessment identified significant needs for additional resources. Three-hundred and forty-thousand dollars in end-of-year funds was made available to the fever tick force to fulfill immediate needs. The assessment also identified the need for an additional $17 million over the next two years to successfully eliminate fever tick infestation from the Temporary Preventive Quarantine Areas and to assure sufficient interdiction efforts on the border to prevent continued incursion of ticks into Texas and the U.S.

In addition to the short term needs of the fever tick eradication effort, there are long term needs for the fever tick program. In early 2006 USDA completed a five year strategic plan for the fever tick program. This plan includes five major objectives:

1. prevent entry of fever ticks into the U.S.
2. enhance and maintain effective surveillance to rapidly detect cattle fever tick incursions
3. prevent establishment of fever ticks by eradicating infestations resulting from fever tick incursions
4. identify and procure tools and knowledge to maintain the U.S. free of cattle fever ticks
5) Foster collaboration and cooperation with Mexico to eliminate cattle fever ticks in areas of Mexico that impact the U.S.

If we are to ultimately be successful in preventing fever tick incursions into Texas and the US, we must provide the necessary resources to accomplish the objectives. The estimated costs for full implementation of all elements of the strategic plan are approximately $8 million each year for five years. The strategic plan has not yet been funded.

Dr. Javier Rojas, Commission of Mexico America (COMEXA), gave and update on the screwworm eradication project. Strategies of eradication of the screwworm made by COMEXA in Mexico, Central America and Panama, Libya and Aruba, and actions that are taking place in Jamaica were discussed. There were comments about the project that COMEXA is going to start with the financial support of the Inter American Bank of Development and USDA-APHIS and the Mexican Secretary of Agriculture, Ranching, Rural Development, Fisheries, and Food supply (SAGARPA) National Services of Animal and Plant Health Quality and Food Safety (SENASICA) in the border of Brazil and Uruguay and with Paraguay as an observer. Also, discussed was the outbreak that occurred this past September in a dog that came from Trinidad and Tobago to the United States through Miami. The infested animal was detected in Mississippi by a private veterinarian four days after arrival. This shows the risk of any country infested with screwworm for the countries screwworm free.

The participation of COMEXA in Commission on Livestock Development for Latin America and the Caribbean (CODEGALAC) meeting this year in Colombia where Ecuador and Venezuela showed interest in having a screwworm eradication program was discussed. Also discussed was the COMEXA participation in an World Organization for Animal Health (OIE) meeting in Argentina in which Argentine cattleman asked if Argentina is going to be involved in the Brazil-Uruguay-Paraguay project. Also, Cuba has showed interest in a screwworm eradication program.

Dr. Pat Berger, USDA-APHIS-VS gave an update on the tropical bont tick eradication program in St. Croix, United States Virgin Islands. From early 2002 to present 12 tropical bont tick infested premises were identified. Six of the 12 are vacant and monitored. Three of the 12 have livestock or horses, but have not had incidents of tropical bont tick infestations for 15 months to 2.5 years. One primary hotspot on the West End has been a site of recent infestations. St. Croix tropical bont tick eradication since 1967 has been modeled on APHIS *Boophilus microplus* eradication protocols. *Amblyomma variegatum*, a 3-host tick, has a life cycle of at least 191 days. Each stage of the cycle can survive dormancy for extended periods of time dependent of wet/dry periods and host availability.

Dr. Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, gave an update on surveys for infestations of wildlife by *Amblyomma variegatum* in St. Croix, U.S Virgin Islands. Surveys of small mammals and birds were conducted at nine

premises in the western area of St. Croix during 2005-2006. Eight of these nine premises were classified as *A. variegatum*-infested premises during 2001-2006. Surveys for *A. variegatum* infestation of white-tailed deer and feral cattle were conducted in the mountainous rain forest and surrounding areas in the western end of St. Croix. This area is central to all of the recent *A. variegatum*-infested premises. A total of 6,714 specimens representing 26 ectoparasite species were collected, but specimens of *A. variegatum* were not found on small mammals, birds, white-tailed deer or feral cattle. The absence of *A. variegatum* on wildlife and feral cattle in this survey was indicative of the low abundance of *A. variegatum* in St. Croix during the survey period. This absence of the tick does not rule out wildlife involvement if *A. variegatum* becomes more abundant, nor does it rule out the possibility that infestations of wildlife, especially deer or feral cattle, occurred at a prevalence below which we could detect. Isolated infestations of wildlife and feral cattle might occur, and even at a low prevalence, infestations of white-tailed deer and feral cattle might result in the survival of isolated populations of *A. variegatum*, at least for periods of several years.

Dr. Thomas Edling, PETCO Animal Supplies, Inc., Dr. Jamie Reaser and Mr. Marshall Meyers, Pet Industry Joint Advisory Council gave a presentation on the pet trade, parasitic diseases and exotic animal imports. The American Pet Product Manufacturers Association (APPMA) estimates that nearly 63 percent of American households have at least one companion animal, and that the total number of pets in the US is approximately 360 million. While dogs and cats are the most common pets in the US, the diversity of companion animals is high and increasing. Pets confer considerable joy and security to their owners, and research indicates that pet companionship substantially benefits human well-being and health. The collective benefits pets provide to their human companions can foster a substantial human-animal bond. The deepening of this bond has greatly improved the quality of life for many pets in recent decades.

However, as is true of all human activities, the benefits of companion animals are not without risks and impacts. A wide range of parasitic diseases can be transmitted from pets to people, domestic animals (including livestock), and wildlife. Most “traditional” pets (e.g., dogs, cats, parakeets, goldfish) have been captive bred for decades (if not centuries) and their parasites are widely recognized and readily managed. The increasing number and diversity of “non-traditional” pets (e.g., wild caught animals or those reared in relatively small numbers such as sugargliders) does present new challenges for parasitic disease identification and management.

Pet acquisition and care supports a thriving industry, with an estimated annual market value of $40.8 billion in the U.S. alone. The Pet Industry Joint Advisory Council (PIJAC) and its members recognize that minimizing the risk of parasitic disease transmission is not only to the benefit of the industry, but also to pets, the public (esp. pet owners), other industries (e.g., cattle industry) and the environment. Thus, individual companies are implementing proactive biosecurity measures and PIJAC has developed industry-wide campaigns that engage all industry segments, as well as state and federal agencies and other relevant partners. Examples of projects include: The National Reptile Improvement Plan (NRIP), The Bd-Free ‘Phibs Campaign, Habitattitude™, and taxon-specific reference manuals and best practices guidelines.

Dr. Freeda Isaac, VS-APHIS-USDA, gave an update on the Analysis of Pathways for Exposure of Domestic Ruminant Livestock and Ruminant Wildlife in the Continental United States to *Ehrlichia ruminantium* (heartwater). This presentation summarized a pathways analysis prepared by USDA-APHIS-VS, Center for Animal Disease Information and Analysis (CADIA) for USDA-APHIS-VS, National Center for Import-Export (NCIE) that shows the pathways for introducing *Ehrlichia ruminantium* (heartwater) into domestic ruminant livestock and ruminant wildlife in the United States. A pathways analysis is a systematic assessment of the paths along which an exotic disease agent (also referred to as the *hazard*) might enter the United States and establish an outbreak of the disease. This technique is also applicable for delineating the paths along which a disease agent that is present domestically might spread to one or more new states or regions and establish an outbreak of disease. A pathways analysis, in turn, is integral to a risk assessment that has the purpose of estimating, in qualitative or quantitative terms, the likelihood of an outbreak of disease occurring from the identified pathway(s) and the consequences of it.

A pathways analysis entails a four-step process. The first step involves establishing an understanding of host, agent, and environmental interactions for the foreign or domestic disease in question based on scientific literature, expert opinion, personal experience or other sources of information. The second step involves developing a list of potential pathways for release of the disease agent into a susceptible livestock and/or human population based upon the aforementioned understanding of host, agent, and environmental interactions. The third step involves using data from governmental, public domain, or other sources to evaluate the feasibility of each pathway. Finally, entry points of each feasible pathway into the United States, if a foreign disease agent, or state(s) and/or region(s), if a domestic disease agent, are used to identify the populations of animals and people, if a zoonotic disease, at-risk for possible exposure to the disease agent in question. This four-step approach was used to identify pathways that might serve as a conduit for release of *E. ruminantium* (Heartwater) into the United States.

The hazard identified in this pathways analysis is the release of *Ehrlichia ruminantium*, the causal agent of the disease known as Heartwater, into domestic ruminant livestock and ruminant wildlife in the United States. *Ehrlichia ruminantium* is a gram-negative intracellular rickettsia. The organism is extremely fragile and does not survive very long outside the host. *Amblyomma* spp. ticks are only important to the identified hazard to the extent that these arthropods serve as an intermediate host (vector) for *E. ruminantium*. By virtue of being an intermediate host, *Amblyomma* spp. ticks are required for transmission of these rickettsial organisms from an infected ruminant to a new uninfected but susceptible ruminant in order to sustain a disease outbreak.

Five pathways were identified for release of *E. ruminantium* (Heartwater) into the U.S.: (1) importation of *E. ruminantum*-infected species, (2) migrating cattle egrets serving as a transport host for *E. ruminantium*-infected *Amblyomma spp.* ticks, (3) mechanical transport of *E. ruminantium*-infected *Amblyomma spp.* ticks by humans and imported animals, reptiles, and other birds, (4) mechanical transport of *E. ruminantium*-infected *Amblyomma spp.* ticks by fomites, and (5) smuggling of live *E. ruminantium.* Each pathway was evaluated for its importance using data confined to the calendar years 2000-2005.

The analysis of the first pathway, importation of *E. ruminantium*-infected animal species, found that legal importation of domestic ruminants from African or Caribbean countries where heartwater exists is currently not a feasible pathway to consider for release of this disease agent into the general animal population in the United States. Current regulations prohibit the entry of domestic ruminants from heartwater affected countries into the United States. due to the presence of foot and mouth disease in those countries. Although the importation of wild zoo ruminants from Canada and Mexico could be considered a potential pathway, current regulations require these animals to have been in those countries for at least 60 days so it is unlikely that heartwater infected animals would remain undetected in those countries. Illegal importation of these ruminants would not be considered a feasible pathway since the size of the animals and the inspection processes at US ports of entry would make this a difficult thing to accomplish.

The second pathway which is mechanical transport of *E. ruminantium*-infected *Amblyomma spp.* ticks by migrating cattle egrets is a feasible pathway. Three islands in the Caribbean (Antigua, Guadeloupe, and Marie-Galante) are known to be infected with *E. ruminantium* and contain the vector *A. variegatum* (tropical bont tick). Studies have shown that cattle egrets infested with the tropical bont tick migrate from these islands to the United States. There is also evidence to suggest that more of the Caribbean Islands are infected with heartwater.

The third pathway analysis, mechanical transport of *E. ruminantium*-infected *Amblyomma spp.* ticks by humans and imported animals, reptiles, and other birds identified several feasible pathways. There are large numbers of visitors and importations of reptiles from heartwater endemic areas into the United States. Airline and cruise ship passengers from heartwater endemic countries could serve as mechanical vectors for infected ticks as well as legal and illegal importation of reptiles. Legal importation of birds and NEOISI mammals would also be a feasible pathway for these animals to serve as vectors for infected ticks. Importations from Canada and Mexico of these same animals which originated from heartwater countries could serve as a pathway. The legal importation of poultry and ratites would not be an effective pathway since

there is a temporary ban on the importation of these animals due to avian influenza from many heartwater endemic countries.

The fourth pathway which is the mechanical transport of *E. ruminantium*-infected *Amblyomma* ticks by fomites is also a feasible pathway. There is bedding in reptile cages as well as feedstuffs and equipment from heartwater endemic countries on which ticks could be transported into the United States.

The fifth pathway analysis, smuggling of live *E. ruminantium* agent into the United States could be a possibility. Currently, although heartwater is considered a select agent, there is no system currently which tracks international laboratories which maintain stocks of *E. ruminantium*. Although this would not be as likely a pathway as others previously described, it is still a possibility.

In summary there have been several pathways identified in this assessment which warrant a more detailed review by APHIS-VS of what mitigations can take place under existing regulations to minimize the introduction of *E. ruminantium* and *E. ruminantium*-infected *Amblyomma spp.* ticks. A further analysis to quantify some of the risks could also be undertaken while new regulations are developed to address additional mitigations. Discussion with other agencies such as the Fish and Wildlife Service to assess regulatory authorities and current import control measures would be important in order for APHIS VS to determine the best approach in development of import regulations for non-domestic livestock species.

Dr. Thomas J.Holt, Florida Department of Agriculture and Consumer Services gave a report on the Florida perspective on tick associated diseases and exotic animal imports. The introduction of exotic ticks and their potential for carrying foreign animal diseases continue to be of great concern to animal health officials and the animal industries of Florida.

Florida strongly supports the current need to enhance the Cattle Fever Tick Eradication Program in Texas. This program serves to protect our livestock industries throughout the southern United States. In addition, we need to strengthen other border surveillance and prevention efforts to prevent the entry of exotic ticks. For Florida, this means an increased effort by USDA and Department of Homeland Security (DHS) to inspect and prevent entry of animals and animal products that may harbor such ticks and diseases.

We have recently been concerned over increased reporting and sampling of livestock ticks in Florida. Whether this is due to acaricide resistance or the spring drought followed by late summer rains remains unclear, but we have enhanced our tick surveillance in the field and identification by the National Veterinary Services Laboratories. Thus far we have not detected any exotic ticks on livestock this year. The SCWDS and their cooperating agencies also play a valuable role in monitoring Florida wildlife for invasive or exotic tick species.

Our concerns also explain the very strict restriction requirements for cattle entering Florida from both the U.S. Virgin Islands and the Commonwealth of Puerto Rico which involve multiple acaricide treatments, inspections, and quarantine. Livestock movements from these islands must be restricted because of ticks which serve as vectors for bovine and equine piroplasmosis, prevalent diseases in these areas, as well as Heartwater present in other areas of the Caribbean. Should any of these exotic ticks or diseases be introduced and established in Florida, expected restrictions for Florida livestock moving to other states could be devastating to our industries.

In addition, we also remain very concerned over the issue reported on at this Committee meeting in 2005. Tick infested reptiles continue to be imported into the United States on a daily basis from around the world without restriction. An estimated 50,000 permitted reptiles are imported into Miami on a weekly basis and many more reptiles are imported legally that do not require permitting of any kind. Of those reptiles requiring permits, it is estimated that less than 10 percent are inspected at all and those observed to be infested with ticks may or may not be reported by Fish and Wildlife to DHS or to USDA. There are no restrictions placed on the free movement of tick infested reptiles imported from Africa, Asia, and South America to destinations throughout the United States.

Tick species introduced into the United States with imported reptiles have been well documented and now include 32 exotic tick species, with little known as to their role in the spread of animal or human disease. In a survey carried out by the Florida Department of Agriculture in

2005, seven *Amblyomma* species were detected in tick collections from 119 ticks taken from imported retiles. Previously in work reported by Dr. Mike Burridge, University of Florida, four *Amblyomma* species were collected from imported reptiles, all of which have been shown to be competent vectors for heartwater, a devastating disease of livestock in Africa.

While tick infested reptiles imported through Florida are sold as pets, Wildlife officials and the general public in Florida are also concerned about the potential illegal release of these animals into the wild, as they may become larger, unmanageable, and a burden to pet owners. The release of reptiles into suitable habitats could result in the establishment of breeding colonies of exotic ticks on Florida wildlife and domestic animals. Such exotic ticks could also introduce heartwater or other diseases into Florida and other parts of the Southeastern United States with subsequent spread via domestic ticks.

A Resolution calling for action by USDA, with responsibility for protecting the health of our livestock from foreign pests and diseases, is again submitted to the Committee. This same Resolution was passed by this Committee in 2005 and approved by the Board of Directors and the general membership of USAHA and forwarded to USDA. USDA did carry out a pathway analysis for animal exposure to heartwater as reported in April 2007. This report did conclude that legal and illegal reptile importations into the United States are feasible pathways for release of tick vectors with or without *Ehlichia* infection, but concluded that they could not substantiate the importance of such introductions because of a lack of data.

Published reports are available to document the entry of exotic ticks capable of transmitting heartwater, the establishment in some cases of breeding populations within captive reptile colonies, and the increasing numbers of reptiles entering the United States. The USDA study did report that 90 percent of the legally imported reptiles are imported through Miami and Los Angeles, and noted that the Southeastern United States is ecologically best suited to the establishment of heartwater vector ticks in the United States. Because of the continued danger to our livestock in the United States and the growing industry involving the importation of reptiles, steps need to be taken to control this risk.

As a first step in implementing the Resolution, requirements for pre-movement permitting and a certification of tick free status for reptiles entering the United States should be put in place. This would allow for regulatory enforcement and place responsibility on exporting countries and exporters to control ticks on reptiles sent to this country. Such requirements would then allow federal officials to refuse entry of those reptiles that have been inspected and found to be tick infested. Even if inspections continue to be below 10 percent of the reptile shipments imported, random inspections could serve to place incentives to implement control measures prior to arrival. This limited action could serve not only to lesson the risk but also provide additional data to evaluate the severity of the risk based on reptile species, countries of origin, and the pathogenicity of the associated ticks. Initial planning has been carried out in Florida working with the affected reptile industry leadership to design a program by establishing control measures based on risk.

Although the Florida reptile industry has been willing to work with state and federal officials to control this problem, they have also expressed the need to take any regulatory action at a federal level, as opposed to an individual state level because of the ease in which marketing channels could be changed to circumvent regulatory controls. Rather than moving tick infested reptiles through Miami, they could easily be diverted to ports in other states and then moved without detection between states.

Imported reptiles infested with exotic ticks, capable of carrying diseases to animals and people, should not be allowed to continue to be imported without restriction. The associated reptile industries have shown a willingness to work with us and it is time USDA and cooperating federal and state agencies take steps to mitigate the risk of foreign disease entry via the entry of tick infested reptiles into the United States.