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United States
Department of
Agriculture ⁰²

Animal and
Plant Health
Inspection
Service

Veterinary
Services

APHIS 91-39

National Tick Surveillance Program

Calendar Year 1983

MAY 8 1983

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National Tick Surveillance Program Calendar Year 1983

During calendar year 1983, the collection and submission of ticks from native and imported animals plus plant and animal material was 12 percent greater than in 1982. There were 10,207 collections in 1983, 9,086 in 1982, 9,381 in 1981, 7,763 in 1980, and 11,553 in 1979.

Lyme Disease

Lyme disease is a tick-borne disease of humans transmitted by *Ixodes dammini* which is characterized by a skin lesion (erythema chronicum migrans) that may be accompanied by headache, stiff neck, fever, malaise, fatigue, aching muscles and joints, and swollen lymph nodes. Weeks or months later some patients develop brain and heart infections, central and peripheral nervous disorders, and migratory musculoskeletal pain. Still later arthritis may develop and persist for several years resulting in erosion of the cartilage and bone.¹

The disease was first recognized in 1975 in children in Lyme, Connecticut. The rural setting and seasonal nature of the cases suggested possible arthropod involvement. Investigations soon incriminated a newly recognized tick species *Ixodes dammini* as one of the vectors. Interestingly *I. dammini* has in recent years been shown to vector another disease in humans. In 1976 Spielman incriminated *I. scapularis* (later recognized as the new species, *I. dammini*) in the transmission of *Babesia microti* in humans on Nantucket Island, Massachusetts.²

The etiologic agent for Lyme disease was suspected as possibly being bacterial when it was noted that when penicillin or tetracycline was given early in the illness the duration of the skin lesion was shortened and the arthritis was either prevented or attenuated. In 1982 a new spirochete was isolated from *I. dammini* in New York. In 1983 the same spirochete was isolated from the blood, skin, and cerebrospinal fluid of patients ill with Lyme disease.

In 1983 three employees of Plant Pest Quarantine, Otis Methods Development Center, Otis Air Force Base, Massachusetts, were diagnosed as having Lyme disease. The three cases were recognized in late June and early July 1983 in employees involved with testing

Gypsy Moth pheromones at Otis Air Force Base. Reportedly these clinical cases coincided with the period of greatest seasonal activity for ticks in that area.

Since Lyme disease is now known to occur in at least 14 States, Europe, and Australia, it is important to be aware of the etiology, transmission, symptoms, clinical signs, and treatment of the disease. Other endemic tick species may possibly play a significant role in the maintenance and transmission of the disease agent.

Update on Heartwater in the Caribbean

Throughout 1983 there was continued interest and concern regarding the presence of heartwater, the tick-borne disease caused by the rickettsial organism, *Cowdria ruminantium*. This disease was reported from Guadeloupe in 1980. In late 1983 official correspondence was received in Washington, D.C. from the Chief Veterinary Officer of Antigua confirming the presence of heartwater in livestock on Antigua.

Other islands in the West Indies, such as Puerto Rico, St. Kitts, and Martinique, are especially concerned since they also presently have established populations of *Amblyomma variegatum*, a primary vector of heartwater. In 1983 there were 39 laboratory confirmed collections of *A. variegatum* from Puerto Rico. It is strongly emphasized, however, that there were no reports of heartwater from Puerto Rico in 1983 or earlier years.

There is a potential threat for the introduction of heartwater into the continental United States since one of the experimental vectors, *Amblyomma maculatum*, is endemic in 10 States. These are primarily Gulf of Mexico or Atlantic Ocean coastal States. Increased illicit drug and animal traffic, along with the influx of illegal aliens, increases the threat of introducing *A. variegatum* and heartwater in coastal States such as Florida. It is important that Federal and State regulatory officials improve the surveillance program to rapidly detect and eliminate heartwater should it be introduced onto the mainland of the United States.

African Swine Fever

In light of the recently demonstrated potential for the soft tick, *Ornithodoros puertoricensis*, to transmit swine fever (ASF) virus, a great deal of interest has centered around this tick.³ In July 1983 a team of USDA, Agricultural Research Service (ARS), and Animal and Plant

¹Steer, Allen C. et al. 1983. The Spirochetal Etiology of Lyme Disease. New England J. Med., Vol. 308, No. 13:733-742.

²Spielman, Andrew. 1976. Human Babesiosis on Nantucket Island: Transmission By Nymphal *Ixodes* Ticks. Am. Jour. Trop. Med. Hyg. Vol. 25, No. 6: 784-787.

³Butler JF, and Gibbs EPJ. 1983. Distribution of Potential Soft Tick Vectors of African Swine Fever in the Caribbean Region. Prev Vet Med: In press.

Health Inspection Service (APHIS) entomologists conducted a survey for *O. puertoricensis* in the Dominican Republic. Surveying for this burrow-dwelling tick was greatly enhanced due to the use of a vacuum sampling device developed by researchers of the University of Florida at Gainesville. Serological evaluation, using an agar gel double-diffusion test to determine host blood present in the ticks, was performed at the Pathobiology Laboratory of the National Veterinary Services Laboratories, (NVSL), Ames, Iowa. No ticks were shown to have fed upon hogs, although 20 percent of those collected had fed on rats and mongooses. ASF virus has not been isolated from samples taken in the Dominican Republic in 1983. The eradication effort to curb this highly contagious viral disease appears to be progressing satisfactorily.

Status of ARS Cattle Fever Tick Research

In October 1983 the new USDA, ARS Cattle Fever Tick Research Laboratory was opened at Moore Field near Mission, Texas. The quarantined facility is situated within double security fences and occupies about 103 acres of land. The new laboratory will provide opportunities for field-type experiments that were not possible at the old laboratory site at Falcon Heights, Texas. The laboratory complex includes a general laboratory and office building, a separate acaricide laboratory building, barns with stalls to accommodate up to 64 animals, a covered experimental dipping vat and spray application area, a program dipping vat, and a utility building. Future research efforts at Mission will include studies to evaluate the susceptibility to acaricides of fever ticks collected from tick outbreaks within the Tick Eradication Quarantine Area, which separates Texas from Mexico. Other areas of research shall include the following:

- (1) acaricide testing as warranted by special problems or the need to test selected new chemicals,
- (2) studying the role of white-tailed deer and exotic game in the ecology of fever ticks,
- (3) expanded efforts to perfect the sterile hybrid *Boophilus* method of tick eradication, and
- (4) a variety of other projects related to the ecology and eradication of *Boophilus* ticks. Dr. Ronald B. Davey is the scientist-in-charge of the laboratory.

During 1983 Dr. Glen I. Garriss and his staff of the ARS Tropical Tick Research Laboratory at Mayaguez, Puerto Rico, completed field evaluations of fenvalerate, permethrin, and amitraz. None of these three acaricides is

as effective against adult *B. microplus* as organophosphates such as coumaphos or crotoxyphos, but they are very efficacious against immature ticks. Spray treatments at the manufacturer's recommended concentrations provide almost 100 percent protection for 4-7 days' posttreatment against reinfestation of treated cattle by larvae. Tick research in Puerto Rico also includes the second year of a 2-year study of *B. microplus* ecology. When this investigation is completed in December 1984, it will confirm the survival times of larvae in both high and low rainfall areas on the island.

Dr. Garriss has begun a cooperative study of *Amblyomma variegatum* with French scientists on Guadeloupe. They will evaluate the susceptibility of *A. variegatum* to acaricides and determine factors that influence its distribution in the Caribbean. Studies will also be conducted to determine the survival rate of free-living stages of the tropical bont tick.

Experimental Transmission of Anaplasmosis by Males of *Dermacentor albipictus* and *D. occidentalis*

Agriculture Research Service scientists recently unequivocally incriminated the males of *Dermacentor albipictus* and *D. occidentalis* as intrastadial, biological vectors of *Anaplasma marginale* under experimental conditions.⁴ This is apparently the first such record for the males of a one-host tick species such as *D. albipictus*. An earlier preliminary study by Stiller had suggested that the males of the one-host tick, *D. albipictus*, could serve as competent intrastadial, biological vectors of the causative agent of anaplasmosis.

The confirmation of the role of one-host males to act as intrastadial, biological vectors of *A. marginale* has potential significance because if such males transfer to more than one host animal in the field, they could acquire and transmit the parasite in the absence of infection in the host animal on which they fed as immatures. This could increase the vector potential of one-host ticks, perhaps including important vector species such as *Boophilus microplus* and *B. annulatus*.

The males of the three-host species, *D. occidentalis*, are especially efficient vectors of *A. marginale* as demonstrated in the experiment where as few as three *D. occidentalis* males transmitted the causative agent. This may be especially important in that it has been often assumed that *A. marginale* is transovarially

⁴Stiller, D.; Johnson, L. W.; and Kuttler, K. L. 1983. Experimental Transmission of *Anaplasma marginale* Theiler by Males of *Dermacentor albipictus* (Packard) and *Dermacentor occidentalis* Marx (Acari: Ixodidae). Proc. US Animal Health Assoc., pp. 59-65.

transmitted by the female of *D. occidentalis* although this assumption is based on a single study conducted in the mid-1930's. This early study did not address the possibility of accidental fly transmission of *A. marginale* and subsequent studies were unable to repeat the transovarial transmission of *A. marginale* by *D. occidentalis*. For this reason, and because the common hosts of the immature stages of this tick are not known to harbor *A. marginale*, the males of *D. occidentalis* could represent an important means by which *A. marginale* enters the three-host cycle of this vector species.

The true significance of male tick vector competence in the epizootiology of anaplasmosis cannot be accurately assessed without additional information on the frequency of interhost transfer by males in the field. This important aspect should receive additional research to fully determine the role male ticks may play.

***Amblyomma variegatum* Eradication in Puerto Rico**

The tropical bont tick continues to be a problem in Puerto Rico. There were 38 laboratory-confirmed collections in 1983 as compared to 50 collections confirmed in 1982. The areas known to have infested livestock in 1983 include the municipalities of Cabo Rojo and Ponce and the island of Vieques. These infested areas are widely separated with Cabo Rojo on the western coast and Ponce approximately on the south central coastal area of the main island of Puerto Rico. Vieques is an island some 10 miles off the eastern coast of Puerto Rico.

***Boophilus microplus* in Puerto Rico**

Eradication efforts continued in Puerto Rico against the widespread infestation of *B. microplus*. The National Veterinary Services Laboratory, Ames, Iowa, confirmed 4,295 collections of *B. microplus* in 1983 as compared to 2,208 collections in 1982. Over 98 percent of the collections were taken from cattle with less than 2 percent of the hosts being horses and goats.

One serious problem encountered in 1983 was the reinfestation of herds recently freed of ticks and released from quarantine. Federal and Commonwealth tick eradication personnel continue to implement changes in the program to correct problems as they are detected.

***Boophilus* Tick Eradication in Texas**

Compared to recent years, the tick eradication activities for 1983 were successful and relatively uneventful. There were no major outbreaks of *Boophilus* ticks in either the Tick Eradication Quarantine Area (TEQA) or

the Free Area (FA). Only two introductions involving 543 cattle and 5 horses occurred in the FA. These introductions were quickly confined and eradicated. Several introductions occurred in the TEQA which borders on the Rio Grande. These involved small numbers of livestock and were also rapidly contained and eliminated.

Despite a reduction-in-force of 11 inspectors in the spring of 1983, the fever tick problem was minimal compared to recent years. This was primarily due to the hard work and the dedication of inspectors and the cooperation of industry people. Because of relatively few quarantines in the FA, inspectors were able to concentrate on river patrols to stop the introduction of ticks at this point.

The weather conditions in 1983 were extremely dry. Most range lands had little or no forage for livestock and some stock ponds were also dry. The Rio Grande was lower than normal allowing for easier crossing of stray Mexican livestock.

Smuggling of horses from Mexico continued to be a problem in 1983. Tick eradication personnel apprehended 19 head of horses involving 18 illegal introductions. The Tick Eradication Force was responsible for the apprehension of 73 stray cattle and 109 stray horses representing 56 separate incidents of which six involved *Boophilus*-infested animals.

Legislation has been passed giving certain USDA employees the authority to carry firearms. Firearm safety and training was initiated for all tick force employees in December 1983 at Glynnco, Georgia.

Ticks and Zoological Compounds

In recent years there has been a trend to develop large, commercial zoological compounds throughout the United States. Generally, these are large, double-fenced compounds where a variety of compatible wild animals roam freely. The general theme is to develop habitats suggestive of Africa where the animals usually originate. For a fee, tourists or other interested persons may tour the facility in their own automobiles or in vehicles provided by the management. This allows them to observe the wildlife in their "native" habitat.

However, such a compound poses some problems regarding the possible introduction of exotic ticks on animals from Africa. Some species of animals such as rhinoceroses, elephants, hippopotamuses, and the big cats are not presently required to be held in postentry quarantine.

Nevertheless, these animals may serve as suitable hosts for the immature and mature stages of economically important ticks. For example, in the past rhinoceroses have entered the United States and were subsequently found infested with live *Amblyomma hebraeum*. In 1960, live *Rhipicephalus evertsi* ticks were found on elands, zebras, and nilghai in "Africa USA" at Boca Raton, Florida. An intensive eradication effort was required to eradicate this tick. Shortly thereafter, *R. evertsi* and *R. pulchellus* were found at "Busch Gardens," Florida, and at the "Catskill Game Farm" in up-state New York.

Exotic ticks are also commonly found on animals in quarantine at the USDA New York Animal Import Center, Newburgh, New York. Precautionary dipping is routinely carried out on such animals held in quarantine. The real threat exists with those animals which may enter the USA without having to be held in quarantine or having to be given a precautionary dipping. Not only are many exotic ticks serious blood-sucking parasites of domestic livestock, but they also transmit diseases such as anaplasmosis, babesiosis, theileriosis, heartwater, Nairobi sheep disease, and spirochetosis.

Procedures for Collecting and Submitting Ticks

Veterinary Medical Officers and Animal Health Technicians should carefully review V.S. Memorandum 558.1, September 8, 1978, for information on the collection and submission of ticks. Any personnel not having this memorandum may obtain a copy from their Veterinarian-In-Charge. Cooperating State animal health regulatory personnel may also obtain a copy of this memorandum.

Tick Collections From All Hosts CY 1983

PERIOD	Calendar Year 1983
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HOST
All Hosts

ANH FORM 5-55
MAY 1971

REPLACES AEC FORM 5-55, DEC 1954, WHICH IS OBSOLETE.

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Animals and Products Offered For Entry CY 1983

REPORT OF TICKS COLLECTED												PERIOD	Calendar Year 1983										HOST Animals and Products Offered for Entry						
STATE	TOTAL	AMBL YONMA AMERICANUM	AMBL YONMA CAEVENSENSE	AMBL YONMA IMITATOR	AMBL YONMA MACULATUM SPP.	ARGAS PERDITUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALPINEUS	DERMACENTOR BREVIPALPIS	DERMACENTOR HUNTERI	DERMACENTOR LONGICORNIS	DERMACENTOR PARVULUS	DERMACENTOR SPP.	HAEMAPHYSALIS LONGICORNIS	HAEMAPHYSALIS PARVULUS	IXODES CORREI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBUS MEGALINUS	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.			
TOTAL	148		10	2	2	1		24	19	24	25			3							1	1			12	1	3	1	
ARIZONA																													
Douglas	10										10BO																		
Tucson	5										1D					4BH ^d													
CALIFORNIA																													
Lawndale	1																											1HO ^{aa}	
FLORIDA																													
Miami Airport	1																								1BG				
MARYLAND																													
Balt/Wash Airport	1															1DW													
NEW MEXICO																													
Columbus	4										2BO		1BO			1BO ^k													
NEW YORK																													
JFK Airport	2																				1PM ^{ip}						1PM ^{rc}		
Rock Tavern	2																										12 ^{re} 12 ^{rm}		
TEXAS																													
Del Rio	14	1BO					3BO	3BO	5BO ^{**}						1BO ^{**}					1BO									
Eagle Pass	41			1BO			19BO	2BO	7BO ^{**}	6BO		2BO		2BO	1BO ^{**}	1BO ^{**}													
El Paso	19									5BO					2BO ^{**}									12BO					
Laredo	47	9BO	2BO	1BO	1BO ^{**}	2BO	1D 12BO 1HO	12BO ^{**}	1BO					2BO 1HO	2BO ^{**}														
Presidio	1														1BO ^k														

ANH FORM 5-55
MAY 1971

REPLACES AOE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Host
BG Baggage
BO Bovine
BH Bighorn Sheep
D Deer
DW Dead Wood-wooded
area of airport
HO Horse
PM Plant Material
Z Zebra

Key to Species
aa Haemaphysalis longicornis
(= H. bispinosa)
d Dermacentor hunteri
k Dermacentor parumaptus
ip Ixodes pilosus

rc Rhipicephalus compositus
re Rhipicephalus evertsi evertsi
rm Rhipicephalus evertsi mineticus
** Nymphal stage
Bracketed figures refer to Laredo

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Cattle CY 1983

REPORT OF TICKS COLLECTED																PERIOD		Calendar Year 1983										HOST		
STATE	TOTAL	AMBL.YOMMA AMERICANUM	AMBL.YOMMA CALIFORNENSE	AMBL.YOMMA IMITATOR	AMBL.YOMMA MACULATUM	AMBL.YOMMA SPP.	ARGAS PERSCUS	BOOPHILUS ANULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICUS	DERMACENTOR VITIOSUS	DERMACENTOR VITIOSUS (P. S. G. 1983)	DERMACENTOR NIGROLINEATUS	DERMACENTOR LITENSE	DERMACENTOR OCCIDENTALIS	DERMACENTOR CARINATUS	DERMACENTOR SPP.	HEMAPHYSALUS PARVUS	HEMAPHYSALUS PARVUS	IXODES SCUTELLARI	IXODES SCUTELLARI	IXODES SCUTELLARI	IXODES SPP.	ONCHITHOONOS SPP.	OTIOBIUS MEGRINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.	
TOTAL	7738	334	279	10	822	100		11	4257	1	207		26	300		692	17	3				31				647	1			
Alabama	4	2			1																	1								
Alaska																														
Arizona																														
Arkansas																														
California																														
Colorado																														
Connecticut																														
Delaware																														
Florida	36	15			13												3					5								
Georgia	3																3													
Hawaii																														
Idaho	2										2																			
Illinois																														
Indiana																														
Iowa																														
Kansas	2				2																									
Kentucky	1																1													
Louisiana																														
Maine																														
Maryland	1																1													
Massachusetts																														
Michigan																														
Minnesota																														
Mississippi	3	2			1																									
Missouri																														
Montana																														
Nebraska	1																1													
Nevado																														
New Hampshire																														
New Jersey																														
New Mexico	1										1																			
New York																														
North Carolino	5	3															2													
North Dakota																														
Ohio																														
Oklahoma	1																					1								
Oregon																														
Pennsylvania																														
Rhode Island																														
South Carolina	8	2															6													
South Dakota																														
Tennessee	19	16															2					1								
Texas	3067	294	278	10	805	27** 36 ⁿ		11	11	1**	204		26			673	17**	3				23				647	1			
Utah																														
Vermont																														
Virginia																														
Washington																														
West Virginia																														
Wisconsin																														
Wyoming																														
Puerto Rico	4584		1*		37 ^v			4246					300																	
Virgin Islonds																														

ANH FORM 5-55
MAY 1971

REPLACES AOE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Species
n *Amblyomma inornatum*
v *Amblyomma variegatum*

* Not endemic, source of introduction unknown
** Nymphal stage

USDA, APHIS, V5
NVSL, AMES, IOWA

Tick Collections From Dogs

REPORT OF TICKS COLLECTED														PERIOD	HOST
														Calendar Year 1983	
STATE	TOTAL	AMBL-YOMMA AMERICANUM	AMBL-YOMMA CAJARENSE	AMBL-YOMMA INDIATOR	AMBL-YOMMA MACULATUM	ARGAS TRICICUS	BOOPHILLUS ANNULATUS	BOOPHILLUS MICROPLUS	BOOPHILLUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SHANNONSI	DERMACENTOR PENN.S. Q.	DERMACENTOR ALBOSTRIATULUS	DERMACENTOR TITUS	Dogs
TOTAL	440	16	2	12	2					1				166	
Alabama	4													2	
Alaska															
Arizona															
Arkansas															
California															
Colorado	8									1					1 6
Connecticut															
Delaware															
Florida	13	2		1										4	2
Georgia	2														1
Hawaii															
Idaho	3													1	2
Illinois															
Indiana															
Iowa															
Kansas															
Kentucky															
Louisiana															
Maine															
Maryland															
Massachusetts															
Michigan															
Minnesota															
Mississippi	2													1	1
Missouri															
Montana															
Nebraska															
Nevada															
New Hampshire															
New Jersey															
New Mexico															
New York	1	1													
North Carolina	7	1												1	4
North Dakota	2													2	
Ohio															
Oklahoma															
Oregon															
Pennsylvania															
Rhode Island															
South Carolina	12	1												2	4
South Dakota															
Tennessee	1													1	
Texas	377	11	2	11	2**									151	4 2 194
Utah															
Vermont															
Virginia	1													1	
Washington															
West Virginia															
Wisconsin															
Wyoming															
Puerto Rico	7														7
Virgin Islands															

ANH FORM 5-55
MAY 1971

REPLACES AGR FORM 5-55, DEC 1954, WHICH IS OBSOLETE

Key to Species
a Ixodes affinis

** Nymphal stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Horses and Mules **CY 1983**

REPORT OF TICKS COLLECTED														PERIOD		HOST								
														Calendar Year 1983		Horses and Mules								
STATE	TOTAL	AMBLIOMMA AMERICANUM	AMBLIOMMA CAJENNENSE	AMBLIOMMA INTA TOR	AMBLIOMMA MACULATUM	AMBLIOMMA SPP.	ARGAS PERICUS	BODIPILUS ANNULATUS	BODIPILUS MICROPIILUS	BODIPILUS SPP.	DERMACENTOR ALBIPICITUS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS SELLITARSIS	IXODES COCKEII	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTIOBIUS MEGALINI	RHIPICEPHALUS TANGULIENSIS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.	
TOTAL	1064	29	44	2	77	2		2	17	1	62		2	328			8					14		
Alabama																								
Alaska																								
Arizona																								
Arkansas																								
California																								
Colorado	1										1													
Connecticut																								
Delaware																								
Florida	27				1									15			1		6				4	
Georgia																								
Hawaii																								
Idaho																								
Illinois																								
Indiana																								
Iowa																								
Kansas																								
Kentucky																								
Louisiana																								
Maine																								
Maryland																								
Massachusetts																								
Michigan																								
Minnesota																								
Mississippi																								
Missouri																								
Montana																								
Nebraska																								
Nevada																								
New Hampshire																								
New Jersey																								
New Mexico																								
New York																								
North Carolina																								
North Dakota																								
Ohio																								
Oklahoma																								
Oregon																								
Pennsylvania																								
Rhode Island																								
South Carolina	2				1									1										
South Dakota																								
Tennessee																								
Texas	704	29	44	2	75	1**		2	1	1**	61		2	5		470		2				9		
Utah																								
Vermont																								
Virginia	4															4								
Washington																								
West Virginia																								
Wisconsin																								
Wyoming																								
Puerto Rico	326				1 ^v				16					308								1		
Virgin Islands																								

AMH Form 5-55
MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Species
v *Amblyomma variegatum*

** Nymphal stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Native Wildlife

PERIOD	Calendar Year 1983
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HOST	Native Wildlife
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ANH FORM 5-55
MAY 1951

REPLACES GDS FORM 5-55, DEC 1954, WHICH IS OBSOLETE.

USDA, APHIS, VS
NVSIL, AMES, IOWA

Key to Hosts

BC Bobcat	FD Fallow Deer
CD Coyote	FR Ferret
D Deer	FY Ferral Swine
E Elk	J Javelina (Peccary)
F Fox	JR Jack Rabbit

M	Mouse (white footed)	RC	Raccoon
ML	Mountain Lion	SH	Shrew
MK	Mink	TS	Tree Squirrel
PD	Opossum	VL	Vole
R	Rabbit		

Key to Species
a Ixodea affinia
an Ixodes anguatus
n Amblyomma inornatum
t Amblyomma tuberculatum

* Larval stage
 ** Nymphal stage
 *** Trophy from Craig County, Colorado

Bracketed figures refer to state
 indicated

Tick Collections From Zoo Animals And Miscellaneous Hosts CY 1983

REPORT OF TICKS COLLECTED														PERIOD	Calendar Year 1983				HOST	Zoo Animals and Miscellaneous Hosts									
STATE	TOTAL	AMBL YOMMA AMERICANA	AMBL YOMMA CALIFINENSE	AMBL YOMMA MEXICANA	AMBL YOMMA MACULATUM	AMBL YOMMA SPP.	ARGAS PERSEUS	BODIPHILUS ANNULATUS	BODIPHILUS MICROPLUS	BODIPHILUS SPP.	DERMACENTOR ALBIPALPIS	DERMACENTOR BREVIPALPIS	DERMACENTOR KANSAS	DERMACENTOR MICROPHILUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS PARVUS	IXODES COCKLEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBUS MEGRINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.	
TOTAL	116	13	2	2	5	5			33					5		30				1		4				2	12	1	1
Alabama																													
Alaska																													
Arizona																													
Arkansas																													
California																													
Colorado																													
Connecticut																													
Delaware																													
Florida	8	2Q 1H			1H											1HM						1Q					1HS 1X		
Georgia	2				1Q																	1Q							
Hawaii																													
Idaho																													
Illinois																													
Indiana																													
Iowa																													
Kansas																													
Kentucky	2															1H 1G													
Louisiana																													
Maine																													
Maryland																													
Massachusetts																													
Michigan																													
Minnesota																													
Mississippi	2																									1X	1WH ^{PS}		
Missouri	1	1Q																											
Montana																													
Nebraska																													
Nevada																													
New Hampshire																													
New Jersey																													
New Mexico																													
New York																													
North Carolina	2	1C														1Q													
North Dakota																													
Ohio																													
Oklahoma																													
Oregon																													
Pennsylvania																													
Rhode Island																													
South Carolina	3															2H						1S							
South Dakota																													
Tennessee	1															1H													
Texas	57	6H 1X 1DK	2H	2H	1C 1H 1G	1C ¹ 1Q** 3H**										5C 7Y 9H 1Q 1G			1Q		1C				1C 1Q	3C 2Q 1HM 3X		1PH ^{ar}	
Utah																													
Vermont																													
Virginia																													
Washington																													
West Virginia																													

ANN FORM 5-55
MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Host

C Cat
DK Donkey
G Goat
H Human
HM Dwelling
HS Horse Stall
PH Chicken House
Q Host not given
S Sheep

WH Wart Hog (trophy hide, origin

South Africa)
X Inanimate object
Y Swine

Key to Species

ar Argas radiatus
n Amblyomma inornatum
rs Rhipicephalus simul
** Nymphal stage

Brackets enclose Texas collections

USDA, APHIS, VS
NVSL, AMES, IOWA