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United States
Department of
Agriculture

**Animal and
Plant Health
Inspection
Service**

**Veterinary
Services**

APHIS 91-39

National Tick Surveillance Program

Calendar Year 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 form 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

[1]Steer, Allen C. et al. 1983. The Spirochetal Etiology of Lyme Disease. New England J. Med., Vol. 308, No. 13:733-742.
[2]Spielman, Andrew. 1976. Human Babesiosis on Nantucket Island: Transmission By Numphal *Ixodes* Ticks. Am. Jour. Trop. Med. Hyg. Vol. 25, No. 6: 784-787.

[3]Butler 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 Gainsville. 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. Garris 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. Garris 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 a *Boophilus micro-plus* 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

[4]Stiller, 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 deermine 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 Glynco, 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.

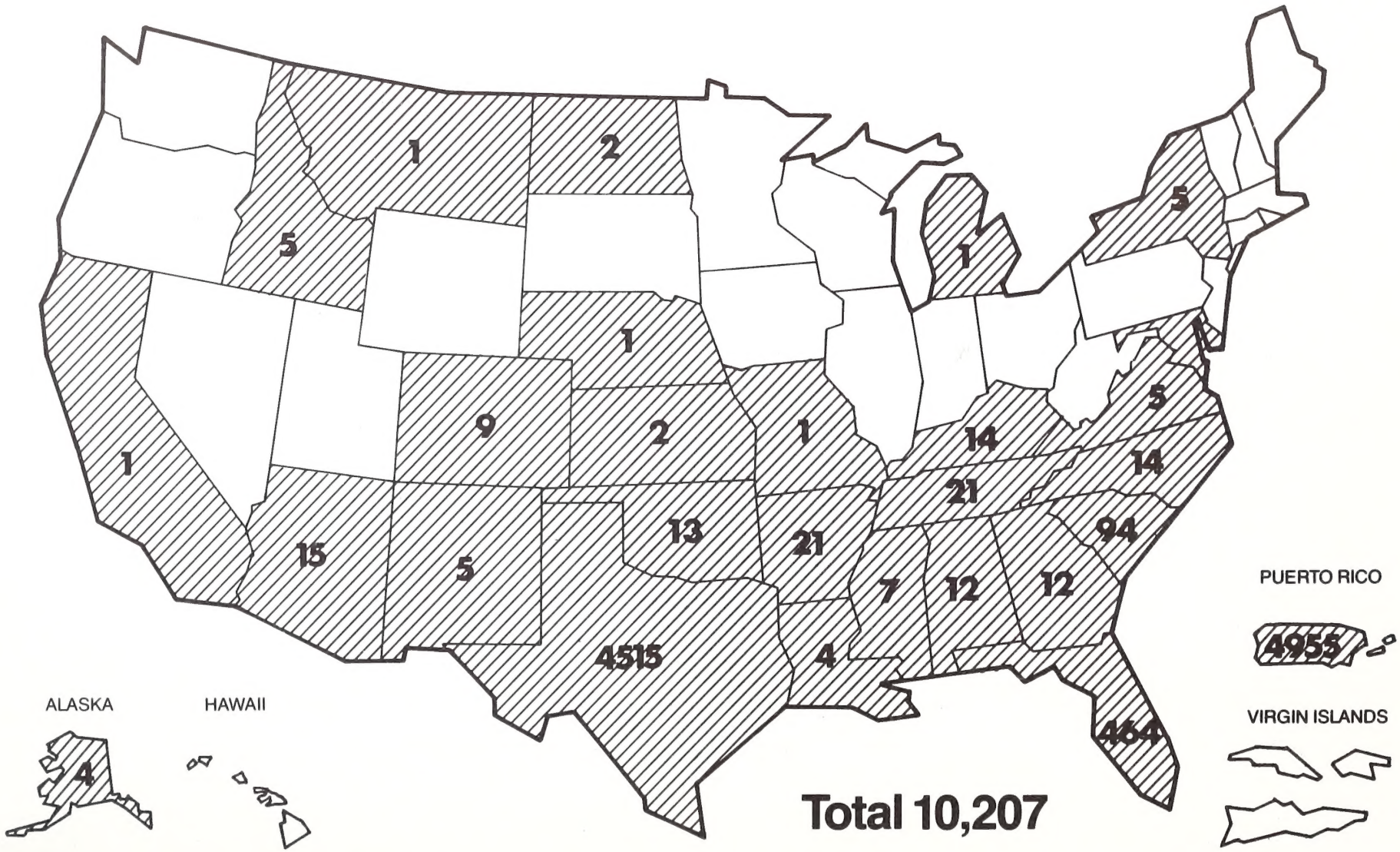
Nevertheless, these animals may serve as suitable hosts for the immature and mature stages of economically important ticks. For example, in the past rhinoceroses have entered the United States and were subsequently found infested with live *Amblyomma hebraeum*. In 1960, live *Rhipicephalus evertsi* ticks 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 upstate 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



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1983

HOST: All Hosts

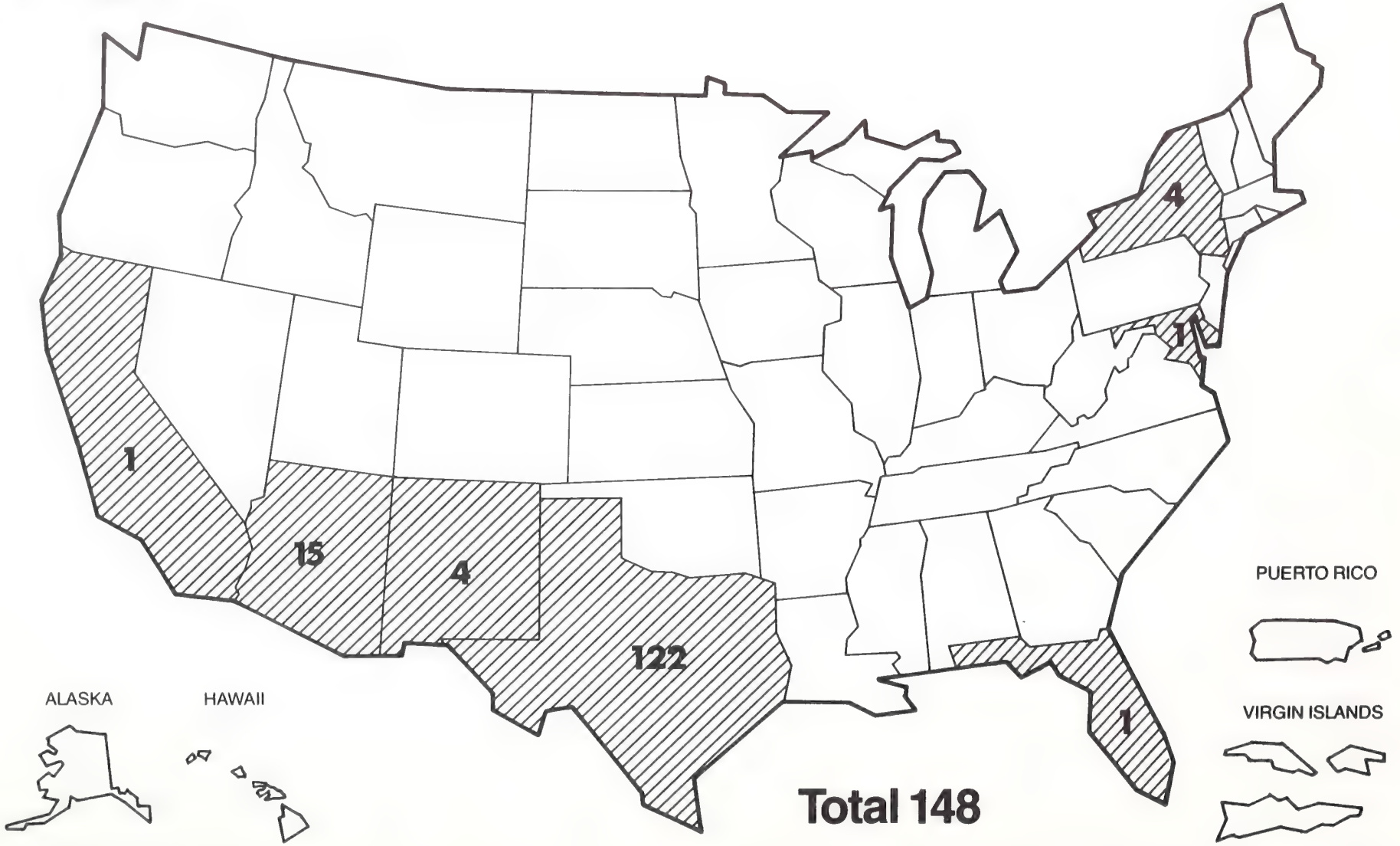
STATE	TOTAL	CATTLE	DOGS	HORSES & MULES	ZOO ANIMALS & MISC. HOSTS	NATIVE WILDLIFE	ANIMALS & PRODUCTS FOR ENTRY
TOTAL	10207	7738	440	1064	116	701	148
Alabama	12	4	4			4	
Alaska	4					4	
Arizona	15						15
Arkansas	21					21	
California	1						1
Colorado	9		8	1			
Connecticut							
Delaware							
Florida	464	36	13	27	8	379	1
Georgia	12	3	2		2	5	
Hawaii							
Idaho	5	2	3				
Illinois							
Indiana							
Iowa							
Kansas	2	2					
Kentucky	14	1			2	11	
Louisiana	4					4	
Maine							
Maryland	4	1				2	1
Massachusetts							
Michigan	1					1	
Minnesota							
Mississippi	7	3	2		2		
Missouri	1				1		
Montana	1					1	
Nebraska	1	1					
Nevada							
New Hampshire							
New Jersey							
New Mexico	5	1					4
New York	5		1				4
North Carolina	14	5	7		2		
North Dakota	2		2				
Ohio							
Oklahoma	13	1				12	
Oregon							
Pennsylvania							
Rhode Island							
South Carolina	94	8	12	2	3	69	
South Dakota							
Tennessee	21	19	1		1		
Texas	4515	3067	377	704	57	188	122
Utah							
Vermont							
Virginia	5		1	4			
Washington							
West Virginia							
Wisconsin							
Wyoming							
Puerto Rico	4955	4584	7	326	38		
Virgin Islands							

ANH FORM 5-55 MAY 1971

REPLACES ADE FORM 5-55, DEC 1964, 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	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SIGNACULUS (= D. VARIABILIS & D. NITENS)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODORUS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	148		10	2	2	1		24	19	24	25		3			5	12	2			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																									1Z[re] 1Z[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	12BO**	1BO					2BO 1HO	2BO**										
Presidio	1								1HO								1BO[k]										

ANH FORM 5-55 MAY 1971 — REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

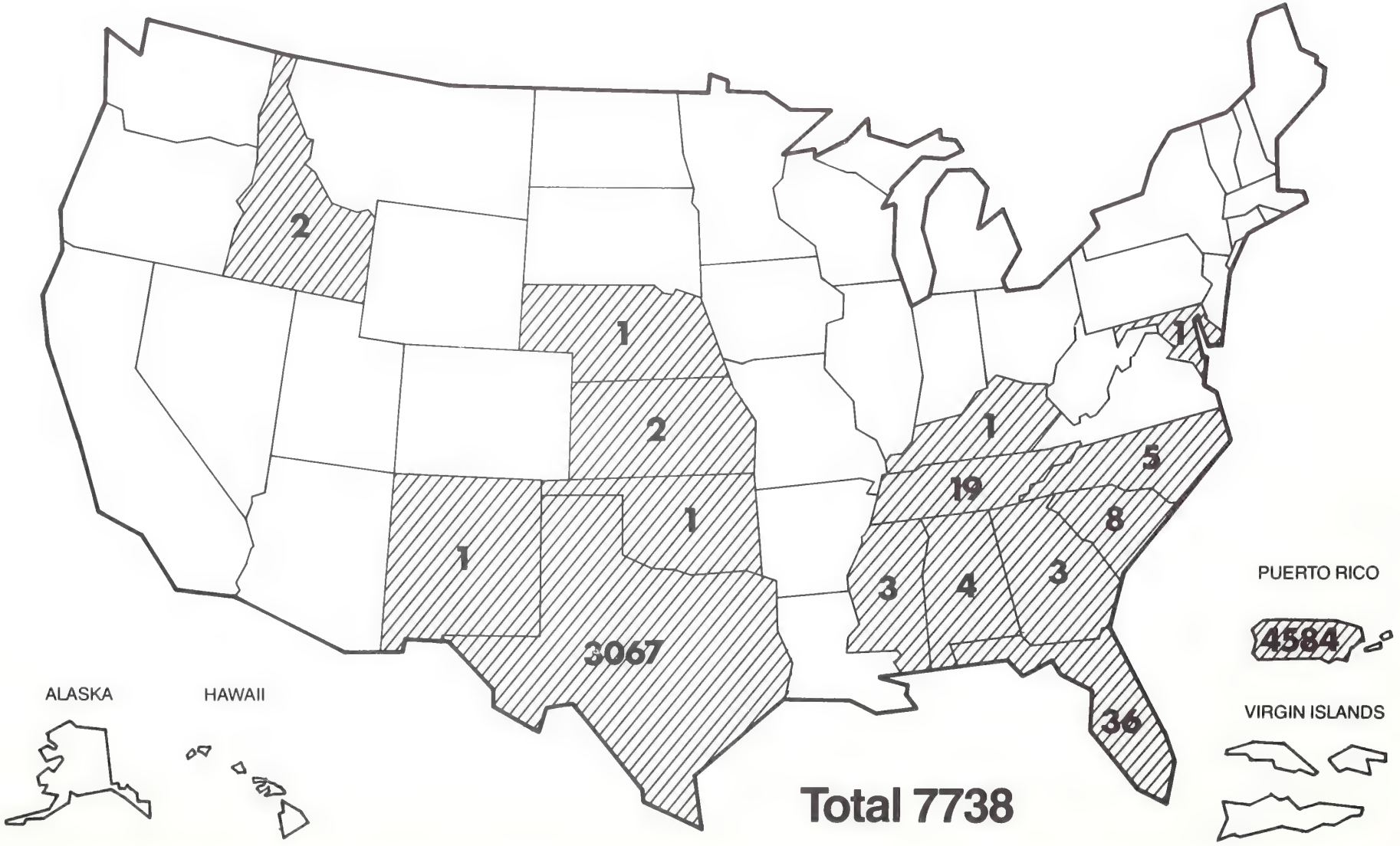
USDA, APHIS, VS
NVSL, AMES, IOWA

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 parumapertus
ip Ixodes pilosus
rc Rhipicephalus compositus
re Rhipicephalus evertsi evertsi
rm Rhipicephalus evertsi mimeticus
** Nymphal stage

Bracketed figures refer to Laredo

Tick Collections From Cattle
CY 1983



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1983

HOST: Cattle

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA INTERMEDIUM	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR ANDERSONI (PARKS) VARIABILIS (SAY)	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	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											
Nevada																											
New Hampshire																											
New Jersey																											
New Mexico	1										1																
New York																											
North Carolina	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 Islands																											

ANH FORM 5-55 MAY 1971

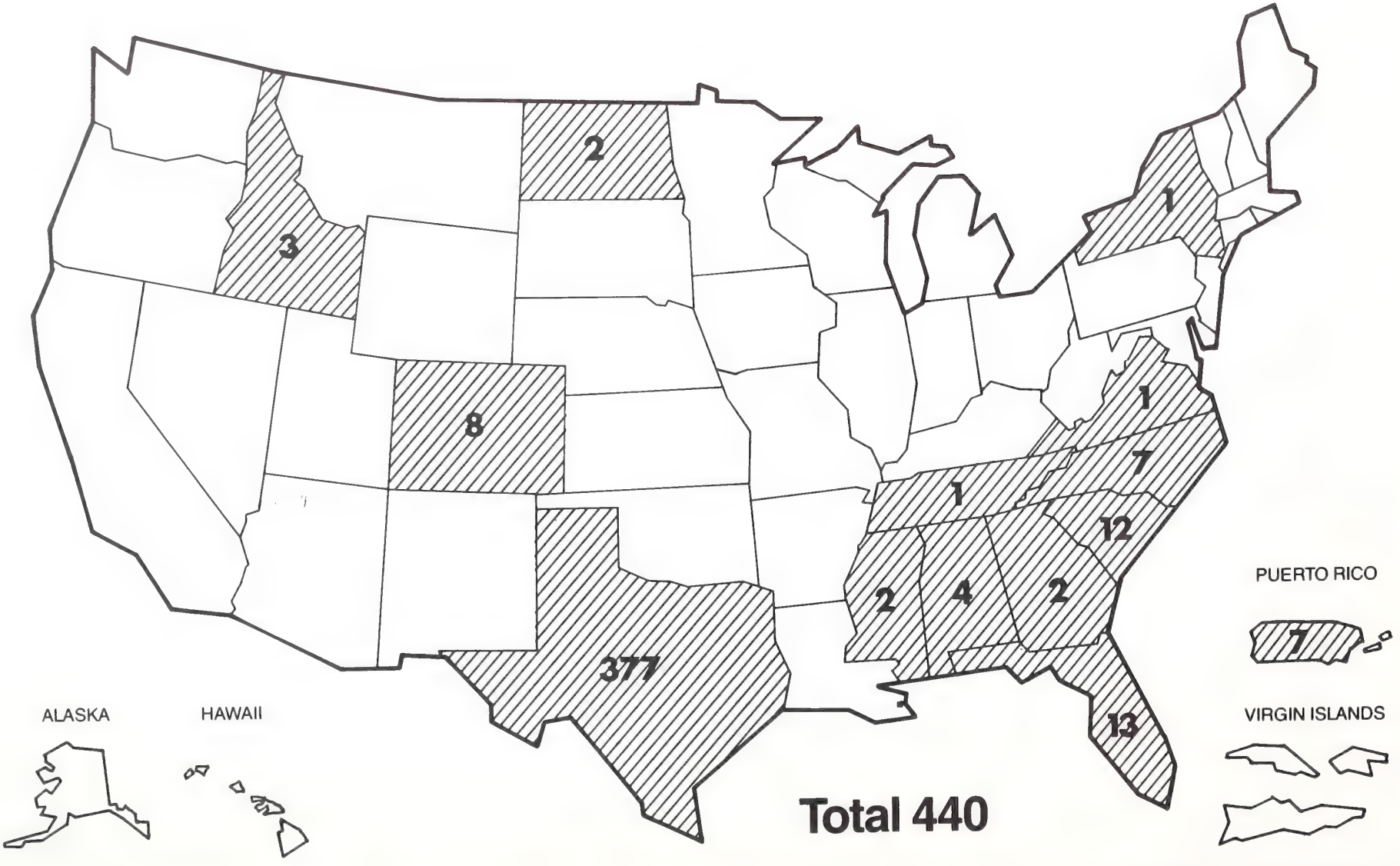
REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Species
n Amblyomma inornatum
v Amblyomma variegatum

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

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Dogs
CY 1983



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1983 | HOST: Dogs

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR NITENS (D. SILVARUM & D. VENUSTUS)	DERMACENTOR NIGROLINEATUS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	440	16		2	12	2					1			166						14	1		3	223		
Alabama	4													2										2		
Alaska																										
Arizona																										
Arkansas																										
California																										
Colorado	8										1												1	6		
Connecticut																										
Delaware																										
Florida	13	2			1									4						4				2		
Georgia	2																			1				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						1				4		
North Dakota	2													2												
Ohio																										
Oklahoma																										
Oregon																										
Pennsylvania																										
Rhode Island																										
South Carolina	12	1												2						4	1[a]			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																										

AMH FORM 5-55 MAY 1971

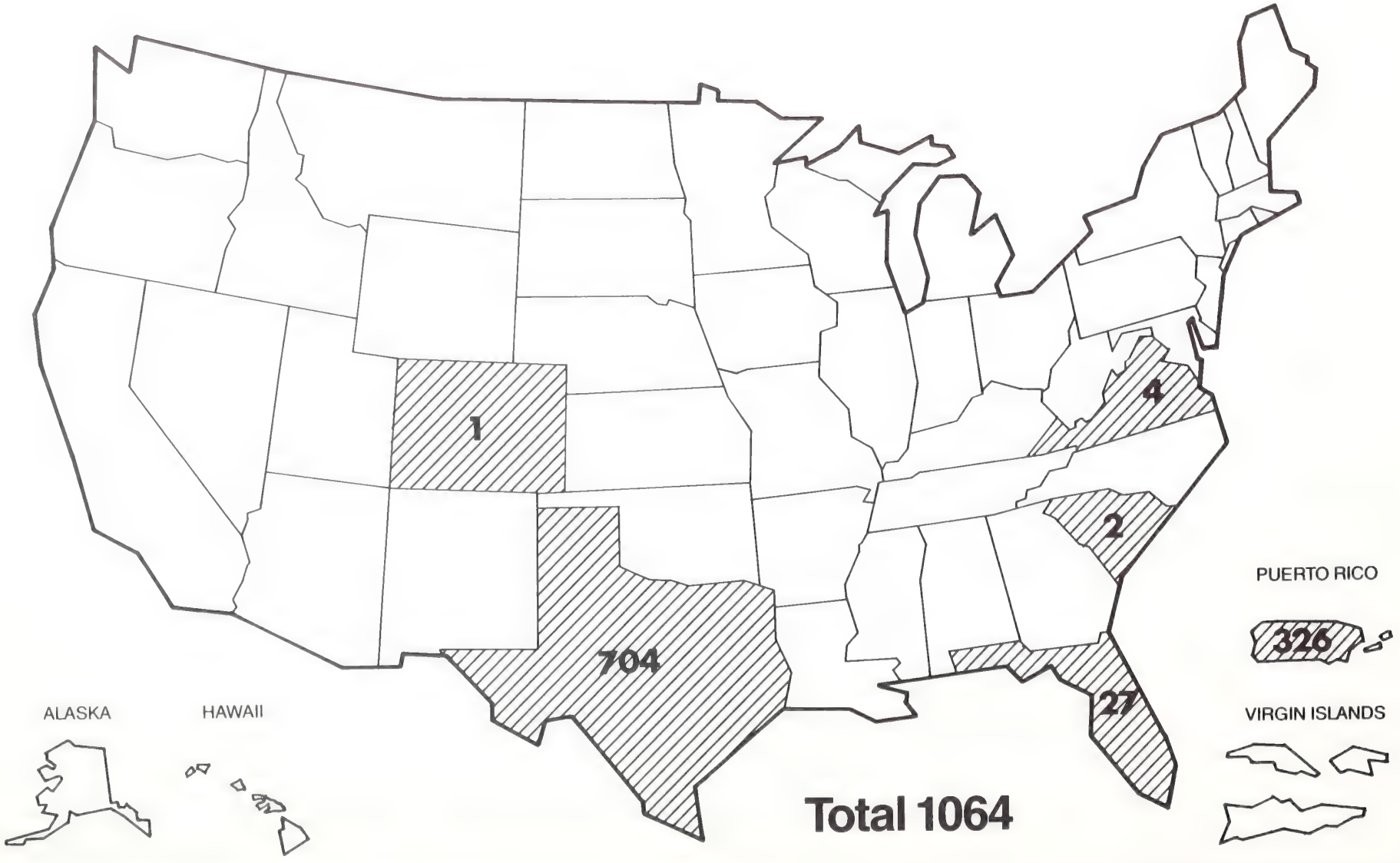
REPLACES ADE FORM 5-65, DEC 1964, WHICH IS OBSOLETE

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: Calendar Year 1983 | HOST: Horses and Mules

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SILVARUM (= D. OCCIDENTALIS FEMALES & NYMPHS)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	1064	29	44	2	77	2		2	17	1	62		2	328		476					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																											

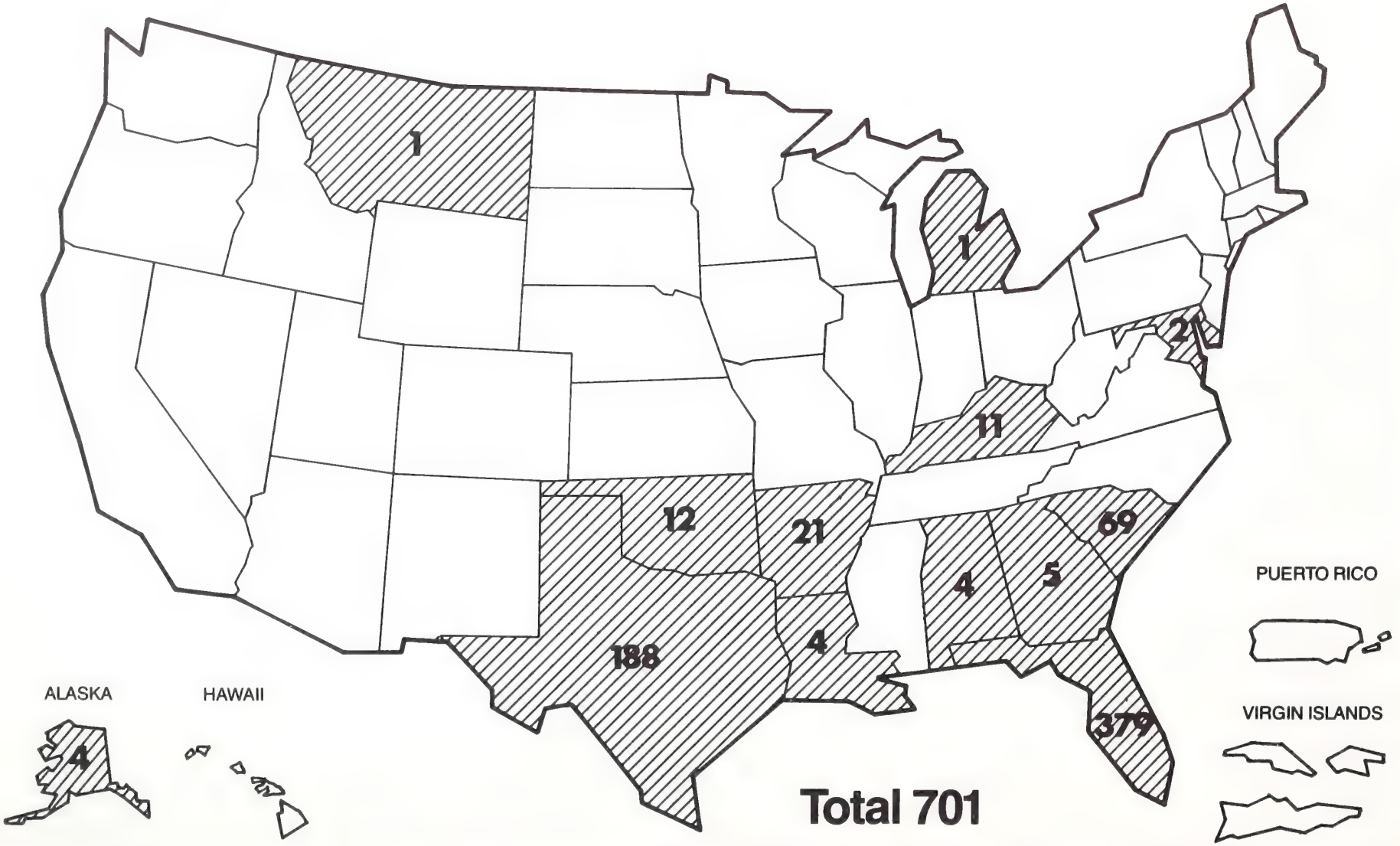
ANH FORM 5-55 MAY 1971 — REPLACES ADE FORM 5-55, DEC 1964, WHICH IS OBSOLETE

Key to Species
v Amblyomma variegatum

** Nymphal stage

USDA, APHIS, VS
NVSL, AMES, IOWA

Tick Collections From Native Wildlife
CY 1983



REPORT OF TICKS COLLECTED

PERIOD: Calendar Year 1983 | HOST: Native Wildlife

STATE	TOTAL	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SHPLEY SP.	DERMACENTOR VENUSTUS & N.SP.	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORIS-PALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODOROS SPP.	OTOBIUS MEGNINI	RHIPICEPHALUS SANGUINEUS	RHIPICEPHALUS SPP.	MISCELLANEOUS SPP.
TOTAL	701	139	12		94	9		2			25		36			29	3	101	2		237	8		1	3		
Alabama	4	1CO			2D											1CO						2VL[an] 1M[an] 1SH[an]						
Alaska	4																											
Arizona																												
Arkansas	21	20D			1D																							
California																												
Colorado																												
Connecticut																												
Delaware																												
Florida	379	87D			76D	3D[t]*										2D 1FY					208D	2D[a]						
Georgia	5	1FY 1D														1FY 1RC			1RC									
Hawaii																												
Idaho																												
Illinois																												
Indiana																												
Iowa																												
Kansas																												
Kentucky	11	6D 5FD																										
Louisiana	4	4D																										
Maine																												
Maryland	2	2D																										
Massachusetts																												
Michigan	1																						1MK*					
Minnesota																												
Mississippi																												
Missouri																												
Montana	1										1E																	
Nebraska																												
Nevada																												
New Hampshire																												
New Jersey																												
New Mexico																												
New York																												
North Carolina																												
North Dakota																												
Ohio																						1RC						
Oklahoma	12	1D 1CQ																		1MK		2F 2D 2BC 1CQ				1FR		
Oregon																												
Pennsylvania																												
Rhode Island																												
South Carolina	69	8D			4D 1FY								34D			1RC 1FY						1F 13D 2FY	1D[a]		1E***	1F		
South Dakota																1F												
Tennessee																												
Texas	188	1D 1TS	10D 1FY 1J		8D 1CO 1ML	2D** 1CO[n] 2R[n] 1F**		2D			24D		2D			2D 5BC 7CO 2RC 1PO 1ML 1R 1J	3D**	1D 20JR 80R			5D				1R		
Utah																												
Vermont																												
Virginia																												
Washington																												
West Virginia																												
Wisconsin																												
Wyoming																												
Puerto Rico																												
Virgin Islands																												

AMH FORM 5-55 MAY 1971 — REPLACES ADE FORM 5-65, DEC 1964, WHICH IS OBSOLETE

USDA, APHIS, VS
NVSL, AMES, IOWA

Key to Host

BC Bobcat	FD Fallow Deer	M Mouse (white footed)	RC Raccoon
CO Coyote	FR Ferret	ML Mountain Lion	SH Shrew
D Deer	FY Ferral Swine	MK Mink	TS Tree Squirrel
E Elk	J Javelina (Peccary)	PO Opossum	VL Vole
F Fox	JR Jack Rabbit	R Rabbit	

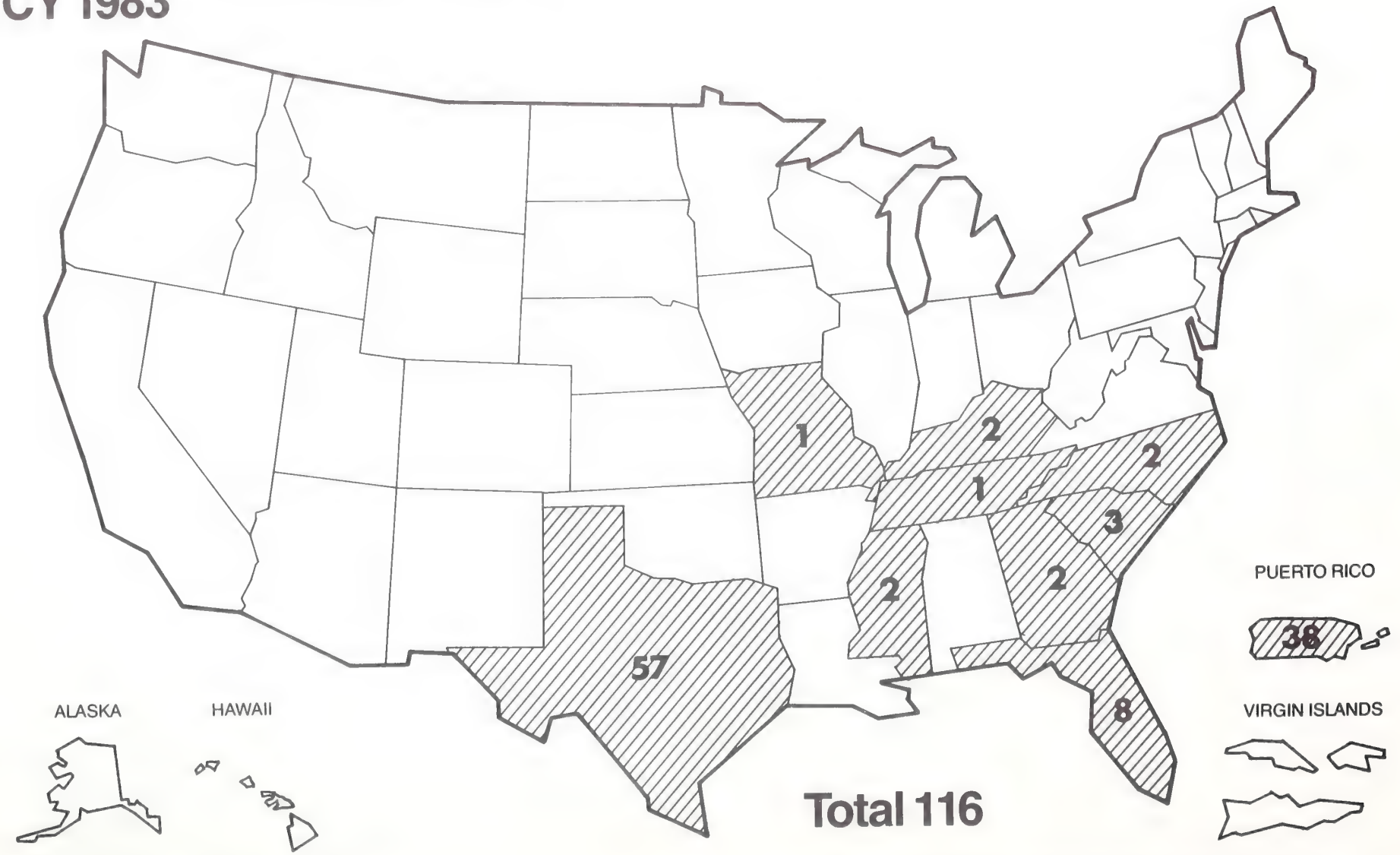
Key to Species

a Ixodes affinis
an Ixodes angustus
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	AMBLYOMMA AMERICANUM	AMBLYOMMA CAJENNENSE	AMBLYOMMA IMITATOR	AMBLYOMMA MACULATUM	AMBLYOMMA SPP.	ARGAS PERSICUS	BOOPHILUS ANNULATUS	BOOPHILUS MICROPLUS	BOOPHILUS SPP.	DERMACENTOR ALBIPICTUS	DERMACENTOR SPP. (NEAR ALBIPICTUS)	DERMACENTOR VARIABILIS (NEAR NITENS)	DERMACENTOR NIGROLINEATUS	DERMACENTOR NITENS	DERMACENTOR OCCIDENTALIS	DERMACENTOR VARIABILIS	DERMACENTOR SPP.	HAEMAPHYSALIS LEPORISPALUSTRIS	IXODES COOKEI	IXODES PACIFICUS	IXODES SCAPULARIS	IXODES SPP.	ORNITHODORUS SPP.	OTOBIUS MEGNINI	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[rs]	
Missouri	1	1Q																										
Montana																												
Nebraska																												
Nevada																												
New Hampshire																												
New Jersey																												
New Mexico																												
New York																												
North Carolina	2	1C															1G											
North Dakota																												
Ohio																												
Oklahoma																												
Oregon																												
Pennsylvania																												
Rhode Island																												
South Carolina	3																2H					1S						
South Dakota																												
Tennessee	1																1H											
Texas	57	6H 1X	2H	2H	1C 1H	1C[H] 1Q**											5C 7Y			1Q		1C			1C 1Q	3C 2Q		1PH[ar]
Utah		1DK			1G	3H**											9H 1Q 1G									1HM 3X		
Vermont																												
Virginia																												
Washington																												
West Virginia																												
Wisconsin																												
Wyoming																												
Puerto Rico	38								20G 13Q						5Q													
Virgin Islands																												

ANH FORM 5-55 MAY 1971

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

Key to Host

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

WH Wart Hog (trophy hide, origin South Africa)
X Inanimate object
Y Swine

Key to Species

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

Brackets enclose Texas collections

USDA, APHIS, VS
NVSL, AMES, IOWA

February 1985