

**ARMED FORCES PEST MANAGEMENT BOARD
TECHNICAL GUIDE NO. 8**

**Surveillance Guide & Response Plan
for the Asian Longhorned Tick,
*Haemaphysalis longicornis***



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1. Target Audience

This document was developed to assist preventive medicine, pest management, and veterinary personnel in identifying and implementing risk mitigation strategy measures for the Asian Longhorned and other ticks and tick-borne diseases on DoD installations.

2. Background

The Asian longhorned tick, ALT, (*Haemaphysalis longicornis*), was first collected in the United States in 2010 on a white-tailed deer in West Virginia but was not confirmed until reexamination by the United States Department of Agriculture-National Veterinary Services Laboratory (USDA-NVSL) in June 2018 and reported by the USDA Animal Plant Health Inspection Services (USDA-APHIS). The first reported identification of the ALT occurred in 2017 in New Jersey when the ticks were discovered on sheep. It is known to feed on a variety of mammals, aggregating in large numbers resulting in stress to the host and can potentially cause exsanguination and death. Of particular concern is the potential effect of this tick species on the livestock industry in the United States. The USDA-APHIS is the lead agency for the investigation and control of this species along with the Centers for Disease Control and Prevention (CDC) and state and academic stakeholders. The most up-to-date information on the status of the ALT can be found at www.aphis.usda.gov/animal_health/animal_diseases/tick/downloads/longhorned-tick-sitrep.pdf.

a. Biology

The Asian longhorned tick is a three-host tick and can be found in large numbers in grass habitats, especially those bordering wooded areas. In the United States, the ALT has been collected from medium to large mammals and several bird species.

Asian longhorned ticks are unique in that the species is represented by two distinct genetic populations defined by reproductive strategy. One population reproduces sexually and is primarily located in China, Russia, Korea, and Japan. The second population reproduces parthenogenetically and produces very few males. This population is invasive and is found in a broader range within Asia as well as Australia and, now, the United States.

Nymphs emerge from diapause from March through September, with their highest population density occurring between late April and early May. After the nymphs emerge, they attach to a host and feed for 5-7 days, then molt into adults. Adults observed in the northeastern United States are active from April to September and peak between late June and July. After adults emerge they seek out and attach to a host and feed for 7-14 days, drop off the host, and lay

between 800 and 2,000 eggs. Larvae hatch from June through October with peak emergence between middle August and early September. After attaching to a host, they feed for 3-5 days, drop off the host, molt into nymphs, and then begin diapause to overwinter. In warm parts of the United States that do not have harsh winters ALT nymphs do not undergo diapause.

b. Current Distribution of the Longhorned Tick

The distribution of ALT is rapidly evolving, so be sure to check for the most up to date information at the following website:

https://www.aphis.usda.gov/animal_health/animal_diseases/tick/downloads/longhorned-tick-sitrep.pdf.

As of October 9, 2020, the USDA has reported ALT in Arkansas, Connecticut, Delaware, Kentucky, Maryland, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia (Fig. 1).

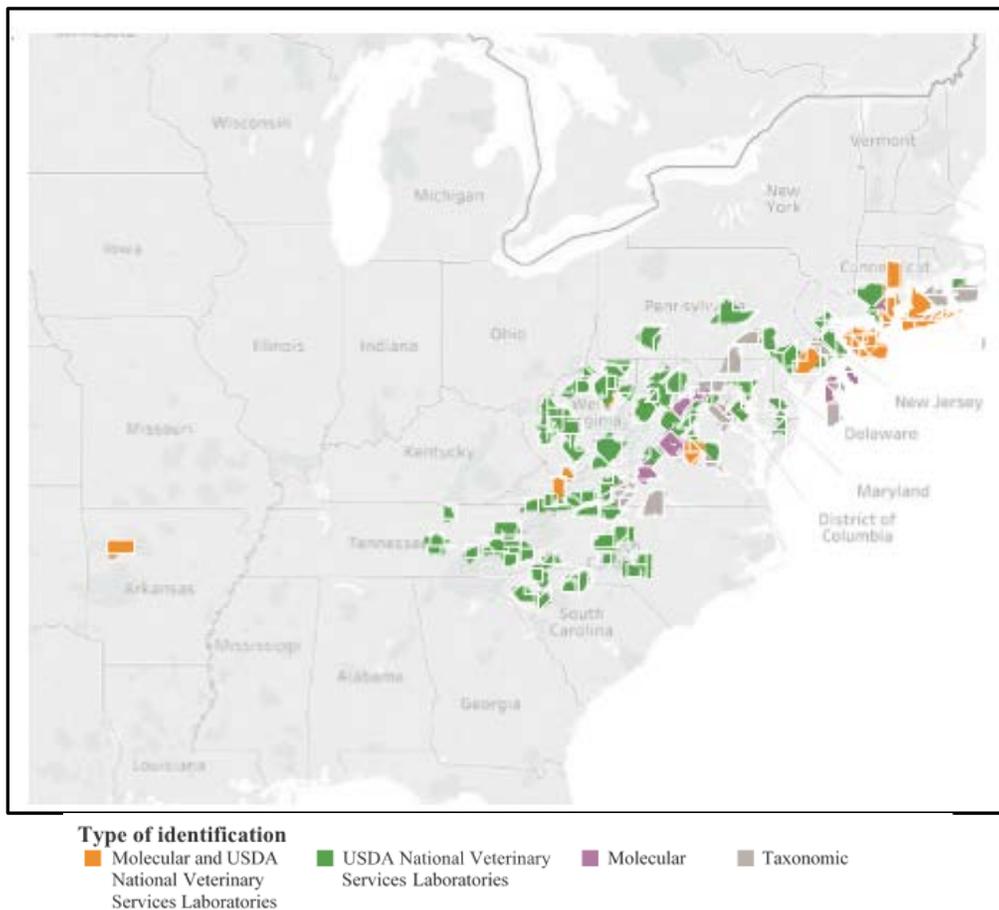


Fig. 1 Known distribution of Asian longhorned tick as of October 2020. Source: USDA/APHIS

c. Potential Range of the Asian Longhorned Tick

The Rutgers University Center for Vector Biology has developed a habitat suitability model for the ALT in North America from ALT home range surveillance data collected in East Asia, Australia, and New Zealand (Fig. 2). This habitat suitability model suggests ALT could inhabit much of the eastern United States as well as the coastal Pacific Northwest.

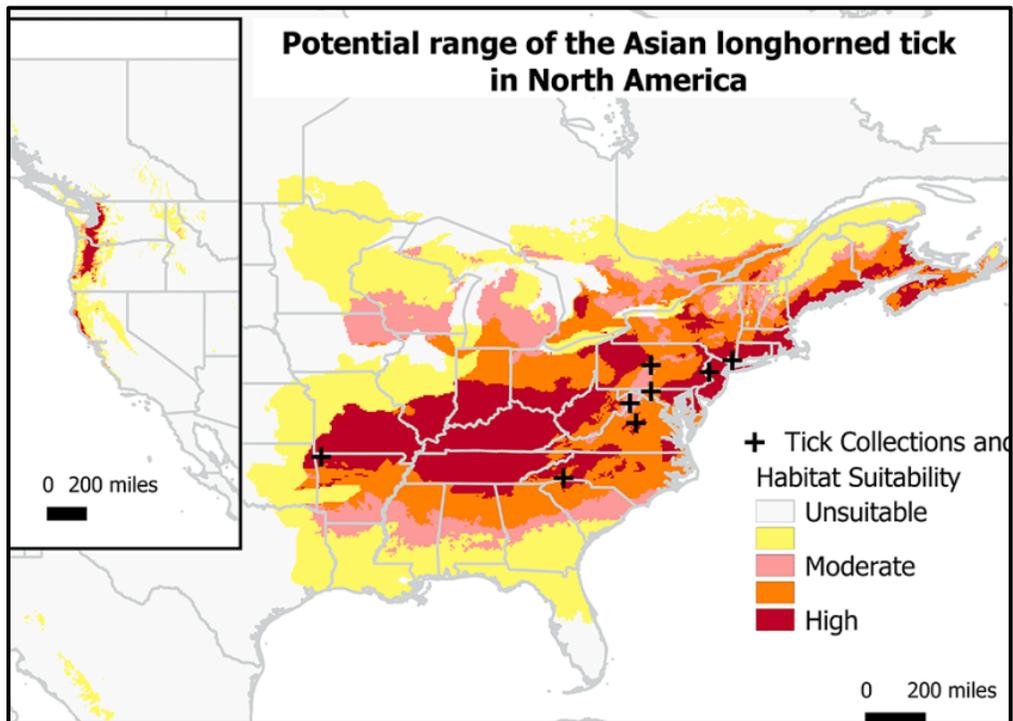


Fig. 2 Rochlin 2018, Habitat suitability model for ALT in the US.

d. Potential Pathogens

In its native range, the ALT is a known or suspected vector of several pathogens including severe fever with thrombocytopenia syndrome (SFTS) virus, Russian-spring summer encephalitis virus, *Coxiella burnetii*, *Rickettsia japonica*, *Theileria mutans*, and *T. orientalis* (Rainey et al. 2018). In China and the Republic of Korea, field populations have been found infected with *Anaplasma*, *Ehrlichia*, and *Borrelia* species (Heath 2002, 2016). Studies on the salivary proteins of the ALT in Japan indicate that bites from this species may also trigger the "alpha gal" allergy to red meat (Chinuki et al. 2016).

The ALT is currently being evaluated as a potential vector of several tick-borne diseases established in the United States. Laboratory studies indicate that ALT is unlikely to vector *Borrelia burgdorferi* s.s., the pathogen that causes Lyme disease. The Lyme spirochete does not undergo transstadial transmission in this tick, nor does the ALT readily feed on mice (Bruener et al. 2020). However, ALT collected in the United States was determined by laboratory studies to

be a competent vector for *Rickettsia rickettsii*, the pathogen that causes Rocky Mountain spotted fever (Stanley et al. 2020). Further investigations into ALT vector competency are ongoing.

3. Authority

Tick surveillance and control are mandated by the following issuances:

a. Department of Defense

- (1) DoDI 4150.07, DoD Pest Management Program, 26 December 2019
- (2) DoDD 6490.02E, Comprehensive Health Surveillance, 8 February 2012
- (3) Technical Bulletin, Medical, 298, Veterinary Care and Management of the Military Working Dog, 9 May 2019

b. Department of the Army

- (1) AR 40-5, Army Public Health Program, 12 May 2020
- (2) AR 200-1, Environmental Quality, Environmental Protection and Enhancement, 13 Dec 2007

c. Department of the Navy

- (1) OPNAVINST 6250.4C, Navy Pest Management Programs, 11 April 2012

d. Department of the Air Force

- (1) AFMAN 32-1053, Integrated Pest Management Program, 6 August 2019
- (2) AFI 48-102, Medical Entomology Program, 9 September 2019

4. Personnel Protective Measures

Personnel should protect themselves from ticks by adhering to the [DoD Insect Repellent System](#), which includes wearing long pants tucked into boots, long sleeve uniform or shirt fastened at the wrist, applying DoD-approved insect repellents to exposed skin, and sleeping inside a bed net when required. Laboratory trials conducted by the CDC indicate that DoD-approved topical repellents and permethrin clothing treatments are effective against the ALT (Foster et al. 2020).

Military Working Dogs (MWDs) will receive monthly topical application of imidacloprid/permethrin/ pyriproxyfen (Advantix II®), in accordance with TB Med 298. Imidacloprid/permethrin topical products have been proven effective in preventing the attachment and feeding of ALT on dogs.

a. Insect Repellents for Skin

Using a DoD approved topical repellent on exposed skin is an effective way of preventing tick bites. Active ingredients approved by the DoD include DEET, picaridin, and IR3535. See [Appendix A](#) for a list of DoD-approved military insect repellents available for use on exposed skin.

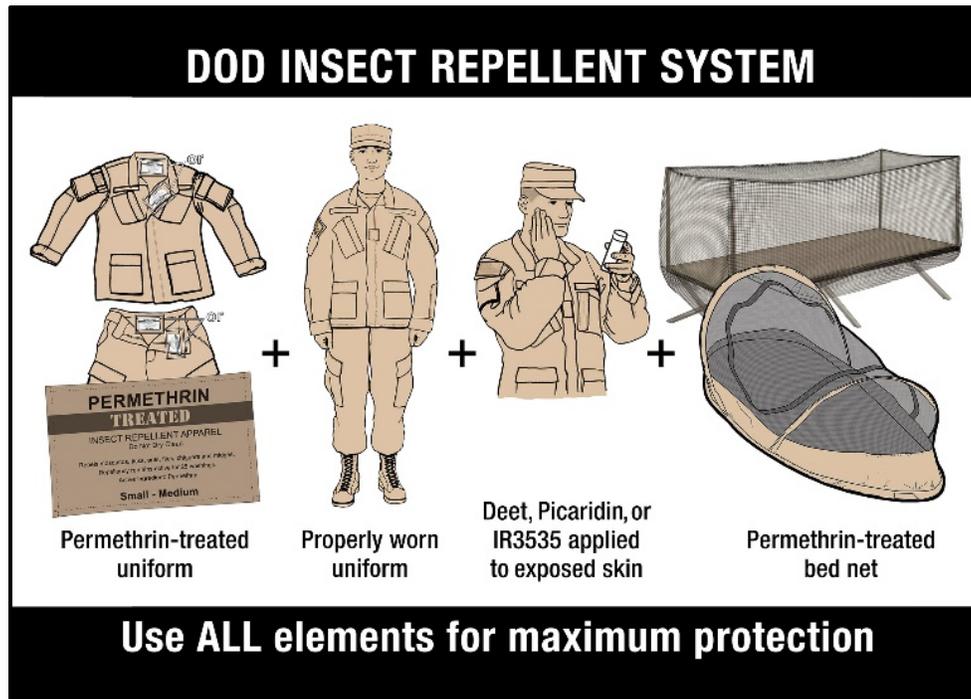


Fig. 3 DoD Insect Repellent System

b. Uniform and Clothing Insect Repellents

Permethrin-treated uniforms are a key component of the DoD Insect Repellent System (Fig. 3). Personnel wearing a permethrin-treated uniform are protected against insect and tick bites and diseases by wearing the uniform with the sleeves rolled down, closing all openings in clothing that might let in insects, tucking pants into boots and undershirt into pants, and keeping the uniform loose. For over 20 years, the DoD Insect Repellent System has effectively prevented biting insects and ticks from becoming an annoyance or making Service members/personnel sick.

(1) Military: Currently, both the Universal Camouflage Pattern (UCP) and Operational Camouflage Pattern (OCP) uniforms issued to Army and Air Force personnel are factory-treated with permethrin. This permethrin treatment will provide bite protection through 50 launderings. Personnel should check the tags sewn into the uniform trousers and blouse to determine if the uniform is permethrin-treated. Navy Working Uniforms (NWU) Type II and Type III are not factory treated, and may be treated with permethrin concentrate using the 2-gallon sprayer

method (NSN 6840-01-334-2666) or the IDA kit (NSN 6840-01-345-0237). These methods will provide protection for 50 laundering cycles. Uniforms treated with the 2-gallon permethrin product may be retreated one time, after 50 launderings. Alternatively, uniforms may be treated using the 0.5% aerosol application method (NSN 6840-01-278-1336), and may be re-treated after six weeks and the sixth laundering.

(2) Civilian DoD Employees: Personnel who do not have a prescribed service working uniform may purchase commercial insect repellent clothing at outdoor and sporting goods stores. Commercial insect repellent clothing is factory-treated with permethrin and will be labeled with a sewn-in tag. Always check for this tag before purchasing. Always read and follow the directions on the clothing label. Untreated clothing may also be treated with a commercially available 0.5% permethrin application method by following the product label.

5. Human Case Surveillance

In accordance with DoDD 6490.02E, all suspected or confirmed cases of tick-borne diseases at military treatment facilities, must be reported within 48 hours using the Disease Reporting System–internet (DRSi). Each Service utilizes DRSi according to guidance provided by their respective public health authorities. Timely identification and response to tick-borne disease cases requires constant communication between healthcare providers, local and state public health departments, and vector control specialists. Contact your Service-specific public health authority to receive installation-specific human tick-borne disease case information. The Service DRSi POCs are:

- a. **Army:** Army Public Health Center, usarmy.apg.medcom-aphc.mbx.disease-epidemiologyprogram13@mail.mil, 410-436-7605, DSN 584-7605
- b. **Navy:** Navy and Marine Corps Public Health Center, usn.hampton-roads.navmcpubhlthcenpors.list.nmcphc-ndrs@mail.mil, 757-953-0737, DSN 377-0737
- c. **Air Force:** USAF School of Aerospace Medicine, afdrsi@us.af.mil, 937-938-3207, DSN 798-3207

6. Tick Surveillance

Vector surveillance should be conducted as part of an integrated pest management program (IPMP) by the Military Treatment Facility, community health, or preventive medicine program. Tick surveillance helps identify key areas to focus control efforts by tracking the distribution and abundance of tick populations. Effective surveillance for ticks relies on identifying potential tick harborage areas and collecting, identifying, and testing ticks for pathogens; responding to complaints; and collecting regional data from local health departments. Surveillance data can be used to determine the level of risk and the appropriate risk mitigation strategy.

a. Habitat

Active surveillance for ALTs relies on identifying potential harborage areas such as grasslands with wildlife activity, near water sources, and transition zones from grassland to wooded habitats (Fig 4). Though not their preferred habitat, ALTs can be collected in wooded habitats as well.



Fig. 4 Transition habitat example. Ron Spomer, 2018

b. Surveillance Methods

(1) Dragging: Questing hard ticks are typically collected by dragging a weighted, light-colored cloth behind the collector through grassy areas. Tick drags are available for purchase through the National Stock System (NSN 3740-01-535-1314). Sampling should be done at different times of day to improve the chances of collecting at peak tick activity periods. Early morning may not be a good time for tick collection because of overnight dew and low temperatures, which reduce tick activity. Late morning from 1100-1200 and late afternoon from 1500-1630 are often better periods for surveys. Note basic weather conditions on a data sheet. When dragging, use a fixed distance (e.g., 100 m) to standardize samples. If the same area will be dragged repeatedly, use engineer's flagging to mark the beginning and end of the drag line. Examine the cloth drag for ticks every 10 paces or so. Store ticks in a break-proof plastic collection vial (e.g., cryovials), each labeled with sample number, site location, and date. Remove adult and nymphal ticks from cloth with forceps and place in the vial. A blade of grass will provide sufficient moisture for ticks in vials. Alternatively, you can use a 2-inch wide piece of tape or a lint roller to remove ticks from the drag material that can then be marked with the

date, time, location, collector's name, and drag distance. A video demonstrating tick dragging can be viewed [here](#).

(2) Flagging: When ticks are questing close to the surface of the ground or in dense vegetation, a tick flag can sometimes produce better results than a drag. A flag is made by attaching a piece of cloth to a stick or dowel so that it resembles a flag. The flag is then swept back and forth under, in, and around vegetation or leaf litter, in those areas where ticks are most likely to quest for their preferred host.

(3) Storing ticks: Adding a blade of grass to a vial of ticks will provide enough moisture to keep the collected them alive. Ticks can also be collected and kept alive on masking tape attached to a thick-gauge plastic food storage bag, which, in turn, is inserted and sealed in another bag with a slightly moist paper towel. Ticks can be kept alive in this manner for weeks to months if refrigerated. Kill specimens by freezing them at or below -25°C , which will also preserve any pathogens they may contain.

c. Attached Tick Removal

(1) It is important to remove attached ticks from the body as soon as possible. The chance of infection with a pathogen increases the longer a tick is attached. When checking for ticks, pay special attention to the following areas: under the arms, in and around the ears, inside the navel, back of the knees, in and around hair, between the legs, and around the waist. If you find a tick attached, remove it as soon as possible. When checking for ticks on MWDs, pay special attention to inside ears, between digits and paw pads, in axillae ("arm pits"), around the anus, and under collars. When checking for ticks on livestock, check inside and around the ears, on the dewlap (loose skin below the neck), between the legs, on the genitalia, around the anus, around the tail, and at the base of the udder.

(2) How to remove an attached tick:

1. Grasp the tick's mouthparts with pointed tweezers held close to the skin.
2. Pull back slowly and steadily.
 - a. Pull backward in the opposite direction the mouthparts are inserted, like you would for a splinter.
 - b. Be patient—the long, central mouthpart (called the hypostome) is covered with barbs, sometimes making removal difficult. The hypostome is the only part of a tick that enters the skin—they do not burrow.
 - c. Continue to pull steadily until the tick mouthparts have been eased out of the skin.
 - d. Clean the bite site with soap and water or alcohol after removal.

(3) What not to do when you are removing an attached tick:

1. Do not pull back sharply; this may tear the mouthparts from the body of tick, leaving them embedded in the skin. Mouthparts alone cannot transmit disease but if left in the skin, can introduce secondary infection.
2. Do not squeeze or crush the body of the tick because this may force infective body fluids through the mouthparts and into the bite site.
3. Do not apply any substance such as petroleum jelly, finger nail polish remover, repellents, pesticides, or a lighted match to the tick while it is attached. These materials can agitate the tick and cause it to regurgitate infective fluid into the bite site.

d. Identification

A hard tick morphological overview can be found in [Appendix E](#) and a taxonomic key to identify hard ticks to genus can be found in [Appendix F](#). Species-specific identification pages to assist in identifying *Haemaphysalis chordeilis*, *H. juxtakochi*, *H. leporispalustris*, and *H. longicornis* are provided in [Appendix G](#). *H. juxtakochi* is not typically found in the United States but is established in Mexico, resulting in occasional collections in the United States on migratory birds. If you are unfamiliar with tick identification, seek assistance from a trained entomologist to ensure correct identification. Instructional materials on tick identification can be downloaded from the AFPMB website at https://www.acq.osd.mil/eie/afpmb/training_resources.html.

e. Pathogen Detection and Identification Services

(1) Department of Defense personnel: Ticks removed from DoD personnel and their dependents in CONUS can be sent to the Military Tick Identification/Infection Confirmation Kit ([MiTICK](#)) program at the Army Public Health Center. For OCONUS locations, contact the appropriate POC referenced in [Appendix K](#). For ticks removed at Army locations in Europe, contact Army Public Health Command–Europe (APHC–E) and follow submission instructions in [Appendix N](#).

(2) Army personnel: Regional Army Public Health Command laboratories provide identification and pathogen testing services for ticks and other arthropods of medical significance collected from the environment at military installations. The following are key elements of the program: Installation preventive medicine and veterinary services personnel collect and submit specimens to their supporting Public Health Command Entomology Branch for identification confirmation. The Entomology Branch identifies the specimens and submits the samples to the lab for tick-borne disease pathogen testing. Shipping and contact information for submitting tick specimens can be found in [Appendix K](#) for each Public Health Command region.

In the event a tick-borne pathogen is detected, the lab will notify the Public Health Command Entomology Branch. The Entomology Branch will then contact the POC for the facility/surveillance. Notifications will also be made to appropriate regional and national health and veterinary officials, the Army Public Health Center, and the Army Environmental Command

(AEC) entomologist. Confirmed ALT samples will be reported to USDA-APHIS by emailing nvsl_concerns@usda.gov.

(3) Air Force personnel: For AFNORTH, USAFE, AFAFRICA, AFCENT and AFSOUTH, Public Health and Preventive Medicine personnel submit tick samples to US Air Force School of Aerospace Medicine's Public Health Epidemiology Consult and Research Services Division (USAFSAM/PHR) for identification confirmation and pathogen testing using agreed-upon protocols. In the event a tick-borne pathogen is detected, USAFSAM/PHR will notify the submitting POC and the Public Health Flight Commander located at the installation from which the submission was collected. Confirmed *H. longicornis* identified submissions will be reported to USDA-APHIS. Medical and Civil Engineering Pest Management personnel located in PACAF locations will utilize the 18 AMDS Theater Preventive Medicine Flight for vector/pest identification and pathogen testing services. See [Appendix K](#) for contact information.

(4) Navy personnel: The Navy Entomology Center of Excellence (NECE) provides identification services and pathogen testing for ticks collected and not attached to personnel. Any ticks attached to personnel should be submitted to the MilTICK program directly or through their health care provider. Preventive medicine personnel may submit suspected ALT samples to NECE for identification confirmation and pathogen testing. In the event a tick-borne pathogen is detected, NECE will notify the Commanding Officer of the installation from which the submission was collected, the submission POC, and local public health representatives. Confirmed ALT will be reported to USDA-APHIS by emailing nvsl_concerns@usda.gov. In addition, Navy Environmental and Preventive Medicine Units (NEPMUs) and the Navy and Marine Corps Public Health Center headquarters have resident entomologists who can identify ticks, but do not have pathogen testing capabilities.

f. Shipping Requirements

Shipping addresses and POCs for all services can be found in [Appendix K](#). Personnel utilizing Army PHC-E laboratory services should include the form found in [Appendix M](#) when shipping specimens. Navy personnel should include the form found in [Appendix L](#) when shipping specimens.

7. Vector Control

a. Control Methods

(1) Habitat modification

Questing ticks prefer tall grasses as this allows them to grab onto passing hosts easily. This habitat also provides a microhabitat beneath the grass where ticks can retreat to rehydrate and prevent desiccation. If grass is mowed to less than 6 inches in height, questing becomes more

difficult and the moisture level at the ground is reduced. Mowing will also expose small mammals, the preferred hosts of immature hard ticks, forcing them to relocate to other areas. Pasture and lawn control measures such as maintaining low grass height, controlling weeds and other brushy areas, and removing woody debris from pasture and lawn edges can reduce tick-bite risk. Maintaining a 9-foot distance between pasture or lawn and wooded edge habitat can reduce the risk of tick contact. More information on tick habitat modification can be found in AFPMB Technical Guide 26 accessible at: <https://www.acq.osd.mil/eie/afpmb/docs/techguides/tg26.pdf>.

(2) Chemical Control

All chemical applications on DoD installations must conform to environmental and health regulations, and must be done in accordance with the installation's integrated pest management plan (IPMP). Only EPA-registered pesticides labeled for tick control will be used for control efforts and only individuals who are certified to apply pesticides on military installations are authorized to conduct chemical control. Pesticide selection may require input from the installation's command pest management consultant. For best results, grass should be mowed to an acceptable level before pesticide applications are made. This allows pesticides to penetrate more deeply into the thatch where non-questing ticks may be located.

Environmental vector control around MWD kennels and training grounds is critical for reducing risk of exposure of the MWDs to ticks. Ensure the control method is safe for use around dogs and notify the kennels when areas will be treated and how long the dogs should remain out of the area for dog and handler safety.

Afterword

MAJ Jordan Coburn and LCDR Michael Kavanaugh of the AFPMB authored this document. COL Derron Alves and Ms. Anne Radavich of the US Army Public Health Center and Lt Col Timothy Davis, LTC Jeffrey Clark, MAJ Erica Lindroth, and Mr. Terry Carpenter of the APFMB provided reviews, inputs and edits to the final product.

Appendix A. Insect Repellents

Insect repellents for use on exposed skin come in a variety of formulations. All approved insect repellents for use on exposed skin are registered by the U.S. Environmental Protection Agency (EPA) and recommended by the Centers for Disease Control and Prevention. These products are safe to use. Always refer to the product label for safety information and to determine frequency of repellent application based on activity. Users should familiarize themselves with the product label and Safety Data Sheet (SDS) before applying repellents. Per TB Med 298, MWDs will continue to receive a monthly topical application of imidacloprid/ permethrin/ pyriproxyfen (Advantix II®) for routine vector prevention.

Insect Repellents for Use on Exposed Skin

National Stock Number (NSN)	Item (Alternative trade name)	Unit Package	ACC	Price	Unit Issue	Users
6840-01-284-3982	Insect Repellent, personal application, Ultrathon (3M/EPA 58007-1)	(12) 2-oz tubes	H	90.18	BX	A, N, F, M
6840-01-584-8393	Insect Repellent, personal application, 30% DEET (SP532-Ultra30/LipoDEET)	(12)-2 oz tubes	H	75.15	BX	A, N, M, F
6840-01-584-8598	Insect Repellent, personal application, 25% DEET, pump spray bottles (Cutter Backwoods DEET Insect Repellent)	(12)-6 oz BT	H	74.44	BX	A, N, F, M
6840-01-619-4795	Insect Repellent, personal application, 20% Picaridin, pump spray bottle (NATRAPEL Insect Repellent)	(12)-3.4 oz BT	H	109.27	BX	A, N, M, F

All NSNs are hyperlinked to the standard list of pesticides available on the Armed Forces Pest Management Board website via CAC access (https://extranet.acq.osd.mil/eie/afpmb/cac/standardlists/DOD_PESTICIDES_LIST.pdf), which has links to the product label and safety data sheet.

Insect Repellents for Use on Clothing

National Stock Number (NSN)	Item (Alternative trade name)	Unit Package	ACC	Price	Unit Issue	Users
6840-01-278-1336	Insect Repellent, clothing application, aerosol (Permethrin Arthropod Repellent)	(12) 6-oz cans	H	72.64	BX	A, N, F, M
6840-01-345-0237	Insect Repellent, clothing application, permethrin (IDA)	12 kits	H	47.40	BX	A, N, F, M
The following repellent must be applied by trained personnel or a DoD-certified pesticide applicator.						
6840-01-334-2666	Insect Repellent, clothing application, 40% permethrin, liquid (for use with 2-Gal sprayer)	(12) 151-ml bot	H	141.16	BX	A, N, F, M

Note: Factory treated uniforms may not be retreated with permethrin. Navy uniforms treated with permethrin concentrate and the 2 gallon "hand can" sprayer may be re-treated one time after 50 launderings. To determine type of treatment, look at the label sewn into the garment to confirm whether it has been factory treated or the date marked on the label if treated with permethrin concentrate.

Appendix B. Tick Surveillance Equipment

Equipment for Collecting Ixodid ("hard") Ticks

National Stock Number (NSN)	Item (Alternative trade name)	Cage Code	ACC	Price	Unit Issue	Users
3740-01-535-1314	Tick Drag Cloth, Part No. 2840T, 23 x 45 in. cloth used for collecting ticks	59590	Z	33.51	EA	A, N, F, M
3740-01-474-7377	Tweezers, Tick Removal, Stainless Steel, Part No. 0621	1TJF0	Z	5.07	EA	A, F, N, M

Constructed Tick Sweep

Materials List:

Approximate Cost: \$10.50/sweep

- | | |
|--|-----------------|
| • (1) 10' x ¾" PVC40 Pipe | \$2.71 |
| • (2) ¾" PVC40 Cap SLIP (Fig 1) | \$0.64 ea |
| • (3) ¾" PVC40 Male Adapter MPT x SLIP (Fig 2) | \$0.61 ea |
| • (2) ¾" PVC40 Female Adapter SLIP x FPT (Fig 3) | \$0.74 ea |
| • (1) ¾" PVC40 45° Elbow SLIP x SLIP (Fig 4) | \$1.14 |
| • (1) ¾" PVC40 Riser Extender FPT x MPT (Fig 4) | \$0.66 |
| • (1) Double-sided waterproof flannel | \$8.99 per yard |
| • (1) 8oz PVC Cement (Regular) | \$4.50 |

Construction: (Fig 5-11)

1. Cut 10' PVC pipe into six 18" sections (One 10' length makes 1.5 sweeps)
2. Section A - Cement (1) PVC Cap Slip and (1) ¾" Male Adapter on opposing ends of one 18" piece (Fig 5A)
3. Section B - Cement (1) ¾" Male Adapter and (1) ¾" female Adapter on opposing ends of one 18" piece (Fig 5B and 5C)
4. Section C - Repeat Step 3 making two identical pieces.
5. Section D - Cement (1) ¾" PVC Cap Slip and (1) ¾" 45° Elbow on opposing ends of one 18" piece (Fig 5D)

6. Cement (1) $\frac{3}{4}$ " PVC40 Riser Extender into the 45° Elbow of Section D
7. Measure and cut the flannel material into a rectangle of 16"x24" (One yard makes approximately four sweeps)
8. Using heavy duty masking tape or duct tape, attach the 16" side of the flannel material to Section D. Position the material so that the attachment point is at the bottom of the sweep when held upright. Reinforce with two layers of tape if using masking tape (Fig 6)
9. Let cement dry per labeled instructions and assemble

This design allows for the sweep to be collapsible for easy packing and carrying.



Fig 5. $\frac{3}{4}$ " PVC40 Cap SLIP



Fig 6. $\frac{3}{4}$ " PVC40 Male Adapter MPT x SLIP



Fig 7. $\frac{3}{4}$ " PVC40 Female Adapter SLIP x FPT



Fig 8. $\frac{3}{4}$ " PVC40 Riser Extender FPT x MPT



Fig 9. The four completed sections labeled.



Fig 10. The completed end section with flannel attached.

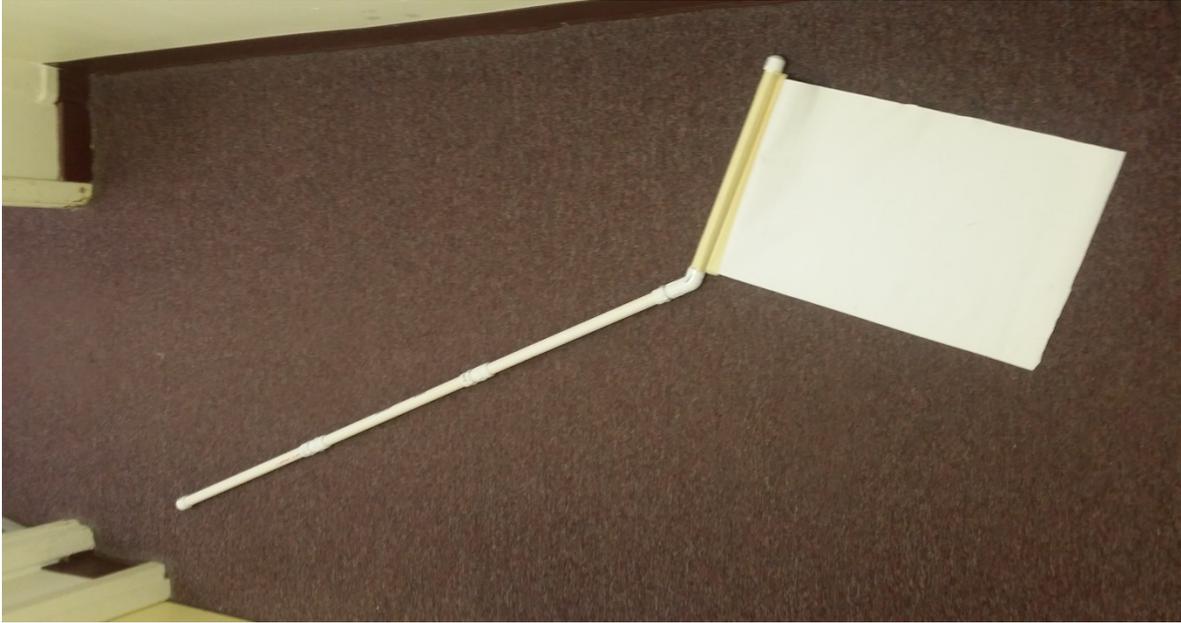


Fig 11. The completed tick sweep.

Appendix C. Insecticide Application Equipment

Backpack and Hand-Compressed Spraying Equipment

National Stock Number (NSN)	Item (Alternative trade name)	Cage Code	ACC	Price	Unit of Issue	Users
3740-00-191-3677	Sprayer, Pesticide, Manually Carried, 1-gallon stainless tank, with pressure gauge. CID A-A-55748. Flow rate - 0.8 l/min.	58536	D	148.53	EA	A, N, F, M
3740-00-641-4719	Sprayer, Pesticide, Manually Carried, 2-gallon stainless tank with pressure gauge. CID A-A-55748. Flow rate - 0.8 l/min	58536	D	161.74	EA	A, N, F, M
3740-01-496-9306	Sprayer, Pesticide, Manually Carried Hydraulic Backpack sprayer, SOLO 475 DLX	8T840	Z	115.30	EA	A, N, M, F
3740-01-543-0676	Sprayer, Pesticide, Manually Carried Hydraulic Backpack sprayer. Birchmeier, Iris model, manually/hand operated piston pump comes with pressure gage, gasket and repair set for tank and pump	4GRF7	Z	489.34	EA	A, F, M, N

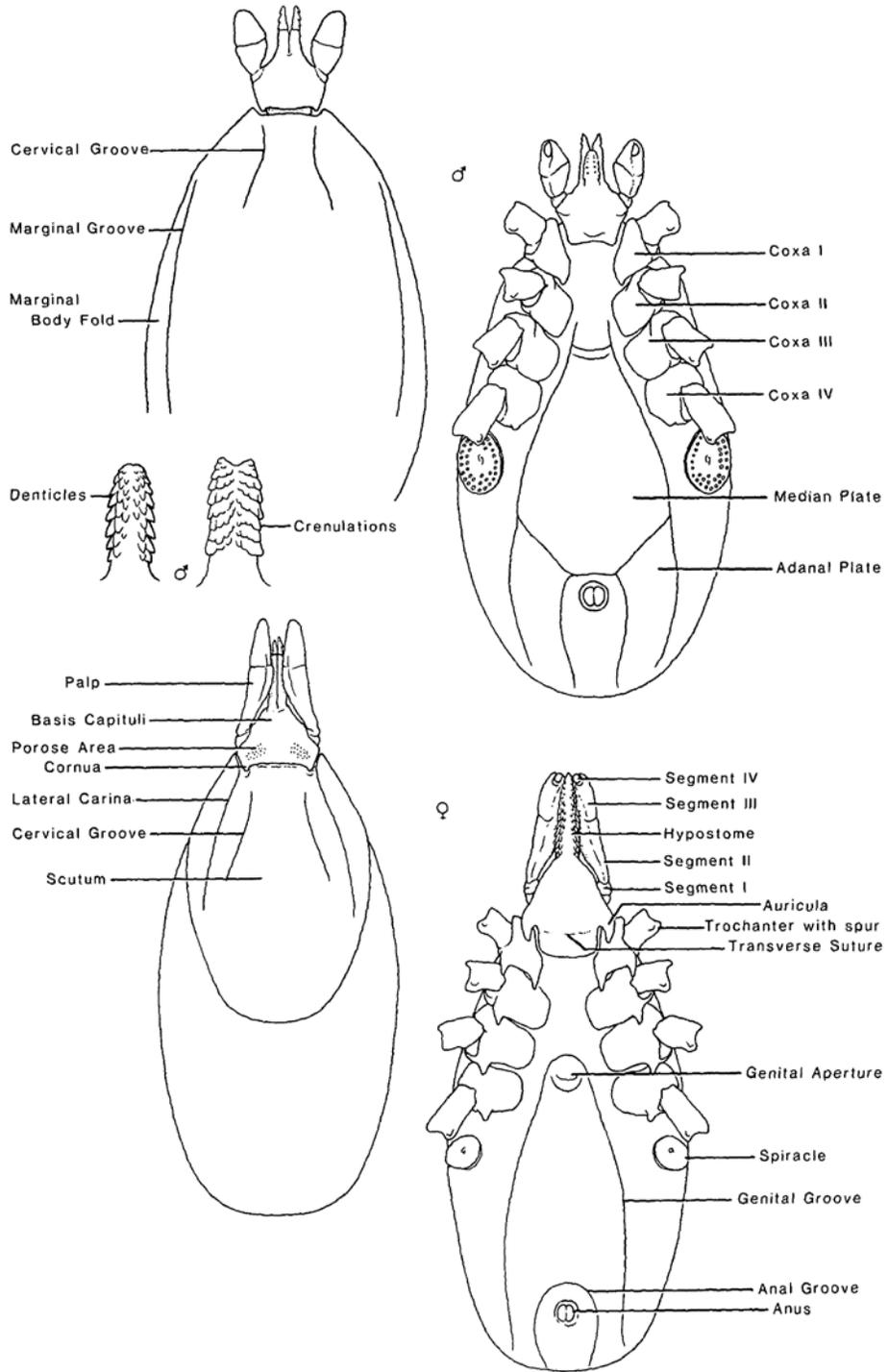
Skid or Framed Mounted Spraying Equipment

National Stock Number (NSN)	Item (Alternative trade name)	Cage Code	ACC	Price	Unit of Issue	Users
3740-00-993-4000	Sprayer, Pesticide, Frame Mounted, mist and solid stream, no tank included, with pressure gauge. Part No. CSR47500A, Mil-S-12511. Flow rate 3 gal/min.	82254 81349	Y	2394.00	EA	A
3740-01-518-6876	Sprayer, Pesticide, Skid Mounted, hydraulic sprayer/applicator, Stinger Hydraulic Sprayer Part No. 20583. 25 gal tank. Flow rate 3 gal/min	3B757	J	3429.86	EA	A, N, F, M
3740-01-211-7226	Sprayer, Pesticide, Frame, Mounted, gasoline engine driven, MIL-S-12511, tank not included, Flow rate 3 gal/min	81349	C	1033.00	EA	A
3740-01-454-1981	Sprayer, Pesticide, Electric, Liquid (SPEL), AG 25 LR Deluxe Spot Sprayer, 25 gal tank	03JL1	Z	270.45	EA	A, N, M, F

Appendix D. Chemical Control

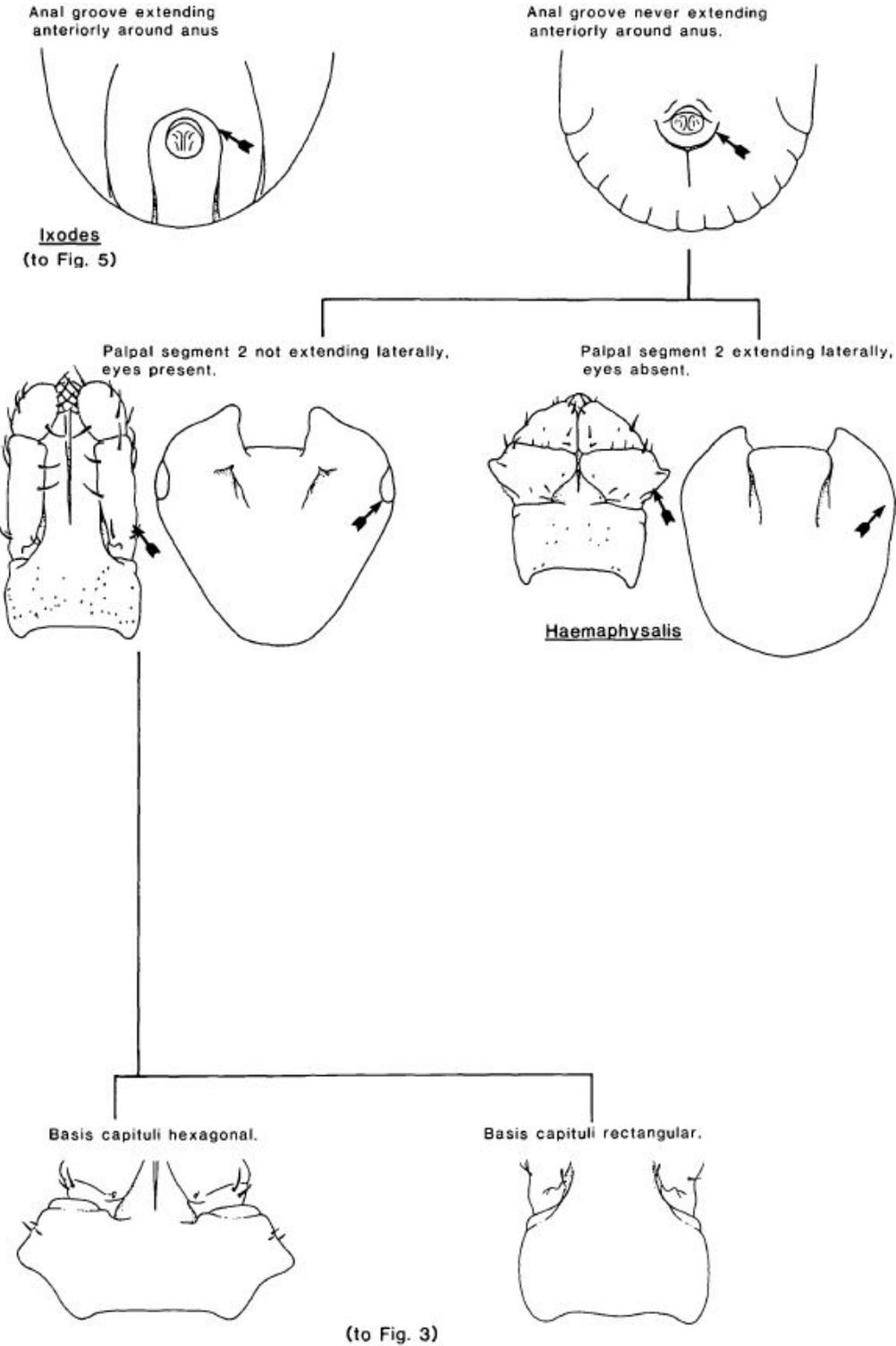
National Stock Number (NSN)	Item (Alternative trade name)	Unit Package	ACC	Price	Unit of Issue	Users
6840-01-591-2155	Insecticide, (S)-Methoprene 0.085%, Permethrin 0.35%, Phenothrin 0.3%, N-octyl bicycloheptene dicarboximide 2%, and Piperonyl butoxide 1.75% (Precor 2000 Plus)	12 aerosols/box	H	225.94	BX	A, N, F, M
6840-01-525-6888	Insecticide, Bifenthrin, 7.9% liquid (Talstar P Professional)	1-qt co	H	63.46	QT	A, N, F, M
6840-01-104-0887	Insecticide, Carbaryl, 43%, liquid (Carbaryl 4L)	(2) 2.5-gal co	H	384.99	BX	F, N
6840-01-313-7359	Insecticide, beta-cyfluthrin, 11.8% (Tempo SC Ultra)	(12) 240-ml bot	H	625.84	BX	A, N, F, M
6840-01-642-9286	Insecticide, Deltamethrin, 0.1% granules (DeltaGard G)	20-lb. bag	J	180.80	BG	A, N, F, M
6840-01-428-6646	Insecticide, Lambda-cyhalothrin, 9.7% (Demand CS)	(8) 8 oz. bottle	H	459.11	BX	A, N, M
6840-01-823-7849	Insecticide, Pyrethrins 0.5%, Piperonyl butoxide 1% and N-octyl bicycloheptene dicarboximide 1%, aerosol (PT 565 Plus XLO)	(12) 20-oz cans	H	277.47	BX	A, N, F

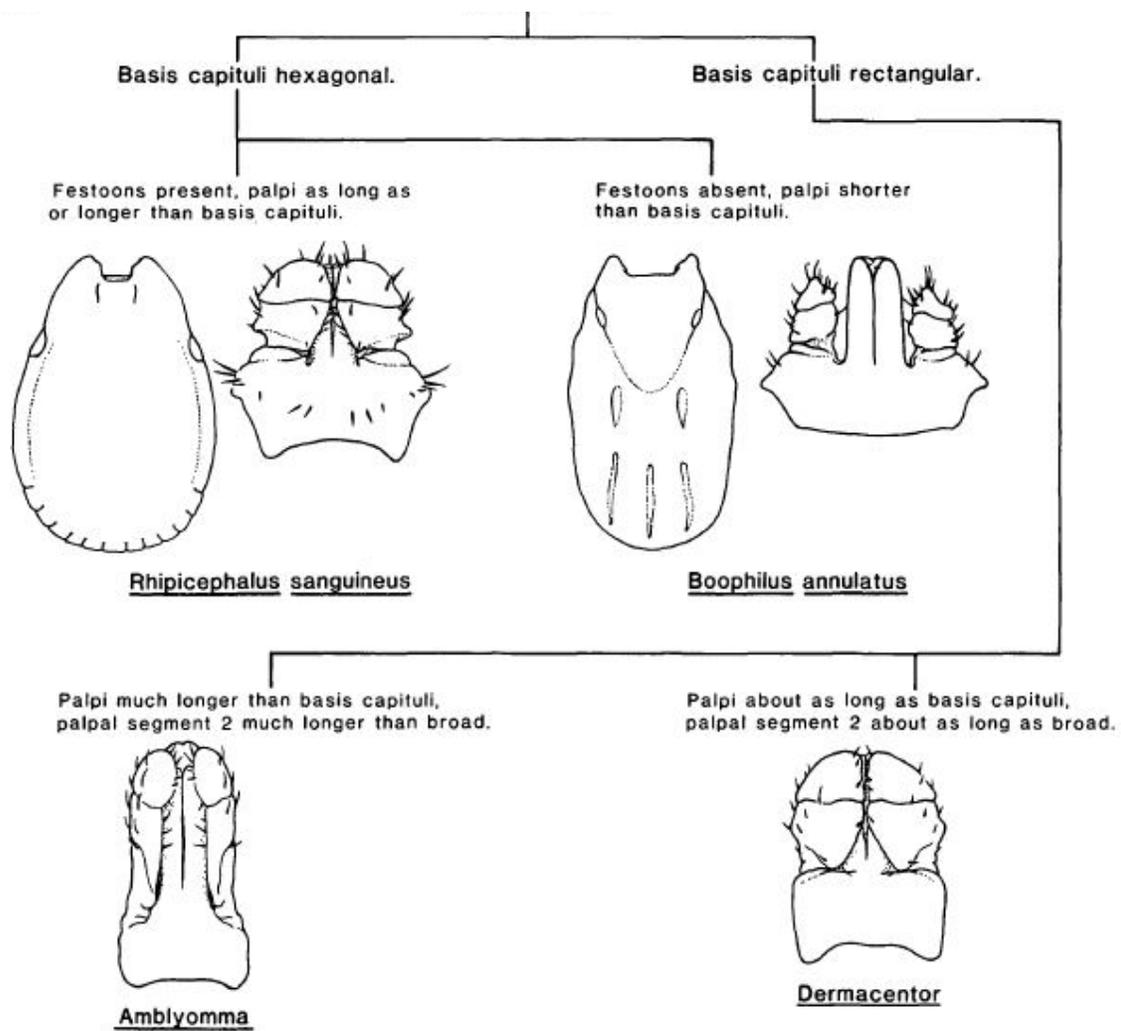
Appendix E. Hard Tick Anatomy



Source: Keirans & Litwak 1989. Available online at: <https://academic.oup.com/jme/article-abstract/26/5/435/2220689?redirectedFrom=fulltext>

Appendix F. Taxonomic Key for Identifying Hard Tick Genera





Source: Keirans & Litwak 1989. Available online at: <https://academic.oup.com/jme/article-abstract/26/5/435/2220689?redirectedFrom=fulltext>

Appendix G. Key to *Haemaphysalis* species of North America

Adults (illustrated in Fig. 12)

- 1 Palpal segment 3 dorsally with prominent retrograde spur (Fig. 1a).....
.....*Haemaphysalis (Kaiseriana) longicornis* Neumann, 1901
- Palpal segment 3 without dorsal spur (Fig. 1b)2
- 2 Palpal segment 3 ventrally with long, slender, retrograde spur extending at least to middle of segment 2 (Fig. 1d)*Haemaphysalis (Gonixodes) juxtakochi* Cooley, 1946
- Palpal segment 3 ventrally with short spur, not reaching segment 2 (Fig. 1c).....3
- 3 Basis capituli ventrally with cornua at postero-lateral margins; dental formula 3/3 (Fig. 1e)
.....*Haemaphysalis (Gonixodes) leporispalustris* (Packard, 1869)
- Basis capituli ventrally without cornua; dental formula 5/5 (Fig. 1f).....
.....*Haemaphysalis (Aboimialis) chordeilis* (Packard, 1869)

Nymphs (illustrated in Fig. 13)

- 1 Basis capituli ventrally with cornua at postero-lateral margins (Fig. 2a).....2
- Basis capituli ventrally without cornua at postero-lateral margins (Fig. 2b).....3
- 2 Palpal segment 2 ventrally with 4–8 stout hairs along internal margin; palpal segment 3.....
ventrally with a short, blunt spur, not reaching anterior margin of segment 2 (Fig. 2c)
.....*Haemaphysalis (Gonixodes) leporispalustris* (Packard, 1869)
- Palpal segment 2 ventrally with 2 fine hairs along internal margin; palpal segment 3 ventrally
with a longer, sharp, retrograde spur, extending to or beyond anterior margin of segment 2
(Fig. 2d)*Haemaphysalis (Gonixodes) juxtakochi* Cooley, 1946
- 3 Dorsally, lateral margins of basis capituli straight (Fig. 2e); hypostomal dental formula 3/3
.....*Haemaphysalis (Kaiseriana) longicornis* Neumann, 1901
- Dorsally, lateral margins of basis capituli pointed (Fig. 2f); hypostomal dental formula 2/2....

.....*Haemaphysalis (Aboimisalis) chordeilis* (Packard, 1869)

Larvae (illustrated in Fig. 14)

- 1 Basis capituli ventrally with cornua at postero-lateral margins (Fig. 3a).....2
- Basis capituli ventrally without cornua at postero-lateral margins (Fig. 3b).....3
- 2 Basis capituli dorsally with prominent posteriorly directed cornua (Fig. 3c).....

.....*Haemaphysalis (Gonixodes) leporispalustris* (Packard, 1869)

- Basis capituli dorsally with cornua faint or absent (Fig. 3d)

.....*Haemaphysalis (Gonixodes) juxtakochi* Cooley, 1946

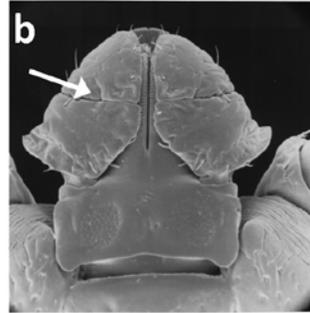
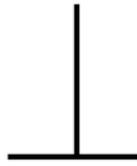
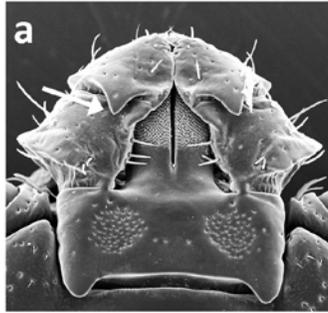
- 3 Dorsally, lateral margins of basis capituli straight (Fig. 3e)

.....*Haemaphysalis (Kaiseriana) longicornis* Neumann, 1901

- Dorsally, lateral margins of basis capituli pointed (Fig. 3f)

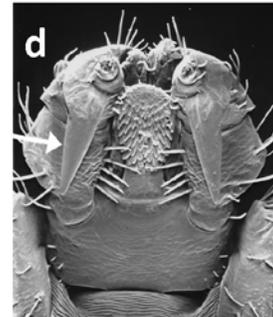
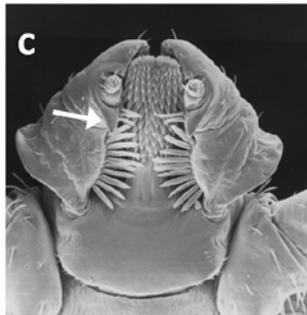
.....*Haemaphysalis (Aboimisalis) chordeilis* (Packard, 1869)

Dorsal spur on palpal segment 3, present or absent?



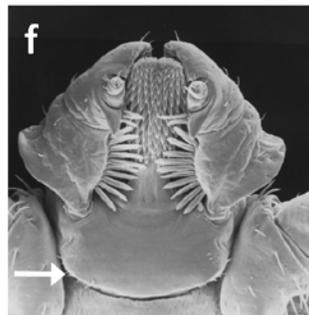
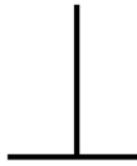
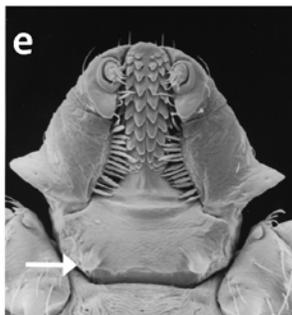
Present.....
H. longicornis

Absent.....
Ventral spur on palpal segment
3, long and pointed or short
and blunt?



Short and blunt.....
Ventral cornua present or
absent?

Long and pointed...
H. juxtakochi

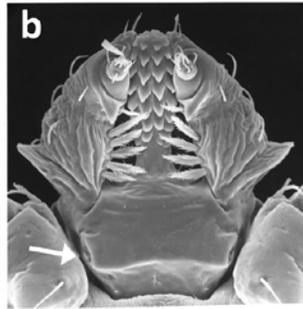


Present.....
H. leporispalustris

Absent.....
H. chordeilis

Fig 12. Pictorial key to adults of *Haemaphysalis* spp. occurring in North America.

Ventral cornua, present or absent?

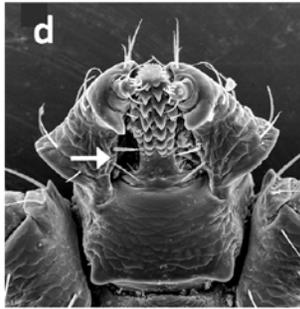


Present.....
Internal margin of palpal segment 2, 4-8 stout hairs or 2 fine hairs?

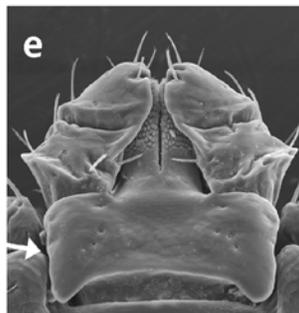
Absent.....
Lateral margins of dorsal basis capituli, straight or pointed?



4-8 stout hairs.....
H. leporispalustris



2 fine hairs.....
H. juxtakochi



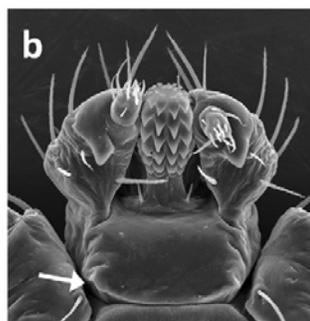
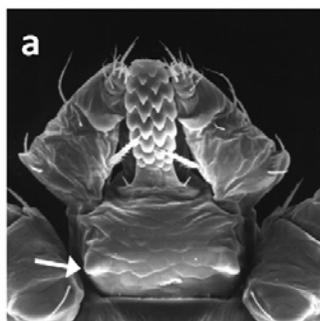
Straight.....
H. longicornis



Pointed.....
H. chordeilis

Fig 13. Pictorial key to nymphs of *Haemaphysalis* spp. occurring in North America.

Ventral cornua, present or absent?

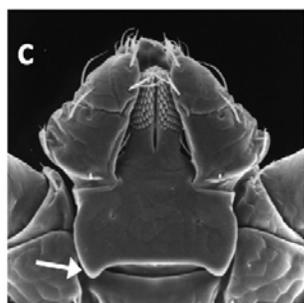


Present.....

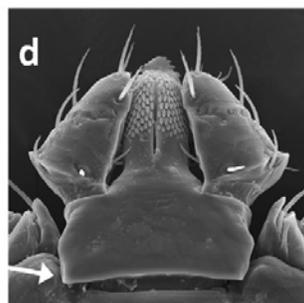
Dorsal cornua prominent or absent?

Absent.....

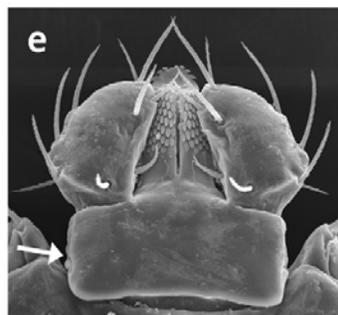
Lateral margins of dorsal basis capituli, straight or pointed?



Prominent dorsal cornua.....
H. leporispalustris



Dorsal cornua faint or absent.....
H. juxtakochi



Straight.....
H. longicornis



Pointed.....
H. chordeilis

Fig 14. Pictorial key to larvae of *Haemaphysalis* spp. occurring in North America.

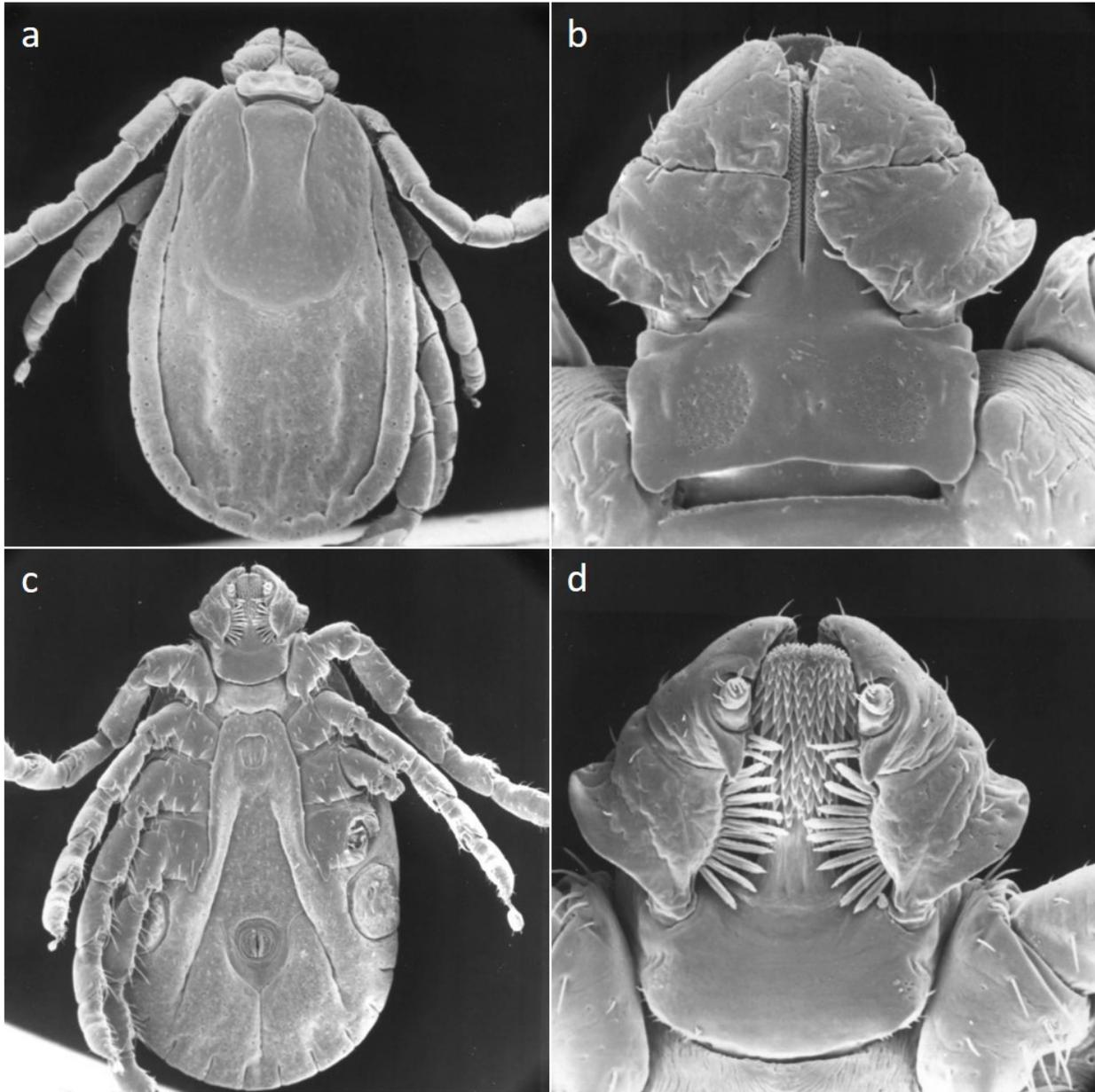


Fig 15. Scanning electron microscopy photos of female *H. chordeilis*. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

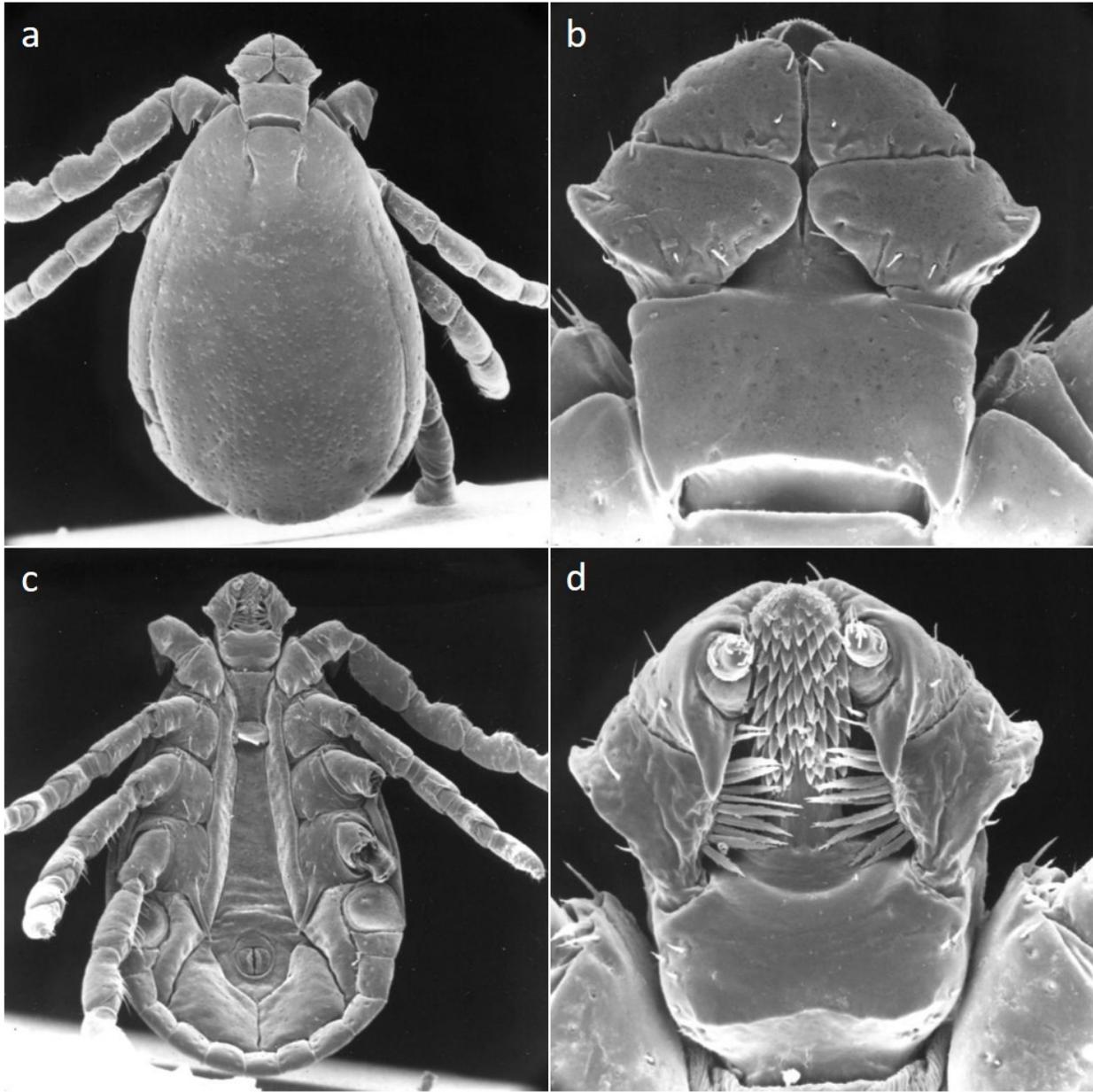


Fig 16. Scanning electron microscopy photos of male *H. chordeilis*. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

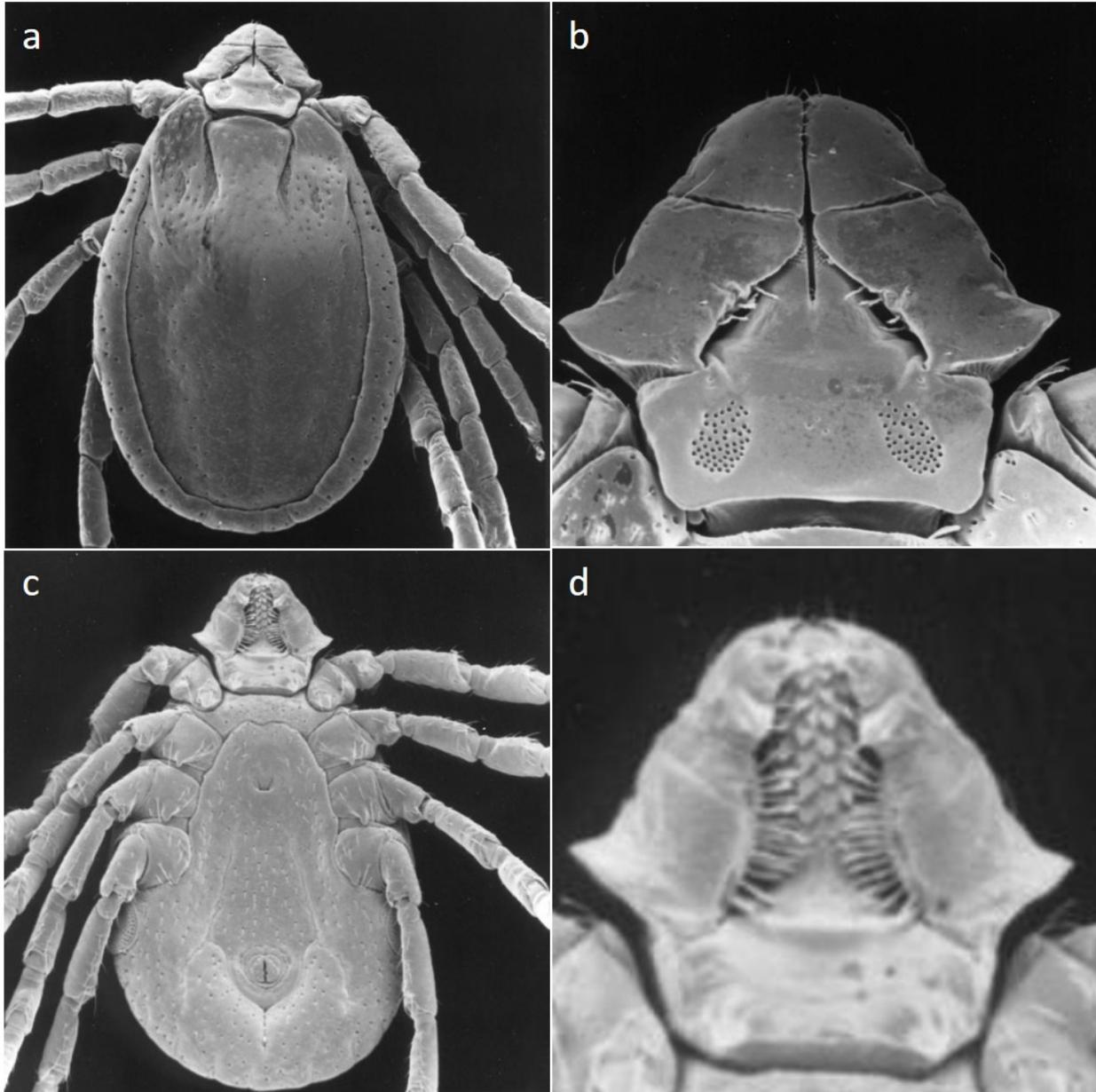


Fig 17. Scanning electron microscopy photos of female *H. leporispalustris*. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

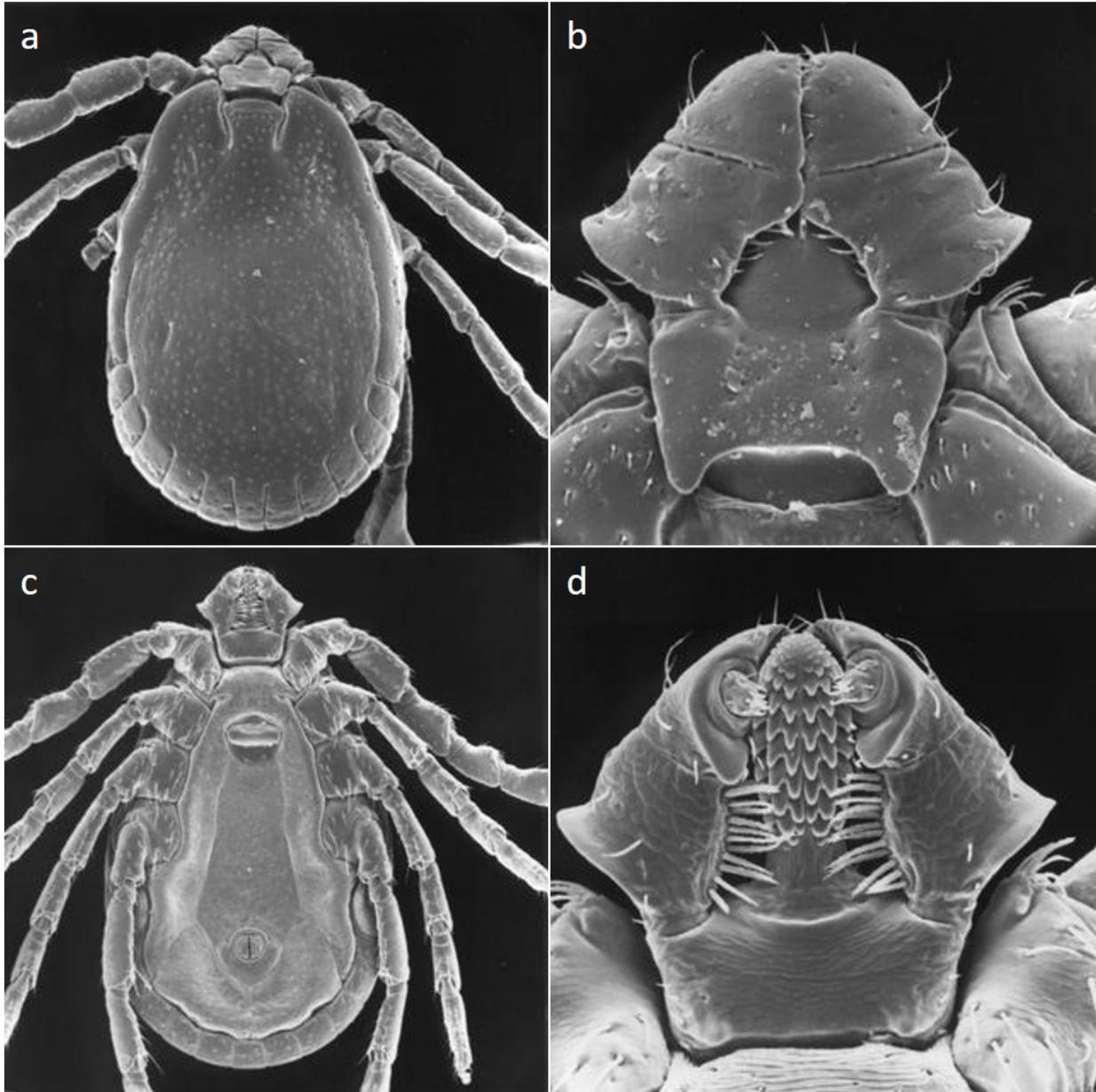


Fig 18. Scanning electron microscopy photos of male *H. leporispalustris*. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

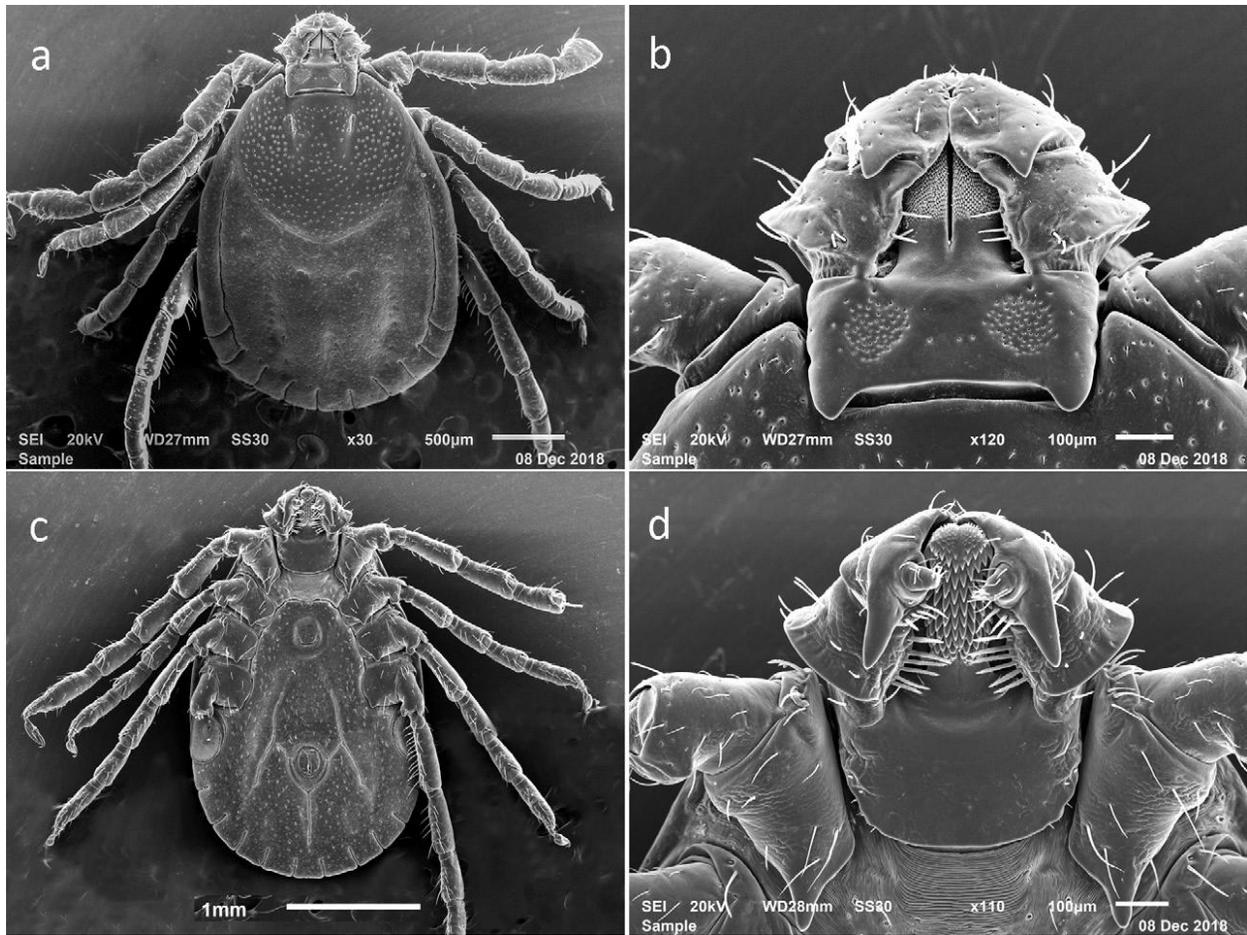


Fig 19. Scanning electron microscopy photos of female *H. longicornis* from a colony started with specimens from Jeju-teukbyeoljachido, Republic of Korea. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

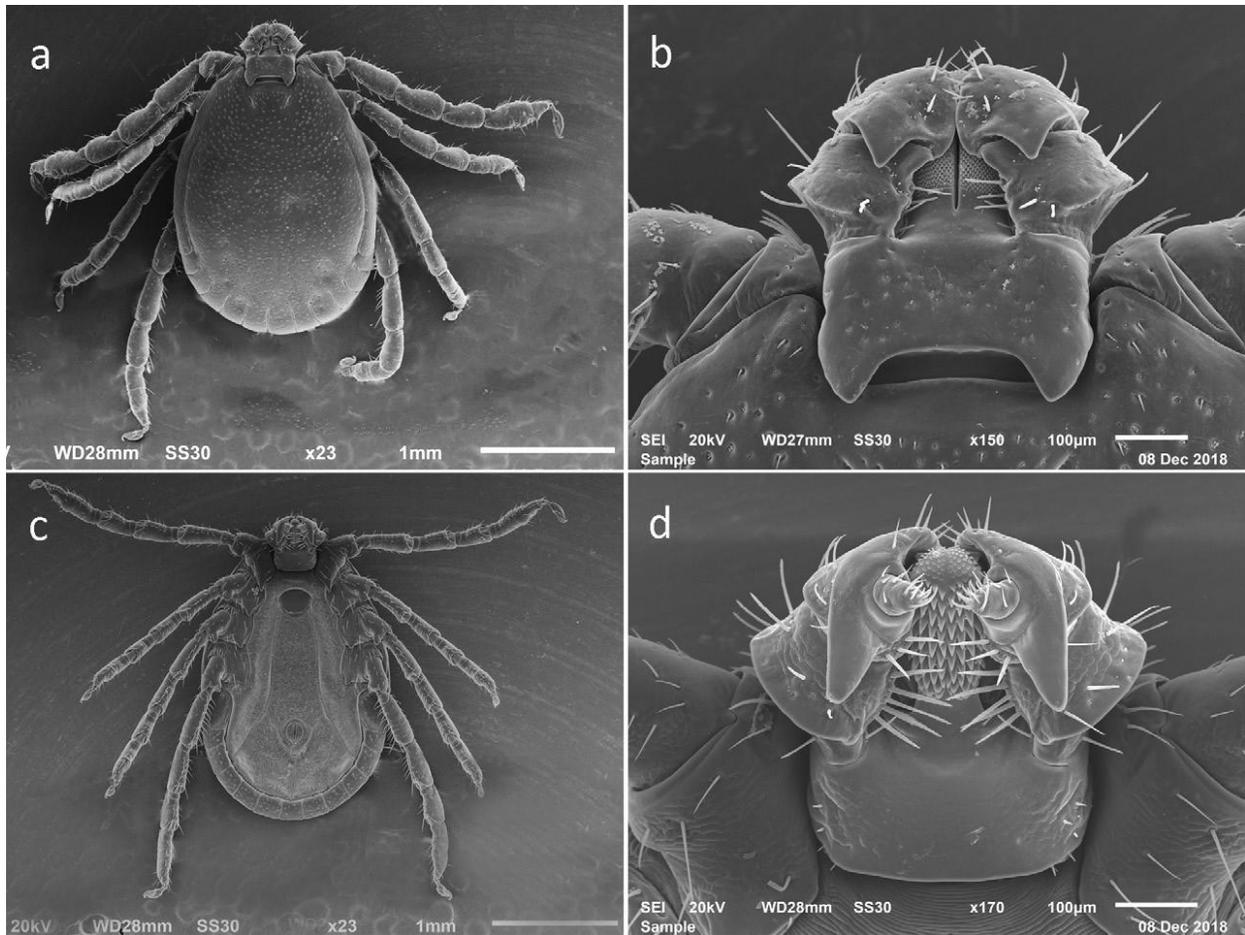


Fig 20. Scanning electron microscopy photos of male *H. longicornis* from a colony started with specimens from Jeju-teukbyeoljachido, Republic of Korea. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

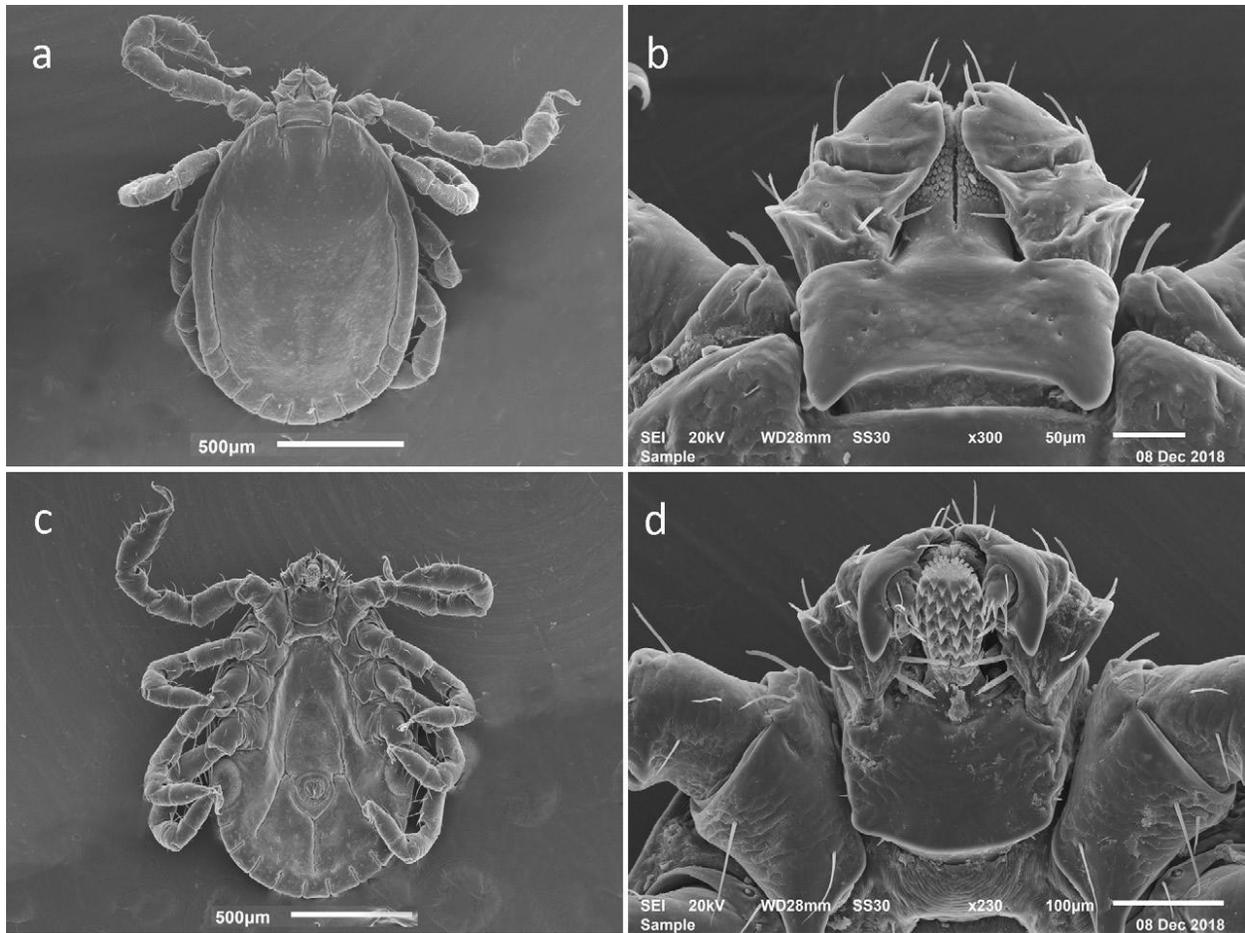


Fig 21. Scanning electron microscopy photos of nymphal *H. longicornis* from a colony started with specimens from Jeju-teukbyeoljachido, Republic of Korea. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

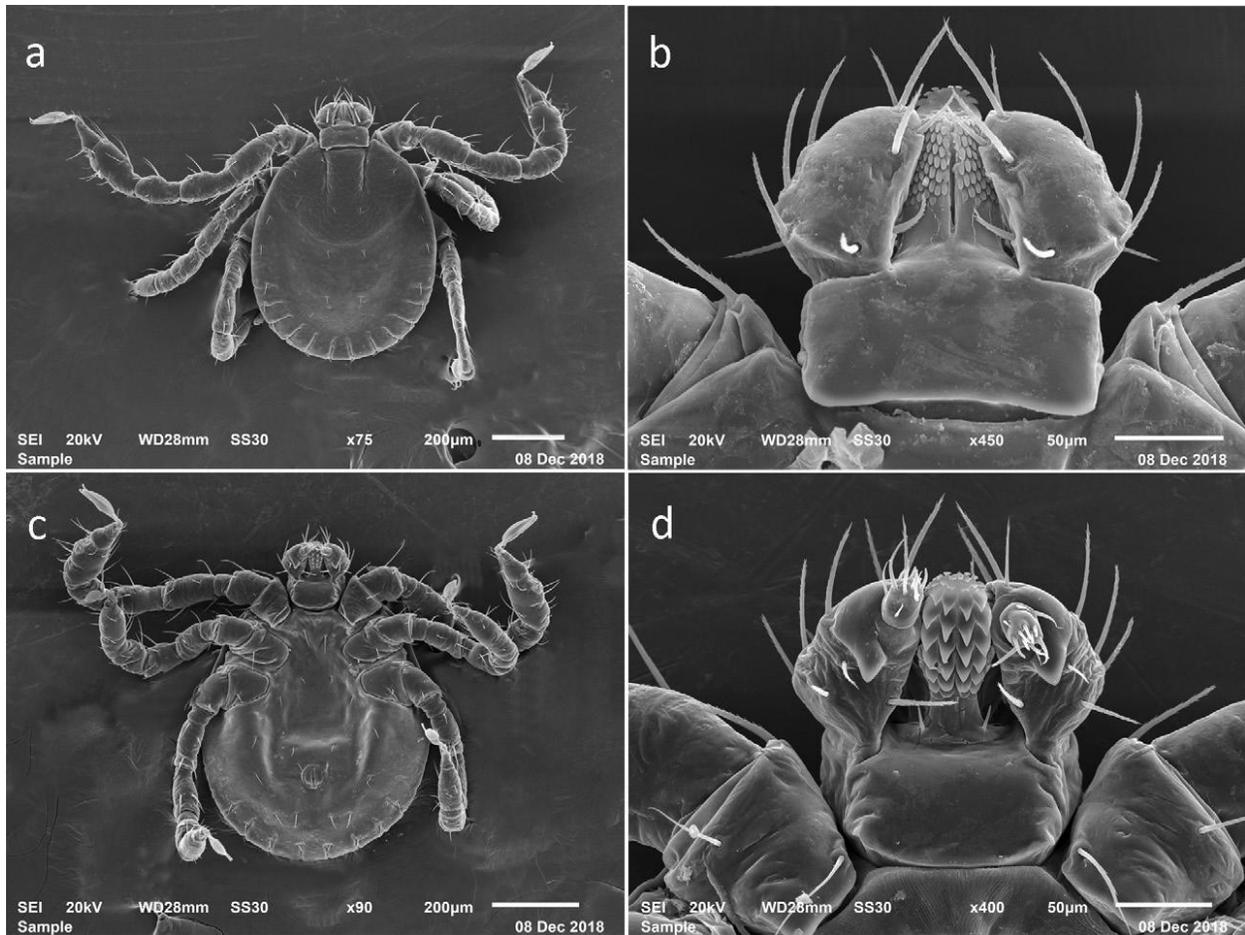


Fig 22. Scanning electron microscopy photos of larval *H. longicornis* from a colony started with specimens from Queensland, Australia. **a** Dorsal full body, **b** Dorsal capitulum, **c** Ventral full body, **d** Ventral capitulum.

Source: National Tick Collection, 2004, <https://cosm.georgiasouthern.edu/usntc/>

Appendix I. Instructional Resources and References

(Note: click on hyperlinks to access documents electronically)

Websites:

CDC Website: [Tick-Borne Diseases of the United States](#)

CDC Website: [Borrelia miyamotoi](#)

Cornell University Website: [Intruder Alert: Longhorned Tick what you need to know about the Invasive Tick *Haemaphysalis longicornis*](#)

Videos:

APHC Video: [Performing a Tick Drag](#)

APHC Video: [How to Remove Attached Ticks](#)

APHC Video: [How to Prevent Tick Bites](#)

APHC Video: [Reducing the Threat of Ticks around Your Home](#)

APHC Video: [DEET Works](#)

APHC Video: [How to Apply DEET](#)

APHC Video: [Permethrin Effectiveness – Ticks on ACU that has been treated with permethrin](#)

APHC Video: [Treating Civilian Clothing with Permethrin Repellent](#)

APHC Video: [Deploying a bed net with poles](#)

Fact Sheets:

USDA Fact Sheet: [Asian longhorned tick](#)

CDC Fact Sheet: [Asian longhorned tick](#)

APHC Fact Sheet: [Tick control around the home](#)

APHC Fact Sheet: [DoD Insect Repellent System and Permethrin Treatment of Military Uniforms](#)

APHC Fact Sheet: [Using insect repellents on children](#)

Military Tick Identification/Infection Confirmation Kit (MiltICK) Program:

[Main Information Page](#)

[Instructions for the Test Kit Specimen Submission Form](#)

PHC-Regional Tick Testing:

[PHC-Europe Instructions for the Tick Test Kit](#)

[PHC-Europe Tick Test Specimen Submission Form](#)

Training Program:

AFPMB Download: [Interactive Program for Teaching Tick Morphology](#)

Brochures:

APHC Brochure: [Use the DoD Insect Repellent System](#)

Connecticut Agricultural Experiment Station Brochure: [Tick Management Handbook](#)

CDC Brochure: [4-Poster bait station](#)

Poster:

APHC Poster: [We've Got Your Back](#)

Card:

APHC Card: [Protecting Yourself from Ticks](#)

Technical Guides:

AFPMB TG 14, [Personal Protective Equipment for Pest Management Personnel](#),
September 2017

AFPMB TG 26, [Tick-Borne Diseases: Vector Surveillance and Control](#), November 2012

AFPMB TG 36, [Personal Protective Measures Against Insects and Other Arthropods of
Military Significance](#), November 2015

AFPMB TG 41, [Protection from Rodent-Borne Diseases with Special Emphasis on
Occupational Exposure to Hantavirus](#), December 2013.

AFPMB TG 46, [DoD Entomological Operational Risk Assessments](#), April 2011

Appendix J. Personnel to Contact When Implementing the Emergency Plan for Disease Vector and Pest Control (Blank Template)

(a) Commanding Officer who can authorize additional resources to support emergency vector control:

Name:
COMM: DSN: E-Mail:

(b) Officer in Charge, Branch Clinic:

Name:
COMM: DSN: E-Mail:

(c) Environmental Health Officer/Environmental Science Officer/Public Health Officer:

Name:
COMM: DSN: E-Mail:

(d) Installation Pest Management Coordinator:

Name:
COMM: DSN: E-Mail:

(d) Installation Pest Control Supervisor:

Name:
COMM: DSN: E-Mail:

(e) Pest Control Shop:

Name:
COMM: DSN: E-Mail:

(f) USAF School of Aerospace Medicine:

Name:
COMM: DSN: E-Mail:

(g) Public Health Command POC:

Name:
COMM: DSN: E-Mail:

(h) Army Environmental Command POC:

Name:
COMM: DSN: E-Mail:

(i) Naval Facilities Engineering Command POC:

Name:

COMM:

DSN:

E-Mail:

(j) Local Health Department, Infectious Disease Surveillance Branch POC:

Name:

COMM:

DSN:

E-Mail:

Appendix K. Points of Contact

All Services

Ticks collected from humans should be shipped with completed Laboratory Information Documentation System (LIDS) Form 850 and USDA Permit (found here: https://phc.amedd.army.mil/PHC%20Resource%20Library/MilTICKforms_2020.pdf) to:

Tick-Borne Disease Lab
Army Public Health Center
8638 40th St., BLDG E5800
Aberdeen Proving Ground, MD 21010-5403

Air Force

AFNORTH, USAFE, AFAFRICA, AFCENT, AFSOUTH Locations — USAF School of Aerospace Medicine

POC: Dr. Leah Colton, E-mail: leah.colton.civ@mail.mil
Phone: 937-938-3078 (DSN: 798-3078) Lab: 937-938-3071 (DSN: 798-3071)
Address:
USAFSAM/PHR (Attn: Entomology)
2510 5th Street
Wright-Patterson AFB, OH 45433

PACAF Locations — Theater Preventive Medicine Flight

POC: Capt Caroline Brooks E-mail: caroline.brooks3.mil@mail.mil
DSN: 315-634-2639
Address:
Detachment 3, USAF School of Aerospace Medicine (USAFSAM)
Unit 5213, Box 10
Kadena AB, Japan (Okinawa), APO AP 96368-5213

Army

Public Health Command–Atlantic — Entomological Sciences Branch

POC: Mr. Ben Pagac E-mail: benedict.pagac.civ@mail.mil Phone: 301-677-3932
Address:
Attn: Ben Pagac
Public Health Command–Atlantic
4411 Llewellyn Avenue,
Fort Meade, MD 20755

Public Health Command–Central — Entomological Sciences Branch

POC: Walter Roachell E-mail: walter.d.roachell.civ@mail.mil
Phone: 210-808-6098
Address:

Attn: Walter Roachell
Public Health Command–Central
2899 Schofield Road
JBSA Fort Sam Houston, TX 78234

Public Health Command–Europe — Entomological Sciences Branch

DSN: 314-590-9734 COMM: 49-6371-9464-9734

[PHC-E Entomology e-mail: usarmy.landstuhl.medcom-ph-e.list.ehe-esp@mail.mil](mailto:usarmy.landstuhl.medcom-ph-e.list.ehe-esp@mail.mil)

Shipping Address:

U.S. Army Public Health Command–Europe

ATTN: Entomological Sciences Program

Unit 33105

APO, AE 09180-3100

Public Health Command–Pacific — Entomological Sciences Branch

DSN: 315-263-8489/4194

PHC-P Entomology e-mail: usarmy.shafter.medcom-ph-p.list.phc-p-entomology@mail.mil

FEDEX Shipping Address:

Public Health Command–Pacific

Building 715, Camp Zama

City: Zama

Province: Kanagawa

Japan, Postal Code: 252-0027

Military Postal System Shipping Address:

Department of the Army

Commander, Public Health Command–Pacific

Unit 45006

Camp Zama, Japan

APO, AP 96343-5006

Attn: Medical Entomology

Official Business

Navy

Navy Entomology Center of Excellence

Building 937

Naval Air Station

Jacksonville, FL 32212

DSN: 942-2424; Com: (904) 542-2424

Navy Environmental and Preventive Medicine Unit TWO

1285 West D, BLDG U238

Norfolk, VA 23511-3394

DSN: 377-6600; Com: (757) 953-6600

FAX: (757) 953-7212

Navy Environmental and Preventive Medicine Unit FIVE
Naval Station, Box 368143, BLDG 3235
3035 Albacore Alley
San Diego, CA 92136-5199
DSN: 526-7070; Com: (619) 556-7070
FAX: (619) 556-7071

Navy Environmental and Preventive Medicine Unit SIX
385 South Ave. BLDG 618
JBPHH, HI, 96860
DSN: (315) 471-0237; Com: (808) 471-0237
FAX: (808) 471-0157

Navy Environmental and Preventive Medicine SEVEN
PSC 819 Box 67
FPO AE 09645-0067
DSN: 314-772-2270

Appendix L. Navy Entomology Center of Excellence Tick Forms

Tick Test Kit

- Tick identification
- Analysis for tick-borne disease



NAVY ENTOMOLOGY CENTER OF EXCELLENCE

Directions:

1. Place tick in plastic screw cap vial.
2. Fill out only Section (A) of Tick Analysis Data Sheet, enclosed. **(Be sure to include a sample number, your unit address, POC name and phone number).**
3. Place vial and Tick Analysis Data Sheet in plastic bag provided.
4. Place plastic bag in the enclosed mailing envelope and send without delay **FIRST CLASS**

Navy Entomology Center of Excellence
Naval Air Station, Box 43 Bldg. 937 Attn: Fleet
Support
Jacksonville, FL 32212-0043

TICK ANALYSIS DATA SHEET

Section A: To be completed by originator

Collection Location:	Sample #	POC:	Unit Address:
	Date:		

Section B: To be completed by NECE Personnel

NECE Sample #	Date Rec'd	Identified By:	Tested By:
		Date:	Date:

TICK IDENTIFICATION	Sex & Stage			Engorgement			Condition	
Species	Adult M/F	Nymph M/F	Larva M/F	flat	part	full	alive	dead
<i>Amblyomma americanum</i> Lone star tick								
<i>Dermacentor variabilis</i> American dog tick								
<i>Ixodes scapularis</i> Blacklegged tick (a.k.a. deer tick)								
Other:								

THIS TICK WAS TESTED FOR:	Pos	Neg	REMARKS:
Human granulocytic anaplasmosis, HGA; (a.k.a. human granulocytic ehrlichiosis, HGE) <i>Anaplasma phagocytophilum</i>			
Babesiosis (BAB) <i>Babesia microti</i>			
Ehrlichia ewingii infection (EE)			
Human monocytic ehrlichiosis (HME) <i>Ehrlichia chaffeensis</i>			
Lyme disease (LD) <i>Borrelia burgdorferi</i>			
Rocky mountain spotted fever (RMSF) <i>Rickettsia rickettsii</i>			
Southern tick-associated rash illness (STARI) <i>Borrelia lonestari</i>			
Other:			

Appendix M. PHC-Europe Specimen Submission Paperwork



U.S. Army Public Health Command - Europe

TICK TEST KIT PROGRAM

SUBMISSION OF TICK SPECIMEN(S) FROM:

DATE RECEIVED AT
PHCE
Lab Use Only

Clinic Name & Mailing Address: _____

Clinic POC: _____
Email: _____
Phone: DSN: _____ **Comm:** _____

ALL SUBMISSIONS OF TICKS **MUST** GO THROUGH A MEDICAL OR VETERINARY TREATMENT FACILITY. PHCE WILL NOT ACCEPT ANY PRIVATE SUBMISSIONS, NEITHER HAND CARRIED NOR THROUGH MAIL SUBMISSION, UNLESS THEY ARE ENVIRONMENTAL SAMPLES FROM PREVENTIVE MEDICINE PERSONNEL.

ALL SENDERS NEED TO STRICTLY FOLLOW HIPAA RULES AND **NOT INCLUDE ANY PAI** IN THE TICK KIT DOCUMENTATION. THIS INCLUDES DoD ID NUMBER, SSN, AND OTHER INFORMATION NOT REQUESTED ON THIS FORM.

SUBMISSIONS WITHOUT COMPLETE MTF OR VTF POC INFORMATION WILL NOT BE PROCESSED.

CLINIC SAMPLE ID No.
(NO PERSONALLY IDENTIFIABLE INFORMATION)

PHCE ID No.

Lab Use Only

ANIMAL INFORMATION	ENVIRONMENTAL TICK INFORMATION
<p>TYPE OF ANIMAL: (CIRCLE)</p> <p>DOG BIRD RODENT CAT REPTILE OTHER*</p> <p>STATUS: (CIRCLE)</p> <p>MWD DOMESTIC PET FERAL ANIMAL LIVESTOCK WILD EXOTIC</p> <p>SEX: MALE FEMALE</p> <p>ECTOPARASITE CONTROL?: YES NO</p> <p><small>*FURTHER DESCRIPTION NEEDED IN REMARKS SECTION</small></p>	<p>LOCATION WHERE SPECIMEN(S) ACQUIRED? <small>(CIRCLE AND EXPLAIN)</small></p> <p>ON-POST _____ OFF-POST _____ UNKNOWN</p> <p>DATE OF REMOVAL/COLLECTION _____ UNKNOWN <small>DAY / MONTH / YEAR</small></p> <p>WHERE WAS SPECIMEN COLLECTED ON BODY? (CIRCLE)</p> <p>EAR HEAD NECK NOSE CHEST/ABDOMEN FEET LEGS BACK GROIN TAIL (ANIMAL)</p> <p>ENVIRONMENTAL COLLECTION TYPE? (CIRCLE)</p> <p>DRAG FLAG WALK CO₂ OTHER _____</p>
<p style="text-align: center;">HUMAN INFORMATION</p> <p>SERVICE ASSOCIATION: (CIRCLE)</p> <p>ARMY NAVY AIR FORCE MARINES</p> <p>STATUS: (CIRCLE)</p> <p>ACTIVE DUTY NAT'L GUARD RETIRED RESERVES MILITARY DEPENDENT CIVILIAN OTHER</p> <p>AGE: _____ Sex: M F</p>	<p>REMARKS:</p> <div style="border: 1px solid black; height: 100px;"></div>



PHC-Europe Form 321- 3, 27 JUN 2019 (MCHB-TS-OEN)



U.S. Army Public Health Command - Europe
TICK TEST KIT PROGRAM

TICK ANALYSIS DATA SHEET

TESTS PERFORMED ON LIVE TICKS ARE THE MOST ACCURATE. NEGATIVE TEST RESULTS FOR DEAD TICKS CAN BE UNRELIABLE (I.E., THEY MAY BE FALSE NEGATIVE), BECAUSE THE DNA OF PATHOGENIC ORGANISMS BEGINS TO DEGRADE ONCE THE TICK DIES. THEREFORE, THE PATIENT SHOULD BE ALERT FOR SYMPTOMS OF TICK-BORNE DISEASES APPEARING 1 TO 4 WEEKS FOLLOWING THE TICK BITE.

QUESTIONS?

U.S. Army Public Health Command Europe, Entomological Sciences Program

usarmy.landstuhl.medcom-ph-e.list.ehe-esp@mail.mil

BELOW FOR LAB USE ONLY

NUMBER OF TICKS RECEIVED	CLINIC SAMPLE #	PHCE SAMPLE #	DATE OF IDENTIFICATION	ID BY:
--------------------------	-----------------	---------------	------------------------	--------

TICK IDENTIFICATION	SEX & STAGE			ENGOREGEMENT			CONDITION		
	SPECIES	ADULT M/F	NYMPH	LARVA	FLAT	PART	FULL	LIVE	DEAD
<i>IXODES RICINUS</i> COMMON SHEEP TICK									
<i>IXODES VENTALLOI</i> RABBIT TICK									
<i>RHIPICEPHALUS SANGUINEUS</i> BROWN DOG TICK									
<i>DERMACENTOR MARGINATUS</i> ORNATE SHEEP TICK									
OTHER									

PATHOGEN TESTING				REMARKS:	
TEST PERFORMED/COMMON VECTOR	POS	NEG			
TICK-BORNE ENCEPHALITIS (TBE) <i>(IXODES SPP.)</i>					
BORELLIA SPP. (LYME BORRELIOSIS) <i>(IXODES SPP.)</i>					
EHRlichia SPP. <i>(IXODES SPP. FROM ANIMALS)</i>				SENT TO LAB	DATE
ANAPLASMOSIS <i>(IXODES SPP. FROM ANIMALS)</i>				RESULTS RECEIVED	DATE
CRIMEAN-CONGO HEMORRHAGIC FEVER VIRUS <i>(HYALOMMA SPP. & AMBLYOMMA SPP.)</i>				EMAIL CUSTOMER	DATE
OTHER					



Appendix N. MilTICK Instructions for PHC-Europe

INSTRUCTIONS FOR TICK TEST KIT

U.S. Army Public Health Command - Europe
ATTN: Entomological Sciences Program
Unit 33105
APO AE 09180-3100
DSN 314-590-9734; Com 49-6371-9464-9734

*Preferred
method*

MEMORANDUM FOR HEALTH CARE PROVIDER:

Ticks will only be accepted by medical and veterinary treatment facilities! Our kit provides you with a quick, easy means of obtaining an identification of a tick removed from a patient, and an assay of that tick for infection with a variety of tick-borne pathogens, including those that cause Lyme borreliosis, human granulocytic anaplasmosis HGA (a.k.a. human granulocytic ehrlichiosis HGE), tularemia, tick borne encephalitis (TBE), *Rickettsia* spotted fever group (SFG), and Crimean-Congo hemorrhagic fever (CCHF). Since different species of ticks transmit different diseases, and since most tick-borne diseases have very similar early symptoms, knowing the species and infection status of the tick can support the physician's ability to accurately diagnose and treat the patient. *If your clinic runs out of kits, please still submit specimens in a closed container with a completed form to the address below.*

The tick should be removed from the patient with as little trauma to the tick as possible (i.e., attempt to keep mouthparts intact; do not puncture or crush body). These precautions will decrease the likelihood of pathogens being injected into the wound site during removal and facilitate identification.

Tests performed on live ticks are the most accurate. Negative test results for dead ticks can be unreliable (i.e., they may be False Negative), because the DNA of pathogenic organisms begins to degrade after the tick dies. Therefore, in the case of negative results for dead ticks, the patient should remain alert for symptoms of tick-borne diseases that appear 1 to 4 weeks following the tick bite.

We will test dead ticks, but the condition of the tick specimen affects the quality of the test. A complete specimen, kept cool (not frozen) and dry and **mailed to us promptly**, will yield more reliable results than a specimen that is kept in warm, moist conditions (mold develops, and the tick degrades rapidly). Placing a blade of grass or moist piece of tissue paper in the vial with the tick and stored in the refrigerator is ideal. A tick that is in pieces, or even just a piece of a tick, can sometimes be identified and tested, but intact, whole ticks will yield more reliable results.

Be sure to fill out the accompanying data sheet carefully and return it to us with the tick. We will contact you by e-mail with the results of identification and analysis, followed by written confirmation, so be sure to include a POC name, address, e-mail address, and phone number. Provide a clinic identification number of **your choice** so that we can link our results to your specimen, but **DO NOT USE THE PATIENT'S SOCIAL SECURITY NUMBER** or any other PII as this information is protected by the Privacy Act and is not desired for our records.

Follow these instructions:

1. Place the tick into the vial. DO NOT add water. You CAN add a blade of grass or a damp piece of paper towel.
2. Screw the cap onto the vial securely and seal it in the ziplock plastic bag by "zipping" it closed.
3. Fill out the front of the data form SUBMISSION OF TICK SPECIMENS (PHC-Europe Form 321-R) completely and fold it in half.
4. Place the data form and the ziplock bag inside the preaddressed mailing envelope forward immediately by DOD Official Intra-Theater Mail or by courier to Landstuhl Regional Medical Center, Dr. Hitzelberger Strabe, 66849 Landstuhl (Gate 3), Building 3809, customer entry, 2nd floor, north-west corner.

If you have any questions contact:

Public Health Command - Europe
Entomological Sciences Program
DSN 314-590-9734; Com 49-6371-9464-9734
usarmy.landstuhl.medcom-ph-e.list.ehe-esp@mail.mil

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