Contents

1.0 Purpose/Scope

This procedure provides a standardized method for the collecting ticks to measure the tick population density in a given area. It should be used in conjunction with the SBMS Subject Area *Natural Hazards in the Environment.*

Employee exposure to the hazards of tick borne diseases presents a risk for BNL workers assigned to tasks that occur outdoors in grassy & wooded areas and to BNL employees and visitors who access wooded areas on the BNL campus. This procedure offers a standardized sampling technique to be used to quantify the risk of tick exposure in an area. It also provides the safety measures to ensure the SHSD personnel performing the tick sampling are not exposed to undue risk of contracting a tick borne disease.

2.0 Responsibilities

2.1 Use of the procedure is to be limited to persons who act under the direction of a competent hazard assessment person and have demonstrated the competency to satisfactorily use the procedures and its safety measures, as evidenced by experience and training, to qualification criteria set by BNL. See Section 7.

2.2 Personnel that perform exposure monitoring with this procedure are responsible to follow all steps in this procedure.

3.0 Definitions none

4.0 Prerequisites

4.1 Area Access: Use appropriate PPE for outdoor area, see Section 5.
4.2 Complete TQ-Lyme1.

5.0 Precautions

5.1 **Hazard Determination:**

5.1.1 By its very nature, this procedure may be used in areas with a high tick population that pose a risk to the sampler.

5.1.2 The procedures do not generate Hazardous Waste. Ticks that are collected are to be preserved in household grade Isopropanol. No waste Isopropanol is generated by this sampling. All Isopropanol is consumed in preservation of the tick samples, but is recycled and not disposed of.

5.2 **Personal Protective Equipment:**

5.2.1 See attachment 9.1 for the **REQUIRED** PPE to perform this field testing.

6.0 Procedure

6.1 **Equipment:**

6.1.1 Stereo Microscope

6.1.2 Isopropanol (household grade is adequate. This is used as a preservative for tick specimens).

6.1.3 Fine tipped Tweezers

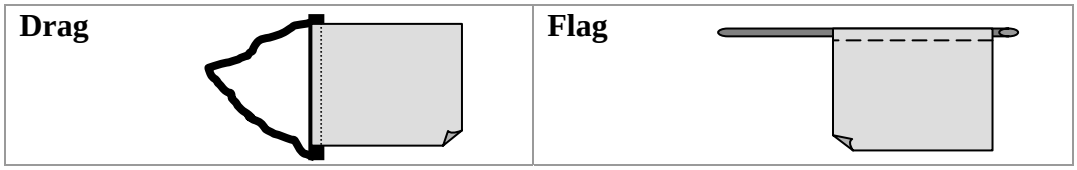
6.1.4 1" x 3" polyethylene zip lock storage bags or 1 dram glass vials or 3 ounce plastic jars.

6.1.5 100 meter tape measure.

6.1.6 Dry Ice

6.1.7 Carbon Dioxide Bait Sampler

6.1.8 Sampling Flags (1 meter x 1 meter [or 36" x 36"] white flannel.



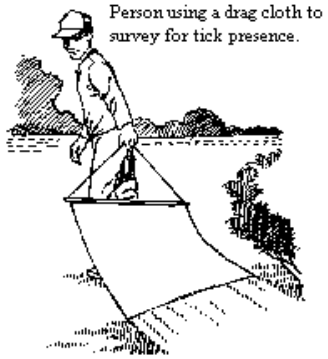
6.2 Done the recommended and required PPE described in Attachment 9.1 prior to entering areas with vegetation. Apply tick repellants as described in Attachment 9.1.

6.3 Measure out the sample plot using the fiberglass tape measure. The ideal sample plot is 1 meter wide by 30 meters (100 feet) or 1 meter wide by 50 meters (164 feet) long. When sampling is done to quantify the tick population for research or to determine the need for controls, the results need to be normalized to a specific sample area. $50m^2$ is an ideal plot size.

- 1 meters = 3.2808399 feet
- 1 feet = 0.3048 meters

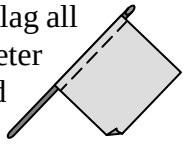
6.4 Plan sampling for maximum effectiveness in determining tick populations:

- Observe the seasonality of ticks and know the life stage of tick present at any time of year.
- Avoid high wind periods.
- Avoid extreme cold periods.
- Avoid sampling in the heat of the afternoon.
- Do sample in the mid-morning and early evening.
- When sampling to determine the need for controls in an area, repeat the same sample plot 3 to 4 days in a row to maximize the effectiveness of the tick population density measurement.


Person using a drag cloth to survey for tick presence.

6.5 **Drag Sample:** Drag the flannel cloth with the short rod and extension string along low grass, lawns, tall grass and very low shrubs. Allow the flag to fully contact the surface. Cover the pre-measured distance of the sample plot in a single pass 1 meter wide. [Note: When using the drag as a tick population control technique, repeat the drag several times over the same plot to capture more of the ticks that are questing. Control by this method is about 10% on only one pass.]

6.6 **Flag Sample:** Using the flannel cloth flag on a pole, wave and insert the flag 1 meter deep through low braches, tall grass, shrubs, and low tree branches. Flag all levels of the low level plant canopy (up to shoulder height) one-meter deep over the length of the sample plot. Cover the pre-measured distance of the sample plot. [Note: When using the flagging as a tick population control technique, repeat the flagging of the plot several times to capture more of the ticks that are questing].



6.7 **Carbon Dioxide Baited Flannel Cloth Sampling:** Place a 1 square meter flannel flag on the ground in the area to be sampled. In the center of flannel cloth, place about 250 ml of dry ice pellets or a chip of 200 cc size onto the cloth. Return for the cloth in 12-24 hours and transfer ticks into plastic bags or into vials/jars containing Isopropanol.

6.8 **Carbon Dioxide Tape Trap Sampling:** Place clear 2-inch packing tape around the perimeter of the base of the trap, with the sticking side facing down. Place about 250 ml of dry ice pellets or a chip of 250 cc size into the plastic container in the trap. Place the trap in the desired sample area. Return for the trap in 12- 24 hours and transfer ticks trapped in the tape into plastic bags or into vials/jars containing Isopropanol.

6.9 **Removal of ticks from Flag/Drag Samples:** At the end of sampling using, place the flannel on a flat surface and carefully remove all ticks from both sides of the flannel. Use a hand magnifier to assist in viewing larva and nymph stages. Place the captured ticks into a plastic bag or in a jar or vial containing Isopropanol.

- Avoid using picnic tables and other surfaces that people will occupy later as the surface for counting, unless the surface is covered with Kraft paper or plastic that is removed at the end of the counting session.

6.10 **Documenting Field Sample Information**:

6.10.1 Record the sample number on the bag/vial/jar.

6.10.2 Record the locations samples, time of day, weather conditions, number of ticks collected, tick species, and the life stage of each specimen on the Field Sampling form (Attachment 9.3).

6.11 **Preparing the flannel for the next sample:**

- If a large number of larvae are encountered on a sample plot, the collection of all the larvae from the flannel is not likely in the field. It is best to use a new flag for the balance of sampling.
- The exposed flag should be exposed to high heat (left on a paved surface in the

direct sun for several hours) or cleaned with a lint roller and then stored prior to the next sampling round.

6.12 **Post decontamination of sampling personnel:** Within 15 minutes of the end of sampling:

6.12.1 Remove and closely examine all outer clothing (shoes, socks, pants, shirt, coats, and hat). Check skin & hair for the presence of ticks.

6.12.2 Change into non-exposed clothing and shoes.

6.12.3 Handle the exposed clothing by one of these techniques:

- Place the clothing on a paved surface in the direct sun for several hours.
- Clean the fabric with a tape lint roller.
- Place the clothes in a laundry dryer and run for at least 30 minutes on heated cycle.
- Spray the clothing with a Permethrin spray, allow the spray to dry, and store in a cardboard box for at least 24 hours before using.
- If the clothing was pre-treated with a Permethrin spray within the last two weeks and the clothing has not been wetted, store the clothing in a cardboard box or plastic bag until the next use without additional spray.
- Place the clothing into a gallon size zip lock bag or plastic bag with a tie and store for at least 10 days.
- Place the clothing into plastic bag that has a desiccant (such as calcium sulfate or silica gel) and store for at least 5 days.
- Place the clothing into a cardboard box and store in a location that limits the spread of ticks to occupied areas. Store for at least 20 days before the next use.

6.13 **Laboratory analysis of field sampled ticks:** For the nymphal and larval stages of ticks, return specimens to the laboratory for microscopic evaluation of the tick under 10 to 40 x magnification using the stereo microscope. Complete the field sampling form (Attachment 9.3) to document identification results. Use Attachment 9.2 as a reference in the identification of specimens.

6.14 **Lab analysis of specimens submitted for ticks attached to personnel:** For the adult, nymphal, larval stages of ticks, examine the specimens in the laboratory with microscopic evaluation under 10 to 40 x magnification using the stereo microscope. Record the analysis on the Lab Analysis form (Attachment 9.4) to document identification results. Use Attachment 9.2 as a reference in the identification of specimens.

6.15 **Disposal of specimens after sampling and identifications:** Do not dispose of any live ticks, either back into the environment or into the trash stream. Keep ticks within a sealed container when disposing of them.

- The plastic bag will kill the tick specimens within a few days. Hold these samples until the ticks are dead (usually 5 days) before disposal of the sealed bag with ticks in the trash stream.
- The Isopropanol in jars/vials will kill the ticks within an hour of the immersion on the tick into the Isopropanol. Remove the ticks from the Isopropanol with tweezers and dispose of the dead ticks in a sealed zip lock bag in the trash stream. Recycle the used Isopropanol for the next tick specimens to avoid need to dispose of it as hazardous waste.

6.16 **Documenting Sampling Data and Work Conditions readings:** Use the ***BNL Field Survey Form*** (Attachment 9.3) to record field events and information including the locations samples, time of day, weather conditions, number , species, and life stage of the ticks.

6.17 **Results interpretation**: When sampling has been requested by the occupants/owner of an area, a competent person should write a hazard evaluation report that evaluates the survey data and summarizes the potential for occupational exposure to ticks. Ensure that a copy of the hazard evaluation report is sent to the IH Laboratory and is included in the ESHQ Directorate Recordkeeping system.

7.0 Implementation and Training

7.1 Training prior to using this meter includes a demonstration of proper operation of the instrument based on training, education, and experience. All persons must have met the qualification criteria for IH89 Tick Sampler set in *IH50300 BNL IH Program and IH Group Training & Qualification Matrix.*

7.2 Personnel are to document their training using Attachment 9.5, the Job Performance Measure Completion Certificate. Qualification on this JPM is required on a 3 year basis, providing the professional is monitoring noise sources frequently.

7.3 Complete web based class TQ-Lyme1 and review Job Risk Assessment SHSD-JRA-05.

8.0 References

8.1 US Air Force Technical Information Memorandum No. 26: Lyme disease Vector Surveillance and Control, March 1990.
8.2 Web page: www.paru.cas.cz, E. Bouman, Institute of Parasitology, CV|BDV 2001 *Ixodes ricinus* breeding.
8.3 Falco, R.; Grounds Maintenance: Controlling deer ticks, 2/1/2002.
8.4 National Foundation for IPM Education, Pesticide Environmental Stewardship Program, *Risk Reduction: Demonstration of the '4-Poster' Device for Control of Ticks*, U.S. Dept. of Defense. August 22, 2002.
8.5 National Foundation for IPM Education, Pesticide Environmental Stewardship Program, *Deer-Target Application of Pesticides for Control of Ticks*, U.S. Dept. of Defense. August 22, 2002.
8.6 Hubalek, Z, et. Al: Medical and Veterinary Entomology (2003) 17, 46-51: *Longitudinal surveillance of the tick Ixodes ricinus for borreliae.*
8.7 Keirans, J.E. and T. R. Litwak, Key to Adult Ixodidae East of Mississippi River, Journal of Medical Entomology, Vol. 26, No. 5

9.0 Attachments

9.1 Required Personal Protective Equipment
9.2 Tick Identification
9.3 Field Sampling form
9.4 Lab Analysis form
9.5 Job Performance Measure: Qualification record

10.0 Documentation

Document Development and Revision Control Tracking		
PREPARED BY: *(Signature and date on file)* **R. Selvey** **Date: 04/24/06**	**REVIEWED BY:** *(Signature and date on file)* **E. Lacina** **Date: 04/27/06**	**APPROVED BY:** *(Signature and date on file)* **R. Selvey IH Manager** **Date: 04/28/06**
ESH Coordinator/ Date: *none*	Work Coordinator/ Date: *none*	SHSD Manager / Date *none*
QA Representative / Date: *none*	Training Coordinator / Date: *none*	Filing Code: **IH52**

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Facility Support Rep. / Date: *none*	Environ. Compliance Rep. / Date: *none*	Effective Date: **04/26/06**
ISM Review - Hazard Categorization ☒ High ☐ Moderate ☐ Low/Skill of the craft	Validation: ☐ Formal Walkthrough ☐ Desk Top Review ☒ SME Review Name / Date: R. Selvey 4/27/05	Implementation: Training Completed: Tracked in BTMS Procedure posted on Web: 04/28/06 Hard Copy files updated: 04/28/06

Revision Log

Purpose: ☐ Temporary Change ☐ Change in Scope ☐ Periodic review ☐ Clarify/enhance procedural controls

Changed resulting from: ☐ Environmental impacts ☐ Federal, State and/or Local requirements ☐ Corrective/preventive actions to non-conformances ☒ none of the above

Section/page and Description of change:

SME Reviewer/Date:	Reviewer/Date:	Reviewer/Date:

Attachment 9.1

Required & Recommended Personal Protective Equipment

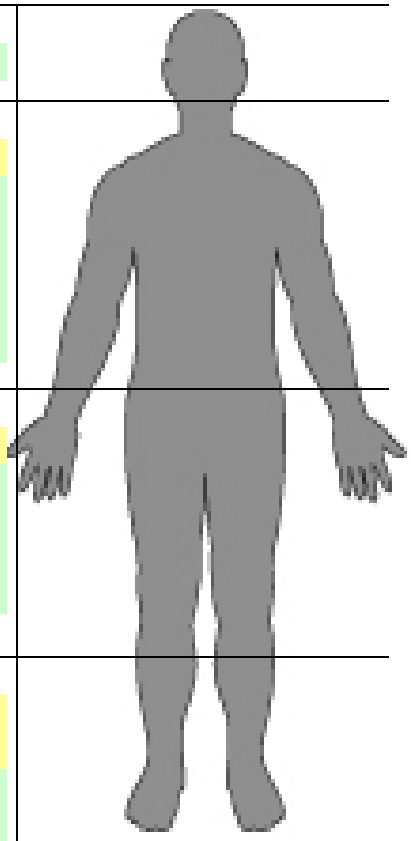
Required =	**Minimum, mandatory PPE**
Recommended =	**Optional clothing/PPE that enhances protection**
Alternative =	**Optional mechanism that replaces [Required] with additional protection**
Prohibited =	**Clothing that is not allowed**

HEAD
Light colored hat (Recommended)

UPPER BODY
Light colored, short sleeve shirt (Required)
Light colored, Long sleeve shirt (Recommended)
Light colored, nylon or polyester wind jacket (Recommended)
Tyvek or Kleenguard coverall (Alternative)
PVC rain suit (Alternative)
Spraying external surfaces with Permethrin Spray (Recommended)

LOWER BODY
Light colored, long pants (Required)
Light colored, nylon or polyester wind pants(Recommended)
Tyvek or Kleenguard coverall (Alternative)
PVC rain suit (Alternative)
Spraying external surfaces with Permethrin Spray (Recommended)
Short pants (Prohibited)

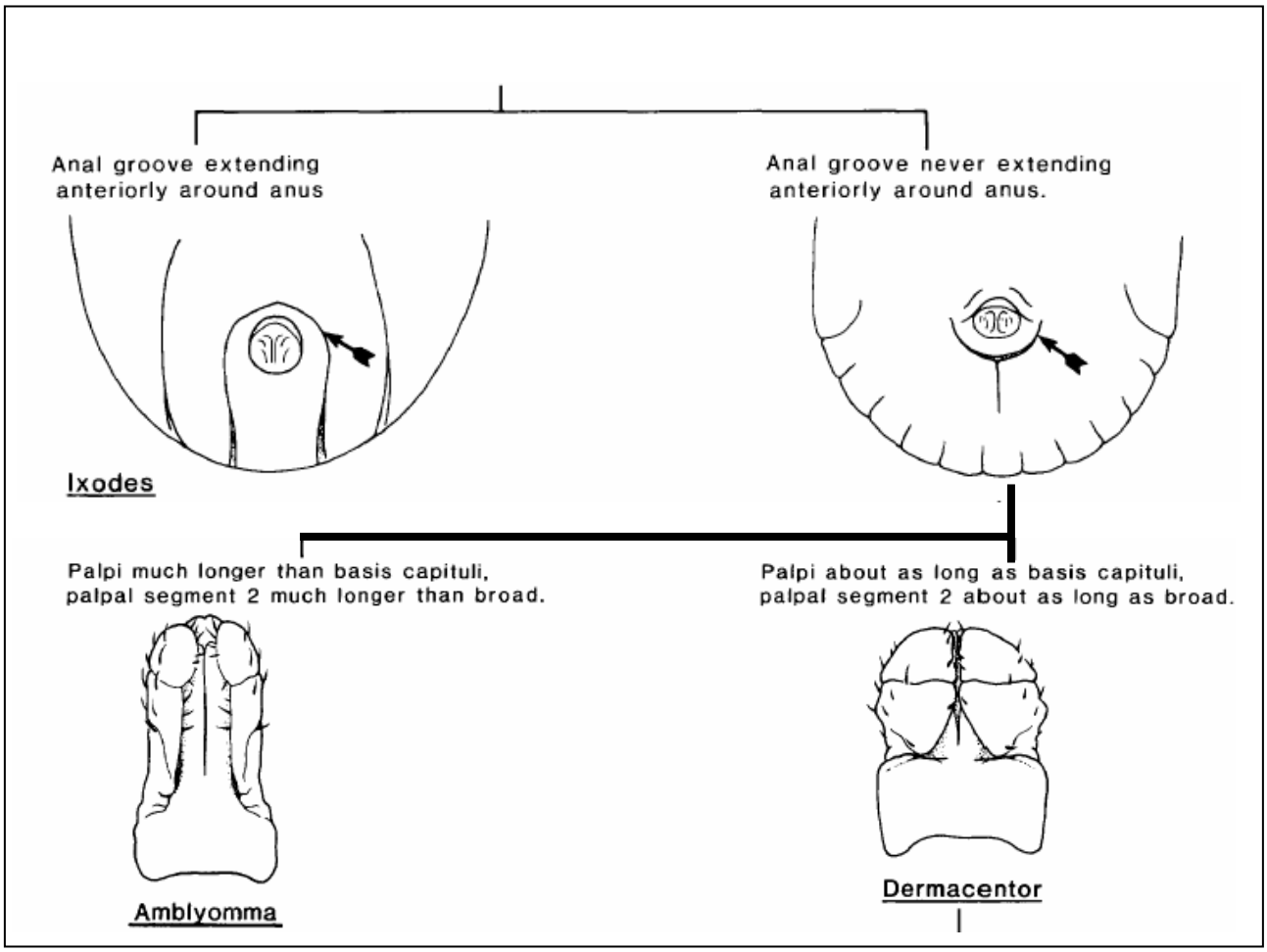
FEET
White socks (Required)
Socks tucked into pants leg (bloused) (Required)
Socks taped to pants leg (Alternative)
Nylon hose bridging shoes to pants (Alternative)
Rubber boots taped to pants (Alternative)
Tyvek or Kleenguard suit with attached booties (Alternative)
Spraying external surfaces with Permethrin Spray (Recommended)
Sandals or open toed shoes (Prohibited)



Attachment 9.2
Tick Identification Principles

Taxonomy Key for Long Island Ticks

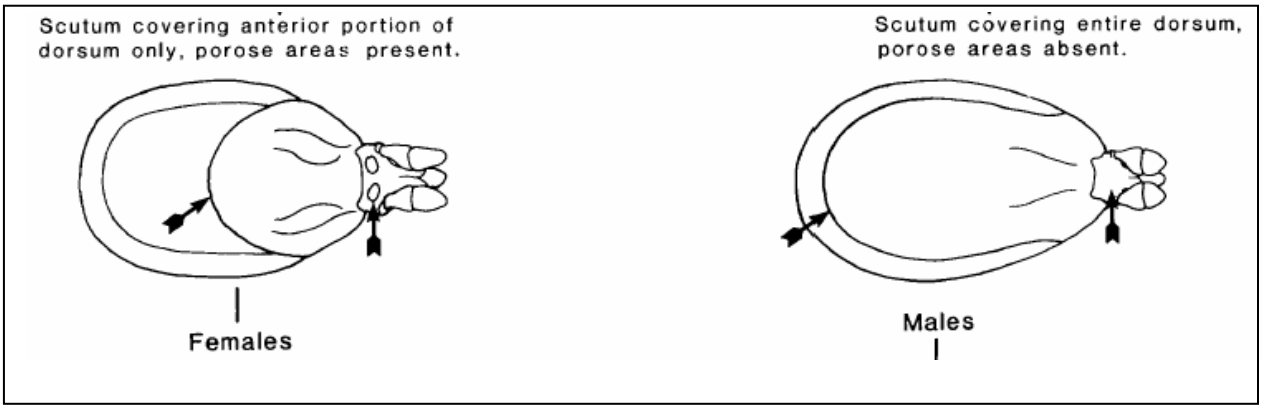
Adapted fron: Keirans, J.E. and T. R. Litwak, Key to Adult Ixodidae East of Mississippi River, Journal of Medical Entomology, Vol. 26, No. 5



Identification of Female versus Male

Subject:

Field Sampling and Laboratory Analysis of Ticks



Phylogenetic Classification of The Deer Tick: **Genus *Ixodes***

Phylum **Arthropoda** - Arthropods
Subphylum **Chelicerata**
Class **Arachnida** - Arachnids
Order **Acari** - Mites
Suborder **Ixodides** - Ticks
Family **Ixodidae** - Hard Ticks
Genus ***Ixodes***
Species ***scapularis*** - Deer Tick

Taxonomic Key

Adapted from: US Air Force Technical Information Memorandum No. 26: Lyme disease Vector Surveillance and Control, March 1990.

(ADULTS)

J. E. Keirans (unpublished, 1986; revised 1987)
Acarology Summer Program
The Ohio State University

1. Eyes present (may be difficult to see in some male Boophilus and Anocentor nitens) 5
Eyes absent 2

2. Festoons absent; anal groove distinct, extending anteriorly around the anus; Prostriata (cosmopolitan, common) ..... *Ixodes*
Festoons present; anal groove distinct or indistinct but never extending anteriorly around the anus; Metastriata 3

3. Scutum ornate or, uncommonly, inornate; palpi elongate, subcylindrical (almost always on reptiles) ..... *Aponomma*
Scutum inornate; palpi elongate or short, conical, not subcylindrical (on birds and mammals, almost never on reptiles) 4

4. Basis capituli square to rectangular dorsally; palpi short, conical, segment II at least as broad as long and usually extended laterally (cosmopolitan, common ..... *Haemaphysalis*
Basis capituli of male quadrangular dorsally with posterolateral margins diverging anteriorly; basis capituli of female hexagonal; palpi elongate, conical, segment II at least twice as long as broad, not extending laterally (Russia, China, Nepal, rare) ..... *Anomalohimalaya*

5. Spiracular plate with irregular ridges and partially ornamented with ivory coloration; festoons number 9 (Africa, rare) ..... *Cosmiomma*
Spiracular plate normal, without ridges or coloration; festoons present or absent, if present, never 9 festoons 6

6. Palpi much longer than basis capituli, palpal segment II much longer than broad 7
Palpi about as long as basis capituli, palpal segment II about as long as broad 9

7. Scutum and palpi ornamented, palpal segment III with a dorsal and ventral flange; male with paired adanal, accessory and subanal plates (India, rare ..... *Nosomma*
Scutum ornate or inornate, palpal segment III without both a dorsal and ventral flange; male with or without ventral plates 8

8. Scutum inornate; male with adanal and usually with subanal plates; festoons irregular, partially coalesced (India, Mideast, Africa, common) ..... *Hyalomma*
Scutum usually ornate; male without anal and subanal plates; festoons regular, not coalesced (essentially pantropical, common) ..... *Amblyomma*

9. Palpi extremely short, ridged dorsally and laterally; anal groove indistinct, festoons absent (cosmopolitan, cattle ticks) ..... *Boophilus*
Palpi not extremely short nor ridged dorsally and laterally; festoons present or absent 10

10. Festoons absent; leg IV of male greatly enlarged (Africa, rare) ..... *Margaropus*
Festoons present; leg IV of male norma 11

11. Festoons number 7; spiracular plate round with goblets few (ca. 8) and large (Neotropical, common on horses) ..... *Anocentor*
Festoons number 11; spiracular plate round or with dorsal extension, goblets numerous 12

12. Basis capituli rectangular; usually ornate (cosmopolitan, common) ..... *Dermacentor*
Basis capituli hexagonal dorsally; usually inornate 13

13. Scutum usually inornate (4 ornate species); adanal and accessory plates present in the male; coxa IV of male not much larger than I-III, without two long spurs, two short pointed spurs absent on female coxa IV ..... *Rhipicephalus*
(Rhipicephalus sanguineus cosmopolitan, others primarily African)
Scutum inornate; adanal and accessory plates absent in the male; coxa IV of male larger than I-III, with two long spurs, two short pointed spurs present on female coxa IV (Africa, rare)
..... Rhipicentor

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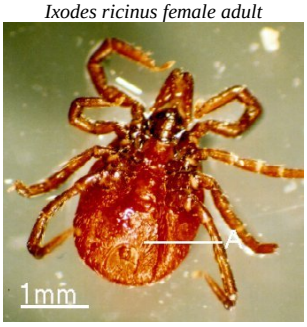
Identification of hard tick Life stages

Adapted from: University of Lincoln: Frank L. Ruedisueli & Brigitte Manship

Tick has:		***If so, you are observing:***
Six legs	*Ixodes ricinus larva*  *dorsal view*	1) a Larva (see life cycle)
Or **Eight legs** **Hardly visible** **genitalia (A)**	*Ixodes ricinus nymph*  *ventral view* A. Genitalia	2) a Nymph (see life cycle)
Or **Eight legs** 3) an Adult (see life cycle) **Developed and** **visible genitalia (A**	*Ixodes ricinus female adult*  *ventral view* A. Genitalia	3) an Adult (see life cycle)

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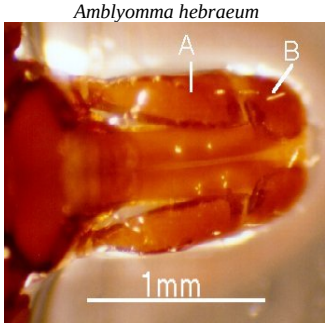
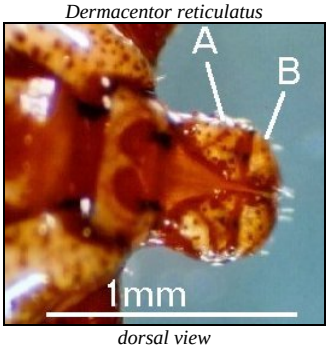
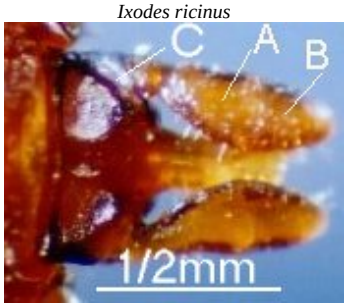
Identification of hard tick Larvae and Nymphs using capituli

To identify Larval or Nymphal stages use the table below.
The small size of both Larva and Nymph stages (respectively 0.6-1.25 mm and 1.2-2 mm) make their identification difficult. Nevertheless they can be recognized when examining their capituli (under microscope), as all three stages have the same shaped head/palpi.

Does the head have:		***The tick is of genus:***
* a long capitulum article II (A), three times as long as III (B)	*Amblyomma hebraeum*  *dorsal view*	**Amblyomma** A. Article II B. Article III
* palpi as wide or wider than long * rectangular basis capituli	*Dermacentor reticulatus*  *dorsal view*	**Dermacentor** A. Article II B. Article III
* palp long and broad: - articles II (A)and III (B) longer than width of basis - set wide apart	*Ixodes ricinus*  *dorsal view*	**Ixodes** A. Article II B. Article III C. Basis capituli

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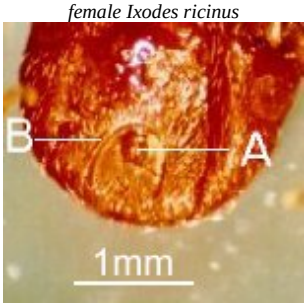
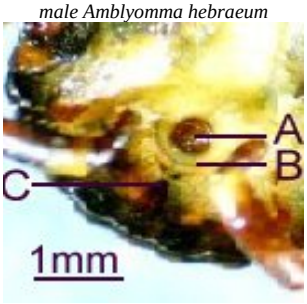
Adult Identification Step 1: Position of the anal groove

When looking ventrally:		**If so:**
The anal groove extends above the anus	*female Ixodes ricinus*  *dorsal view*	**The tick is of genus:** **Ixodes** A. anus B. anal groove
The anal groove extends below the anus	*male Amblyomma hebraeum*  	Go to **Step 3** A . anus B. anal groove C. Postanal median groove

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division **INDUSTRIAL HYGIENE GROUP** Standard Operating Procedure: Field Procedure	NUMBER **IH89200**
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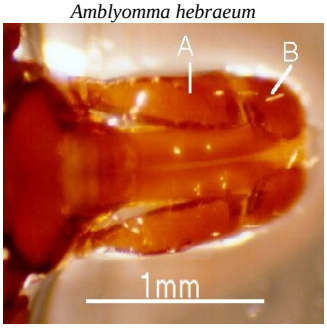
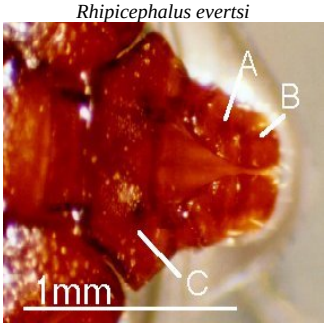
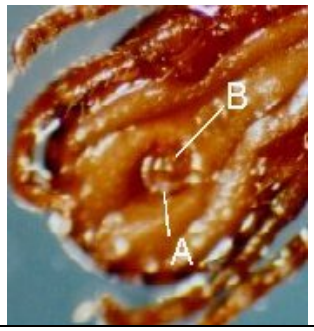
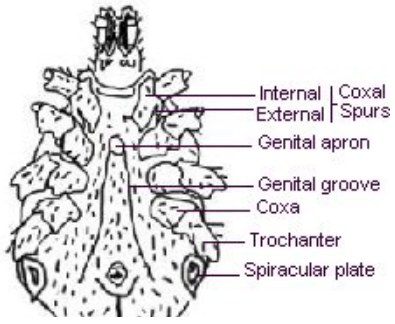
Adult Identification Step 3: Size of palpi

On the capitulum :		**If so:**
The palpi (A & B) are longer than wide and tick ornate	*Amblyomma hebraeum* 	**The tick is of genus: Amblyomma** *male Amblyomma hebraeum* *dorsal view* *A. Article II* *B. Article III*  *dorsal view*
The palpi (A & B) are wider than long and tick has decorations on the scutum	*Rhipicephalus evertsi*  *dorsal view* A. Article II B. Article III C. Basis capituli	**The tick is of genus: Dermacentor** *male Dermacentor reticulatus*  *dorsal view*

TICK IDENTIFICATION GLOSSARY

Adapted from: University of Lincoln: Frank L. Ruedisueli & Brigitte Manship

Anal groove Part of the genitalia **Anus** Part of genitalia	A. Anal groove B. Anus 
Basis capituli Attaches head to body can be various shapes, such as rectangular or hexagonal. Usually comprises porose areas like eyes **Capitulum** Head or mouthpart of the tick made up of palpi and three segments or articles	A. Capitulum C. Basis capituli 
Coxa Base of the legs, attachment to body	

Subject:

Field Sampling and Laboratory Analysis of Ticks

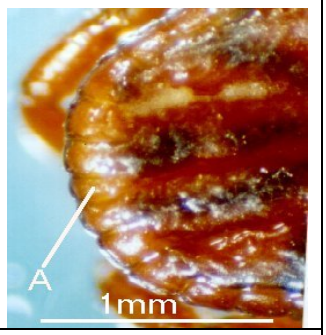
Eyes Are present at margin of scutum

A. Eyes

Festoons

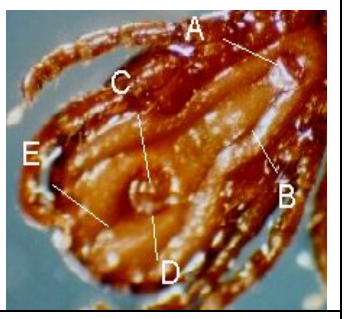
Wrinkles located at the bottom of the back

A. Festoons



Genitalia Reproductive organ of the tick, composed of the genital apron (A), genital groove (B), anal groove (D), postanal median groove (E) and the anus (C)

A. Genital apron
B. Genital groove
C. Anus
D. Anal groove
E. Postanal median groove



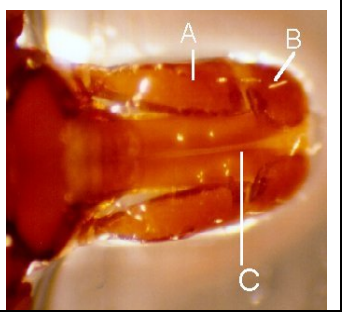
Haller's organ Sensory structure sensitive to humidity and odors situated at the tip of the first tarsus of the first walking leg

Hypostome Extension of the basis capituli, found between palpi

Articles or segments of palpi or legs

Palpi Part of mouthpart made up of four segments

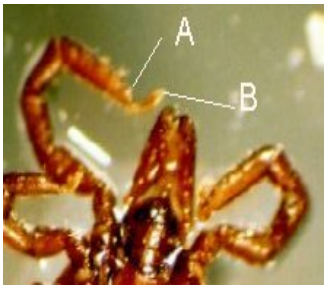
A. Article II of palpi
B. Article III of palpi
C. Hypostome



Pulvilli Pads present at the end of the legs

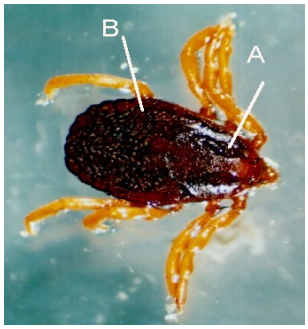
Claws At the end of pads help tick to attach to host

A. Pulvilli
B. Claws



Scutum
Hard shield found on the back of the tick. Expands over the whole back in males, but only 1/3 of the back in females

A. Female scutum
B. Body



BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division **INDUSTRIAL HYGIENE GROUP** Standard Operating Procedure: Field Procedure	NUMBER **IH89200**
	REVISION **Final Rev0**
Subject: **Field Sampling and Laboratory Analysis of Ticks**	DATE **04/28/06**
	PAGE **21** of 25

Ticks of Long Island Photos

Adapted from BNL Photos and Internet Site: Entomological Society of America

Deer Tick ***Ixodes scapularis***	**Dog Tick** ***Dermacentor variabilis***	**Lone Star Tick** ***Amblyomma americanum***
Adult Female 	**Adult Female** 	**Adult Female** 
Adult Male 	**Adult Male** 	**Adult Male** 
Nymph 	**Nymph** 	**Nymph** 
Larvae 	**Larvae** 	**Larvae** 

BROOKHAVEN NATIONAL LABORATORY

DEER TICK SAMPLING

IH89200 Attachment 9.3 **File Code: IH62**

DATE:	METHOD: White flannel (3' x 3') SAMPLE SIZE: 100 ft length by 3 ft width	SURVEYOR(S):	
Sky: __Sunny __Partial Cloudy __Overcast	Wind: _____fpm _____mph	Temp: shade _____°F; sun _____°F	RH: _____% DewPt: _____ °F

Sample #	Time of Sample	Location of Sample	Field ID of Ticks *Ix= Ixodes scapularis* *Dv= Dermacentor variabilis* *Aa = Amblyomma americanum*				
			Total	Adult Male	Adult Female	Nymph	Larvae

Date:

Sample #	Time of Sample	Location of Sample	Field ID of Ticks *Ix= Ixodes scapularis* *Dv=Dermacentor variabilis* *Aa = Amblyomma americanum*				
			Total	Adult Male	Adult Female	Nymph	Larvae

BROOKHAVEN NATIONAL LABORATORY

Safety & Health Services Division
Industrial Hygiene Group
IH89200 Attachment 9.4

Tick Laboratory Identification and PCR Test Record

	DATE:	ANALYSIS BY:
Presented By:	NAME:	BNL#:
Patient:	___Same ___BNL Employee	___Family Member Name:
Location:	DEPT/DIV:	BLDG:
Contact Info:	BNL phone Number	Email: ___Outlook Other:
Where At BNL:		**Date Of Attachment:**

ANALYSIS UNDER MAGNIFICATION

Genus	___ *Dermacentor variabilis* **Dog Tick**	___ *Ixodes scapularis* **Deer Tick**	___*Amblyomma americanum* **Lone Star**
Life Stage	___ Adult Female ___ Adult Male ___ Nymph ___ Larvae	___ Adult Female ___ Adult Male ___ Nymph ___ Larvae	___ Adult Female ___ Adult Male ___ Nymph ___ Larvae
Signs Of Attachment	Status Of Hypostome: ___Intact ___Partial ___Missing		
Signs Of Engorgement	___None ___Partial ___Full ___Blood in Body ___Blood Streaking		

PCR TESTING

Date Sent:		**Results Received:**
Sample Id:	BNL-_____- _____- ____- ___. MMDDYY ORG INITIALS #	
Sent To:	___ Igenex ___ Imugen ___Other:	
Analysis For:	___ *Borrelia Burgdorferi* ___*Babesia* ___*Ehrlichiosis*	
Results	___ Positive ___ Negative ___ Inconclusive	

BROOKHAVEN NATIONAL LABORATORY

SHSD Industrial Hygiene Program

IH89200 Attachment 9.5
HP-IHP-89200

Tick Field Sampling
Job Performance Measure (JPM) Completion Certificate

Candidate's Name	Life Number:

Practical Skill Evaluation: Demonstration of Evaluation Methodology by Oral Exam & Demonstration of Methodology

Criteria	Qualifying Performance Standard	Unsat.	Recov.	Satisf.
1. **Hazard Analysis**	Understands the tick hazards and exposure potential to the self as sampler and workers in the area.			
2. Personal Protective Equipment	Understands the need for PPE. Demonstrates the correct use of protective clothing and the proper treatment and storage of exposed clothing.			
3. Sampling Equipment	Knows where equipment needed for the procedure is located and how to properly use it.			
4. Field Sampling methods	Demonstrates correctly setting up sample plots.			
5. Field Sampling methods	Demonstrates correctly dragging of ground vegetation & flagging vegetation in the low canopy.			
6. Field Sampling methods	Demonstrates the correct set up of CO2 Bait traps			
7. Field Sampling methods	Demonstrates the proper method of recovering ticks from the flannel sample cloth.			
8. Lab Analysis	Demonstrates knowledge of the principles of identification of tick species, and life stages.			
9. Specimen disposal	Demonstrates the proper method to dispose of tick specimens and recycle the Isopropanol used as a preservative.			
10. Documentation	Demonstrates correctly filling out IH monitoring forms.			

I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:

I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date: