TICKS

affecting man and dogs in Canada

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TICKS

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DR. H.J. SMITH

Animal Pathology Division, Health of Animals Branch,
Atlantic Area Research Laboratory, Sackville, N.B.

Ticks are small insect-like animals having jointed limbs and a hardened outer covering like that of shrimps, centipedes, insects and spiders.

The food of all stages of both male and female ticks consists entirely of blood and lymph. Consequently, they are blood-sucking parasites of a great number of animals, especially warm-blooded mammals, including man. Some species may remain attached for long periods while engorging on blood. Ticks are not only important for their role as blood-suckers but, also, as vectors of disease.

Description

Ticks should not be confused with insects. They are wingless parasites with a fused head and thorax or body. Eyes, when present, are small and simple. The mouth parts are highly specialized structures adapted for piercing the host's skin and sucking blood. Longitudinal rows of recurved teeth situated on the immovable mouth part, called the hypostome, enable ticks to hold fast (Fig. 1), and also account for the difficulty frequently encountered in trying to dislodge feeding ticks.

The body of the tick is covered with a leathery elastic cuticle, or exoskeleton, which permits it to enlarge considerably during feeding. Adult and nymphal ticks have four pairs of legs but larval ticks only have three pairs.

By way of contrast, true insects have three body segments: head, thorax and abdomen. The head is equipped with eyes and antennae, and the thorax has six legs and usually one or two pairs of wings.

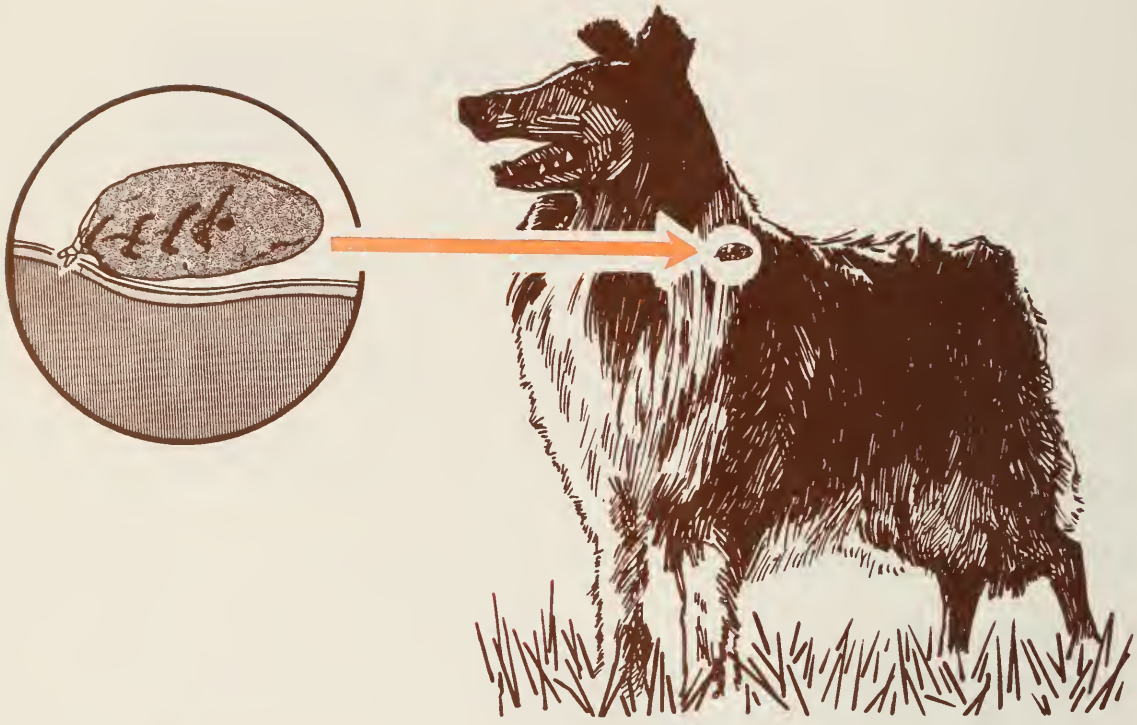

Figure 1. A feeding tick with the hypostome and mouth parts embedded in the skin.

Life Cycles

The life cycle of ticks consists of four stages (Fig. 2): (1) egg, (2) larva or seed tick, (3) nymph and (4) adult. Transition from one stage to the next is accomplished by one or more moltings of the skin or exoskeleton. The life cycle may be completed in a period as short as 6 weeks or as long as 2 years depending on the species of tick.

Ticks are classed as one-, two- or three-host ticks depending on the number of hosts required to complete the life cycle. A one-host tick spends its entire developmental period, from young larva to mature adult, on one animal. A two-host tick leaves the host either as a mature larva or a mature nymph, molts on the ground, and then completes its development on a second host. A three-host tick leaves its host to molt on completion of a larval stage. As a nymph, it attaches to a second animal but again leaves its host to molt. Finally, as an adult, it feeds on a third animal. The three hosts may be of the same or different species.

The fully engorged female tick usually deposits her eggs on the ground, the number varying from about 100 perhaps as many as 2,000 eggs, depending on the species. Immediately following hatching, the larvae, or "seed ticks" as they are called, remain clustered near the place of energence. After a time they commonly climb up grasses and other low vegetation to come within easy reach of grazing or passing animals. The nymphs and adults employ the same method for locating hosts. (Fig. 3)

Ticks are obligatory parasites requiring blood to develop. In feeding, most ticks attach to any part of the host's body, although some species

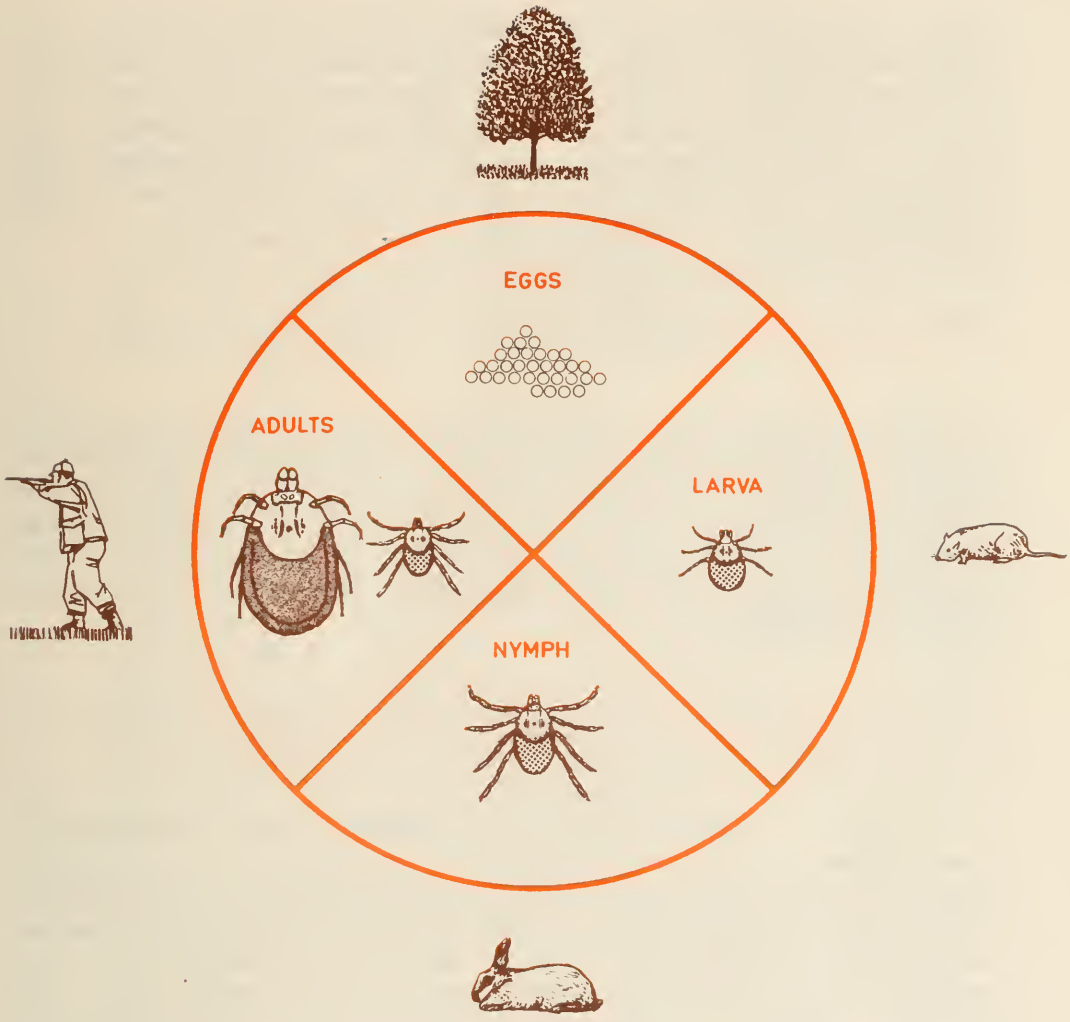

Figure 2. Life cycle of *Dermacentor andersoni* — a three-host tick.

Figure 3. Ticks on grass waiting for a passing host.

prefer certain locations. As an example, the tropical horse tick generally prefers to attach in the ear. The length of time a tick feeds depends upon the species and the stage of development. The seed ticks commonly feed for a number of days but nymphs and adults may differ greatly in their feeding habits. For example, the common fowl tick feeds nightly and intermittently, and the nymph of the spinose ear tick may take as long as 7 months to engorge.

Longevity

Ticks are very hardy arthropods capable of living for long periods without food and water. Moisture is an important factor and its complete absence is highly destructive to ticks. Adults and nymphs usually live longer than the larvae. There have been recorded instances where larvae of the castor-bean tick lived for 19 months. It is not uncommon for adults of some species to live up to 3 years under certain conditions.

Important Canadian Species

In Canada, there are no ticks that appear to be specific parasites of man, although there are a number of species that are regarded as important pests in certain areas. In Western Canada, from British Columbia to Saskatchewan, the Rocky Mountain wood tick, *Dermacentor andersoni,* frequently is found on man. In Eastern Canada, the American dog tick, *Dermacentor variabilis,* is perhaps the most common offender. In recent years this species has been particularly prevalent in southwestern Nova Scotia. Other species of ticks that have been reported from man from time to time are the moose tick, *Dermacentor albipictus;* the rabbit tick, *Haemaphysalis leporis-palustris;* the common bird tick, *Haemaphysalis chordeilis;* the hermsi soft tick, *Ornithodoros hermsi,* and several species of *Ixodes* ticks including *I. pacificus, I. angustus* and *I. cookei.* The fowl tick, *Argas persicus,* although rarely found in Canada will attack man probably only in the absence of birds.

In Canada, dogs are the primary hosts for several species of ticks, notably the American dog tick, *Dermacentor variabilis,* and the brown dog tick, *Rhipicephalus sanguineus.* Dogs, like man, may also be attacked by several other species of ticks, such as *Ixodes* ticks, which are not necessarily host-specific.

Effects of Tick Infestations

Ticks affect their hosts in a number of ways:

- Initially the bite itself may be troublesome, although the host may be unaware for some time that the tick has attached. The long hypostome of *Ixodes* ticks, for example, frequently breaks

off in the skin, resulting in a painful, slow-healing wound at the site of the bite. *Ixodes* ticks also have more toxic secretions than *Dermacentor* ticks and punctures of even a short duration by the former species may show intense swelling, inflammation and irritation.

- In addition to the irritation and pain of the actual bite, ticks may cause serious disease by virtue of the number attacking an animal. In heavy infestations, ticks may cause anemia, unthriftiness, emaciation and death.

- Ticks may also cause a disease in man and animals called tick paralysis, which is characterized by incoordination and collapse. A single, attached, engorging female tick is capable of producing tick paralysis in man and dogs in about 6 days after attachment, but it takes many ticks to produce the disease in cattle. The exact cause of this disease is not fully understood but it is believed that a neurotoxin (a toxin that affects nerve tissue), secreted by the salivary glands of the feeding tick, is involved. Several species of ticks can cause tick paralysis, with *Dermacentor andersoni* the most common offender in Canada, although *D. variabilis* may also initiate this disease. In the southern United States, several *Amblyomma* species have also been incriminated.

- Ticks are extremely important vectors and carriers of diseases affecting both man and animals. Examples of diseases either transmitted or capable of transmission by ticks include Colorado tick fever, equine encephalomyelitis, St. Louis encephalitis, tularemia, Rocky Mountain spotted fever, Q fever, relapsing fever, canine piroplasmosis and Texas cattle fever.

Control

Control is extremely difficult considering the tremendous reproductive potential, the habits and habitat of ticks. Climatological factors such as cold weather, excessive heat, dryness or rainfall adversely affect some species and predators such as birds, rats, mice, ants and parasitic insects play some role in natural control.

It is perhaps impractical to consider the absolute control and elimination of ticks from large areas naturally infected with ticks. However, in inhabited areas, along trails, in parks and resorts, where people and their pets are likely to travel, spraying of the ground and vegetation with appropriate acaricides may reduce the number of ticks significantly. Chlordane, malathion, methoxychlor and carbaryl are products that may be used for this purpose.

Clearing away brush and cutting weeds, grass and other low vegetation where possible may reduce the number of ticks within limited areas. Control of rodents and other small animals that may act as hosts for ticks may also prove helpful.

There are a number of things one can do to increase his or her protection if forced to live, travel or work in areas endemically infested with ticks. Always wear clothing that will afford the greatest protection. For example, secure trouser cuffs inside boots and leggings to prevent ticks from gaining access to the legs. Dipping of clothing in an appropriate repellent gives good protection. After leaving a tick-infested area, check clothing and body and remove any attached ticks.

Ticks may gain entrance to buildings. In Canada, the brown dog tick, which is primarily a domestic pest, appears to be the tick mainly involved. Control involves treatment of both the dog and the premises. An oil-base spray containing 2% chlordane or 1% lindane should be applied to baseboards and other woodwork, under floor coverings, furniture, behind fixtures, on curtains and drapes, in cracks and all other likely hiding places.

Affected dogs may be treated with a spray, dip or dust containing an appropriate acaricide. This will not only remove the ticks but will offer some protection against reinfection. Acaricides available include:

1. Lindane as a 0.25 to 0.5% solution or a 1% dust applied to cover the animal thoroughly. Do not use on puppies.
2. Malathion at the rate of $1^1/_4$ ounces per gallon of water and applied with a hand spray to cover animal thoroughly. Repeat treatment weekly only when necessary.
3. Coumaphos as 0.5% dust. Apply thoroughly under the hair over the entire body and repeat weekly as necessary. Also apply to bedding.
4. Carbaryl as 5.0% dust. Apply liberally and rub thoroughly into the skin over entire animal, avoiding the eyes. Repeat weekly if needed.
5. Methoxychlor as .5 - 1% solution. Spray lightly. Do not use on young dogs. As 5% dust work down to skin. Repeat if necessary but not more than once a week.

Removal of ticks manually should be done pulling slowly and steadily to avoid breaking off the mouth parts. Bite wounds should be treated with an antiseptic to avoid infection.

Recommendations on the use of acaricides and other pesticides are subject to change. Before using any product mentioned in this bulletin check with your agricultural representative or provincial authority to make sure your proposed use is still recommended.

Acaricides should only be applied according to the manufacturer's directions for use and all warnings and precautions as found on the label should be strictly adhered to.

CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:	
LINEAR			
inch	x 25	**millimetre**	**(mm)**
foot	x 30	**centimetre**	**(cm)**
yard	x 0.9	**metre**	**(m)**
mile	x 1.6	**kilometre**	**(km)**
AREA			
square inch	x 6.5	**square centimetre**	**(cm^2)**
square foot	x 0.09	**square metre**	**(m^2)**
acre	x 0.40	**hectare**	**(ha)**
VOLUME			
cubic inch	x 16	**cubic centimetre**	**(cm^3)**
cubic foot	x 28	**cubic decimetre**	**(dm^3)**
cubic yard	x 0.8	**cubic metre**	**(m^3)**
fluid ounce	x 28	**millilitre**	**(ml)**
pint	x 0.57	**litre**	**(ℓ)**
quart	x 1.1	**litre**	**(ℓ)**
gallon	x 4.5	**litre**	**(ℓ)**
bushel	x 0.36	**hectolitre**	**(hl)**
WEIGHT			
ounce	x 28	**gram**	**(g)**
pound	x 0.45	**kilogram**	**(kg)**
short ton (2000 lb)	x 0.9	**tonne**	**(t)**
TEMPERATURE			
degrees Fahrenheit	(°F-32) x 0.56 or (°F-32) x 5/9	**degrees Celsius**	**(°C)**
PRESSURE			
pounds per square inch	x 6.9	**kilopascal**	**(kPa)**
POWER			
horsepower	x 746	**watt**	**(W)**
	x 0.75	**kilowatt**	**(kW)**
SPEED			
feet per second	x 0.30	**metres per second**	**(m/s)**
miles per hour	x 1.6	**kilometres per hour**	**(km/h)**
AGRICULTURE			
gallons per acre	x 11.23	**litres per hectare**	**(ℓ/ha)**
quarts per acre	x 2.8	**litres per hectare**	**(ℓ/ha)**
pints per acre	x 1.4	**litres per hectare**	**(ℓ/ha)**
fluid ounces per acre	x 70	**millilitres per hectare**	**(ml/ha)**
tons per acre	x 2.24	**tonnes per hectare**	**(t/ha)**
pounds per acre	x 1.12	**kilograms per hectare**	**(kg/ha)**
ounces per acre	x 70	**grams per hectare**	**(g/ha)**
plants per acre	x 2.47	**plants per hectare**	**(plants/ha)**