Please pay attention to ticks to prevent them from attaching to your body.

- When playing on thick grasses in fields and mountains, along rivers, in parks or campgrounds, please wear clothes that cover your body as much as possible.
- Please spray repellent. Repellents that can be sprayed on clothes are also suitable.
- Check your clothes for ticks that might have attached to it right before entering your home.
- Take a shower and check your body for ticks that might have attached to it.
- If you find ticks on your body, please go to a hospital to have them pulled off. Do not pull them off or crush them yourself.
- Please apply insecticides/acaricides* for your pets (*available in veterinary hospitals).

Obihiro University
of Agriculture and Veterinary Medicine

National Research Center for Protozoan Diseases

Project for Joint Usage/Research Center (From 2017 to 2021)
"Establishment of Tick Biobank
and its application to vector biology research"

https://www.obihiro.ac.jp/facility/protozoa/en

Tokachi Tick Encyclopedia

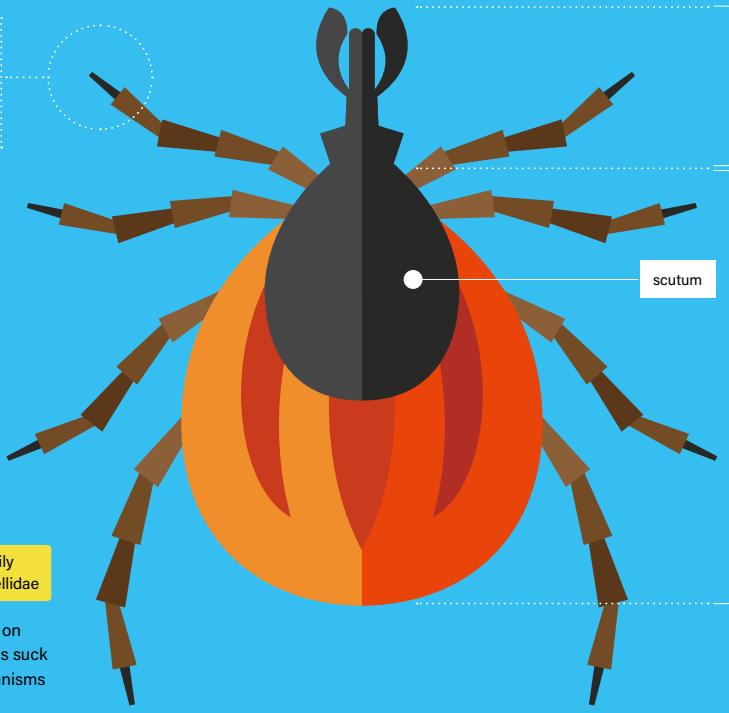
National Research Center for Protozoan Diseases

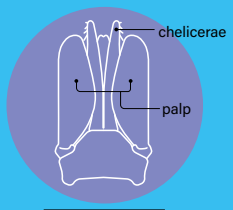
National Research Center for Protozoan Diseases
Tick Project

What is a tick?

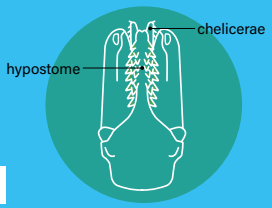
Ticks have a very different ecology from mites. Mites breed in a mattress or carpet feed on dandruff, dust, spilled food and the like. On the other hand, ticks feed on the blood of vertebrate animals (excluding fish). When larval ticks hatch from their eggs, they start to suck blood, and continue to suck blood and molt repeatedly while growing up.

Ticks don't have antennae. They have a sensory organ, referred to as Haller's organ, on the tip of the first leg with which they sense odors, heat, external stimuli and the like.

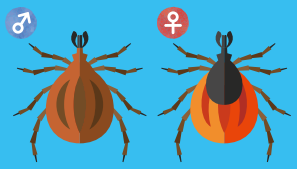




dorsal aspect



ventral aspect

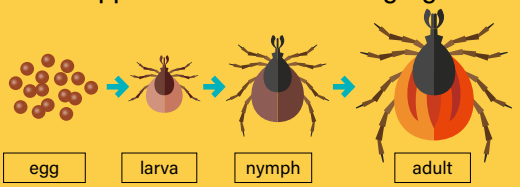


Since the entire body of a male tick is covered with a hard scutum, male ticks do not swell much, even though they suck blood.

- Phylum Arthropda
  - Subphylum Chelicerata
    - Class Arachnida
      - Subclass Acari
        - Superorder Parasitiformes
          - Order Ixodida
            - Family Ixodidae
            - Family Argasidae
            - Family Nuttalliellidae

There are approximately 900 species of ticks on the earth. Approximately 10% of these species suck blood whereby they transfer pathogenic organisms to animals and humans.

What happens when ticks are engorged with blood?



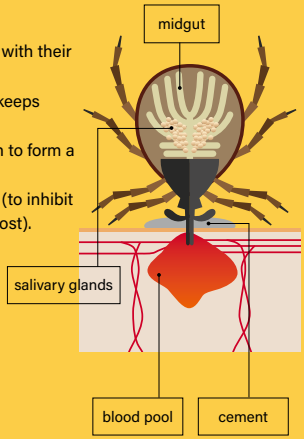
Ticks suck blood for several days to several weeks. Larval ticks and nymphal ticks undergo metamorphosis and molting when they are engorged with blood. Several weeks later, they become nymphs and adults, respectively.

When female ticks have sucked a sufficient amount of blood, they mate with male ticks. After mating, the female ticks, which are engorged with blood, then leave the animals' skin. They lay their eggs on the ground over several weeks and eventually die.

How ticks suck blood

- They open their palps to pierce the host's skin with their chelicerae, and then insert the hypostome.
- They then secrete a cement-like material that keeps them stuck to the skin.
- The capillary vessels under the skin are broken to form a pool of blood, from which they suck blood.
- They suck blood and secrete saliva alternately (to inhibit hemostasis and the immune response of the host).

When engorged with blood, a female tick's weight increases to approximately 100 to 200 times that before sucking blood.



Ticks in Tokachi

Life cycle of ticks

What kinds of diseases can ticks carry?

Not all ticks have pathogens. In addition, even if pathogens are transferred to the host animals or humans, the host may not develop any symptoms. However, it is necessary to pay attention because some of the diseases that may occur may, lead to death. There are no therapeutic agents or vaccines for many of tick-borne diseases.

These are important diseases in Japan among tick-borne diseases.

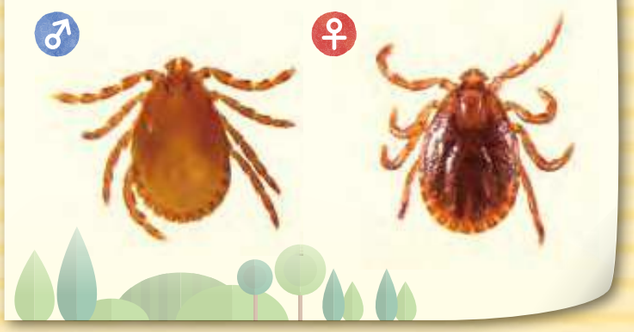
cattle	theireliosis：protozoan parasites
	babesiosis：protozoan parasites
dog	babesiosis：protozoan parasites

human babesiosis：protozoan parasites
Japanese spotted fever：bacteria (*Rickettsia*)
Lyme disease：bacteria (*Borrelia*)
tick-borne encephalitis：virus
severe fever with thrombocytopenia syndrome (SFTS)：virus

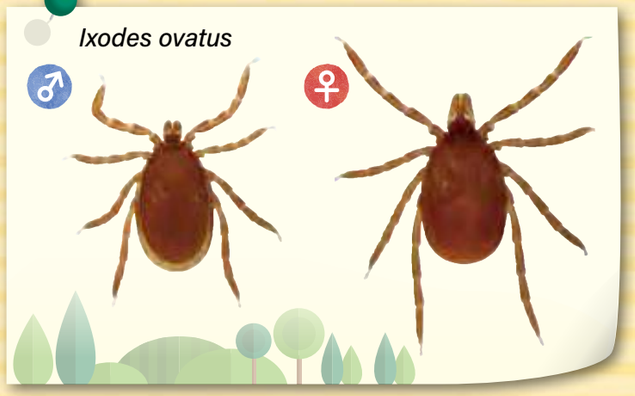
Major tick species inhabiting Tokachi

Ixodes persulcatus

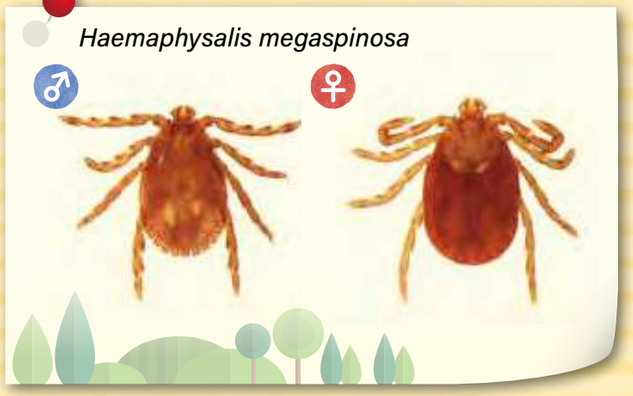
Haemaphysalis japonica



Ixodes ovatus

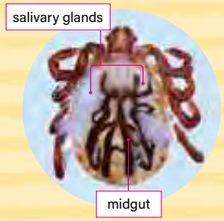


Haemaphysalis megaspinosa



Where are the pathogens found in ticks?

Many pathogens hide in the tick's body. They are asleep while ticks don't suck blood. For example, protozoans hide in the cells of the salivary glands that secrete saliva. When ticks start sucking blood, the protozoans wake up to move into the saliva, thus the pathogens are carried to animals or humans.



Ixodid ticks that are widely distributed in Japan

Genus *Ixodes*	Genus *Amblyomma*
Genus *Dermacentor*	Genus *Haemaphysalis*
Genus *Rhipicephalus*	Genus *Rhipicephalus (Boophilus)*

Haemaphysalis longicornis
Most important tick species in Japan.

Tick Project

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The National Research Center for Protozoan Diseases performs maintenance and supply of ticks for research, analysis of the whole genome of ticks, as well as research on ticks' distribution and the diseases they carry in various regions. The center is intended to serve as a base for international joint research studies on ticks and has accumulated large amounts of information and established Japan's first "Tick Biobank." This project contributes to domestic and international research on ticks and tick-borne infection control measures.