



# Ticks

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## Introduction

Ticks are blood-sucking arthropods found in virtually all terrestrial regions of the planet. Globally, approximately 900 species of ticks are recognized of which about 700 species are ixodid or hard ticks and 200 species are soft ticks. Approximately 200 ixodid and 40 argasid species are present in the Afrotropical region but only a small number are of veterinary and medical importance. Many of the ticks and tick-borne diseases occur usually in specific geographical areas but with globalisation and climate change their range may expand and even spread intercontinentally.

## Systematics/Taxonomy/Identification

There are three families of ticks although one family, *Nuttallielidae* comprises only one species. Hard ticks or *Ixodidae* are characterized by the presence of a hard scutum or shield and mouthparts projecting forward which makes them visible from the dorsal side. In soft ticks or *Argasidae*, the mouthparts are recessed ventrally except in the larval stage.

The identification of ticks is normally based on morphological features although in a holistic way the hosts on which they occur, the locality where they are found and their seasonal activity is taken into consideration for the final identification.

## Biology/Ecology

All ticks, both soft and hard ticks, are haematophagous and each life cycle stage needs a blood meal to develop to the next stage or in the case of adults they

require a bloodmeal to reproduce. Both hard and soft ticks undergo four developmental stages: egg, larva, nymph and adult (male and female). In the argasids several nymphal stages are present and also multiple gonotrophic cycles, in contrast to hard ticks, which only have one nymphal stage and where females die after oviposition. In hard ticks three types of life cycle exist, each of them determined by the number of questing life cycle stages. The one-host type, where all stages remain on the host after larval attachment, is the most advanced. Three-host ticks quest in each life cycle stage and are therefore more vulnerable to environmental conditions.

## Distribution

Ticks are widely distributed around the world and survive in a wide range of climatic conditions. The most widespread and therefore cosmopolitan species is the dog tick *Rhipicephalus sanguineus* which, together with its host, occurs worldwide. Also the Asian cattle tick *Rhipicephalus (Boophilus) microplus* has spread to most parts of the world mainly because of the movement of cattle for restocking or breed improvement. Other species are more restricted to a specific habitat where their specific hosts are present and where climatic conditions allow survival and reproduction. Ticks (e.g. *Dermacentor rhinoceros*) of rhinoceros are restricted to the rhino's distribution range and will become extinct when the rhino becomes extinct. Most of the tick species however are not that host-specific and feed on a variety of hosts, both domestic and wild hosts.



## Importance

Ticks are among the most important vectors of human and animal diseases caused by protozoa, rickettsiae, bacteria, viruses and helminths of vertebrates. They rank second only to mosquitoes as vectors of life threatening or debilitating human and animal diseases. Moreover, ticks transmit a greater variety of infectious agents than any other arthropod vector group.

Ticks are also important as pests, affecting humans, livestock and wildlife. Apart from the discomfort they cause, these blood-feeding ectoparasites cause considerable production losses especially to improved animal breeds in the Afrotropical region. Each engorging female tick takes between 1 and 5 ml of blood depending on species and size.

## Control

Control of ticks is essential in those areas where ticks are carriers and vectors of pathogens, both of human and animal importance, or where they cause significant production losses in livestock. On cattle ticks are often controlled by plunge dips, spray races or pour-ons. Although efficient in reducing heavy tick numbers, intensive ticks control can disturb the endemic stability of a disease, leading to an increased prevalence of a disease.

## Sampling /Collection methods

A series of sampling methods for ticks are available, some of them adapted to the biology and behaviour of the tick species that one wants to collect, others are more general in a sense that they can be applied to collect a variety of ticks. Especially free-living ticks with a "hunting" behaviour, like *Amblyomma* spp, the vectors of the *Ehrlichia ruminantium*, the causative agent of heartwater, are sampled using dry ice traps as they mimic the carbon dioxide produced by their hosts. Questing ticks like larvae of the one host tick *Rhipicephalus (Boophilus) microplus*, the vector of bovine babesiosis and anaplasmosis, are sampled

using the dragging apparatus. The parasitic stages of most ticks species can be collected on the host itself.

## Find out more

The following topics are covered:

- *Tick Importance and transmission:* The ticks of veterinary importance and the different routes of transmission, including transovarial, transtadial and intrastadial transmission are described.
- *Identification of ticks:* The systematics and taxonomy of ticks, the seasonal occurrence, different life cycles, tick morphology and identification and differential diagnosis of ticks of veterinary importance are described.
- *Tick surveillance:* Information is provided on the different collection methods of ticks, including vegetation sampling, nest/burrow sampling, tick traps and host sampling methods.
- *Control of ticks:* Control strategies (chemical, biological and vaccines), principles of acaricide resistance, and the effect of tick control on endemic stability of tick-borne diseases are described, and information on the available chemical products is provided.

