FAUNA

TICKS

by Gordon Paine

TICKS are external parasites of a wide variety of vertebrates, including reptiles and birds. Although particularly common in the tropics, some also occur in temperate parts of the world.

Having a structure similar to that of insects, with jointed legs and a hard outer casing, ticks were classed in the Phylum ARTHROPODA. Recently they have been transferred, with spiders, scorpions and mites, to the CHELICERATA, with only one Class, ARACHNIDA. They differ from insects in having four pairs of legs in the imago or adult stage. Ticks are grouped with mites, which are very similar but smaller, in the Order ACARINA.

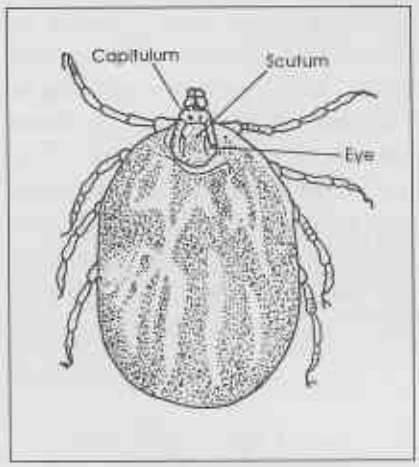
There are two families of ticks, the ARGASIDAE and the more common IXODIDAE. Also known as hard bodied ticks, the Ixodidae have a hard scutum or shield on the upper surface which can be seen in all stages with a lens.

All ticks feed on the blood of vertebrates. They fasten themselves to their hosts by means of a barbed structure, the hypostome.

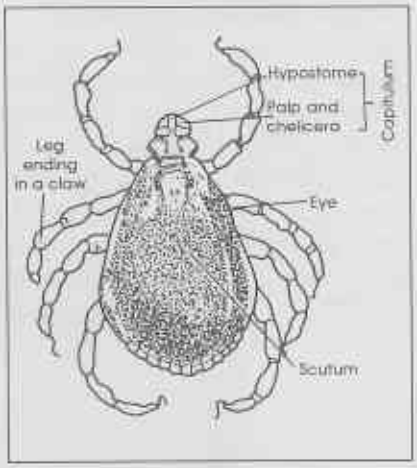
Ixodid Ticks

Tick bodies have no segments; they consist of an oval body which contains the digestive and reproductive organs and a capitulum with the mouthparts. All stages remain attached to the host for several days until feeding is completed. Females engorge themselves, their bodies distending to a centimetre or more long. These are the ticks usually seen by owners on their animals. Some appear a bluish colour due to the engorged blood which is being digested. The males are small and do not enlarge as they feed.

Mating occurs while the ticks are feeding. If the body of a female is raised, the male may be seen beneath her. Both sexes have a genital pore on the under surface. When a female is fully engorged she falls to the ground, seeks a sheltered spot such as under a tuft of grass, where she lays her eggs and dies. The males also die, but may remain in situ on the host for a while.



Engorged female Ixodid tick - dorsal view.



Dorsal view of a male Ixodid tick.

Several thousand eggs are laid. Six-legged larvae hatch out after a few days, the time depending on the species, temperature and humidity. They climb plant stems or other suitable objects, helped by a claw on the end of each leg, and wait for a passing animal to which they can cling. The numerous pin-head size creatures sometimes seen all over the walls of a room by pet owners are larvae, also known as seed-ticks, which have recently hatched out. After feeding, the larvae drop to the ground and moult into nymphs. The nymphs repeat the process of waiting for a new host, feeding, then falling to the ground where they moult into adults. The adults wait for a final host on which to complete their life cycles. This life cycle is characteristic of three-host ticks. All stages, unfed larvae, nymphs and adults, can remain alive for considerable periods of weeks or months depending on the species, while waiting for a new host to which they can attach themselves

The tropical cattle tick of northern Australia, *Boophilus microplus*, is an example of a one-host tick. This creature undergoes all the stages of development as above, but remaining on one host animal, without falling to the ground to moult.

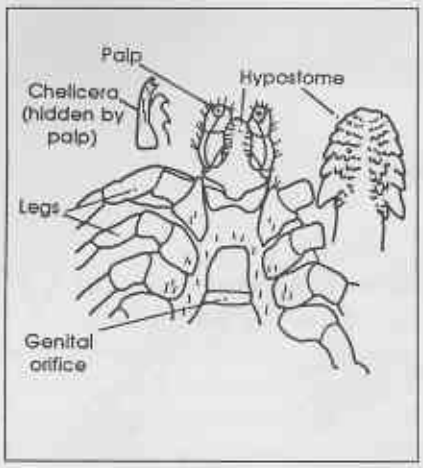
Some ticks, especially many of the Genus *Hyalomma* which occur throughout the drier parts of Africa and Asia, require two hosts, each of different species. The larvae and nymphs develop on one host, usually a small rodent, and the adults require a different host species such as a camel. It is probable that some of the camels brought to Australia during the last century were carrying *Hyalomma* ticks when they boarded ship. The females would have lain their eggs in cracks in the woodwork but the larvae found no suitable host and eventually died. There is no evidence that any are now present on outback camels.

Most ticks need to feed on particular species of host animals in order to complete their life cycles. Each species of tick depends for its distribution on the availability of suitable hosts, a climate with a particular range of humidity and temperature for feeding and breeding and a vegetation type to protect the creatures when off the host. For ticks of some species, the domestic home and garden have replaced their natural environment.

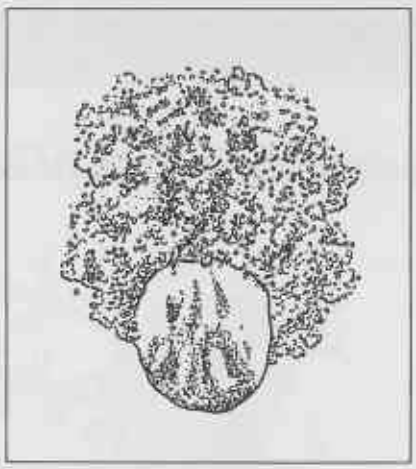
Argasid Ticks

Referred to as soft-bodied because they lack a scutum, argasid ticks also differ in the position of their mouthparts; which are underneath the body and cannot be seen from above. Their bodies are flattened.

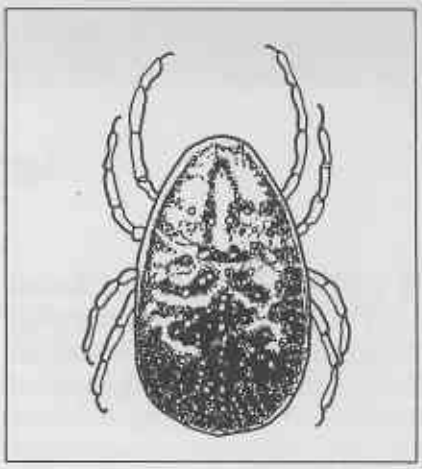
Their life cycles are similar to those of Ixodid ticks, but some species undergo several nymphal stages. Feeding is not always



Ventral surface of male Ixodid tick.



Female Ixodid tick with eggs.



Dorsal view of an Argasid tick.

continuous in argasid ticks. *Argas persicus*, a pest of poultry, seeks refuge in cracks or crevices during the day, only emerging at night to feed from birds roosting on their perches. Females produce small numbers of eggs at a time, but lay after each blood meal.

The Effects of Ticks

By their presence and the saliva which they inject to prevent blood from clotting, ticks can cause irritation and sometimes local suppuration. Each tick species has favoured sites of attachment on the host. one African species favours the teats and udders of cows, sometimes causing the development of abscesses which lead to mastitis and loss of one or more quarters.

Heavy infestations can cause loss of blood and anaemia. Wild animals in their natural habitats have few ticks, the parasites and their hosts having adapted to one another over many generations. When domestic animals are introduced, such as cattle into Africa, ticks, especially of the genus *Boophilus*, find a new and very suitable host on which they may build up populations of many hundreds. With heavy infestations, infection develops, flies are attracted to the area where they feed and lay eggs; the maggots then destroy more tissue as they feed.

The saliva of some species of ticks contains substances which can cause paralysis in humans, sheep and some other animals. The condition may be fatal, but recovery follows removal of the ticks.

The most important effects of ticks are due to the diseases that they can spread. Worldwide, they cause considerable sickness and economic loss by transmitting pathogenic viruses, rickettsia, protozoa and bacteria to humans and other animals.

The puncture wounds made by ticks mark and reduce the value of hides and skins.

Ticks in Australia

The tropical cattle tick, *Boophilus microplus*, is the most important tick economically because of the diseases that it transmits to cattle across the north of the country, babesiosis and anaplasmosis. Related diseases, but milder, have been seen in other domestic animals such as horses and dogs.

Ixodes holocyclus, a parasite of marsupials and rodents in the eastern states, is believed to transmit a rickettsial infection known as Queensland Tick Typhus to humans. This tick can also cause paralysis in man and some other animals.

The brown dog tick, *Rhipicephalus sanguineus*, is fairly widespread in Australia. It can cause tick paralysis of dogs and spread several diseases. There are many other ticks occurring on native animals which are not important from the human viewpoint.

Control of Ticks

Several chemicals are available for treating tick infections by spraying, dipping or injection. Pet owners can prevent ticks from becoming established on their premises by treating their pets regularly during the seasons when ticks are active.

An ecologically sound method of tick control is to groom the animals daily, or run one's hands over their coats, feeling for little bumps in the hair which may be ticks. These should be picked off and crushed or burned. Once a female has been able to lay eggs in the house or garden, it can be difficult to get rid of all the ticks.

People who are sensitive to ticks can reduce their chances of being affected when walking in the bush by wearing leggings.

Removing Ticks from the Skin

The feeding tick is held firmly in place by the barbs on its hypostome. The tick is unable to withdraw this even if its back is touched by a cigarette end or one of the various substances suggested for its removal is applied.

As the parasite ingests, enzymes in its saliva probably act with the host's own reaction to break down slowly the tissues which hold the hypostome in place. By the time the tick is replete the surrounding tissues have given way so that the parasite falls to the ground passively.

Ticks can be removed with a pair of tweezers. Grasp the tick as near to the capitulum as possible and lift it upwards and away from

continued on page 10

TICKS

continued from page 9

the skin. In practically every case the tick will come away complete with its mouthparts. I have removed many thousands of ticks this way from various animals, very few left their mouthparts in the host skin. In the small number that do, the reaction in the host tissues will expel the remaining parts within a few days occasionally in a little pustule.

Gordon Paine is a veterinary surgeon who has worked with ticks and tick-borne diseases of animals in South America, Africa and Asia. He can be contacted on (08) 9797 0673.

Drawings by Louise Burch from veterinary texts.