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## Phthraptera

# Lice

Lice are blood-feeding or skin/hair/feather-chewing ectoparasites that are a menace to pets, livestock and humans. There are 3200 known species of lice that infect wild birds or animals but only a small percentage has any known medical or veterinary importance.

### Description:

There are two main groups amongst lice, sucking and chewing or biting. Sucking lice consume a bloodmeal from their host and are more important in transmitting pathogens. Chewing or biting lice ingest feathers, fur and skin and sometimes blood from their host.

Adult lice are small (0.4 – 10 mm), wingless, and dorso-ventrally flattened. The female glues her eggs onto the host's hair or feathers. The eggs are referred to as nits. There can be 10-12 generations a year. A bloodmeal is essential for the development and survivorship for all sucking lice, while chewing lice can survive several days off the host.

Lice are transferred between hosts by direct contact by crawling or by phoresy which means they hitch a ride on another insect in order to find a new host.

Cattle operations in the US have to deal with five species of lice; the cattle biting louse (*Bovicola bovis*), the longnosed cattle louse (*Linognathus vituli*), the little

blue cattle louse (*Solenopotes capillatus*), the shortnosed cattle louse (*Haematopinus eurysternus*), and the cattle tail louse (*Haematopinus quadripertusus*).

There is also a horse biting louse (*Bovicola equi*), a hog louse of domestic swine (*Haematopinus suis*), and the sheep biting louse of sheep and goats (*Bovicola ovis*).

### **Animals Attacked:**

Livestock, birds, pets, humans; young, old and sick animals are more susceptible

### **Veterinary Impact:**

A small host can only support a small number of lice before adverse effects lead to its demise but a large host (livestock) can have more than a million lice and still be healthy.

A large number of lice can be debilitating to an animal. They can cause anemia, dermatitis, allergic responses, hair loss and other disorders which can be costly to the livestock industry.

Millions of lice per an animal can lead to restlessness, pruritus, anemia, low weight gain, low milk yield, dermatitis, hide or fleece damage, skin crusting or scabbing, and lameness.

Sucking lice on cattle can cause serious damage to the host and severe anemia, abortions, or even death at times.

Severally infested horses might experience pruritus, hair loss, or coat deterioration.

The hog louse is capable of ingesting significant volumes of blood from its hosts; especially the piglets and the feeding sites can cause intense irritation.

Lice found on goats and sheep can cause debilitation, even in small numbers, because of the damage to the fleece and wool. Some sheep will even develop hypersensitivity to the sheep louse, making the fleece value decline and also causes cockle which is an economically disfiguring condition of sheep fleece.

### **Disease Transmission:**

Lice can transmit some disease causing pathogens: swinepox to hogs (*H. suis*), bovine anaplasmosis and bovine dermatomycosis to cattle.

### **Control:**

Lice numbers are reduced by host grooming, resistance, molting and feather loss, hibernation, and hormonal changes, as well as predators, parasites and parasitoids.

Feeding cattle a high energy diet and maintaining uncrowded conditions, will reduce the chances of a louse infestation. The use of spot-treatments and quarantine for infected individuals will limit the spread of the lice. Most insecticides and formulations on the market work against lice. If lice treatment is needed, it is best to do it at the end of fall and repeat the treatment two weeks later. Keeping wool sheared will remove 80% of the lice present.



This is a horse with severe lice infestation. The patchiness of the hair-coat is very evident.

A close up of the hair coat. Lice and nits cluster at the base of the horse's hairs.

The entire lifecycle is short - about 2-3 weeks.

The final moult results in an adult louse.



### ENTIRE LIFE-CYCLE ON HOST'S HAIRCOAT

The eggs hatch releasing louse nymphs that look like small adults.

The nymphs undergo three moults, producing two more nymphal stages and one adult stage.



The adult lice lay eggs (nits) that are attached to the host's hair shafts.

## Siphonaptera: fleas

### Characteristics

Fleas are small, wingless insects ranging in size from approximately 1-10 millimetres in length depending on the species. Almost everybody, especially those with cats or dogs will be familiar with these small biting insects and will have either seen them or the effects of their nuisance bites. Fleas can be recognised by the following features:

- Laterally compressed bodies
- Piercing-sucking mouthparts
- Enlarged hind legs adapted for jumping
- Strong tarsal claws adapted for holding onto their hosts
- Backward pointing hairs and bristles for ease of movement through the hair of a host
- Small antennae which tuck away into special grooves in the head

The species *Ctenocephalides felis* (above) is the introduced cat flea but can survive on a wide range of host species. The larvae of all fleas appear grub-like and are usually found in the nests of their host or other areas where they commonly rest.

### Life Cycle

Fleas mate on their host animal and lay their eggs either onto the animal where they fall to the nest or directly in the nest. The small larvae hatch from the eggs and do not begin to feed on blood like that of their parents but consume the dead



skin and other dirt and dust from the host animal. The larvae develop through 3 instars and when fully grown spin a silken cocoon and pupate in the nest of the host. The vibrations of a host often trigger the emergence of the adult flea from the pupal case, enabling it to immediately find a host and begin feeding. The complete life cycle may take from several weeks to many months depending on the species.

### **Feeding**

Adult fleas feed on the blood of their host and although most fleas are adapted to one particular animal, many are not host specific and will move to other animals if their preferred host is unavailable. Fleas are very adaptable and are also able to withstand unfavourable conditions and can live for many days without food.

### **Habitat**

Fleas are always found close by their hosts, either in direct contact such as among the feathers or hair or within their nests. Fleas are found in almost all habitats in Australia where there is a ready host and many native species of flea are closely associated with native marsupials and rodents. The main introduced species are also associated with animals that have been introduced to the country such as the cat flea (*Ctenocephalides felis*) the dog flea (*Ctenocephalides canis*) and the rat flea (*Xenopsylla cheopis*).

### **Direct effects of bites**

In many species, fleas are principally a nuisance to their hosts, causing an itching sensation which in turn causes the host to try to remove the pest by biting, pecking or scratching. Fleas are not simply a source of annoyance, however. Flea bites cause a slightly raised, swollen itching spot to form; this has a single puncture point at the centre, like a mosquito bite. Besides this, the eczematous itchy skin

disease flea allergy dermatitis is common in many host species, including dogs and cats. The bites often appear in clusters or lines of two bites, and can remain itchy and inflamed for up to several weeks afterwards. Fleas can lead to hair loss as a result of frequent scratching and biting by the animal, and can cause anemia in extreme cases.

### **Flea as a vector**

Fleas are vectors for viral, bacterial and rickettsial diseases of humans and other animals, as well as of protozoan and helminth parasites. Bacterial diseases carried by fleas include murine or endemic typhus, and bubonic plague. Fleas can transmit *Rickettsia typhi*, *Rickettsia felis*, and *Bartonella henselae*, and the myxomatosis virus. They can carry *Hymenolepiasis* tapeworms and Trypanosome protozoans. The chigoe flea or jigger (*Tunga penetrans*) causes the disease tungiasis, a major public health problem around the world. Fleas that specialize as parasites on specific mammals may use other mammals as hosts; thus, humans may be bitten by cat and dog fleas.

### **Fleas as intermediate hosts of parasites**

Fleas play an important role as intermittent hosts in the development of at least three species of tapeworms. The double-pored tapeworm (*Dipylidium caninum*) is dependent on fleas as intermediate hosts and on dogs as final hosts. Two other tapeworms, the dwarf tapeworm (*Rodentolepis nana*, syn. *Hymenolepis* (*H.*) *nana*) and the rodent tapeworm (*H. diminuta*) use fleas and other insects as intermediate hosts for their development from eggs to cysticercoids. For these worms, humans may play a role as accidental final hosts. Humans are infected by incidental ingestion of

infected rat fleas (*X. cheopis*, *N. fasciatus*) and they may play a role as accidental final hosts.

## Flea control

Regular application of parasiticides to prevent flea infestation is a common strategy in veterinarian practice. The cosmopolitan distribution of the insects and the fact that fleas are major nuisance pests, a matter of public health and the source of FAD, make control definitely necessary. A lot of different flea control products are provided by the pharmaceutical world, with many of them exhibiting almost 100% efficacy. Major differences regarding the speed of action and the issue of resistance are due to the active substances.

If a substance possesses a fast mode of action, the probability decreases that transmission of pathogens occurs within the remaining feeding time. With imidacloprid, Bayer provides a proven active ingredient, which effectively stops flea feeding within minutes.

