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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 groves 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.