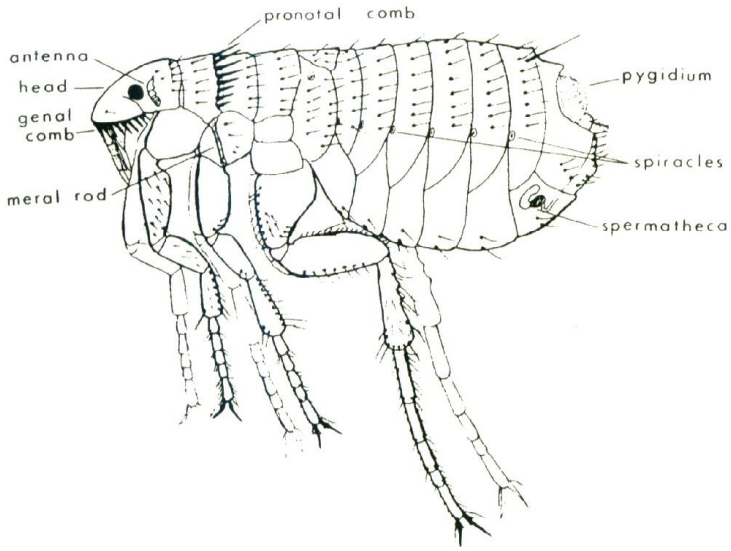
FLEAS

Fleas are blood-sucking ecto-parasites that live temporarily on mammals and birds for feeding purposes. They are small, brown, wingless insects, 2.0 – 2.5 mm in size, with laterally compressed bodies. They have powerful legs that each end in 2 curved claws.

Life cycle



Lateral view of adult flea showing position of comb and meral rod

Fleas tend to be host-specific, but their activities permit the infestation of animals other than their preferred hosts.

The life span is about one year under favourable conditions.

The adult fleas feed on their hosts, while the larvae feed on any nutritive debris especially dried blood and the faeces of the adult fleas.

Both sexes suck blood. Fleas have an unusual ability to jump, which enables them to transfer readily from host to host.

The eggs are small, ovoid and white or cream coloured and bout 0.5 mm in length.

They are laid in the hairs or the habitat of the host. In houses they are deposited in small batches under rugs, in floor cracks, on the ground near or under buildings. Fleas develop by complete metamorphosis, passing through a larval and a pupal stage in the host's environment.

Epidemiology

The incidence of human infestation varies with hygienic standards and the association if man with animals. Man is an important host for *Pulex irritans*, *Ctenocephalides canis* (the dog flea), *Ctenocephalides felis* (the cat flea) and *Tunga penetrans* and an incidental host of several species parasitic on other animals. The salivary secretions of the flea, cause no reaction in some but others may develop a raised, pink, slightly oedematous lesion. Sensitive individuals may have more extensive inflammation or a popular rash, which is very itchy.

Vectors of disease

Fleas are medically important mainly because they transmit plague and endemic typhus. They may also act as intermediate hosts of animal parasites.

Plague: Humans usually get plague (caused by *Yersina pests*) from the fleas the transmit the infection from rat to rat. On the death of the rat near human habitations, the infected fleas seek new hosts, either humans or other rats.

Xenopsylla cheopis is the most important and efficient vector. It is readily infected, remains infectious for a long time and has a wide distribution. *Pulex irritans* is a plague vector in the Chile. *Yersina pestis* may be transferred from flea to person by (i) infected mouth parts, (ii) the regurgitation of organisms that have multiplied in the gut, particularly if the proventriculus has been blocked and (iii) rarely by the contamination of the wound with faeces. Most successful transmissions are from blocked fleas, which are persistent in their efforts to feed.

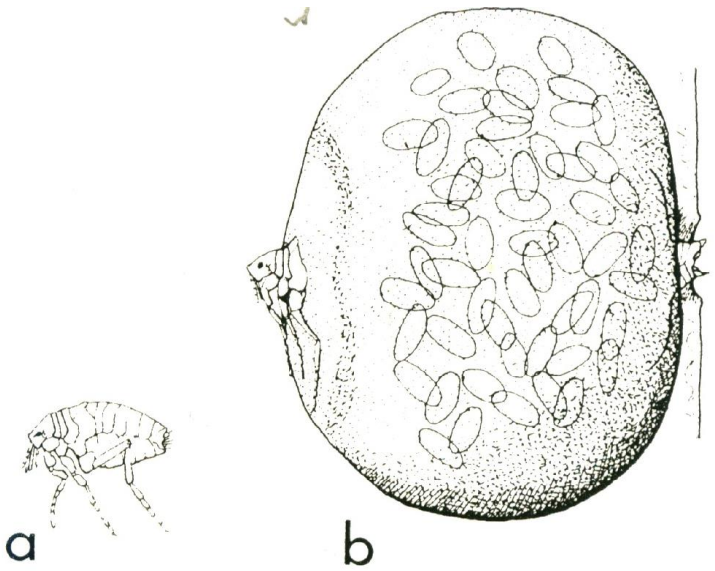
Plague has not been reported in Sri Lanka since the 1930s.

Typhus: Endemic (murine) typhus, caused by *Rickettsia typhi* is also transmitted by fleas, from rat to rat, or from rat to man. *Xenopsylla cheopis* is a common vector. The organism is excreted in the faeces and infection occurs when contaminated faeces or a crushed flea are rubbed into bite wound, or an abrasion.

Fleas may also act as intermediate hosts for the dog tapeworm *Dipylidium caninum*, and the rat tapeworm *Hymenolepis diminuta*. Both tapeworms are accidental parasites of man. Acquired by accidental ingestion of infected fleas.

Tunga penetrans

Tunga penetrans (also known as chigoe flea, jigger, nigua or sand flea) is a parasite of humans, pigs and dogs in tropical America and parts of Africa, Middle East and India. It has not been reported in Sri Lanka. It is differentiated from other fleas by its small size (1 mm) and its shortened thorax. In addition to sucking blood, the fertilized female flea burrows into the skin of the host to deposit its eggs. Humans are infested by contact with soil or sand infested with immature fleas. The burrow is usually located about the toes, soles of the feet, fingernails or interdigital spaces. As the flea feeds on tissue fluid and blood, it burrows deeper, enlarges into a ball shape and expels eggs to the outside.



Adult of *Tunga penetrans* **(a).** Non- gravid (immature) female flea; **(b).** Gravid female with enormously swollen abdomen full of eggs, embedded in skin of host. Tip of abdomen projects from host's skin to exterior.

The lesion first appears as a central black spot in a tense, pale area, and develops into a festering, painful sore. Secondary bacterial infection may produce an extensive, painful ulcer, which may cripple the host. The burrowing *Tunga penetrans* may be removed surgically. Infection may be prevented by using a spray repellant, or dusting the shoes with 10% DDT.

Control:

Environmental control of fleas consists of spraying rat runways, harborage areas, floors and other areas with an insecticide. Before an anti-rat campaign is started, the environment should be thoroughly sprayed to kill all fleas. Otherwise, as the rats die and the fleas seek new hosts, humans become their targets, thus increasing the chances of spread of disease. Dogs and cats may be dusted with an insecticidal powder, but it must be done with care in cats, because they lick themselves frequently. Their sleeping areas should also be dusted or sprayed.