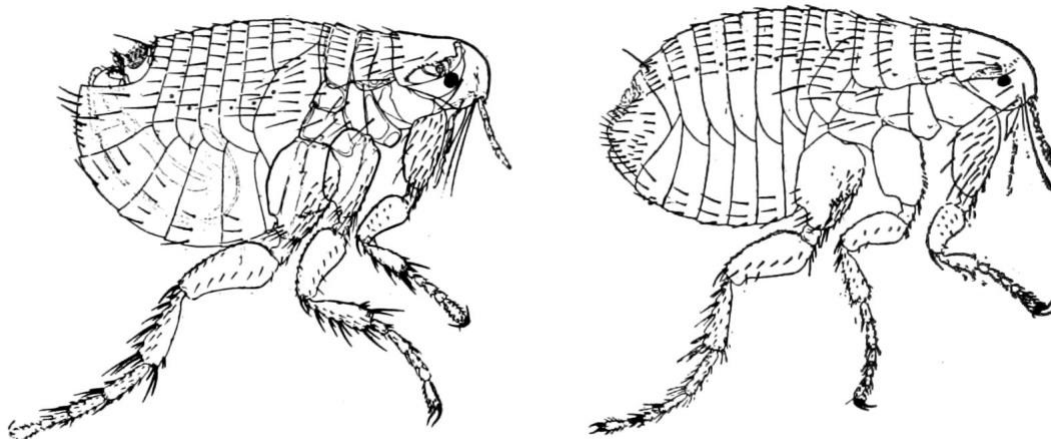


## Oriental Rat Flea (*Xenopsylla cheopis*)

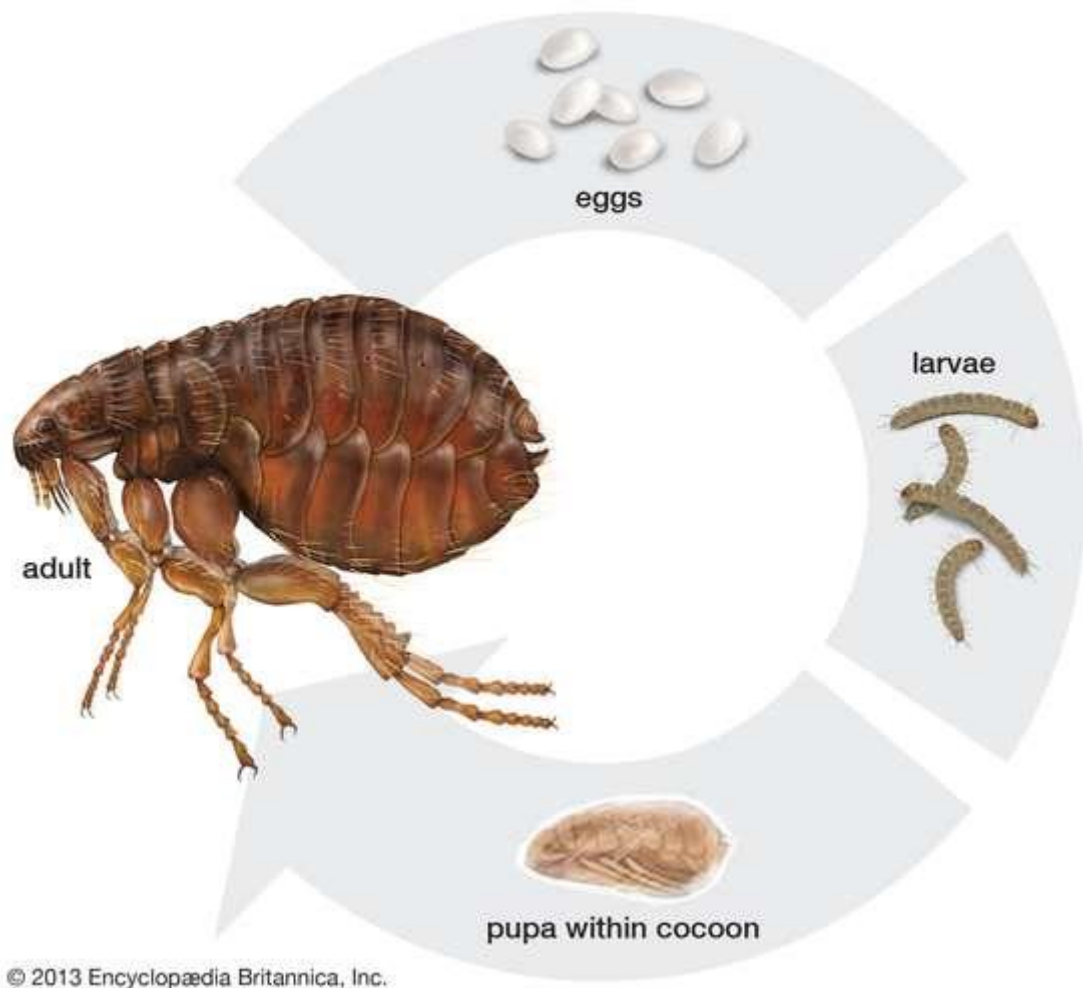
This flea is the principal vector of the causative agents of plague and murine typhus in many tropical and subtropical parts of the world. Some other species of *Xenopsylla* also are vectors of plague bacilli. Although it is most common on domestic rats, it also will feed on humans, dogs, cats, the house mouse, chickens, and other hosts, especially if rats become scarce. Like the human flea, adults of *Xenopsylla cheopis* lack both a pronotal and a genal ctenidium (Fig. 10.11), but the head and eyes are smaller in proportion to the rest of the body in *X. cheopis*.

### Body structure

1. It is commonly known as rat flea, and is common in tropics.
2. It is an ectoparasite on rats and other such mammals and acts as disease vector for plague.
3. Body is laterally compressed and maybe divided into head thorax and abdomen, which may not be demarcated clearly.
4. The head bears a small 3 to 4 jointed antennae a pair of simple eyes and piercing & sucking or siphoning mouthparts.
5. Thorax bears three pairs of long, jointed and clawed legs for hopping but no wings.
6. Abdomen is swollen in middle and has 8 segments and a pair of anal styles.
7. The Oriental rat flea has no genal or pronotal combs. The head and the thorax have rows of bristles (called combs), and the abdomen consists of eight visible segments.



*Xenopsylla cheopis*, the oriental rat flea; male, left; female, right.



## flea life cycle

Fleas, like other holometabolous insects, have a four-part life cycle consisting of eggs, larvae, pupae, and adults. Eggs are shed by the female in the environment. Eggs hatch into larvae in about 3-4 days and feed on organic debris in the environment. The number of larval instars varies among the species. A larva that looks very similar to a worm and is about two millimeters long. It only has a small body and a mouth part. At this stage, the flea does not drink blood; instead it eats dead skin cells, flea droppings, and other smaller parasites lying around them in the dust. Larvae eventually form pupae, which are in cocoons that are often covered with debris from the environment (sand, pebbles, etc). The larval and pupal stages take about 3-4 weeks to complete. The flea remains a pupa from one week to six months changing in a process called **metamorphosis**. When the flea emerges, it begins the final cycle, called the adult stage. A flea can now suck blood from host and mate with other fleas. A single female flea can mate once and lay eggs every day with up to 50 eggs per day.

Experimentally, it has been shown that the fleas flourish in dry climatic conditions with temperatures of 20–25 °C (68–77 °F).<sup>[2]</sup> They can live up to a year and can stay in the cocoon stage for up to a year if the conditions are not favourable.

## Importance

Infestation by fleas may cause severe inflammation of the skin and intense itching. Although many animals acquire partial immunity after constant or repeated attacks, individuals (especially humans) can occasionally become sensitized after exposure and develop allergies. Certain fleas that feed primarily on rodents or birds sometimes attack people, particularly in the absence of their usual host. When rats are dying of bubonic plague, their hungry fleas, themselves infected with plague bacilli and seeking food elsewhere, can transmit the disease to humans, especially in buildings heavily infested with rats. The Oriental rat flea (*Xenopsylla cheopis*) is the most efficient carrier of plague, but other species of fleas (e.g., *Nosopsyllus fasciatus*, *Xenopsylla brasiliensis*, *Pulex irritans*) can also transmit the disease to people. Although there are occasional cases of plague in tropical and some temperate regions, the disease in humans can be controlled by early diagnosis and antibiotics. Plague (sylvatic plague) is a widespread disease in hundreds of species of wild rodents throughout the world and is maintained in those populations by fleas that parasitize these animals. More than 100 species of fleas are known to be able to be infected by the plague bacillus, and an additional 10 species are implicated as carriers of the classic type of urban plague.

Fleas, particularly *Xenopsylla cheopis*, are thought to be the principal carriers of murine (endemic) typhus, a rickettsial disease of humans. As in plague, rats and mice are the sources of infection. Fleas are considered important in the maintenance and spread of many locally restricted infections among rodents and other mammals, including tularemia and Russian spring-summer encephalitis. Fleas transmit myxomatosis, a viral disease of rabbits, which is used deliberately to control rabbits in areas where they are severe pests (e.g., in Australia). Fleas are probable carriers of a filarial worm of dogs and serve as the intermediate host of a common tapeworm (*Dipylidium caninum*) of dogs and cats and occasionally children. If heavily infested, animals can suffer severe damage or be killed by the effects of flea bites and the resultant loss of blood. Fleas are subject to parasitism by external mites, internal nematode worms, and bacterial, fungal, and protozoan infections.

### Diseases transmission

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This species can act as a vector for plague, *Yersinia pestis*, *Rickettsia typhi* and also act as a host for the tapeworms *Hymenolepis diminuta* and *Hymenolepis nana*. Diseases can be transmitted from one generation of fleas to the next through the eggs.<sup>1</sup>

### Flea control measures

- **Insecticides**
  - DDT is the most commonly used insecticide against rat fleas
  - It is sprayed as powder form in areas frequented by rats and their burrows
  - Spraying should be done on the floor and on the walls up to a height of 1 foot
  - The DDT powder gets adhered to the fur coat of rats and kill the fleas
  - In areas where plague is endemic, fleas have acquired resistance to DDT and BHC
  - In these areas, malathion or carbaryl can be used
  - Other host animals like cats and dogs and their premises should also be treated with insecticide dusts or sprays

- **Repellants**
  - Diethyl toluamide is a good flea repellent
  - Clothes treated with it repel fleas up to 1 week
  - Benzyl benzoate can also be used as repellent
- **Rodent control measures**
  - Rodent control measures should be used along with flea control measures to get maximum benefit