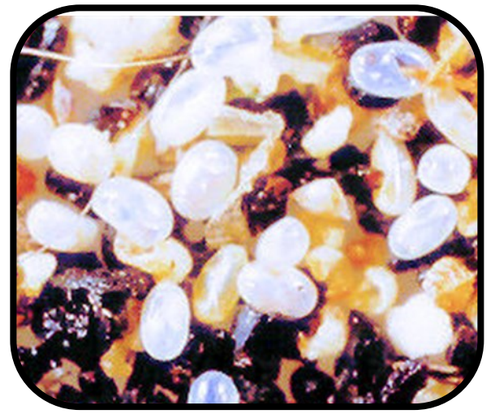
Life cycle of the cat flea *Ctenocephalides felis* in the domestic setting

The cat flea ***Ctenocephalides felis*** is the most clinically important arthropod of cats and dogs worldwide: the blood sucking activity of this common ectoparasite produces a range of effects from minor irritation to a severe allergic dermatitis. Many flea species coexist with wild animals that occupy discrete nests and bedding but the cat flea has taken this further by adapting to the modern domestic dwelling with pet cats and dogs where it will readily complete the life cycle. The life cycle stages comprise adults which usually remain on the animal and the environmental stages of eggs, larvae and cocoons, all of which can usually be found in areas of the home where infested pet animals rest. The life cycle duration is highly temperature-dependent. Other less common species of flea, including the dog flea *C. canis* are regularly found on pets.

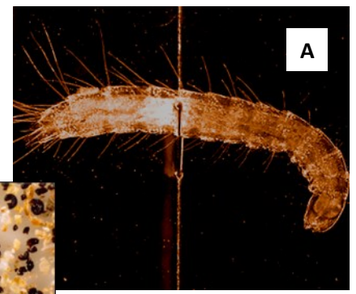
1. Adult female and male cat fleas (1.5-4.0mm) have an unmistakable appearance being glossy brown and flattened laterally, enabling rapid movement through fur and feathers. The powerful back legs are for jumping in response to host cues such as warmth and host carbon dioxide and once on an animal they will immediately start to take frequent blood meals.

PUBLIC HEALTH IMPORTANCE/ALLERGIC REACTIONS

Cat fleas are competent vectors for a wide range of pathogens, many of which are zoonotic such as *Rickettsia felis* (the cause of Flea-borne spotted fever or Cat flea typhus) and *Bartonella henselae*. The latter causes Human cat scratch fever contracted by handling animals infested with fleas; animal owners and veterinarians are at particular risk. Domestic cats are considered to be the natural reservoir for *Bartonella.* Cat fleas will readily bite people, often on the lower limbs, causing an intense irritation. Some cats and dogs are susceptible to Flea Allergic Dermatitis (FAD) which in dogs is a severe reaction to flea saliva and is characterised by intense pruritus, hair loss, excessive licking and lesions with crusting; in cats there is often a miliary dermatitis.

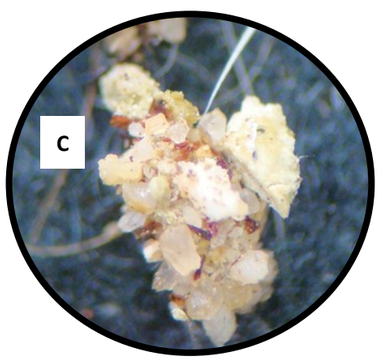


2. The female flea starts to lay eggs 1-2 days after the first blood meal; many pearly white oval eggs (0.5mm) are deposited in the coat every day but unlike louse eggs, flea eggs roll off the animal onto the ground where they accumulate in carpets and animal bedding.



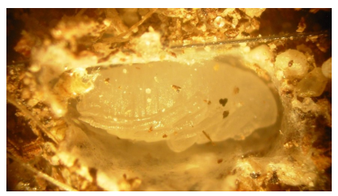
3. Eggs start to hatch in 1-5 days depending on the conditions. The first stage larva is approx. 2mm long, and feeds on skin scales and organic debris. Feeding continues and two moults occur as the larva reaches the final mature stage at which point it is approx. 5mm in size. (Image A), which takes 1-7 weeks. The larvae are covered with bristles and are somewhat mobile, looping like caterpillars but they avoid light and stay hidden deep in the carpet, under rugs and other areas.

A major source of nutrition for developing flea larvae is dried blood excreted in the faeces by the adult fleas and which has fallen off the animal (B). Some excess blood also stays on the coat, known as flea dirt, and can be used to diagnose flea infestations as it turns bright red when dabbed with wet tissue.



4. Eventually the third instar larva stops feeding and empties its gut, becoming quiescent before spinning a sticky silk-covered cocoon (C). The stickiness attracts small pieces of grit and particles from the environment; this adhered covering is an important life cycle factor, affording the developing adult flea

5. Metamorphosis to the newly formed adult flea inside the cocoon may take a week or more, the precise period being highly variable. Even then, the new adult within does not necessarily emerge immediately: Indeed a waiting period of several months may occur if temperatures and conditions are sub optimal. Once emerged, the fleas can survive long periods without a blood meal.



6. The time taken for an egg to become a mature adult within a cocoon is typically 3-4 weeks in the summer but this period depends very much on ambient temperature and humidity. Dogs and cats typically acquire fleas which have just emerged from cocoons. Infestations resulting from fleas moving between animals is a minor route of 'transmission'.

File:Ctenocephalides felis. cocon et nymphe..JPG - Wikimedia Commons , Cat and dog image: Wikimedia Commons