

INSIDE
THIS
ISSUE

Ectoparasites of Rodents

Ceratopogonids

Ectoparasites of Rodents

Ectoparasite refers to the parasites that live on the body surface of an organism. Ectoparasites on rodent are very often overlooked because of their size. However, their ability to carry disease causing

agents poses many risks to humans. Typical disease vectors that are parasitic to rodents include fleas, mites and ticks.

Flea is small wingless and blood-feeding insect with a laterally compressed body

which avails themselves to hide among hosts' hairs. Adult fleas are about 1 to 4 mm long and have a pair of well-developed hind legs for jumping. The common species found on rodents is Oriental Rat Flea, which is an important vector of plague. The most well-known outbreak of plague, the Black Death, caused millions of death in Asia and Europe in 14th century. Flea usually feeds around human's legs and ankles, leaving a spot surrounded by a red halo. Flea's bites can trigger off severe itching and allergic reactions to sensitive population.

Mites and ticks have frequently been mistaken as insect. They are



A chigger mite

Source: Bruce Martin www.gifrusimage.com

actually arthropod belonging to Class Arachnida. They are primarily external parasites of mammals and birds feeding on blood, but they will also feed on humans. Mites, unlike ticks which can be observed with naked eyes, are hardly recognized without a microscope. Despite their tiny sizes, their bites or excreta could infect humans with arthropod-borne diseases. Chigger mites are the vector of scrub typhus that usually contracted by hikers. They spend most of the time living in moist soil or living on hosts.

Ticks are the vectors of various human diseases including spotted fever, which brown dog tick is the important vector. Tick size is varied from species, but engorged tick can increase its body size up to a hundred times after a full blood meal. They are usually found on tall grass and shrubs, waiting for passing hosts to attach on. Their mouths have barbs angled back allowing them to anchor firmly on host while feeding. Improper removal of anchored ticks may increase the chance of contracting diseases.



A male brown dog tick

Source: James Gathany US CDC PHIL

These small animals are inactive in searching for host. They could come to the bodies of humans or pets accidentally who walk in scrubby areas or have been in close contact with the natural hosts of these pests. We can protect ourselves from these pests by wearing long-sleeve clothes and spraying with insect repellents. In addition, avoid coming into contact with their natural hosts can also effectively reduce the chance of becoming their accidental hosts. More information on their prevention can be obtained from other pages of our websites.

Ceratopogonids

Ceratopogonids are tiny flying insects commonly known as biting midges. There are around 6000 known Ceratopogonidae species belonging to 124 genera globally. In Hong Kong, biting-midges are among the most frequently encountered biting insects. They cause nuisance to human beings from rural to urban environments. A territory-wide survey conducted in 2006 by the FEHD revealed that there are at least 57 species in 10 genera of Ceratopogonid in Hong Kong.

Both sexes of adult biting midges feed on nectar. Many of them, especially those small hairy species, are important pollinators in nature. In some countries, Ceratopogonids are crucial for pollination of commercial crops. There are also some predatory Ceratopogonidae species, which are important in controlling the population sizes of different kinds of insects, including biting midges themselves. Although

biting-midges are not considered as important vector of human diseases, they do transmit a variety of livestock diseases.

Biting midges undergo complete morphogenesis. Its life cycle consists of the four stages egg, larva, pupa and adult. Under favorable environmental conditions, the cycle takes about 25 days to complete. Ceratopogonids can breed in diversified habitats and geographic locations. Their habitats could be aquatic or semi-aquatic, fresh water or sea water, and coastal or inland environments. Sites rich in decaying organic matters are particularly attractive to ceratopogonids. The abundance of suitable breeding places makes biting midges one of the most difficult-to-control pests in the world.

The flying ranges of biting midges are short and hence adults usually stay close to their breeding places. Location where biting occurs usually suggests a breeding place is present nearby. Activity of adult biting midges would be greatly reduced by strong wind and dry weather may shorten their lifespan.



Fig. 1 *Culicoides* Hairs and patterns of dark and white spots can be seen on wings of *Culicoides*. These patterns are important for identifying *Culicoides* species. The red abdomen of this specimen was the result of blood meal.

Fig. 2 *Lasiohelea* Wings of *Lasiohelea* are covered by hairs but without dark-white pattern.



Fig. 3 *Leptoconops* Dark-white spots and hairs are absent on wings of *Leptoconops*. Veins are also not apparent. The elongated cerci at end of female abdomen are common in *Leptoconops*.

Biting midges have a wide range of hosts for obtaining blood meals, including mammals, birds, reptiles, amphibians and even insects. Those attacking human mainly belong to 3 genera, namely *Culicoides*, *Lasiohelea* and *Leptoconops*. Members of all these genera had been found in Hong Kong. Similar to mosquitoes, female adults of biting-midges obtain blood meals to seek proteins required for egg production. Peak biting time varies from species to species. *Culicoides* is most active in mating and biting after dusk, and *Lasiohelea* and *Leptoconops* are more active in daytime. Although both are day-biters, *Lasiohelea* bites more frequently during the period with highest temperature while *Leptoconops* prefers cooler hours.

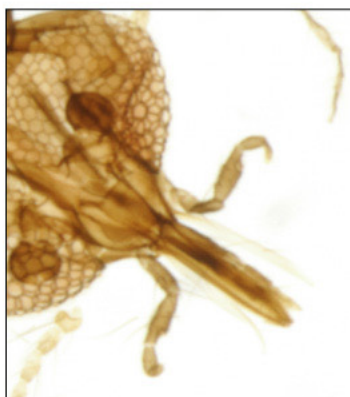


Fig. 4 Mouthparts The piercing mouthparts of biting midges are short. Bite can be prevented effectively with long-sleeved clothing.

To control biting midges, one can apply knock down insecticide spray to reduce the number of adults. Slow-releasing granule or powder insecticides including organophosphate and pyrethroids are suitable for treating their breeding places. B.t.i., commonly used in controlling larval mosquito, is not effective in killing biting midges larvae. Trimming of vegetation, exposing the soil to direct sunlight, removing stagnant water and reducing decaying vegetation on soil can reduce the breeding of biting midges. To prevent midges bites, individuals could wear long-sleeved clothing and apply insect repellent.