

ORIGINAL ARTICLE

CAT FLEA OUTBREAK IN KUCHING DISTRICT, SARAWAK

Lau SM¹, Jamail M¹, Sarina S², Bahtiar¹ R & Asmad M³

¹ Division Health Office, Kuching Division, Jalan Tun Ahmad Zaidi Adruce, 92350 Kuching, Sarawak.

² Medical and Health Science Faculty, University Sarawak Malaysia, Lot 77, KTL D, 22 Section, Tun Ahmad Zaidi Adruce Road, 93150 Kuching.

³ Sarawak State Health Department, Tun Abang Haji Openg Road, 93590 Kuching, Sarawak.

ABSTRACT

Cat fleas were reported to attack human in RPR Batu Kawa, a housing area about 3 km from Kuching town, resulting in an outbreak. A total of 19 people (10 adults and 9 children) were attacked by fleas. They presented with red spots, slightly raised (swollen) and irritation of skin, mostly found on the ankles and legs. The first 4 cases were reported on 29 September 2007 and the last case was on 17 November 2007. The remaining 12 cases which represent the majority of cases reported on 4th October 2007. The study conducted based mainly on field investigation and flea sampling from animals on field at that moment to find out the causes of the disease spread. Flea samples from human and cats were found to be *Ctenocephalides felis*; which is the most prevalent species in the world. However, no fleas were found on dog, rabbit and rat. This is the first reported case in Kuching; the study was carried out to determine the cause and the epidemiological pattern of the disease. This is important, because cat flea might attack human especially if house owners fail to monitor their pets and practice proper sanitation method to avoid the presence of cat flea larvae at home.

Key words: Cat flea, Kuching, *Ctenocephalides felis*, outbreak

INTRODUCTION

Fleas are wingless and flattened laterally insects which are classified in the phylum Arthropoda, class Insecta and order Siphonaptera. They are brown color and can readily jump. The adults of both sexes feed only on blood only blood and are all external parasites of mammals and birds. They have piercing and sucking mouthparts. Many species are host specific but may migrate to another host when necessary. Adult fleas can survive several months without food¹.

Fleas pass through a complete life cycle consisting of egg, larva, pupa and adult. Completion of the life cycle from egg to adult varies from two weeks to eight months depending on the temperature, humidity, food and species. Flea eggs are usually laid on dirt or in on the nest of the host. Flea may lay up to 600 eggs in lifetime. Eggs hatch in two days to two weeks into larvae stage; which found inside homes in floor cracks and crevices, on furniture or beds and in outdoor in sandy gravel soil where pet may rest or sleep⁷. Adult fleas not only can cause nuisance to human and pets, but can cause medical problems such as flea allergy dermatitis,

resulting in skin irritation caused by the flea salivary secretions that varies among individuals. Most bites usually occur at the ankles and legs^{1, 10}. It is uncommon that adult cat fleas can transfer from cat to human, but human can get bites when adult flea emerge from its pupal cocoon and jumps onto a person who walk in their vicinity which has very supportive environment for flea larvae's development².

This is the first reported outbreak related to cat flea in Kuching to briefly introduce RPR Batu Kawa here. Thus, this study was carried out to determine the outbreak epidemics, causes, and entomology in addition to preventive control measures and strategies.

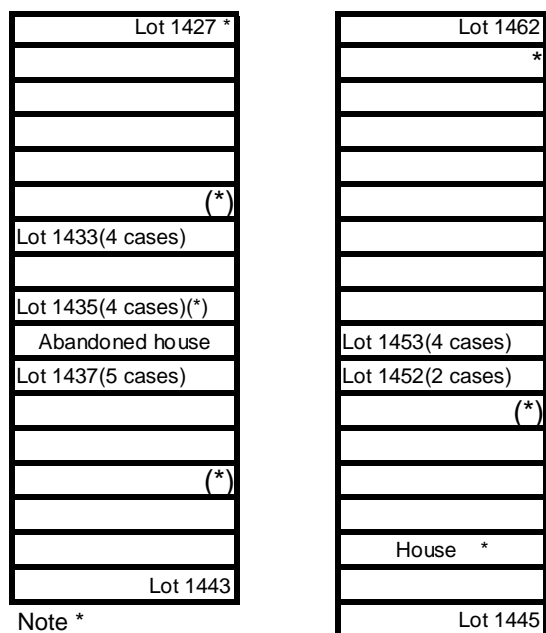
METHODOLOGY

The study was carried out to tackle the outbreak issue and the relevant associated factors. Fleas problem was reported from one lane in RPR Batu Kawa, consisting of 36 houses with total inhabitants of 157 people. All of them are Malays. It is located in a low cost housing area, with two rows of houses by a lane. Field

investigation was carried out from 7 to 8 November 2007. Cases were interviewed to verify the symptoms, subsequent environmental sanitation conducted, as well as a thorough inspection conducted on the suspected pets and pests.

RESULTS

It was found that two houses have inhabitants and another one house was abandoned with overgrown bushes and grass in front and backyard. There was some abandoned furniture in the abandoned house. The house was at the centre of the case houses. Location of the case houses and infected cat with fleas was shown in Figure 1.



Note *
 * - cat not examined
 (*) - cat infected with flea

Figure 1. Sketch map of one lane of RPR Batu Kawa

Chronological Events and Characteristics of Cases

Flea problem was expected to be started on 29 September 2007 when 2 persons from Lot 1452, 1 person from each of Lot 1453 and Lot 1435 were bitten, mainly on the leg. Fresh bite was manifested by small, hard, red and slightly-

raised (swollen) itchy spot with the appearance of a halo in the centre of each spot after a few days. Secondary infection occurred due to scratching (Plate 1). The patients received only some treatment by applying creams on the red spots.



Plate 1. Flea bite spot on leg (Central red spot surrounded by a red halo)

The case from Lot 1453 claimed that, it started from a wild female dog with its eight new born puppies which stayed at his house for 2 weeks started from 29 September 2007. Later on, they moved to the opposite house, which was an abandoned house; few days late they disappeared. Signs of old scars were also observed on their legs during the field investigation on 7 November 2007.

One week later, 13 more cases were detected, which included 3 cases from Lot 1453, 5 cases from Lot 1437, 3 cases from Lot 1433 and 2 cases from Lot 1435. The total numbers of cases then reduced to 2 cases only, reported from Lot 1433 on 5 November and Lot 1435 on 7 November. About 18 cases (94.7%) were bitten on the legs, the rest were on different parts of their bodies (4 cases) and hands (2 cases). A total of ten adults and 9 children were infected with the age range from 6 to 59 years old, 7 (36.8%) of them were students. In regards to case distribution by gender, there were almost equal numbers of cases; 11 male and 9 female were bitten. Epidemic curve (bar chart) is shown in Figure 2.

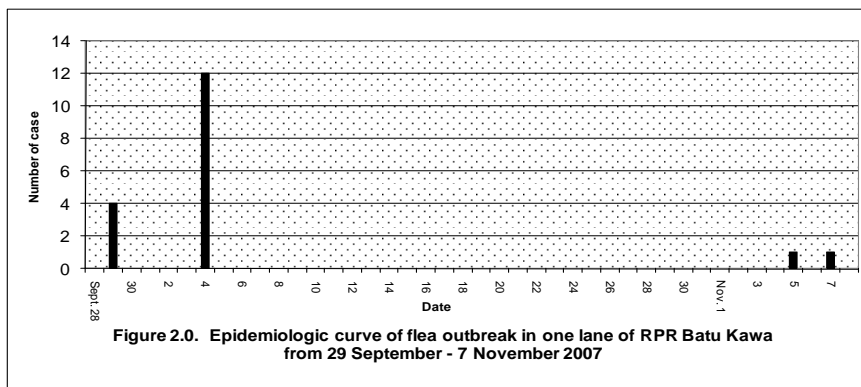


Figure 2. Epidemiologic curve of flea outbreak in one lane of RPR Batu Kawa

Results of environmental and entomological survey

Environmental / Site Survey

Fleas were screened and noticed to be present in the house (over the floor), on plant and human body. It was easily detected during sunset time. It was found that four houses without cat rearing had flea bites cases, may be due to the presence of wild cat in their houses or while the patients visiting other cases' house with infested cats.

Human Samples

Three fleas were recovered on the spot from human within half an hour. Under microscope examination (40 X), it was confirmed as *Ctenocephalides felis*, a cat flea. It shows the characteristics of genal and pronotal comb with its frons elongated and pointed anteriorly, and one hind tibia shown to have one short stout bristle between postmedian bristle and apical long bristles (Plate 2)³.



Plate 2. Cat flea, female *Ctenocephalides felis* (40 X)

Animal Samples

Flea survey on animals was then carried out on 8 November 2007. All 36 houses were surveyed. A total of 16 cats, 1 dog, 2 birds, 1 rat and 1 rabbit were found. However, only 8 cats (50% cats) were checked, while others were unavailable because the houses were locked, cats ran away or became aggressive. Samples were randomly collected from the cats using flea comb. All examined cats were positive for flea infestation. Severe infestation was observed in 2 cats from the cases' house (Lot 1435) (Plate 3). Other infected cats were from Lot 1432, Lot 1440 and 1451.



Plate 3. Heavily flea infested cat

About 9 fleas from animal samples were examined under a microscope (40 X) and were confirmed to be the same species as the 3 species found on human body (*Ctenocephalides felis*), 8 (88.9%) of cat fleas were female and 1 (11.1%) was male. However, no fleas were isolated from the dog, rabbit and rat.

Control Measures

Immediate control measures were carried out from 8 November 2007 to 12 November 2007. Chemical control such as thermal fogging using pyrethroid permethrin and residual spray using insecticide deltamethrin were carried out both indoor and outdoor, focusing on flea "hot-spot" areas. About 16 premises (44.0%) were completely sprayed, 17 premises (47.0%) partially sprayed with a dose of 23 mg deltamethrin per meter. Health education and notices were given from door to door to increase local people awareness on house sanitation. Advices were given on pet treatment, soaking of clothes in hot water before washing, exposing mattresses under sunlight and to clear the bushes. Follow up after 2 weeks showed no more cases of flea bites.

DISCUSSION

There were numerous fleas found on cats and human and surrounding places. *Ctenocephalides felis* found to be the most prevalent species and is capable of infesting and feeding on the blood of a range of domesticated animals such as chicken, squirrels, rabbits, dogs, rat, and mice in addition to humans^{2,5}. Humans are most commonly bitten by the cat flea, *Ctenocephalides felis*¹. In this outbreak, about 92.3% of cases were bitten on leg. Cat flea bites tend to be concentrated on legs but can also occur on other parts of the body^{4,8}. Mass flea outbreak in Southern Mediterranean shore of Israel showed that the bite mainly concentrated on the legs of adults, whereas in children they were frequently found on the arms, thorax and neck area⁹. However, studies done in Uganda showed that cat fleas (*Ctenocephalides felis*) readily bite rats and humans and could serve as secondary vectors for *Yersinia pestis* transmission to cause human plague⁶.

Transfer of cat fleas from infested pets to pet owners appears to be uncommon. It happens when the home environment is supporting the development of flea larvae, which can be a continuous source of adult fleas which then infest cats. Thus, pet owners can contribute to the development of cat fleas by failing to monitor their pets and to practice sanitation methods; such as keeping pets sleeping area clean². Adult fleas make up only a minor portion of the total flea population in an infested area, where bulk of indoor flea populations are made up of pupae (10%), larvae (35%) and eggs (50%)⁷. Most houses in the area were found to be

suitable places for flea breeding, especially Lot 1435 which showed to be a suitable place for fleas to develop and hide in carpet, furniture and cats.

Experience of cat flea outbreak control in Mississippi showed that flea can be eradicated by eliminating entry of cats and using residual insecticides⁴. Effective control of flea outbreak in Southern Mediterranean shore of Israel was to eliminate flea from the pets, home and the yard. Most of the symptoms of infestation disappeared 1 - 2 weeks after the first treatment with insecticides. A thorough investigation including environmental inspection is necessary for the discovery of the etiology of household popular urticaria. Only eradication of the parasite from the immediate environment of the patients can prevent re-infestation and the reappearance of clinical symptoms⁹.

This study was based on the cases report and the field investigation; however, the limitation of the study is to know the actual spread distance of the human infestation and to get larger sample size for cats and any other animals to test its actual pest infestation coverage.

CONCLUSION

Flea problem in one lane of RPR Batu Kawa housing area that involved 10 adults and 9 children was confirmed to be caused by cat flea (*Ctenocephalides felis*). There were 5 premises involved with a total of 19 people infected. A total of 8 cats were found to be positives for cat flea. Non fleas were found on dogs, rabbits or rats. Immediate actions taken were thermal fogging with permethrin and residual spraying with deltamethrin, health education and notices were issued. Follow up after 2 weeks showed no more cases of flea problem. Cat flea problem not only need the treatment of infested pets, but also a thorough treatment of all areas with flea breeding sites.

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