

# CURRENT PUBLIC HEALTH STATUS OF SOME FOOD-BORNE PARASITIC ZOOSES IN MALAYSIA

K Inder Singh

Division of Medical Ecology, Institute for Medical Research, Kuala Lumpur, Malaysia.

**Abstract.** The current public health status in Malaysia of some of the food-borne parasitic zoonoses, such as angiostrongyliasis, trichinellosis, toxoplasmosis, sarcocystosis, and other food-borne zoonoses, such as pentastomiasis, is presented.

## Angiostrongyliasis

In Malaysia, angiostrongyliasis was first reported in the house rats, *Rattus rattus diardii* (Jentick) and *R. exulans* (Peale) by Sachacher and Cheong (1929). The parasite was first described as *Angiostrongylus cantonensis*. Differences were later found among three geographical taxa and the Malaysian parasite was described as *A. malaysiensis* by Bhaibulaya and Cross (1971).

In Malaysia, six human cases of eosinophilic meningoencephalitis have been reported. The first five cases were reported from Sarawak (Watts, 1969) and the sixth case was reported in Kuala Lumpur (Bisseru *et al*, 1972). Although there has been no further report of human cases, accidental infection by the parasite because of consumption of freshwater snails and contaminated fresh vegetables or water is always possible.

*A. malaysiensis* is found throughout Malaysia, both in commensal and feral rats, *R.r. diardii*, *R. norvegicus*, *R. tiomanicus*, *R. argentiventer*, *R. exulans*, *R. bowersii*, and *Sundamys muelleri* (Lim *et al*, 1965, 1976; Lim, 1967). Commensal rats play an important role in the propagation of parasites, compared to forest rats. The rate of infection in these hosts is associated with different ecological habitats. The intermediate hosts of the parasite are the land slugs, *Microparmarion malayanus*, *Laevicaulis alte*, *Girasia peguensis*, and *Lamperula* sp.; land snails, *Macrochlamys resplendens*, *Achatina fulica*, *Ouantala striata*, *Subulina octona*, *Bradybaena similaris*; and the aquatic snails *Pila scutata*, *Bellamyia ingallsiana*, *Indoplanorbis exustus*, and *Lymnaea rebiginosa* (Lim and Rama-

chandran, 1979).

The degree of susceptibility of the molluscan host to *A. malaysiensis* varies with the host species. Infection rates in these intermediate hosts were found to be related to those of the principal definitive hosts of this parasite.

Among these intermediate hosts, one aquatic snail, *Pila scutata*, is of potential importance in the transmission of the disease in man. Lim *et al* (1978) studied the consumption of *P. scutata* by local human populations in Malaysia and found that among the three ethnic groups, Malays, Chinese and Indians, the Chinese are the principal consumers of this snail. *P. scutata* which is consumed as food and for medicinal purposes is the only molluscan intermediate host that can be considered as a potential source of human infection in Malaysia. Heyneman and Lim (1967), demonstrated that fresh vegetables, particularly lettuce, may also be involved in the transmission of the parasite to man. Human infection with the parasite most likely results from accidental ingestion of raw or improperly cooked food, including water harboring or contaminated with infective third-stage larvae of the parasite.

An enzyme-linked immunosorbent assay (ELISA) for the detection of antibody to *A. malaysiensis* has been established. Approximately 20 sera from rats infected with *A. malaysiensis*, as well as other cestode and nematode infections have been tested. A good correlation between ELISA OD and infection was obtained, however, more sera from rats in endemic areas need to be tested and the assay needs to be converted to detect antibody to *A. malaysiensis* in humans.

### Trichinellosis

Since *Trichinella spiralis* has a wide distribution and has been reported in neighboring countries, studies were conducted to investigate the presence of *T. spiralis* in both wild and domestic animals in Peninsular Malaysia. Five hundred and thirty-six wild animals (rodents, cats and pigs) caught in different habitats were examined. The diaphragm, tongue, cheek portions, neck, breast, and leg muscles were examined for trichinae. The compression and digestion techniques were used. In the compression method, the whole of the diaphragm and portions of the lung (5 samples of 1 g each) were teased apart, cleared in 2% acetic acid, mounted in a screw compressor, and examined under a dissecting microscope. This method was only used to examine tissues from small rodents. In the digestion method, about 5 g of muscle from different parts of the body of all the animals were minced and digested in 1% trypsin at 37°C for 2 hours, strained through a coarse sieve, sedimented and examined under a dissecting microscope (Singh *et al.*, 1984).

*Trichinella* infections were not found in any of the feral and wild rodents, wild cats or wild pigs, and so far trichinellosis has not been reported in Malaysia.

### Toxoplasmosis

*Toxoplasma gondii* is an intracellular protozoan which is widely distributed in nature and is capable of infecting all orders of mammals. However, only members of the cat family (*Felidae*) are capable of producing oocysts which, along with the tissue cyst, is the infective stage of the parasite.

In Malaysia, serological studies have shown that all types of domestic animals, e.g., cats, cattle, chicken, goats, pigs, sheep and rats tested were seropositive for *T. gondii* antibodies (Singh *et al.*, 1967; Tan and Zaman, 1973) indicating that these animals may play a role in the transmission by oocysts and contaminated meat. Humans can acquire the infection by accidental ingestion of oocysts from cat feces or by eating improperly cooked meat containing tissue cysts of infected animals.

In Malaysia, studies carried out on various

groups of the population showed the presence of specific antibodies in people of both sexes in all age groups of all the races. In a survey carried out in 1973, the prevalence rate of the disease was 13.9% (Tan and Zaman, 1973). Another survey carried out later in 1976 gave a prevalence rate of 23% (Tan *et al.*, 1976) and in pregnant women, it was 27.3% (Cheah *et al.*, 1975). Studies conducted recently gave a prevalence rate of 30.2% (Sinniah *et al.*, 1984).

Serologic studies have also shown that there is a close relationship between cats and prevalence of toxoplasmosis in various ethnic groups in Malaysia (Tan *et al.*, 1973; Cheah *et al.*, 1975). Malays has the highest rate of infection followed by Indians, Chinese and Orang Asli (Sinniah *et al.*, 1984). Among various age groups, the prevalence was highest among children below 10 years of age, indicating possible infection with oocysts from contaminated soil. The highest prevalence rate among Malays in all these studies is due to the large number of domestic cats kept by them and their close association with these animals. Although studies carried out by Zahedi *et al.* (1985) showed a positive correlation between cat ownership and seropositivity to toxoplasmosis, the authors suggest that the ingestion of oocysts from an environment contaminated with cat feces containing oocysts as the most important source of infection. Although pigs are known to have the highest *T. gondii* infection rate among domestic animals (Zaman *et al.*, 1967) and the Chinese consume more pork than any other meat, they usually cook their meat very thoroughly avoiding infection by this route.

There have been no deaths due to acquired toxoplasmosis in Malaysia. The absence of a significant number of confirmed cases, in spite of the high prevalence of *T. gondii* antibodies, indicates that toxoplasmosis is not an important cause of morbidity and mortality. Presently, studies are being carried out on the biology and immunology of *T. gondii*.

### Sarcocystosis

*Sarcocystis* is a coccidian parasite with a life cycle involving a herbivorous intermediate host and a carnivorous definitive host. Only six cases of muscular sarcocystosis have been reported in

Malaysia (Kutty and Dissanaiké, 1975; Kutty *et al.*, 1975; Prathap and Dissanaiké, 1976, 1978; Pathmanathan and Kan, 1981; Pathmanathan *et al.*, 1988). These were all incidental findings in muscle tissue sampled during the course of routine histopathological examination from autopsied or biopsied materials which were investigated for other reasons. None of the cases had manifested any clinical manifestations of the infection (Pathmanathan *et al.*, 1988).

*Sarcocystis* cysts have been reported in Malaysia from a wide variety of domestic and wild animals, such as house and field rats, *Rattus rattus diardii*, *R. exulans*, *R. tiomanicus*, *R. annandalei*; the bandicoot, *Bandicota indica* (Lai, 1977; Kan, 1979); the moonrat, *Echinosorex gymnurus* (Dissanaiké and Poopalachelvan, 1975); the slow loris, *Nycticebus coucang* (Zaman, 1970); the long-tailed macaque, *Macaca irus* (Prathap, 1973); and the water buffalo, *Bubalus bubalis* (Dissanaiké and Kan 1977a, b). The complete life cycles of most of the *Sarcocystis* spp. have not been studied, except for *S. fusiformis* and *S. levinei* from the buffalo which were shown to have a cat-buffalo and dog-buffalo life cycle. Human infections are most likely acquired by accidental ingestion of sporocysts shed by some carnivorous or predatory animals which would have acquired the infection by ingesting sarcocysts found in the herbivorous intermediate host.

#### Pentastomiasis

Human infestation by arthropods of the class Pentastomida are uncommon parasites of man, although several cases have been sporadically reported in recent years. The infection known as pentastomiasis is caused by the larval and nymphal stages of the parasite. Parasite adults are generally parasitic in the respiratory tract and lungs of vertebrates. Man is an accidental host and acquires the infection by the ingestion of inadequately cooked foods or from food contaminated with pentastomid eggs.

Infections with *Armillifer moniliformis* were found during autopsies conducted on ten adult Malaysian aborigines. The liver and the lungs and the viscera were most frequently infected. The patients were from tribes either living on the jungle fringe or in the deep jungle (Prathap *et al.*, 1969). The food of those tribes consists of a great

variety of insects (especially grubs), and vertebrates such as snakes, lizards, rodents, insectivores, carnivores, non-human primates and birds. The snakes are often definitive hosts, infected with pentastomid nymphs. Small animals are usually eaten raw but large animals, such as snakes and monkeys are skinned and at times inadequately cooked. The pentastome has also been reported from a Dayak and a European in Sabah (Rail, 1967).

The infection mechanism has not been documented but the food habits of the aborigines suggest probable methods. There are two main modes of infestation; one is with food or drink contaminated with parasite eggs excreted in nasal secretions of snakes and other carnivorous animals which harbor the adult in respiratory passages. Another source is contaminated meat which is not sufficiently cooked to kill the pentastomid eggs. Unwashed contaminated utensils used in the preparation of raw meat, may be responsible for transmitting eggs to other foods (Prathap *et al.*, 1969).

The study of infections in wild animals is valuable in understanding the endemic transmission of pentastomiasis. In Malaysia, nymphal stages of the parasite were found in a wide variety of animals, such as reptiles, lower primates, insectivores, carnivores (including the domestic cat), rodents and artiodactyles, a fruit-eating bat, and a meerkat; while adults were recovered from pythons and a colubrid snake (Krishnasamy *et al.*, 1981; Chooi *et al.*, 1982; Lim *et al.*, 1983; Krishnasamy *et al.*, 1984).

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## FOOD-BORNE ZONOSSES IN MALAYSIA

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