

Pentastomid infection in the house geckoes from Sarawak, Malaysia

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Introduction

THE HOUSE GECKOES or chichaks are the most familiar of our lizards. As their common name suggests, they are commensal of Man. There are some five species of house geckoes:— the Common House Gecko (*Hemidactylus frenatus*), the Flat-tailed Gecko (*Platyurus platyurus*), the Four-clawed Gecko (*Gehyra mutilata*), the Tokay (*Gecko gecko*), and the Spotted Gecko (*Gecko monarchus*). These house geckoes, particularly *Hemidactylus frenatus* and *Platyurus platyurus*, have been found to be infected with the pentastomid *Railietiella hemidactyli* (Lavoipierre and Lavoipierre, 1966). It has also been demonstrated that the coprophagous blattids (e.g. *Periplaneta americana* and *P. australasiae*) serve as intermediate hosts (Lavoipierre and Lavoipierre, 1965 & 1966; Lavoipierre and Rajamanickam, 1973; Rajamanickam and Lavoipierre, 1965). As house geckoes and cockroaches are common and closely associated with human dwellings their potential importance in public health cannot be overlooked. For instance, we do not know for certain whether these house geckoes carry any diseases that are transmissible to Man.

Materials and methods

Collection of house geckoes were made in three different localities in Kuching, Sarawak during April–May, 1964. Samples were taken from Chinese shop-houses in the centre of the city in Kuching, a Malay Kampong (Kampong Pangkalan Kuap), 12 miles south of Kuching, and a Dayak Long House, 22 miles south of Kuching.

A total of 990 individuals were examined. Each specimen was dissected and searched for pentastomids under a dissecting microscope. The parasites were preserved in 5% formalin, subsequently stained with Alum Carmine, and mounted with Hoyer's mounting medium.

Results

The proportions of the house geckoes naturally infected with *Railietiella hemidactyli* are summarised in Table I according to localities where these lizards were caught. Table 2 summarises the comparisons between any two localities for the prevalence of *R. hemidactyli* in a given species of house gecko. The proportions of infected *G. mutilata* and *G. monarchus* appear to be not significantly different for all three localities. With the exception of the village and long house samples for *P. platyurus*, the proportions of infected *H. frenatus* and *P. platyurus* are significantly different for different localities.

Table I. The proportion of house-geckoes naturally infected with pentastomid

	Kuching Town	Malay Village	Long House
<i>Hemidactylus frenatus</i>	55/100	15/100	29/100
<i>Platyurus platyurus</i>	68/100	28/100	17/100
<i>Gehyra mutilata</i>	21/100	11/100	12/100
<i>Gecko monarchus</i>	6/30	3/30	1/30

Table 2: 2 × 2 contingency-table and Fisher's Exact Test for the prevalence of pentastomid in four species of house geckoes from three different localities

	Town vs Village	Town vs Long House	Village vs Long House
<i>Hemidactylus frenatus</i>	X ² = 33.43 p < 0.001	X ² = 12.83 p < 0.001	X ² = 4.92 0.05 > p > 0.02
<i>Platyurus platyurus</i>	X ² = 30.47 p < 0.001	X ² = 51.15 p < 0.001	X ² = 2.87 0.1 > p > 0.05
<i>Gehyra mutilata</i>	X ² = 3.01 0.1 > p > 0.05	X ² = 2.32 0.2 > p > 0.1	X ² = 0.05 0.9 > p > 0.8
<i>Gecko monarchus</i>	p = 0.16	p = 0.05	p = 0.25

Table 3 summarises the comparisons of the prevalence of *R. hemidactyli* in different species of the house geckoes in a given locality. For the town, the proportions of infected *H. frenatus* is not significantly different from *P. platyurus*, that of *G. mutilata* not different from *G. monarchus*. For the village, there are no significant difference between the proportions of infected *H. frenatus*, *G. mutilata*, and *G. monarchus*. For the long house, the proportion of infected *P. platyurus* is not significantly different

from *H. frenatus*, and *G. mutilata* is not different from *G. monarchus*.

The number of pentastomids present in various species of house geckoes from the three localities is summarised in Table 4. The majority of the geckoes studied does not harboured more than 5 pentastomids per individual, the mean being around 2.

Table 3. A comparison of the proportions of various species of house geckoes in different localities naturally infected with pentastomids (2 × 2 contingency-table or Fisher's Exact Test on figures given in Table 1)

	Town	Village	Long House
1. <i>Hemidactylus frenatus</i> vs. <i>Platyurus platyurus</i>	X ² = 3.04 0.1 > p > 0.05	X ² = 4.27 0.05 > p > 0.03	X ² = 3.42 0.1 > p > 0.05
2. <i>H. frenatus</i> vs. <i>Gehyra mutilata</i>	X ² = 23.11 p < 0.001	X ² = 0.40 0.7 > p > 0.5	X ² = 7.85 0.01 > p > 0.001
3. <i>H. frenatus</i> vs. <i>Gecko monarchus</i>	X ² = 9.99 0.01 > p > 0.001	p = 0.20	p < 0.001
4. <i>P. platyurus</i> vs. <i>G. mutilata</i>	X ² = 42.84 p < 0.001	X ² = 9.16 0.1 > p > 0.001	X ² = 0.65 0.5 > p > 0.3
5. <i>P. platyurus</i> vs. <i>G. monarchus</i>	X ² = 19.77 p < 0.001	p = 0.02	p = 0.04
6. <i>G. mutilata</i> vs. <i>G. monarchus</i>	X ² = 0.02 0.9 > p > 0.8	p = 0.26	p = 0.12

Table 4. Pentastomids found in various species of house geckoes caught in three different localities

	No. of infected geckoes	No. of worms recovered		No. of infected geckoes	No. of worms recovered		No. of infected geckoes	No. of worms recovered	
		x ± SD	Range		x ± SD	Range		x ± SD	Range
<i>Hemidactylus frenatus</i>	55	3.83 ± 2.56	1-11	15	2.45 ± 1.43	1-5	29	2.34 ± 1.32	1-5
<i>Platyurus platyurus</i>	68	2.11 ± 1.28	1-6	28	1.75 ± 0.84	1-4	17	1.94 ± 1.24	1-5
<i>Gehyra mutilata</i>	21	1.52 ± 0.68	1-3	11	1.45 ± 0.70	1-3	12	1.66 ± 0.67	1-3
<i>Gecko monarchus</i>	6	2.5 ± 0.98	1-5	3	1.67 ± 1.45	1-3	1	1	1

Discussion

Of the house geckoes, *H. frenatus* and *P. platyurus*, are found in houses but each has its own niche in the house and seldom occur together. They feed on moths, flies and other insects attracted by light to the ceilings and walls of houses. *G. mutilata* lives in darker places of the house and is more often found on the walls and ceilings outside houses. Whether this is due to niche exclusion remains to be affirmed. *G. monarchus* is common but less abundant. This gecko is found in the stores and in dark corners of kitchen inside houses. Unlike the other three species it seldom comes out in the open. Although it feeds on insects, it has also been found to be cannibalistic, feeding on other smaller geckoes.

It is obvious from the present study that the overall natural infections with pentastomid in *H. frenatus* and *P. platyurus* were higher than that of *G. mutilata* and *G. monarchus*. However, the fact that the latter two species were found naturally infected indicates that they are also susceptible hosts of the parasite. Although not stated specifically, Lavoipierre and Lavoipierre (1966) also found that of the 31 infected geckoes out of a sample of 100 in Singapore, the majority were *H. frenatus* and *P. platyurus*.

It is also significant that high prevalence of the parasite was found in *H. frenatus* and *P. platyurus* from the shop houses among the Chinese community. Whereas, the incidence of natural infection was relatively low in geckoes among the Malay and Dayak communities (see Table 2). The high prevalence in the shop houses may be attributed to the presence of favourable intermediate insect hosts, particularly the cockroaches which are abundant in these shop houses probably because of available food and probably also due to poor sanitation in these places. There is also no control of the insects infesting these shop houses. In the Malay Kampong and Dayak Long House, being dwelling places, there is a certain amount of sanitation taken by residents in these places and also that insect control are checked periodically by the Health Authorities. It is expected that the density of insects in these latter places is being kept at a low level, and may thus support the finding of low prevalence of the parasite among the geckoes in these two localities.

In contrast to *H. frenatus* and *P. platyurus*, no statistically significant difference has been demonstrated in the prevalence of pentastomid in *G. mutilata* and *G. monarchus* from different localities (see Table 2). Nonetheless, it is obvious from the raw data (Table 1) that the proportions of infected

geckoes are relatively higher in the Kuching Town compared with the two rural habitats. Whether this may be due to the greater abundance of potential intermediate insect hosts in the town area, and hence a greater chance of being parasitized, remains to be confirmed. It has only so far been established that the blattids serve as intermediate hosts of *R. hemidactyli* (Rajamanickam and Lavoipierre, 1965). It is not known whether there are other coprophagous insects serving as intermediate hosts. Nonetheless good sanitation will help cut down the spread of this pentastomid.

The important question arising from the infestation of geckoes with pentastomid and the cockroaches serving as the intermediate hosts, is: Is man susceptible to the pentastomid *R. hemidactyli*? As geckoes and cockroaches are intimately associated with Man, there is every possibility of these animals contaminating his food and other supplies. Existing literature shows that Man and other non-human primates can become infected by pentastomids, although so far limited to the genera *Porocephalus*, *Armillifer* and *Linguatula* (Self and Cosgrove, 1972). In Peninsular Malaysia, the Orang Asli (Malayan aborigines) have been found to be infected with *Porocephalus* nymphs (Prathap, Lau and Bolton, 1969). 10 out of 22 consecutive autopsies on adult Orang Asli above 20 years of age were found to be infected. A further 8 autopsies on Orang Asli below 20 years of age were free of the pentastomid. This report indicates that possibly food habit and multiple exposures are responsible for pentastomid infection. Both males and females are equally susceptible to infection. Further, Orang Asli living in jungle-fringe habitats shows higher incidence of infection probably due to food habit and occurrence of other animals (such as reptiles) which are parasitized by pentastomids. As Man takes other living organisms for food and many animals are commensals, it may prove fruitful to carry out a more detailed investigation concerning the relationships of pentastomids with Man.

Summary

990 house geckoes, belonging to 4 species from 3 localities in Sarawak, East Malaysia, were examined for pentastomid infection. The proportions of infected *Gehyra mutilata* and *Gecko monarchus* appear to be not significantly different for all three localities. With the exception of the village and long house samples for *Platyurus platyurus*, the proportions of infected *Hemidactylus frenatus* and *P. platyurus* are significantly different for different localities. The overall natural infections with pentastomid in *H. frenatus* and *P. platyurus* are higher than that of *G. mutilata* and *G. monarchus*.

These findings are discussed with respect to public health. The occurrence of pentastomid infection in Man is also discussed.

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