

Helminthic Parasites of Scavenging Chickens (*Gallus domesticus*) from Villages in Penang Island, Malaysia

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Abstrak: Enam puluh ekor ayam pembangkai dari beberapa kampung di Pulau Pinang diperiksa mengenai status nutrisi atau keadaan tubuh serta parasit helminth. Kebanyakan daripadanya menunjukkan keadaan tubuh yang kurang memuaskan di mana 66.7% (ayam betina) dan 73.3% (ayam jantan) dimasukkan ke dalam kategori 'di bawah normal'. Sebanyak lapan spesies helminth berlainan diperolehi daripada trakea dan saluran gastro-usus. Empat daripada spesies tersebut adalah nematod dan selainnya adalah cestod, manakala tidak satu trematod pun diperolehi daripada ayam-ayam tersebut. Tanggungan purata cacing yang tertinggi direkodkan untuk cestod *Raillietina echinobothrida* manakala yang terendah ialah nematod, *Ascaridia galli*.

Kata kunci: Ayam Pembangkai, Status Nutrisi, Keadaan Badan, Parasit Helminth

Abstract: Sixty scavenging chickens from villages in Penang were examined for their state of nutrition or body condition and the presence of helminthic parasites. The majority of the chickens were of poor body condition. More than 66.7% (females) and 73.3% (males) belonged to the 'below normal' category of general body condition. A total of eight different helminth species were recovered from the trachea and the gastrointestinal tract of the various chickens. Four of the species were nematodes and the rest were cestodes. No trematodes were recovered from the chickens. The highest mean worm burden was recorded for the cestode *Raillietina echinobothrida* while the lowest was the nematode, *Ascaridia galli*.

Keywords: Scavenging Chickens, State of Nutrition, Body Condition, Helminthic Parasites

INTRODUCTION

In most rural villages of Malaysia, poultry are left to scavenge around housing compounds during the daytime to obtain whatever feed they may be able to find in the environment, often offal, insects or seeds. Owing to these free range and scavenging habits, traditional village poultry are in permanent contact with soil and insects (Pandey *et al.* 1992). Malaysian soils, especially when humid and warm, may serve as an important reservoir and transmission site for external larval stages of helminthes. Similarly, any insects that may act as vectors for helminths are also favoured by such climatic conditions.

Helminthic parasites of Malaysian poultry have been reported by many researchers (Lancaster 1957; Shanta 1962; Omar & Lim 1968; Shanta *et al.* 1971; Sinniah 1980; Krishnasamy *et al.* 1983; Sani *et al.* 1986; Lee *et al.* 1991;

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Amin-Babjee *et al.* 1997). However, most of these studies were confined to poultry from outside Penang Island. The only report on the prevalence of parasites in poultry from Penang Island was that of Khairul and Khamis (1978), but the poultry in the study were obtained from markets. The present paper reports on the prevalence of helminthic parasites in rural scavenging poultry in Penang Island. The prevalence of helminthic parasites in the different sexes was compared.

MATERIALS AND METHODS

The poultry population examined in the present study was comprised of flocks of scavenging animals obtained from various villages in the Balik Pulau, Sungai Nibong, Bayan Lepas and Jelutong regions.

To produce a rough estimate of the state of nutrition or body condition of each chicken, the volume of the pectoral musculature was physically examined. The volume was classified as below normal when the sternum was felt easily through the pectoral musculature, normal when the sternum was hardly felt, and above normal when the sternum was not felt at all.

Post-mortem examinations were performed according to Fowler (1990). After decapitation, the trachea was examined directly and the entire gastrointestinal tract, including the oesophagus, was collected from each animal and divided into four sections: oesophagus plus crop, proventriculus plus the gizzard, the small intestine and finally the caeca plus the rectum and cloaca.

Each section was opened longitudinally and the contents were carefully washed through a 100 µm sieve. The mucosa was scraped in order to collect the helminthes embedded in the mucosa layer. In addition, the keratinized layer of the gizzard was peeled off in order to look for nematodes. The crop was also examined. Finally, the contents were examined under a dissecting microscope and all helminths were counted before being stored in 70% ethanol. For further identification, the helminths were cleared in lactic acid and examined under a light microscope. All parasites were identified using the helminthological keys of Chabaud (1978), Soulsby (1982) and Khalil *et al.* (1994).

RESULTS

A high percentage of the chickens in the present study were generally of poor body condition, whereby only 16.6% and 10.0% of the male and female chickens respectively had above normal pectoral musculature (Table 1). The majority were of poor body condition, with more than 66.7% (females) and 73.3% (males) assigned to the 'below normal' category.

Table 1: State of nutrition or body condition of each adult chicken based on physical examination of the pectoral musculature.

	Below normal	Normal	Above normal
Male chicken (%)	73.3	16.7	10.0
Female chicken (%)	66.7	16.6	16.6

In total, 30 male and 30 female adult chickens were examined. A total of eight different helminth species were identified in the trachea and the gastrointestinal tract. Four of the species were nematodes and the rest were cestodes.

Total worm counts of the various species recovered are shown in Table 2, with *Raillietina echinobothrida* having the highest count, followed by *Heterakis gallinae*, *Raillietina tetragona*, *Hymenolepis carioca*, *Capillaria* spp., *Strongyloides avium*, and *Raillietina cesticillus*, respectively. The lowest worm count was recorded for *Ascaridia galli*.

The overall prevalence in male and female chickens identified in the study are shown in Table 2. The most prevalent nematodes were *H. gallinae* (in both sexes), followed by *Capillaria* spp. (in both sexes) and *S. avium* (in males), respectively. The prevalence of *A. galli* was 60.0% and 46.7% in females and males, respectively. The most prevalent cestodes were *R. tetragona* and *R. echinobothrida* (93.3% in both sexes), followed by *H. carioca* and *R. cesticillus*, respectively. Surprisingly, no trematodes were found in either the trachea or the gastrointestinal tract. For all species of helminths recovered, there were no significant differences in their prevalence between the sexes of the chickens.

Table 2: Total worm counts and prevalence (in %) of helminths in male and female chickens from Penang.

Parasite	Total worm count	Prevalence (%)	
		Male chicken (N = 30)	Female chicken (N = 30)
<i>A. galli</i>	49	46.7	60.0
<i>H. gallinae</i>	560	93.3	93.3
<i>S. avium</i>	104	67.7	53.3
<i>Capillaria</i> spp.	172	66.7	66.7
<i>R. tetragona</i>	277	93.3	93.3
<i>R. echinobothrida</i>	845	93.3	93.3
<i>R. cesticillus</i>	78	46.7	53.3
<i>H. carioca</i>	213	80.0	60.0

The mean worm burden, standard deviation and the range of parasite numbers in male and female chickens are presented in Table 3. The mean worm burden in male chickens was significantly higher ($p < 0.05$) than that of females for all species of helminths. The highest mean worm burden was recorded for *R. echinobothrida* while the lowest was *A. galli*. The highest range was observed in male chickens for the helminth *H. gallinae*.

Table 3: Mean worm burden, standard deviation (S.D.) and range of parasites in male and female chickens in Penang.

Parasite	Mean \pm S.D.		Range	
	Male chicken	Female chicken	Male	Female
<i>A. galli</i>	1.7 \pm 0.659	1.6 \pm 0.514	1–8	1–6
<i>H. gallinae</i>	23.3 \pm 6.927	12.8 \pm 2.384	3–122	3–32
<i>S. avium</i>	4.9 \pm 1.268	3.4 \pm 0.919	1–15	1–12
<i>Capillaria spp.</i>	7.8 \pm 2.016	3.5 \pm 0.900	3–21	1–23
<i>R. tetragona</i>	9.9 \pm 2.117	7.8 \pm 1.200	1–25	2–16
<i>R. echinobothrida</i>	28.8 \pm 4.304	27.5 \pm 3.714	9–54	6–42
<i>R. cesticillus</i>	2.4 \pm 0.772	2.3 \pm 0.844	2–10	2–11
<i>H. carioca</i>	10.8 \pm 2.426	3.4 \pm 1.013	2–29	12

DISCUSSION

In the present investigation, a total of four different species of nematodes and four different species of cestodes were demonstrated, with no species of trematode being recovered. The cestode *R. echinobothrida* showed the highest total count as similarly reported by Sani *et al.* (1986) and Amin-Babjee *et al.* (1997), although Khairul and Khamis (1978) showed that *R. tetragona* was highest when compared with the other species.

Omar and Lim (1968) and Shanta *et al.* (1971) showed that among the nematodes, the highest infection was demonstrated in *A. galli*, as compared to *H. gallinae* in the present study. Infection rates in nematodes depend on many factors. For example rainfall pattern, soil type, locality and the types of food given to the chickens. Variations in these factors may explain the differences between the findings reported by various researchers with regard to nematode infections.

The majority of the identified species have been reported as potentially pathogenic for poultry, causing enteritis, ulcerations or granulomas followed by anorexia, depression, emaciation and death (Soulsby 1982). Also infections with

A. galli, *Capillaria* spp. and *R. ethinobothrida* have been reported to cause severe pathological lesions and death (Soulsby 1982; Ojok 1993). Many of the chickens in the present study were infected with mixed species.

He *et al.* (1990) showed that helminth infections had a significant effect on weight loss. The state of nutrition and body condition was below average in the chickens investigated (Table 1). These findings might be explained as a result of helminth infections. Even though there is some variation in the prevalence and mean worm burdens within the sexes, and in spite of the small sample size used in the present study, it is quite probable that the majority of scavenging chickens in the country are parasitized throughout the year with two or more species of gastrointestinal helminthes and thus may be a cause of tremendous economic loss to Malaysian chicken farmers.

CONCLUSION

In conclusion, based on physical examination of the pectoral musculature, the state of nutrition of the chickens belonged to the 'below normal' category. As regards to parasites, only nematodes and cestodes were recovered, with total absence of trematodes.

REFERENCES

- Amin-Babjee S M, Lee C C and Mahmood A A. (1997). Prevalence of cestodes and nematodes in different age groups of village chickens. *Malaysian Veterinary Journal* 9: 61–65.
- Chabaud A G. (1978). Keys to the genera of the Superfamilies Rhabditoidea, Dioctophymatoidea, Trichinelloidea and Muspiceoidea. In R C Anderson *et al.* (eds.). *Keys to the nematode parasites of vertebrates*. Farnham Royal, UK: Commonwealth Agricultural Bureau, no. 9: 26.
- Fowler N G. (1990). How to carry out a field investigation. In F T W Jordan (ed.). *Poultry diseases*. London: Bailliere Tindall, 372–400.
- He S, Susilowati V E H S, Purwati E and Tiuria R. (1990). An estimate of meat production loss in native chicken in Bogor and its surrounding districts due to gastrointestinal helminthiasis. *Proceedings of the 5th National Congress of Parasitology, Pandaan, Pasuruan, East Java, 23–25 June 1990*, 57.
- Khairul A A and Khamis S. (1978). Helminth parasites of *Gallus domestica* in Penang Island. *Medical Journal of Malaysia* 33: 186–192.
- Khalil L F, Jones A and Bray R A. (1994). *Keys to the cestode parasites of vertebrates*. Wallingford, UK: CAB International, 751.
- Krishnasamy M, Inder-Singh K and Vattanodorm S. (1983). Survey of endoparasites in the domestic fowl *Gallus domesticus* around aborigines settlements. *Malaysian Veterinary Journal* 19: 277.

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- Lancaster W E. (1957). A checklist of helminthes of domestic livestock in Malaya. *Journal of Malaya Veterinary Medical Association* 1: 151–163.
- Lee C C, Sani R A, Amin-Babjee S M, Jeffery J and Krishnasamy M (1991). Checklist of arthropods, protozoa and helminthes of domestic animals in Malaysia. *Journal Veterinary Malaysia* 3: 45–57.
- Ojok L. (1993). Diseases as important factor affecting increased poultry production in Uganda. In *Der Tropenland Wirt, Zeitschrift fur die Landwirtschaft in den Tropen und Subtropen*, 94: 37–44.
- Omar A R and Lim S Y. (1968). Diseases of specimens submitted to the Veterinary Research Institute, Ipoh during 1961–1966. *Kajian Veterinaire Malaysia-Singapore* 1: 224–235.
- Pandey V S, Demey F and Verhulst A. (1992). Parasitic diseases: A neglected problem in village poultry in Sub-Saharan Africa. In V S Pandey and F Demey (eds.). *Village poultry production in Africa*. Rabat Morocco, 136–141.
- Sani R A, Harisah M and Bohari Y. (1986). Parasites of the indigenous fowl (*Gallus gallus domesticus*) in Selangor. *Kajian Veterinar* 18.
- Shanta C S. (1962). A record of the finding of the trematode *Echinostoma revolutum* in a fowl. *Journal Malaysian Veterinary Medical Association* 3: 109.
- Shanta C S, Song S Y and Wan S P. (1971). Helminth parasites of the alimentary tract of broilers in North Malaya. *Malaysian Veterinary Journal* 5: 1–8.
- Sinniah B. (1980). *Tanaisia fedtschenkoi* from the body cavity of *Gallus domesticus*. *Southeast Asian Journal of Tropical Medicine and Public Health* 11: 423.
- Soulsby E J L. (1982). *Helminths, arthropods and protozoa of domesticated animals*. London: Bailliere Tindall, 809.