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A report on caecal heterakiasis in a community flock of Guinea fowl in Ramanathapuram district

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Abstract

A community flock of 21 numbers of Guinea fowl managed under backyard system of rearing along with 8 turkeys and 43 desi chickens was reported to have acute mortality during the month of December 2019, rainy season in Tamil Nadu. Among the total strength of 21 birds, almost 15 numbers of guinea fowls in the age group of 5 months were succumbed to death within a week. The condition was said to be slowly contracted to other intact turkeys and the country chickens too. It was reported that all the ailing birds showed inanition, reduction in weight, inability to bear weight on legs, reduction in bodily condition, sternal recumbency and diarrhoea. Post mortem examination revealed debilitated carcasses with blanched skin and thin and pale muscles. The intestinal lumen contained scanty, partially digested content mixed with viscid mucous material. The intestinal mucosa was congested and found to be thick. The caeca was filled with yellowish brown, semi solid content mixed with numerous tiny, hairy nematodes. The microscopic examination of the sediment of the caecal content revealed numerous barrel shaped eggs morphologically indistinguishable from the ova of *Heterakis gallinarum*. The microscopic examination of the worms confirmed as *Heterakis gallinarum*. The remaining birds in the flock were treated with Fentas Plus® (Fenbendazole 1.5% and Praziquantel 0.5%) suspension in drinking water at the rate of 1ml/3kg body weight, single dose and advised supplementation of multivitamin and minerals 3 days after the deworming. The farmer was also advised to separate turkey from desi birds and rear them as an individual unit. The birds recovered completely after deworming.

Keywords: Guinea fowl, community flock, mortality, *Heterakis gallinarum*, deworming

1. Introduction

The nematode *Heterakis gallinarum* is a caecal pinworm of gallinaceous birds. *H. gallinarum* is mostly not a serious threat to birds, but plays an important role in the epidemiology and transmission of *Histomonas meleagridis* which in turn affects many gallinaceous species. *H. gallinarum* is associated with free ranging poultry (Riddell *et al.* 1988) [8], laying hens kept in battery cage systems (Waters *et al.* 1994) [15], guinea fowls (Khan *et al.* 1994; Menezes *et al.* 2001) [5, 6] and ring necked pheasants (Draycott *et al.* 2000; Rodrigo *et al.* 2003) [2, 9]. The mode of transmission of Heterakiasis is by ingestion of eggs shed in the faeces by the definitive hosts and ingestion of earthworms, the paratenic host having the larvae that may remain infective for at least one year in this paratenic host. The female *H. gallinarum* produces about 34,000 to 86,000 eggs in its lifetime (Fine, 1975) [3]. The protozoan *H. meleagridis* can remain viable in *H. gallinarum* eggs for as long as these remain viable and release the protozoan when they are ingested by new host species. *H. gallinarum* eggs can remain viable and infective for years in the soil due to longevity of the eggs and ability of the earthworms as paratenic hosts, Heterakiasis is difficult to eliminate from the flock. Although the *H. gallinarum* is said to cause less damage or no clinical signs in infected birds, in certain severe conditions, they too produce serious threat and produce high mortality after causing limping, inanition, debilitation and diarrhoea (Papini and Cacciuttolo, 2008) [7]. This paper discusses an incidence of acute severe mortality due to Heterakiasis without any association of Histomoniasis in a community flock of guinea fowl reared along with turkey and desi birds under backyard system of management.

2. Materials and Methods**2.1 Materials**

The ailing and dead birds from a community flock of Guinea fowl managed under backyard system of rearing at Puliankudi village of Mudukulathur taluk, Ramanathapuram district, information shared by the farmer, information acquired by post-mortem examination and data

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generated during on farm investigation were serving as the materials for this study.

2.2 Methods

The lesions found in the 5 month old guinea fowl carcasses on post-mortem examination were recorded along with the anamnesis received from the farmer. The parasites lodged in the caeca were macroscopically examined and preserved in 10% formalin for microscopic examination. The caecal content was collected and examined under microscope as per Soulsby (1982) ^[13] for the demonstration of parasitic eggs. The worms preserved in 10% formalin were cleared and examined under microscope for species identification as per the methods described by Soulsby (1982) ^[13]. On-farm investigation was done to study the management practices being followed in the farm and to assess the predisposing factors in the farm premises. The details on general management were collected. The conditions around the farm were noted down. The information on the onset, course and pattern of mortality and morbidity were collected.

3. Results and Discussion

Among the 21 guinea fowls 15 (71%) were succumbed to death within a week. Schou and Permin (2003) ^[12] reported increasing mortality, 10-20% losses due to impaired feed conversion, reduced growth and egg production in heterakiasis affected laying hens. The birds were housed together with turkey and country chicken. The condition was said to be slowly spread to turkey and desi fowls too. The birds were maintained in backyard system of management. Rodrigo *et al.* (2003) ^[9] encountered heterakiasis in ring-necked pheasants maintained in backyard system of management in Rio de Janeiro, Brazil. Similarly Menezes *et al.* (2001) ^[6] reported higher (100%) prevalence of Heterakiasis in guinea fowls and Grisi and Carvalho, (1974) ^[4] in domestic chickens in Brazil. This condition occurred during the rainy season (December) when the backyard and other areas, where the birds found to wander were of wet and water logged. Salam (2018) ^[10] reported a higher intensity of infestation during the period of higher rainfall. Alam *et al.* (2014) ^[1] also recorded higher infectivity (30%) due to *H. gallinarum* in rainy season when the scavenging habit of indigenous chickens provides easy accessibility to the paratenic hosts, the earth worms. Reduction of disease resistance, newer infestation, lesser adaptability of the birds to strain of worm and the stress caused by heavy rainfall and starvation or malnutrition and easy accessibility to earth worm during the rainy season might have augmented the intensity and effect of infestation in the present case. The ailing guinea fowls were said to have inanition, inability to bear weight on legs, reduction in bodily condition, sternal recumbency and diarrhoea. Tompkins *et al.* (2001) ^[14] reported that the *H. gallinarum* recovered from pheasants were more severely

affecting the partridge in terms of reduction in weight and feed intake. Papini and Cacciuttolo (2008) ^[7] reported clinical signs of extensive feather loss in neck and chest areas and lameness in *H. gallinarum* infestation. They opined that the lameness might be due to muscular and joint pains. The incidence in this reported community flock primarily affected the guinea fowls and slowly spread to turkeys and desi chickens. The carcasses were debilitated in condition with pale skin and blanched, thin muscles. This might be due to the lesser availability of balanced ration and also the intense parasitism. No abnormalities detected in the liver. The intestinal lumen contained scanty, partially digested content mixed with viscid mucus material. The intestinal mucosa was thick, congested and oedematous. The caeca was dilated and tightly filled with yellowish brown, semisolid content mixed with numerous hairy, tiny worms. The wall of the caecum was thin and congested. Similar intestinal and caecal lesions with *H. gallinarum* infestation was reported by Rodrigo *et al.* (2003) ^[9] in pheasants. Menezes *et al.* (2001) ^[6] also reported a similar type of caecal lesions with absence of nodules in guinea fowls affected with heterakiasis. Papini and Cacciuttolo (2008) ^[7] did not observe any gross lesions in the caeca. However Khan *et al.* (1994) ^[5] reported nodular lesion in the caecum of guinea fowls affected with heterakiasis. Riddell and Gajadhar (1988) ^[8] opined that the nodular lesions in the caecum of the heterakiasis affected birds might be due to the continuous reinfection. The microscopic examination of the sediment of the content from caeca revealed the presence of numerous ellipsoidal ova with thick and smooth outer shell (Fig. 1) as described by Soulsby (1982) ^[13] for *Heterakis gallinarum*. Macroscopically the parasites appeared very thin, hairy, whitish in colour with elongated tails and agreed with the description of Soulsby (1982) ^[13]. Microscopically some of the worms had sub equal spicules on both the side (Fig. 3) with a characteristic curved-up tip, the characteristic feature of male *H. gallinarum*. Some were had a narrow pointed tail which are considered as the females of *H. gallinarum* (Fig. 6). Both male and female had a mouth with 3 equal sized lips, narrow lateral alae extended almost to end of body on both sides and the oesophagus ended in a well developed bulb containing a valvular apparatus (Fig. 2 and 4) as stated by Sang-Ik and Sung-Shik (2010) ^[11]. The adult females had numerous ellipsoidal eggs (Fig. 5) in their shell gland.

The affected flock was dewormed with the suspension of Fentas Plus® (Fenbendazole 1.5% and Praziquantel 0.5%) in drinking water at 1ml/ 3kg body weight, single dose which yield a good result of recovery in all the ailing birds and the mortality stopped. Good ration with supplementation of vitamins and minerals were advised. The farmer was also advised to rear turkey and desi birds as a separate unit. Now the mortality was completely controlled and the flocks were showing good signs of health.



Fig 1: Barrel shaped egg of *Heterakis gallinarum*



Fig 2: *Heterakis gallinarum* - Male anterior end revealing mouth, lips and oesophageal bulb



Fig 3: *Heterakis gallinarum* - Male posterior end revealing dissimilarity in spicules



Fig 4: *Heterakis gallinarum* - Female anterior end revealing mouth and lip portion

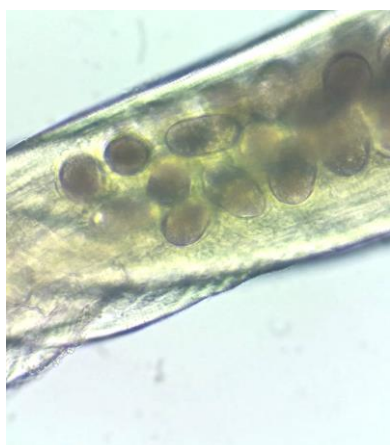


Fig 5: *Heterakis gallinarum* – Female mid portion revealing uterus with numerous barrel shaped eggs



Fig 6: *Heterakis gallinarum* - Female posterior end revealing long, narrow and pointed tail

4. Conclusion

Present study revealed the community rearing of mixed species of birds in a poor management practices pose threat to the whole unit. Malnutrition, stress by prevailing environmental factors might have caused a continuous and severe toll. Although it had been reported that the *H. gallinarum* acted as the intermediate host for the protozoan parasite *H. meleagridis* and the devastating effect in birds was only due to histomoniasis, in this particular incidence no lesions of histomoniasis could be observed and is considered to be a mono infection due to *H. gallinarum* and the severity and death might be due to new infestation, stress by environmental factors, lesser adaptability of the birds, malnutrition and poor management practices. The condition was very well responded to the anthelmintic therapy.

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6. Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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