

FIRST RECORD OF ADULT *BRACHYLAIMA* SP. (DIGENEA: BRACHYLAIMIDAE) RECOVERED FROM AN INDIGENOUS CHICKEN IN PENANG ISLAND, MALAYSIA

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Abstract. Most of the helminthic studies on chickens in Malaysia reported on the occurrence of nematodes and cestodes species, nonetheless a few species have also been reported from digeneans trematode. In this study, only one gravid adult digeneans from the family Brachylaimidae which were identified as *Brachylaima* sp. was found in one of the chickens examined from Penang Island, Malaysia. It was morphologically studied and was classified based on the external and internal morphology of the organs such as the position of genital pore, cirrus sac, reproductive organs (i.e ovary and testes), and the extension of the vitellarium as well as the shape of the eggs. This is the first report on the general morphological characteristics of a species of *Brachylaima* in Malaysia recovered from an indigenous chicken in Penang Island, the northern region of Malaysia. We want to increase the awareness of veterinarians, researchers as well as the farmers particularly on digeneans in indigenous chickens as they may serve as potential zoonotic reservoirs.

Keywords: *Brachylaima*, Chicken, Malaysia, Parasite, Trematode

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Introduction

Trematodes are parasitic flatworms which also known as flukes. They are classified into two groups namely, Monogenea and Digenea. The Monogenea are externally parasitic, commonly found in the excretory bladder or on the gills of fishes and require only a single host to complete their life cycle whereas Digenea has a complex life cycle which require two or more host species.

There had been several studies reported on trematodes in fowls in Malaysia. At first, Shanta [1] reported *Echinostoma revolutum* from the caecum and rectum of a fowl whereas after a decade, Shanta et al. [2] recovered another species of trematode, *E. lindoense* in rectums of broilers followed by Vattanodorn et al. [3] who reported *E. revolutum*, *Heterophyes* sp. and *Prosthogonimus* sp. found in the small intestine of chickens from an aborigine settlement. In 1980s, the kidney fluke, *Tanaisia zarudnyi* was found in Malayan red jungle fowls by Lee et al. [4] and in domestic chickens by Lee and Amin-Babjee, [5]; Amin-Babjee *et. al* [6] whereas Cheah & Rajamanickam [7] reported for the first time the occurrence of *Postharmostomum gallinum* obtained from caeca of birds. Subsequently, Amin-Babjee & Lee [8] reported two species of trematodes, *Postharmostomum gallinarum* and one from the family Heterophyidae. Later, in the 2000s, Rahman et al. [9] and Suhaila et al. [10] carried out studies on the endoparasitic infection in scavenging chickens from Penang Island, however none were reported for the presence of trematodes. Thus, this study aims to report the morphological features of this fluke which warrants detailed information of a new species recovered in Malaysia specifically on *Brachylaima* sp.

Materials and Methods

The specimen of the gravid adult *Brachylaima* sp. in this study was acquired from a study done by Farah Haziqah & Khadijah [11] in which 240 indigenous chickens were brought from rural areas as well as wet markets in Penang Island, Malaysia. The examined chickens were handled according to protocols approved by the Animal Ethic Committee USM (AECUSM) (Case No.: USM / Animal Ethics Approval / 2011 / (65) (293)).

The gastrointestinal tract of each animal was separated from the rest of the organs and inspected for trematode. The contents were washed with distilled water and filtered through a strainer while the deposits were transferred to a petri dish for examination. Trematode was picked, recorded and stored in universal bottles containing 70% ethanol [12].

Identification of the trematode was carried out by clearing in lactophenol with addition of a few drops of 10% lactic acid and examined under the light microscope. Later it was identified by morphological characters according to Soulsby [13] and it was later confirmed by the Assoc. Prof. Dr. Thomas Cribb, an expert from the University of Queensland, Australia, who has made a significant contribution to the knowledge of flukes in general especially in brachylaimids. Meanwhile, morphometric analyses of the cleared specimen were performed on an Olympus BX41 microscope connected to an Olympus Digital camera calibrated with an eyepiece micrometer.

Results and Discussion

According to Farah Haziqah & Khadijah [11], *Brachylaima* sp. (Figure 1) was the only trematode species recovered with very low prevalence. This trematode was found in the caeca of one examined chicken (0.42%; 1/240). The trematode was deposited in the Department of Parasitology, Veterinary Research Institute (VRI), Perak and it is available upon request. This trematode has not been recorded in the previous local checklist of parasites of domestic chickens [14] and thus was observed for the first in this country.



Figure 1. Whole body of a gravid adult *Brachylaima* sp. in ventral view.

The general features of the adult trematode worm found in this study satisfy the characteristics of the family belongs to the member of Brachylaimidae Joyeux and Foley, 1930 [15]. This family is characterized by the anterior end is not retractile and elongated with smooth body (Figure 2a). It is a small or medium sized trematode. Reda & El-Shabasy [16] reported that there were more than 70 species under the genus of *Brachylaima* Dujardin, 1843 (Platyhelminthes: Digenea). Other unique characteristics of this genus was the present of pharynx and esophagus, the ventral sucker lies at the anterior third of the body (Figure 2b) and the intestinal caeca extend to the posterior end of the body.

Brachylaima sp. is hermaphroditic (monoecious). Figure 2c shows the position of the reproductive organs in which the testes are posterior in position whereas the ovary lies between them. The testes are irregularly rounded with the posterior one is median and the anterior one lies to the left of the mid-line whereas, the ovary lies to the right.

Trematode egg consists of an eggshell which encloses an ovum, sperm and a cluster of vitelline cells. The eggshell of *Brachylaima* sp. (Figure 2d) is light brown in color with an oval

or asymmetric oval shape with a small operculum seen at the anterior end. Size, shape and color of the eggshell are of value for identification.

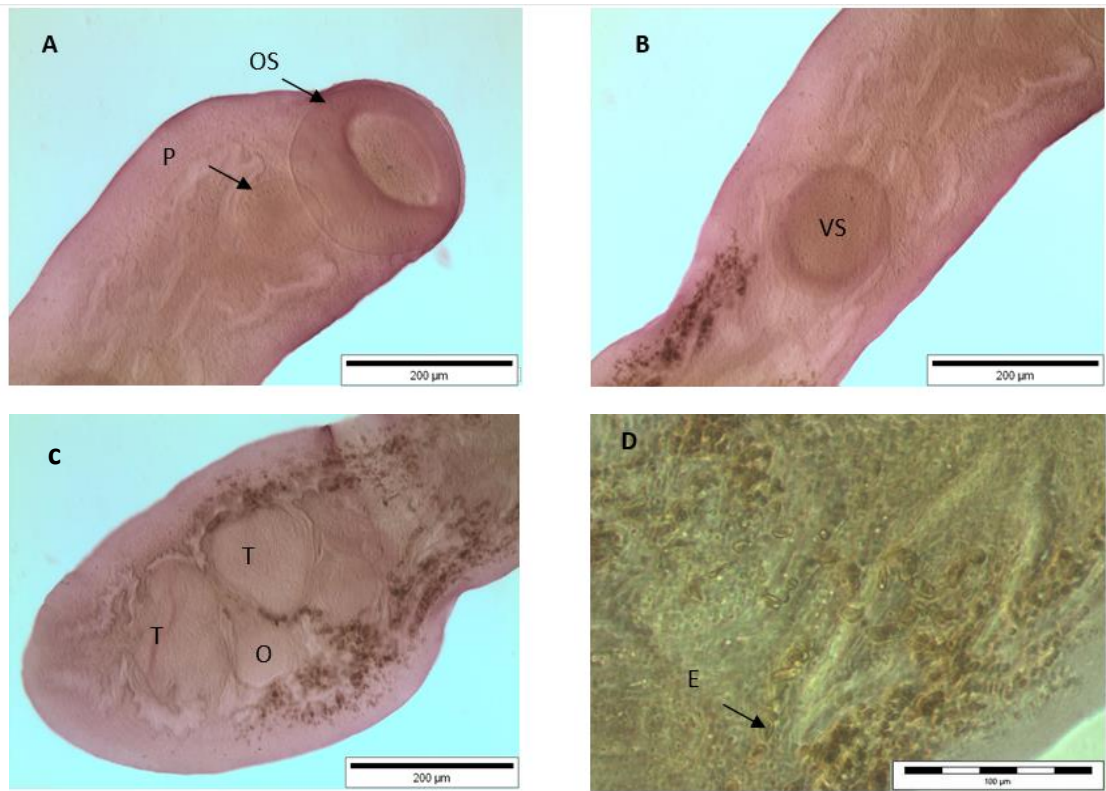


Figure 2. (A) Anterior end showing: OS: oral sucker, S: shoulder, P: pharynx; (B) VS: Ventral sucker; (C) Posterior end: T: testes, O: ovary; (D) Asymmetrically eggs obtained from uterus: E: egg.

The life cycle of trematodes is quite complicated. It begins when the terrestrial snails which is the first and second intermediate hosts ingest the egg-containing faeces of the definitive hosts [17; 18]. A study by Gracenea & Gállego [19] reported the highest prevalence of *Brachylaima* spp. in *Cornu aspersum* (Pulmonata: Stylommatophora) commonly known as garden snail. This edible land snail acts as a first and second intermediate host of this trematode causing brachylaimiasis in Spanish. Meanwhile, in Japan, the land snails of the genus *Euhadra* (Gastropoda: Bradybaenidae) was found to have the larvae of *B. lignieuhadrae* [20]. Notably, the first intermediate host of each species of *Brachylaima* involve a specific species or group of snails while for the second intermediate host involve a wide range of snail species [20].

The definitive hosts for this digenean trematode are birds and mammals specifically, chickens and rodents. Few studies conducted in Iran reported that dogs have been found to harbour this digenean trematode in which the most recent study reported the occurrence of five adults *Brachylaima* in a stray dog (*Canis familiaris*) out of 42 stray dog's intestines examined from Northern Iran [21].

The species of the genus *Brachylaima* may have both veterinary and medical significance since they can occur in various domestic birds and mammals as well as humans [21]. There had been two cases of human infections with *Brachylaima* sp. reported in two children [22] and an adult [23] from South Australia. Based on Butcher & Grove [24], the first brachylaimid trematode identified to have infected humans is *B. cribbi* n. sp. The intermediate host snails of this trematode are the helicid land snails which originated from Europe and later introduced into Australia [25].

Malaysia is fortunate that the flukes causing serious illness in human are not or are only rarely found. Nevertheless, there was no case report on *Brachylaima* infection in human until today. Other than chicken, Sinniah [26] reported for the first time the occurrence of *B. ratti* Baugh, 1962 found in the small intestine of Malayan Black rat (*Rattus rattus diardii*) in Malaysia. As the gastrointestinal pathologies in humans have been found to be related to infections of mature *Brachylaima* sp., intensify study on the genus *Brachylaima* need to be conducted because of its veterinary and medical significance as well as the low host specificity at all levels of the life cycle [24].

Conclusion

This information is vital in order to increase the awareness of veterinarians, researchers as well as the farmers particularly on digeneans in indigenous chickens as they may serve as potential zoonotic reservoirs. Thus, free range poultry farmers or poultry workers as well as veterinary health care workers need to have proper care and protection when handling poultry especially with the evidence of the occurrence of this potentially zoonotic protozoan parasite in chicken population in Malaysia.

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Author contributions

All authors contributed toward data analysis, drafting and critically revising the paper and agree to be accountable for all aspects of the work.

Disclosure of conflict of interest

The authors have no disclosures to declare.

Compliance with ethical standards

The work is compliant with ethical standards.

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