Morphology of the Oviduct Fluke, *Prosthogonimus ovatus* , Isolated from Indonesian Native Chickens and Histopathological Observation of the Infected Chickens

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(Received 26 March 2002/Accepted 5 August 2002)

ABSTRACT. *Prosthogonimus ovatus* infection was detected in 5 of 130 chickens in the oviduct and 4 chickens in the bursa of Fabricius. Scanning electron microscopy (SEM) revealed that the spines of the *P. ovatus* were densely distributed on the cuticula of the entire dorsal surface of body, but on the ventral surface, they were densely present to the level of ventral sucker but gradually decreased in density posteriorly, and they could not be seen in the posterior 1/3 area. The spines were finger-shaped and denticulate at the tip. Histopathological examination showed that polypous elevations, degeneration and exfoliation of the mucosal epithelium were detected in the bursa of Fabricius possibly by the suction of flukes, in addition to the stratification of the mucosal epithelium, and interstitial cell infiltration.

KEY WORDS: Indonesian native chicken, oviduct fluke, *Prosthogonimus ovatus*.

More than 24 species of 2 genera of oviduct flukes are known to infect fowls. In chickens, 3 species (*Prosthogonimus ovatus*, *P. macrorchis* and *P. pellucidus*) have been reported [2].

Oviduct flukes are pathogenic to chickens, and distributed in Africa, Asia, Europe and America. Chickens become infected by ingesting dragonfly or dragonfly naiads, an intermediate host, and chickens affected show inflammation of the oviduct and bursa of Fabricius. In the present study, we investigated the situation of oviduct fluke infection in Indonesian native chickens. The flukes obtained from the bursa of Fabricius and oviduct of infected chickens were morphologically examined by light and scanning electron microscopies (SEM). In addition, the bursa of Fabricius and oviduct of infected chickens were pathologically examined.

From September 1995 to September 1997, 130 chickens were randomly purchased at markets in 5 areas (Jawa, Kalimantan, Sumatra, and Sulavesi islands) in Indonesia, and examined. Necropsy of the chickens revealed that oviduct fluke infection was detected in the bursa of Fabricius of 4 hens (3.1%; 2 hens in Jawa Island and 2 in Sumatra Island) and the oviduct of 5 hens (3.8%; 4 hens in Jawa Island and 1 in Kalimantan Island). The mean number of parasites was 8 in the bursa of Fabricius and 2.6 in the oviduct. The oviduct flukes obtained were fixed in 10% neutral buffered formalin, cleared with lactophenol solution, and observed under a stereoscopic light microscope. Identification was performed based on the descriptions by Skrjabin [5], Arundel and Kington [1], and Nath [4]. For SEM, parasite samples were fixed in 70% ethanol, post-fixed in 1% osmic acid, dehydrated with a series of ethanol, and soaked in 2-methyl-2-propanol for 5–10 min. After critical point drying, the samples were metal-evaporated and observed under a scanning electron microscope (Nihon Denshi, Type JSM-630 1F).

The bursa of Fabricius and oviduct of the infected hens were fixed in 10% neutral buffered formalin. Paraaffin sections were prepared by the routine method, stained with hematoxylin-eosin(HE) and observed by light microscopy. The parasites were spindle-shaped and measured an average of 4.2 × 3.2 mm in both dimensions (n=20). The genital pore opened on the anterior right margin of the oral sucker, and the cirrus sac was sinuous, extending beyond the intestinal bifurcation to the ventral sucker. The pharynx was very small, and the ovary was present immediately posterior to the ventral sucker. The oval or almost spherical testes were situated posterior to the ovary on both sides. The vitelline gland extended from the level of the ventral sucker, to the area posterior to the testes (Fig. 1). The oval eggs within the uterus were operculated and embryonated, and measured both dimensions of 21.6 by 12.7 µm (n=100). At the pole opposite to the operculum, a small spine was...
Based on these morphological characteristics, the parasites were identified as Prosthogonimus ovatus. All the parasites isolated from the bursa of Fabricius and oviduct were of the same species. SEM showed that the ventral sucker (225 × 175 µm) was larger than the oral (62.5 × 56.3 µm). No accessory organs were observed in either sucker. The spines were densely distributed on the entire dorsal surface of cuticula (Fig. 2). On the ventral surface, however, the spines were densely distributed in the anterior half area, but gradually decreased in density, and were absent in the posterior 1/3 area. The spines were posteriorly protruded and finger-shaped, and denticulate in the tip (Fig. 3), and those on the dorsal surface were 6.7 µm in length and 4 µm in width at the base, and slightly tapered toward the tip. Kig-
ston [2] reported the presence of spines in *P. macrorchis*. Nath [4] observed the life history of *P. ovatus* and showed the spines in the figure of the report. However no detailed reports have been published on the spines of *P. ovatus*. This study may be the first that showed the ultrastructure of the spines of *P. ovatus*.

Histopathological examination revealed that the parasites were parasitic between mucosal folds of the bursa of Fabricius. Some parasites attached themselves to the epithelium using the ventral sucker, this resulting in polypous elevations, marked degeneration and exfoliation of the epithelium (Fig. 4). The epithelial cells of mucosal folds were hyperplastic and stratified near the parasites. Numerous lymphocytes, plasma cells and small numbers of eosinophilic granulocytes and macrophages infiltrated into the subepithelial interstitium. The cysts containing necrotic cells were observed between lymph follicles (Fig. 5). Arundel and Kington [1], Kigston [2], and Soulsby [6] reported that oviduct fluke infection results in inflammation and rupture of the oviduct and peritonitis. However, our examination showed no oviductal lesions. This may be because of the infection with a small number of parasites. Only a few studies have been made on the infection of bursa of Fabricius with the fluke. Muraleedharan and Pande[3], who experimentally induced *P. ovatus* infection, observed congestion in the epithelium around the flukes that attached themselves to the areas between mucosal folds of the bursa of Fabricius, and blood cells in the intestine of flukes. In this study, polypous elevations, epithelial exfoliation and stratification and interstitial cell infiltration were observed, this suggesting severe damage due to the attachment of flukes. Whether inter-follicular cysts observed in this study is produced by the suction of flukes should be determined by further studies of additional cases.

ACKNOWLEDGMENT. We thanks Mr. M. Kobayashi for preparing the SEM, and Dr. Y. Ando for preparing the photographs.

REFERENCES