Cover: Pipistrellus tenuis recorded during the small mammalian fauna study, Manipur, India. © Uttam Saikia.
Visceral tetrathyridiosis *Mesocestoides* sp. (Cestoda: *Cyclophyllidea*) in a wild Barn Owl *Tyto alba* - a first report and new host record

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*Mesocestoides* sp. is most commonly recorded in all parts of the world (Soulsby 1982) except Australia (Bradley et al. 2018) and this is probably the first record from India. Incidence depends on the species and the region and the disease caused by *Mesocestoides* sp. tapeworms is called as mesocestoidosis or mesocestoidiasis. Predilection site of adult *Mesocestoides* sp. tapeworms is the small intestine.

Tapeworms of the genus *Mesocestoides* sp. require three hosts. The primary definitive host are carnivorous mammals or birds of prey and it does not affect cattle, sheep, goats, swine or horses (Padgett & Boyce 2004). Tetrathyridium is a second stage larvae affecting vertebrate (second intermediate host) and the first stage larvae (metacestode) of first intermediate host is unknown but believed to be an coprophagous arthropod (Brigitte 1991). *Mesocestoides* species can live in a wide range of hosts, but are particularly widespread in carnivores (Barker et al. 1993; Tenora 2004; David et al. 2011).

Tetrathyridium attached to internal organs were torn loose or cut free and fixed in histo-pathological examinations in 10% neutral-buffered formalin. During necropsy, the encapsulated tetrathyridium were searched throughout the body with a bright LED light source. Formalin fixed tissues were processed by routine paraffin embedding method and 4-μm-thick sections mounted and stained with hematoxylin and eosin (HE). The tissues samples were examined under light microscope. (Rifki et al. 2005; Karl et al. 2016).

Microscopic examination of the tissue samples taken from the liver and lung revealed chronic multiple pyogranuloma due to infestation by *Mesocestoides* sp. Individual larvae (around six number) were different in shape with convoluted borders. Thick eosinophilic cuticle lined larvae resemble a single layer of cells. The remaining body of the parasite was composed of a loose mesenchymal network with widely scattered parenchymal and muscle cells. Numerous clear vesicles/refractile bodies namely calcareous corpuscles, round to oval in shape, were observed within the stroma of the parasite. Mineralized areas were seen in some of the old lesions (Soulsby 1982; McAllister 2014; McAllister et al. 2018).

Tetrathyridia in the liver parenchyma were surrounded by a thick mantle of inflammatory cells and a scant, loose connective tissue. In some lesions, there were small lymphocytic nodules at the periphery. No
reactive changes were seen in the visceral peritoneum except in superficial lesions where the inflammation extended to the liver surface. Single tetrathyridia occurred in each nodule.

Tetrathyridium on the pleura surface of the lungs were surrounded by a thin layer of loose connective tissue that appeared to be continuous with the pleura. The inner lining of the capsule was partly lined by flattened epithelial-like cells. There was a mild inflammatory reaction to the tetrathyridia, with infiltration of a few macrophages, lymphocytes, and plasma cells. In all lesions examined, tetrathyridia were intact and showed no evidence of degeneration.

We conclude that, Tetrathyridium has been reported in various vertebrate hosts, including wild and domestic animals like birds, snakes, frogs, and rodents (Soulsby 1982; Frank 1991; McAllister et al. 2017) but this is the first record from Barn Owl.

Prey species were more prone to risk due to hunting or scavenging on small vertebrates infected with tetrathyridia and detailed molecular discrimination (Skirnisson et al. 2016) within the species to be studied. There are no real effective preventative measures that prevent Mesocestoides tapeworm infection. Effective prevention and control can be achieved with numerous anthelmintic products in domestic animals but less possible in wildlife (Ivan et al. 2004; Ubelaker et al. 2014). Biological control of Mesocestoides is so far not feasible and there are no reports on resistance of Mesocestoides tapeworms to anthelmintics.

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