

Occurrence of gastro-intestinal parasites among small ruminants in Malaysia: highlighting *Dicrocoelium* infection in goats

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Abstract. The aim of the present study was to determine the gastro-intestinal (GI) parasitic infections among small ruminants (i.e., goats, sheep, deer) in Malaysia through formalin-ether concentration technique. Overall, 70.9% or 302 out of 426 small ruminants (79.4% or 251/316 goats; 87.5% or 35/40 sheep; 22.9% or 16/70 deer) were infected with at least one species of GI parasites. Overall, ten types of GI parasites [Helminth: strongyle (57.7%), *Moniezia* spp. (5.4%), *Paramphistomum* spp. (4.5%), *Strongyloides* spp. (4.2%), *Dicrocoelium* spp. (2.3%), *Trichuris* spp. (2.3%); Protozoa: *Eimeria* spp. (23.7%), *Entamoeba* spp. (18.8%), *Giardia* spp. (1.9%), *Cryptosporidium* spp. (0.2%)] were detected in this study. Among the studied animals, goats harboured the highest diversity of GI parasites (ten types), followed by sheep (six types) and deer (two types). Polyparasitism was observed in goats (43.7% or 138 of 316) and sheep (15.0% or 6 of 40). Cumulatively, a total of 32 combinations of co-infections (Helminth+Helminth: 8 combinations; Helminth+Protozoa: 20 combinations; Protozoa+Protozoa: 4 combinations) between detected parasites with up to quintuple infections were reported. Among these parasites, “strongyle + *Eimeria* spp.” and “*Moniezia* spp. + strongyle” were the commonest infections in goats (13.5% or 34 of 251) and sheep (5.7% or 2 of 6), respectively. This study is a comprehensive documentation on multiple GI parasitisms among small ruminant in Malaysia, and the findings are crucial for effective farm management, especially for the formulation of parasitic control and elimination strategies.

INTRODUCTION

Livestock industry in Malaysia is one of the key contributors to local economic development. In 2015, the livestock population reached approximately three million heads, of which 17.7% comprised small ruminants [estimated by Department

of Veterinary Services (DVS), 2016]. Consumption of mutton has increased by 152.8% from 15,072 million tons in 2004 to 38,107 million tons in 2015 (DVS, www.dvs.gov.my).

Occurrence of GI parasites has threatened agriculture sector, leading towards lower productivity and higher