

## Egg Production of Paramphistomata in Dairy Cattle

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### Abstract

This paper deals with egg output of Paramphistomata in dairy cattle. Six dairy cattle, four Chinese Holstein and two Simmental cows whose ages were 4.1, 6.4, 6.8, 7.3, 7.8, 9.1 years, were examined. Total egg amounts of Paramphistomata were calculated in total fecal quantity of a cow per day. The results were  $1.8 \times 10^6$ ,  $4.1 \times 10^6$ ,  $1.8 \times 10^7$ ,  $9.0 \times 10^6$ ,  $1.5 \times 10^7$  and  $4.3 \times 10^5$  eggs. Dissection was used to collect paramphistomata samples from rumen, omasum, rectum and cecum of the six dairy cows completely. The results were that total worm numbers were 1660, 1180, 5047, 3115, 4463 and 132 showed that egg output of paramphistomatata were 1084, 3458, 3524, 2907, 3360 and 3258 per worm per day, respectively. The average egg output was 2932 eggs/worm/day. On the other hand, the slide samples of 371 paramphistomatata worms from the six autopsied cows were identified for species. The results from these morphological analyses were that there were ten species assignable to four genus, *Paramphistomum* (*P. cervi*, *P. gotoi* and *P. gracile*), *Calicophoron* (*C. skrjabini* and *C. calicophorum*), *Ceylonocotyle* (*C. longicoelium*, *C. streptocoelium*, *C. dicranocoelium* and *C. scoliocoelium*) and *Homalogaster* (*H. paloniae*), 2 families, Paramphistomatidae and Gastrodiscidae.

**Keywords:** Paramphistomatata; Egg output; Dairy cattle

### Introduction

Paramphistomiasis is one of the most common parasitic diseases of ruminants, including cattle, buffalo, yak, goat, sheep deer etc. [1]. While some studies suggest that paramphistomiasis may be a relatively unimportant parasite for dairy cattle [2,3], but it may become a more serious disease in other settings [4]. For example, the infective rate of paramphistomata disease was 84.24% in dairy cattle in Hongya, Sichuan, China [5]. The host may die as a result of the motility of the paramphistomata larva which can lead to damage to the host's liver or other organs. Unfortunately, it is difficult to cure infected dairy cattle because of medicinal issues, such as the curative level, side-effects etc. [6].

Livestock and poultry parasitic diseases are usually diagnosed using egg counts and worm numbers in infected animals. The latter is rarely used because of the requirement to slaughter the animal, with an obvious cost impact. Therefore, the egg count technique becomes the common method in monitoring and control of parasitic disease [7]. For example, Fanyao et al. [8] thought when the EPG (numbers of eggs in one gram feces) value of nematode's or hepatica's eggs exceeds 1000 or 300 respectively, then infected goats or sheep should be treated, respectively. Further, the egg output for many parasites, such as *Schistosoma japonicum*, *Fashiola hepatica*, *Hamonchus*, *Oesophagostomum*, *Chabertia*, *Gaigeria*, *Bunostomum*, *Trichostrongylus*, *Ostertagia*, *Cooperia* and *Nematodirus* [9,10], etc., are studied for not only diagnosis, but also other biological characteristics. Highly relevant here is that the egg output of paramphistomata worms has not been reported.

### Materials and Methods

#### Dairy cattle

Six dairy cows, four Chinese Holstein and two Simmental cows were confirmed to be infected with paramphistomiasis using the method of examining eggs in the feces. Their ages were 4.1, 6.4, 6.8, 7.3, 7.8, 9.1 years, respectively. For collection of their feces, animals were normally fed all alone during the test period.

### Paramphistomata species in dairy cattle

The paramphistomata samples were collected from autopsied cows. Samples were randomly selected to be mounted as slide samples using established methods [8,10]. Morphological analysis was performed to identify paramphistomata species by reference to standard texts [10-12].

### Egg count of paramphistomata

Before dairy cattle were slaughtered, its feces was fully collected and mixed to obtain the EPG value of paramphistomatata eggs using the method described by [13,14] and total egg amount in fecal sample of a dairy cattle per day by the following formula. It was repeated in 3 successive days:

$$\text{Total eggs} = \text{EPG} \times \text{Feces quantity (g)/d}$$

Autopsy was used to collect essentially complete paramphistomata worm samples from the rumen, omasum, rectum and cecum of the dairy cattle completely and the worms were counted. Analysis was repeated on three successive days.

Egg output was calculated a paramphistomata worm per day by the following formula;

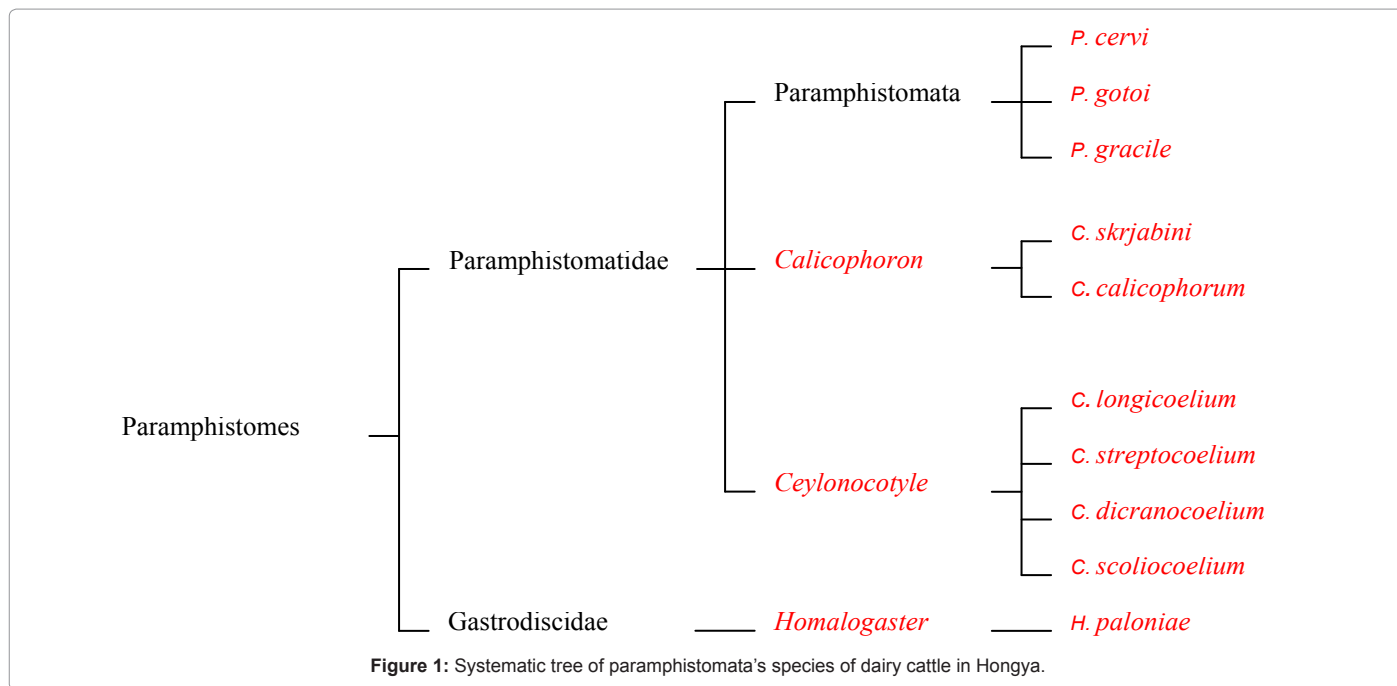
$$\text{Eggoutput} = \frac{\text{Total eggs}}{\text{Total Paramphistomata}}$$

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No.	Breed	EPG ( $\bar{x}$ )	Quantity of feces(g)/d	Total eggs/d	Worms	Eggs/Worm/d
1	Holstein	194	9300	$1.8 \times 10^6$	1660	1084
2	Holstein	100	40800	$4.1 \times 10^6$	1180	3458
3	Holstein	760	23400	$1.8 \times 10^7$	5047	3524
4	Holstein	295	30700	$9.0 \times 10^6$	3115	2907
5	Simental	855	17500	$1.5 \times 10^7$	4463	3360
6	Simental	50	8600	$4.3 \times 10^5$	132	3258

**Table 1:** Egg output of paramphistomata in dairy cattle.

## Results

### Paramphistomata species

371 slide samples of the paramphistomatata samples from the autopsied cows were classified in our laboratory. The results from morphological analysis were that there were ten species relegating to four genus, *Paramphistomum* (*P. cervi*, *P. gotoi* and *P. gracile*), *Calicophoron* (*C. skrjabini* and *C. calicophorum*), *Ceylonocotyle* (*C. longicoelium*, *C. streptocoelium*, *C. dicranocoelium* and *C. scoliocoelium*) and *Homalogaster* (*H. paloniae*), two families, Paramphistomatidae and Gastrodiscidae (Figure 1).

### Egg output of Paramphistomata

1660, 1180, 5047, 3115, 4463 and 132 paramphistomata worms were collected from the dairy cattle, respectively. Total egg numbers were  $1.8 \times 10^6$ ,  $4.1 \times 10^6$ ,  $1.8 \times 10^7$ ,  $9.0 \times 10^6$ ,  $1.5 \times 10^7$  and  $4.3 \times 10^5$  in their feces per day. The results showed that the egg output of paramphistomata in these dairy cattle were 1084, 3458, 3524, 2907, 3360 and 3258 per worm per day, respectively. Subsequently, average of egg output was 2932 eggs/worm/day (Table1).

## Discussion

### Species of Paramphistomata in dairy cattle at Hongya

We investigated the species of paramphistomatata of cattle and buffalo at Hongya in 1983. The results were that there were seven species,

*Fischoederius explanatus*, *Carmyerius synethes*, *Ceylonocotylev cheni*, *C. sinuocoelium*, *Paramphistomum gotoi* and *Cotylophoron cotylophorum*, relegating to five genus (*Fischoederius*, *Carmyerius*, *Ceylonocotylev*, *Paramphistomum* and *Cotylophoron*), two families (Paramphistomatidae and Gastrothylacidae) [15,16]. Interestingly, gastrodisciasis is a normal consequence of paramphistomiasis in cattle and buffalo in this region, but this did not appear in the cattle included in this investigation. It, therefore, remains unclear whether gastrodisciasis can not invade into dairy cattle or that the incidence has subsided for reasons unknown.

### Egg output of Paramphistomata in dairy cattle

Among six anatomized dairy cattle, egg outputs of paramphistomata in dairy cattle were estimated to be 1084, 3458, 3524, 2907, 3360 and 3258 eggs/worm/day. This demonstrates that there was a great difference in the level of egg production, between 2907-3524 and 1084. The dairy cattle examined did not exhibit any clinical signs of illness prior to slaughter. Hence, the large difference in egg output might be not due to disease in the cow with 1084 eggs influencing the paramphistomata worms laying eggs. Other parasites, such as *Ascaris suum*, exhibit a ten-fold variance in egg production [10]. Therefore, the near three fold variance in egg output of paramphistomata may be a natural characteristic.

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