

## Effects of Stomach Worm (*Haemonchus contortus*) Infection on The Kids Born of Infected Mother Goats

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**ABSTRACT:** Twelve newborn goat kids born of philippine does (3.5 and 5 years old) were used in this study. Four mother (candidate) doe goats were randomly allocated to each group. The mother does were infected orally with three levels (0, 15,000 and 30,000 larvae) of infective *Haemonchus contortus* larvae. Before infection, all animals were housed in individual pens with concrete floors. They were provided with a uniform management. Estrus of does were synchronized using PGF2 alpha. All the animals were bred naturally by the same buck. Baby goat born of infected mother goats were divided into three groups T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively, from mother treatment groups. Birth weight and growth of goat kids born from *H. contortus* infected mother goats were determined. Birth weights of kids of T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were

1.9, 1.5, and 1.2kg, respectively. No significant ( $p > 0.05$ ) differences in birth weight of kids for the 3 treatment groups were found. However, significant ( $p < 0.05$ ) effects of stomach worm infection and duration of infection on liveweight gain of kids were observed. After second and third week of birth, respectively, the kids of groups 3 and 2 registered lower liveweight gains than the kids in control group. However, no significant ( $p > 0.05$ ) difference in liveweight gain was found between the kids of infected mother does. Fecal egg counts of the infected mother does showed patent infections which also indicated by postmortem worm counts. However, no worm egg was found in the feces of the test kids.

(Key Words: Effects, Newborn Goat Kid, *Haemonchus contortus*, Experimental Infection, Mother Goat).

### INTRODUCTION

*Haemonchus contortus* is commonly known as stomach worm of small ruminants. In tropical countries, it is the predominant internal parasite of sheep and goats. The main feature of *H. contortus* infection is anemia. The presence of both adult and fourth larval stages of this parasite in sheep and goats will suck blood and cause hemorrhage into the abomasum. Thus, it is of major economic significance to the sheep and goat industries in the hot and humid areas of the world. The parasite reduced the productivity of sheep and goats in the less developed countries (LSD) (Devendra, 1981).

Anemia produced by blood sucking activities of *H. contortus* is similar to that resulted in periodic bleeding (Fourie, 1931 cited by Evans et al., 1963). *Trichostrongylus* spp. infection affects the productive and

reproductive performances of ewes and lambs (Wheeler et al., 1988; Murray et al., 1971).

Investigations of the pathogenesis of haemonchosis have generally been made only over a relatively short period of infection, usually during the acute phase of the disease. As a result, there is little information regarding the process of chronic infection. Moreover, no information is available on the effect of infection of mother goats on the birth weight and liveweight changes of their babies in early life. In order to determine the chronic effect of *H. contortus* infection of mother goats and the birth weight and liveweight gains of kids, it is necessary to determine the effect of different levels of infections during the gestation and postkidding periods, hence, this study was done.

### MATERIALS AND METHODS

A uniform group of 12 worm-free Philippine does aged between 3.5 to 5 years were randomly allocated into treatment groups T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>. They were housed in

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individual pens with concrete floors. Strict cleanliness and hygienic measures were adopted to ensure that adventitious infections with nematode parasites did not occur. They were fed uniform concentrate mixture at equivalent to 1% of their liveweight. The concentrate feed was compounded using copra meal (50.5%), tricalcium phosphate (1.7%), rice bran (29.5%), molasses (15.2%), urea (1.0%), salt (1.0%), limestone (1.0%) and vitamin-mineral (0.1%). Napier grass (*Pennisetum purpureum*) and Guinea grass (*Panicum maximum*) were offered *ad libitum* to satisfy the dry matter requirement of the animals.

*Haemonchus contortus* infective larvae were obtained by culturing the feces of kids harboring monospecific infections of the parasite. Each mother animal in the treated groups T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was fed orally with a single dose of 0, 15,000 and 30,000 *Haemonchus contortus* infective larvae in 10ml physiological saline solution, respectively. Each mother doe was intramuscularly injected with 5 mg/ml/kg body weight PGF2 alpha for estrus synchronization. Detection of estrus was done by placing a doe with the buck for 30 minutes twice daily in the morning and afternoon at approximately 12 hours interval. A doe was considered in heat when she accepted the services of the buck. The time of estrus and breeding were recorded. All the does were bred by the same buck to maintain the uniformity of the group of kids. Goat kids were weighted immediately after birth and once every week up to 5 weeks of age to ascertain the effect of infection on the growth of kids born from infected mothers. All the kids were reared in the worm-free pens in the farm throughout the study period. Kids were allowed to suckle their mothers. No other feed was provided to the experimental kids. At fortnightly and weekly intervals, respectively, from mother goats and kids, fecal samples were collected directly from rectum of each animal and the number of eggs per gram (EPG) of feces was determined following a modified method of Gordon and Whitlock (1939). Four grams of feces were mixed with 60 ml saturated sodium chloride (NaCl) solution. A portion of the fecal suspension was examined using a McMaster's slide. The EPG of feces was calculated by adding the egg counts of two chambers which was multiplied by 50 to represent the EPG. A split-plot-in-time analysis of variance was used to test for differences between different levels of larval infections, time periods and larval infection by period interaction. Comparison based on the least significant difference at P = 0.05 was made between the means of T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> at each time period.

## RESULTS AND DISCUSSION

### Fecal egg count

Fecal samples of goat kids did not contain any parasite egg during the 5 weeks study period. All the kids were found to be healthy and no morbidity from any disease. Fecal egg counts of mother does are presented in figure 1. After kidding at 14th to 15th fortnight after infection, the EPG of feces of mother goats in groups 2 and 3 showed higher values which persisted till the end of the study. Some fecal samples of mother goats in the control and infected groups showed insignificant number of nematode parasite eggs other than *Haemonchus* during the sampling period.

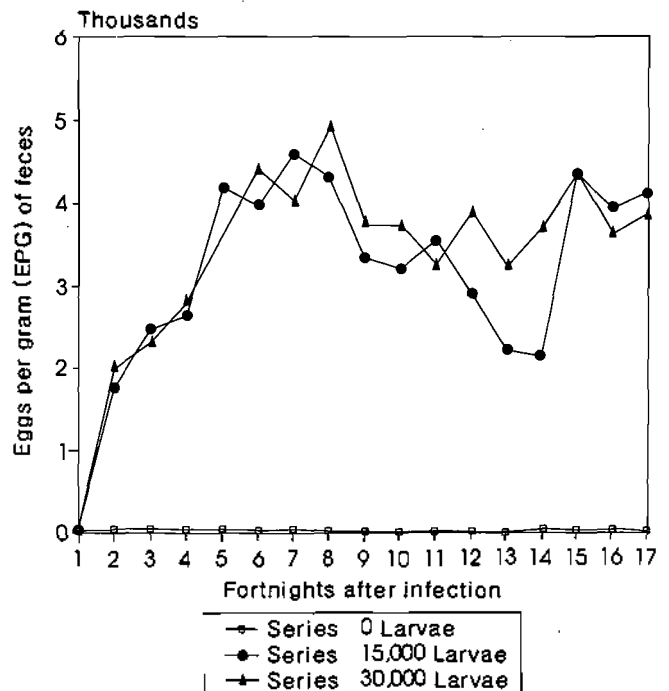


Figure 1. Average fortnightly fecal egg per gram (EPG) of feces of does as affected by different levels of stomach worm (*Haemonchus contortus*).

### Birth weight of kid

The average birth weight of kids born of mothers infected with different levels of stomach worm, *Haemonchus contortus* are presented in table 1. These results were in conformity with those of Jeffcoate et al. (1988) and Leyva et al. (1982) who found that there was no significant difference in birth weight of lamb born of *Oesophagostomum columbianum* infected and uninfected ewes. Results in this study were also consistent with the findings of Wheeler et al. (1988) who reported that parasitized ewes lambed having lower liveweight.

**Table 1.** Average birth weight (kg) of kids born of mother does infected with different levels of stomach worm (*Haemonchus contortus*)

Treatment (T)	Birth Weight (kg)	
	Ranks	Mean <sup>1</sup>
T <sub>1</sub> (0 larva)	3	1.9
T <sub>2</sub> (15,000 larvae)	1	1.5
T <sub>3</sub> (30,000 larvae)	2	1.2
Mean		1.5

<sup>1</sup> Average of four replications.

### Body Weight Gain of Kid

Weekly body weight changes of kids are presented in table 2. There was significant ( $p < 0.01$ ) interaction effect of stomach worm infection and duration of infection of mother on the liveweight gains of their kids. In the first week after birth, the body weight of kids in three treatment groups did not differ significantly ( $p > 0.05$ ) from each other. From the second week, kids in treatment group 3 registered significantly ( $p > 0.05$ ) lower liveweight compared with the kids of treatment group 1. Similarly, from the 3rd week after birth, the kids in treatment groups registered significantly ( $p < 0.05$ ) lower body weights than the kids in control group. A significant ( $p < 0.05$ ) faster rate of liveweight gain was evident for the kids of control mother group over the kids of infected mother groups (table 2).

**Table 2.** Average weekly body weight (kg) changes of kids born of mother does infected with different levels of stomach worm (*Haemonchus contortus*)

Time (W)	Body Weight (kg)		
	T <sub>1</sub> (0 larva) <sup>1</sup>	T <sub>2</sub> (15,000 larvae) <sup>1</sup>	T <sub>3</sub> (30,000 larvae) <sup>1</sup>
W0	1.9eA	1.5cA	1.2cA
W1	2.6dA	1.9bcA	1.3bcA
W2	3.4cA	2.1abAB	1.4abcB
W3	3.7bcA	2.2abB	1.6abcB
W4	4.1abA	2.4aB	1.7abB
W5	4.4aA	2.4aB	1.8aB

<sup>1</sup> Average of four replications. Means in the same column with a common small letter, and in a row with a similar capital letter are not significantly ( $p > 0.05$ ) different.

These results were partially consistent with those of Jeffcoate et al. (1988) who reported that the body weight gain of lambs did not differ significantly at four weeks old. In the present study, the liveweight gain of kids from groups 2 and 3 did not significantly ( $p > 0.05$ ) differ up

to second and first week of age, respectively. After that period, there was significantly ( $p < 0.05$ ) lower liveweight gain of the kids in groups 2 and 3 compared with group 1. These variations could be attributed to the reduced milk flow in the infected mother during early lactation period. The milk produced by the infected mothers was not enough for an optimum growth of their kids. Therefore, this growth rate was to be expected and was associated with more demands for milk. Leyva et al. (1982) found that milk production of *Ostertagia circumcincta* infected ewes was reduced during the postpartum period but not until the fourth week. However, in the present study, the actual amount of milk produced by the test does was not determined. The amount of milk produced was assumed by weighing the body weight and observing the suckling and appetite of the kids. The young kids were getting lower amount of milk from their mothers from second and third week for groups 2 and 3, respectively, after birth. Gordon (1950) found a reduction in milk production of the ewe from 1.65 to 0.35 liter/day within 20 day of commencement of infection with *H. contortus*. In this study, the lower growth rates could be attributed to the lower milk production of the mother goats. These findings agreed with the results of Cobon and O'Sullivan (1992) who reported that 2,000-3,000 *H. contortus* larvae significantly ( $p < 0.05$ ) decreased milk production of ewes and the lambs of infected ewes had lower growth rates. Further, they mentioned that superior milk yield of the control ewes alone was responsible for their lambs' superior growth rate during lactation. This highlighted the significance of growth rates during lactation and supported the finding that growth rates of lambs were dependent on the mothers' milk yield (Barnicoat et al., 1949; Coombe et al., 1960). The lower growth rates of the kids of infected does suggested that the capacity of the does to produce milk was limited by infection.

**Table 3.** Summary of body weight (kg) changes of kids born from mother does infected with different levels of stomach worm (*Haemonchus contortus*)

Treatment (T)	Initial Weight <sup>1</sup> (kg)	Final Weight <sup>1</sup> (kg)	Total Gain <sup>1</sup> (kg)	Average Daily Gain <sup>2</sup> (g)
T <sub>1</sub> (0 larva)	1.9	4.4 <sup>a</sup>	2.5 <sup>a</sup>	70.9 <sup>a</sup>
T <sub>2</sub> (15,000 larvae)	1.5	2.4 <sup>b</sup>	0.9 <sup>b</sup>	25.4 <sup>b</sup>
T <sub>3</sub> (30,000 larvae)	1.2	1.8 <sup>b</sup>	0.7 <sup>b</sup>	18.9 <sup>b</sup>

<sup>1</sup> Average of four replications.

<sup>2</sup> Average of 35 days weight change.

In a column, means with a common superscript are not significantly ( $p > 0.05$ ) different.

A summary of body weight changes of kids born of *H. contortus* infected mother is presented in table 3. The total gain and average daily gain (ADG) of the kids of infected does were significantly ( $p < 0.05$ ) lower than the controls. It might be concluded that *H. contortus* infection of the mother doe affected the liveweight gains of kids in the early life.

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