Prevalence of Gastrointestinal Nematodiasis and Comparative Efficacy of Anthelmintics on Body Weight of Cattle in Bangladesh

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Abstract. In cattle, parasites cause serious loss of production in Bangladesh. The objectives of the study were to determine the prevalence of gastrointestinal nematodiasis and effects of the anthelmintics on body weight of 1.5-3 years old cattle. A total of 52 cattle, 30 were heavily infested with gastrointestinal nematodes which were identified by faecal examination to determine the eggs by direct smear, flotation methods and Egg Counting Mc. Master Methods. Among 30 cattle 20 were selected on the basis of clinical symptoms and randomly divided into four equal groups. Group A, B and C were treated with Albendazole (Helmex-vet®) 7.5, Fenbendazole (Peraclear®) 7.5 and Levamisole (Ralnex®) 7.5 mg/kg body weight orally. Group D was kept as infected control. In present study Haemonchus, Trichostrongylus, Trichuris, Oesophagostomum, Bunostomum and mixed infections were observed before treatment. The prevalence was highest for Haemonchus (17.31%), followed by mixed infections (13.46%), Trichostrongylus (9.61%), Oesophagostomum (7.69%), Trichuris (5.77%) and Bunostomum (3.85%). A significant (p<0.01) reduction of EPG count on 7th, 14th, 21st and 28th day of Helmex-vet® (46.91%, 72.84%, 84.44%, 93.58%), Peraclear® (46.67%, 71.67%, 83.33%, 90.56%) and Ralnex® (49.27%, 72.82%, 93.93%, 85.80%) of treated cattle of group A,B and C respectively. EPG counts of untreated control group were increased 3.37%, 6.75%, 8.13% and 9.69% on 7th, 14th, 21st and 28th day respectively. The body weight was increased significantly (p<0.01) after Helmex-vet®, Peraclear® and Ralnex® treatment in group A,B,C (2.2%, 1.9% and 2.19%) respectively. On the other hand body weight was reduced to the extent of 0.82% in the control group D after 28 days.

Keywords: Anthelmintics, Body weight, Cattle, Nematodiasis

1. INTRODUCTION

Bangladesh is an agro-economy based developing country. About 80% people of Bangladesh live in village and most of them are fully or partially depended on agriculture. Among the sub-sectors of agriculture livestock is an important constituent of the mixed farming system practiced and this sector provides a greater contribution in Bangladesh. Among all agricultural activities cattle farming occupy large area and play a vital role in the national economy. The contribution of agricultural sector on the gross domestic product (GDP) is 20.16% (Economic Index, 2010). The total contribution of animal farming sector in Bangladesh to gross domestic products (GDP) is approximately 3.02% (Anon, 2000) and livestock sector contributing about 2.67% GDP (Economic index, 2010). Almost each and every village home holds livestock, and the livestock population in Bangladesh is currently estimated to comprise 26.828 million cattle, 0.544 million buffalo, 16.242 million goat and 1.221 million sheep (BBS, 2010) which plays an important role in the rural economy (Kamaruddin, 2003).

Bangladesh is one of the densely populated developing countries of the world, where more than 80% rural people rear indigenous cattle. The Red Chittagong cattle (RCC) are the only recognized cattle variety available in Bangladesh. However, it has been reported that the Red Chittagong Cattle (RCC) require lower input support than other indigenous cattle with high quality milk and beef production (Bhuiyan, 2007). The cattle farming are facing various constraints in Bangladesh and parasitic diseases are the most common among the problems. But very limited research works on production and health especially on bovine tuberculosis and the effects of endoparasites on blood values have been done in this
variety of cattle (Habib et al., 2009; Mufti et al., 2009; Rabeya et al., 2009; Rahman and Samad 2008; Siddiki et al., 2010). The present study was, therefore, designed to explore the status of parasitic diseases prevalent in Cattle and the effect of anthelmintics against gastrointestinal nematodiasis on body weight.

Parasitic infestation is a major constraint of cattle production and causes great economic loss to dairy industry by way of retarded growth, low productivity and increased susceptibility of animals to other infections (Yadav et al., 2004). The infection causes productivity losses through reduced feed intake and decreased efficiency in feed utilization due to subclinical or chronic infections that are responsible for economic losses (Rinaldi et al., 2011). The cattle kept at high level of nutrition and in better management yet declined in their health and productivity, due to their regular infestation with gastrointestinal parasites. Infections by gastrointestinal helminth parasites of livestock are among the most common, which are considered as economically important diseases of grazing livestock (Perry et al., 2002). The infection with various types of gastrointestinal parasites in cattle is a worldwide problem (Belem et al., 2000; Bennema et al., 2011 and Regassa et al., 2006). Gastrointestinal nematodes of ruminant include Haemonchus sp, Mecistocirrus sp, Trichuris sp, Bunostomum sp, Oesophagostomum sp, Ostertazia sp, Cooperia sp, Trichostrongylus sp, Capillaria sp, etc (Hosking et al., 2008 and Samanta and Santra, 2009).

Among the multitude of problems hindering the cattle development in Bangladesh, disease problems specially related to parasitism constitute a serious threat. Despite the special emphasis on the rearing ruminants, the development of the industry in Bangladesh is seriously threatened. It is thought to be one of the major constraints that hinder the development of livestock population (Kakar et al., 2008) and also adversely affects the health and productivity of animals (Radostits et al., 1994). Asian development Bank (ADB, 1984) estimated that the loss of animal production due to parasitic diseases was 50% in Bangladesh. The losses caused by parasitic infections are in the form of lowered general health condition, retarded growth rate, diminishing the working efficiency, decrease milk and meat production, abortion; cost associated with preventive measures and reduces the disease resistance capability, which may ultimately lead to higher mortality (Silvestre et al., 2000 and Radostits et al., 1994).

These losses caused by gastrointestinal parasites can be minimized by the prevention, control and protective treatment. In developed countries the principles of control of parasitic (gastrointestinal nematodiasis) diseases are based on pasture and barn management and protective treatment (Radostits et al., 1994). But in Bangladesh, it is quite impossible because our farmer graze mixed animal in limited field and have lack of knowledge and pasture land. There are two preventive measures were taken in Bangladesh to control the parasitic diseases. Measures of chemical control are practiced for therapeutic action (treatment for ongoing PGE), prophylactic action (treatment for prolonged avoidance of economically apparent disease), or a combination of these two measures (Thomas et al., 2006). So, we can prevent and control of parasitic diseases by using a routine prophylactic anthelmintics measurement. In regard to nematode infections, several chemicals provide solely therapeutic activity wherein existing worm burdens are removed to a variable degree. Among these Albendazole (Helmex-vet®, Renata Limited, Bangladesh), Fenbendazole (Peraclear®, Techno Drugs) and Levamisole (Ralnex®, Novartis, Bangladesh Limited) are widely used for the treatment of gastrointestinal Nematodiasis.

Parasitism, the problems are often neglected and overlooked as majority of the infected animals show a number of little obvious clinical signs during their productive life and their effects are gradual and chronic (Raza et al., 2010). Hence, the current investigation will give an overall idea about the prevalence of gastrointestinal parasitic infection in the region which will ultimately assist the clinicians forecasting and conscious the farmers to take appropriate control measures against parasitism. The present research work was conducted on the gastrointestinal nematodiasis in cattle at Sreenagar Milk Shed area (Milk Vita) in Munshigonj district, Bangladesh and was undertaken with the following aims and objectives.

(i) To observe the prevalence of gastrointestinal nematodiasis in cattle under farm condition. (ii) To study the comparative efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) against gastrointestinal nematodiasis in cattle. (iii) To study the effect of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) on body weight gain/loss.

2. MATERIALS AND METHODS

2.1. Study area

Munshiganj Sadar is located at 23.4583°N 90.5417°E. Munshiganj District (Dhaka division) with an area of 954.96 sq km, is bounded by Dhaka and Narayanganj districts on the north, Madaripur and Shariatpur districts on the south, Comilla and Chandpur districts
on the east, Dhaka and Faridpur districts on the west. Annual temperature maximum 36°C and minimum 12.7°C; total rainfall 2376 mm.

This research work was carried out in local dairy farm at Sreenagar Milk Shed area (Milk Vita) in Munshigonj District, Bangladesh in Collaboration with the Department of Physiology and Pharmacology, Sylhet Agricultural University, Sylhet, Bangladesh. The following procedures were adopted for performing this work.

2.1.1. The research work consisted of the following parts

(i) Selection and grouping of the animals; (ii) Collection of drugs and chemicals; (iii) Design of experiment; (iv) Faecal sample examination; (v) Measurement of body weight; (vi) Analysis of the results and calculation

2.2. Selection and grouping of the animals

Faecal samples from 52 cattle (Both local and cross breed; 1.5-3 years old) were examined by direct smear, flotation methods (Soulsby, 1986) and Egg Counting Mc. Master Methods. A total of 20 positive cases were selected and randomly divided into 4 groups, (A, B, C and D). Each group consists of 5 cattle which were both male and female.

2.3. The test parasites

The most important gastrointestinal nematodes of cattle were *Strongylids* (*Haemonchus* sp., *Mecistocirrus* sp. etc.), *Trichuris* sp., *Trichostrongylus* sp., *Oesophagostomum* sp. and *Bunostomum* sp.

2.4. Collection of drugs

Three modern anthelmintics were purchased from local market. (i) Tab. Helmex-vet® (Albendazole, Renata Limited, Bangladesh). (ii) Tab. Peraclear® (Fenbendazole, Techno Drugs, Bangladesh). (ii) Tab. Ralnex® (Levamisole hydrochloride, Novartis Bangladesh limited).

2.5. Design of experiment

Out of 52 cattle 30 were heavily infested with different gastrointestinal nematodes which were identified by faecal examination in the laboratory of the department of Physiology and Pharmacology, Sylhet Agricultural University, Sylhet, Bangladesh. Among 30 cattle 20 were selected for this experiment and randomly divided into four equal groups (group A, B, C and D). Cattle of group D was kept as an infected control group. Rest groups (Group A, B and C) of cattle were treated with patent drug Albendazole (Helmex-vet®) 600 mg/Tab) 7.5 mg/kg body weight, Fenbendazole (Peraclear®) 250 mg/bolus) 7.5 mg/kg body weight and Levamisole (Ralnex®) 708 mg/bolus) 7.5 mg/kg body weight orally for the determination of effects of these anthelmintics on body weight.

2.5.1. Experimental Drugs

<table>
<thead>
<tr>
<th>Groups</th>
<th>Name of drugs</th>
<th>Preparation</th>
<th>Composition</th>
<th>Manufacturing company</th>
<th>Doses and routes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Helmex-vet®</td>
<td>Tablet</td>
<td>Albendazole</td>
<td>Renata Limited</td>
<td>@ 7.5 mg/kg body weight orally</td>
</tr>
<tr>
<td>B</td>
<td>Peraclear®</td>
<td>Bolus</td>
<td>Fenbendazole</td>
<td>Techno Drugs</td>
<td>@ 7.5 mg/kg body weight orally</td>
</tr>
<tr>
<td>C</td>
<td>Ralnex®</td>
<td>Bolus</td>
<td>Levamisole</td>
<td>Novartis (Bangladesh Ltd.)</td>
<td>@ 7.5 mg/kg body weight orally</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>-</td>
<td>Untreated infected control</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Groups of cattle</th>
<th>Treatment</th>
<th>Time of days Pre-treatment</th>
<th>Post-treatment</th>
<th>Day 0</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 21</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Albendazole (Helmex-vet®)</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
</tr>
<tr>
<td>B</td>
<td>Fenbendazole (Peraclear®)</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
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</tr>
<tr>
<td>C</td>
<td>Levamisole (Ralnex®)</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
</tr>
<tr>
<td>D</td>
<td>Untreated infected control</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
<td>■■</td>
</tr>
</tbody>
</table>

■■ Faecal sample examination  ▽▽ Clinical parameter (body weight)
2.6. Fecal sample examination

The sufficient amount of fecal samples were collected from the rectum by hand, was kept in polythene bag and these were marking with Tag number. These were brought to the laboratory and examined by following different methods.

(a) By direct smear method

A small quantity of faeces was placed on a glass slide and 1-2 drops of tap water was poured on it. The diluted faeces were spread over the slide by glass rod. The coarse undigested materials were removed by glass rod, covered with cover slip and the slide was examined directly under microscope with low power (10x × 6 ocular) lens. At least two slides from each faecal samples were examined.

(b) By flotation method

About 5gm of faeces was placed in a beaker and 25ml saturated salt solution was poured on it. The faeces were mixing by using glass rod. The faecal suspension was then strained and the filtrate was poured inside the glass vial up to its top. The glass slide was placed on it for touching the surface of the flaccid and kept for about 30 minutes, after which the glass slide was removed. The flaccid adhering to the slide was covered with cover slip and examined under microscope with low power and occasionally high power lens. The parasitic eggs were identified (Soulsby, 1986).

(c) Egg counting Mc. Master Method

5 gm faecal sample was taken in a beaker. 45 ml saturated salt solution was added in the beaker and mixed thoroughly. The mixture was then sieved to remove coarse particles. Chambers (2) of the Mc. Master slide were filled with suspension (Each chamber contain 0.15 ml suspension) and left for 3-5 minutes. Therefore the slide was examined under microscope using 10x objectives and 7x eye pieces.

Photograph 1: Identification of egg of parasites under microscope

The number of eggs per gram (EPG) of faeces was calculated.

The egg per gram (EPG) of faeces was counted on day “0” before giving treatment and on 7th, 14th, 21st and 28th post treatment day. Faecal samples were counted from each animal of both treatment and control groups. Fresh samples were collected before each examination.

2.7. Measurement of body weight

The body weights of all experimental cattle were taken on day “0” and 28th day of experiment. The body weight of each cattle was measured as per method cited by Samad (1996)

\[ \text{Body weight} = \frac{\text{Length} \times (\text{Girth})^2}{300 \times 2.2} \text{ kg} \]

Here, Length = Length from the point of shoulder to the buttock in inches.

Girth was also measured in inches at the point of xyphoid cartilage.

2.8. Analysis of the result and calculation

The data were analyzed statistically by using student “T” test (Gupta, 1978).

\[ \frac{N_1 - N_2}{N_1} \times 100 \]

The percentage of reduction of EPG was calculated as

N1 = Number at day “0”; N2 = Number on next counting day
3. Results

The research work was conducted on the prevalence of gastrointestinal nematodiasis in cattle at Sreenagar milk shed area (Milk vita), in Munshigonj district, Bangladesh for the period from January to May 2010. The present investigation was carried out to determine the comparative efficacy of locally available anthelmintics; Albendazole (Helmex-vet®, Renata Limited, Bangladesh), Fenbendazole (Peraclear®, Techno Drugs) and Levamisole (Ralnex®, Novartis Bangladesh Limited) against gastrointestinal nematodiasis and effects of these anthelmintics on body weight gain/loss in 1.5-3 years old cattle.

3.1. Clinical findings

Most of the animals infected with gastrointestinal parasites showed normal rectal temperature, pulse rate, respiration. But there was loss of appetite, rough hair coat, pale conjunctiva, dehydration, dullness, depression, pot belly, weakness, diarrhoea, decreased body weight and milk production before treatment with the anthelmintics. There were improvements of all mentioned clinical findings after treatment with Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®).

3.2. Prevalence of gastrointestinal nematodiasis in cattle

In the present study Haemonchus, Trichostrongylus, Trichuris, Oesophagostomum, Bunostomum and mixed infections were observed before treatment. Among the parasite the prevalence was highest for Haemonchus (17.31%) and was followed by mixed infection (13.46%), Trichostrongylus (9.61%), Oesophagostomum (7.69%), Trichuris (5.77%) and Bunostomum (3.85%). Prevalence of different parasitic infection in cattle is shown in table 1 and figure 1.

3.3. Studies on comparative efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) against gastrointestinal nematodiasis in cattle

The results on the comparative efficacy of anthelmintics are summarized in Table 2 and shown in Figure 2. In group A, Mean EPG count before treatment was 810±33.17 and after treatment with Helmex-vet® mean EPG on 7th, 14th, 21st and 28th day were 430±20.00, 220±9.49, 126±9.80 and 52±4.90 respectively. Reduction of mean EPG on 7th, 14th, 21st and 28th day after treatment were 46.91%, 72.84%, 84.44% and 93.58% respectively. In group B, Mean EPG count before treatment was 720±25.50 and after treatment with Peraclear® mean EPG on 7th, 14th, 21st and 28th day were 384±14.35, 204±7.48, 120±5.48 and 68±3.74 respectively. Reduction of mean EPG on 7th, 14th, 21st and 28th day after treatment were 46.67%, 71.67%, 83.33% and 90.56% respectively. In group C, Mean EPG count before treatment was 824±25.02 and after treatment with Ralnex® mean EPG on 7th, 14th, 21st and 28th day were 418±25.38, 224±12.08, 117±3.74 and 50±3.16 respectively. Reduction of mean EPG on 7th, 14th, 21st and 28th day after treatment were 49.27%, 72.82%, 85.80% and 93.93% respectively. In group D, EPG of the control group D was 746±20.40 on “0” day, which increased to 826±18.60 on the 28th day.

Table 1: Prevalence of gastro-intestinal nematodiasis in 52 cattle

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Parasites</th>
<th>Number of cattle affected</th>
<th>Prevalence percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Haemonchus spp.</td>
<td>9</td>
<td>17.31</td>
</tr>
<tr>
<td>2</td>
<td>Trichostrongylus spp.</td>
<td>5</td>
<td>9.61</td>
</tr>
<tr>
<td>3</td>
<td>Trichuris spp.</td>
<td>3</td>
<td>5.77</td>
</tr>
<tr>
<td>4</td>
<td>Bunostomum spp.</td>
<td>2</td>
<td>3.85</td>
</tr>
<tr>
<td>5</td>
<td>Oesophagostomum spp.</td>
<td>4</td>
<td>7.69</td>
</tr>
<tr>
<td>6</td>
<td>Mixed infection</td>
<td>7</td>
<td>13.46</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>30</td>
<td>58.67</td>
</tr>
</tbody>
</table>

3.4. Effect of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) on body weight of cattle

Table 3 and Figure 3 showed 28 days post treatment effect of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) on body weight of cattle. There was significant improvement in body weight following the administration of drugs. Before treatment with Helmex-vet®, Peraclear® and Ralnex® body weight was 145.2 ± 3.01, 137.2± 4.50 and 137 ± 5.78 respectively. However, the highest improvement was observed on 28th day of post-treatment of drugs and the percentage of improvement was 2.2%, 1.9% and 2.1% in the group of A, B and C respectively. Whereas, body weight was reduced to the extent of 0.82% in the control group D after 28 days.
4. DISCUSSION

Keyyn et al. (2003) observed most infected animals contained more than one nematode species. Gastrointestinal parasites are widely distributed among the cattle population in Bangladesh. The climatic condition of this country is very favorable for survival and propagation of parasites and their intermediate host. The study was undertaken to find out the prevalence of gastro-intestinal nematodiasis in cattle under farm condition and to study the effect of the anthelmintics on body weight gain and or loss.
Table 2: Comparative efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) against gastrointestinal nematodiasis in cattle

<table>
<thead>
<tr>
<th>Groups</th>
<th>Drug with Dose</th>
<th>Pre-treatment EPG at ‘0’ day (Mean ±SE)</th>
<th>Post treatment EPG at 7th day (Mean ±SE)</th>
<th>EPG at 14th day (Mean ±SE)</th>
<th>EPG at 21st day (Mean ±SE)</th>
<th>EPG at 28th day (Mean ±SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Albendazole (Helmex-vet®) 600 mg/Tab) 7.5 mg/kg b.wt orally</td>
<td>810 ± 33.17 (46.91%)</td>
<td>430** ± 20.00 (72.84%)</td>
<td>220** ± 9.49 (84.44%)</td>
<td>126** ± 9.80 (93.58%)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Fenbendazole (Peraclear®) 250 mg/bolus) 7.5 mg/kg b.wt orally</td>
<td>720 ± 25.50 (46.67%)</td>
<td>384**± 14.35 (71.67%)</td>
<td>204** ± 7.48 (83.33%)</td>
<td>120** ± 5.48 (90.56%)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Levamisole (Ralnex®) 708 mg/bolus) 7.5 mg/kg b.wt orally</td>
<td>824 ± 25.02 (49.27%)</td>
<td>418** ± 25.38 (72.82%)</td>
<td>224** ± 12.08 (85.80%)</td>
<td>117** ± 3.74 (93.93%)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Control</td>
<td>746 ± 20.40 (3.37%)</td>
<td>772** ± 20.83 (6.75%)</td>
<td>800** ± 18.17 (8.13%)</td>
<td>826** ± 8.60 (9.69%)</td>
<td></td>
</tr>
</tbody>
</table>

Within the parenthesis value showing (% increase and decrease)
The above values represent the mean±SE of 5 cattle
** = Significant at 1 percent level (p<0.01)
* = Significant at 5 percent level (p<0.05)

Table 3: Comparative efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) recommended doses on body weight (kg) gain/loss in cattle

<table>
<thead>
<tr>
<th>Groups</th>
<th>Drug with Dose</th>
<th>Pre-treatment 0 day (b.wt, Mean ±SE)</th>
<th>Post treatment 28th day (b.wt, Mean ±SE)</th>
<th>Live weight gain/loss (kg)</th>
<th>Improvement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Albendazole (Helmex-vet®) 600 mg/Tab) 7.5 mg/kg b.wt orally</td>
<td>145.2 ± 3.01 (2.20%)</td>
<td>148.4** ± 3.20 (2.20%)</td>
<td>+3.2</td>
<td>+2.20</td>
</tr>
<tr>
<td>B</td>
<td>Fenbendazole (Peraclear®) 250 mg/bolus) 7.5 mg/kg b.wt orally</td>
<td>137.2± 4.50 (1.90%)</td>
<td>139.8 ± 4.68 (1.90%)</td>
<td>+2.6</td>
<td>+1.90</td>
</tr>
<tr>
<td>C</td>
<td>Levamisole (Ralnex®) 708 mg/bolus) 7.5 mg/kg b.wt orally</td>
<td>137 ± 5.78 (2.19%)</td>
<td>140 **±5.77 (2.19%)</td>
<td>+3</td>
<td>+2.19</td>
</tr>
<tr>
<td>D</td>
<td>Control</td>
<td>146.2 ± 0.51 (0.82%)</td>
<td>145* ±4.84 (0.82%)</td>
<td>-1.2</td>
<td>-0.82</td>
</tr>
</tbody>
</table>

Within the parenthesis value showing (% increase and decrease)
The above values represent the mean±SE of 5 cattle
** = Significant at 1 percent level (p<0.01)
* = Significant at 5 percent level (p<0.05)
Fig. 3: Efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) at recommended doses on body weight (kg) gain/loss in cattle

Higher prevalence of parasitic infection in adult cattle might be due to keeping them for a longer period of time in breeding and milk production purposes or supply inadequate feed against their high demand (Sardar et al., 2006). Moreover, stress like lactation, pregnancy, nutritional deficiency which might be accounted for higher prevalence in adult cattle (Radostits et al., 1994) that was very much similar to this study.

4.1. Prevalence of gastrointestinal nematodiasis in cattle

Out of 52 cattle, the study recorded an overall prevalence of Haemonchus (17.31%), Trichostrongylus (9.61%), Trichuris (5.77%), Bunostomum (3.85%), Oesophagostomum (7.69%) and mixed infection (13.46%). More or less similar prevalence of gastrointestinal parasites have been reported earlier by Rao and Deorani (1988); Chowdhury et al., (1993); Samanta and Santra (2009).

In this study the dominant nematode species found was Haemonchus spp. (17.31%). This result is in conformity with earlier reports of Bali and Singh (1977); Costa et al. (1978); Chowdhury et al. (1993); Alam (1997); Mazid et al. (2006). The prevalence of Oesophagostomum spp. (7.69%); is in conformity with the report of Barkakoty et al. (1977); Costa et al. (1978); Zong et al. (1997). However, on the other hand, present finding of Oesophagostomum is much lower than those reported by Hassan (1965). In present study the prevalence of Trichostrongylus spp. (9.61%) is more or less similar with the result made by Barkakoty et al. (1977); Rao and Deorani (1988); Rahman and Ahmed (1991); Chowdhury et al. (1993); Waruiru et al. (1993); Samanta and Santra (2009). But the present findings of Trichostrongylus spp. was much lower than the findings made by Costa et al. (1978); Lameta and Manud (1981). The prevalence of Trichuris spp. (5.77%) infestation observed in present study is more or less similar with the result made by Barkakoty et al. (1977); Chowdhury et al. (1993); Samanta and Santra (2009). Similarly, the prevalence of Bunostomum spp. (3.85%) observed in the present study is also more or less similar with the result of Barkakoty et al. (1977). On the other hand, the prevalence of Bunostomum spp. (3.85%) observed in the present study was higher than the findings by Costa et al. (1978); Mazid et al. (2006). The prevalence of mixed infection (13.46%) found in the present result is more or less similar with the result of Rahman et al. (1972); Rahman and Razazk (1973); Qadir (1974); Barkakoty et al. (1977); Samanta and Santra (2009). Presence of the helminthes in this study are in agreement with the previous findings of Alam et al., 1994; Raina et al., 1999; Pandit et al., 2004; Yadav et al., 2004 and Kuchay et al., 2011.

The prevalence of gastrointestinal parasitosis recorded in red chittagong cattle (RCC) reared under farming system supports the earlier report of Siddiki et al., (2010) who reported the prevalence rate of gastrointestinal parasitosis in RCC maintained under rural condition. The percentage of animals infected with different nematode sp. i.e. Haemonchus sp. (38.01%), Trichuris sp. (14.87%), Strongyloides sp. (11.98%) and mixed infection (7.43%). Haemonchus sp. infection is predominant in all season (Chavhan et al., 2008). However, these workers have also recorded the occurrence of other helminthes and this regional variation may be attributed to different geographical
distributions, host factors and climatic conditions required for the development of free living stages of the nematodes (Muzaffar et al., 2013). These variations were still due to the difference in farm management systems (Adem et al., 2011).

Prevalence of parasitic infections especially, Paramphistomum spp, Schistosoma spp, Haemonchus spp Trichuris spp and Fasciola spp were found the observation of Sardar et al., (2006) and Fritsche et al., (1993). Prevalence of strongyloes (Haemonchus sp., Trichostrongylus sp., Oesophagostomum sp. and Mecistocirrus sp.) infection was highest followed by Ascaris. sp., Bunostomum sp., Trichuris sp., Strongyloides sp. and mixed infection were observed by Waruiru et al., (2001). The prevalence of mixed infection of this genera’s are also reported in ruminants by Regassa et al., (2006) in Ethiopia, in buffalo and cow calves by Bilal et al., (2009) in Pakistan and in ruminants at Nagpur by Chavhan et al., (2008). This might be no cross protection and cattle are one of the host for them. According to the Addisu et al., (2014) the prevalence of gastrointestinal tract (GIT) parasites in general of helminthes parasites involved species and the severity of infection also vary considerably depending on local environmental condition such as humidity, temperature, rainfall, vegetation and management practice.

4.2. Clinical findings

Parasitic infestation is a major constraint of livestock and causes great economic loss to dairy industry. Shahiduzzaman et al. (1999) observed that the different helminth infections are responsible for about 54.22% calf mortality in Bangladesh. The animals infected with gastrointestinal parasitized shows normal rectal temperature, pulse rate and respiration was observed during this study. But there were loss of appetite, rough hair coat, pale conjunctiva, dehydration, dullness, depression, pot belly, weakness, diarrhoea, decreased body weight. Similar result were also found by Pandit (1981); Holmes (1985); Amin and Samad (1987). The clinical form results in direct losses attributed to acute illness and death, premature slaughter and rejection of some parts of meat inspection. But, indirect losses include the diminution of productive potentials such as decreased growth rate, weight loss in young growing calves and late maturity observed by Hansen and Perry, 1994. Parasite also cause depressed feed intake, losses in animal production and can impair tissue deposition and skeletal growth (Radostits et al., 2007; Urquhart et al., 1996; Soulsby, 1982).

Based on the level of infection, from mild to heavy nematode levels with a range of symptoms can be seen as from simply normal retarded growth and gain rates to variable amount of diarrhea, weight loss, poor hair coats, decreased appetite hypoproteinemia and anemia recorded by Agnessens et al., 2000. These parasites adversely affect the health status of animals and cause enormous economic losses to the livestock industry (Irfan, 1984; Anwar et al., 1995; Tesfaye, 2009). Gastrointestinal helminthes show some clinical symptoms which is a common cause of low productivity, unthriftness and occasional deaths in farm animals. Similar observation found by Yadav et al., 2004 by the way of retarded growth, low productivity and increased susceptibility of animals to other infections. The losses due to parasitism can be minimized by early detection and timely initiation of prophylactic measure (Yadav et al., 2004). Gastrointestinal nematodes are also serious problems for ruminants, especially young animals. Previous reports suggest that 50% cattle up to one year of age died due to gastrointestinal parasites that cause digestive disturbances and malnutrition leading to calf mortality (Debnath et al., 1995). All these signs are reduced after the treatment with anthelmintics that was observed during this study.

4.3. Studies on comparative efficacy of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) against gastrointestinal nematodiasis in cattle.

The efficacy of different anthelmintics was recorded on the basis of faecal egg count of the treated cattle. The efficacy of Albendazole (Helmex-vet®) was 93.58% in the present study. This result is more or less similar reported by earlier workers Theodorides et al. (1976); Williams et al., (1977); Wescott et al., (1979); Partani et al., (1995); Anwar et al., (1996); Williams et al., (1997); Amin et al., (2005); Soutello et al., (2007). But some earlier workers reported 100% efficacy of Albendazole against gastrointestinal nematodiasis are Borgsteed (1979); Dzakula et al., (1985); Yadav and Kumar (1990); Sharma (1992); Nwosu et al., (2007); Demeler et al., (2009). The efficacy of Fenbendazole (Peraclear®) was 90.56%. This result is more or less similar by earlier reported Craig and Bell (1978); Jagannath et al., (1988); Maqbool et al., (1996); Atanásio et al. (2002); Amin et al. 2005). However, some workers reported variable efficacy like Sinha et al., (1987); 99.68%-99.91%; Maqbool et al., (1996) 72%-92.40%; Jagannath et al., (1988) 80-100% efficacy. The efficacy of Levamisole (Ralnex®) was 93.93% against gastrointestinal nematodiasis. More or less similar result was found by earlier workers Beck et al., (1991); Craig et al., (1978); Sharma and Jagadish (1991); Prodhan et al., (1993); Thejomoorthy et al., (1995); Vesconcelos et

4.4. Effect of Albendazole (Helmex-vet®), Fenbendazole (Peraclear®) and Levamisole (Ralnex®) on body weight of cattle

The body weight of gastrointestinal nematodes infested cattle were increased (p<0.01) after treatment with different anthelmintics on 28th days. It might be due to proper digestion, absorption and metabolism of feed nutrient because of absence of gastrointestinal nematodes infection. Some workers found earlier improvement in body weight after treatment with anthelmintics (Hayet et al., 1985; Rajangam and Balachandran, 1989; Taylor et al., 1995; Ryan et al., 1997; Fornieles et al., 2000; Kaminsky et al., 2008; Kuzmina and Kharchenko 2008). These results, in retarded growth, reduced productivity and increased susceptibility to other infections without been noticed, and this was very important from an economic point of view. Managements, especially feeding system and age were found to be important risk factors in the incidence of nematode in cattle.

Thus, alternatively uses of different antihelminthes for strategic deworming to treat clinical and subclinical cases, indoor feeding, rotational grazing with further study on the impact of nematodes on growth rate and production performance of dairy animal were recommended (Adem et al., 2011)

5. CONCLUSION

The finding of the present study reveals that Helmex-vet®, Peraclear® and Ralnex® are highly effective for reduction of EPG of gastrointestinal nematodes. These three drugs have wide therapeutic index and they may kill or inhibit egg production of gastrointestinal nematodes. From this study, the Cattle should be regularly monitored through faecal examination for the presence of gastrointestinal parasites in order to provide rational treatment and to make the Cattle farming profitable. However, the present result is preliminary control efficacy studies of anthelmintics which may help the future researchers to explore the details pharmacokinetic and toxic effects for wide therapeutic uses in Bangladesh for the treatment of parasitic infection in cattle. The approach to take further widespread study related to these infections which will help to take obligatory preventive and control measures against parasitism.

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