**Chapter-2**

**Review of literature**

Gastrointestinal (GI) parasitism is a very common and economically important condition affecting domestic livestock species worldwide (Krecek 1992 and Waller, 2004 and Miller et al., 1987). Pertinent literatures on gastrointestinal parasitism along with their prevalence in cattle are reviewed in this chapter. The main purpose of this chapter is to provide up-to-date information concerning the research work which is addressed here. Important information related to the present study was represented below under the following headings:

* Gastrointestinal parasites: Epidemiology, Factor affecting the size of gastrointestinal parasitic infections
* Diagnosis of gastrointestinal parasitism.
* Prevalence of gastrointestinal parasites in cattle in Bangladesh
* Prevalence of gastrointestinal parasites in cattle in other countries of the world.

2. Gastrointestinal Parasitism

2.1 Epidemiology

The development and survival pattern of infective larvae in the environment differs according to the climate. Three broad types of climate are found in tropical and sub-tropical regions:

arid tropical and sub-tropical climate

humid tropical climate

savannah-type tropical and sub-tropical climate with a long dry season

The humid tropical climate characterizes much of West Africa as well as the regions surrounding Lake Victoria and parts of coastal eastern Africa. It is also the climate of much of southeastern Asia, Central America and northern South America.

The parasites' eggs or larva developed into in the fecal material or in environment to make themselves accessible to ingestion by ruminants, the larvae have to migrate or be transported from the faces in which they were deposited on the ground to any nearby herbage. Such movement occurs in two ways: horizontal migration/transport and vertical migration/transport. Embryonation and hatching of the eggs depends on light, temperature, humidity and oxygen and this process does not take place while the eggs are in the faecal mass. The development of larvae in the environment depends upon warm temperature and adequate moisture. In most tropical and sub-tropical countries, temperatures are permanently favourable for larval development in the environment. Exceptions to this are the highland and mountainous regions throughout the world and the winters of southern Africa and Latin America where temperatures may fall below those favourable for the development larvae. The ideal temperature for larval development of many species in the microclimate of the tuft of grass or vegetation is between 22° and 26°C. Some parasite species will continue to develop at temperatures as low as 5°C, but at a much slower rate. Development can also occur at higher temperatures, even over 30°C, but larval mortality is high at these temperatures. The ideal humidity for larval development in this microclimate is 100%; the minimum humidity required for development is about 85%. The survival of larvae in the environment depends upon adequate moisture and shade. Desiccation from lack of rainfall kills eggs and larvae rapidly and it is the most lethal of all climatic factors (Hansen and Perry, 1990).

**2.2 Factors affecting the size of gastrointestinal infections**

The size of any gastrointestinal nematode infection depends on the following five main factors:

* The number of infective larvae/eggs ingested by the host, which in turn is influenced by the climate, the amount of protection provided by vegetation, the livestock density and the grazing pattern of the ruminants present.
* The rate at which acquired resistance develops in the host, which is influenced by the species of the parasite and host, genetic factors, nutrition and physiological stress (e.g., parturition).
* The intrinsic multiplication rates of the species of parasites present which are controlled by the fecundity, pre-patent period, environmental development and survival rates of these species.
* Management, particularly grazing patterns (Radostits et al., 1994).
* Geographical distribution and availability intermediate hosts
* Use of anthelmintics, including the timing and frequency of administration. (Radostits et al., 1994 and Hansen and Perry, 1990)

2.3 Diagnosis of gastrointestinal parasitism

To diagnose gastrointestinal parasitic infections of ruminants, the parasites or their eggs/larvae must be recovered from the digestive tract of the animal or from faecal material. These are subsequently identified and quantified. The following are the main tasks involved in this process:

* Collection of faecal samples
* Separation of eggs/larvae from faecal material and their concentration
* Microscopical examination of prepared specimens
* Preparation of faecal cultures
* Isolation and identification of larvae from culture (Baermann’s apparatus techniques)

**The following Qualitative and Quantitative tests were used for the diagnosis of gastrointestinal parasitism**

**Fecal Sample**

Qualitative test

Quantitative test

Centrifugal

Flotation

Direct Method

Indirect Method

Direct Smear

Flotation

Sedimentation

Simple

Flotation

Test tube Flotation

Simple Sedimentation

Centrifugal

Sedimentation

\* McMaster Technique

\* Stools Ova counting technique

**Fig. :** 1 Diagnosis of Gastrointestinal Parasitism. (Qualitative and Quantitative tests) Adaped by (Urquhart et al., 1996; Hansen and Perry, 1993; Soulsby, 1982 and Benbrook and Sloss 1962).

**2.4.1 Prevalence of gastrointestinal parasitism in cattle in Bangladesh:**

**In different areas of Bangladesh, several investigations were carried out on gastrointestinal parasitism. In an investigation, it was observed that cattle harbor at least 10 species of trematodes, 2 adult cestodes, two larval cestodes and 21 species of nematodes. Multiple infections with different species of helminthes were recorded in fifty one cattle. Concurrent infection with most harmful heminthes recorded as *Fasciola gaigantica, Schistosoma indicum, Schistosoma spindalis, Mecistocirrus digitatus, Trichostrongylus axei, Oesophagostomum radiatum, Haemonchus* spp were recorded in twenty one cattle above six years of age (Rahman and Mondal, 1983). In another study prevalence of gastrointestinal parasitism in cattle was recorded as *Toxocara* spp 7.1%, *Strongyles* spp 26.4%, *Strongyloides* spp 9.2% and *Trichuris* spp 5.8% (Rahman and Ahmed, 1991).**

A study was conducted on GIT Parasitism in calves under traditional management in Bangladesh. It has shown that 63.32% had single, 33.74% had dual and only 2.94% had triple parasitic infection. The parasitic infection was recorded in calves up to 30 days (3.79%), higher level of infection was observed between 271 to 365 days. The prevalence of *Strongyloides spp.* (4.46%), *Trichuris spp.(*3.52%), *Fasciola spp.* (*11.20%),* *Paramphistomum spp.(* 38.92%), *Moniezia spp.(* 2.35%), *Balantidium spp*.(3.52%) and Coccidiasis 8.93%.( M.A. Samad ,2001).

In Chittagong, a one year (2009-2010) prevalence study on gastrointestinal parasitism was conducted in crossbred and local cattle where 216 crossbred and 432 local cattle of four representative areas were considered. The author recorded the overall prevalence of gastrointestinal parasitic infestation recoded 39.75% and 46.25% in crossbred and local cattle, respectively. Frequency of trematode and nematode infection was persistent in all study areas. The highest prevalence of Trematodes infections was found in Boalkhali (32.41%) compared to Noakhali (23.14%), Rangunia (18.53%) and Khagrachari sadar upazilla(17.60%). The investigation also revealed that prevalence of Nematodes infection was the highest (25.93%) in Noakhali sadar upazilla in local cattle. Occurrence of gastrointestinal parasitic infections was more common in rainy season followed by summer and winter. Significantly higher prevalence of *Paramphistomum* spp (20.13%) was found in rainy season, wheras *Haemonchus* spp (5.56%) and *Moniezia* spp (4.16%) were higher in summer(P≤0.05). *Paramphistomum* spp infections were more frequent in adult while *Toxocara* spp were predominant in calf (P≤0.05). Prevalence *of Haemonchus* spp (4.86%) infections was significantly higher in local adult cattle whereas *Trichostrongylus* spp (4.86%) infections were predominant in local young cattle (P≤0.05). The author also suggested that breed and season, age were the important predictor of gastrointestinal parasitism (Alim et al., 2011). The prevalence and seasonal variation in liver fluke and gastro-intestinal parasites were studied in native (n = 360) and crossbred (n = 360) cattle with four age groups (<12 months, >12-24 months, >24-36 months and >36 months) and three seasons (summer, rainy and winter) in Trishal Upazilla, Mymensingh district for a period of November 2002 to October 2003. Feces were collected to examine the worm load in each of the animal. The maximum rate of infection of gastro-intestinal parasite was recorded in crossbred cattle with the exception of *Strongylid.* In the rainy season highest gastro-intestinal parasitic infestation was observed. The infection rates of *Fasciola, Paramphistomum, Trichuris* and *Schistosoma* were highest in the age group >36 months and lowest in the age group < 12 months. The infection rates of *Ascaris, Strongylid, Strongyloids* and *Moniezia* were very high in the age group < 12 months and low in the age group >36 months ( Sardar et al.,2006).

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| The prevalence and seasonal variation in gastro intestinal parasites were studied in native (N = 312) and crossbred (N = 118) calves with four age groups (Up to 3 months, >3 to 6 months and >6 to 9 months and >9 to 12 months) and three seasons (rainy, autumn and winter). Among them 180 native and 60 crossbred calves were infected. The maximum rate of infection of gastro intestinal parasite was recorded in native calf with the exception of *Trichuris.* In the rainy season, the infection rates of *Fasciola (18.08%), Bunostomum (16.39%), Trichuris (4.46%)* and *Schistosoma (9.69%)* were highest in the age group >9 to12 months and lowest in the age group up to 3 months. The infection rates of *Strongylid (6.6%), Strongyloides (7.23%), and Trichuris (4.46%)* were very high in the age group < 3 to 6 months and low in the age group up to 3 months. The infection rates of *T.vitulorum (43.6%), Strongylid (6.6%), Strongyloides (7.23%)* and *Schistosoma (9.69%)* were very high in the age group up to 3 months and low in the age group >9 to 12 months. (Shuvo et al., 2011).  In a new investigation two tracer animals (two cow calves and two goats) were released for a month in grassland used for communal grazing of livestock near school premise in Kanthal, Trishal, Mymensingh to determine the association of grassland with parasitic diseases livestock. After slaughtering, the determined species were *Haemonchus contortus,* *Trichostrongylus axei*,*Mecistocirrus digitatus, Oesophagostomum spp, Trichuris spp, Bunostomum spp* and *Moniezia* spp. The number of parasites in each calf were from 42 to 154 for *Haemonchus contortus*, from 18 to 33 for *Trichostrongylus axei,* from 15 to 34 for *Mecistocirrus digitatus*, from 22 to 47 for *Oesophagostomum spp*, from 23 to 32 for *Trichuris* spp, from 13 to32 in *Bunostomum* spp and from 3 to 16 for *Moniezia* spp. The numbers of parasites in each goat were from 22 to 45 for *H. contortus*, from 10 to 27 for *T. axei*, from 24 to 160 for *Oesophagostomum* spp, from 16 to 35 for *Trichuris* spp, from 2 to 8 for *Bunostomum* spp and from 12 to 21 for *Moniezia* spp (Mondol et al., 2000).    In Tangail district , prevalence of *Paramphistomum* spp infection was 64.4%, *Capillaria bovis* 12.2%, *Strongylus* spp 34%, *Fasciola* spp 22.4%,*Balantidium coli* 13.6%, Coccidia 12.2% and *Strongyloides papillosus* 1.6% where 50% of the studied cattle were infected with two or more different parasitic species.(Garrels,1975) |

**2.4.2 Prevalence of gastrointestinal parasitism in cattle in different countries of the world:**

**In India, the overall prevalence of gastrointestinal parasitic infestation in crossbred cows and buffaloes of Namakkal was 30.0% and 24.6% respectively. The prevalence rate of round worms, intestinal coccidian, flukes and tapeworms were 18.6%, 4.3%, 2.9% and 1.0% respectively. The percentage of animals infected with *Strongyles*, *Eimeria* spp, *Amphistoma* spp, *Trichuris* spp, *Toxocara* spp, *Schistosoma* spp, *Moniezia* spp and *Strongyloides* spp were 14.8%(composed of *Haemonchus* and others at 77.4% and 22.5% respectively), 4.35%,1.9%,1.9%,1.4%,1.0%,1.0% and 0.5% respectively. Mixed infection of Coccidial oocysts and *Strongyles* was observed in 2.4% animals. The age wise prevalence rate of gastrointestinal parasites among the total number of animals examined were 22.6%,27.8%,27.0%,25.8% and 41.7% for calves and heifers(2.5 years old),first calving (2.5-3.5years old),second calving (3.5-4.5 years old),third calving (4.5-5.5years old) and fourth years calving(5.5-6.5 years old) animals, respectively (Saravanana et al.,2009). In Tamil Nadu, India, a systematic survey was conducted to determine the prevalence of *Schistosoma spindale* in cattle, buffalo and goat slaughteded at Chennai. Examination of mesenteries collected from slaughter houses revealed 30.7% cattle, 19.64% buffalo and 9.52 % goat harbouring *S.spindale*. The prevalence of *S.spindale* was higher in cattle followed by buffalo and goat. The seasonal pattern of prevalence showed a moderate peak in monsoon season in cattle and winter season in buffalo and goat (Jeyathilakan et al., 2008). However, in Assam, prevalence of *Schistosoma spindale* was 2.9% in cattle and2.7% in goat and 16% in buffalo (Rajkhoa et al., 1992). In** Bikaner, Rajasthan a total of 200 faecal samples comprising of 100 samples each from cattle and buffaloes were analyzed to confirm the presence of gastrointestinal parasitic infection. Twenty four (12.00%) samples were found positive for strongyle eggs. Eleven per cent cattle and 13 per cent buffaloes were found to be positive for gastrointestinal helminthosis. The prevalence in cattle varied from 9.09 to 12.50 in different locations. Prevalence range was slightly higher in buffaloes which ranged between 10.52 to 14.81.The estimation of EPG count for *Strongyle* species in cattle range between 200-1000, with an average of 504.00+245.41. This range was 200-1400 with an average of 684.61+350.82 in buffaloes ( Ashutosh et al.,2011). In Himachal Prodesh, the overall percentage of infection of gastrointestinal parasites (either singly or mixed infection) in cattle during the period of 1986-90 and 1993-98 were 87.2% and 54.2%. The prevalence of *Fasciola* spp, *Amphistome* spp*, Dicrocoelium* spp, *Schistosome* spp*, Moniezia* spp, *Strongyle* spp, *Strongyloides* spp, *Toxocara* spp , *Dictyocaulys* spp,  *Trichuris* spp and *Capillaria* spp were 36%, 16.6%, 11.4%, 0.6%.2.9%, 31.4%, 9.1%, 3.9%1.9%, 5.2% and 1.4%,respectively in 1986-1990, whereas percentage of infection with the same species reduced to 6.3%, 15.1%, 2.1%, 0.0%, 0.9%,13.5%, 1.7%, 2.1%, 0.7%,0.0% and 0.9%,respectively in 1993-1997(Annual reports.1990-98, Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur, Himachal Pradesh ). In Gujarat, a two years long investigation revealed that prevalence of gastrointestinal parasites in cattle was 45.8% where Amphistomes (17.9%), Strongyles(14.2%) and Coccidia (7.5%) were predominant parasites and highest infection rate was found in raniny season.(Hirani et al., 2006). In Karnataka, overall prevalence of nematode infection was 18.2% and 20.9% in cattle and buffaloes, respectively. *Strongylus* spp was found more predominating in cattle and *Neoascaris* spp in buffalo (Muraleedharan, 2005). In Nagpur, a year round study at two villages namely, Chicholi and Bodala revealed that the overall prevalence of nematodes infections were 39.34%. The infection rate in buffalo, cattle and goat was 41.63%, 32.18% and 51.94%, respectively. Higher infection was recorded during monsoon (63.07%) followed by winter (32.22%) and summer (21.33%). The percentage of animals infected with *Haemonchus spp, Toxocara spp, Trichuris spp ,Strongyloides spp.* And mixed infection was found to be 38.01%, 27.68%, 14.87%, 11.98% and 7.43% respectively (Chavhan et al., 2008).

**In Pakistan**, the overall prevalence of endoparasites in youngstock of Holstein-Friesian and Jersey breeds was 39% and 38.21%,respectively in Kasur district (Zahid et al., 2005)whereas the liver parasites in cows was 45.01% in Quetta city. The highest prevalence was found in *Fasciola hepatica* (16.16%) infection followed by *Fasciola gigantica*(12.37%) and *Paramphistomum explanatum* (7.82%) (Kakar et al., 2008) . In Punjab, a study was done for the investigation of helminth’s prevalence in cattle.

Therefore, 500 faecal samples of cattle, were examined by direct, indirect (sedimentation and floatation techniques) and coproculture techniques.Species recorded were *Fasciola hepatica, Fasciola gigentica, Toxocara vitulorum, Paramphistomum cervi, Monezia expansa, Monezia bendeni,Oesophagostomum radiatum, Haemonchus placei and Bunostomum phlebotomumn* in cattle, an overall prevalence of helminths was 51% (255/500). The highest prevalence (105/500; 21%) was recorded for nematodes followed by trematodes (85/500; 17%), cestodes (10/500; 2%) and mixed helminth infections

(55/500; 11%). A total of nine species of helminths including four nematodes, i.e. *Toxocara vitulorum, Oesophagostomum radiatum, Bunostomum phlebotomum, Haemonchus placei;* three *trematodes, i.e. Fasciola hepatica, F. gigantica, Paramphistomum cervi;* and *two cestodes, i.e. Moniezia expansa, M. benedeni*, were recorded. *Toxocara vitulorum* was the most prevalent species of helminth followed by

*Fasciola hepatica, Paramphistomum cervi, Oesophagostomum radiatum, Bunostomum phlebotomum, Haemonchus placei, Moniezia expansa, M. benedeni and F. gigantica.* The mixed helminth infection(55/500; 11%) was often composed of 10 species including *Fasciola hepatica, F. gigantica, Toxocara vitulorum, Moniezia expansa, Trichostrongylus spp., Paramphistomum cervi, Haemonchus placei, Oesophagostomum radiatum, Bunostomum phlebotomum* and *Cooperia* spp (Md. Ashif raza et al.,2013). In Karachi,8.50% (Baliquees and Alam,1988) and 8.00% (Sabri et al.,1981%) incidence of Fascioliasis is 17.64%(Reza et al.,2009 )was recorded in Tehsil Jatoi district. In district Shorkot, prevalence of helminthes was found to be 52.84 %. The prevalent species included *Fasciola hepatica* 46.23 followed in order by *Haemonchus contortus* 21.5%, *Trichostrongylus* spp 20.43% and *Ascaris vitulorum* 11.82% (Iqbal et al., 2007). At Multan, the point prevalence of *Toxocara vitolurum* in buffalo and cattle slaughtedrd at abattoir was 63.83% and 37.50% in buffaloes and cattle , respectively .Sex wise prevalence of *T. vitulorum* was recorded as 39.46% in male and 72.72 % in female(Raza et al., 2010).

**In Italy**, an epidemiological investigation on GI parasitic infections in 5 to 12 years old cattle of Cuneo province showed that the prevalence of *Ostertagia ostertagi* infection was 82% followed by *Haemonchus placei* 61%, *Cooperia oncophora* 27% and *Trichostrongylus axei* 25%. The highest infections was recorded during spring when animals were put on pasture (Bulbo, 1973).

**In Syria**, examination of 34 stomach and small intestine and large intestine of 4 more Syrian cattle revealed the prevalence of nematodes which were as follows: *Oestertagia ostertagi* 76%, *Cooperia oncophora* 76%, *Cooperia punctata* 05%, *Trichostrongylus axei* 17%, *Cooperia zurnabada* 23%, *Bunostomum phlebotomum* 58%, *Haemonchus contortus* 64% and *Trichostrongylus vitrinus 76*% (Moukdad, 1979).

**In Japan**, a parasitological survey by post-mortem examination of the abomasums and the upper small intestine of cattle of Hokkaido retion revealed that the prevalence of GI nematodes were 56%.They are *Ostertagia ostertagi* (47%), *Mecistocirrus digitatus*(29%), *Haemonchus placei* (1%) , *Nematodirrus helvetianus*(1%) , *Bunostomum phlebotomum* (1%),*Trichostrongylus axei*(3%) ,*Cooperia oncophora*(3%) and *C.punctata*(1%) .In another investigation, eggs of GI nematodes were found in 74% of the 231 cattle fecal samples examined. The incidences of the various species were *Ostertagia* (62.7%) *Oesophagostomum*(23.2%),*Trichuris*(17.3%),*Mecistocirrus*(13.4%),*Nematodirrus(*11.7%),*Bunostomum*(7%), *Strongyloides*(5.6%), *Capillaria, (*3.9%),*Trichostrongylus (*3.5%),*and Cooperia* (1.2%). Eggs of Moniezia were detected in 1.7%, Eimeria oocysts in 59.7% and eggs of mites in 41.1% of fecal samples examined (Nakazawa, 1986).

**In Combodia**, prevalence and seasonal variations of helminth infections and their associations with morbidity parameters were studied in traditionally reared Cambodian cattle. The overall proportion of samples that was positive for gastrointestinal nematodes was 52%,44% and 37% in calves from (from 1 to 6 months),young animals(6 to 24 months) and adults (over 24 months),respectively, while geometric mean fecal egg counts (FEGs) for each of these age categories were 125,66 and 15 eggs per gram, respectively. The prevalence of *Fasciola* and *Paramphistomum*, estimated by coproscopical examination, varied between 5-20 % and 45 -95%, respectively (Dorny et al., 2011).

**In Germany**, a survey was made know the influence of re-wetting of pastures on the occurrence of important endoparasities in cattle was monitored over the course of three years. A total of 692 samples were tested where the overall prevalence was 29.5% for Eimeria spp and 42.2% for nematodes (Kemper and Henze, 2009).

**In Greece**, a two years long study was carried out to know the GI parasitic infections in beef cattle of 15 farms in Mediterranean climate. Among a total of 262 samples, 42(16%) samples were positive where Strongyle-type eggs were found in 28 (10.7%) samples, Strongyloides spp and Toxocara spp eggs in 8 (3.1%) samples and capillaria spp and Moniezia spp eggs in 1(0.4%) sample followed by Coccidian oocysts were found in 123 (46.9%) samples. It was also revealed that a four –fold increase in the risk of coccidian infection in calves less than 12 months old compared with animals that were more than 36 months old ( Theodoropolous et al., 2010).

**In Ethiopia**, an epidemiological investigation in western Oromia region was conducted to determine the prevalence and risk factors associated with gastrointestinal parasitism. The investigation showed that the overall prevalence of gastrointestinal parasites was 69.6% with50.2%, 75.3% and 84.1% in cattle, sheep and goats, respectively. *Strongyle* and *Eimeria* were the most prevalent parasites encountered. Most of the cattle ( 44.4%),sheep(45.1%) and goats (47.8%) were infected by single parasite while the remaining 5.8%,30.2% and 35.3%,respectively,were infected by 2 and more than 2 types of parasites, where most of the combinations were *Strongyles* and *Eimeria* (Regassa et al.,2006).

**In Tanzania**, a survey was conducted to know the prevalence of GI parasitic infection in grazing Maasai cattle in pastoral farming area where Coccidian oocyst, nematodes and trematodes infections were found in 2.2%, 20%, and 56.6% in cattle, respectively. The overall prevalence was estimated to be 47% (Swai et al., 2006). However an abattoir survey showed that the infection rate of *Schistosoma* *bovis* was edtimated a 31% ( Masaba et al., 1977) .

**In Algeria**, a total of 222 calves varying of 1 – 18 months of age were examined to evaluate the prevalence of gastrointestinal helminthiasis of calves. The prevalence of eggs of *Strongyloidea , Thrichuris sppp, Moniezia spp, Strongyloides* *papillosus* and coccidial oocysts were, in properties and calves:100 and 66,100 and 57.8,50 and8.2,25, and 1.8, and 33.3and 7.8% respectively. Of the 66 for eggs of the *Strongyloidea*, 64 were attributed to *Haemonchus* spp and 53.75% to *cooperia* spp (Repossi et al., 2006).

**In Costa Rica**, a longitudinal survey was carried out to determine ,describe the prevalence and intensity of gastrointestinal parasite infections in two different ecological zones A) beef cattle, B)were *Eimeria* spp (94.7%, 93.7%), *Strongylidae* (75.0%, 81.4%), *Buxtonella* *sulcata* (%) and *Strongyloides papillosus* ,whereas *Moniezia* *benedeni* , *Trichuris* spp , *Toxocara* *vituolorum* and *Entamoeba bovis* were less prevalent(Jimeneza et al., 2007).

**In Kenya**, a study in Magadi division revealed the overall prevalence of nematodes in the calves, sheep and goats was 69%,80% and82% ,respectively the overall prevalence of Coccidial oocysts in calves ,sheep and goats was 30%,44% and 45% , respectively (Maichomo et al., 2004).

**Clinical Signs of Gastrointestinal parasitic infection:**

**Fasciolosis-**Sudden death where blood stained froth appears at the nostrils& anus, weakness, mucosal edema,abdominal pain indicate acute fasciolosis.on the oter hand anemia, bottle jawindicate chronic fasciolosis(Kamaruddin *et al.,* 2007)

**Paramphistomiasis-**A characteristic& persistent foetid diarrhea, depression, dehydration & anemia followed by sudden death were the important clinical signs of paraamphistomiasis(Amalendu, 2005).

**Ascariasis-** The major clinical signs of ascariasis are untriftiness, poor growth , vague digestive disturbences including constipation, mild diarrhea& dysentery.(Amalendu, 2005)

**Moneiziasis-**Poor coat, less than optimal growth, afebrile diarrhea& occassionaly colic are the common signs of ascariasis.(Blood et al.,2003)

**Oesophagostomiasis-** Fidgeting, palor of mucosae, weakness, anasarcaunder the jaw and along the belly, prostration and death in two to three days.( Blood et al., 2003)

**Trichostrongyloidiosis**- Diarrhoea in young animal is the most common clinical sign**.**(Blood et al., 2003)