A STUDY ON
INTESTINAL HELMINTH PARASITES OF GOATS (*Capra hircus*) BROUGHT TO KHASIBAZAR, BAGBAZAR (KATHMANDU) FOR SLAUGHTER PURPOSE

A THESIS

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RECOMMENDATION

This is to recommend that the dissertation entitled "Intestinal helminth parasites of goats (*Capra hircus*) brought to Khasibazar, Bagbazar (Kathmandu) for slaughter purpose" has been carried out by **Ms. CHANDA PATHAK** for the partial fulfillment of M.Sc. Degree in Zoology (Parasitology). This work has been conducted under our supervision. To the best of our knowledge, this dissertation work has not been submitted for any other degree.

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This dissertation work submitted by **Ms. CHANDA PATHAK** entitled "Intestinal helminth parasites of goats(*Capra hircus)* brought to Khasibazar, Bagbazar (Kathmandu) for slaughter purpose" has been approved as a partial fulfillment of requirements for the Master's Degree of Science in Zoology with special paper Parasitology.

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DECLARATION

I hereby declare that the work presented in this thesis has been done myself, and has not been submitted elsewhere for the award of any degree. All sources of information have been specifically acknowledged by references to the authors or institutions.

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ABSTRACT

A total of 202 stool samples of *Capra hircus* (goat) from Khasi bazaar (Bag bazaar) Kathmandu were microscopically examined to identify the prevalence of intestinal helminth parasite. Both sedimentation and flotation technique were used for the detection of helminth parasites. Out of total 202 samples, 161(79.70%) samples were found positive for more than one helminthes. The overall prevalence of different genera of helminth results statistically significant in goats (χ^2 =101.49, P<0.05, d.f. =17). There is significant difference in prevalence of trematode, cestode and nematode infection among goats. The infection with trematodes was 5.94%, with cestodes 4.45%, with nematode 69.30%.

The trematode genera identified with their prevalence percentage was found to be *Fasciola* 3.46% and *Paramphistomum* 2.47% The difference in the prevalence of different genus of trematodes result statistically significant (χ^2 =0.332, P>0.05, d.f. =1).

Among cestodes, the prevalence percentage of identified genera was found to be *Moniezia* 1.48%, *Taenia* 2.97%. The difference in the prevalence of different genus of cestode result statistically significant (χ^2 = 1, P>0.05, d.f. =1)

Nematodes include *Strongyloides* 3.46%, *Haemonchus* 13.36%, *Chabertia* 4.95%, *Oesophagostomum* 11.88%, *Trichuris* 7.42%, *Ostertagia* 5.94%, *Trichostrongylus* 2.97%, *Nematodirus* 2.97%, *Cooperia* 2.47%, *Dictyocaulus* 1.48%, *Dioctophyma* 1.48%, *Capillaria* 5.94%, *Bunostomum* 0.99%, *Oxyuris* 0.99%. The difference in the prevalence of different genus of nematodes result statistically significant (χ^2 =84.37, P<0.05, d.f. =13).

Single infection was observed among 38 samples and highest due to *Haemonchus.* Mixed infections were observed among 123 samples positive samples. Among Trematodes the heavy infection was found due to *Fasciola*, among cestode, due to *Moniezia* and among Nematodes, due to *Oesophagostomum.*

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ABBREVIATIONS

ADPCD	:	Animal Disease and Parasite Control Division
ARS	:	Agricultural Research Station
CCPP	:	Contagious Caprine Pluro- Pneumonia
DLSO	:	District Livestock Service Office
FAO	:	Food and Agricultural Organization
GI	:	Gastro- Intestinal
HMG	:	His Majesty Government
IAAS	:	Institute of Agriculture and Animal Science
IELA	:	Import and Export of Live Animala
LARC	:	Lumle Agricultural Research Centre
LP	:	Livestock Production
MOAC	:	Ministry of Agricultural and Cooperative
NASc Conv.	:	National Animal Science Convention
PAC	:	Pakhribas Agriculture and Center
PPR	:	Peste des Petits Ruminants
rpm	:	rate per minute
VDC	:	Village Development Committee
VEC	:	Veterinary Epidemiology Centre
WHO	:	World Health Organization

1. INTRODUCTION

1.1 Background

Capra hircus (goat) is an important livestock of our country. Reason for its importance is that it satisfies the need as a dairy product i.e. milk is used by man specially to feed their babies. *Capra hircus* (goats) are slaughtered on a large scale in our country to feed on its flesh which is rich in protein, which acts as a body building constituent of our diet. The excreta of C*apra hircus* is used as manure in the fields in rural area and in urban area it is used in garden. *Capra hircus* in rural region are reared on a large scale as it can add an extra income to those people. A special training is organized in towns to give information regarding how to rear *Capra hircus*. *Capra hircus* (goat) has a life span of 8-15years; its weight is approximately 20-100 kg. The gestation period 145-155 days. Litter's size is 2. *Capra hircus* is an herbivorous.

As rearing of goat is not expensive so the people below the average economic range are encourage to rear this animal so that it can add to their income. In our country people are encouraged to rear this species as the need for this species is increasing day by day. To fulfill the demand, our country imports from the neighboring country. About fourteen percent of goats are brought from India and 26 percent from different parts of Nepal to Kathmandu market (3^{rd} NASc Conv., 1998\1999). *Capra hircus* (goat) is important in the country through Nepalgunj,Kakarvitta,Bhairahawa,Janakpur,Birjung,Mahendranagar.

Slaughtering of goat is done not only for the feeding purpose but these is a blind belief in our country that goddess Durga also feeds the blood of goat and will protect country, people from natural disasters and other evil things so during dashain goats is slaughtered in each and every house of our country. During marriage ceremonies and when a baby boy is born in a family to express their happiness and to celebrate their joy goat is slaughtered.

Meat production in is also satisfied by small poultry farm, and also the buffaloes. Nearly 60 - 70 percent of people feed on flesh of goat. So the market has high demand for goat.

The population of goat and meat production is estimated to be 6.6 million and 0.4 metric ton respectively, which contribute 19.4 percent of the total meat production of the country (MOSC 2002). Nepal produced about42, 320 metric tons goat meat in a year 2006(VEC 2006) and the annual production of meat per household was 51.54 kg in the year 2006.

Internal parasite is a problem and hazards to livestock because of in apparent, unrecognized loss. In goat herd young animals less than 6 months of age are by for the most susceptible to the parasitic infection as they have very little resistance to immunity. The second most susceptible to blood loss due to the action of stomach worms. This age of group is most susceptible to parasitic diseases. The animal that receive a balance diet are less susceptible to diseases i.e. parasitic infection.

The most susceptible infection in goat, helminth diseases. The infection is with fluke, tapeworms and roundworms are responsible for marked deleterious effects that tend to lower overall production both by the way of morbidity and mortality.

The widely prevalent nematodes are *Haemonchus, Ostertagia, Trichostrongylus, Cooperia, Nematodirus, Oesophagostomum and Bunostomum.* These nematodes is small intestine may cause sever damage to the intestinal mucous membrane. *Toxocara* sp, *Dictyocaulus* sp (filarial nematodes) has the worldwide distribution and the prevalence is higher in cattle and buffaloes (Karki 2005).

Cestodes found in goat are acquired by eating contaminated food or water found affects the ruminant. This group includes genera *Moniezia , Taenia* which is found in rumen. They have reported from Asia and Africa (Karki 2005).

Trematodes are commonly known also as flukes, are found in bile ducts or small intestine and also affect the lungs. Trematodes include *Fasciola* sp, *Dicrocoelium* sp, *Schistosoma* sp, *Paramphistomum* species.

Moniezia sp. in ruminants of goats and cattles causes infections by ingesting herbage containmented with the mites carrying the infective stages of the parasites. Heavy infections causes poor growth and diarrhea in lambs.

Taenia saginata usually called cow or buffalo tapeworms has two hosts viz.,definitive host man and intermediate host cow or cattle. It is also called beef tapeworm. The worm (segments) passes out along with the faeces of human being and when ingested by cattles, infects them on reaching alimentary canal of the host the eggs hatch out and liberated, they penetrate the gut wall and enter mesenteric lymphatics and finally reaches circulations. Then they invade the muscular tissue and undergo further development.

Fascioliasis is a well known parasites of herbivorous animal. It has worldwide distribution on the animal reservoir host. A large variety of animals such as cattles, buffaloes show infection rate that varies from 70% - 90% in some area. The different local names of these diseases, such as Namle, Matey, Law etc in different regions are proof of its continued existence for many years in the animal population of the country.

Infection of domestic ruminants with *Fasciola hepatica* and *Fasciola gigantic* causes significant less estimated at over US $ 2000million per year to the agriculture sector worldwide with over 600million animals affected (Hasen 1994).

Fasciola hepatica and *Fasciola gigantica* inhabit similarly in the bile ducts of final host. The eggs produced by parasite are expelled with the bile into the intestine.

Infections of gastrointestinal nematodes usually occur by the ingestion of eggs by the young kids. These nematodes damages the mucous membrane of the small intestine, migrating larvae may cause damage to the liver and lungs and cause severe anemia and diarrhea to the host.

Man and herbivorous animals acquire infection by ingestion of moist and saw aquatic plants, contaminated vegetables or drinks, by penetrating the skin and sometimes the infection may be accidental.

The owner of goat herd must give some attention. One of the biggest health problems faced by goats is worms. We must become accustomed to have several highly effective drugs to select for the treatment of the worms. But worms are spreading and drug companies are not developing new products. So fore this an integrated parasite control program should be applied so that the number of worms, their impact on goats and their level resistance to drugs will vary from farm to farm. Internal parasite infects gastrointestinal tract, liver, lungs, blood system, lymphatic system and skin.

1.2 Significance of the Study:

The main infection of livestock i.e. goat are helminthes. Knowledge about this helminth is not sufficient. So the knowledge is not sufficient so appropriate steps or major cannot be taken. Due to lack of knowledge there is no awareness among the owners who rear goats. On the other hand the butchers also lack the knowledge about the diseases and they slaughter the diseases and ill goat which play a major role in transmission of the disease. The disease is transmitted among the herds and human being by consuming the contaminated flesh.

This study will also prove as around map for future researcher and investigators. The study will also explore the privative rate of the helminth parasites and will suggests some appropriate mitigative measure. Thus the study has got a great importance and significant itself.

Research on internal parasite is scanty in our country. And this study can help for further investigation. As the study is done this can also help to make the people aware.

1.3 Limitation of study

This study was carried out to determine the prevalence of helminth parasites but the study didn't reveal why some parasites were more predominant and other were not. The time for the study was limited as it was a dissertation research work. The problem was not only with time but the other thing was financial problem. Considering all these reason the study had to be completed within the given time frame.

2. OBJECTIVES

2.1 General objective:

- To study the intestinal helminth parasites of goat brought to Bag bazar (Kathmandu) for slaughter purpose.

2.2 Specific objectives:

- To identify intestinal helminth parasites.
- To determine the general prevalence of intestinal helminth parasites.
- To develop the recommendations for future planning regarding control of helminth parasites in *Capra hircus* (goat).
- To develop the background for the further studies.

3. LITERATURE REVIEW

Parasites are living organisms which receive nourishment and shelter from other organisms where they live. Hosts are organisms which harbor the parasites. Intestinal parasites are endo parasites that live in the intestinal wall derive nutrition from the food in the lumen and the intestinal wall in the process of which they harm the host. Most of the parasites follow a specific route in different parts of body before they are established in the intestine by which they cause variety of diseases. The intestinal parasites are generally the helminthes.

3.1 Global Context:

Tembely *et al.,* (1983-1985) conducted an investigation of helminth parasites in 284 sheep and 318 goats in Mali. They reported 9 nematodes species *Trichostrongylus columbriformis, Strongyloides ovis, Haemonchus contortus, Gaigeria pachyscelis, Strongyloides papillosus, Oesophagostomum colombianum, Trichostrongylus axei, Cooperia pectinata and Cooperia punctata;* 3 terematode species*: Fasciola gigantic, Dicrocoelium nospes, Paramphistomum* sp *and Carmyerius* sp, one larval *(Cesticercus tenuicollis)* and three cestodes *Moniezia, Stilesia* and *Avitillina.*

Muimo (1998) conducted a study on seasonal fluctuations of Trichostronghlid infection in 30 adult female and 30 kids of Boer goats on two commercial farms in Lusaka Zambia. Observations included faecal egg counts in every 14 days and larval cultural and haematological Indies every month. Eggs per gram in adults and kids peaked in February (rainy season) and in March and began to fall at the start of dry season, in May. Larval differentiation from faecal cultures showed that *Strongyloides papillosus, Haemonchus contortus, Oesophagostomum columbianum* were the most prevalent species.

Jithendran and Krishna (1990) conducted a study on prevalence of helminthiasis in small ruminants in Palampur (Himanchal Pradesh, India). Faecal examination of 325 goats was done and 93 percent goats were found to be infected with *Strongyloides* and species of *Fasciola.*

Ndao *et al.,* (1991) conducted an epidemiological survey on gastrointestinal helminthiasis in 51 sheep and 51 goats on Senegal from October 1990 to September 1991. All the animals examined were infected with at least one helminth species. Three trematodes (*Fasciola gigantica* ,*Schistosoma bovis, Amphistomum* sp*),*2 cestodes (*Moniezia expansa, Cysticercus tenuicollis)* and 9 nematodes were identified. The most important parasite in goat was *Trichostrongylus colubriformis,* while *Haemonchus contortus* in sheep.

Jithendran (1993-1997) examined the status of helminth parasites in goats and sheep in Palampur (Himanchal Pardesh) by using standard coprologic parasitological procedure and recorded the prevalence of predominant nematodes species of *Strongyloides, Trichostrongylus, Haemonchus* and *Oesophagostomum, Fascilola*, *Dicrocoelium* and *Schistosoma* among the trematodes *and Moniezia* among the cestodes.

Faizal *et al.,* (1999-2000) conducted a study on comparative weight gains in Anthelmintic treated crossbred goats turned out in the rainy and dry seasons in the dry zones of Srilanka. During this study, *Haemonchus* (72%), *Trichostrongylus* (15%) and *Oesophogostomum* (13%) were the genera of nematodes present in the untreated goats.

Silvestre *et al.,* (2000) studied the relationship between helminth species diversity, intensity of infection and breeding management in diary goat farms of South Western France. A total of 17 helminths, among which 14 nematodes, one cestode (*Moniezia* sp*)*and two trematodes *(Paramphistomum and Dicrocoelium)*were recorded.

Mondal *et al.,* (2002) conducted a study of gastrointestinal helminth in livestock grazing is grassland of Banglandesh. They released two cow calves and two goats in a grassland used for grazing of livestock. After slaughtering of the tracer animals, their gastrointestinal examination revealed six species of nematodes and one cestode. The nematode species were *Haemonchus*

contortus,Trichostrongylus axei,Mecistocirrus digitaus, Oesophagostomum sp.Trichuris sp and *Bunostomum sp.* The cestode was one of the genuses *Moniezia.* With the study, grasslands are thought to be one of the main sources of gastrointestinal parasitic diseases of livestock in Bangladesh.

Wanjala *et al*., (2002) conducted a research on prevalence of parasitic infection in small ruminants in a post oral community in Narok district, Kenya. The investigation was done in 150 sheeps and 150 goats during wet season (May –June) and dry season (August – September) and the finding showed that 52 percent of the animals were infected. The most prevalent genera of helminthes identified were *Strongyle* group.

Woldemariam (2002-2003) conducted a study on 57 lambs and 53 kid tracers during different seasons in the Mid –Rift valley of Ethiopia. In this study,the predominant worms recovered from 57 lambs were *Haemaonchus contortus (95-100%)*and *Trichostronagylus colubriformis(90-100%),* followed by *Oesophgostomum columbianum (*33-83%) and *Trichuris ovis* (8-33%). Similarly, *Haemonchus contortus* (95-100%)*Trichostrongylus colubriformis* (83-100%) were predominant in the 53 kid tracers, followed by *Oesophagostomum columbianum*(58-83%) and *Trichuris ovis* (41-74%). A significant different in eggs counts was observed with in season and sites.

Besier and Love (2003) conducted a study on intestinal parasites in sheep and goats in Australia. In this study, *Haemonchus* sp, *Trichostrongylus* sp, and *Ostertagia* sp, were predominant helminth parasites.

Regasa *et al.,* (2003-3004) were conducted a study on epidemiology of gastrointestinal parasites of ruminants in western Oromia, Ethiopia. This study showed that the overall prevalence of gastrointestinal parasites were 84.1 percent in goats. Nematodes of group *Strongyle* and *Eimeria* were the most prevalent parasites encountered in this area.

Yadav *et al.,* (2005) reported the highest incidence of gastro-intestinal nematodiasis in goats followed by buffalo and cattle in India. *Haemonchus ,Trichostrongylus, Bunostomum,*

Oesophagostomum and *Strongyloides* species were the main parasites recovered from the intestine of sheep, goats and buffaloes.

Waruiru *et al.,* (2005) conducted a study on gastrointestinal parasitic infections of sheep and goats in semi-arid area of Machakos district, Kenya. The overall prevalence were *Strongyloides* (51.6%), *Fasciola* sp (31.5%), *Coccidia* (28%),*Moniezia* sp (29.00%),*Haemonchus* (58%) was the most etprevalent nematode followed by *Trichostrongylus* (29%)and *Oesophagostomumm* (13%) .

Opera *et al.,* (2005) conducted a study on occurrence of parasitic helminthes among small ruminants reared under traditional husbandry system in Owerri, South East Nigeria. In this study, out of 2,550 small ruminants examined 71.4 percent were goats which have helminth infection rates of 78.4 percent were goats which have helminth infection rates 90.1 percent, while trematodes and cestodes were recorded 13 percent and 8.7 percent respectively. Among trematodes, *paramphistomum* infection is 86.7 percent, among nematodes *Strongyloides* 62.2 percent and among cestodes *Moniezia* 50 percent were the highest.

Human Ziehank *et al.,* (2006) conducted a study on prevention of endoparasites in sheep and goat in ecological farming. Prophylactic management, monitoring of faecal egg counts and restricted drug use were regarded suitable to reduce parasite to an acceptable level and to slow down development of drug resistance. Indoor animal husbandry.

Lima *et al*., (2006) studied the fiscal samples collected from 20 goats in Paulista, Pernambuco, Brazil from Aug 1998 – July 1999 they were subjected to eggs per gram faeces (EPG) determination and nematode larvae culture. It was shown that 82% of the samples were position for helminthes *Strongyloides, Moniezia, Trichuris* sp. ova were obtained in 72.8, 8.4 and 2.0% of the samples, respectively, while third stage larvae of *Haemonchus, Trichostrongylus and Oesophagostomum* sp. were obtained from 75.13, 24.32 and 0.54% of the samples, respectively. Then medium no. of *Haemonchus* and *Trichostrongylys* sp. larvae per gram faeces was higher in the rainy month. There was a significant correlation between EPG and temperature, EP and rainfall and EPG and the number of *Haemonchu* sp. larvae per gram faeces. *Haemonchus* sp. was presented throughout the study period.

Gianneto *et al.,* (2007) conducted a study on Biomorphology of gastro intestinal nematodes of small ruminants- under the term gastro intestinal nematodes are included numerous parasites

species of livestock belonging to the family Strongyloididae (*Strongyloides),* Strongylidae (*Chabertia, Oesophagostomum),* Trichostrongylidae (*Trichostrongylus, Ostertagia, Teladorsagia, Cooperia, Marshallagia) Molineidae, Nematodirus, Bunostomum* and *Trichuris.* The paper reviews the biomorphology aspects of the parasites as well as the controversy by the taxonomist in the classification.

Rajapahse *et al.,* (2008) collected and examined the gastro intestinal tract of 218 cross bred goats representing the dry zone of Sri Lanka during the year study period. 217 (more than 99%) of the animals examined were infected with one or more species of nematodes. 5 species of nematodes were found in the abomasums and intestine. They were *Oeophagostomum columbianus* (88%), *Haemonchus contortus* (81%), *Trichostrongylus axei* (59%), *Trichostrongylus columbriformis* (76%) and *Trichuris ovis* (59%).

Kaba *et al.,*(2008) conducted a study on prevention of infectious diseases in a goat herd- Polish legal regulations concerning goat diseases distinguish notifiable diseases and those that have to be both notified and controlled. Acute diseases in a herd are usually easy to spot by the breeder, but the disease is not always clear by the symptoms. To avoid losses proper vaccinations should be provided.

Mendes Ahid *et al.,* (2009) conducted a gastro study on intestinal parasites in goats and sheep raised in the oest region Rio Grande Do Norte, Brazil – samples of fecal of goat and sheep were collected and examined. Among 500 samples .71.2% goats and 25.7% sheep into 49.5% goats were verified gastro intestinal parasite presence. The raise prevalence was the *Strogyloides* sp.(63.3%) in second *Haemonchus* sp.*(16.9%)Trichostrongylus* sp.(12%),*Oesophagostomum* sp.(9%) being the largest prevalence rate appeared for species that shelter the parasite the category adult female.

Atlas Mehtap Guel *et al.,* (2009) conducted a study on the prevalence of Gastro intestinal Nematodes in Hair goats of Sanliurfa region. The alimentary canal was examined for the

presence of nematodes, among these 83% were found infected with nematodes. A total of 7641 nematodes were collected, 20 species were identified.

3.2 In Context of Nepal

The preliminary work on parasitic diseases of farm livestock in Nepal initiated during 1970-72 under a Swiss associated project. Surveys on common parasitic diseases were undertaken in the Kathmandu Valley and in few other districts representing hills, Terai and high mountains (Singh *et al.,* 1973). This study determined the prevalence of parasitic diseases (Liver fluke) and carried out the identification of nematodes parasites, snail species and some ectoparasites. Following this study, prevalence of parasitic diseases were carried out by other workers in different parts of the country but most of these studies were limited to the examination of dung samples for Liver fluke in buffaloes and cattle (commonly) and very rarely studied the gastro-intestinal parasites of sheep and goats.

Morel (1985) reported the common GL nematodes parasites of goats in Pakhribas Agriculture Centre (PAC) and in the Koshi hill regions in the eastern Nepal. These workers reported *Haemonchus contortus*, *Trichostrongylus* sp, *Nematodirus* sp, *Oesophgostomum* sp, *Ostertagia* sp, *Strongyloides* and *Trichuris* as the major nematode parasites present in the animals.

Ghimire (1987) analyzed the incidence of common diseases of livestock in Surkhet Veterinary Hospital and recorded the percentage of parasitic disease to be about 82 percent of the total goat case reported in the hospital of which *Fascioliasis* is the most prevalent (83%).

Dhakal and Kharel (1998) analyzed the hospital cases at Chitwan Veterinary hospital and reported the incidence of liver fluke in sheep and goats to be 26 percent and 58 percent and incidence of nematodes to be 14 percent and 5 percent respectively.

Thakur and Thakuri (1992) reported that the prevalence of the parasitic infection was 100% in goats during the month of July in western Nepal.

Jha *et al.,* (1993) analyzed the autopsy record of 266 goats carried out at Pakhribas Agriculture Centre, Dhankutta and attributed 6.4 percent mortality in goats due to GL nematodes and 3.7 percent and 1.2 percent mortality due to *Fascioliasis* and *Paramphistomiasis* respectively.

Joshi (1994) recorded 28 percent mortality in goats due to gastro-intestinal nematodes in a sedentary flock at low hill village of western Nepal in which *Haemonchus contortus* was the main worm species involved.

Thakuri (1994) found that the major clinical problem in goat was parasitic diseases which accounted for about 74 percent of the total cased of the 20,499. Helminth parasites recorded in the hill district were 34 percent trematodes, 65 percent nematodes and 1 percent cestodes.

Joshi (1995) carried out a detailed study on sheep and goats in western hills of Nepal. In this study during 12 months, a total of 4090 faecal samples were analyzed from both migratory and sedentary systems. Prevalence of worm infection ranged between 60-100 percent in ewes, 7-97 percent in adult goats and 6-100 percent in goat kids.

Dhakal *et al.*,(1996) reported the prevalence of GL nematodes in sheep and goats in Pathivara VDC of Sankhuwasawa district to be 100 percent and 85 percent respectively.

Mahato *et al.,* (1997-2000)reported an epidemiological basis of the control of fascioliosis in Nepal. Despite increased awareness of the diseases and massive increase in the use of anthelmintics, they found no impact of on the prevalence of the diseases in the last two decades. Failure to control the disease were mainly due to lack of information about it's epidemiology in the country.

Joshi (1997) carried out a detailed survey on GL parasites of sheep and goats rose under sedentary and migratory management in western Nepal and identified the parasites at the species level. He recorded a total of 20 nematodes species in these animals.

Sharma (1998-1999) conducted a study on parasitic infection in animals of Panchthar district. *Ascariasis* (43.69%) was found to be the most common followed by *Fascioliasis* (40.12%) and *Paramphistomiasis* (16.20%).

Acharya (1999) carried out a study on GL parasites of goat and sheep of IAAS livestock farm and recorded *Haemonchus, Ostertagia, Chabertia, Strongyloides, Trichostrongylus, Oesophogostomum* and *Cooperia*.

Joshi (2000*)* conducted a study for a period of one year on the epidemiology and clinical significance of gastro- intestinal nematodes on the health and production of goats raised under the sedentary and migratory management Joshi (2000) in the hills and mountains in Nepal. The finding showed that the worm burden in the migratory goats was considerably higher than that in the sedentary (management) goats throughout the year. *Ostertagia* was the predominant nematode genus present in migratory system followed by *Trichostrongylus* species with a low proportion of *Haemonchus.* In sedentary system,however, the predominant genus was *Trichostrogylus* followed by *Haemonchus.*

Nirmal (2000) conducted a study of major diseases of goats in far western region Nepal. In the study, 71 percent cases were found as parasitic diseases, among which 54.6 percent due to *Strongyloides* and 61 percent due to coccidians.

Kushwaha (2000) conducted an investigation of goat diseases under commercial rearing system from May 1999 to April 2000 in Surkhet. In this, the prevalence percentage of parasitic disease was 44 percent of which 88 percent due to *Strongyloid* species, 2 percent due to *Ostertagia* species, 7 percent due to *Haemonchus* species and 1 percent due to *Coccidia* species.

Devekota (2005/06) conducted a study on outbreak of parasitic gastroenteritis in goats under sedentary management in low hill of western Nepal. In this, study, *Haemonchus contortus* was the most prevalent species.

Jaiswal (2006) carried a study on fascioliasis in ruminant at Dhanusa district based on the examination of faecal sample brought to the DLSO Janakapur from June 15th to November 15th 2005. Total 2655 faecal samples were examined out of which 70.70 percent were positive for overall parasitic infestation. Among these, prevalence of fascioliasis was found to be 43.43

percent followed by paramphistomiasis 38.09 percent and round worms 13.43 percent. The prevalence of *Fasciola* infection was found in goat is 31.25 percent in cattle 49.36 percent and in buffalo is 56.02 percent.

Dhital (2006) conducted a study to determine the prevalence of gastro-intestinal parasites is goat at the IAAS livestock farm and Maglapur VDC- Chitwan. A total number of seven gastro intestinal parasites were found from goats. Among them, *strongyles* types (*Haemonchus, Trichostrongylus, Bunostomum, Cooperia* and *Ostertagia* and *Nematodirus*) were the commonest parasites, where as *Trichuris, Moniezia* and *Oesophagostomum* sp where less common. The faecal sample examination showed that out of 20 samples collected from the goats of IASS farm, 90 percent were po.sitive for eggs of one or more types of GI parasites, were as out of 30 samples collected from Manglapur VDC- 2, 76.66 percent were positive for eggs of these parasites.

Parajuli(2007) studied intestinal helminth parasite of goat (*Capra hirus)*found parasites of goat181(81.53%) positive samples among 222total samples from khasibazar of Kalanki Kathmandu.

Basir(2009)studied seasonal prevalence of instestinal helminth parasites of goat (*Capra hircus)*found 158(70.53%)positive sample among 224 total samples from khasibazar of kalanki Kathmandu.

4. MATERIALS AND METHODS

4.1 Study Area

Nepal is one of the richest countries in the world in terms of biodiversity due to unique geographical position and latitudinal variation. Geographically, it is 80˚4 ˝to 88 ˚12 ˝ East longitude and 26˚22˝ to 30˚ 27˝ North latitude. It is an independent, sovereign and landlocked country bordered by China to the North and India to the East, West and South. It is approximately 885 km in length ad it's mean width is 193 km with a total land area of 147,181 sq. km.

The Kathmandu Valley, located in the kingdom of Nepal is the capita city. It stands at an elevation of approximately 4,265 ft (1,300m). The cities of Kathmandu, Patan and Bhaktapur located in this valley, present a high style of Nepalese art and architecture.

Goats are most demanded common livestock species because of their wide acceptance as a source of animal protein (meat) for all religious and ethnic groups. The population of goat and meat production is estimated to be 6.6 million and 0.4 metric tons respectively which contributed 19.4 percent to the total production of the country (MOAC, 2002).

Bagbazar of Kathmandu metropolitan city is surrounded by Putalisadak and Ratnapark in east and west respectively. The study area is located at Bagbazar. The dealing and distribution if goat is done at Khasibazar (Bagbazar) for entire places of Kathmandu. Goats are brought to Khasibazar for slaughter purpose from almost all parts of Nepal and boarder area of India like Lucknow, Bahraich (UP) mainly on Sunday, Tuesday and Thursday. In these days, 7 -10 trucks carrying 200 – 250 goats on each are brought.

This study carried out for the prevalence rate of helminth infection in goats. The stool samples were collected from the study area and brought at Central Veterinary Laboratory, Tripureshwor for laboratory diagnosis.

4.2 Study Design

The study is based under laboratory examination.

4.3 Study Period

November, December 2007 and May 2008.

4.4 Sample Size

A total of 202 stool samples of were collected from Khasibazar (Bagbazar) of Kathmandu metropolitan city, which were non symptomatic samples. Mostly the goats brought were from almost all parts of Nepal and boarder area of India like Lucknow and Bahraich(UP).

To ensure better condition during sample collection, the following precautions were taken.

a. The fresh stool samples were taken.
b. The samples were collected in airtight container to prevent desiccation.
c. 3 – 4 drops of 10 percent formalin were used to preserve stool samples.

4.5 Laboratory Equipments and Materials

I. Cotton
II. Refrigerator
III. Slides
IV. Glass rod
V. Cover slip

VI. Centrifuge machine
VII. Volumetric flask
VIII. Gloves
IX. Electronic weight machine
X. Centrifuge tube
XI. Tea strainer
XII. Microscope
XIII. Pasteur pipette
XIV. Test tube
XV. Rack
XVI. Dropper

4.6 Chemicals

I. Distilled water
II. Zinc sulphate solution (33%)
III. Methylene blue
IV. Formalin (10%)

4.7 Stool Examination

The stool samples were collected and brought to laboratory in preservatives and refrigerated. The stool samples were examined by differential floatation technique, sedimentation technique and stool's counting method.

4.8 Floatation Technique

The floatation technique is widely used for the detection of nematode and cestode eggs. Eggs of cestodes and nematodes are relatively small and light. This technique ensures the eggs to float in the floatation liquid.

Three gram of stool sample was taken in a beaker and 42 ml of 33 percent zinc sulphate solution was added. With the help of motor and pestle, the sample was grinded lightly and filtered with a tea strainer. The filtered solution was poured into a plastic tube of 15 ml and centrifuged at 1000 rpm for 5 minutes. More zinc sulphate solution was added so that convex surface is formed at the top of the tube. A cover slip was placed over the top of the tube so that zinc sulphate touches the cover slip for a few minutes and the cover slip was placed on a slide and examined at 10X.

4.9 Sedimentation Technique

The technique is used for the detection of trematode eggs. It provides good results as the eggs of the trematodes are bit heavier than the other eggs and deposited at the bottom of the tube after the centrifugation with zinc sulphate solution.

A drop of deposited materials was taken out of from the test tube with the help of pipette and placed on the slide, added a drop of methylene blue into it and examined under the microscope at 10X to 40X.

4.10 Stoll's Counting Method

It is the easiest quantitative method to count the number of eggs present in the microscopic field without the help of Mcmaster (According to Dr. Tom Nola, University of Pennsylvania, 2004).

Three grams of faeces was taken in a beaker and 42 ml of water was added. Using a tongue depressor, 3gm of faeces was pushed through a sieve into the water. Then the sieve was lifted and holds over the dish. Then the remaining water was pushed out from the faeces. After stirring the water – faeces mixture, 0.15 ml of the suspension was taken and spread over two

slides. Each slide was covered with a long cover slip. Then both slips were examined for eggs. The total amount of eggs counted multiplies with 100 represents the number of eggs per gram of faeces.

Key for trematodes, cestodes and nematodes

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- Gibbons, L.M; Jacobs, D.E; Fox, M.T. and Hansen, J. (2007). Faecal examination for Helminth Parasites. *The RVC/FAO Guide to Veterinary Diagnostic Parasitology, Electronic Media Unit at the Royal Veterinary College,* London.

5. RESULTS

The study has been divided into three parts:

1) **Identification of eggs of helminth parasites**
2) **General prevalence of helminth parasites**
3) **Intensity of infections**

5.1 IDENTIFICATION OF EGGS OF HELMINTH PARASITES

Out of 202 total samples examined with the help of sedimentation and floatation technique, 161 (79.70%) samples were found to be positive.

Altogether 18 genera were observed; trematodes belonging to 2 genera, nematodes belonging to 14genera and cestodes belonging to 2 genera (Table 1).

The genera of various eggs of helminth parasites have been identified according to their characters and morphology.

Table 1: Types of genera observed in different classes

S.N.	Class	Identified Helminthes (genera)
1	Trematoda	*Fasciola*
2		*Paramphistomum*
3	Cestoda	*Moniezia*
4		*Taenia*
5	Nematoda	*Haemonchus*
6		*Trichostrongylus*
7		*Chabertia*
8		*Ostertagia*
9		*Oesophagostomum*
10		*Bunostomum*
11		*Capillaria*
12		*Trichuris*
13		*Cooperia*
14		*Nematodirus*
15		*Dictyocaulus*
16		*Dioctophyma*
17		*Strongyloides*
18		*Oxyuris*

TREMATODES

Fasciola sp (Linnaeus)

Classification

Class	-	Trematoda
Subclass	-	Digenea
Family	-	Fasciolidae
Genus	-	*Fasciola*

Description of the eggs

Eggs are 130 – 197 by 63-104 µm in size, oval shaped, yellowish in colour, consists of embryonic mass and shell, operculum usually indistinct. (Photograph no.1)

Discussion

In 1758, Linnaeus reported *Fasciola hepatica* from the bile ducts of sheep and other ruminants.

From Nepal,

In 1967 -92, Parajuli reported *Fasciola* sp 56.75 percent in buffaloes from Surkhet district.

In 1981 -82, Lohani and Jaeckle reported *Fasciola* sp from Palpa district.

In 1987,Ghimire reported *Fasciola* sp in cattle, buffaloes and goats from Surkhet district.

In 1993, Jha *et al*., reported 3.7 percent mortality in goats due to fascioliasis from Dhankutta.

In 1998 – 99, Sharma reported *Fasciola* infection 40.12 percent in animals from Panchthar district.

In 1999, Regmi, Dhakal and Sharma reported *Fasciola* infection 67.66 percent in buffaloes and 62.10 percent in cattle from Thuladihi VDC Syangja district.

In 2002 – 03 Adhikari, Shrestha and Shrestha reported *Fasciola* sp in cattle and buffaloes in Kathmandu valley.

In 2003, Rabwin *et al.,* reported *Fasciola* sp in yaks from Chandanbari, Langtang.

In 2006, Jaisawal reported *Fasciola* infection 56.02 percent in buffalo, 49.36 percent in cattle and 31.25 percent in goat.

In 2007, Mukhiya reported Fasciola infection 32.06 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Paramphistomum sp (Zeder)

Classification

Class	-	Trematoda
Subclass	-	Digenea
Family	-	Paramphistomatidae
Genus	-	*Paramphistomum*

Description of the eggs

Eggs are 114 -176 by 73 -100 µm in size, oval in shape, whitish to transparent in colour with distinct operculum knob – like thickening at the acetabular end of shell, embryonic cells distinct. (Photograph no. 2)

Discussion

In 1790, Zeder reported *Paramphistomum cervi* from the caecum of Indian patient.

From Nepal,

In 1967 -92, Parajuli reported *Paramphistomum* 35.13 percent in cattle in buffaloes from Surkhet district.

In 1982, ADPCD reported *Paramphistomum* sp in cattle and buffaloes from Kathmandu.

In 1987, Ghimire reported *Paramphistomum* sp in cattle,buffaloes and goats from Surkhet district.

In 1993, Jha *et al.,* reported *Paramphistomum* sp in goats.

In 1998 -99, Sharma reported *Paramphistomum* 16.20 percent in animals from Panchthar district.

In 2002 -03, Adhikari, Shrestha and Shrestha reported 43 percent *Paramphistomum* sp in cattle from areas of Kathmandu valley.

In 2006, Jaisawal reported 38.09 percent Paramphistomiasis in ruminants from Janakpur district.

CESTODES

Moniezia sp (Rudolphi)

Classification

Class	-	Eucestoda
Subclass	-	Anoplocephalidea
Family	-	Anoplocephalidae
Genus	-	*Moniezia*

Description of the eggs

Eggs are 56-75µm in size; triangular, globular or quadrangular in shape and contain a well developed pyriform apparatus. (photograph no.3)

Discussion

In 1810, Rudolphi reported *Moniezia expansa* from the small intestine of sheep, cattle and other ruminants.

From Nepal,In 1982, ADPCD reported *Moniezia* sp from calves and sheep.

In 1987, Ghimire reported *Moniezia* sp in cattle, buffaloes and goats from Surkhet district.

In 1989, Gupta first reported *Moniezia expansa* from goat.

In 2007, Mukhiya reported *Moniezia* infection 12.21 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Taenia sp (Linnaeus)

Classification

Class	-	Eucestoda
Order	-	Dilepididea
Family	-	Taenidae
Genus	-	*Taenia*

Description of the eggs

Eggs are 24 – 41 µm in diameter, spherical in shape, brown to dark – yellow in colour, thick shelled and contain an onchosphere. (photograph no. 4).

Discussion

In 1758, Linnaeus reported *Taenia solium* in the small intestine of man.

From Nepal,

In 1998, Paudyal reported *Taeniasis* 13.6 percent in pigs of Kathmandu and Dharan.

In 2002, Ghimire reported *Taenia* sp 1.42 percent from human female and 1.63 percent in human male.

In 2003, Karki reported *Taenia* sp 46.15 percent in Magar community to Barangdi VDC, Palpa.

In 2005, Manandhar reported *Taenia* sp 12.8 percent from stray dogs of Kathmandu.

NEMATODES

Haemonchus sp (Rudolphi)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongyloidea
Family	-	Trichostongylidae
Genus	-	*Haemonchus*

Description of eggs

Eggs are 70 – 85 by µm in size, oval in shape and embryo 16 – 32 celled when laid. (photograph no. 5).

Discussion

In 1803, Rudolphi reported *Haemonchus* species from the abomasums of sheep, cattle and other ruminants.

From Nepal,

In 1997, Joshi reported *Haemonchus contortus* in sheep and goat from western hills of Nepal.

In 1999, Acharya reported *Haemonchus contortus* in sheep and goats of IAAS livestock farm from Central Lab. Tripureshwor.

In 2000, Joshi reported *Haemonchus contortus* in goats of the hills and mountains in Nepal.

In 2006, Dhital reported *Haemonchus* sp in goats of Manglapur VDC -2 and IAAS livestock farm, Chitwan.

In 2007, Mukhiya reported *Haemonchus* infection 1.14 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Ostertagia sp (Ranson)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongyloidea
Family	-	Trichostongylidae
Genus	-	*Ostertagia*

Description of the eggs

Eggs are 80 -100 by 40 -50 µm in size, elliptical in shape, contain fully developed larva within, when laid. (Photograph no. 6)

Discussion

In 1907, Ranson reported *Ostertagia* sp from the abomasums and small intestine of sheep, cattle and other ruminants.

From Nepal

In 1982, ADPCD reported *Ostertagia* sp in pig, cattle and buffaloes from Nepal.

In 1997, Joshi, Gibbons and Jacob reported *Ostertagia nianquingtanggulaensis* in goat and sheep from western hills of Nepal.

In 1999, Acharya reported *Ostertagia* sp in sheep and goat of IAAS livestock farm.

In 2000, Joshi reported *Ostertagia* sp in the hills and mountains in Nepal.

In 2006, Dhital reported *Ostertagia* sp in goat of IAAS livestock farm and Manglapur VDC – 2, Chitwan.

Strongyloides sp (Ranson)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Orde	-	Rhabditida
Super family	-	Rhabditoida
Family	-	Strongylidae
Genus	-	*Strongylides*

Description of the eggs

Eggs are 40 -64 by 20 -40 µm in size, ellipsoidal, thin shelled, embryocated when laid. (Photograph no. 7)

Discussion

In 1911, Ranson reported *Strongyloides* sp from the small intestine of sheep, goat and cattle.

From Nepal

In 1996, Dhakal, Jha and Basnet reported *Strongyloides* in goats of Pathivara VDC, Sankhuwasava.

In 1997, Joshi reported *Strongyloides papillosus* from goat and sheep of western hills of Nepal.

In 1999, Acharya reported *Strongyloides papillosus* from goat and sheep of IAAS livestock farm, Chitwan.

In 2002 – 03, Adhikari, Shrestha and Shrestha, reported 10 percent *Strongyloides* sp among buffaloes from areas of Kathmandu valley.

In 2003, Rabwin *et al.,* reported *Strongyloides* sp in horses from Kyanjin Gompa, Langtang.

Trichostrongylus sp (Giles)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongyloidea
Family	-	Trichostongylidae
Genus	-	*Trichostrongylus*

Description of the eggs

Eggs are 79-118 by 39 -52 µm in size, oval in shape and bilaterally symmetrical, shell has a thin and transparent outer chitinous layer and a thin inner lipodial layer, embryonic mass multisegemented and varies from 16 -32 in number.(photograph no.8).

Discussion

In 1892, Giles reported *Trichostrongylus colubriforms* from small intestine of sheep, goat and cattle.

From Nepal

In 1996, Dhakal *et al.,* reported *Trichostrongylus* sp in goats from Pathivara VDC, Sankhuwasava.

In 1997, Joshi reported *Trichostrongylus axei* from cattle and goat from western hills of Nepal.

In 1999, Acharya reported *Trichostrongylus* sp in sheep and goat of IAAS livestock farm.

In 2003, Rabwin *et al.,* reported *Trichostrongylus* sp in Yaks from Chandanbari, Langtang.

In 2006, Dhital reported *Trichostrongylus* sp in goats at the IASS livestock farm and Manglapur VDC- 2, Chitwan.

Chabertia sp (Gmelin)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Strongylidea
Family	-	Trichonematidae
Genus	-	*Chabertia*

Description of the eggs

Eggs are 90 -105 by 52-55 µm in size, oval shaped, laid in morula stage. (Photograph no.9).

Discussion

In 1790, Gmelin reported *Chabertia ovina* from the colon of sheep cattle and other ruminants.

From Nepal

In 1997, Joshi reported *Chabertia* sp in sheep and goat from western hills of Nepal.

In 1999, Acharya reported *Chabertia ovina* in sheep and goat of IAAS livestock farm.

In 2007, Mukhiya reported *Chabertia* infection 0.38 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Oesophagostomum sp (Rudoiphi)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Strongyloidea
Family	-	Trichonematidae
Genus	-	*Oesophagostomum*

Description of the eggs

Eggs are 70-80 by 34-45 µm in size, oval in shape, thin shelled, embryonated when laid. (Photograph no.10).

Discussion

In 1803, Rudoiphi reported *Oesophagostomum radiatum* from the colon of cattle and water buffalo.

From Nepal

In 1982, ADPCD reported *Oesophagostomum* sp in pig, cattle and buffaloes from Kathmandu.

In 1996, Dhakal, Jha and Basnet reported *Oesophagostomum* sp in goat of Pathivara VDC, Sankhuwasava.

In 1997, Joshi reported *Oesophagostomum venulosum* in goat from western hills of Nepal.

In 1999, Acharya reported *Oesophagostomum* sp in sheep and goat of IASS livestock farm, Chitwan.

In 2006, Dhital reported *Oesophagostomum* sp from goats of IAAS livestock farm and Manglapur VDC-2, Chitwan.

Cooperia sp (Railliet)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongyloidea
Family	-	Trichostongylidae
Genus	-	*Cooperia*

Description of the eggs

Eggs are 68-82 by 34-42 µm in size, elliptical, consist of segmented ovum and a double layered covering.(Photograph no.11).

Discussion

In 1803, Railliet reported *Cooperia* sp from the small intestine and abomasums of ruminants,

From Nepal

In 1982, ADPCD reported *Cooperia* sp.in goat, sheep and buffalo from Kathmandu.

In 1997, Joshi reported *Cooperia curticei* in sheep from western hills of Nepal.

In 1997, Joshi reported *Cooperia punctata* in sheep from western hills of Nepal.

In 1999, Acharya reported Cooperia sp in goats of IAAS livestock farm and Manglapur VDC-2, Chitwan.

In 2007, Mhkhiya reported *Cooperia* infection 0.76 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Trichuris sp (Abildgaard)

Classification

Class	-	Nematoda
Subclass	-	Adenophorea
Order	-	Enoplida
Super family	-	Trichuroidea
Family	-	Trichuridae
Genus	-	*Trichuris*

Description of the eggs

Eggs are 70-80 by 30-42 µm in size, brown in colour, contain unsegmented embryo barrel shaped with transparent plug at either pole.(Photograph no. 12)

Discussion

In 1795, Abildgaard reported *Trichuris ovis* from caecum of sheep, cattle and other ruminants.

From Nepal

In1982, ADPCD reported *Trichuris trichiura* in cattle, sheep, goat and buffaloes from Kathmandu.

In 1982, ADPCD reported *Trichuris suis* in pig from Kathmandu.

In 1988, Gupta reported *Trichuris trichiura* in human from Kirtipur.

In 1996, Dhakal, Jha and Basnet reported *Trichuris* sp in goats in Pathivara VDC, Sankhuwasava.

In 2002, Ghimire reported 5.17 percent *Trichuris vulpis* among dogs of Kathmandu.

In 2006, Dhital reported *Trichuris* in goats of IAAS livestock farm and Manglapur VDC-2, Chitwan.

Capillaria sp (Zeder)

Classification

Class	-	Nemotada
Subclass	-	Adenophorea
Order	-	Enoplida
Super family	-	Trichuroidea
Family	-	Capillaridae
Genus	-	*Capillaria*

Description of the eggs

Eggs are 30-63 µm in size, barrel shaped, contain unsegmented embryo, colourless shell. (Photograph no.13).

Discussion

In 1800, Zeder reported *Capillaria* sp from the small intestine of dog and cattle.

From Nepal,

In 1982, ADPCD reported *Capillaria* sp in poultry from Kathmandu.

In 2005, Manandhar reported *Capillaria* sp in stray dogs of Kathmandu.

In 2007, Mukhiya reported *Capillaria i*nfection 0.38 percent among buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Dictyocaulus sp (Rudolphi)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongyloidea
Family	-	Dictyocaulidae
Genus	-	*Dictyocaulus*

Description of the eggs

Eggs are 82-88 by 30-33 µm in size, ellipsoidal, contain fully developed larva when laid or first stage larva may pass. (Photograph no. 14)

Discussion

In 1809, Rudolphi reported *Dictyocaulus* sp from the bronchi of sheep, goat and wild ruminants from Nepal.

From Nepal

In 1982, ADPCD reported *Dictyocaulus* sp in goat and sheep from Kathmandu.

In 2007, Mukhiya reported *Dictyocaulus* infection 0.76 percent in buffaloes brought to Santungal (Kathmandu) for slaughter purpose.

Nematodirus sp (Rudolphi)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Trichostrongylidea
Family	-	Trichostrongylidae
Genus	-	*Nematodirus*

Description of the eggs

Eggs are 152-230 by 67-121 μm in size, elliptical, contain an embryo of about eight cells when passed by the host. (Photograph no. 15).

Discussion

In 1802, Rudolphi reported *Nematodirus fiicolis* in the small intestine of sheep, cattle and other ruminants.

From Nepal

In 1985, Morel reported *Nematodirus* sp from goats of PAC and in the Koshi hill regions in the Eastern Nepal.

In 2006, Dhital reported *Nematodirus* sp in goats at IAAS livestock farm and Manglapur VDC-2, Chitwan.

In 2006, Devkota reported *Nematodirus* sp in goats from western Nepal.

Bunostomum sp (Rudolphi)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Strongylida
Super family	-	Strongyloidea
Family	-	Necatorinae
Genus	-	*Bunostomum*

Description of the eggs

Eggs are 79-106 by 47-50 µm in size, elliptical, have blunt ends and darkly pigmented embryonic cells (photograph no. 16).

Discussion

In 1808, Rudolphi reported *Bunostomum trigonocephalum* in the small intestine of sheep and goats.

From Nepal

In 1996, Dhakal, Jha and Basnet reported *Bunostomum* from goats of Pathivara VDC, Sankuwasava.

In 1997, Joshi reported *Bunostomum trigonocephalum* from sheep and goats reared under sedentary and migratory management.

In 2006, Dhital reported *Bunostomum* from goats of IAAS livestock farm and Manglapur VDC-2, Chitwan.

Dioctophyma sp (Goeze)

Classification

Class	-	Nematoda
Subclass	-	Adenophoria
Super family	-	Dioctophymatoidae
Family	-	Dioctophymidae
Genus	-	*Dioctophyma*

Description of the eggs

Eggs are 71-84 by 46-52 µm size, barrel shaped, brownish yellow in colour and shells are pitted except at the poles (photograph no. 17)

Discussion

In 1782, Goeze reported *Dioctophyma renale* in the kidneys and other organs of the dog, fox, mink and other wild carnivores.

From Nepal

No work on *Dioctophyma* sp was found. So this genus is first time reported from Nepal.

Oxyuris sp (Schrank)

Classification

Class	-	Nematoda
Subclass	-	Secernentea
Order	-	Ascaridia
Super family	-	Oxyuroidea
Family	-	Oxyuridae
Genus	-	*Oxyuris*

Description of the eggs

Eggs are 90 by 42 µm in size, elongate, slightly flattened on one side, provided with a plug at one pole (photograph no. 18).

Discussion

In 1788, Schrank reported *Oxyuris equi* in the large intestine of equines.

From Nepal,

In 1982, ADPCD reported *Oxyuris equi* from horses in Kathmandu.

In 2003, Rabwin, *et al*., reported *Oxyuris equi* from horse in Kyanjin Gompa, Lantang.

5.2 PREVALENCE OF HELMINTH PARASITES IN GOATS

5.2.1General Prevalence

A total of 202 stools samples were collected from the study area Khasibazar, Bagbazar where goats are brought from different parts of the country. The goats are kept for sale for slaughter purpose.

With the help of floatation and sedimentations technique, the collected stool samples were examined. Among them, 161 samples were found to be positive and 41 samples were found to be negative.

Therefore the positive percentage was found to be 79.70% and the negative percentage was 20.29% {the overall prevalence of different genera of helminth results statistically significant in goats (χ^2 =101.49, P<0.05, d.f. =17)}.

5.2.2 Class- wise Prevalence

Eggs of 18 genera were observed. Out of 161 (79.70%) positive samples, 140 (69.30%) samples were found positive for nematodes species, 12 (5.94%) samples were found positive for trematode species and 9 (4.45%) samples were found positive for cestode species.

The total numbers of genera observed are as follows

Trematoda	-	2 genera
Cestoda	-	2 genera
Nematoda	-	14 genera

Table 2: Types of genera observed along with different classes

S.N.	Class	Identified Helminthes (genera)
1	Trematoda	*Fasciola*
2		*Paramphistomum*
3	Cestoda	*Moniezia*
4		*Taenia*
5	Nematoda	*Haemonchus*
6		*Trichostrongylus*
7		*Chabertia*
8		*Ostertagia*
9		*Oesophagostomum*
10		*Bunostomum*
11		*Capillaria*
12		*Trichuris*
13		*Cooperia*
14		*Nematodirus*
15		*Dictyocaulus*
16		*Dioctophyma*
17		*Strongyloides*
18		*Oxyuris*

5.2.3 Prevalence of Trematode Genera

Out of 12 (5.94%) positive samples for trematodes, 2 genera were observed. Prevalence of *Fasciola* (3.46%) was found to be more than *Paramphistomum* (2.47%). The difference in the prevalence of different genus of trematodes result statistically significant (χ^2 =0.332, P>0.05, d.f. =1).

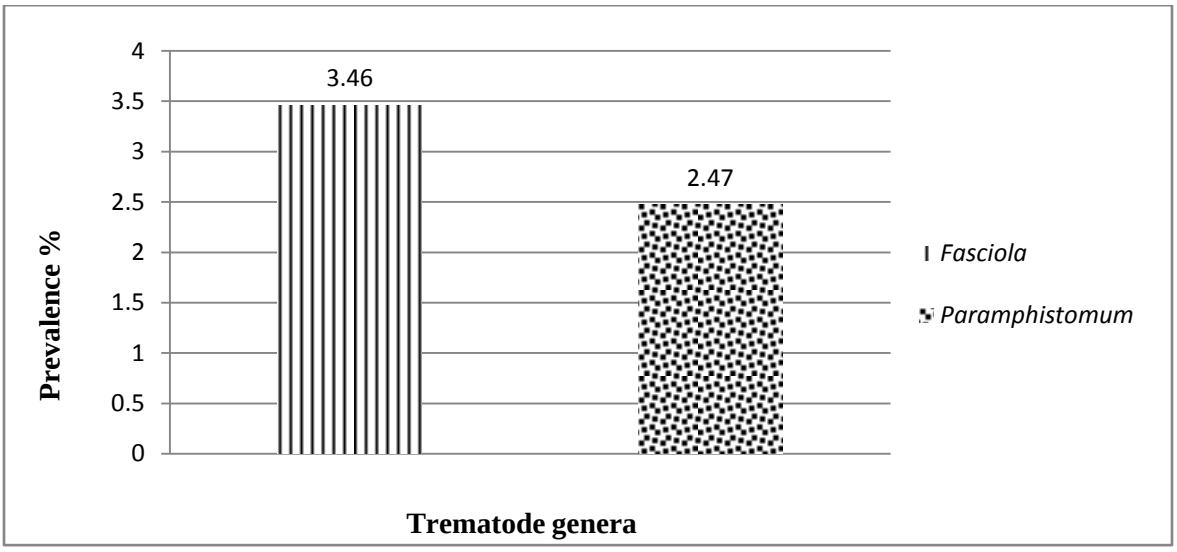

Figure 1: Prevalence of Trematode genera in goats

5.2.4 Prevalence of Cestode Genera

Out of 9 (4.45%) positive samples for cestode, only two genera were observed. Prevalence of *Moniezia* was found to be (1.48%) and *Taenia* (2.97%). The difference in the prevalence of different genus of cestode result statistically significant ($\chi^2 = 1$, P>0.05,d.f. =1)

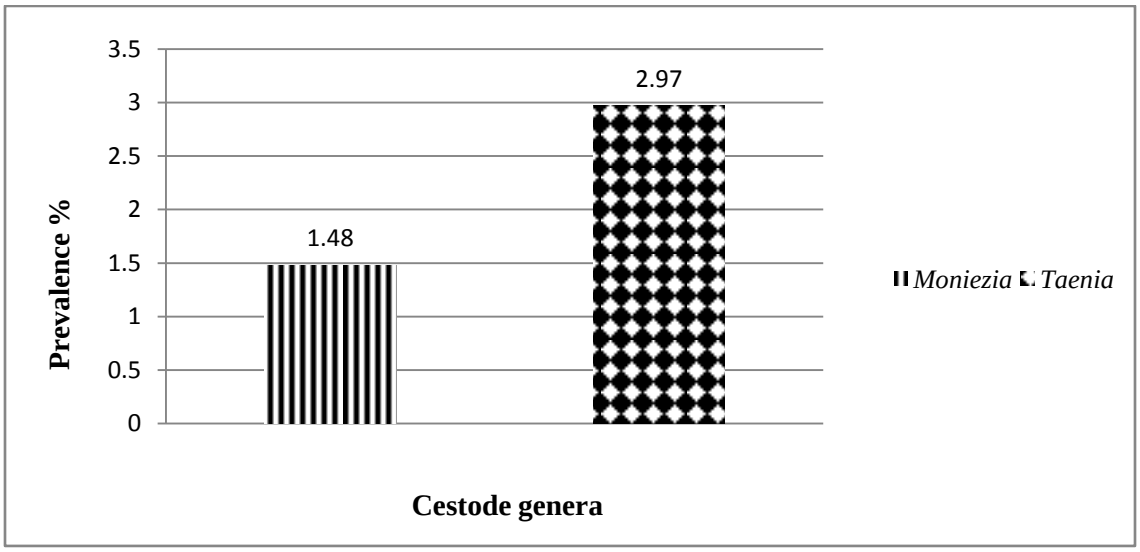

Figure 2: Prevalence of cestode genera in goats

5.2.5 Prevalence of Nematode genera

Out of 140 (69.30%) positive samples for nematodes, 14 genera were observed. *Haemonchus* sp. found (13.36%) , *Chabertia* (4.95%) *Oesophagostomum* (11.88%), *Trichuris* (7.42%), *Strongyloids* (3.46%), *Ostertagia* (5.94%), *Trichostrongylus* (2.97%), *Nematodirus* (2.97%), *Cooperia* (2.47%), *Dictyocaulus* (1.48%), *Dioctophyma (1.48%), Capillaria (5.94%), Bunostomum (0.99%), Oxyuris* sp. (0.99%). The difference in the prevalence of different genus of nematodes result statistically significant (χ^2 =84.37, P<0.05, d.f. =13).

Table 3:- Prevalence of nematode genera

S.N.	Name of genera	Total samples examined	Positive samples	
			Numbers	Percentage (%)
1	*Trichuris*	202	7	3.46
2	*Capillaria*	202	12	5.94
3	*Haemonchus*	202	27	13.36
4	*Strongyloids*	202	15	7.42
5	*Trichostrongylus*	202	6	2.97
6	*Ostertagia*	202	12	5.94
7	*Oesophagostomum*	202	24	11.88
8	*Cooperia*	202	5	2.47
9	*Nematodirus*	202	6	2.97
10	*Dioctophyma*	202	3	1.48
11	*Chabertia*	202	10	4.95
12	*Oxyuris*	202	2	0.99
13	*Bunostomum*	202	2	0.99
14	*Dictyocaulus*	202	3	1.48

5.3 INTENSITY OF INFECTIONS

5.3.1 Degree of Infections

Table 4: Degree of Infections

S.N.	Class	Name of genera	+	+ +	+ + +	+ + + +
1	*Trematoda*	*Fasciola*	2	3	4	2
2		*Paramphistomum*	2	3	_	_
3	*Cestoda*	*Moniezia*	5	4	2	_
4		*Taenia*	4	1	_	_
5	*Nematode*	*Haemonchus*	12	7	6	3
6		*Trichuria*	8	1	1	_
7		*Capillaria*	2	1	_	_
8		*Trichostrongylus*	10	3	_	4
9		*Oestertagia*	13	_	2	1
10		*Oesophagostomum*	15	2	5	6
11		*Cooperia*	4	_	_	1
12		*Nematodirus*	6	1	_	_
13		*Dioctophyma*	3	1	1	_
14		*Dictyocaulus*	2	1	1	_
15		*Chabertia*	14	4	2	_
16		*Oxyuris*	1	_	_	_
17		*Strongyloids*	4	3	4	1
18		*Bunostomum*	1	_	1	_

Note: - The figure in the column is the numbers of samples.

+ = less than 2 ova per field (light infection)

++ = 2 – 4 ova per field (mild infection)

+++ = 4 – 6 ova per field (moderate infection)

++++ = 6 or more ova per field (heavy infection)

5.3.2 Single Infection

In this study, out of 161 (79.70%) positive sample, 38 samples were found to have single infection. Among positive samples with single infection the highest 15 (39.47%) were due to *Haemonchus* followed by *Oesophagostomum* 10 (26.31%), 8(21.05%) due to *Strongyloids*.

5.3.3 Multiple Infections

In this study, out of 161 (79.70%) positive sample, 123 samples were found to have multiple infection i.e. these samples had 2 – 4 species mixed. *Oesophagostomum*15 (+) positive samples (12.19%) which was light infection,*Haemonchus* 5 (++) positive samples (4.06%) which was mild infection, *Haemonchus* 6(+++) positive samples (4.87%) which was moderate infection, the heavy infection was observed of *Oesophagostomum* 6(++++) positive samples (4.87%).

6. Discussion

It is well known that the intestinal parasites are cosmopolitan in distribution and all animals, whether humans, domestic animals or wild animals bear different kinds of parasites. Many researches have been carried out regarding the intestinal parasites of human because he is very eager to known about his health. Vetenarians are also interested to known about the domestic animals, as they are one of the income sources of people of our country.

In the present study the samples were collected from Khasibazar (Bagbazar) of Kathmandu metropolitan city. The study period was (December 2007- May 2008). Out of 202 samples were examined, 161 (79.70%) samples were found positive. The samples for trematode species were 12 (5.94%) whereas 140 (69.30%) for nematode species and 9 (4.45%) samples were found positive for cestode species.

In the present study, 2 genera of trematodes, 2 genera of cestodes and 14 genera of nematodes were found. Among trematodes, *Fasciola and Paramphistomum* were found. In cestodes, the genera found were *Moniezia* and *Taenia*. Among nematodes, *Haemonchus, Ostertagia, Oesophagostomum, Strongyloides, Chabertia, Nematodirus, Trichuris, Capillaria, Cooperia, Dioctophyma, Dictyocaulus, Oxyuris, Trichostrongylus* and *Bunostomum*.

The prevalence of trematode genera found in goats *Fasciola* (3.46%), *Paramphistomum* (2.47%). Among cestode ,*Moniezia* (1.48%), *Taenia* (2.97%) were found. In the nematode, *Haemonchus* (13.36%), *Trichuris* (3.46%), *Capillaria* (5.94%), *Strongyloids* (7.42%), *Trichostrongylus*(2.97%),*Ostertagia*(5.94%),*Oesophagostomum(*11.88%) *Cooperia* (2.47%), *Nematodirus* (2.97%), *Dioctophyma* (1.48%), *Chabertia* (4.95%), *Oxyuris* (0.99%), *Bunostomum* (0.99%) and *Dictyocaulus* (1.48%).

High prevalence of *Fasciola* (83%) has been reported from Surkhet among goats (Ghimire, 1987), followed by 58 percent from Chitwan district (Dhakal and Kharel, 1988), 31.5 percent from Kenya (Waruiru, Otieno and Mutune, 2005) and 31.25 percent infection from Dhanusa district (Jaisawal, 2006). These data show higher infection among goats compared to the present study (3.46%).

Likewise, the prevalence of *Paramphistomum* (86.7%) from south east Nigeria among goats (Opara, Nwaobasi, Okoli, 2005), 38.09 percent from Dhanusa district (Sharma 1998-99) are reported. All these show higher infections compared to the present study (2.47%).

Cestode *Moniezia* has been reported from Kathmandu and Surkhet district (ADPCD, 1982/ Ghimire, 1987/Gupta,1989) among them buffaloes, sheep, goat and cattle. In the present study, *Moniezia* has been reported among goats.

The overall prevalence of helminth parasites among goats raised under traditional husbandry system in South East Nigeria (Opara, Nwaobasi and Okoli, 2005) were 90.1 percent of which nematode infection was 78.4 percent, trematode and cestode infection were 13 percent and 8.7 percent respectively. The present study is found a bit similar to this study i.e. nematode infection 69.30percent, trematode 5.94 percent and cestode 4.45 percent.

The prevalence of helminth parasites among sheep and goats in semi-arid area of Machakos district, Kenya (Waruiru, Otieno and Mutune, 2005) were *Haemonchus* (13.36%), *Fasciola* (3.46%), *Trichostrogylus* (2.97%), *Oesophagostomum* (11.88%) and *Moniezia* (1.48%). Comparing to the present study, the prevalence of *Haemonchus* (19.36%), *Fasciola* (5.4%) has been found higher. However, infection with *Moniezia* (50%) reported from South East Nigeria (Opara, Nwaobasi and Okoli, 2005) was higher than that in the present study.

The GI nematodes reported from India (Yadav *et al.,* 2005) i.e. *Haemonchus, Trichostrongylus, Bunostomum, Oesophagostomum* and *Strongyloides* were the main parasites among goats which were found similar to the present study.

The gasto- intestinal helminth parasites reported from goats in Palampur, Himanchal Pradesh (Jithendran, 1993-1997) were *Strongyloides, Trichostrongylus,Haemonchus, Oesophagostomum, Fasciola, Dicrocoelium,Moniezia*, which were found similar to the present study. Similarly *Strongyloides, Haemonchus, Trichostrongylus, Chabertia, Cooperia, Oesophagostomum* and *Ostertagia* have been reported among goats (Acharya, 1999) is found to be similar to the present study.

Nematode *Dictyocaulus* has been reported from Kathmandu among goats (ADPCD, 1982). The same genus has been also reported from goats in the present study.

Infection with *Haemonchus*(72%) and *Oesophagostomum* (13%) among goats have been reported from dry zones of Srilanka (Faizal, Rajpaksha and Rajapaksha, 1999-2000) is greatly higher than the present study i.e. *Haemonchus* (19.34%) and *Oesophagostomum (*8.11%). But infection with *Haemonchus* (7%) among goats from Surkhet (Kushwaha, 2000) is lower than present study.

Ascaris (43.69%) reported from Panchathar district (Sharma, 1998-99) is found to be higher than the present study (1.98%).

The prevalence of *Trichostrongylus* (15%) reported from Srilanka (Faizal, Rajapaksha and Rajapaksha, 1999-2000) is a bit similar with the present study. But the prevalence of *Trichostrongylus* reported in the present study is lower than that of Kenya (29.0%) (Waruiru, Otieno and Mutune, 2005).

Prevalence of *Ostertagia* (2%) reported from Surkhet (Kushwaha, 2000) is lower than in the present study (5.94%).

Prevalence of *Strongyloids,* (88%) reported from Surkhet (Kushwaha, 2000) and 62.2 percent reported from Owerri, South East Nigeria (Opara, Nwaobasi and Okoli, 2005) is greatly higher than that in the present study (7.42%).

Wanjala *et al*., (2002) conducted a research on prevalence of parasitic infection in small ruminants in a post oral community in Narok district, Kenya. The investigation was done in 150

sheeps and 150 goats during wet season (May –June) and dry season (August – September) and the finding showed that 52 percent of the animals were infected. The most prevalent genera of helminthes identified were *Strongyle* group.

Opera *et al.,* (2005) conducted a study on occurrence of parasitic helminthes among small ruminants reared under traditional husbandry system in Owerri, South East Nigeria. In this study, out of 2,550 small ruminants examined 71.4 percent were goats which have helminth infection rates of 78.4 percent were goats which have helminth infection rates 90.1 percent, while trematodes and cestodes were recorded 13 percent and 8.7 percent respectively. Among trematodes, *paramphistomum* infection is 86.7 percent, among nematodes *Strongyloides* 62.2 percent and among cestodes *Moniezia* 50 percent were the highest.

Menkir (2007) of eastern Ethopia reported higher prevalence rate of *Haemonchus* followed by *Trichostrongylus* in goats and sheep. The worm burden was recorded highest during two rainy seasons (peaks in May and September). Thirteen species of nematodes and four species of flukes were reported. Presented study had shown highest prevalence of *Oesophagostomum, Dictyocaulus, Chabertia, Strongyloid* somewhat similarities was seen in case of no. of species of Nematodes i.e. 16 species observed in present study. Regarding worm burden the present study showed similarity during month of May/June/July.

A research work by Iyaz *et al.,* (2008) on goats of Lahore, Pakistan showed highest infection rate of nematodes (42.67%) followed by trematodes (16.67%) and cestodes (4%). But present study showed extremely higher overall prevalence rate of nematodes (91.2%), cestodes (46.85%) and trematodes (20.25%). The higher prevalence match with *Oesophagostomum* only. The difference in the result could be due to the variation in weather condition and humidity in atmosphere.

According to Islam *et al.,* (2008) the most commonly occurring gastro intestinal parasites in goats and sheep were *Emeria, Trichostrongylus, Haemonchus, Moniezia, Fasciola.* Similarly present study depicted *Oesophagostomum, Dictyocaulus, Chabertia* and *Strongyloids* as the most prevalent helminth parasites of goats.

7. CONCLUSION

The study was done to investigate the prevalence of helminth parasite in goats. During the study period of helminth parasite in goats 202 samples were collected from Khasibazar of Kathmandu metropolitan city, the positive samples 161(79.70%) were found. The positive samples for trematodes 12 (5.94%) samples for cestodes 9(4.45%) were found and the positive samples for nematodes 140(69.30%) were found.

During the present study, 2 genera of trematode, 2 genera of cestode and 14 genera of nematodes were found. The trematode genera were *Fasciola, Paramphistomum* were found. The cestode genera were *Monezia,Taenia.* The nematode genera were *Haemonchus, Ostertagia, Oesophagostomum, Strongyloides, Chabertia, Nematodirus, Trichuris, Capillaria, Cooperia, Dioctophyma, Dictyocaulus, Oxyuris, Trichostrongylus* and *Bunostomum* were found.

Nematode genus *Dioctophyma* regarding this genus less work has been reported. Other nematode genus *Capillaria* and *Oxyuris* has been reported from other host except horse and goat. The reporting of these species is very less from Nepal.

Nematodes *Nematodirus, Chabertia, Bunostomum* and *Cooperia* were reported from goats but prevalence rate has not been reported. Likewise, mixed infection with various species of trematodes, cestodes and nematodes were reported but no prevalence rate has been reported.

8. RECOMMENDATIONS

On the basis of outcome of the present study, following measures are recommended.

- Application of anthelmintics should be applied to eliminate the parasite from the host.
- The program for awareness of the meat borne diseases and zoonotic diseases to the public and butcher should be developed.
- Animal slaughter and meat inspection act should be implemented for better quality and disease free meat.
- Survey by the vet's should be implemented periodically to goat rearing areas.
- Diseased host must be separated from the herd.
- During the epidemic public must be given proper instructions regarding the disease so that there won't be heavy loss.

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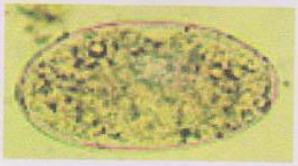
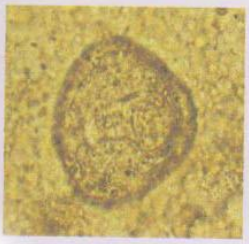
PHOTOGRAPHS

1. Egg of *Fasciola* sp (10X×4X)

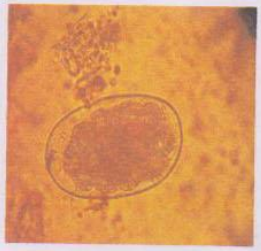


2. Egg of *Paramphistomum* sp (10X×4X)



4. Egg of *Moniezia* sp (10X×10X)

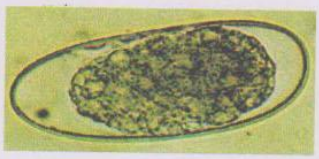
5. Egg of *Taenia* sp (10X×10X)



6. Egg of *Haemonchus* sp (10X×10X)

7. Egg of *Ostertagia* sp (10X×10X)

8. Egg of *Strongyloides* sp (10X×10X)

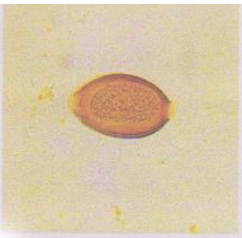


9. Egg of *Trichostrongylus* sp (10X×10X)

10. Egg of *Chabertia* sp (10X×10X)

11. Egg of *Oesophagostomum* sp (10X×10X)

12. Egg of *Cooperia* sp (10X×10X)

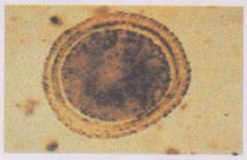


Egg of *Trichuris* sp
(10X×10X)

Egg of *Capillariea* sp
(10X×10X)

Egg of *Dictyocaulus* sp
(10X×10X)

Egg of *Ascaris* sp
(10X×10X)



Egg of *Toxocara* sp
(10X×10X)

Egg of *Nematodirus* sp
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Egg of *Bunostomum* sp
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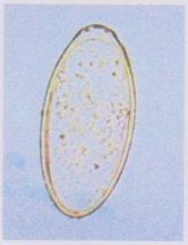
Egg of *Dioctophyma* sp
(10X×10X)



Egg of *Oxyuris* sp
(10X×10X)