Global Veterinaria 18 (3): 188-196, 2017
ISSN 1992-6197
© IDOSI Publications, 2017
DOI: 10.5829/idosi.gv.2017.188.196

Abattoir Survey in Order to Ascertain the Prevalent Trematode Parasites of Cattle in North Kashmir

[1]*Aqib Rehman Magray,* [1]*Irfan-ur-Rauf Tak,* [2]*Hidayatullah Tak,*
[1]*B.A. Ganai,* [1]*M.Z. Chishti,* [1]*Jehangir Shafi Dar and* [2]*Fayaz Ahmad*

[1]Centre of Research for Development, University of Kashmir, Srinagar - 190 006, India
[2]Department of Zoology, University of Kashmir, Srinagar - 190 006, Kashmir, India

Abstract: The aim of present study was to investigate the prevalence of trematode parasite species of cattle in various abattoirs of North Kashmir. During the present study, on spot inspection of cattle was done and visceral samples were collected from different abattoirs of North Kashmir and were examined for any probable trematode parasite. Results showed that various trematode parasites were prevalent with different levels of infection. The highest prevalence was found among the old animals of age group (A_3), followed by young animals of age group (A_1) and less prevalence in adults of age group (A_2). The Trematode parasites recovered were liver flukes; *Fasciola hepatica* and *Fasciola gagintica,* lancet fluke; *Dicrocoelium dendriticum,* & *Paramphistomum cervii,* were the only stomach fluke recovered from the slaughtered ruminants. The highest prevalent parasite found was of genus *Fasciola* (20.89%), followed by genus *Paramphistomum* (17.98 %) and the least prevalent was Genus *Dicrocoelium* (1.32%). Concurrent infection of *Paramphistomum* and *Fasciolasis* showed a marked result of (18.25%) prevalence. It was interesting that prevalence was higher in males as compared to females in all the three age groups. So, in order to prevent the cattle from the prevalence of trematode, cattle caretaker must recognize that good husbandry and household practices, a sound knowledge of animal health and regular dosage of essential medicines (antihelmintics) etc, will go a long way towards reducing the potential for diseases as well as readiness of cattle for trematode parasitic infections.

Key words: Trematode · Prevalence · *Fasciola hepatica* · *Fasciola gigantica* · *Dicrocoelium dendriticum* · *Paramphistomum cervi*

INTRODUCTION

Agriculture is the main stay of Jammu and Kashmir economy as more than 75% of population is directly and indirectly dependent on agriculture and allied sectors. Live stock is an important sector among the allied sectors of agriculture. It is one of the rapidly expanding sectors playing a significant role in the development of rural economy. Per Capita consumption of meat and poultry items is higher in Jammu and Kashmir State as compared to the consumption at the national level. In order to suffice this requirement there is an important programmed structure, regarding artificial insemination and animal health care facilities, the animal husbandry department is providing health care and breeding cover facilities to livestock population across the state through a chain of veterinary dispensaries, block level hospitals, artificial insemination centre and mobile dispensaries. Besides the advancement in all these respects in order to increase the livestock production, parasitism is an unpleasant threat to the livestock including cattle of J&K, to which no complete control has been yet taken on. Hence play an important role to take cattle towards morbidity and mortality.

Helminth parasites cause the most economic losses ravaging cattle productivity. Cattle act as the hosts to multiple species of parasitic helminthes that cause varying degree of diseases ranging from chronic forms, characterized mainly by diarrhea, dehydration, anemia and weight loss to highly acute infections resulting high mortality, reduced milk yield and reproductive rate [1, 2]. Pathogencity of these helminth parasites varies with

Corresponding Author: Irfan-ur-Rauf Tak, Centre of Research for Development, University of Kashmir, Srinagar – 190 006.

different intensity. The major endoparasitic diseases of economic importance include gastrointestinal and respiratory nematodioses, fascioliosis and cestodiosis. These infections in general produce anorexia, reduce food intake, loss of blood and plasma proteins into gastrointestinal tract, alteration in proteins metabolism, enteritis, diarrhea resulting in reduce, body weight gains, decreased milk productions, reproduction and death due to secondary infections [3, 4]. The climatic factor may favor the development of helminthic parasites during nutritional stress and wet season in tropical and semitropical areas of the world [5]. The cool temperate agro climatic conditions, traditional animal husbandry practices and poor veterinary infrastructure; abundance of alpine and sub alpine pastures are natural determining factors of incidence and severity of various parasitic diseases of livestock in these regions [6, 7]. For better and appropriate control strategies, it is important to identify helminth parasites and specific risk factors that are unique to the area and farming system. As the effects of parasites in animals vary between different climatic zones, so the research is essential in each climatic zone.

In Kashmir division so far a lot of work have been carried out in order to know the prevalence of various helminthic parasites in small as well as large ruminants, which include studies on seasonal prevalence of gastrointestinal helminthes in cattle, epidemiological studies of fasciolasis, in large ruminants, survey of helminth parasites in slaughtered sheep and goats etc. [7-12]. The present study was under taken by investigating many slaughter houses of two neighboring districts (Srinagar and Ganderbal) to know the prevalence of trematode parasites in large ruminants (Local and exotic cattle), which are slaughtered everyday throughout the year in the division of Kashmir, hence this study will stimulate the people to make strategic control against these helminth parasites.

MATERIALS AND METHODS

During this study, weekly visits were made to different abattoirs in district Srinagar and Ganderbal to collect gut samples from different localities. Information such as season of survey, species of animals, age, sex, breed and number found positive and local and exotic animals were recorded at the time of sample collection. The gut samples were minutely observed for helminth parasites. The main organs examined were stomach, intestines and liver. The abomasums, small intestines and large intestines were separated and kept in separate containers. The abomasum was opened along the side of great curvature, the contents were washed under running tap water and volume was made up to 2-4 liters after thorough mixing. The contents from bucket were sieved and residue was examined. The stomach was checked on spot and parasites were collected with the help of brush, forceps and needles and immersed in normal saline water (0.85%) available in Petri dishs. Small intestine was opened along its entire length and its contents were washed in to bucket and were minutely examined. Infected livers were taken to laboratory by immersing in sterilized polythene bags filled with normal saline (0.85%) and analyzed by normal procedures [7]. The viscera were thoroughly examined and the trematode parasites recovered were fixed in Cornoy's fixative and then kept in 70% alcohol. The parasites were then processed and mounts were prepared for their microscopic examinations and identification on the basis of morphology [13].

RESULTS AND DISCUSSION

Trematodes are one of the major problems which affect the productivity of cattle. Losses caused by the trematodes invariably depend on the prevalence, nature and intensity of infection and the management practices. A variety of factors like age, sex and breed of the host, grazing habits, level of education and economic capacity of the farmers, standard of management and anthelmintic used can influence the prevalence of helminthes [14-18]. The following results were found during the survey:

Total Prevalence of Trematode Parasites in Cattle: During the present study, total viscera of 378 from large ruminants were examined weekly in various abattoirs of the region throughout the four climatic seasons of the year 2012- 2013, among which 152 animals were found positive for one or the other trematode parasite depicting the total prevalence of 40.21%. The trematode parasites recovered were liver flukes; *Fasciola hepatica* and *Fasciola gagintica,* lancet fluke; *Dicrocoelium dendriticum,* while as *Paramphistomum cervii* were the only stomach fluke recovered from the 68 slaughtered ruminants. Concurrent infections were found in very few rare cases where in amphistomiasis and fasciolasis were present.

Seasonal Prevalence of Trematode Parasites in Cattle: The highest overall seasonal prevalence of all the three parasite species in cattle was through the autumn season which was 46.23 %, followed by spring 40.54%, summer

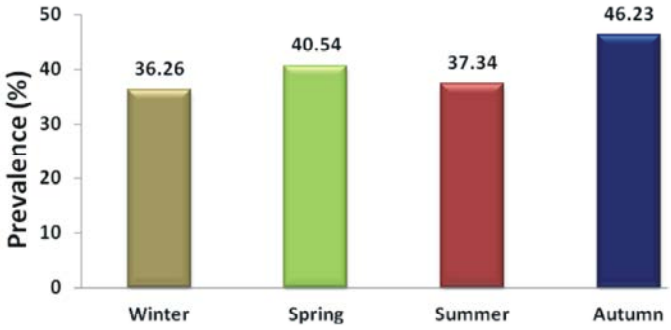

Fig. 1: Overall seasonal prevalence of parasites in cattle

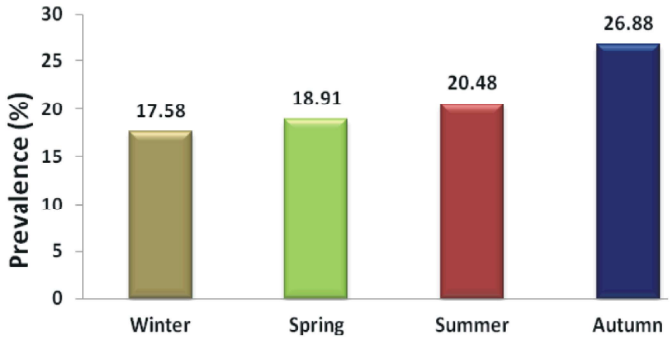

Fig. 2: Seasonal prevalence of Fasciolasis in cattle

Table 1: Overall seasonal prevalence of *Fasciola* spp., *Paramphistomum* sp. and *Dicrocoelium* sp. in cattle

Season	Total examined	Total infected	Prevalence
Winter	91	33	36.26%
Spring	111	45	40.54%
Summer	83	31	37.34%
Autumn	93	43	46.23%

Table 2: Seasonal prevalence of Fasciolasis in cattle

Season	Total examined	Total infected	Prevalence
Winter	91	16	17.58%
Spring	111	21	18.91%
Summer	83	17	20.48%
Autumn	93	25	26.88%

37.34% and winter 36.26%, respectively (Table 1 and Figure 1). By using Chi Square test, (P=0.01), which means data is statistically significant. The highest prevalence in autumn and spring seasons is in agreement with many reports around the world [9, 19, 20].This could be due to the existence of a direct relationship between prevalence with the rainfall, humidity and temperature. In this study, the presence of sufficient rainfall and moisture during the wet season favored the survival of infective larvae in the pasture, emergence of cercaria from snails which results in higher probability of uptake of the infective larvae leading to higher prevalence rate [21].

The highest prevalence of fasciolosis occurred during autumn, followed by summer and spring, while it was lowest during winter (Table 2 and Figure 2). By using Chi Square test, (P=0.03), which means data is statistically significant. The findings were found consistent with observations reported earlier [9, 19, 22]. In fact, some reported that fasciolosis is definitely seasonal and is at most restricted to two seasons of the year; autumn and spring [23, 24]. *Fasciola* cercariae and *Lymnaea* snails have been found to survive better at 25-30°C which explains, in part at least, the much higher prevalence in autumn compared to other seasons. Other studies reported that the two most important factors influencing the prevalence of fasciolosis are temperature and moisture, where both affect the hatching of fluke ova, the viability of encysting metacercariae and population of snails. Soulsby emphasized that there are at least two seasonal periods in which temperature and moisture are favourable for the rapid propagation of the parasitic life cycle. Consequently, metacercariae may show their existence in July after ingestion, which produces fasciolosis in animals.

Paramphistomiasis showed a striking boost in Spring season (21.62%), while almost stable and lower rate of prevalence was found during other seasons of the year (i.e. winter- 15.38%, summer-16.86%, autumn-17.20%)

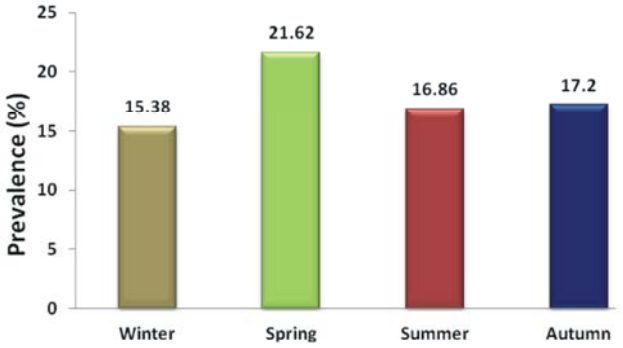

Fig. 3: Seasonal prevalence of Paramphistomiasis in cattle

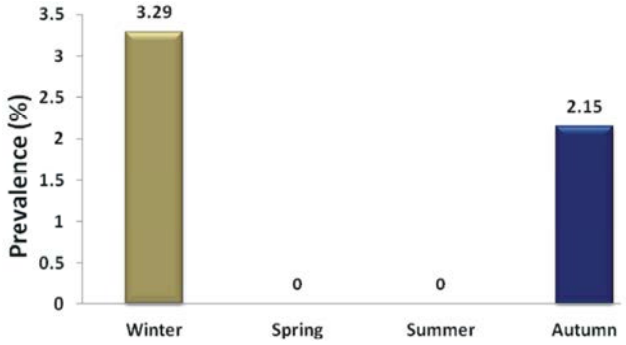

Fig. 4: Seasonal prevalence of Dicrocoeliasis in cattle

Table 3: Seasonal prevalence of Paramphistomiasis in cattle

Season	Total examined	Total infected	Prevalence
Winter	91	14	15.38%
Spring	111	24	21.62%
Summer	83	14	16.86%
Autumn	93	16	17.20%

Table 4: Seasonal prevalence of Dicrocoeliasis in cattle

Season	Total examined	Total infected	Prevalence
Winter	91	3	3.29%
Spring	111	0	0%
Summer	83	0	0%
Autumn	93	2	2.15%

(Table 3 and Figure 3). By using Chi Square test, (P=0.02), which means data isstatistically significant (Keeping in mind that overall prevalence of Paramphistomiasis is lower than fasciolosis, within all the seasons except spring where prevalence of Paramphistomiasis was higher than that of fasciolosis. This Lower prevalence of *Paramphistomum* in cattle was also recorded by Ozdal *et al.* [25] who recorded 8.95% prevalence in Turkey. Jithendran [26] from India 25.20% in buffaloes and 23.8% in cows by Juyal *et al.* [27] and 5.94% in cows by Shanila *et al.* [28] and Kanwal *et al.* [29] from India, 13.6% in cows in turkey by Sevimli *et al.* [30], 17.1% by not found [31] from Zambian, 28% in cows from Thailand by Morakot and Sakchai [32] and Kaewthamasorn and Wongsamee [33] 26.2% in sheep by Tony and Njoku [34] in Nigeria, 62.85% and 56.25% in buffaloes and cows by Bilal *et al.* [35] in Pakistan. 28.57% in sheep, 23.80% in goats, 17.64% in cows and 20% in buffaloes by Raza *et al.* [18] in Pakistan prevalence was observed. In the present study recorded data were showing nearly similarity to above mentioned workers in various countries of the world. The occurrence of paramphistomosis in an area is influenced by a multifactorial system that is composed of hosts, parasitic agents, transmission process and environmental effects as well as different climatic condition [36, 37].

Among the trematode parasites cattle was found to be least affected by Dicrocoeliasis as very few rare cases of infection was found. The prevalence of *Dicrocoelium dendriticum* remained high during winter and autumn with prevalence of 3.29% and 2.15%, respectively (Table 4 and Figure 4), which is reliable with the reports from Himachal Pradesh, India and similar reports were shown by from Doda District of J&K in slaughtered sheep of the area, where higher percentage of this infection was found in autumn and winter [26, 38- 40]. Byusing Chi Square test, (P=0.06), which means data isstatistically insignificant.

The least prevalence of Dicrocoeliasis in cattle may be attributed to the fact that in order to complete the life cycle, parasite requires two intermediate hosts (Snail and ant) and one definitive host (Cattle or sheep) and there are very less chances to get all the hosts so are very rare chances for parasite to complete life cycle [41, 42].

Age-Wise Prevalence: In case of age groups A1 (Up to 1.5 years), A2 (1.5- 3 years) and A3 (above 3 years), highest prevalence were found among the old animals of age group A3 (44.76 %), followed by young animals of age group A1 (41.56%) and less prevalence in adults of age group A2 (33.64%) (Table 5 and Figure 5). By using Chi Square test, (P=0.04), which means data is statistically significant The higher prevalence of flukes in old animals of age group (A_3) than in young animals of age group (A_2, A_1) concurs with other studies [43-45] and may be due to longer exposure time for parasitic infections during the animal life of adults (Snowballing infections while growing old). As per [46] higher prevalence of flukes in old animals of age group than in young animals can be attributed to the fact that adults rarely receive scheduled antihelminthic treatments. Furthermore it may be related to management system whereby animals of age groups (A3) are trekked to grazing areas long distance away from valleys, in moist areas during the dry season, so divulging them to metacercaria contaminated pastures as metacercaria has suitable conditions to mature in open.

Gender-wise Prevalence of Parasites: It was, though, interesting to note that prevalence was higher in males compared with females in all the three age groups (Figure 6). Normally, females are assumed to be more infected due to stress of pregnancy and parturition but results here are quite different. This may be due to the practice of stall feeding females around pregnancy and thus lesser exposure to pasture contamination, regular as well as periodic dosage of antihelmintics during the pregnancy and parturition time. Most of the researchers have observed higher rates of trematode infection/fluke burden in female hosts compared with the males [14-18, 46, 47].

Furthermore, studies on seasonal transmission patterns of flukes among management systems required to design of reasonable and lucrative worm control programmes at community level. In addition to it, proper education must be provided to cattle rears of the area by various seminars and other programmes. There must be well developed veterinary facilities and hygienic conditions in cattle rearing and grazing areas.

Table 5: Age wise prevalence of trematode parasites in cattle

Age groups	Total no. Examined	Paramphistomiasis	Fasciolasis	Dicrocoeliasis
A1	166	29/166	35/166	5/166
A2	107	17/107	19/107	0/107
A3	105	22/105	25/105	0/105
Total	378	68/378	79/378	5/378

A1 (Up to 1.5 years), A2 (1.5- 3 years), A3 (above 3 years)

Table 6: Prevalence of trematode parasites (species-wise) in cattle

Trematode Species	No. Examined	No. Infected	Prevalence
Fasciola sp.	378	79	20.89%
Paramphistomum sp.	378	68	17.98%
Dicrocoelium sp.	378	5	1.32%
Paramphistomum + *Faciola* sp.	378	69	18.25%

Prevalence of Individual Trematode Species in Cattle: The prevalence of different species of trematodes in slaughtered cattle surveyed at various abattoirs is presented in Table 6 and Figure 7. By using Chi Square test, (P=0.04), which means data is statistically significant (P<0.05). The highest prevalent parasite found was of the genus *Fasciola* (20.89 %) followed by the genus *Paramphistomum* (17.98%) and the least prevalent was the genus *Dicrocoelium* (1.32 %). During present investigation it was also observed that higher prevalence of Fasciolasis and Amphistomiasis in old aged animals as compared to young animals. These results coincide with the results reported by Fatima *et al.* [9]. They reported it in epidemiological studies in slaughter houses, livestock farms and on household cattle under the different climatic conditions in Kashmir valley. The high prevalence of fascilosis and paramphistomiasis observed in present study was in accordance to earlier reports who have reported helminth parasites from different geographical regions of the world [48, 49]. The minor difference in results may be due different geoclimatic conditions and study areas. The high prevalence of Amphistomiasis and Fasciolasis concurs with other studies [9, 50-52]. The prevalence may be due to high biological potential of the intermediate snail host [53] lack of effective drugs against these parasites especially *Paramphistomum* [52].

The results on Prevalence of trematode parasite species-wise in cattle prevails Fasciolasis as highest prevalent followed by *Paramphistomum* and least prevalent is *Dicrocoelium*. This may be due to the fact that accessibility to intermediate host as well as metacercaria involved in fasciolasis is very common in climatic conditions of the area under investigation as compared to intermediate host concerned in infections of the paramphistomes. Another reason for expansion of

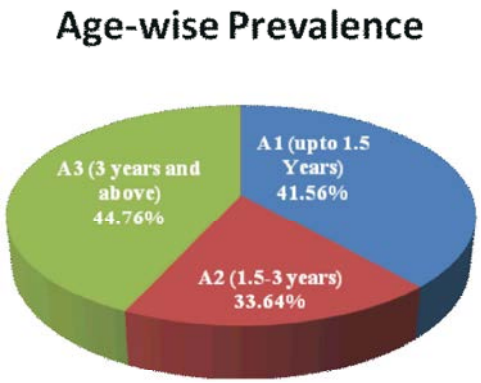

Fig. 5: Age wise prevalence of trematode parasites in cattle

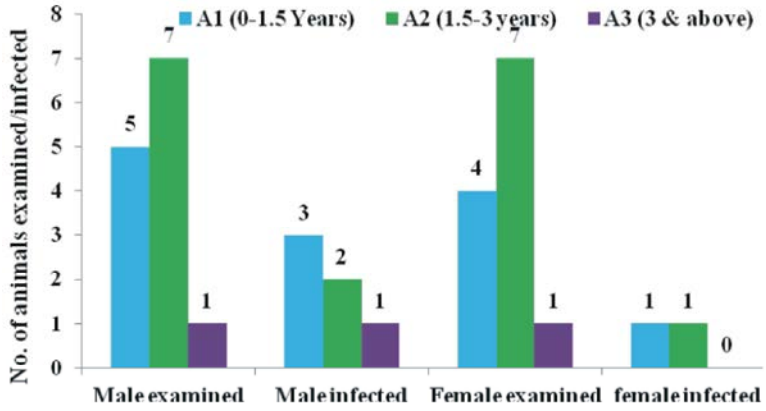

Fig. 6: Gender-wise prevalence of trematode parasites in cattle

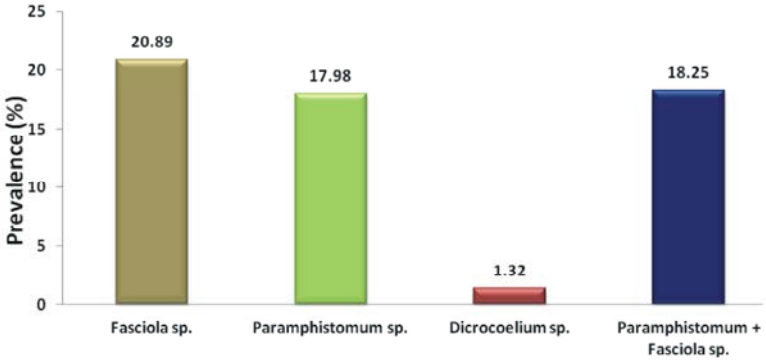

Fig. 7: Prevalence of trematode parasites (Species-wise) in cattle

more fasciolasis than paramphistomes may be due to the less exposure of the Fasciolasis to antihelmitics, wherein Fasciolasis occur in liver, less exposed to drugs as compared to paramphistomes which reside in stomach more exposed to latter. It depends on the developing sites of the two parasites. *Dicrocoelium* is less prevalent as observed in the present study; it may be due the fact that it requires two intermediate hosts (Snail and ant). Hence, there are fewer chances of conquering infections as there will be reduced availability of intermediate hosts because they require different climatic conditions as well as other requirements in order to increase their number up to toll [13]. Concurrent infection of *Paramphistomum* and Fasciolasis showed a marked result of (20.00%) prevalence. A similar result was also reported by Komoin *et al.* [46]. They reported the concurrent infections in traditional small and large-scale dairy farm cattle of Iringa district, Tanzania.

CONCLUSION

Present study concludes that old aged animals are more prone to prevalence of trematode parasites, males surmount in trematode parasites as compared to females and concurrent infections of certain parasites were rarely present. In addition to it, the main information revealed from the study is that trematode parasites are prevalent in cattle up to a great extent throughout the area and is devastating a large number of animals annually and pretense the threat too, in addition to decreasing the live-stock milk and meat yield. Hence, it is also posing great losses to economy of the area. It should be borne in mind that, in order to increase the yield of cattle as well as their number, one should suffice the important needs of cattle which will help in decreasing the prevalence of helminthes and trematode as well.

REFERENCES

1. Abebe, M., Y. Alemu and P.B. Hedge, 2002. Growth performance and mortality of Menz sheep in the traditional sector of Lallo, Mama MiderWoreda, North Shoa: Proceedings, Pastoral and Agro Pastoralism. Society of Animal Production (ESPA) Addish Ababa, Ethiopia.
2. Gorski, P., R. Niznikowski, D. Popielarczyk and H. Wedrychowicz, 2004. Natural parasitic infections in various breeds of sheep in Poland. Arch Tierz Dummesstorf, 47: 50-55.
3. Sheikh, H.U.D., M.M. Haq, M.J. Karim and M.M.H. Khan, 1983. Parasites of zoonotic importance in domestic ruminants. Pak. Vet. J., 3: 23-25.
4. Alcaíno, H., 1990. Epidemiology of fascioliasis in Chile. In: R.Ehrlich, A. Nieto and Yarzabál, L., Basic Research in Helminthiasis. Ediciones Logos, Montevideo, Uruguay, pp: 11-30.
5. Hicks, C., 1995. The role of Zambian cattle populations in socio-economic development. Livestock Research for Rural Development, 7: 20-25.
6. Tariq, K.A., M.Z. Chishti, A.S. Shawl, F. Ahmad and H. Tak, 2008. Seasonal prevalence of Gastrointestinal Nematodes according to Faecal examination of Sheep. J&K 2 Science Congress Proceedings, pp: 427-432.
7. Tak, I.R., M.Z. Chishti and F. Ahmad, 2013a. Epidemiological studies of abomasal nematodes of sheep of Kashmir Valley with particular reference to Haemonchuscontortus. Nature and Sci., 11: 34-39.
8. Gul, N., T. Hidayatullah and B.A. Lone, 2012. Global application of studying comparative electrophoretic behaviour of fasciola hepatica and fasciola gigantica– a review, DAV International Journal of Science, 1: 75-79.
9. Fatima, M., M.Z. Chishti, F. Ahmad and B.A. Lone, 2012. Epidemiological Study of Fasciolosis in Cattle of Kashmir Valley. Advances in biological research, 3: 106-109.
10. Lone, B.A., M.Z. Chishti and F.A. Ahmad, 2012. Survey of Gastrointestinal Helminth Parasites of Slaughtered Sheep and Goats in Ganderbal, Kashmir.Global Veterinaria, 8(4): (4).
11. Tak, I.R., B.A. Ganai, M.Z. Chishti and F. Ahmad, 2013b. Epidemiological studies of Ostertagiaostertagi infecting sheep of Kashmir Valley. DAV International Journal of Science, 2: 68-73.
12. Tak, I.R.S., A. Dar, J.S. Dar, B.A. Ganai, M.Z. Chishti and F. Ahmad, 2014. A brief study of morphology of Haemonchuscontortus and its hematophagous behavior. Global Veterenaria, 13(6): 960-965.
13. Soulsby, E.J.L., 1982. Helminths, Arthropods and Protozoa of domestic animals. 7th Ed. Baillier Tindall and Cassel Ltd. London.
14. Asanji, M.F. and M.O. Williams, 1987. Variables affecting population dynamics of gastrointestinal helminth parasites of small farm ruminants in Sierra Leone. Bull. Anim. Hlth Prod Afr, 35: 308-313.
15. Pal, R.A. and M. Qayyum, 1992. Breed, age and sex-wise distribution of gastro-intestinal helminths of sheep and goats in and around Rawalpindi region. Pak. Vet. J., 12: 60-63.
16. AL-Saeed, A.T.M. and N.W. AL-Khalidi, 1990. Epidemiological studies on Abomassal Nematodes of sheep in Mosul, Iraq. Journal of Veterinary Parasitology, 4: 17-20.
17. Maqsood, M., Z. Iqbal and A.H. Chaudhry, 1996. Prevalence and intensity of haemonchosis with reference to breed, sex and age of sheep and goats. Pak. Vet. J., 16: 41-43.
18. Raza, M.A., S. Murtaza, H.A. Bachaya and A. Hussin, 2009. Prevelance of paramphistomumcervi in ruminants slaughtered in district MuzaffarGarh Pakistan. Pak. Vet. J., 29(4): 214-215.
19. Gupta, R.P.C.L., N. Yadav and S. Ruprah, 1986. The epidemiology of bovine fascioliasis (*Fasciola gigantica*) in Haryana State. Ind. Vet. J., 2.63: 187-190.

20. Al-Khafaji, N.J., A.M. Ridha and M.T. Jarjees, 2003. Common parasitic infections in livers of ruminants slaughtered in Mosul abattoir, Iraq. Iraqi J. Veterinary Sci., 16: 81-87.
21. Sissay, M.M., A. Uggla and P.J. Waller, 2006. Epidemiology and seasonal dynamics of gastro-intestinal infections of sheep in a semi-arid region of eastern Ethiopia. Veterinary Parasitol., 143: 311-321.
22. Ghirmire, N.P. and N.P.S. Karki, 1996. Prevalence of fascioliasis and efficacy of various anthelmintics in buffaloes of Rural Kathamanduvetcon. N.U.A, pp: 43.
23. Swarup, D. and S.P. Pachauri, 1987. Epidemiological studies on fascioliasis due to Fasciola gigantica in buffaloes in India. Buffalo- Bulletin, 6: 4-9.
24. Chaudhri, S.S., R.P. Gupta, S. Kumar, J. Singh and A.K. Sangwan, 1993. Epidemiology and control of Fasciolagigantica infection of cattle and buffaloes in Eastern Haryana, India. Indian. J. Anim. Sci., 63: 600-605.
25. Ozdal, N., A. Gul and S. Deger, 2010. Prevalence of paramphistomum infection in Cattle and sheep in Vanprovince, Turkey. Helminthologia, 47: 20-24.
26. Jithendran, K.P., 2000. Helminth parasites- a constraint in animal health management in Himachal Pradesh. ENVIS Bulletin - Himalayan Ecology & Development, 8(2).
27. Juyal, P.D., K. Kaur, S.S. Hassan and K. Paramjit, 2003. Epidemiological status of paramphistomosis in domestic ruminants in Punjab. Parasites and diseases, 231: 235.
28. Shanila, P.K. and M. Hafeez, 2005. Prevalence of paramphistomosis in cattle in Chittoor district of Andhra Pradesh, India. Journal of Parasitic Disease, 29: 10-08.
29. Kanwal, S., S. Wadood, S. Naiz, M. Jamil, M. Irshad, M. Ilyas and I. Malook, 2014. Prevalence of Gastrointestinal Parasite (ParamphistomaCervi) In Domestic Animals of District Buner, KPK, Pakistan, Reviews of Progress, 1(44): 1-14.
30. Sevimli, F.K., M. Kose, E. Kozan and N. Dogan, 2005. Paramphistomiasis and distomatosis in cattle in the Afyon province. Turkiye.Oarasutik.Derg, 29(1): 43-46.
31. Phiri, I.K., P. Dorny, S. Gabriel, A.L. Willingham, C. Sikasunge, S. Siziya and J. Vercruysse. 2006. Assesment of routine infection methods for Porcine Cysticercosis in Zambian Village Pigs. Journal of Helminthology, 80: 69-72.
32. Morakot, K. and W. Sakchai, 2006. A preliminary survey of gastrointestinal and haemoparasites of beef cattle in the tropical livestock farming system in Nan province northern Thailand. J. Parasitology Research, 3: 306-308.
33. Kaewthamasorn, M. and S. Wongsamee, 2006. A preliminary survey of gastrointestinal and haemoparasites of beef cattle in the tropical livestock farming system in Nan Province, northern Thailand. Parasitol. Res., 99(3): 306-8.
34. Tony, R.F. Njoku, 2011. Prevalence of Paramphistomiasisamong Goats Slaughtered In Some Selected Abattoirs In Imo State, Nigeria. World Rural Observations, 3(1).
35. Bilal, M.Q., A. Hameed and T. Ahmad, 2009. Prevalence of gastrointestinal parasites in buffalo and cow calves in rural areas of Toba Tek Singh, Pakistan, The Journal of Animal and Plant Sciences, 19: 67-70.
36. Hayat, C.S., B. Hayat, M. Ashfaque and K. Muhammad, 1984. Bottle jaw in Berberi (Teddy) goat. Pak. Vet. J., 4: 183.
37. Zar, M.A., 1996. Studies on the incidence taxonomy and seats of preditection of various species of paramphistomes in buffaloes. M.Sc. thesis, Dept. Vet. Parasitol., Univ. Agri, Fasalabad.
38. Keyyu, J.D., J. Monred, N.C. Kyvsgaard and A.A. Kassuku, 2005. Epidemiology of fasciola gigantica and amphistomes in cattle on traditional, small scale dairy and large scale dairy farms in the southern highland of Tanzania, Tropical Animal Health Production, 37: 303-314.
39. Dhar, D.N., R.L. Sharma and G.C. Bansal, 1982. Gastro intestinal nematodes in Sheep in Kashmir. Veterinary Parasitology, 11: 271-277.
40. Kanwal, S., S. Wadood, S. Naiz, M. Jamil, M. Irshad, M. Ilyas and I. Malook, 2014. Prevalence of Gastrointestinal Parasite (Paramphistoma Cervi) In Domestic Animals of District Buner, KPK, Pakistan.
41. Motahar, H.M., K. Islam and J. Hur, 2000. Examination of Gastrointestinal helminths in livestock grazing in grass land of Bangladesh. The Korean Journal of Parasitology, 38: 187-190.
42. Oncel, T., 2000. The prevalence of helminth species in sheep in the southern region of Marmara. Turkiye Parazitoloji Dergisi, 24(4): 414-419.

43. Mahlau, E.A., 1970. Liver fluke survey in Zebu Cattle of Irangia region of Tanzania & the first finding of the small fluke Dicrocoeliumhospes / loos. Bulletin of epizootic diseases in Africa, 18: 21-28.
44. Silangwa, S.M., 1973. Incidence of liver flukes (Fasciolagiganticas) in Barotse cattle, zambia. Bulletin of epizootic diseases in Africa, 21: 11-17.
45. Schillhorn, V.V., 1980. Fasciolasis (Fasciola gigantic) in West Africa a review. Vertinary Bulletin, 50: 529-533.
46. Komoin, O.C., J. Zinsstag, V.S. Pandey, F. Fofana and A.N. Depo, 1999. Epidemiology of parasites of sheep in the southern forest zone of Coted'Ivoire. Revue-d'Elevage-et-de-Medecine-Veterinaire-des-Pays-Tropicaux, 52: 39-46.
47. Valcarcel, F. and R.C. Garcia, 1999. Prevalence and seasonal pattern of caprinetrichostrongyles in a dry area of central Spain. J. Vet. Med. Series B., 46: 673- 681.
48. Mondal, M., M. Khyrul-Islam, J. Hur, L. John-Hwa and B.K. Beak, 2000. Examination of gastrointestinal helminth in livestock grazing in grassland of Bangladesh. The Korean J. Parasitol., 38(3): 187-190.
49. Pandit, B.A., R.A. Shahardar, M.M. Darzi, M.A.A. Banday and A.S. Bhat, 2003. Survey of Gastrointestinal nematodes in sheep of Kashmir Valley. Indian Journal of Small Ruminants, 9: 39-42.
50. Nyundo, B.A., 1994. Studies on amphistomes of domestic ruminants in Kasulu district, Tanzania, M.sc dissertation. University of dare-es-salaam, Tanzania.
51. Szimidt-Adjide, V., M. Abroyus, C.C. Adjide and G. Dreyfuss, 2000. Prevalence of Paramphistomumdaubneyi infection in cattle. Veterinary Parasitology, 87: 133-138.
52. Mage, C., H. Bourgne, J.M. Toullien, D. Rondelaud and G. Dreyfuss, 2002. Fasciola hepatica & paramphistomumdaubneyi; changes in prevalence of natural infections in cattle and in lymneatrancatula in central france over 12 years. Veterinary Research, 33: 439-447.
53. Dinnik, J.A., 1964, Intestinal paramphistomiasis & calicophoronmicrobothrium Fischoeder in Africa. Bulletin of epizootic diseases in Africa, 12: 439-454.