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Author

**Plagiarism Certificate**

I, Manas Chandra Das would like to strongly assure that I have performed all the work furnished here in this report. The information has been collected from national and international journals and other references. All references have been acknowledged duly.

Therefore, I hold entire responsibility of collection, preservation and publication of all data accumulated here in this report.

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The author

September, 2015

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**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| **ABBREVIATIONS** | **ELABORATION** |
| **UVH** | Upazila Veterinary Hospital |
| ***et al.*** | And his associates |
| **gm** | Gram |
| **etc** | Etcetera |
| **n** | Number |
| **%** | Percentage |

**ABSTRACT**

The present investigation described some epidemiological aspects of fascioliasis in cattle population of Subarnachar upazila, Noakhali, Bangladesh. Coprological examination of cattle registered at UVH (n=39) and cattle case of personal call from surrounding area of upazila (n=08) was performed during January to March, 2015. The overall prevalence of fascioliasis was 57.45% and all positive cases were infected with *Fasciola gigantica*. The prevalence of disease was significantly higher in female and younger cattle as compared to male and adult cattle. The magnitude of disease was significantly higher in grazers followed in order by ground and trough feeders. Prevalence of disease was higher in population provided with river water followed by pond water and tap water. Seasonal de-worming is essential. Pasture management by creating bio competent environment with snail predators can be very effective in reducing the rate of incidence and controlling the problem. This study will provide necessary information regarding fascioliasis in cattle of Subarnachar for their effective control and hence for a better production which will be beneficial resource to poor people where livestock rearing is one of the important sources of livelihood.

|  |  |
| --- | --- |
| **Key words:** Prevalence, Risk Factors, *Fasciola gigantica,* Cattle, Subarnachar. | |
|  |

**CHAPTER 1**

**INTRODUCTION**

Livestock is an important component of the mixed farming system practiced in Bangladesh for centuries. Ruminant, especially cattle and goats constitute the major portion of the livestock. Most of these animals are reared under smallholder traditional management system in rural areas. The management practices of animals and geo-climatic condition of Bangladesh are favorable for the occurrence of various diseases. People from the neighboring areas bring their sick animals to the Veterinary hospital every day. Analysis of the case record gives a comprehensive idea about the disease problems at local areas. (Hossain *et al.*, 1986; Das and Hashim, 1996; Samad *et al.*, 2002),

Domestic ruminants in Bangladesh are at continuous risk of infection with one or more harmful helminths and the extent of financial losses is estimated between 25 and 30 million sterling pounds annually (Rahman, 1999).

Helminthiasis, especially Fascioliasis constitutes a serious health problem and limitation to the productivity of ruminants throughout the world due to the associated morbidity, mortality and cost of treatment and control measures (Silvestre *et al*., 2000). In Bangladesh, parasitism has been considered as one of the major constraints of livestock production. Among the parasitic diseases, Fascioliasis is an economically important of livestock particularly in cattle, sheep and goats. The prevalence of Fascioliasis among ruminants in Bangladesh is rampant and the economic loss from this disease is considerably high. It is reported that *F.* *gigantica* is the most prevalent and economically important liver fluke in Bangladesh. Despite the wide prevalence of the malady and huge loss sustained from it, no epidemiological study on the disease have so far been undertaken at Subarnachar Upazila in Noakhali district of this country. Therefore, in this study, an attempt was made to record the prevalence of fascioliasis in cattle associated with the influence of age and sex on the prevalence and to correlate between fluke and seasonal changes.

The overall prevalence of *Fasciola gigantica* in cattle and also its relationship with age, sex, breed, grazing pattern and seasons has been described in this paper. So, for controlling the disease in this area, appropriate preventive control strategies have to be designed to reduce the impact of the disease on livestock production in Bangladesh.

**CHAPTER 2**

**MATERIALS AND METHOD**

**Study Area**

This clinical study was undertaken at the Upazilla Veterinary Hospital (UVH), Subarnachar and surrounding area of that upazila in Noakhali. The Meghna riverine areas are used as pasture for grazing of livestock. The soil contains alluvial deposits which results in the stagnation of water, being one of the suitable habitats of snails.

**Study Period**

The work was done for the two months study period from January to March, 2015.

**Study Population**

A total of 47cattle of different age and sex registered at UVH and found within the confines of the respective area were screened. Of which, 8 cattle was of personal call. Rests were brought to the UVH by their owners.

**Sample Collection**

After taking all the relevant information, the fecal samples were collected directly from the rectum of the animals or immediately after defecation. Before collection, the animals were restrained properly and all possible hygienic measures including wearing apron, hand gloves and gumboot were taken to avoid contamination. About 15-25 grams of feces were collected from the animals. Each sample was kept in separate polythene bag, tied carefully and numbered properly.

**Diagnosis**

Presumptive diagnosis was made on history of enzootic area and following clinical signs under **(1) physical examination** showed by the animals of personal call in field areas -

Loss of body weight.

Dullness and depression, roughed body coat and Inappetancy.

Pale mucus membrane and conjunctiva.

Diarrohoea with characteristic foul odour.

Submandibular edema (Bottle Jaw).

Greasy feces (Staturrohoea).

 

**Figure 1:** Submandibular edema **Figure 2**: Greasy feces

Confirmative diagnosis was made through (2) microscopic examination of fecal samples and identification of egg of parasites.

**Microscopic Examination**

Direct Smear method was followed to detect the fluke eggs in fecal samples as described by Thienpont *et al.*(1979). The eggs of *Fasciola* *gigantica* of were identified according to the keys described by Thienpont *et al.* (1979) and Soulsby (1983). A drop of fecal sample was taken on a petridish, thoroughly diluted with few drop of water, few drop taken on slide, covered with cover slip and examined under microscope using both low and high power of magnification (10X and 40X) for the identification of *Fasciola gigantica* egg.

 ****

**Figure 3:** Feces sample **Figure 4:** Feces mixing withwater

** **

**Figure 5:** Slide preparation **Figure 6:** *Fasciola gigantica* egg

**CHAPTER 3**

**RESULTS**

Out of a total of 47 cattle case during the period of study, 39 were registered at UVH and 8 were of personal call from surrounding area of the upazila. Out of the 39 registered cattle at UVH, 24 (61.54%) were infected. Sixteen (16) of these were males with infection rate of 8 (50.00%), while 23 were females with infection rate of 16(69.57%). On the other hand, out of the 8 cattle of personal call from surrounding area of UVH, 3 (37.50%) were infected. Only one of these was male with infection rate of 0 (00.00%), while 7 were females with infection rate of 3(42.86%).

**Table – 01: Overall prevalence of Fascioliasis**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Source With**  **Number of Case** | **Sex** | **Total Case** | **Positive Case** | |
| **UVH**  (39) | Male | 16 | 08 (50.00%) | 24  (61.54%) |
| Female | 23 | 16 (69.57%) |
| **Personal Call**  (08) | Male | 01 | 00 (00.00%) | 03  (37.50%) |
| Female | 07 | 03 (42.86%) |
| **Total** |  | 47 | 27 (57.45%) | |

Table -01shows thatthe overall prevalence of Fascioliasis was 57.45%,(27out of 47) in study area.

**Figure 7:** **Prevalence of Fascioliasis according to sex group and also considered negative case.**

Figure-07 shows that female cattle (40.43%) were affected more with fascioliasis than the males (17.02%).

**Table-02:** **Age and Sex wise prevalence of Fascioliasis**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Source** | **Sex** | **Positive case** | **6months-1year age** | **1-2 years age** | **2-3years age** | **>3 years age** |
| **UVH**  **(39)** | Male | 08 | 02 | 05 | 01 | 00 |
| Female | 16 | 05 | 09 | 01 | 01 |
| **Personal call**  **(08)** | Male | 00 | 00 | 00 | 00 | 00 |
| Female | 03 | 00 | 02 | 01 | 00 |

Table-02 shows that in young female cattle of 1-2 years of age fascioliasis was recorded higher (40.74%).

**Table-03:** **Prevalence of fascioliasis on the basis of different managemental and animal related** **factors.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factors** | | | **Percentage (%) of infection** | |
| **Fecal egg (+ve)** | **Fecal egg (-ve)** |
| **Animal**  **Related**  **Factors** | Breed | Local | 12 (44.45%) | 15 (75.00%) |
| Cross | 15 (55.55%) | 05 (25.00%) |
| Sex | Male | 08 (29.63%) | 09 (45.00%) |
| Female | 19 (70.37%) | 11 (55.00%) |
| Body Condition | Cachectic | 24 (88.89%) | 08 (40.00%) |
| Normal | 03 (11.11%) | 12 (60.00%) |
| **Managemental**  **factors** | De-worming | Yes | 06 (22.22%) | 16 (80.00%) |
| No | 21 (77.78%) | 04 (20.00%) |
| Watering | River, Pond water | 19 (70.37%) | 06 (30.00%) |
| Deep water | 08 (29.63%) | 14 (70.00%) |
| Snail Control | Yes | 00 (00.00%) | 00 (00.00%) |
| No | 27 (100.0%) | 20 (100.0%) |
| Feeding | Posture-land grazing | 14 (51.85%) | 08 (40.00%) |
| Stall feeding | 13 (48.15%) | 12 (60.00%) |
| Rearing | Back yard | 16 (59.26%) | 17 (85.00%) |
| Bathan | 11 (40.74%) | 03 (15.00%) |

Table-03 shows that, controlling of snails influenced to a great extent. There was no record of snail controlling neither in back yard farming nor in bathan system.

Cattle of cross breed were highly infected 15 (55.55%) where fecal egg negativity was of 05 (25.00%) due to their lower disease resistance and insufficient nutrition provided by the owner and climatic in-adaptation. Cattle in which de-worming was done were also infected and rate of infection was 06 (22.22%) may be due to drug resistance from continuous use of same anthelmentic at under dose where rate of infection in cattle which were not de-wormed was 21 (77.78%). Watering of cattle with water from river and pond influenced to a great extent and rate of infection was 19 (70.37%).

**CHAPTER 4**

**DISCUSSION**

Overall 57.45% prevalence of fasciolosis was recorded in cattle which could directly be related to the geography of the study area. Presence of low lying and swampy areas (suitable habitat of snail population) was most important cause of higher prevalence rate in Subarnachar upazila. Furthermore, unhygienic measures adopted by farmers were another reason for higher prevalence of fasciolosis in Subarnachar.

The epidemiology of *Fasciolosis* has been studied by several authors in different countries (Honer and Vink, 1963; Boray, 1963; Ross, 1967; Boray *et al*., 1971; Ollerenshaw, 1971; Armour, 1973; Shaka and Nansen, 1979; Smith, 1981; Melendez *et al*., 1983). All of these authors agree that climatic factors i.e., rain fall and temperature, play very important role in the epidemiology of *F.gigantica*, since the population dynamics of the snail intermediate host is affected by them.

In various countries of the world, lower prevalence was also reported ( Hussein, A.N.A. and R.M.A. Khalifa, 2010 and Hassan, K. Roy, Q. Banu, 2011) which might be attributed to variation in agro-ecological conditions; those were less favorable for disease propagation.

Higher prevalence was also observed in different parts of the world (Khan, M.K., M.S. Sajid,2013). This higher prevalence might be associated with non-adoption of control measures, development of resistance against flukicides (Personal communication), indiscriminate animal trade and availability of favorable agro-climatic conditions which help in disease propagation (Jabbar, A. Z. Iqbal,2006).

The probable reason for highest prevalence in winter might be the availability of optimal environmental conditions for the growth, transmission and development of parasitic life cycle stages including temperature humidity which helps in maximal growth of parasite and snail (M.N. Khan,2009; Rowcliffe,1960; M. Shahzad, A. Hussain,2013).

Reports on the duration and period during which animals are exposed to infection with *F. gigantica* vary between habitats and the rate of infection is not constant throughout the year but concentrated over a relatively few months (Spithill *et al*., 1999). The proportion of animals passing fluke eggs increased gradually from the early dry season and peaked at the end of the dry season and the early part of the rainy season (Keyyu *et al*., 2005).

The higher percentage of infection in the females cannot be explained exactly but it might be assumed that hormonal influence as well as stress leading to immune-suppression may be associated with this phenomenon. . Liyod (1983) reported higher level of prolactin and progesterone hormones make the individual more susceptible to any infection. The change of physiologic condition during lactation (productive activity) and/or lack of proper nutrition for production and due to long time exposure of the animals to disease entity and their heavy grazing in submerged areas might be the cause of greater prevalence rate in females.

The study further reveals that animals sex showed an association with the prevalence of the parasites, it was observed that females were more infected than their counter partners this is in consistent with Dhar *et al*.; Fatima *et al.* . This could be due to the physiological peculiarities of female animals, which usually constitute stress factors thus, reducing their immunity to infections and for being lactating mothers. Females are usually weak and malnourished and consequently are more susceptible to infections besides some other reasons (Blood, D.C. and O.M. Radostits, 2000).

Prevalence of *Fasciola* was highest in young age group than in adult. Few reports of higher prevalence in young animals was only limited to areas where Fasciolosis was hyper-endemic and animals get infection shortly after birth. Dagnachew *et al*. reported higher prevalence in young animals. The results were different from the finding of Ahmad 2012, Hassan *et al*. and Mbaya *et al*. The higher prevalence in adult age group was due to long subclinical phase of disease in host which takes 4-6 months for the completion of complete life cycle and manifestation of clinical disease in animals. Another reason of higher prevalence in adults might be due to compromised immunity.

A higher prevalence rate recorded in younger animals as compared to adult ones is in agreement with Firreria *et al*. , Nganga *et al*. from different countries of the world. The reason behind this observation may be the fact that younger animals are more susceptible to infections than adults. Adult animals may acquire immunity to parasites through frequent challenge and expel the ingested parasite before they establish infection.

The explanation for the lower prevalence in higher age group compared to younger age group could be due to the so called self-cure phenomenon (Fryod, 1975; Assanji, 1988) and/or high acquired immunity which increase with age. It has been reported that host may recover from parasitic infection with increasing age and hence become resistant (Winkler, 1982).

The biology of the larval stages of flukes, and also of the snail hosts is influenced to a great extent by ecological factors such as temperature, water quality and speed of water currents, etc (Sponhollz and Short, 1976; Bundy *et al*., 1983; Fagbemi, 1984). The occurrence of *Fasciola* infections throughout the year is suggestive of the fact that essential requirements for the completion of the life cycle of the fluke, i.e., high moisture, moderate temperature and availability of the snail intermediate host, are continually present in that region.

Current study revealed that grazing practice and provision of river water were strongly associated husbandry practices with the prevalence of fasciolosis in the study area. Large ruminants often pasture throughout the year. Some months of year have reduced pasture availability that forces the animals to graze in swampy areas (Personal observation) thus exposing them to heavily infected pasture with metacercariae of *Fasciola* (Soulsby, E.J.L., 1982).

**CHAPTER 5**

**CONCLUSION**

Fascioliasis is one of the major parasitic problems affecting health and productivity of cattle, even detrimental to cattle population. By fecal sample examination, an overall 57.45% *Fasciola* *gigantica* infection was detected in cattle at Subarnachar upazila, Noakhali district, Bangladesh. Age and sex of cattle had significant influence on the prevalence of fasciola infection. Only the prevalence rate was investigated in this study. The effects of parasites in production performance of cattle are essential to be studied which would be more beneficial for the farmers. So, further study should be carried out to determine the economic losses due to *Fasciola* *gigantica* of cattle and to find out effective control measures against it. However, particular emphasis should be given to proper management, regular de-worming and improved hygiene, to prevent the parasitic infections in cattle.

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**ANNEX**

**Questionnaire**

**Case No. Date**

Name of the owner: ……………………………………………………………….

Address: …………………………………………………………………………………

**Species: Cattle**

**Age: (a)** 6 months – 1 year (**b)** 1 – 2 years **(c)** 2 – 3 years (**d)** > 3 years

**Sex:** **(a)** Male **(b)** Female

**Breed:** **(a)** Local **(b)** Cross

**Body Condition:** **(a)** Normal **(b)** Cachectic

**Feces:** **(a)** Normal **(b)** Diarroheal **(c)** Bloody

**Edema:** **(a)** Present **(b)** Absent

**De-worming:** **(a)** Yes **(b)** No

**Snail Control:** **(a)** Yes **(b)** No

**Feeding:** **(a)** Posture land grazing **(b)** Stall Feeding

**Watering:** **(a)** River or pond water **(b)** Deep water

**Rearing:** **(a)** Bathan **(b)** Back yard

**Diagnosis: Fascioliasis- Positive/ Negative**

**BIOGRAPHY**



Manas Chandra Das, son of Amal Chandra Das and Tapoti Rani Das at present is an intern veterinarian under the Faculty of Veterinary Medicine in Chittagong Veterinary And Animal Sciences University (CVASU). He passed the Secondary School Certificate (SSC) examination in 2006 followed by Higher Secondary Certificate (HSC) examination in 2008. In future he wants to do research on animal welfare and Zoonotic diseases having public health significance in Bangladesh.