

ON MORPHOLOGY OF *FASCIOLA GIGANTICA* COBBOLD, 1885 RECOVERED FROM RUMINANTS OF A COLD DESERT – LADAKH**Kuchai J.A. *, Chishti M.Z., Ahmad F. and Dar S. A.**

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(*E-mail-kuchayjk@gmail.com)**ABSTRACT**

Fasciola gigantica is one among the most common trematode parasites infecting the liver of ruminants throughout the world and poses a threat to livestock mostly by damaging the liver of the hosts especially in heavily infected animals. In the present study a large number of flukes were recovered from the livers of ruminants of Ladakh. The morphological studies of these specimens revealed that they possess all the diagnostic characters of the species *Fasciola gigantica* Cobbold, 1885 as regards their shape and size of body, size of suckers, ovaries, and testes etc. However several minor intraspecific variations in size ratio of various body organs were observed as mentioned in table 1. Hence the present species were assigned to *Fasciola gigantica* Cobbold, 1885. The parasite has been reported for the first time from this region and hence it forms the first report. In addition some of the morphological parameters have been described for the first time which were not described by the previous authors these parameters could be of great taxonomic importance. A detailed summary of the parasite is given in the result section of the present paper.

KEY WORDS: *Fasciola gigantica*, Ladakh, Morphology, Ruminants**INTRODUCTION**

Fasciola gigantica is one among the common trematode infections in ruminants throughout the world with varying prevalence and minor intraspecific changes in morphology of the parasite depending on the locality and season of the study area as well as age, species etc of the host (Kendell, 1965; Kuchai *et al.*, 2011a). The parasite inhabited the liver of the host and causes a serious problem in heavily parasitized and small animals. The parasite has been reported and described for the first time by Rudolphi (1819) and since then it has been redescribed by many other researchers (Ben Dawes, 1968; Soulsby, 1982; Fayaz, *et al.*, 2009). The parasites has been reported from the livers of ruminants from different parts of the world as well as from the other two regions (Jammu and Kashmir) of the state of Jammu and Kashmir but not from the Ladakh the third region of the same state with a different climatic condition as being the only cold desert of the world, (Bhalerao, 1935; Bali, 1976; Cobbold, 1889; Blaise, 2001; Aydenizoz, *et al.*, 2002; Al-Khafaji, *et al.*, 2003; Aysha and Khan, 2008).

Study area: Ladakh (the only cold desert of the world) constitutes one among the three main regions of the Jammu & Kashmir State which lies between 32.17 and 36.58 North latitudes and 73.26 and 80.26 East longitudes. This region falls under the districts of Kargil and Leh, the later lies at a comparatively higher level around 3800-5,900 meters from the sea level as compared to the former 2900-4500. The most striking feature of Ladakh region is the mountain ranges that stretch from the southeast to the northeast. Although most of Ladakh is mountainous, yet there are many valleys lying in the lap of the mountain ranges such as the Great Himalayan range, the Zaskar range, the Ladakh range and the Karakoram Range. As like all other high altitude mountainous region, Ladakh is sparsely populated (*ca.* 1,50,000) *i.e.*, only two persons per square kilometer. Although life is difficult at high altitudes yet both man and other animals survive here comfortably as revealed by the diversity of animals (Majid Hussain, 1985).

MATERIALS AND METHODS

A systematic sampling procedure was followed for the collection of samples and the samples thus collected were processed following the standard methods of Maqbool *et al.*, (1994). The bile ducts of livers were opened and visible parasites were removed and placed in normal saline. Some strips, each approximately 10mm thick were removed and placed in plastic jar containing normal saline for further processing, for the collection of microscopic parasites. The parasites were fixed in Carnoy's fixative and preserved in 70% alcohol, the preserved material was taken out of the preservative and was stained in aceto alum carmine. After staining the material was subjected to dehydration by passing it through various grades of alcohol viz., 30%, 50%, 70%, 90%, 100% I and 100% II. The time duration in each grade was 5-10 minutes. After complete dehydration the material was transferred to a clearing agent (xylene in this study). The dealcoholized material was mounted in canadabalsam or DPX on glass slides for a detailed morphological study. The drawings of the parasites or parts of parasites were made with the help of prism type camera lucida for morphometry. Photomicrography was done with the help of Digital Olympus Camera. Faecal samples were collected in collection tubes containing 10% formalin and were examined by direct smear, flotation and sedimentation techniques for the presence of eggs (Urquhart *et al.*, 1988). Identification of adult flukes as well as eggs was done on the basis of various morphological and morphometric characters (Soulsby, 1982; Yamaguti, 1959).

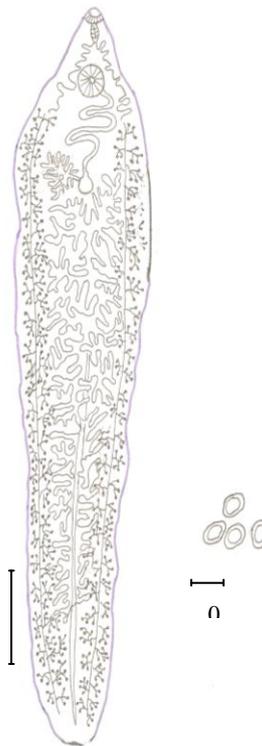
RESULTS AND DISCUSSION

Taxonomy

Fasciolidae	Railliet, 1895
Fasciolinae	Stiles <i>et</i> Hassali, 1808
<i>Fasciola</i>	Linnaeus, 1758
<i>Fasciola gigantica</i>	Cobbold, 1885



Fasciola gigantica Cobbold, 1885



Figures 1-2. *Fasciola gigantica* Cobbold, 1885 (1) Entire fluke (2) Eggs

A large number of digenetic trematodes belonging to genus *Fasciola* Linnaeus, 1758 were recovered from the livers of ruminants of Ladakh during the present study. On close examination the present specimens were found to agree with the known description of *Fasciola gigantica* Cobbold, 1885 on the basis of various morphological and morphometric characters viz; colour, shape, length, width, size, shape and position of various internal organs. The eggs of this parasite species were also recovered from the feces of the host species. The parasite being recorded for the first time from this region is briefly redescribed with some intraspecific variations as under.

Description: Comparative characteristics have been given in Table 1. *Fasciola gigantica* Cobbold, 1885 is more cylindrical, large, narrow, grayish-brown in colour and even more leaflike in shape than *F. hepatica* Linnaeus, 1758. The length of *Fasciola gigantica* exceeds the breadth by more than three times. Conical head process, a direct continuation of body, resulting in almost total absence of shoulders observed in other species of *Fasciola*. The lateral body margins are parallel. Posterior end either absolutely rounded or bluntly constricted. Abdominal suckers large and protuberant, lumen generally elongated backward, forming a blind sac. Pharynx large than esophagus. Lateral outgrowths of intestine correspond to those in *Fasciola hepatica*, but inner median outgrowths numerous, producing more or less distinct branches. Vitelline follicles spread along both dorsal and ventral sides of digestive tube. Testicular field smaller as compared to rest of the body, as observed in *Fasciola hepatica*. The eggs are oval in shape with an operculum at one end.

Location: Liver
Host: Ruminants
Locality: Ladakh

Table 1. Comparative characteristics (measurements in mm) of *Fasciola gigantica* Cobbold, 1885

Particulars	Skryabin (1948)	Ben Dawes (1968)	Soulsby (1982)	Present Specimens
Body length	33-75	25-75	25-75	39.62 (26.47-52.77)
Max. Width	5-12	3-12	12	9.65 (8.525-10.787)
Oral sucker	----	----	----	0.85 (0.62-1.08)
Vent. Sucker	----	----	----	1.84 (1.77-2.91)
Pharynx	----	----	----	0.99 (0.66-1.32)
Ovary	----	----	----	2.69 (1.44-3.94)
Distance b/w O&V sucker	----	----	----	1.98 (1.33-2.63)
Egg Size	0.125-0.175X 0.060-0.100	----	156-197X 90-104 μ	0.132X0.096 (0.088-0.176X 0.664-0.0128)
Host	----	----	Domestic animals	Ruminants
Locality	----	----	London	Ladakh

REMARKS

The specimens described here in completely agree with the generic diagnosis of *Fasciola* Linnaeus, 1758 as given by Skryabin (1948), therefore these are assigned to genus *Fasciola* Linnaeus, 1758. Further the present specimens resemble in most of the morphological features with *Fasciola gigantica* Cobbold, 1885, as regards their shape, size of body and eggs as given by Skryabin (1948), Ben Dawes (1968), and Soulsby (1982). Furthermore a few morphological characters as size of ovary and testes, size of oral and ventral suckers, pharynx which have not been dealt with by these authors have been added to complete the description of the present species. However some intraspecific variations in size ratio of body were recorded in the present specimens, which could be as a result of fixation, intensity of infection, difference in various environmental factors of the present study area, etc Kuchai, *et al.*, 2011b. These variations were not found of any great taxonomic importance and therefore the present specimens were assigned as *Fasciola gigantica* Cobbold, 1885; however this is the first report of this species from Ladakh region.

CONCLUSION

The present study revealed that irrespective of the geographical location and environmental conditions existing in the Ladakh ruminants are infected with *Fasciola*, however with some minor intraspecific morphological and morphometric variations. Therefore steps must be taken to carry out some more research on other aspects and other ruminants of this region so that a controlling strategy could be made for a better production.

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