

## The Prevalence of Liver Flukes in Sheep Slaughtered in Yuksekova, Hakkari Province, Eastern Region of Turkey

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**Abstract:** This study was carried out to determine the prevalence of liver flukes in sheep in Yuksekova which is located in Hakkari Province in Eastern part of Turkey. The livers of 544 sheep in different breeds (out of 544; 492 over 1 year old and 52 under 1) which are slaughtered in Yuksekova, Hakkari Province were investigated in this study. The 232 (42.6%) of these livers were found to be infected with liver flukes. The 87 (37.5%) of these infected sheep were also found to be infected with *Dicrocoelium dentriticum*. On the other hand while 95 (40.9%) of liver fluke infected sheep were also infected with *Fasciola hepatica*; 3 (1.2%) of them were infected with *Fasciola gigantica*.

**Key words:** Hakkari, liver fluke, sheep, *Fasciola hepatica*, *Dicrocoelium dentriticum*

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### INTRODUCTION

Liver flukes (*Fasciola* sp. and *Dicrocoelium dentriticum*) is economically important because of its effects on mortality, morbidity and reduction of growth rate. Additionally liver flukes results in condemnation of livers which has an important role in increasing susceptibility to secondary infection and public health. Most of mammals such as sheep, goats and cattle that are close to people are definitive hosts for liver flukes. The eating watercress is a common source of human infection in around of the infected areas. Man is not considered a definitive host for *F. hepatica* but infections in man have been reported in many countries including Turkey (Malone *et al.*, 1998; Yilmaz *et al.*, 1999, 2004).

In Turkey, many studies have been performed on the prevalence of sheep liver flukes. Vurussaner *et al.* (1998) examined a total of 963 sheep liver, slaughtered in Istanbul and reported that 269 (27.9%) of them were infected with liver flukes. They defined that 21% of them were infected with *Dicrocoelium dentriticum*, 6.0% with *Fasciola hepatica*, 0.1% with *Fasciola gigantica*, 0.7% together with *F. hepatica* and *D. dentriticum* (Vurussaner *et al.*, 1998).

In a study performed in Ankara slaughterhouse, 65% of sheep were found to be infected with *F. hepatica* or *D. dentriticum* (Guralp, 1981). Another study performed in Ankara have reported that distribution rate of liver flukes in sheep is very high (80-90% in some herds this

ratio reached 100%). It is also observed that a significant portion (27%) of infected livers and have been destroyed (Ozgençil, 1960).

In some of the studies performed in Samsun Province; Zeybek reported that 55.6% *D. dentriticum*, 20% *F. hepatica*, 0.6% *F. gigantica* have been detected in the 252 sheep livers, investigated for the presence of the trematodes. Same researcher also reported that the age factor is effective in the formation of infection and liver flukes started to be seen at 8 months old slaughtered lambs (Zeybek, 1980). Celep *et al.* (1995) have reported that they found 20.99% Fascioliasis and 58.29% Dicrocoeliasis in the stool samples examination.

A study in Eastern region of Turkey, Kars Province, reported that the distribution of *D. dentriticum* and *F. hepatica* in 736 sheep is 41 and 9.4%, respectively (Gicik *et al.*, 2002).

In the studies performed in Van Province located near the Hakkari Province, the prevalence of liver flukes in sheep slaughtered in Van municipality slaughterhouse is found to be 63.1%. These livers were also infected with *D. dentriticum* (53.3%), *F. hepatica* (15.9%) and *F. gigantica* (0.29%) (Toparlak and Gul, 1988). The study performed in the Bardakci village of Van to determine the prevalence of the endoparasites and seasonal distribution throughout the year have reported *F. hepatica* 54.8% in Autumn, 43.6% in Winter, 36.9% in Spring, 32.7% in Summer; *D. dentriticum* 26.2% in Autumn, 17.4% in Winter, 27.3% in Spring, 21.7% in Summer (Deger and Akgul, 1991). *F. gigantica* prevalence in sheep have been

detected 11.0% with stool samples examination and 15.6% with incisional examination in slaughtered animals in Van (Deger *et al.*, 1992). A later study performed in order to determine the parasitic fauna in animals slaughtered in Van municipality slaughterhouse have reported 80% *D. dendriticum*, 78.7% *F. hepatica* and 14.5% *F. gigantica* prevalence in sheep (Tas, 1997).

The first study in Hakkari Province have detected 47.0% *F. hepatica*, 34.7% *D. dendriticum* and 2.75% *F. gigantica* distribution in sheep slaughtered in Hakkari Municipality Slaughterhouse (Aydin, 2003).

In the countries bordering the Hakkari Province (may be legal or illegal animal crossing to Turkey) in Iran, 21.6% *D. dendriticum* and 1.62% *F. hepatica* distribution have been reported in 120 sheep slaughtered in Tabriz slaughter house. Another study performed in Ardabil have reported that 18.6% of livers were infected with *D. dendriticum*, 20% with *F. hepatica* in 150 sheep slaughtered in Ardabil slaughterhouse (Nadim, 1995; Saffarbani, 1999). Studies performed in Iraq to determine the prevalence of liver flukes in sheep have detected 0.50% in Kirkuk, 7.1% in Baghdad, 0.7% in Basrah (Al-Barwari, 1977; Mahdi and Al-Baklawi, 1987; Kadir and Rasheed, 2008).

**MATERIALS AND METHODS**

This study was performed within the period of January 2010 to December 2010 in some private slaughterhouse and in Ovas Meat Integrated Facility. The livers of 544 sheep in different breeds (out of 544; 492 over 1 year old and 52 under 1) which are slaughtered in Yuksekova, Hakkari Province were taken after weekly periodical visits to Yuksekova village. These livers were investigated to make transverse incision into biliary tract and gall bladder for liver trematodes. The significance of differences between age groups were detected with  $\chi^2$ -test using SPSS 18.0 Software.

**RESULTS AND DISCUSSION**

The 232 (42.6%) of sheep liver from a total of 544 were found to be infected with liver flukes. Infection rates were detected to be 44.9% (221 sheep) in animals older than 1 year, 21.1% (11 sheep) in animals under 1 year. The difference between age groups was found to be statistically significant ( $p < 0.01$ ). In infected animals, 87 (37.5%) were infected with *D. dendriticum*, 95 (40.9%)

were infected with *F. hepatica*, 3 (1.2%) were infected with *F. gigantica*, 47 (20.2%) were infected together with *F. hepatica* and *D. dendriticum*. Distribution of liver flukes in slaughtered sheep are shown in Table 1.

Liver flukes whose final hosts are ruminants and other some omnivorous animals have importance because of their zoonotic characters and disease condition in domestic animals. Turkey is a suitable country for liver flukes in terms of both climatic and ecological factors. In Turkey, although many researches were applied on epidemiology of sheep liver trematodes but no study on the prevalence of sheep liver trematodes in Hakkari was studied except for the study performed by Aydin (2003) in Hakkari Municipal Slaughterhouse.

Many studies have been performed on prevalence of sheep liver flukes in Turkey. Prevalence of liver flukes was found to be 27.9% in sheep slaughtered in Istanbul and *D. Dendriticum* alone was detected in 21% of the infected livers whereas *F. hepatica* and *F. gigantica* was detected in 6 and 0.1% in the infected livers. *F. hepatica* and *D. dendriticum* together were observed in 0.7% of the infected livers (Vurusaner *et al.*, 1998). In a study, performed in Samsun, *D. dendriticum* distribution was found to be 55.6% while *F. hepatica* distribution, *F. gigantica* distribution was found to be 20 and 0.6%, respectively. Same researcher also reported that liver flukes started to be seen after 8 months old slaughtered lambs (Zeybek, 1980). The present study suggests that the extensity of infections in sheep older than 1 year is higher than younger sheep. The difference between age groups have been found statistically significant ( $p < 0.01$ ). The other study made in Samsun Province have reported the infection rate of livers with Fascioliasis and Dicrocoeliasis as 20.99 and 58.29%, respectively (Celep *et al.*, 1995). When these results are compared with the results obtained in this study; it is found that prevalence of *D. dendriticum* is higher in Samsun while *F. hepatica* and *F. gigantica* is lower.

Some studies on liver flukes prevalence in sheep have been performed in cities in eastern region of Turkey. A study in Eastern region of Turkey, Kars Province, reported that the distribution of *D. dendriticum* and *F. hepatica* in 736 sheep is 41 and 9.4%, respectively (Gicik *et al.*, 2002). In studies that were conducted in Van, very close city to Hakkari Province, *F. hepatica* is found in 15.6-78.7%, *D. dendriticum* is found in 23.9-80.0%, *F. gigantica* is found in 0.29-14.5% of sheep (Deger and Akgul, 1991; Deger *et al.*, 1992; Tas, 1997).

Table 1: The prevalence of liver flukes slaughtered sheep

No. of the investigated livers	No. of the infected livers	No. of the liver infected <i>F. hepatica</i>	No. of the liver infected <i>D. dendriticum</i>	No. of the liver infected <i>F. gigantica</i>	No. of the mixed infection with <i>F. hepatica</i> and <i>D. dendriticum</i>
544	232.0	95.0	87.0	3.0	47.0
Percentage	42.6	40.9	37.5	1.2	20.2

Previous study that was performed in Hakkari by Aydin shows that the prevalence of *F. hepatica* is 47%, *D. dentriticum* is 34.3%, *F. gigantica* is 2.75% (Aydin, 2003). In this study, the prevalence of liver flukes was found to be higher than the prevalence detected in Iran and Iraq, countries bordering Hakkari Province (Al-Barwari, 1977; Mahdi and Al-Baklawi, 1987; Nadim, 1995; Saffarbani, 1999; Kadir and Rasheed, 2008).

### CONCLUSION

Prevalence of liver flukes in sheep slaughtered in Yüksekova district of Hakkari is quite high and higher than the average of Turkey. One of the biggest reasons for this may be the fact that most of the sheep breeders in Hakkari region don't use antiparasitic drugs regularly to protect their flocks from parasitic invasions. To protect trematode invasions which still maintains the importance both for the country's sheep and region's sheep and causing significant losses for the national economy, an awareness should be raised for using antiparasitic medication and keeping away young animals from infected grazing areas. These actions will also provide the greatest benefits to reduce the prevalence.

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### REFERENCES

- Al-Barwari, S.E., 1977. A survey on the liver infection with *Fasciola gigantica* among slaughtered animals in Iraq. Bull. Endemic Dis., 18: 75-92.
- Aydin, A., 2003. The parasite fauna in the animals slaughtered in Hakkari Municipality Slaughterhouse. Ph.D. Thesis, YYU Institute of Health Sciences, Iran.
- Celep, A., M. Acici, M. Cetindag and I. Gurbuz, 1995. Epidemiologic and parasitic studies in sheep in Samsun Province. Turkiye Parazitoloji Dergisi, 19: 290-296.
- Deger, S. and Y. Akgul, 1991. Research on the epidemiologic of endoparasites encountered in sheep. Veteriner Fakultesi Dergisi, 2: 11-22.
- Deger, S., Y. Akgul, Z.T. Agaoglu and S. Tasci, 1992. Studies on epidemiology and ecology of *Fasciolosis infections* caused of the *Fasciola gigantica* in Van Province. Veteriner Fakultesi Dergisi, 3: 133-140.
- Gicik, Y., M.O. Arslan, M. Kara and A. Akca, 2002. Prevalence of liver flukes slaughtered Kars Province. Kafkas Universitesi Veteriner Fakultesi Dergisi, 8: 101-102.
- Guralp, N., 1981. Helminthology. Ankara Universitesi Veteriner Fakultesi Yayin, Ankara, Turkey.
- Kadir, M.A. and S.A. Rasheed, 2008. Prevalence of some parasitic helminths among slaughtered ruminants in Kirkuk slaughter house, Kirkuk, Iraq. Iraqi J. Vet. Sci., 22: 81-85.
- Mahdi, N.K. and F.A.K. Al-Baklawi, 1987. Hepatic fascioliasis in the abattoirs of Basrah. Ann. Trop. Med. Parasitol., 81: 377-379.
- Malone, J.B., R. Gommers, J. Hansen, J.M. Yilma and J. Slingenberg *et al.*, 1998. A geographic information system on the potential distribution and abundance of *Fasciola hepatica* and *F. gigantica* in East Africa based on food and agriculture organization databases. Vet. Parasitol., 78: 87-101.
- Nadim, A., 1995. Prevalence of infection with liver trematodes in Tabriz Slaughterhouse. M.Sc. Thesis, Islamic Azad University, Tabriz Branch, Iran.
- Ozgencl, B., 1960. Studies on pathologic degeneration in livers of the cattle and sheep slaughtered in Ankara caused distomatosis agents. Ankara Universitesi Veteriner Fakultesi Yayin, No. 113.
- Saffarbani, H., 1999. Prevalence of infection with liver trematodes in Ardabil Slaughterhouse. M.Sc. Thesis, Islamic Azad University, Tabriz Branch, Iran.
- Tas, Z., 1997. The parasite fauna in the animals slaughtered in Van Municipality Slaughterhouse. Master's Thesis, YYU Institute of Health Sciences, Iran.
- Toparlak, M. and Y. Gul, 1988. Studies on liver trematode infections in sheep slaughtered in Van Municipality Slaughterhouse. Ankara Universitesi Veteriner Fakultesi Dergisi, 35: 269-274.
- Vurusaner, C., B. Cetin, H. Akkaya and R. Gokce, 1998. A study on liver flukes in sheep slaughtered Istanbul. Turkiye Parazitoloji Dergisi, 22: 432-437.
- Yilmaz, H., C. Kotan, O. Soylemez and H. Aslanturk, 2004. A human fasciolosis presenting with cholelithiasis and choledocholithiasis in Van, Turkey. Saudi Med. J., 25: 1732-1733.
- Yilmaz, H., Y. Goz and H. Bozkurt, 1999. The distribution of fascioliasis and intestinal parasites in Ercis Ziya Gokalp primary school. Turkiye Parazitoloji Dergisi, 23: 153-158.
- Zeybek, H., 1980. Parasitic fauna detection studies in sheep and lambs in Samsun Province. Ankara Universitesi Veteriner Fakultesi Dergisi, 27: 215-236.