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## The Prevalence Rate of *Linguatula serrata* nymphs in Iranian River Buffaloes

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**Abstract:** The aim of this study was to evaluate the prevalence rate of *Linguatula serrata* nymphs in lung, liver and Mesenteric Lymph Nodes (MLNs) of river buffaloes in Urmia City (Iran). Result showed that samples of MLN, liver and lung collected from 15, 2 and 2 buffaloes were infected by the final larva or nymph of *L. serrata*, respectively. Five out of 43 (11.6%) female and 10 out of 37 (27%) male buffaloes had nymphs in their MLNs. It is concluded that some basic strategies such as sanitation, strict slaughterhouse inspection and proper cooking of viscera are useful in combating the parasite.

**Key words:** *Linguatula serrata*, prevalence, buffaloes, Iran, Linguatulosis

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### INTRODUCTION

Asian buffalo or Water buffalo includes two subspecies known as the River and Swamp types, the morphology and purposes of which are different as are the genetics. In Iran, according to data provided by FAO, the estimated buffalo population (*Bubalus bubalis*) is around 400,000, of which 208,200 are adult females used for dairy purposes with an average milk yield of 1200-1865 (kg year<sup>-1</sup>) (Borghese, 2005). The buffalo is a native animal of Iran; approximately 80 percent of them are present in the north and north-western parts (Azerbaijan province) where cattle and buffalo are often farmed together. Iran yearly average of buffalo milk is around 220000 tonnes (Borghese, 2005; Mohsen Pour Azary *et al.*, 2004). Regardless of traditional activity of Buffalo farming and enormous tendency towards consumption buffaloes meat between our nations, there is large paucity of data available on prevalence of zoonotic parasite on them.

*Linguatula serrata*, obligate endoparasite, is a member of small group of parasites which form phylum Pentastomida (Gosling, 2005; Muller, 2002). Of the many pentastomid species, only a few, including *Linguatula serrata*, infect humans. The adult parasites are long, flat, or annulated and have 4 hooks surrounding a central mouth and inhabit the nasal passages and paranasal sinuses of wild and domestic canids and rarely of man, which serve as definitive hosts. Infective eggs containing larvae are discharged into the environment by nasopharyngeal secretions and are ingested by grazing herbivores including cattle, sheep, goat and buffalo in which it develops to nymphal stage in Mesenteric Lymph Nodes (MLNs) liver and lung (Berger and Marr, 2006; Khalil and Schacher, 1965; Soulsby, 1982). The nymph usually lies in a small cyst surrounded by a viscid turbid fluid (Soulsby, 1982). In human, a type of pharyngitis known as halzuon or Marrara syndrom occurs following ingestion of raw or insufficiently cooked viscera including lymph nodes and liver containing nymphs. Parasites attach to

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the upper nasal cavities where they survive approximately 15 months in the absence of treatment. Although the parasite is cosmopolitan, it is more frequently reported in warm countries (Aldemir, 2004; Drabick 1987; Muller, 2002; Yagi *et al.*, 1996).

Numerous studies have been conducted on the prevalence of *L. serrata* in definitive hosts including humans (Aldemir, 2004; Maleky, 2001; Lazo *et al.*, 1999; Rezaee, 1998; Yagi *et al.*, 1996; El-Hassan *et al.*, 1991; Drabick, 1987; Pandey *et al.*, 1987; Beaver *et al.*, 1984; Dincer, 1982) and some grazing herbivores (Farid-e-Tonekaboni, 1966; Dincer, 1982; El-Badaei *et al.*, 1978; El-Sherry and Sakla, 1984; Rahman *et al.*, 1980; Rezaee, 1998; Sherkov and Rabie, 1976; Valero-Lopez *et al.*, 1980; Shekarforoush and Arzani, 2001).

Based on the reports (Sivakumar *et al.*, 2005; Choudhary and Dewan, 1967) on prevalence of *L. serrata* in water buffaloes, in this study, prevalence of the nymphal stage of *L. serrata* in MLNs, liver and lung of Iranian river buffaloes slaughtered at Urmia slaughterhouse, in Urmia city, as one of the most buffalo rearing region in Iran, were investigated.

## MATERIALS AND METHODS

During the period September 2002 and July 2003, 119 and 104 condemned livers lungs and 641 mesenteric lymph nodes of buffaloes slaughtered at the Urmia slaughterhouse (North West of Iran), were collected and examined for the presence of *Linguatula serrata*. The number of lymph nodes collected from each animal varied from 5 to 10. Material collected from each animal were kept separately for further examination. Each lymph node was cut longitudinally, put in petri dishes containing phosphate buffer saline buffer and examined under a dissecting microscope for *Linguatula serrata* nymphs. Liver and lungs samples were sliced in to small sections and observed carefully to find encapsulated or free nymphs. The total numbers of nymphs per organs were recorded.

## RESULTS

MLNs of 15 (18.75%), livers of 2 (1.66%) and lungs of 2 (1.92%) animals were infected with *L. serrata* nymphs is the average length of final larva or nymph was 0.5 to 0.6 cm (curved crescent-wise). It has the same number of body-rings as the adult. The mouth was located on the cephalothorax flanked by two pairs of hooks. Five out of 43 (11.6%) female and 10 out of 37 (27%) male buffaloes had nymphs in their MLNs. Twenty and 30 lymph nodes were infected in female and male buffaloes, respectively. Number of nymphs isolated from each MLNs ranged from 1 to 6, with total of 95 lymph was isolated. Similarly, the average number of nymphs per liver and lung were 4 to 6.5, respectively.

## DISCUSSION

Occurrence of *L. serrata* was endemic in certain parts of the world with different rate (Sivakumar *et al.*, 2005). Rezaee (1998) reported a high prevalence (76.5%) of *L. serrata* in stray dogs in Shiraz, Iran. Close contact between dogs and intermediate hosts (large and small ruminant) plays an important role in the transmission of *L. serrata* in this area. In present study, 18.75% of examined buffaloes had *L. serrata* nymphs in MLNs and 1.66 and 1.92% in the livers and lung, respectively. Sherkov and Rabie (1976) reported that 28.9% of examined goats in Jordan had *L. serrata* nymphs in MLNs. Dincer (1982) reported that 37% of examined slaughtered goats in Turkey were diagnosed as to be infected by *L. serrata* nymphs in MLNs. Rahman *et al.*(1980) diagnosed *L. serrata* infection in 31% of MLNs, 27.6% of lungs and 15.2% of livers of goats in Bangladesh. Shekarforoush and Razavi (2004) diagnosed *L. serrata* infection in 11.5% of MLNs and 3% of liver of examined sheep in Iran.

Aydenizoz and Guclu (1997) reported that 3% of MLNs of sheep and Valenzuela *et al.* (1995) showed 8.67% of cattle were infected to *L. serrata*. They also reported that MLNs had higher prevalence than livers and lungs.

Present results showed high infection of lymph nodes of Buffaloes (7.8%) in Urmia. however the prevalence of *L. serrata* in buffaloes and the number of nymph per each infected lymph node is very low compared to sheep and goat infestations in Iran. According to Sivakumar *et al.* (2005) prevalence of nymphal stage of *L. serrata* in MLNs of water buffaloes was only 2% on the basis of limited sampling (n = 100). They, however, studied the morphometrics of the nymphs and reported that affected lymph nodes were grossly enlarged with cyst and showed pathological lesions of fibroblastic reaction with a mild underlying inflammatory zone.

The results of present study are in agreement with the infection prevalence (10.5%) detected in camels from an study in Fars province (Oryan *et al.*, 1993) but not with the data from the sheep and goat in Tabriz (Jamali *et al.*, 1997) Babol (Esmail-Nia *et al.*, 2000), Urmia (Lotfi, 2001; Hariri, 2001), where it prevalence has been estimated at 28.3, 33.9, 73 and 52.5% in small ruminants, respectively.

According to the life cycle of *L. serrata*, in this study, the prevalence rate of liver infection was lower than that of MLNs, which is in accordance with the findings of the other investigators (Shekarforosh and Razavi, 2004).

Buffalo farming in Iran can be considered to be at a good level since the owned or rented properties are of a large size and the land available for buffalo farming is also extensive. Buffalo farming has been a traditional activity for many decades (Kianzad, 2000). Therefore, the prevalence rate of 18.75% infection in lymph nodes should be considered and its public health importance should be taken into consideration in a country like Iran, where people consume more buffalo meat particularly in North West provinces. Therefore, it should be emphasized that a thorough inspection of visceral organs in particular lymph nodes should be strictly considered in the slaughterhouse inspection.

By-products (offal) such as kidney, brain, liver, intestine, heart and tongue are more commonly consumed by people of the economically weaker sections especially in rural and semi-urban areas of the developing countries (FAO, 1978). In addition, in some underdeveloped regions, because of some underprivileged believes raw or under-cooked liver of some farm animals is useful for growth of the fetus because of its high content of iron and vitamins. However, In the Middle East, Halzoun often occurs after religious feasts in which uncooked sheep or goats may be eaten. In Sudan, it's known as Marrara, after a dish of raw stomach, lung, trachea and liver of sheep, goats, or camels (Yagi *et al.*, 1996; Muller, 2002). Some clinical cases of human nasopharyngeal linguatulosis in Iran have been reported (Sadjjadi *et al.*, 1998; Maleky, 2001).

Considering results, it could be concluded that prevalence of *L. serrata* in Iranian river buffalo is high especially in mesenteric lymph nodes, but it seems buffaloes had little role to play in epidemiology of this parasite compared to small ruminants.

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