



SCANNING ELECTRON MICROSCOPE FOR *ORNITHOBILHARZIA TURKESTANICUM* ISOLATED FROM SHEEP IN MAYSAN/ SOUTHERN IRAQ

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ABSTRACT

Schistosomiasis is one of the most important problems for both animals and human, in Iraq country is consider being most important problem of the animals production and sometimes it is leading to death. *Ornithobilharzia turkestanicum* is one of the species of family Schistosomatidae that infect of the sheep and cause an economical losses, this research is prepared to identification of *O. turkestanicum* at molecular level and confirming the Iraqi strain by sequencing. The result of scanning electron microscope showed the oral and ventral sucker as a smooth circular shape, clear spiny tegument, clear gynecophoric canal as whole groove in tegument and posterior part with clear spiny gynecophoric canal in male, while, the female a smooth tegument. This features which different from other species of Schistosoma as an Iraqi strain.

KEY WORDS: *Ornithobilharzia turkestanicum*, Maysan, Almajidya slaughter house, Scanning Electron Microscope, Iraqi Strain.

INTRODUCTION

Orientobilharzia spp. is a Schistosomes infection that cause Orientobilharziasis in a large number of animals including goats, sheep, cattle and other mammals, which was lived in the portal or intestinal veins of the infected animals and causing emaciation, anemia and diarrhea, with incidence extraction of blood and mucosal material in the host feces, and infection may lead to acyesis or abortion in females and reduce the possibility of growth in young animals (Wang *et al.*, 2009). *Orientobilharzia* spp. are wide spread in many countries at the world including Russia, Mongolia, Turkey, India, Iran, China and Iraq (Agrawal and Rao, 2011), and causing severe infections with heavy economic casualties in production of animals in infected countries (Wang *et al.*, 2012). Skrjabin (1913) has first described *S. turkestanicum* from portal vein in cattle of Russian Turkestan (Machattie, 1936). After that, Price (1929) indicates out that the egg of this Schistosome had two spines, one at each end and records the number of testes, also detected adult worm reside in mesenteric veins and change it into the genus *Ornithobilharzia*, and re-named from *S. turkestanicum* to *O. turkestanicum*. Dutt and Srivastava and Trisal, (1957) suggested transferring to a new genus called *Ornitho bilharzia* and other names, but have not found general acceptance. In Iraq, especially Basrah province, Al-To'mma (1997) showed the infection of sheep with the percentage infection (23.5%) while in goat was (15%), but in cows and buffaloes was (13.3%) per each animals, with intensity of infection about 27 and 31 for sheep and goat respectively. Scanning electron microscopy has been widely employed for the characterization of helminthes morphology especially since the improvement of preparation techniques, a number of workers using SEM (Voge *et al.*, 1978; Kuntz *et al.*, 1979) has observed the external appearance of various

species of *Schistosoma*. There are a little studies of scanning electron microscope on *O. turkestanicum*, Limin (1999) studied of scanning electron microscope observation on *O. turkestanicum* cercaria that divided into five stages: germinal cells stage, germ ball stage, embryo cercaria stage, premature cercaria stage and fully developed cercaria stage according to observation on *S. japonicum*, with high similarity suggest a close relationship existed between them. While Tang *et al.*(1983) studied tegumental surface micro topography of critical point of dried juvenile and adult *O. turkestanicum*. This research designing for study the trematoda *O. turkestanicum* the Iraqi strain by scanning electron microscopy.

MATERIALS & METHODS

A three different provinces were examined their slaughtered animals from slaughterhouse under the present study (Baghdad, Maysan and Basrah), but the adults flukes of *O. turkestanicum* were found only in Maysan slaughter house called (Almajidya slaughter house), so, collected worms from slaughtered sheeps in the local slaughter house in Almajidya in Maysan province. Flukes were collected from the mesenteric veins (intestinal veins) of an infected sheep for the period from July 2015 till December 2015 by using special illustration device designed to facilitate the observation of adult *O. turkestanicum* inside the mesenteric veins, identified based on white color, and the isolated worms were fixed for used in scanning electron microscope to detect the morphology of the worm (in addition to routine microscopic examination) and to detect any exchanges will appear on the worm as a normal according to the method of Hayat (1986).

RESULTS

After fixation the isolated *O. turkestanicum* adult worms, examined by scanning electron microscope, the

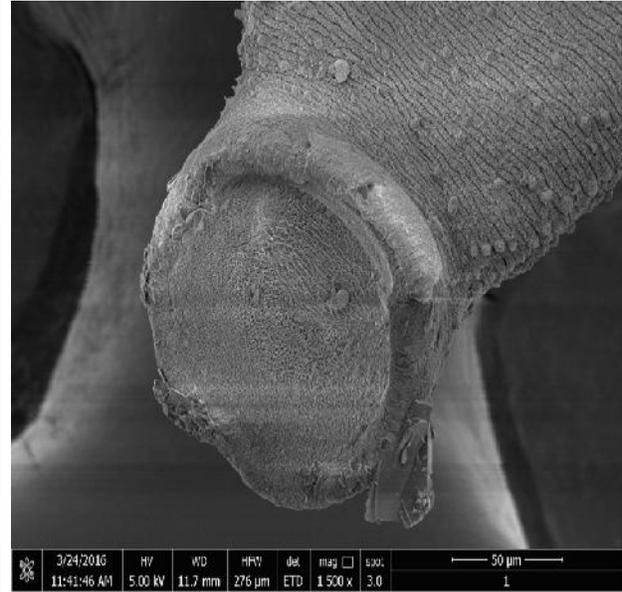
SEM for *Ornithobilharzia turkestanicum* isolated from sheep

examination showed many of differentiations includes: anterior part of male with clear circular oral and ventral suckers (Photomicrograph, 1), male of adult worm with magnified clear oral sucker (Photomicrograph, 2) and highly magnification of ventral sucker (Photomicrograph, 3), Photomicrograph (4) showed male of *O. turkestanicum* with spiny tegument. Photomicrograph (5) showed male of *O. turkestanicum* with clear gynecophoric canal as a whole

grove in spiny tegument, while (Photomicrograph, 6) with male of *O. turkestanicum* posterior part and a clear gynecophoric canal, (Photomicrograph, 7 and 8 showed highly magnificient of posterior part with clear spiny gynecophoric canal in adult male of *O. turkestanicum*, while (Photomicrograph, 9) showed anterior part with oral and ventral suckers of female *O. turkestanicum*.



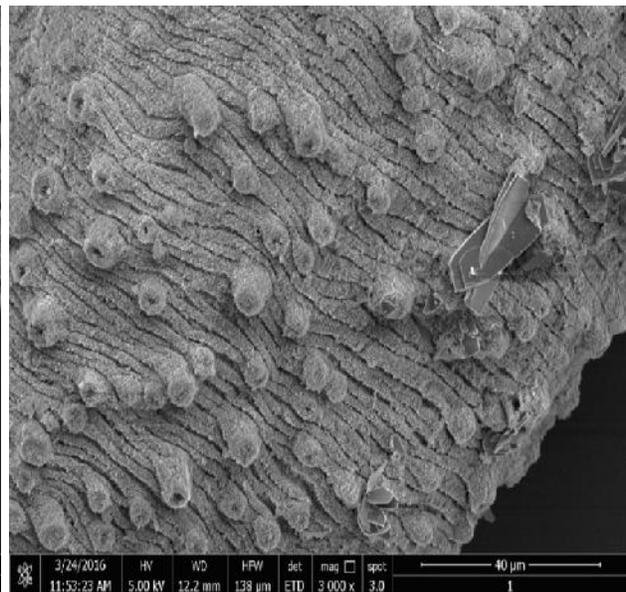
Photomicrograph (1): Anterior part of male of *Ornithobilharzia turkestanicum* with clear oral and ventral suckers, scale bar (200 μ m).



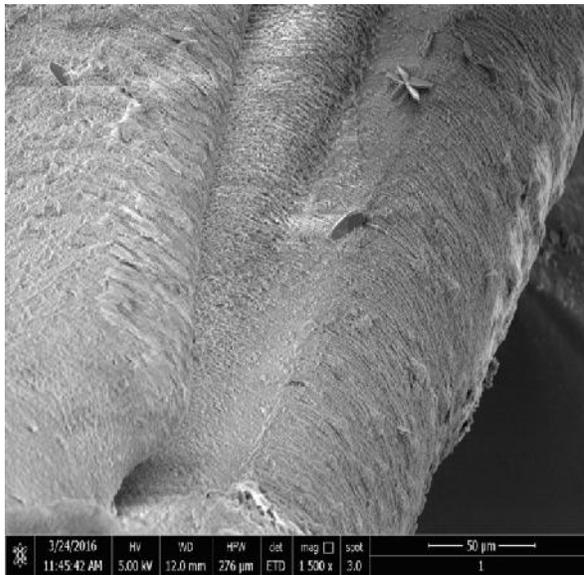
Photomicrograph (2): Male of *Ornithobilharzia turkestanicum* with clear oral sucker, scale bar (50 μ m).



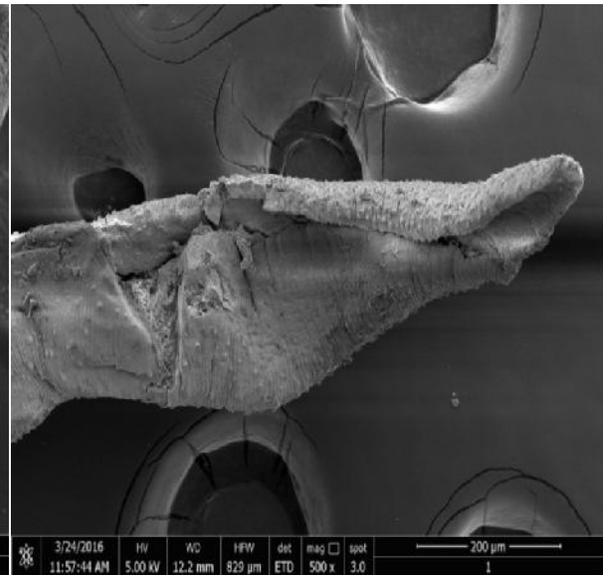
Photomicrograph (3): Male of *Ornithobilharzia turkestanicum* with clear ventral sucker in high magnification, scale bar (50 μ m).



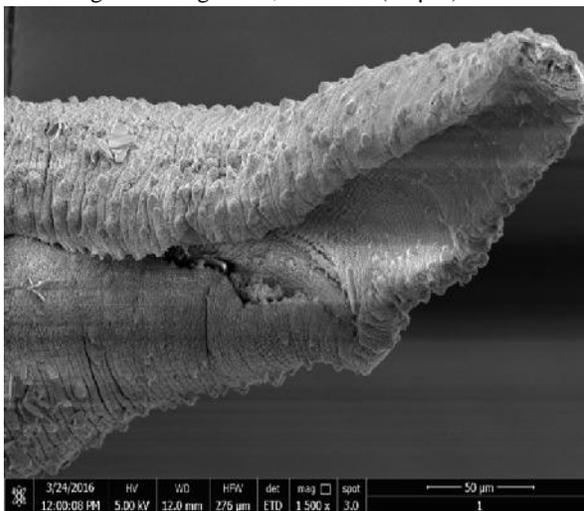
Photomicrograph (4): Male of *Ornithobilharzia turkestanicum* with clear rough spiny tegument, scale bar (40 μ m).



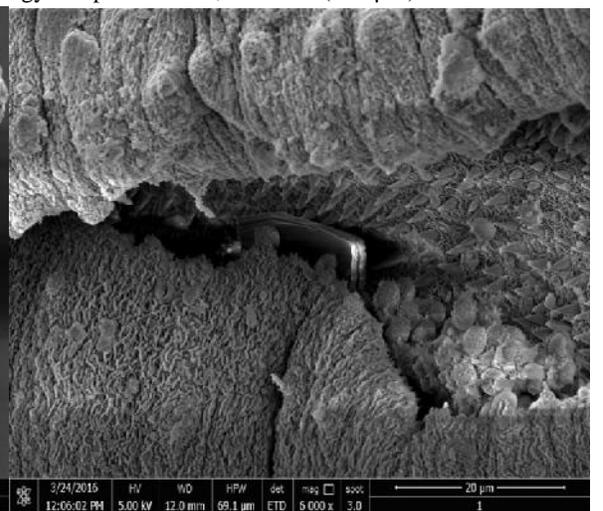
Photomicrograph (5): Male of *Ornithobilharzia turkestanicum* with clear gynecophoric canal as a whole groove in tegument, scale bar (50 µm).



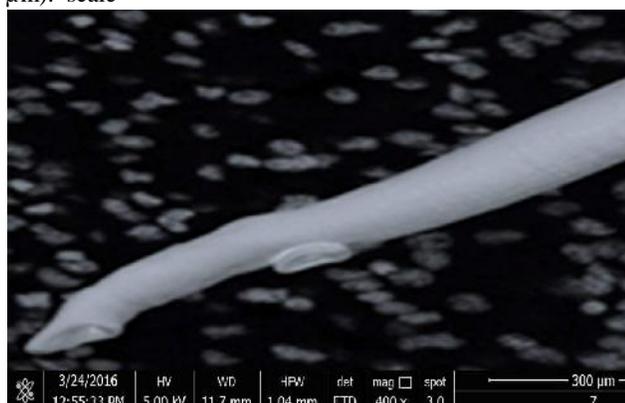
Photomicrograph (6): Male of *Ornithobilharzia turkestanicum* posterior part note a clear groove gynecophoric canal, scale bar (200 µm).



Photomicrograph (7): Male of *Ornithobilharzia turkestanicum* posterior part note a clear rough spiny gynecophoric canal in high magnification, scale bar (200 µm). scale



Photomicrograph (8): Male of *Ornithobilharzia turkestanicum* posterior part note a gynecophoric canal in high magnification, scale bar (20 µm).



Photomicrograph (9): Female of *Ornithobilharzia turkestanicum* anterior part with oral and ventral suckers, with smooth tegument, scale bar (300 µm).

DISCUSSION

After collecting of samples, *O. turkestanicum* detected and observed in mesenteric veins of sheep that slaughtered in abattoir in Maysan only, this may explain that the intermediate host of *O. turkestanicum* found in Maysan only so the life cycle were completed in this region, furthermore, the rivers in this province with suitable condition of pH and salinity and this will be suitable for intermediate host for have infection and shedding cercaria to the rivers and water branches and complete their life cycle. The current study is used scanning electron microscope (SEM) examination to determine the adult male and female of *O. turkestanicum* isolated from sheep as Iraqi strain, this scanning showed the oral and ventral sucker, clear spiny tegument, clear gynecophoric canal as whole groove in tegument and posterior part with clear spiny gynecophoric canal in male and show the clear oral and ventral sucker with smooth tegument of female. This result agreement with Tang *et al.* (1983) who recorded the dorsal body surface of the posterior part regarded to female of *O. turkestanicum* is characterized by many of cuticular condensations with central orifice or and in the part between these cuticular condensations there are tiny spines distributed over the surface. In male, the tegumental folds coating the body surface and extend to the gynecophoral folds. Sakamoto and Ishii (1977) study about *S. japonicum* and recorded the spines are not present on the dorsal part of the male, which may possess a spongy appearance, while many spines are present and cover the inner part of the oral sucker, extend to the pharyngeal orifice. Rim appearance of the oral sucker with variable size of spines, and sharpness inward and outward from the rim. The ventral sucker has many spines smaller than in the oral sucker. Tiny spines roughen the lining of the gynecophoric canal. The integument of the female is ridged and pitted and have a fewer spines than in the ventral sucker, oral sucker, and the gynecophoric canal of the male. Ogbe (1982) recorded there are many difference in male and female by the tegumental part of the body, the female is smoother than male when study of *S. margrebowiei*, also showed the spines on the oral suckers of male and female worms, and recorded they developed in the worm to easy of connection of the parasite on the venous wall during flow of blood in the venous system. Miller *et al.* (1972) also show the presence of numerous spines in the lining of the gynecophoral canal when study of the male *S. mansoni*.

Other studies also showed the differences between tegumental surface of *Schistosoma* male and female adult flukes of other species also by using the SEM examination. Kuntz *et al.* (1979) showed this difference in *S. bovis*, Hicks and Newman (1977) showed in *S. haematobium*, Tulloch *et al.* (1977) in *S. matthei* and Kuntz *et al.* (1976) in *S. mansoni*. In conclusion the current study found that *O. turkestanicum* (Iraqi strain) by scanning electron microscope showed a good diagnostic tool for distinguish between male and female and clear features which differences by other strain.

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