



Research Paper

MORPHOLOGICAL STUDY OF *Echinococcus* WORM ISOLATED FROM DOGS IN ALBIDA CITY -LIBYA

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Abstract

Genus *Echinococcus* has been complicated by attempts to assign species, subspecies status but their some different between strains of the parasite. The genus has Only four species of *Echinococcus* are accepted at the present time these are *E. granulosus*, *E. oligarthus*, *E. vogeli*, *E. multiocularis*. The adult *Echinococcus* possesses a specialized attachment organ, the scolex, which has four muscular suckers and two rows of hooks, one large and one small, on the rostellum. Strobili, is segmented and consists of a number of reproductive units (proglottids), which may vary in number from two to six. Like all tapeworms, *Echinococcus* has no gut and all metabolic interchange takes place across the syncytial outer covering, the tegument, For the isolation sample of parasite *Echinococcus* from dogs, In the present study,30 dogs from Albida city in Libya were examined. By tow method the 1st dogs were using a dose of 1:2 mg / kg of arcoline hydrobromide and the second by dissecting the dead dogs from anywhere in the Albida city, then empty contained intestinal and where samples of faeces were collected and washed with saline solution (0.6 - 0.9) several times to get out the cestode worms to be examined Light microscopy fresh, some worms were fixed in 2.5% glutaraldehyde for the electron microscopy. The adult worm consists of the head and 3 segments. It is flattened conical-shaped and its length ranges from 5.6-6.2mm. On the head there are four suckers and two parallel circles of hooks: an outer and an inner one. The number of hooks ranges from 28-38 distributed equally between the two circles and the length of large hooks measures 25-49µm while that of the small ones' ranges from 16-32µm. The hooks are oriented posteriorly towards the peduncle. Scanning electron microscopy of the head revealed that the hooks in each circle originated alternatively from the places around the rostellum. The second segment (mature) of the adult worm contained the testes, which range in number from 26-79. The surface ultrastructure illustrated the dense covering of the protrusions giving it the velvety appearance. The

local isolates of *Echinococcus* has been identified according to morphology and parasitological standards and was found to belong to *Echinococcus granulosus*.

Key words: Morphology; *Echinococcus*.

INTRODUCTION

The tapeworm (*Echinococcus*.sp) spends most of its adult life in the intestine of its definitive host, (canids) and in particular the dogs and wolves. The tapeworm eggs become voided in the canid's faeces and as a result of ingesting the eggs, infection passes to the intermediate host, commonly herbivores while grazing. However, humans can become accidentally infected and hydatid cysts may develop throughout the body. Therefore, cystic echinococcosis (CE) or hydatidosis is a disease caused by the metacestode stage of *Echinococcus*. The disease is not apparent to farmers but is of considerable economic and public health importance [1,2]. In farm animals, it causes considerable economic loss due to condemnation of edible organs, decreased meat and milk production, reduced hide and fleece value and decrease in fecundity [3,4]. The incidence of human hydatid disease in any country is closely related to the prevalence of the disease in domestic animals and is highest where there is a large dog population and high sheep production [5]. Speciation in the genus *Echinococcus* has been complicated by attempts to assign species, subspecies status or the different strains of the parasite. Only four species of the genus *Echinococcus* are accepted at the present time these are *E. granulosus*, *E. oligarthus*, *E. vogeli*, *E. multilocularis*, [6,7,8]. The adult *Echinococcus* possesses a specialized attachment organ, the scolex, which has four muscular suckers and two rows of hooks, one large and one small, on the rostellum. Strobila, is segmented and consists of a number of reproductive units (proglottids), which may vary in number from two to six [9]. Like all tapeworms, *Echinococcus* has no gut and all metabolic interchange takes place across the syncytial outer covering, the tegument [10].

2.MATERIALS AND METHODS

2.1Sample of parasite:- For the isolation sample of parasite *Echinococcus* from dogs, 170 dogs from Albida in Libya were examined, by tow method the freest, the dogs were anesthetized using a dose of 1:2 mg / kg of arcoline hydrobromide and second method by dissected died dog from anywhere in the Albida city than empty contained intestinal and washing sample of faces by saline solution (0.6-0.9) several time and examined Light microscopy fresh, some worms were fixed in 2.5% glutaraldehyde for the electron

microscopy[13] Light microscopy fresh. The adult worms were fixed between a slide and cover glass for a bout 3h using drops of 70% alcohol as a fixative. The specimens were washed by distilled water, stained with eosin dehydrated, cleared and mounted with Canada balsam. The specimens were put in an oven at 36 C0 for at least one night. Then they were examined under the microscope. The total length of the worm and hooks was measured and the segments and hooks were enumerated [11].

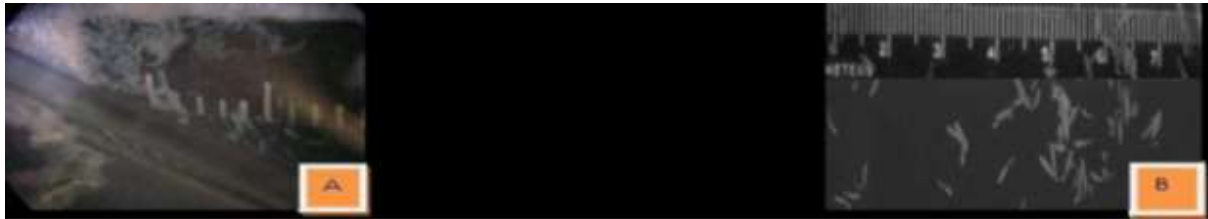


Fig (1): Photographs of the worm Echinococcus in the Petri dish under the dissection microscope 20x, **A-** sample taken from the feces of an infected dog **B-**The worm Echinococcus in the Petri dish, a sample taken from the feces of a dog infected by camera Canon 14-megapixel full zoom.

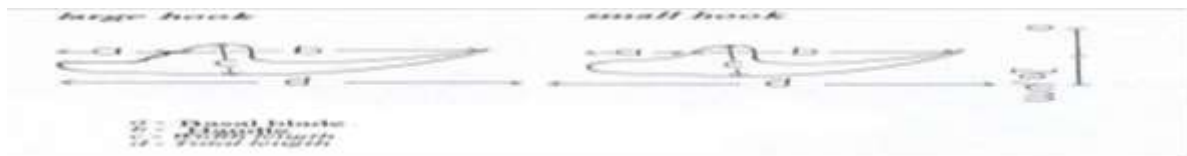


Fig. (2): diagrams showing the method of measuring the length and width of hooks by [2].

2.2 Electron microscopy:

For observation under the scanning electron microscope work (SEM) the collected adult worms were washed several times in saline solution. They were fixed in phosphate buffered 2.5%glutaraldehyde for 3-4h and post fixed in phosphate- buffer 1%osmium tetroxide for 1h. The specimens were dehydrated in a graded series of ethanol and dried at critical drying point using liquid CO₂ in a Polaron E 3000 apparatus. The dried specimens were attached to the stubs and then coated with gold by coating apparatus Polaron E 5000. Examination of these specimens was made using JEOL - JXA - 840 A scanning electron microscope at 30 Kv-wd25 at the electron microscope unit in the National Research Centre -Cairo, Egypt.

3. RESULTS

3.1 Description of Parasites: The adult worm consists of the head 3 segments. It is flattened conical-shaped and its length ranges from 5.6-6.2mm. On the head there are four suckers and two parallel circles of hooks: an outer and an inner one. The number of hooks ranges from 28-38 distributed equally between the two circles and the length of large hooks measures 25-49 μ m while that of the small ones' ranges from 16-32 μ m(Fig.5). The hooks are oriented posteriorly towards the peduncle. Scanning electron microscopy of the head revealed that the hooks in each circle originated alternatively from the places around the rostellum (Fig.3). The second segment (mature) of the adult worm contained the testes, which range in number from 26-79 (Figs 3 and 4 and Table 1). The surface ultrastructure illustrated the dense covering of the protrusions giving it the velvety appearance (Fig, 4 B).



Fig. (3): A: a photograph showing the adult worm(10X), B: photograph showing R-Rostellum and H-Hooks (400X).

Table (1): Measurements of morphometric for adult worm (Echinococcus).

Parameters	Range	Mean \pm SD
Length mm	5.8-6.1	6 \pm 0.2
No. of hooks	28-38	28 \pm 2.5
No. of Suckers	4	4 \pm 0
No. of segments	3	3 \pm 1
No. of testes	27-75	50 \pm 10
No. of Large Hooks	16-19	16 \pm 2.5
No. of Small Hooks	16-19	16 \pm 2.5
Length of Large Hooks μ m	26-48	38.7 \pm 4
Length of Small Hooks μ m	17-31	26 \pm 4

Arrangement of hooks	One small hook between two large hooks.
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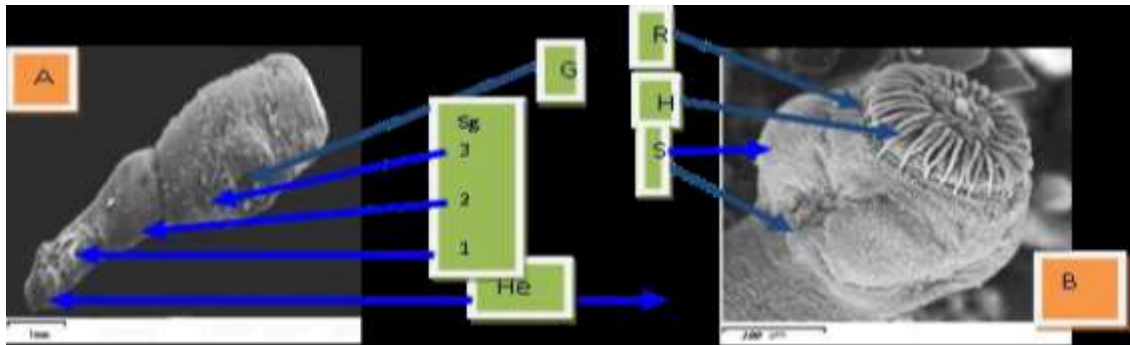


Fig. (4): Scanning electron micrographs *E.granulosus* **A:** Adult worm, Sg = Segments, 1=Immature, 2=Mature, 3=Gravid, G=Genital pore He=head. **B:** Magnification of the head of worm, R=Rostellum, H=Hooks, S=Sucker.

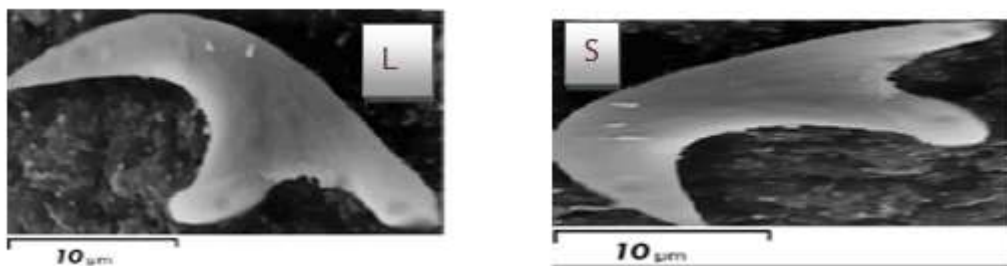


Fig. (5): Scanning electron microscope showing of large(L) and small(S) hooks.

DISCUSSION

The adult worm, of *Echinococcus.sp* were studied by the light and scanning electron microscopes. It was clear that the adult from composed of a head, peduncle and the body. The head has a rostellum surrounded by tow circles of hooks, one inner and the other is outer. Also, the head has four suckers. The body consists of three segments. The surface ultrastructure revealed that it has a velvety appearance due to the presence of indentation or protrusions outside as in all other cestode studied by many authors such as [14,15,16]. Many issues concerning the taxonomy of *E. granulosus* have been resolved on the basis of morphological and morphometric techniques. For these purposes, there is often a need to collect images for recording metacestode rostellum hooks. To date, only conventional morphological techniques as bright-field microscopy, scanning electron microscopy and transmission electron microscopy were used [17,18,19, 20 and 21]. The potential value of new techniques does not seem to have been deeply realized

for *E. granulosus* studies.

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