

# Scanning Electron Microscope Tapeworm Description of *Jardugia Paradoxa* (Family: Hymenolepididae) in Domestic Pigeons *Columbae Liva*

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## Abstract

**Objective:** The current study aimed to study the phenotypic characteristics of tapeworms *Jardugia paradoxa* this is by examining with a light microscope and scanning electron microscope. **Methods:** The current study was conducted in Najaf Governorate from January 4/1/2022 to March 1/3/2022, 20 tapeworms were isolated *Jardugia paradoxa* from the intestines of 30 domestic pigeons *Columbae liva*. **Results:** The morphological characteristics the head, mature segments and gravid segment of the tapeworms were studied by using light microscopy and scanning electron microscope

**Keywords:** *Jardugia paradoxa*, description, Scanning electron microscope, *Columbae liva*

## 1. Introduction

The tapeworm *Jardugia paradoxo* a family Hymenolepididae the family contains more than 90 genera With more than 900 species, including 700 parasitizing birds as its final host, and the rest of the species parasitize on other mammals .

The characteristic of this family of tapeworms is eukaryotes Cyclophyllidea the number of testicles (1-4) and the members of this tape family are distinguished by their sizes. The small to relatively large ones contain four cupholders and carry an armed snout equipped with numbers of hooks from eight to several hundred. Most of the worms of this group are found in the intestines of birds and in exceptional cases under the lining of the gizzard, especially in the walrus family Anseriform.

The life cycle is indirect, as it is found in crustaceans or insects as an intermediate host in the life cycle (Tkach *et al.*, 2013)..

This worm was isolated for the first time in Iraq (Rida, 2017)The genus of this worm includes two types *J. paradoxa* *J. brasiliensis*, The latter was isolated in Brazil, differing from the first type, by the location of the lupus sac, which is on the edge of the body segments. It has also been recorded in Europe, Asia, Africa, Australia, and North America. The intermediate hosts for this parasite are crustaceans and freshwater fish (Khalil *et al.*, 1994)..

A study conducted in Salah Al-Din Governorate was the percentage of infection in the small intestine with tapeworm *Jardugia paradoxa* 11.2% in chicken water *Gallinula chloropus* (Al-Salami, 2018).

## 2. Materials and Methods

### Bird check

The birds were brought after being slaughtered to

the laboratory of the Department of Life Sciences / College of Education for Girls, and the examination process was carried out by dissecting the birds according to the method (Al-Husseini and Damian, 1982) by opening the body. of the bird longitudinally. Using a very sharp scalpel from the complex, passing through the abdomen and chest, and after removing the feathers, an examination of the alimentary canal was performed to note the parasites present in the alimentary canal of the bird, then the alimentary canal was separated from and placed in a petri dish containing saline (9%) at 37 °C To keep it normal, examine the gut lumen with a hand-held magnifying glass for parasites or larval stages. The alimentary canal was divided into four parts, namely the trachea, liver, bile vesicles, gizzards, gizzards, small intestine, large intestine, and collection area. Each part was opened individually, and then each part was opened longitudinally by sharp scissors in a Petri dish placed against a black background. As for the gizzards, the excavated layer was gently removed to search for nematodes underneath.

After completing the process of opening these four parts, the examination process begins and searches for intestinal worms by using a magnifying glass and a dissecting microscope to isolate large and medium-sized worms. As for the smaller worms, they are isolated with a thin needle.

### Microscopy examination of tapeworms

After measuring the lengths of the tapeworms with a ruler, they were cut into suitable pieces and then dyed using the acid cochineal dye. Acetocarmine is ready, as several drops of this dye were placed on the models via a dropper in an hour bottle with continuous examination of the dyed models until they acquire the appropriate redness, and in the event that the model acquires more dye, several

drops of hydrochloric acid (HCL) 10% are added and placed on form, then the head is isolated from it. The remainder of the stained pieces were placed between two strips, tied with rubber bands, and placed in 70% ethyl alcohol for 24 hours at room temperature.

The compressed forms were then opened and placed with ascending concentrations of alcohol, namely: 70% (10-15 minutes), 80% (5-10 minutes), 90% (5 minutes), then absolute alcohol (100%) for one minute and then Absolute alcohol and xylol in a ratio of (1:1) for one minute, then transfer to xylol for one minute to clarify the internal structures of the parasite.

Permanent slides of worms were prepared by loading them onto a slide using Canada Balsam (Al-Saadi et al., 2017). Pictures were taken with a digital camera that diagnosed worms based on the diagnosis of the Natural History Museum and Research Center / University of Baghdad.

### 3. Results

#### Intestinal worm tapeworms

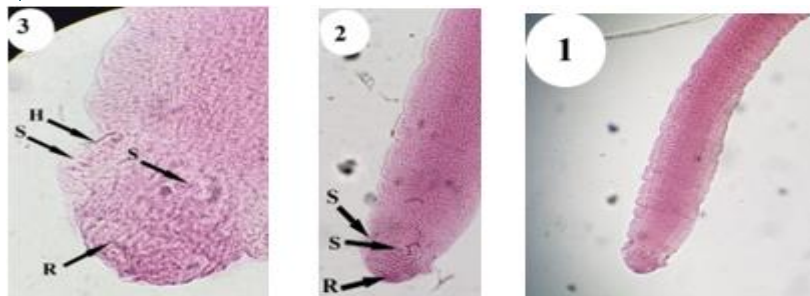


Figure (1): Scolex (Sc) in *Jardugia paradoxa* Rostellum (R) Suckers (S) Hooks (H) the *Columbae liva* host (1) Zoom power40x (2) Zoom power100x (3) Zoom power400x

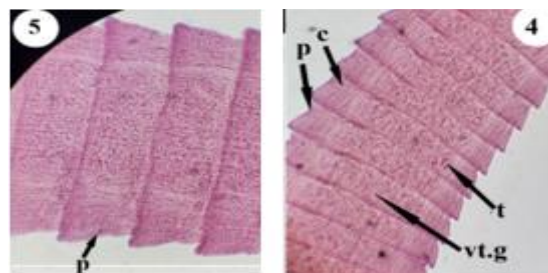


Figure 2: Mature segment in *Jardugia paradoxa* (P) genital pores (t) teste (vt.g) vitelline glands (c) cirrus (4) Zoom power40x (5) The power of magnification100x the *Columbae liva* host

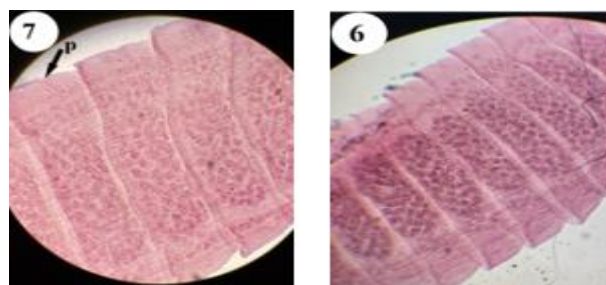


Figure 3: Gravid segment in *Jardugia paradoxa* filled with eggs (p) genital orifice (6) Zoom power40x (7) The power of magnification100x the *Columbae liva* host

Describe Electron microscopescanner *Jardugia paradoxa* isolated during the current study

Scanning electron microscope showed the head in

In this study, parasitic intestinal worms were found in the digestive system of homing pigeons, including tapeworms *Jardugia paradoxa*.

Family: Hymenolepididae *Jardugia paradoxa* Southwell & Hilmy, 1929

Description of the optical microscope of tapeworms *Jardugia paradoxa* isolated during the current study:

This type of tapeworm was isolated from the small intestine of homing pigeons. The worm's body is 21 cm long and 3 mm wide. The heads are circular in shape, 3 microns in length and 9 microns in diameter, and they have four armed apertures, the diameter of the aperture is 3 microns. micron under 40x force. Scaler hooks length 1  $\mu$ m under force 100 x Fig. (1), the mature segment is 11 long by 56  $\mu$ m wide and contains two pairs of reproductive organs and contains two genital openings on each side under force 40 x . Fig. (2) and the chordate segments are large, their width is greater than their length, with a width of 72  $\mu$ m and a length of 22  $\mu$ m under force 40x Fig. (3).

*Jardugia paradoxa* pyramidal the shape The head is 3.5  $\mu$ m long and 2.5  $\mu$ m wide and contains four cupules Diameterscaler 7 strongly magnified150x And snout drop 2 micrometer Strongly150x (Fig.4) In the middle of the snout is a circular disklt

contains two rows of hooks with enlargement force 1000x (Fig. 5) The genital opening in the first trimester for the first of the mature piece and length Ha 4  $\mu\text{m}$  wide and 8  $\mu\text{m}$  wide (Fig.7)

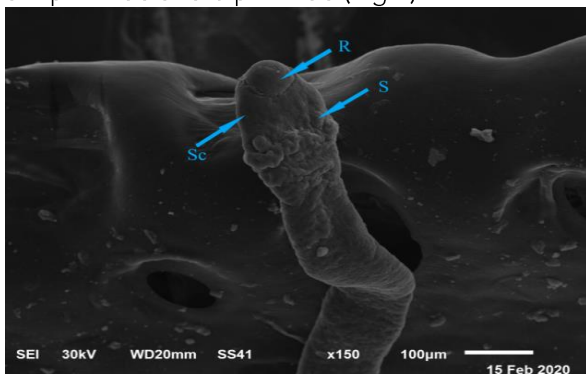


Figure 4: Scolex (Sc) in *Jardugia paradoxa* Rostellum (R) Suckers (S) There are four of them in the *Columbae liva* host, Bar=100 $\mu\text{m}$ .

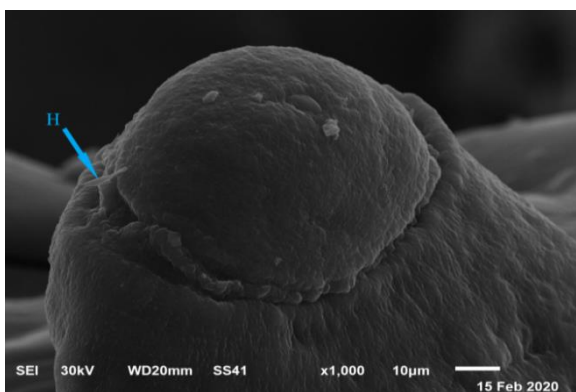


Figure 5: Rostellum in *Jardugia paradoxa* (H) Hooks in the *Columbae liva* host Bar=10 $\mu\text{m}$

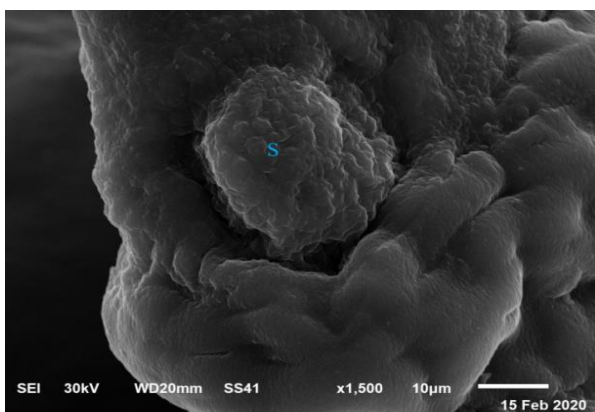


Figure 6: Suckers (S) in *Jardugia paradoxa* Their number is four in the *Columbae liva* host Bar=10 $\mu\text{m}$ .

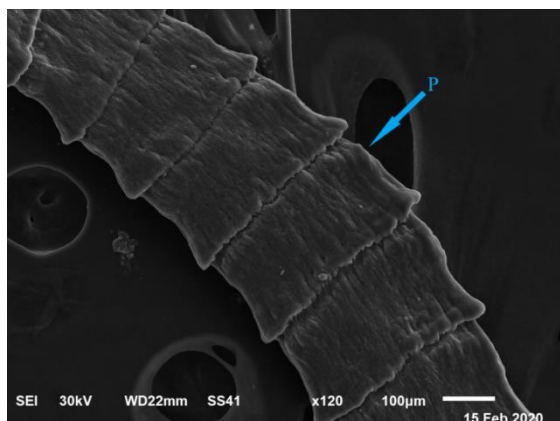


Figure 7: Mature segment in *Jardugia Paradoxa* Genital pore in the *Columbae liva* host Bar=100 $\mu\text{m}$

## 4. Discussion

And the results matched what he said (Southwell & Hilmy (1929), the presence of the rostellum in the Scolex, Suckers armed all around with concentric rows of small hooks, the width of the piece being more than its length, the presence of a pair of testicles for each ring, and a pair of ovaries and uterus in the form of a transverse line.

The results match What he mentioned Yamaguti (1959) Having one crown (rostellum) armed with about 10 long-handled hooks. Body pieces (Proglottides) much broader than long, with a double set of male genitalia and a single set of female glands in the posterior glands, although in the anterior somites there may be one or two sets of male genitalia . There are two layers of inner longitudinal muscles. The external seminal vesicle is at the base of the sacculum. The dorsal genital ducts connect to the excretory ducts . The genital openings are bilateral. The ovary is medium multilobed, occupying the middle third of the width proglottis when it is ripe. There is a deep, intermediate, lobulated vitelline gland posterior to the ovary. The uterus is initially a transverse tortuous sac extending laterally after the oviduct. A double vagina.

The current study does not agree with what Abdullah (2017) mentioned. The length of the worm is 10.8 mm, the width is 2.30 mm, and the Scolex is cup-shaped. There are four sockets in its front, 322  $\mu\text{m}$  wide and 378  $\mu\text{m}$  long. The rostellum is small, round, 0.17 mm long and 0.13 mm wide. The male genitalia consist of one group and appear irregularly in all mature body parts of the parasite. Except for the four peripheral parts. As for the female genital organs, they occupy a central, independent position from the body parts linked by connecting parts.

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