

**The parasitic fauna living in the digestive system of *Blatta orientalis* in Al-Samawa city, Iraq**

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**Abstract :-**

This is first study which demonstrates the parasitic fauna from the digestive system of *Blatta orientalis* that are new records in Al-Samawa city, Iraq. 20 samples were collected from different sites of this city then transfer to parasitic laboratory in Biology Department of Science college of Al-Muthanna university to perform special diagnostic procedures for investigation of digestive parasites from November 2010 to April 2011. the parasitic fauna were one protozoan ciliates and one nematode. One of ciliates *Nyctotherus ovalis* was the most common and prevalent species. The nematode was *Thylastoma* sp. The infected rates were 25% and 10% respectively. Additionally, this study highlights various morphological details.

**Introduction:-**

Cockroach is a household insect that acts as mechanical carrier as well as vector to a large number of pathogens. They harbor a variety of protozoans and helminthes in their digestive system wherein most of them live as endocommensals. The major groups of protozoans reported in the lumen of the gut of cockroaches are ciliates, amoebas, flagellates and apicomplexans. (6, 7, 8, 9, 10). Research on cockroach nematodes have been carried out in different countries of the world. The first oxyurid nematode reported from cockroach was *oxyuris diesingi* described by Hammerschmidt (1838)<sup>5</sup>, from the intestine of *Blatta orientalis*. Chitwood(1932)<sup>2</sup> revised the descriptions of nematode parasites of Blattidae and named several new species cited by Ghosh and Gayen (2006)<sup>4</sup>. Anuar (1987)<sup>1</sup> studies the nematodes of *Periplaneta americana* in Penang, Malaysia. Zervos (1988)<sup>11</sup> has done a considerable work on parasites of cockroach in New Zealand.

The aim of present investigation, therefore, was to study the parasitic fauna of *Blatta orientalis* in Al-Muthanna province, and to determine their morphology which is consider the first study in this province.

**Materials and methods:-****1- Anesthesia and Euthanasia**

The materials used for this work were 20 specimens of *Blatta orientalis* from AlSamawa city. Anesthesia was induced by putting the specimens in the refrigerator at 4°C, in a closed capsule. In general it is best to initiate the work with anesthetized insects, not dead ones, to avoid any damage to the parasites of our interest. In spite of the immobility of anesthetized animals, which does not respond to the external stimuli, the antennas, legs, and buccal palps continue moving, because in the long nervous ventral cord there are many independent ganglia that govern them. Euthanasia of the animals anesthetized by cold can be completed by submerging them for a minute in a more or less concentrated solution of domestic detergent (dishwasher). The detergent is

immediately absorbed by the tracheal system and it kills quickly without affecting the hosts of the digestive tract<sup>3</sup>.

## 2- Dissection

Head is first severed out, and next are the legs, with the help of fine pointed forceps and scissors. Next the body must be pinned to a small dissection tray with thin but rigid pins. With the scissors the ligaments must cut on the righthand side of the abdominal sternites, beginning at the rear end, and the ventral plate so released is hinged towards the left side, clearing its adhesions to the internal organs with sharp needles or with a microscalpel, and is discarded or pinned down. You may want to see the centrally placed ventral nervous cord with its many ganglia and nerves. With thin and sharp teasing needles and (or) very fine pointed forceps, the fat that surrounds the abdominal organs is removed. The alimentary canal is easily isolated and it can be set free from its ties. If you want to separate it more or less completely, the gizzard must be moved with the tweezers until the esophagus is seen and then it must be cut distally, the rest of the digestive tract can now be liberated with the needles, and cut at the other end, at the level of the anus (or cloaca). It is then possible to end with a preparation like this But, given that gizzard and crop normally do not have parasites of interest to us, you may wish to separate only the intestine and the rectum. Identify the intestinal caecae. With the help of the forceps and the scissors, make two cuts in the intestine: one below the caecae, and another one at the level of the cloaca. The separated intestine is transferred to a capsule with clean physiological saline solution. With the two rigid teasing needles, fine and sharpened, the intestine must be open alongside, releasing its content. Do not use a micro-scalpel; you risk cutting in pieces the parasites. With due care remove the intestinal tissues and discard them.

## 3- Collecting the parasites

The material in the capsule is preferably examined over a matt dark background (a black box) with the help of an upper light, this will make it easy to see the nematodes which are wriggling most of the time, or the ciliates swimming in the bottom of the capsule. Separate the most individuals you can, with a fine pointed pipette or a fine pointed brush, with the help of a magnifying glass of 4 to 10 powers. Collect the nematodes into a small capsule in a few of milliliters of physiological saline solution. These preparations will allow to investigate immediately the sample with the 40x and even 100x objectives, to search for the parasitic protozoa. The diagnosis confirmed by Dr. Jayati Ghosh, Department of Zoology, Maulana Azad College, Kolkata, India.

## **Result and Discussion :-**

In only 20 dissected *Blatta orientalis*, one protists (*N. ovalis*) and one of nematodes (*Thelastoma*) found and described in detail below. The infected rates were 25% and 10% respectively (table 1).

Description of the specimens

*N. ovalis*

Habitat: Maximum number of specimens was found in the Colon of the hind-gut.

**Morphology:**

Various morphological characteristics of *N. ovalis* have been studied including body length (L) and width (W) .

The body observed to be oval, comparatively wider in posterior than anterior. Elongated macronucleus situated at anterior one-third. Body length varied from 120.6-128.4  $\mu\text{m}$  and width from 99.4-108.1  $\mu\text{m}$ . (table 2). Cytopyge terminal and oval or slit like in shape. Peristome begins at the anterior end turns slightly to elongated the right and ends in cytostome located midway between the ends.

Body dimensions of *N. ovalis* were relatively smaller than those described by Leidy, 1849. When the L/W ratio was considered, it can be said that the specimens were slightly oval and larger than those described by Ghosh and Gayen (2006). Nuclear shape varied from spherical to ovoid and elongated.

Fig. 1 shows the general morphology of *N. ovalis* under a light microscope and stained with Lugol's Iodine. Compact macronucleus was ovoid form. (Fig. 2) shows the general morphology of *N. ovalis* under a light microscope without stain .

**Helminthes****Genus of *Thelastoma***

This female is only a little shorter than the one of *Hammerschmidtella*. Where its dimensions 912  $\mu\text{m}$  x 101.4  $\mu\text{m}$  while eggs dimensions 54.1  $\mu\text{m}$  x 37.3  $\mu\text{m}$  (table 2). The last third of the body curved to the right and after the anus, the body narrows rapidly where the long thin and pointed tail starts. The mouth gives entrance to one short and cylindrical buccal capsule in which can be clearly distinguished a cylindrical anterior portion, the cheilostom or vestibule, a medium and longer portion, named protostom and finally another small basal portion with its inferior angles rounded, the telostom, that opens in the pharynx or esophagus. This is long, straight and slightly conical, without a corpus or a pseudobulb. (The "corpus" is a widened portion of the pharynx anterior to the pseudobulb). The access to the bulb (a muscular and spherical expansion at the end of the pharynx) is controlled by a very evident sphincter. The gastric pouch does not have any associated cecum, and is continued with the long, thin and straight intestine, that finishes at the anus immediately before the long and thin tail. Nevertheless it is evident in most of the individuals the existence of a secondary and shallow pouch in the dorsal gastric wall of the gastric pouch .The reproductive system is composed of the seminal vesicles (or receptacles), the ovaries and the uterus. The species is didelphic, i.e. it has two ovaries, an anterior one and another posterior, that are continued with a unique large uterus normally full of eggs in different stages of development. The first portion of each branch is the seminal receptacle which stores the semen. See later the long pathway that the semen must travel to reach this location. This morphology and the associated physiology seems like an error in the design of the system. After the seminal vesicle the ovary begins , there were at right the immature eggs, flattened and piled up like coins ready to enter the uterus. Each ripe ovule shows its large clear nucleus which soon becomes enveloped by the shell of the egg. The uterus appeared in all our individuals except one totally full of eggs. These are almost spherical and the embryo, also in a state of morula, occupies a small part of the space delimited by the membrane of the egg. Eggs (figure 4) are expelled to the exterior through a muscular vagina, ending in the small orifice of the vulva.

In fig. 5 apparently corresponding to a young female, the end of the vagina.

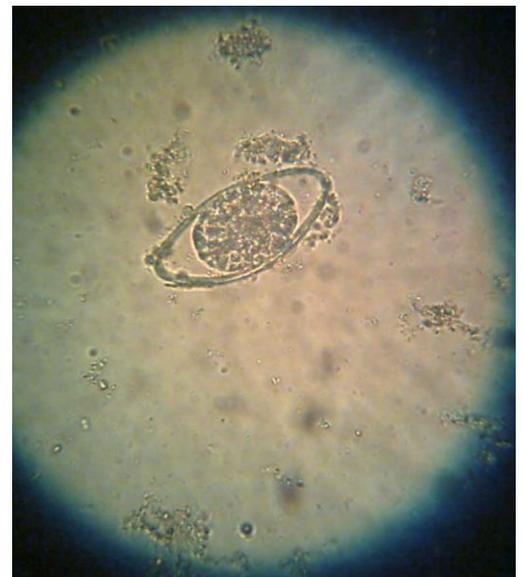
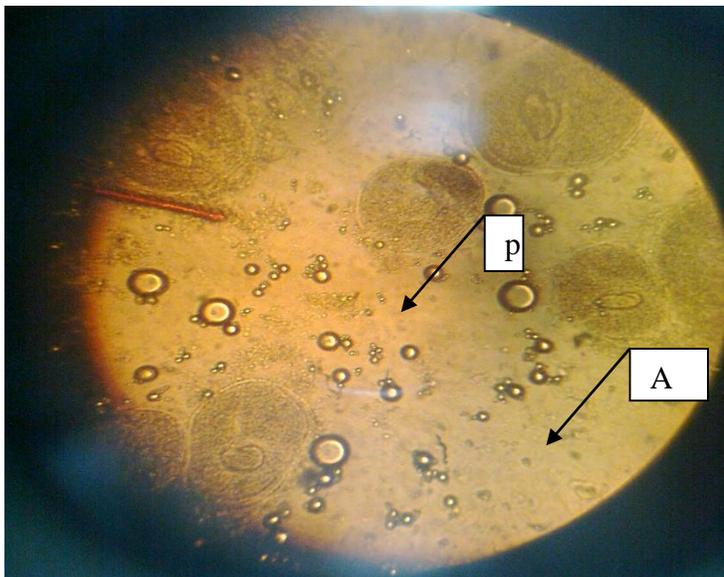
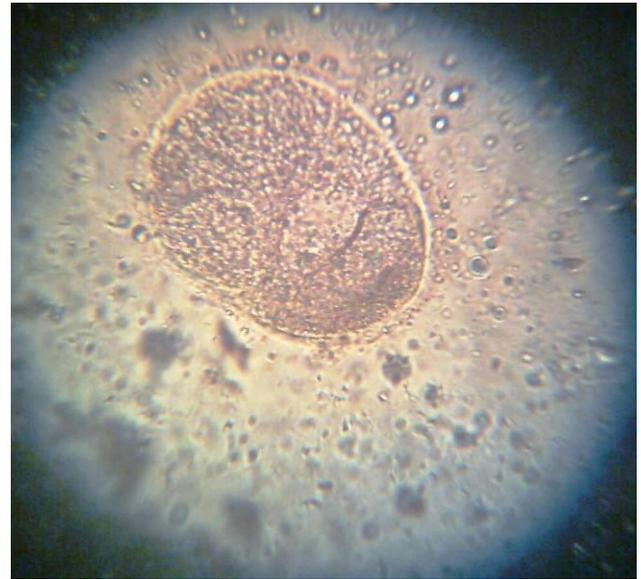


Fig.1:  
*N. ovalis*

stained with Lugol's Iodine

Fig.2: *N. ovalis* stained without Lugol's Iodine

\*ma: macronucleus , p: posterior end , An: anterior end

Fig.3: *N. ovalis* stained with Lugol's Iodine

Fig.4: Egg of *Thelastoma* sp.



Fig. 5: Adult female of *Thelastoma* sp.



Fig. 6: Adult female of *Thelastoma* sp. (posterior end).

\* p: posterior end , An: anterior end

**Table (1):number and proportion of infected cockroach with alimentary canal parasites**

Parasite	No. of examined samples	infected samples	
		No.	%
<i>N. ovalis</i>	20	5	25
<i>Thelastoma</i>	20	2	10

**Table (2):dimentions of the parasites which is found in the alimentary canal of cockroach**

Parasite	Length $\mu\text{m}$	width $\mu\text{m}$
<i>N. ovalis</i>	120.6-128.4	99.4-108.1
<i>Thelastoma</i> Adult	101.4	91.2
<i>Thelastoma</i> egg	54.1	37.3

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دراسة اهم الطفيليات في الجهاز الهضمي للصرصر الشرقي في مدينة السماوة، العراق

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الخلاصة:-

تعتبر هذه الدراسة الاولى من نوعها التي تتناول أهم الطفيليات المتواجدة في الجهاز الهضمي للصرصر الشرقي *Blatta orientalis* في مدينة السماوة في العراق. حيث

جمع (20) عينة من الصراصير من مناطق مختلفة في هذه المدينة ونقلت إلى مختبر الطفيليات في كلية العلوم قسم علوم الحياة جامعة المثنى ثم عزلت منها القناة الهضمية و اجريت الفحوصات

الخاصة بالتحري عن الطفيليات الهضمية للفترة من شهر تشرين الثاني 2010 الى نيسان 2011. وجدت هذه الدراسة نوع واحد من الابدائيات الهدبية (*Nyctotherus ovalis*) ونوع واحد من الديدان الاسطوانية (*Thylastoma sp.*) وكانت نسب الاصابة 25% و 10% على التوالي . أعطي وصف تفصيلي عن تركيب وشكل وقياسات هذه الطفيليات.