



First record of three species of Trematode in Caspin Gull (*Larus cachinnans* Pallas , 1811) in Faw township , southern of Basrah, Iraq*

Amany Moaied Yaseen and Basim Hashim Abdullah

Department of Biology / Collage of Education for Pure Sciences / University of Basrah

Abstract

A total of 30 birds of Caspin Gull (*Larus cachinnans*) were examined and found that all which were infected with Trematode parasites (prevalence 100 %) : *Apophallus crami* , *Heterotestphyes sobolevi* , *Diplostomum spathaceum* , *D. pseudospathaceum* and *Stephanopropora denticulate* . Three of which are recorded for the first time in Iraq (*A. crami* , *H. sobolevi* and *D. pseudospathaceum*). All there parasites were taxonomically described .

Keywords: Caspin Gull parasites , trematoda , *Apophallus crami* , *Heterotestphyes sobolevi* , *Diplostomum spathaceum* , *D. pseudospathaceum* , *Stephanopropora denticulate* .

Introduction :

Despite the importance of aquatic birds as a protein source , they also transport some parasitic infections to wild and domestic birds [1,2]. Some aquatic birds transport Parasites to fish , especially farm fish , because they represent the final host of several species of parasitic worms of fish [3] . *Larus cachinnans* as a migratory birds , that visit Iraq during the short winter period [4] . It may transmit different species of parasitic worms and thus represent a threat to fish stocks and domestic birds . Birds acquire new infections during their migration due to feeding them on different types of intermediate hosts, spores or exposure to worms with direct life cycles [5]. Migratory birds play an important role in transmitting diseases and parasites to domestic birds as well as to humans [6] . In Spain 34 species of parasitic helminths were isolated from *L. cachinnans* , 33 Trematodes [7] . The present study was carried out to examine the helminthes parasites of Caspin Gull (*L. cachinnans*) in Faw township , southern of Basrah governorate , Iraq .

* a part of an M.Sc. thesis submitted by the first author .

Materials and methods :

A total of 30 birds of Caspin Gull (*Larus cachinnans*) were hunted during the period from November 2016 to December 2017 from the Faw township , an area bordering the Shatt al-Arab coast on the international water border between Iraq and Iran in the far south-east of Basra Governorate .

The birds were dissected and all possible places of parasitic worms were examined . The digestive tract was isolated in particular and divided into its main parts (esophagus , stomach , small intestine) . The trematodes were cleared in glycerin for 24 hours [8] and were prepared for taxonomic study.

The dimensions of the trematode body parts were measured using an optical microscope (type Olympus 232545, JAPAN) with an ocular micrometer.

The trematode were determined based on [9] , [10] and [11] . Prevalence (number of individuals of a host species infected with a particular parasite species ÷ number of hosts examined) and Mean intensity of infection (mean number of individuals of a particular parasite species per infected host in a sample) were calculated based on [12] . The bird was classified according to [13] .

All measurement for length and width were in millimeters.

Results :

Five species of trematodes recovered from Caspin Gull (*Larus cachinnans*) Classification of these parasites based on [10] and [11] .

Kingdom: Animalia

phylum: Platyhelminthes

Class: Trematoda

Subclass: Digenea

Order: Opisthorchiida

Superfamily: Opisthorchioidea

Family: Heterophyidae

Genus: *Apophallus*

Species: *A. crami* Price , 1931*

Genus : *Heterotestphye*

Species : *H. sobolevi* Leonov,1957 * *

Order: Strigeida

Superfamily: Diplostomoidea

Family: Diplostomatidae

Subfamily: Diplostominae

Genus: *Diplostomum*

Species: *D. pseudospathaceum* (Niewiadomska, 1984) *

Species: *D. spathaceum* (Rudolphi, 1819)

Order: Echinostomida

Family: Echinostomatidae

Subfamily: Echinostomatinae

Genus: *Stephanoprora*

Species: *S. denticulata* (Rudolphi , 1802)

* Species registration for the first time in Iraq .

* * Genus registration for the first time in Iraq .

Table (1): Species of trematode recorded in *Larus cachinnans* and their prevalence , mean intensity and location of injury to each .

Scientific name of parasitic worms	Number of infected birds	Prevalence %	mean intensity	Location injury in the host body
<i>Apophallus crami</i>	9	30	58	large and small intestine
<i>Heterotestphyes sobolevi</i>	7	23	80.7	duodenum
<i>Diplostomum spathaceum</i>	30	100	8	large and small intestine
<i>D. pseudospathaceum</i>	21	70	6	large and small intestine
<i>Stephanopropora denticulate</i>	30	100	31.6	large and small intestine

***A. crami* Price, 1931 (Fig.1)**

Body small , length 1.5 – 1.8 (1.58) and a width 0.27- 0.36 (0.33), showing a slight contraction in the area between the branch of the intestinal tract and the ventral sucker , oral sucker terminal , rounded it's diameter 0.048 – 0.062 (0.057) , Pre-pharynx short , the pharynx rounded with a diameter 0.03 - 0.04 (0.037) , esophagus length 0.3 - 0.37 (0.33) , ventral sucker circular with a diameter of 0.8 – 0.11 (0.9) . In the fourth quarter of the body, the testes dimensions are located in the front quadrant .The dimensions of the anterior testis 0.13-0.16 (0.15) × 0.18-0.21 (0.2), and the dimensions of the posterior testis 0.16-0.17 (0.167) × 0.19-0.23 (0.21) , and length of ovary 0.073 - 0.092 (0.08) and width 0.072 - 0.094 (0.086). The seminal vesicles are S-shaped , located between the ovary and the ventral sucker. vitellaria glands are relatively large and extend from the posterior end of the ventral sucker to the posterior end of the body, surrounding the testis and not covering them . The uterus contains ovoid eggs length 0.033 - 0.04 (0.035) and width 0.23 - 0.25 (0.024).

***H. sobolevi Leonov, 1957* (Fig.2)**

Body elongate , fore body longer than hind body , Total length 1.22 – 2.73(2.13) width of 0.13-0.39 (0.13) , oral sucker terminal with dorsal transverse muscular ridge , length of 0.12 – 0.16 (0.13) width of 0.13 – 0.19 (0.18) , pre-pharynx is short followed by pharynx it's length 0.083-0.092 (0.086) and width 0.03- 0.06 (0.033).

Acetabulum developed 0.12- 0.2 (0.15) \times 0.14 - 0.2 (0.16) at the end of the first half of the body. The genital atrium is located near and relatively separate from the ventral sucker , with a length of 0.04 - 0.08 (0.05) and a width of 0.04 - 0.09 (0.06) and a genital loop surrounded by a circular ring of very small thorns.

The testes are located at the back of the body and alternately to the right and left of the equine line. The length of the right testis is 0.12-0.14 (0.13) and width 0.05 - 0.09 (0.07) and the left testis 0.12 - 0.14 (0.13) and 0.12-0.14 (0.13) .The ovary are located on the right side of the body, length 0.02-0.06 (0.04) and width 0.02 - 0.06 (0.04) . The uterus is located in the region between the ventral sucker and the testis and is filled with small double walled eggs length of 0.024-0.036 (0.029) and its width 0.014 - 0.023 (0.020) .

***D. pseudospathaceum Niewiadomska, 1984* (Fig.3)**

Body length is 2.1 – 2.65 (2.25) , consists of two broad parts of fore body length 1.02 - 1.6 (1.35) and width at 0.55 - 0.65 (0.6), in which the oral sucker is a semi - circular terminal length 0.07 - 0.10 (0.09) , and width 0.074 - 0.1 (0.089) , pseudosucker well developed 0.11 - 0.13 (0.12) \times 0.07 – 0.09 (0.083) , ventral sucker subglobular length of 0.065-0.095 (0.08) , width 0.07-0.11 (0.085) and is far from the fore body holdfast organ, which is large subglobular 0.16 - 0.38 (0.28) \times 0.16-0.35 (0.25), pre-pharynx is short, and pharynx length 0.05 - 0.10 (0.07) , width 0.053 - 0.108 (0.075) .

Hind body length 1.2 – 2.07 (1.5), width 0.4 – 0.7 (0.56) , two large testes , in posterior half of hind body , length of right testis 0.12 – 0.62 (0.33) , width 0.18 – 0.45 (0.22) and the left testis transversely horseshoe-shaped length 0.25-0.33 (0.26). , width 0.19-0.43 (0.21) .The ovary in mid – hind body length 0.15 – 0.18 (0.17) , width 0.14 – 0.18 (0.16) , follicles numerous , small , arranged in four lateral bands surrounding holdfast organ , and the eggs are small 0.123 - 0.13 (0.125) \times 0.073 - 0.087 (0.083) .

***D. spathaceum* Rudolphi, 1819** (Fig.4)

The body consists of two parts , total body length 2.44 – 3.8 (3.1) , Part 1 for body similar plant leaf length 0.9 - 1.35 (1.06) and a width of 0.6 - 0.8 (0.7) at the top oral sucker length 0.06 – 0.11 (0.08) , width 0.08 – 0.16 (0.95) , and on the sides there are pseudosuckers well -developed . The length of the right pseudosucker is 0.09-0.12 (0.11) and width 0.05 - 0.08 (0.06) . The length of the left pseudosucker is 0.11 -0.14 (0.12), width 0.04 – 0.07 (0.05) , pre-pharynx is short, and pharynx length 0.06 – 0.12 (0.08) , width 0.05 – 0.09 (0.07) . ventral sucker length 0.08-0.15 (0.089) and width 0.09-0.12 (0.11) located near of holdfast organ . Holdfast organ 0.2 – 0.3 (0.27) × 0.21 – 0.39 (0.25) at the end of the for body , Part 2. hind body length 1.42 - 2.5 (2.09) and width 0.58 - 0.65 (0.6), the two testis located in the rear half of the front are, anterior testis length 0.17-0.42 (0.25) and width 0.3 - 0.55 (0.47) , posterior testis is similar to the horseshoe-shaped length 0.16 - 0.53 (0.39) and width 0.35 - 0.62 (0.52), Oval ovaries are located in front of the anterior testis length 0.13-0.2 (0.15) and width 0.16-0.2 (0.18), the vitellaria glands are distributed throughout the body, oval eggs are large in size with a yellow color , length 0.11-0.15 (0.13) and width 0.08-0.1 (0.09) .

***S. denticulate* (Rudolphi,1802)** (Fig.5)

This trematode is medium in size with a white color , length of 4.4 - 5.9 (5.23) and width of the presence of the testis 0.5 - 0.7 (0.67) . The well-developed vertical ring holds 22 fork arranged in one row per length 0.049 - 0.09 (0.06). oral sucker of spherical length 0.1 - 0.25 (0.1) and width 0.08 - 0.125 (0.1). Pre-pharynx short. The pharynx is 0.11 - 0.14 (0.125) × 0.11 - 0.14 (0.125). The long esophagus branches in front of the ventricular to the intestinal tract, and the ventral sucker is approximately length 0.4-0.5 (0.45) and width 0.39-0.45 (0.42) .The testes are located at the beginning of the posterior half of the body. They are situated one upon an other .The anterior testis is 0.71-0.82 (0.75) × 0.39-0.67 (0.52) , and the posterior testis is 0.63-0.82 (0.75) × 0.3-0.43 (0.375) , The cirrus sac shape is almost open to anterior ventral sucker length 0.13-0.18 (0.15) and 0.13-0.18 (0.15) .

The ovary is oval in length 0.103 - 0.24 (0.125) and width is 0.19-0.35 (0.25). The uterus extends between the anterior testis and the ventral sucker and contains the eggs length of 0.086-0.1 (0.093) and width 0.04-0.05 (0.043). The follicles glands extend from the end of the anterior testis to the end of the body.

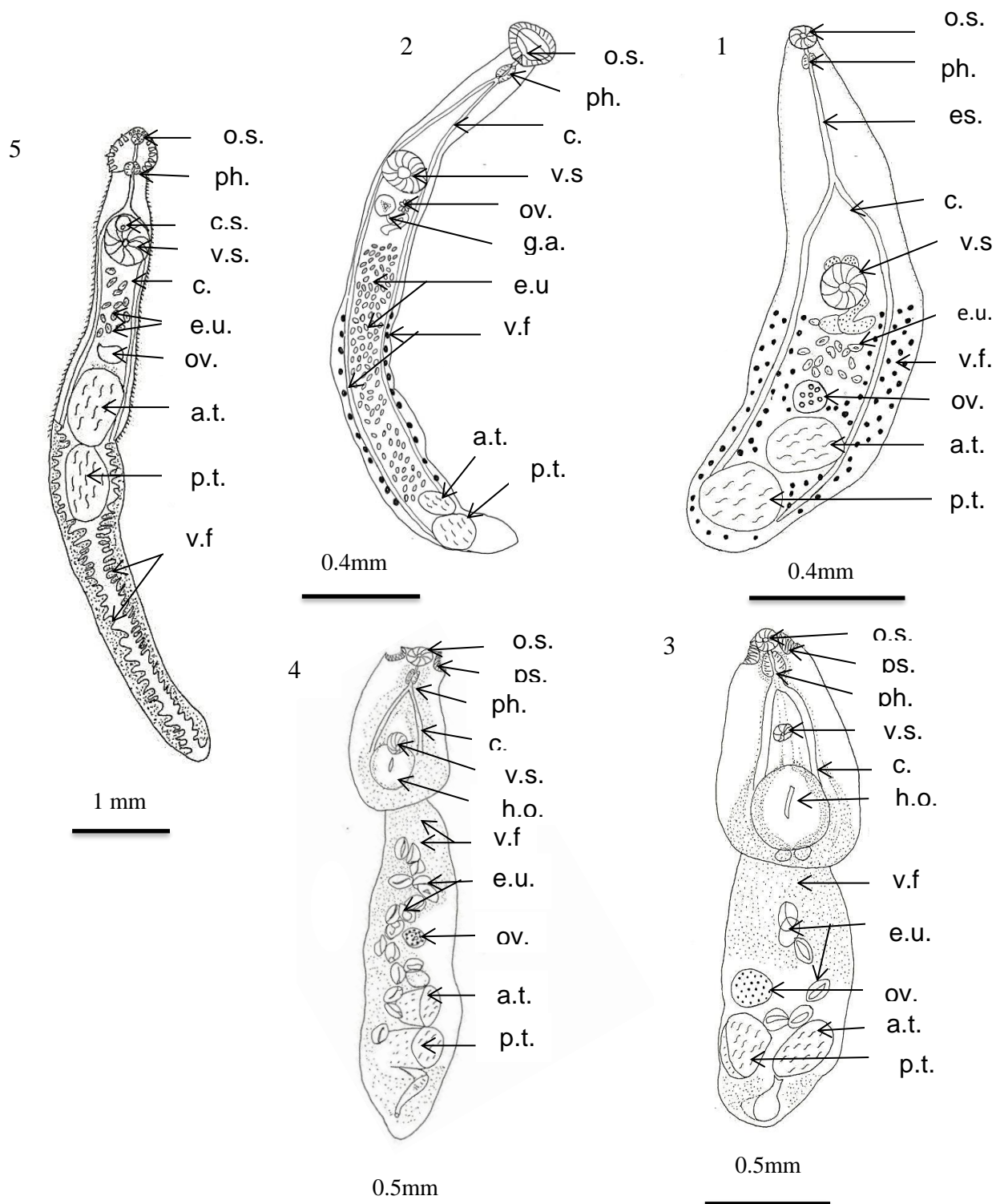


Fig.1: *Apophallus crami* , fig.2: *Heterotestphyes sobolevi* , fig.3: *Diplostomum pseudospathaceum* ,
fig.4: *D. spathaceum* , fig.5: *Stephanopropora denticulate* .

(a.t.) anterior testis , (c.) caecum , (c.s.) cirrus sac , (e.u.)eggs in uterus , (g.a.) genital atrium , (h.o.) holdfast organ , (o.s.) oral sucker , (o.) ovary , (ph.) Pharynx , (ps.) Pseudosuckers , (v.f.) vitelline follicles , (v.s.) ventral sucker .

Discussion:

The knowledge of the diversity of parasites in aquatic birds in the coastal areas has resulted in the acquisition of important information on the food webs and components of the compound population in the regions Where there is an abundance of beaches , waterbirds are increasing as a result of shelter and food [14] . *Apophallus crami* in *L.cachinnans* is the first recorded in Iraq , but the species *A. mühlingi* as already registered by [15] in *L. ichinyaetus* and *L. canus* collected from Shatt al-Arab were recorded with a prevalence 0.95% , 0.1% and the mean intensity of infection 3 & 2 respectively. The description of the spacemen recorded in the current study is similar to the isolation of *L. californicus* [16] This species was distinguished by the distribution of the follicles glands that begin from the posterior end of the ventral sucker.

*Heterotestphytes*_{spp.} are characterized by the fact that the body is longitudinal and scaly, the testis are metatarsal , the genital atrium is distal , and the uterus does not reach the back of two testis . This is due to Hetero-phinae , which is characterized by a large genital reserve at the middle of the body [11] . Previously revealed only two species of the genus *Heterotestphytes* around the world are the type *H. sobolevi* of pigs and gulls in Eurasia and Australia [17] and type *H. heimorgolis*. *H. sobolevi* is characterized by the fact that the body is elongated , and the oral sucker contains a bridge of transversal muscle, the reproductive sac is separate from the ventricle and genital area surrounded by a ring of small thorns [11] . *H. gibsoni* and *H. heckmanni* are isolated from the small intestine of the *Sternula albifrons* of the Laridae family in Pakistan [18] .

The *Diplostomum*_{spp.} are characterized by that the body is divided into two : front (forbody) and back (hindbody) parts . The forbody is similar to the leaf plant with the pseudosuckers on both sides of the oral cavity. *D. pseudospathaceum* is recorded for the first time in Iraq . [19] isolated species *D. pseudospaceum* from *L. ridibundus* and species *D. spathaceum* of two species of sea gulls (*L. fuscus* and *L. ridibundus*) in Poland . In the present study, this species (*D. spathaceum* and *D. pseudospaceum*) have been isolated from the species *L. cachinnans*. previously registered [20] in the first place, the number of species *D. spathaceum* of *L. ridibundus* with a prevalence of 26.5 % . As recorded in [15] species *D. spathaceum* of two sea gulls (*L. ichinyaetus* and *L. canus*) was recorded with prevalence of 47 % and 100% , respectively. The same type isolated by [21] of *L.*

genei was with a prevalence of 13.3% , and of *Himantopus himantopus* and *Actitis hypoleucos*.

*Stephanoprora*_{spp.} have a vertical ring with 22 forks arranged in a row, and type *S. denticulate* that numbers eggs range between (7 - 28) and the length of the egg ranges between 0.088 - 0.11, and the length of the body between 4.4 – 5.9[9].

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تسجيل جديد لثلاثة أنواع من المتقوبات المتطفلة في طيور النورس القزويني *Larus cachinnans* Pallas , 1811 في منطقة الفاو جنوب محافظة البصرة – العراق .

أمني مؤيد ياسين و باسم هاشم عبد الله

قسم علوم الحياة / كلية التربية للعلوم الصرفة / جامعة البصرة

المستخلص

وجد عند فحص 30 طيراً مائياً من نوع النورس القزويني *Larus cachinnans* في قضاء الفاو جنوب محافظة البصرة بأن جميع الطيور المفحوصة كانت مصابة بالمتقوبات Trematoda) اي بنسبة إصابة 100 % (, شخست خمسة انواع منها وهي *Apophallus crami* و *D. Pseudospathaceum* و *Diplostomum spathaceum* و *Heterotestphyes sobolevi* و *Stephanopropora denticulata* ثلاثة انواع منها تسجل لأول مرة في العراق هي (*A. crami* و *H. sobolevi* و *D. pseudospathaceum*) . وصفت الانواع الخمسة من المتقوبات وصفاً تصنيفياً.