FIRST RECORD OF ENDOPARASITE *COLOBOMATUS ASIATICUS* Hayward, 1996 (COPEPODA: POECILOSTOMATOIDA: PILICHTHYIDAE) FROM *SILLAGO SIHAMA* (Forsskål, 1775) FROM IRAQI MARINE WATERS

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ABSTRACT

Females of *Colobomatus asiaticus* Hayward, 1996 have been collected from prepercular canal of silver sillago *Sillago sihama* (Forsskål, 1775) from Iraqi marine waters during May 2016 and December 2017. The present work confirmed the original description of the species by possessing combination of characters: Short and rounded thoracic lobes and both third leg and genital segment with one seta. The present report *Colobomatus asiaticus* considered the new record from Iraq. Detail measurements of different body parts of female were given for the first time.

Key words: short and rounder thoracic, genial segment, fish body.

اول تسجيل للطفيلي الداخلي *Colobomatus asiaticus* Hayward, 1996 (مجذافية الاقدام: بويسلوستوماتيدي) من *Sillago sihama* من المياه البحرية العراقية

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المستخلص

جمعت اناث القشري *Colobomatus asiaticus* Hayward, 1996 من تجاويف العظم قبل الغلصميpreopercular لسمكة الحاسوم *Sillago sihama* (Forsskål, 1775) من المياه البحرية العراقية خلال ايار2015 و كانون اول 2017. اكدت الدراسة الوصف الاصلي للطفيلي بامتلاكه للصفات التالية: اللواحق الصدرية للطفيلي قصيرة ومستديرة النهاية والرجل الرابعة والقطعة التناسلية تحملان هلب واحد. يعد تسجيل القشري *Colobomatus asiaticus* هو الاول في العراق. اعطيت بالتفصيل ولأول مرة قياسات مختلف اجزاء الجسم والقطع الجسمية لكل منطقة.

كلمات مفتاحية: تجاويف العظم، لواحق صدرية، ستديرة النهاية، القطع الجسمية،

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INTRODUCTION

Silver sillago *Sillago sihama* is shallow coastal waters down to a depth of 20m, and rarely to 60 m; It can bury itself in the sand to avoid danger; feeds mostly on polychaete worms and small crustaceans living in the sand and from Arabian Gulf (3). its distributed in Indo-West Pacific: southern Red Sea and Knysna, South Africa to Japan and south to Australia; reported also from New Caledonia (6). In Iraq the genus *Sillago* contained three species viz, *S. arabica* McKay & McCarthy, 1989, *S. attenuata* McKay, 1985 and *S. sihama* (Forsskål, 1775) known from marine waters and could frequently enter Shatt Al-Arab river and southern marsh and *S. attenuata* McKay, 1985 that known from from marine water and Shatt Al-Arab river (1). Studies on parasites of *S. sihama* in Iraq represented with eight parasite species including two trematodes, three monogenoids, two nematodes and one crustacean (11). Parasitic copepods of Marine water fishes of Iraq listed 74 species belong to three orders Cyclopoida, Siphonostomatoida and Isopoda; Cyclopoida represented with Bomolochidae, Chondracanthidae, Ergasilidae, Lernaeidae, Taeniacanthidae and no Philichthyidae so far recorded from Iraq (9).Philichthyidae is a family parasitic on Actinopterigean marine fishes, one from elasmobranch and it consider highly modified family and internal parasite species live in subcutaneous spaces associated with sensory organs of lateral line and skull bones hence they easily overlooked and rarely examination their microhabitat on the host (15, 8, 12). During parasitological surveyed of fishes occurred in marine waters of Iraq the deep muscle of ventral region of gill cover (preopercular canal) of several sillaginid fish *Sillago sihama* exhibited infected with unknown internal copepod, which redescribed herein.

MATERIALS AND METHODS

A total of 96 silver sillago *Sillago sihama* consist of 54 specimens were caught during May 2016 and 42 specimens in December 2017 from fish markets Basrah province, that caught from Iraqi marine waters, by gill nets. In the laboratory of fish Parasitology, Department of Fisheries and Marine Resources, University of Basrah, the skin, gills and fins of each fish individuals were carefully examined by naked eyes and the dark spots of the female parasite in their microhabitat (preopercular bones) were examined in details. The parasite isolated after removed the muscle surrounding the parasite. The parasite preserved in 70% ethanol and were cleared or dissected in drop of lactic acid for overnight. Measurement are the range followed by the mean and standard deviation in parentheses. The illustrations were done by aid of Camera lucida. The terminology followed Essafi *et al*. (5). The host taxonomy followed Carpenter *et al*. (3), and the common and scientific name followed Froese and Pauly (6). All measurements are in micrometres unless otherwise indicated. The ecological terms such as prevalence of infection and mean of intensity were used as defined by Bush *et al.* (2). Six of voucher specimens were deposited in Iraqi natural history Museum at (xx-xx).

RESULTS AND DISCUSSION

Prevalence and Intensity:

Prevalence: 16.67% (9 fish infected/54 fish examined); Intensity 1-2 (mean 1.44) copepod specimens per fish in 2016. Prevalence: 19% (8 fish infected/42 fish examined); Intensity 1-2 (mean 1.62) copepod specimens per fish in 2017.

Description based on 10 females

The body 2.70- 4.47 (3.69± 0.55) mm in length, consists of three differently regions: A spherical anterior part (cephalosome), a subcylindrical middle part and a cylindrical posterior part (Fig. 1 A & B). The anterior part represent the combination of the head and first thoracic segment. it possess two cephalic processes forked at the tip of the head (Fig. 1 A & B). The head 24-47.34 (35.3±16.9) in length and 32-47.3 (35.9±19.16) in width. Length of cephalic processes 55.23-73.64 (65.75±4.76). Antennules ventrolaterally arising (Fig. 1C, D) with uncompleted segmentation, setal formula from basal to distal 1, 9, 2, 3 and 7 (Fig. 1D). The mouth cone (Fig. 1C) protuberance from area between base of antennules. Antenna is modified and occupy the anterolateral part of mouth cone (Fig. 1C- AII). Maxillule behind and overlapping with antenna with single seta distally. Maxilla in the posterolateral part of mouth cone with spinous claw and apically

process. Labium short and simple. Maxilliped is elongate, blade-like posterolateral of mouth cone.The middle region of the body consist of fusion of 2, 3 , 4 and 5 thoracic segments. It possess two pairs of well-developed laterally processes with rounded tips and all these processes bear many spines on their tips (Fig. 1A, B, E). The thoracic length 105-147 (125.65±42.04) and the width 60- 99.9 (79.27±40.58). The length of upper laterally processes 42.08-71.01 (59.99±29.01) and that of lower laterally processes 65.75-115.72 (90.49±37.63). Three pairs of thoracic legs 1-3 found ventrally. The first leg biramous, basis with single seta and two rami, Endopod, basal segment with single seta and terminal seta with two setae. The ectopod, basal segment with single spine and terminal segment with five setae. (Fig. 1I). Second leg with basis has single seta and two rami. Endopod, basal segment with single seta and terminal segment without setal formal. ectopod, basal segment with single spine and terminal segment with five setae. include with largest middle of seta(Fig. 1J). Third leg reduced with single seta (Fig. 1K). The posterior part of the body consist of the last thoracic segment (6^{th} segment) and genital segment and four abdominal segments. All segments of posterior part of body approximately similar in shape, genital segment 18-47.34 (33.14±8.95) laterally bears one seta (Fig. 1H), egg sac has loosely attach with global eggs and easily fall during handling. First abdominal segment 24-42.08 (33.40±6.56) in length and 18-44.71 (30.68±13.31) in width, Second segment 24-42.08 (34.13±6.42) in length and 18-44.71 (29.45±11.84) in width. Third segment 26-39.45 (31.29±4.01) in length and 18-34.19 (25.42±9.60). Fourth segment 16-28.93 (23.56±4.83) and not well differentiated from caudal rami. Caudal rami long and bearing many small setae on outer margin and one seta on inner margin (Fig 1H, G). Member of the family Philichthyidae are actually distinguishable by the number and form of body processes in the female (10). The genus *Colobomatus* is the richest one in the family Philichthyidae, currently included 72 valid species (13). To date, based on the family host specificity level (Sillaginidae), it was easy separated the following six nominal species of *Colobomatus* have been reported from sillaginid hosts from congeneric species: There are *C. arabicus* Hayward, 1996, *C. asiaticus* Hayward, 1996, *C. charleah* Hayward, 1996, *C. fulloonae* Hayward, 1996, *C. sillaginis* West, 1983 and *C. westi* Hayward, 1996. As well as from above mentioned records the following species, *C. arabicus* and *C. asiaticus* and *C. sillaginis* were reported from head bones of the hosts (14, 8). Therefore based on the specificity of microhabitat "subcutaneous spaces of head" (15; 8; 4) together with family host specificity (7,12), it can be compare

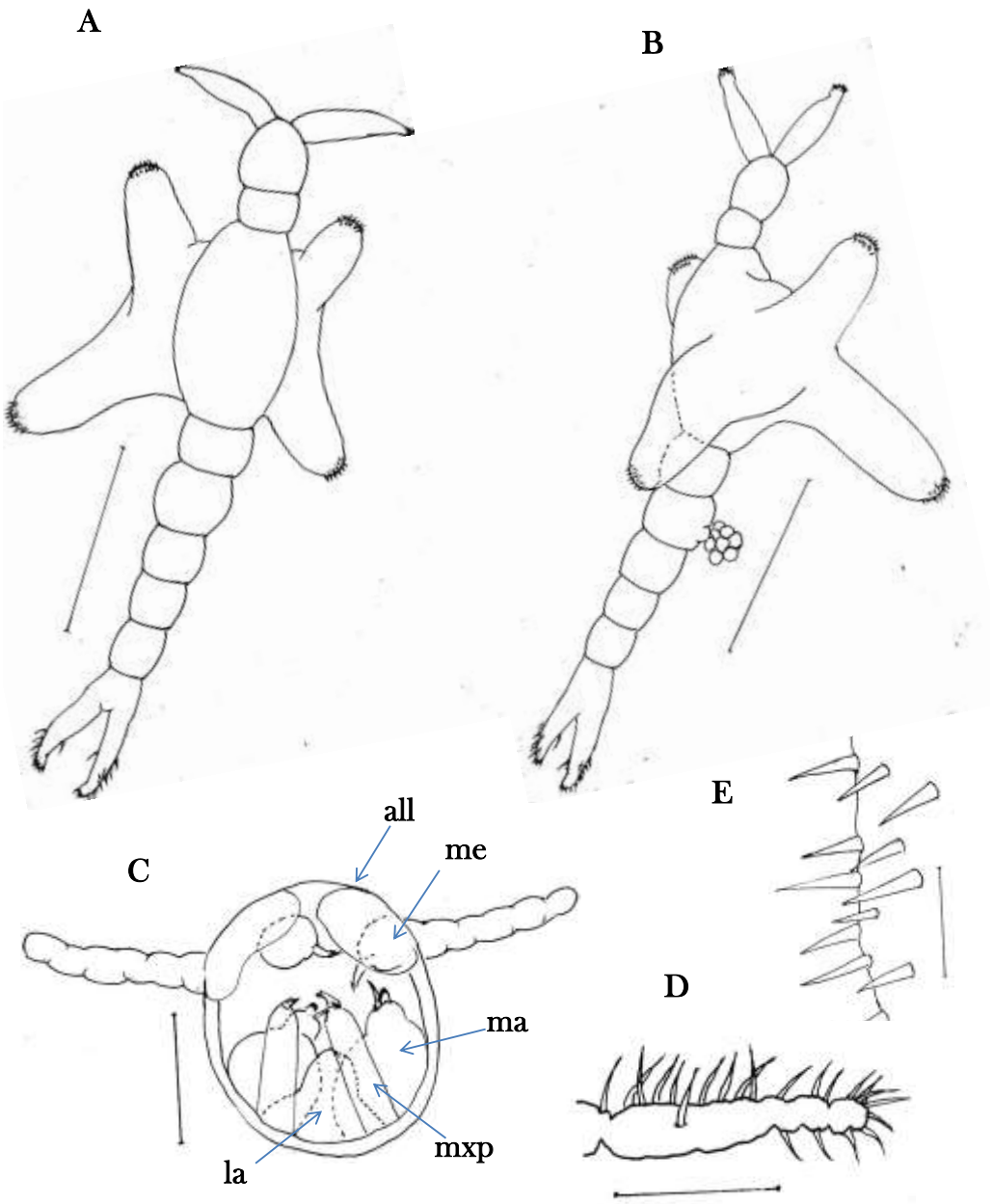

Figure 1. ***Colobomatus asiaticus*** **A: dorsal view, B: lateral view, C: buccal capsule and mouthparts, ventral, all: antenna; la: labium; me: maxillule; ma: maxilla; mxp: maxilliped; D: antennule, E: tip of anterior pair of thoracic lobe. Scale bars: 1500µm in A & B, 200µm in C & D, 50 µm in E).**

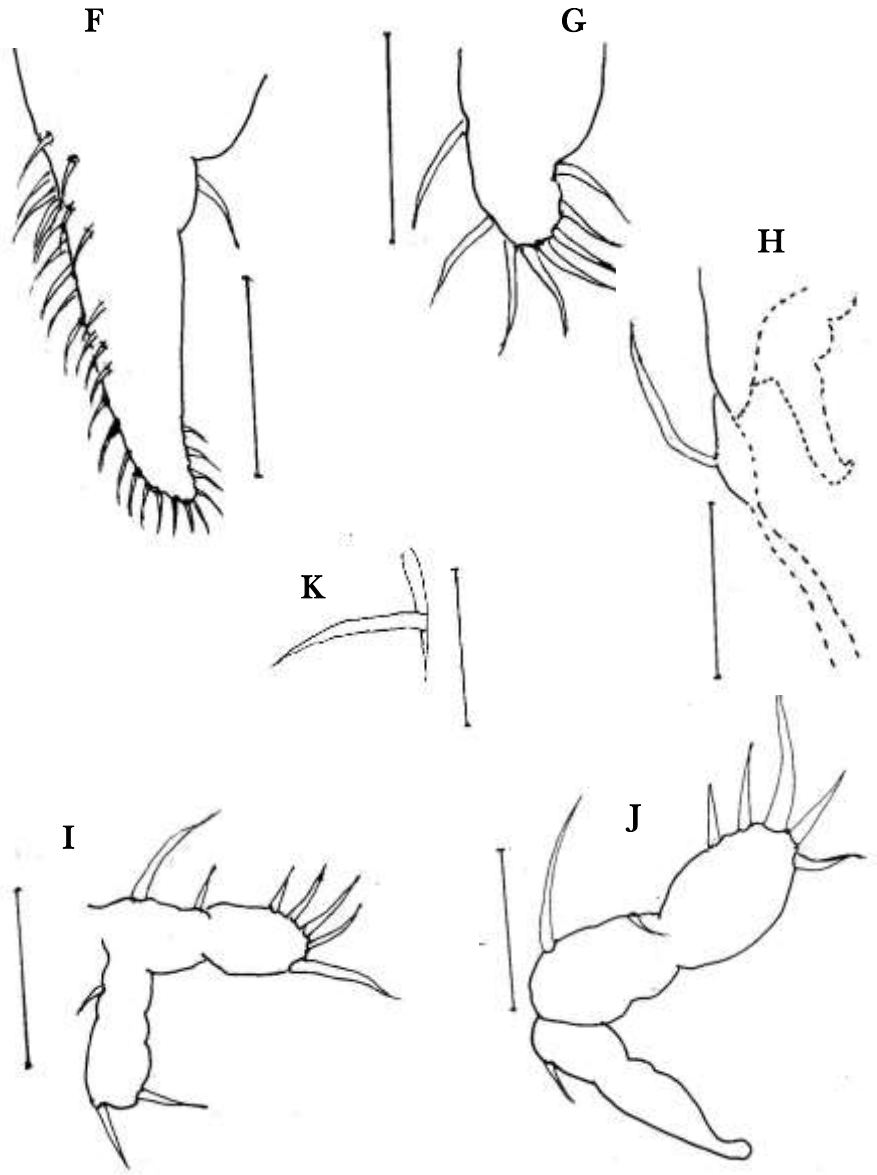

Figure 1 (Continue). F: caudal ramus; G: tip of caudal ramus; H: genital appendage, ventral; I: first leg ventral; J: second leg, ventral; K: third leg ventral (Scale bars: 200µm in F, H; 50µm in G, I, J, K).

just with *C. arabicus* and *C. sillaginis* with present record species (*C. asiaticus*). All three species have similar body shape, with only two cephalic processes instead of three in most other species, the genital lateral processes absence, with simple, well-developed laterally thoracic processes and presence one or two genital seta. However *C. asiaticus* differs distinctly from *A. arabicus* by possessing one seta instead of two setae in the third leg. One seta in the third leg share *A. asiaticus* with *C. sillaginis*. However the thoracic processes of *A. asiaticus* was short and does not extended beyond anterior part the body or beyond genital segment in the posterior. The other distinguished character the cephalic processes shorter than head length in *C. arabicus* and approximately equal to the head in *C. asiaticus*. The thoracic processes of *C. sillaginis* are asymmetrical (anterior pair short, stout, bearing nipplelike constrictions at tip; posterior pair longer, broad-based, tapering gradually to simple rounded tips. The head about 2/3 of cephalic part of body in *C. asiaticus* in compared with the head about more than 3/4 of cephalic part of body in *C.*

sillaginis. The thoracic processes of *C. asiaticus* have setose tips, that tip exist smooth in *C. silaginis*. The tip of caudal rami of *A. asiaticus* possess many small setae on outer side in compared only four setae on both sides of caudal rami's tip of *C. sillaginis*. The parasite originally described as new species by Hayward (8) from preopercular of three sillaginid (*S. asiatica, S. chondropus* and *S. sihama*) from Persian (=Arabian Gulf) off Saudia Arabia and Southeast Asia off Thailand. The parasite of present study relatively longer than of that of original measurement (2.70- 4.47 (3.69) mm in compared with 2.26-3.46 (2.93) mm in original description. These minor differences may be belong to intraspecific variations resulting from the collected copepod in the present study isolated from single host species (*S. sihama*) in compared with three different hosts in Hayward's study, As well as the ecological aspects of both the environment and the life span of the host. However all morphological characters and armature of legs and other parts of body agreed with that of original description. The present study add more details on the measurements of the three parts of body, cephalic processes, thoracic segments, thoracic processes, genital segments and abdomen segments for the first time; as well as the parasite never reported since original description since 22 years ago. According to above discussion this parasite is recorded here for the first time in Iraq and this bizarre endoparasite (Pilichthyidae) considered the first family reported from Iraq.

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