

Jadwiga GRABDA

Parasitology

OBSERVATIONS ON PENETRATION OF *LERNAEOLOPHUS SULTANUS*  
(MILNE EDWARDS, 1840) (*LERNAEOCERIDAE*) IN ORGANS OF  
*PNEUMATOPHORUS COLIAS* (GMELIN, 1788)

OBSERWACJE NAD PENETRACJĄ *LERNAEOLOPHUS SULTANUS*  
(MILNE EDWARDS, 1840) (*LERNAEOCERIDAE*) W NARZĄDACH  
*PNEUMATOPHORUS COLIAS* (GMELIN, 1788)

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An appearance of *Lernaeolophus sultanus* (Milne Edwards, 1840) was noted in buccal cavity of *Pneumatophorus colias* (Gmelin, 1788), originating from Las Palmas (Canary Isl.). Subject of this paper is a penetration of the parasites into eye-socket and nasal cavity and the anatomico-pathological changes associated with an invasion of the parasites.

*Lernaeolophus sultanus* (Milne Edwards, 1840) s. had been well known and its presence noted on various kinds of fish. The first noted specimen of parasite was from *Caranx ascensionis* of an unknown origin (Nordmann, 1864). Heller (1865) noted its presence in Gibraltar on *Serranus scriba* Cuv. and *S. cabrilla* Cuv. The specimens found by Brian (1912) at *Maena vulgaris* Cuv. Val. originated from Portoferraio, Mediterranean Sea.

Heller (1866) and Valle (1880) encountered also the *Lernaeolophus sultanus* in Adriatic Sea on *Serranus scriba* and *S. cabrilla* (after Brian, 1912). At Atlantic in region of Woods Hole (Mass.), the specimen was noted on *Alutera shoepfii* and *Tylosurus marinus*, while at Tortugas (Florida) - on *Haemulon plumieri* (Wilson, 1917, 1932). From Praia de Sao Tiego (Cap Verde Isl.), Eastern Atlantic, originated an exceptionally large specimen of parasite from unknown fish, described by Brian (1912). Kabata (1968) was in possession of materials collected from *Acanthocybion solandri* (Cuv.) originated also from Atlantic, from Gulf of Guine (Annobon Isl. region). We also have the reports on appearance of this species at Indian Ocean (Ceylon region) on *Istiophorus gladius* (Brouss.) (Kirtisinghe, 1935) and on *Rastrelliger canagurta* (Cuv.) (Kirtisinghe, 1964). Its appearance at New South Wales (Australia) was reported by Heegaard (1962) (after Kirtisinghe, 1964).

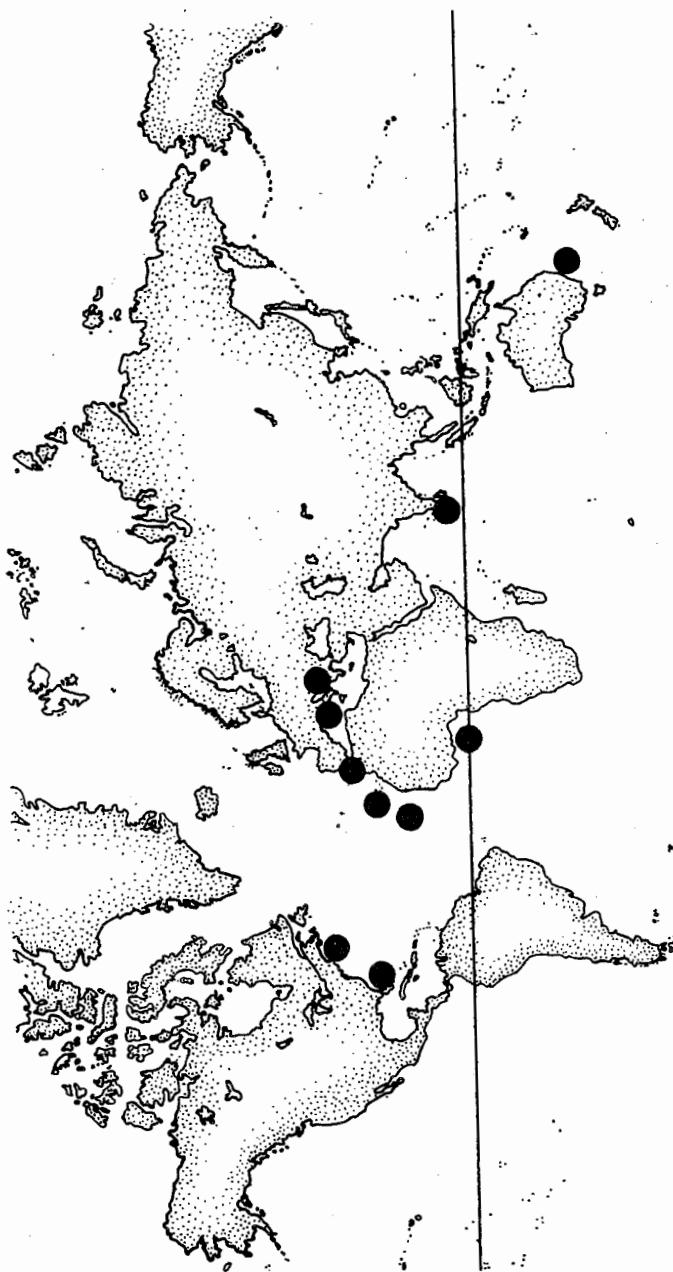


Fig. 1. Distribution of *Lernaeolophus sultanus*

Presently, the above list of localisations should be supplemented by Canary Isl. (Fig.1) and by new host, i.e. *Pneumatophorus colias* (Gmel).

Similiarly to other species of genus *Lernaeolophus* (Heller, 1865), the *Lernaeolophus sultanus* appears most frequently in buccal cavity and in throat of host fish and more seldom on the surface of fish body.

The existing publications comprise mainly more or less detailed morphologic descriptions of the parasite itself. There is a complete lack of data on penetration of parasite into the tissues of a host, beyond the general information that it embeds its anterior part into the fish tissue.

Having an opportunity to study the parasite penetration ways in fish organs, I wish to supplement the existing informations on localisation of *Lernaeolophus sultanus* and to point out to its pathogenic role.

## MATERIAL

Used for investigations were six heads of *Pneumatophorus colias* (Gmel.) with parasites in buccal cavity, and with one exemple of parasite on fish tail, collected by Doc.dr Lech Szlaue r and fixed in formalin.

The fishes were caught on fishing rod at Las Palmas (Canary Isl.) in December 1970. According to information of Doc. Szlaue r, the extensiveness of infection amounted to 50% of examined fish. In principle, the parasites were located in buccal cavity of fish. Only in one case, the parasite was noted on the surface of *colias* body. The size of fish infected, basing on otolithes and scales, was estimated for about 22 cm and the age for 1+.

In all, 11 specimens of parasite were obtained. Head of one fish was macerated in hot solution of NaOH to clean the cranial bones from soft tissues in order to examine the effects produced by parasite on a fish cranium.

## RESULTS

Single specimen of *Lernaeolophus sultanus* was attached to the fish right-side slightly above the laterial line, under the second dorsal fin. The widened part of parasite trunk (genital segment) and its abdomen with outgrowths and with egg-sacks, protruded above the surface of fish body. Cephalothorax with anchor, and so called "neck" were plunged into fish meat. Deep and crater-like loss of skin and of meat was visible in place of parasite attachment. Around the loss, edge of skin was necrotic-changed, white, substantially wide ring of darkened skin appeared around the loss (Fig.4).

In all six heads, the parasites were localised at palate in quantity of one to three specimens in each fish, with grouping between the eye-socket and nasal-cavity. The mucous membrane of buccal cavity at the places of parasite attachment was distinctly soft and fragile; this was particularly well seen in case when parasite bored in it surfacially (Fig.5).

Majority of parasites were deeping through mucous membrane of buccal cavity and through its osseous palate, directing towards the nasal and eye-cavities.

Fig.2. *Lernaeolophus sultanus*, the specimen out-prepared from eye-socket of *Pneumatophorus colias*. Photographed by: mgr E. Ceronik

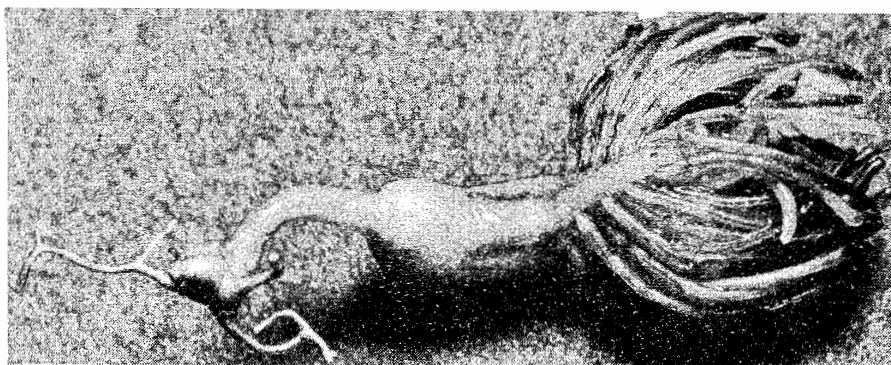
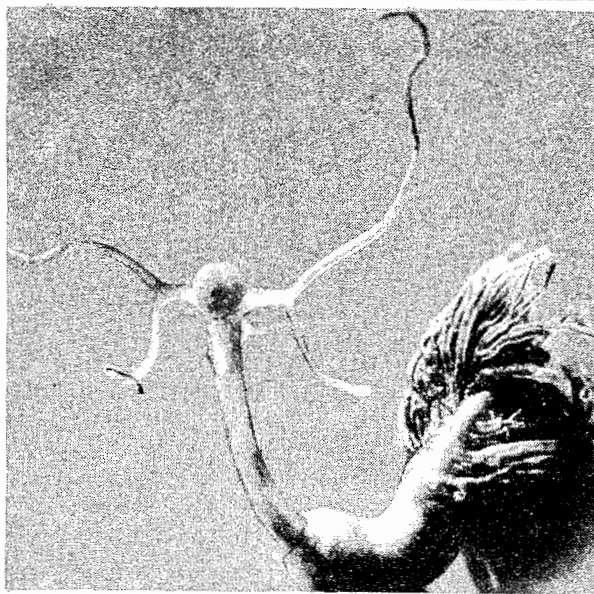


Fig.3. *Lernaeolophus sultanus*, the specimen out-prepared from nasal cavity of fish. Photographed by: mgr E. Ceronik

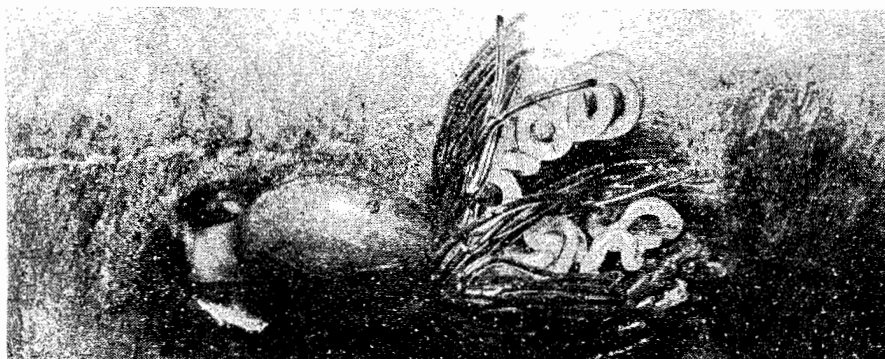


Fig.4. *Lernaeolophus sultanus* on surface of fish body. Seen craterous loss of tissues. Photographed by: mgr E. Ceronik

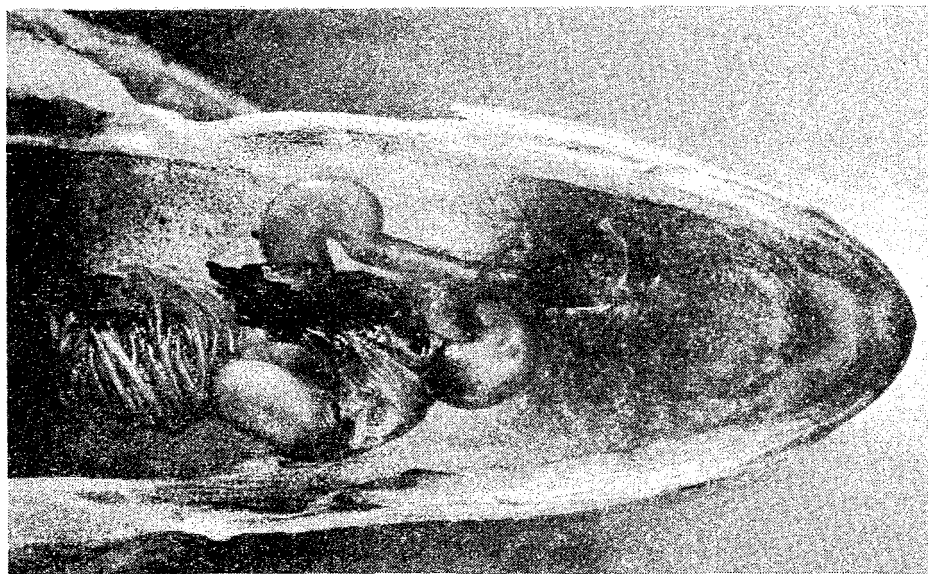


Fig.5. 3 specimens of *Lernaeolophus sultanus* on fish palate.  
 Photographed by: mgr E.Ceronik



Fig.6. Cross-section through head of *Pneumatophorus colias*. Seen in nasal cavity the heads with attaching outgrowths of *Lernaeolophus sultanus*.  
 Photographed by: mgr E.Ceronik

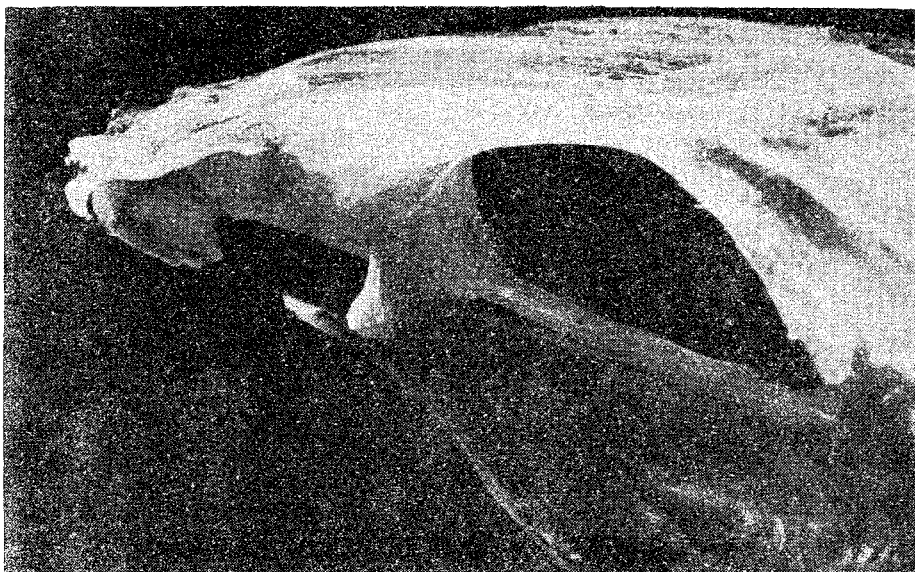


Fig.7. Skull of *Pneumatophorus colias* seen from side. Distinct damage of nasal cavity.

Photographed by: mgr E.Ceronik

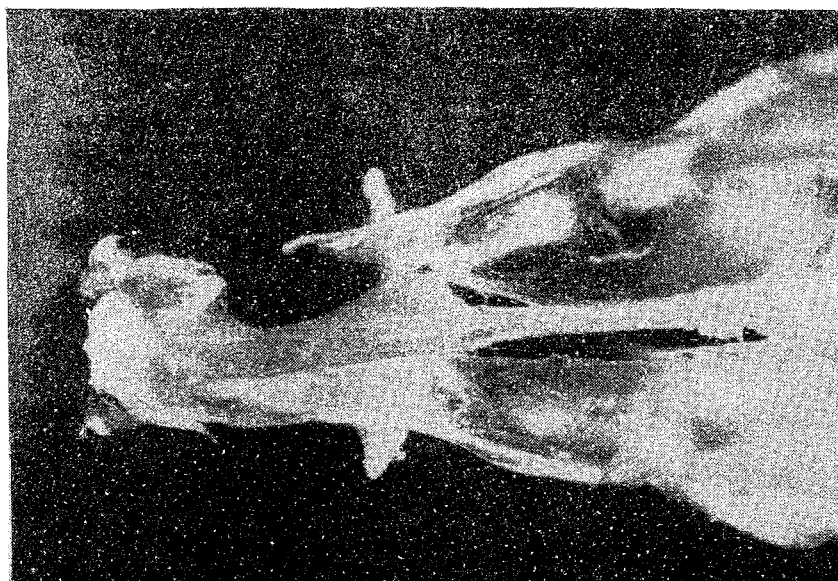


Fig.8. The same skull seen from bottom. Large loss of palatinum

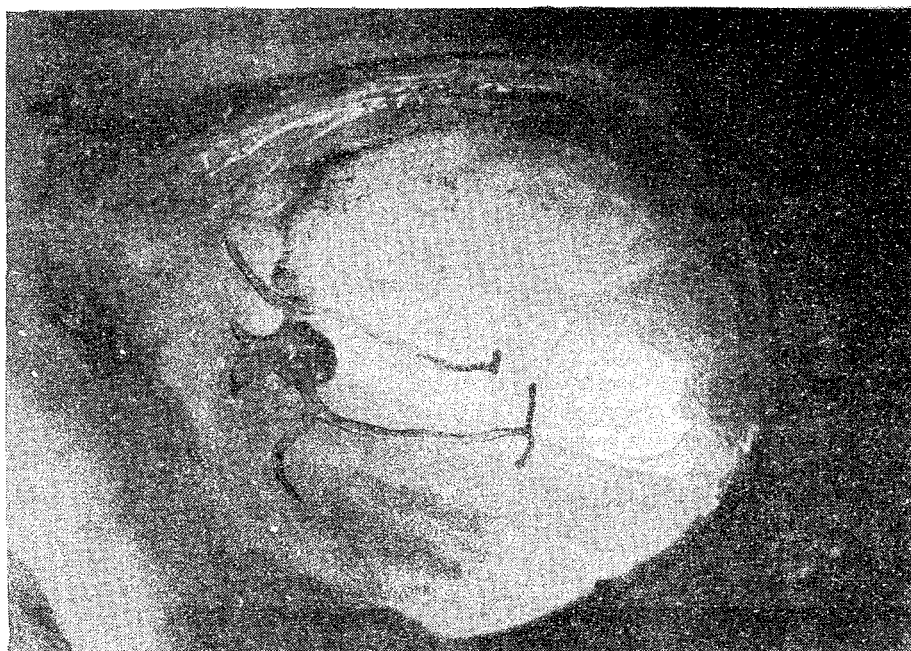


Fig.9. Eye-socket of fish with single parasite.  
Photographed by: mgr E.Ceronik

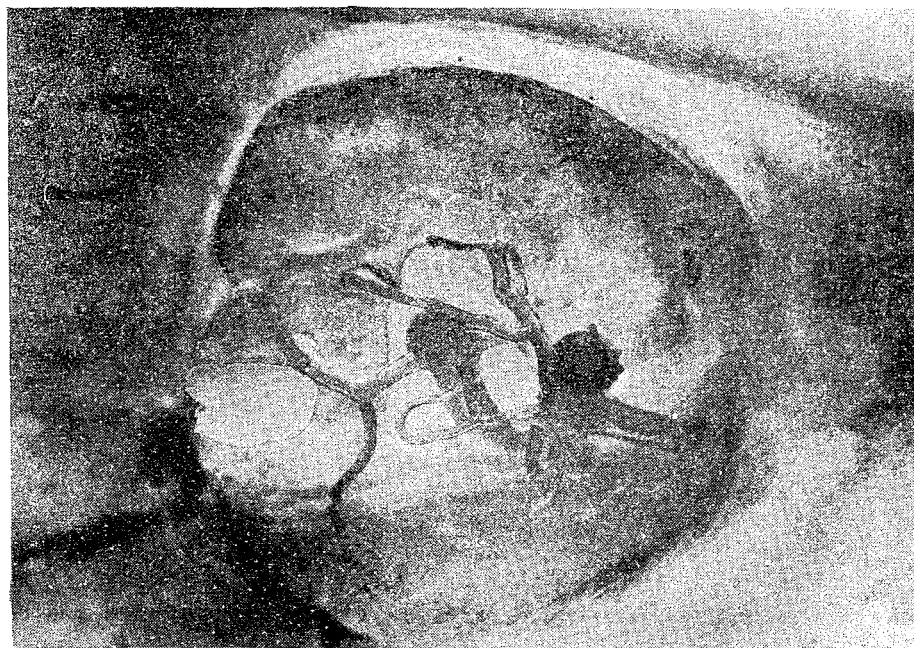


Fig.10. Both eye-sockets of fish affected by parasites.  
Photographed by: mgr E.Ceronik

In nasal cavity, I found one to two parasites in each (Fig. 6). The olfactory epithelium became strung-up and fragile by the anchor of parasite. Complete nasal cavity was filled with mucous. In parts, at parasite buccal part, were seen the petechiae. The bones of head were found seriously damaged by parasites. In case presented on illustrations 7 and 8, the parasite penetrated into the nasal cavity through palatinum causing serious loss in it and damaging the ethmoid bones (proethmoideum and ethmoidale laterale).

Six parasites were localised in eye-sockets, usually one parasite in each (Fig. 9). Only in one case of investigated material, both eye-sockets of the same fish were attacked by parasites (Fig. 10). They are seen penetrating in front corner of eye-socket under the eye-ball and without damaging it, are spreading their head outgrowth in adipose and connective tissue which fills in the bottom of eye-socket. The membranous septum between the eye-sockets is frequently pierced by the parasite anchor which spread at the bottom of eye-socket. The lining tissue of eye-socket was distinctly softened and at places were visible the hemorrhages. The eye-balls of fish remained untouched and retaining the normal position did not reveal the parasites remaining underneath.

In all cases, around the cephalothorax and anchor was appearing the layer of compact tissue which was surrounding the parasite body in sheath-like fashion, while its head was forming the large tumor which without doubt was pressing on eye-ball of fish, as a foreign matter.

Depending on localisation of parasite, wide variety in size and in shape of *Lernaeolophus sultanus* anchor had been observed. The specimens localised in eye-sockets have usually the wide-spread long outgrowths in dichotomic branching (Fig. 2). At parasites of nasal cavity, the arrangement of anchor is less regular and the outgrowth are distinctly shorter (Fig. 3). This, probably, is caused by the more limited space of nasal-cavity than of eye-socket.

## DISCUSSION

The penetration of parasites into the nasal cavity and eye-sockets, associated with serious damages of the soft tissues and of cranial bones, can not remain without any influence on a fish health condition. It may be supplemented, that *Lernaeolophus sultanus* is a parasite strongly chitinous and relatively large of total length upto 23 mm and of anchor outgrowths span upto 17 mm (measurements of own materials). It must then react irritably on the delicate senses of fish and to defect the fish to a higher extent than if located within the tissues of abdomen trunk.

In case described, it appears that, the tendency of parasite of penetrate the nasal cavity or eye-socket is a specific phenomenon characteristic in invasion of *Lernaeolophus sultanus* on *Pneumatophorus colias*.

No reports are available on such specific location of these parasites in eye-socket. Some cases are reported on sporadic wander of parasite into head of fish.

A typical parasite *Lernaeenicus sprattae* (S o w e r b y, 1804) of sprat eye-ball was found once in fish eye-socket plunged in fat tissue in front corner

of eye-socket. The eye-ball did not show any indications (after Kabata, 1970). Similiar penetration of the parasite into eye-socket observed Fryer (1959, 1970). *Opistholernaea laterobranchialis* (Fryer, 1959) frequently appeared in buccal cavity of *Tilapia macrochir* in Bangweulu Lake (Northern Rhodesia). Fryer found only two specimens which penetrated into eye-sockets. Author also calls attention to fact that, around the head and the anchor of parasite, always appears a thick fibrous sheath formed by the tissues of host. Similiar connective tissue sheath appears also in *Lernaea cyprinacea* L., the common parasite of crucian carp *Carassius carassius* (L.).

Until recently, no attention had been paid to fish nasal cavity in parasitological investigations. Finally in sixties, made appearance some first reports on finding in nasal cavity the crustacean parasites of genus: *Paraergasilus* Markewitsch, *Bomolochus* Nordmann, *Chondracanthus* De la Roche, *Caligus* Müller, larvae *Lernaeopodidae* (Smirnova et al., 1964, Kabata, 1969, 1970). However, no reports are available on damages of nasal cavity caused by the above mentioned parasites. In majority, these are minor forms not exceeding one milimeter. According to Kabate (1970), solely the *Chondracanthus narium* Kabata and *Lernaeopoda globosa* Leigh-Sharpe are suspected to be harmful as being the larger forms (*Lernaeopoda globosa* attain 4 mm in length *Chondracanthus narium* - 6.92-7.6 mm).

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OBSERWACJE NAD PENETRACJĄ LERNAEOLOPHUS SULTANUS  
(MILNE EDWARDS, 1840) (LERNAEOCERIDAE) W NARZĄDACH  
PNEUMATOPHORUS COLIAS (GMELIN, 1788)

S t r e s z c z e n i e

Autorka opisuje inwazję Lernaeolophus sultanus (Milne Edwards, 1840) w jamie gębowej Pneumatophorus colias (Gmelin, 1788), złowionych w porcie w Las Palmas (Wyspy Kanaryjskie) w grudniu 1970 roku.

Pasożyty uczepiają się do sklepienia jamy gębowej ryby, najczęściej między oczodołami i jamą nosową. Tylna część ciała pasożyta obejmująca odcinek płciowy i odwłok wraz z wyrostkami i workami jajowymi zwisa do jamy gębowej, część zaś przednia głowotułowia z wyrostkami czepnymi zagłębia się w tkankach ryby.

Penetracja pasożyta sięga bardzo głęboko, przebijając po drodze nie tylko miękkie tkanki ale i kości czaszki i powoduje w nich znaczne ubytki. W opisywanym przypadku pasożyty przebijały się do oczodołów lub do jamy nosowej. Nie obserwowano uszkodzenia gałki ocznej a tylko przebicie błoniastej przegrody między oczodołami oraz stan zapalny tkanki wyściełającej oczodoł. W jamie nosowej natomiast ma miejsce podminowanie i destrukcja nabłonka węchowego.

Sporadycznie Lernaeolophus sultanus może osiedlać się na powierzchni ciała ryby, powodując głębokie kraterowate ubytki skóry i mięśni ryby.

НАБЛЮДЕНИЯ НАД ПЕНЕТРАЦИЕЙ *LERNAEOLOPHUS SULTANUS* (MILNE  
EDWARDS, 1840 (*LERNAEOCERIDAE*) В ОРГАНАХ *PNEUMATOPHORUS*  
*COLIAS* (GMELIN, 1788)

Р е з ю м е

Автор описывает инвазию *Lernaeolophus sultanus* (Milne Edwards, 1840) в ротовой полости *Pneumatophorus colias* (Gmelin, 1788) выловленных в порту в Лас-Пальмас (канарские острова) в декабре 1970 года.

Паразиты живут прицепившись к своду ротовой полости рыбы, чаще всего между глазницами и носовой полостью. Задняя часть тела паразита, включающая половой участок и брюшко вместе с отростками и яйцевыми мешками, свисает в ротовую полость; передняя же часть головогруды с выростами головы углубляется в ткани тела рыбы. Пенетрация паразита распространяется очень глубоко, пробивая на своём пути не только мягкие ткани, но и кости черепа, и вызывает в них значительные разрушения. В описываемом случае паразиты проникали к глазным впадинам или же в носовую полость. Не замечено повреждений глазного яблока, замечено, однако, прободение перепончатой перегородки между глазными впадинами, а также воспаление ткани, выстилающей глазницу. В носовой полости имеет место раздражение и деструкция эпителия обоняния.

В единичных случаях *Lernaeolophus sultanus* может поселяться на поверхности тела рыбы, вызывая глубокие кратеровидные разрушения кожи и мышц рыбы.

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