Cryptobia neghmei sp. n. (Protozoa: Kinetoplastida) in two species of flounder, Paralichthys spp. (Pisces: Paralichthyidae) off Chile

Cryptobia neghmei sp. n (Protozoa: Kinetoplastida) en dos especies de lenguados Paralichthys spp. (Pisces: Paralichthyidae) de la costa de Chile

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ABSTRACT

Cryptobia neghmei sp.n. is described from the blood of two species of flounder, Paralichthys microps and P. adspersus, inhabiting the Chilean coast in the southern Pacific Ocean. Flagellates were elongate, slender, with two flagella and a conspicuous undulating membrane. It was distinguished from previously described species on the basis of its unusual shape and dimensions. All of 97 flounder were infected upon examination. Developmental stages of kinetoplastid protozoans, perhaps C. neghmei sp. n., were observed in some leeches Glyptonotobdella sp. that were found attached to flounder, which probably represent a mode for transmission among piscine hosts.

Key words: Cryptobia neghmei, hemoflagellate, flounder, Paralichthys microps, Paralichthys adspersus, coastal Chile.

RESUMEN

Se describe a Cryptobia neghmei sp.n., un protozoo sangüíneo de dos especies de lenguados, Paralichthys microps y P. adspersus, habitantes de la costa de Chile en el sur-este del océano Pacífico. Los protozoos flagelados son de forma elongada, delgados con dos flagelos y una membrana ondulante conspicua. Esta especie se distingue de aquellas descritas previamente en base a su forma y dimensiones inusuales. Los 97 lenguados revisados estaban infectados. Se observaron otros estados de desarrollo de protozoos kinetoplástidos en la sanguijuela Glyptonotobdella sp. que parasitaba a los lenguados y que probablemente sea el vector del protozoo.

Palabras clave: Cryptobia neghmei, hemoflagelado, lenguado, Paralichthys microps, Paralichthys adspersus, costa de Chile.

INTRODUCTION

Among kinetoplastid protozoans of fish, two morphologically similar genera (Cryptobia Leidy 1846 and Trypanoplasma Laveran and Mesnil 1901) are recognized mainly on the basis of their location on (or in) the host body. Their life cycles can involve direct transmission or by blood sucking leech species. Species of the genus Cryptobia are kinetoplastid flagellates which possess two free-moving flagella, one located anteriorly, the other one posteriorly attached, and invariably an undulating membrane extending the full length of the body. They have been reported from some invertebrates but more often in the blood of fish (Becker 1977, Khan 1991).

This study was conducted on the blood parasites of two species of flounder, Paralichthys microps (Günther 1881) and P. adspersus (Steindachner 1867) living off the coast of Chile. An ectoparasitic leech was also taken from some of the fish and examination of its intestinal contents revealed a number of developmental stages of kinetoplastid protozoans. Since morphometric criteria of this organism were not comparable to those of any species described previously, it is considered a new species. A description of the parasite in flounder and other developmental stages of kinetoplastid protozoans found in the leech are reported herein.

MATERIAL AND METHODS

Flounder were captured by gillnet and by otter trawl off the coast of Chile at three locations:
Concepción bay, San Vicente bay, and Gulf of Arauco, at depths 8-15 m during November and December, 1998 (Fig. 1). The fish were bled from the caudal artery after capture using a 3.0 ml syringe that was heparinised and 23 gauge needle. The fish varied in length from 20 to 55 cm and weighed 65 to 2,100 g. Smear made from living specimens were exposed to iodine vapour for about one minute to prevent contraction. Fresh smears in phosphate buffer (pH 7.6) from the gills and skin of these fish were also examined for parasites. Thick (one drop of blood) and thin smears were prepared from all other fish, air-dried, incubated at 60 °C for 30 min before fixation with methanol and staining with Giemsa (1:10 dilution with phosphate buffer, pH 7.6) for about one hour. Some smears were also stained with “diff quik” (Baxter Scientific Products, Illinois, U.S.A.). Three specimens of a leech, collected from the bodies of three flounder, were dissected and smears prepared on slides were stained with Giemsa. Illustrations of the parasite were made from photomicrographs using a Zeiss “ultraphot”’ with a micrometer and measurement (nm) were made from stained smears. Means and standard errors were determined.

RESULTS

Description of the parasite is based on five living (which were also recorded on a video tape) and 25 stained (both Giemsa and “diff quik”) specimens which were obtained from five hosts (5 per fish). None was seen in smears made from the surface (both dorsal and ventral) of the body or from the gills.

Fig. 1: Sampling locations (black circles) of the flounder Paralichthys spp. off the coast of Chile.
Localidades (círculos negros) de muestreo de los lenguados Paralichthys spp. frente a la costa de Chile.

Genus Cryptobia Leidy 1845

Cryptobia neghmei sp.n. (Fig. 2A, 2B, 2C). Diagnosis (blood stream forms, mean ± SE measurements in mm; based on living and Giemsastained specimens). Body elongate 41.9 ± 0.4 x 3.8 ± 0.6, narrow, tapering toward the posterior extremity of body flexing continually in live specimens; anterior flagellum prominent, moving rapidly, 10.3 ± 1.1 mm long; distinct undulating membrane extending the full length of the body (Fig. 2), beating rapidly in a wave-like manner, posterior; posterior flagellum short, 5.2 ± 0.4 long, flicking but moving less rapidly than the anterior flagellum; nucleus ovoid to elongate, 3.8 ± 0.2 x 3.2 ± 0.1, located 6.8 ± 0.1 from anterior extremity, appearing translucent in living specimens and light gray when stained; in one stained specimen, an extension of the nucleus was observed, kinetoplast elongate, 9.7 ± 0.8 x 3.6 ± 0.2, magenta-stained at the anterior extremity, lying near the flagellum in stained specimens but ovoid and translucent in live specimens.

Kinetoplastid stages in the leech Glyptonotobdella sp. Sawyer and White, 1969, an ectoparasite of flounder

Several developmental stages of kinetoplastid protozoans were observed in stained smears prepared from the digestive tract of three specimens of a leech Glyptonotobdella sp., that were taken from the body surface of flounder. Some were ovoid, (11.6 ± 0.9 x 7.1 ± 0.4) with a nucleus (Fig. 3A), and kinetoplast and appeared to be diving with pale-staining flagella that were faintly visible (Fig. 3B). Others were ovoid to pyriform, nucleated with an anteriorly located kinetoplast and a flagellum 12.5 ± 1.1 x 8.6 ± 1.0 (Fig. 3C, 3D).

Taxonomic summary

Type host: Paralichthys microps and P. adspersus.
Site of infection in host: blood.
Geographical location: coast of Chile (near to 36° 44'S, 73° 09'W) in the South Pacific Ocean.
Prevalence: 100 % from 97 flounder examined.
Vector: probably the leech Glyptonotobdella sp., G. antarctica was reported in this area of Chile, as (misnamed) Glyptonotobdella by Enríquez-Briones and Gallardo (1994) on the red shrimp Pleuroncodes monodon Milne Edwards, 1837 (Anomura: Galatheidae).
Etymology: the species is named after Professor Amador Neghme in recognition of his contributions to parasitology in Chile.