

MONOGENEAN PARASITES OF *SARPA SALPA* (LINNAEUS, 1758) (PISCES: SPARIDAE) FROM THE WESTERN MEDITERRANEAN SEA

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Received 10 June 1991; accepted 22 April 1993

REFERENCE: PELLICER (M.), CAMPOS (A.) & CARBONELL (E.), 1993.— Monogenean parasites of *Sarpa salpa* (Linnaeus, 1758) (Pisces: Sparidae) from the western Mediterranean Sea. *Research and Reviews in Parasitology*, 53 (3-4): 81-85.

ABSTRACT: Gill analyses conducted on 200 hosts of the species *Sarpa salpa* (Linnaeus, 1758) (Pisces: Sparidae) revealed four species of Monogeneans belonging to three families: *Encotyllabe* sp. (Capsalidae); *Lamellodiscus parisi* Oliver, 1969; *L. ignoratus* Pulombi, 1943 (Diplecetanidae); and *Atrispinum salpae* (Parona et Perugia, 1890) (Microcotylidae). This study is the first report for the species *Encotyllabe* sp. and *Lamellodiscus parisi* in Mediterranean waters of the Iberian Peninsula. *Sarpa salpa* becomes a new host species for *Encotyllabe* sp.

KEY WORDS: Monogenea, *Atrispinum*, *Encotyllabe*, *Lamellodiscus*, *Sarpa salpa*, Sparidae, Mediterranean Sea, Valencia coast, Spain.

INTRODUCTION

Many studies have been carried out on monogenean parasites of marine fishes, some of the most significant being those by EUZET (1957, 1984), KTARI (1969), OLIVER (1969, 1987), and LÓPEZ-ROMAN & GUEVARA-POZO (1979). These studies were concerned with helminths affecting *Sarpa salpa* (Linnaeus, 1758) (Pisces: Sparidae), but were not carried out in waters of the Mediterranean coast of Valencia.

Individuals of the species *S. salpa* are gregarious fishes. They are mainly herbivorous when fully grown and are found in the Mediterranean Sea and the eastern Atlantic Ocean (WHITEHEAD *et al.*, 1986).

In this study, we describe the species of monogenean parasites found in *S. salpa* of the western Mediterranean coast of Valencia. Morphological and anatomical features of each monogenean (see Figures), as well as data on prevalence and intensity (Table 1) and infestation distribution on the gill, are presented.

MATERIAL AND METHODS

Two hundred *Sarpa salpa* hosts have been studied over a two-and-a-half-year period (January 1987 to June 1990). Fishes were caught in the maritime zones of Castellon and Moraira (Alicante) using a gill-net.

Once the data on each fish specimen had been taken (weight, sex, location, etc.) the corresponding gill analysis was carried out, separating the gill arches according to their disposition in the host, right and left, numbering them from 1 to 4, previous and back, respectively. All monogenean parasites found were fixed in Bouin's fluid, stained with boric or aluminic carmin and mounted in Canada balsam. Drawings of the specimens were made using a drawing tube attached to an Olympus microscope.

RESULTS AND DISCUSSION

A total of 18371 monogeneans were collected, belonging to four species of three families: Microcotylidae

Taschenberg, 1879 (Polyopisthocotylea Odhner, 1912), Capsalidae Baird, 1853 and Diplecetanidae Bychowsky, 1933 (Monopisthocotylea Odhner, 1912).

Microcotylidae Taschenberg, 1879

Atrispinum salpae (Parona et Perugia, 1890)
Maillard et Noisy, 1979

The anatomical and morphological features of the specimens found agree with those described by KTARI (1969) and LÓPEZ-ROMAN & GUEVARA-POZO (1973). Worth mentioning are the triangular opisthohaptor, consisting of 48-50 pairs of clamps in two rows on each side (Fig. 1A), the eggs which have two long polar filaments (Fig. 1C), and one genital atrium with 4-5 long vertical spines over the longitudinal body axis. The long spines are imbricated and sit on a sclerotic plaque together with 18-20 smaller spines. The spines show a concentric arrangement and are absent in the lower part (Fig. 1D).

The species presents a strict specificity regarding its host and mainly inhabits the Mediterranean. It has been described in *Sarpa salpa* and *Diplodus sargus* (Linnaeus, 1758) (Sparidae) from the Mediterranean off Tunisia (KTARI, 1969), by LÓPEZ-ROMAN & GUEVARA-POZO (1973) in *S. salpa* off the coast of Granada and by ORECCHIA & PAGGI (1978) on the Italian coast. Other studies not dealing exclusively with this species have been carried out by MAMAEV (1977, 1984, 1986), MAILLARD & NOISY (1978-1979) and ORECCHIA & PAGGI (1983).

The high total prevalence detected (41%) must be stressed (Table 1). The parasites appear to be more abundant on the anterior gill arches. There is a distribution gradient, owing probably to higher exposure probabilities when dragged along with gill currents (see Fig. 3A).

Capsalidae Baird, 1853

Encotyllabe sp.

The anatomical traits of the individuals belonging to

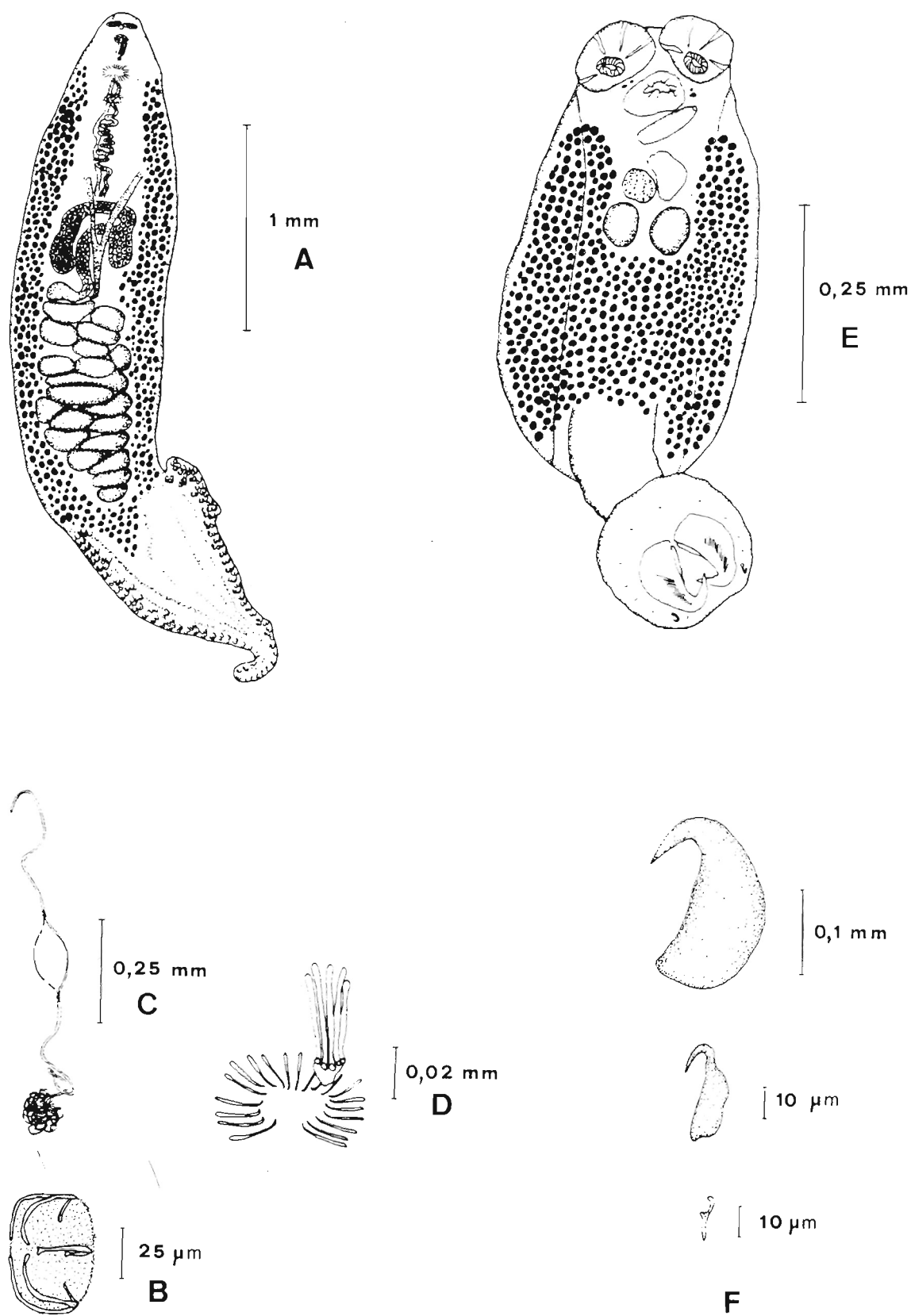


Fig. 1.— Monogenean parasites from *Sarpa salpa*: A) *Atrispinum salpae* in ventral view; B) opisthohaptor hook of *A. salpae*; C) *A. salpae* egg; D) genital atrium of *A. salpae*; E) *Encotyllabe* sp. in ventral view; F) hamulus and opisthohaptor hook of *Encotyllabe* sp.

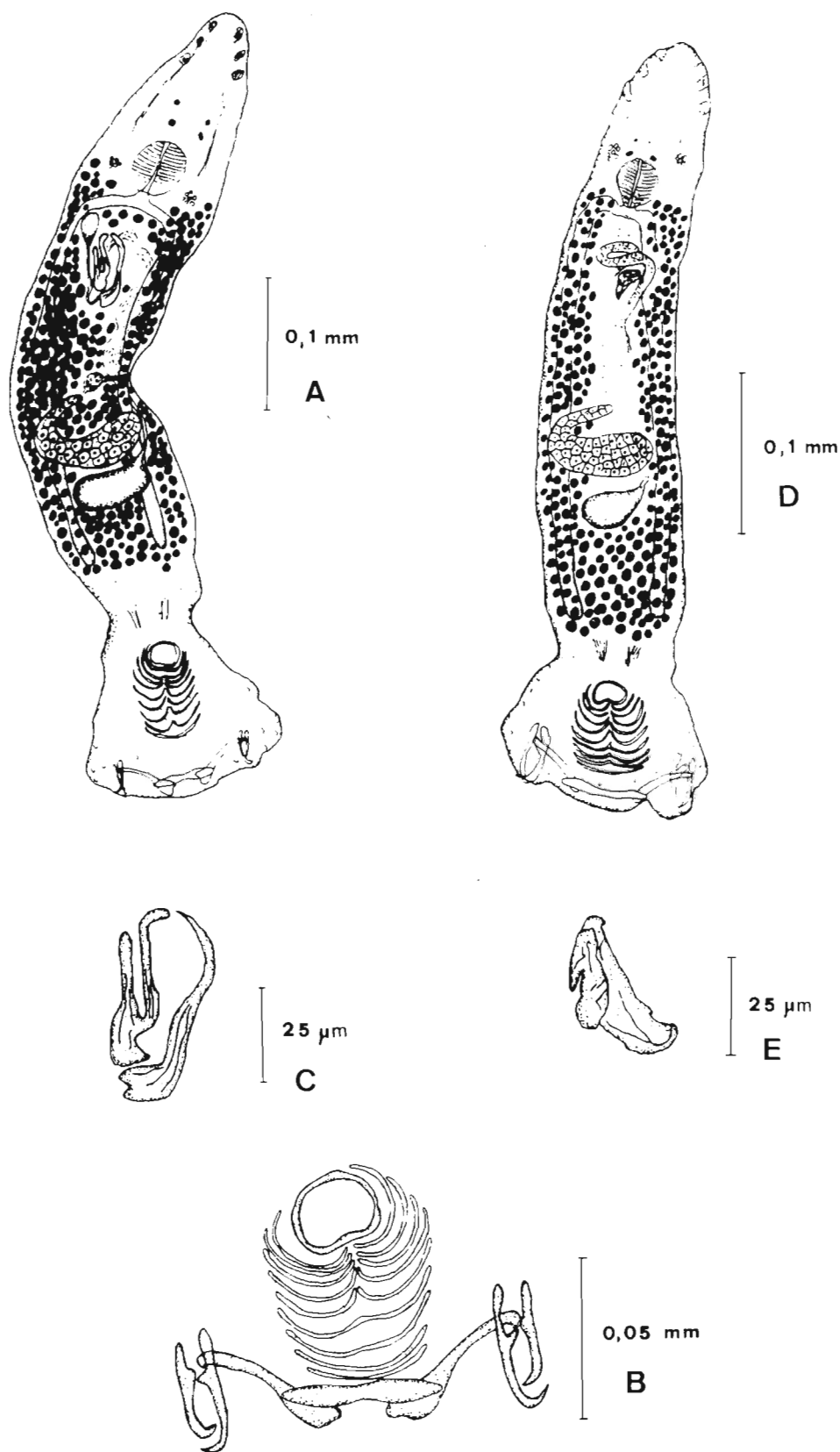


Fig. 2.— Monogenean parasites from *Sarpa salpa*: A) *Lamellodiscus ignoratus* in ventral view; B) lamellodiscus structure in *L. ignoratus* and *L. parisi*; C) male copulator apparatus of *L. ignoratus*; D) *Lamellodiscus parisi* in ventral view; E) male copulator apparatus of *L. parisi*.

this species are very similar to those described by YAMAGUTI (1968), KHON, ABRAMSON & MACEDO (1984) and KHALIL & ABDUL-SALAM (1988) for *Encotyllabe spari* Yamaguti, 1934 (Fig. 1E). In the specimens found in the present study, attention must be drawn, however, to the elipsoidal shape of the body and its concavity and convexity. Also noteworthy are the front suckers, subdivided into radial folds, the pharynx with external digital projections, and the opisthohaptor consisting of two large curved hamuli, two smaller claws below the hamuli and 14 small, hook shaped, concentric and marginal structures (Fig. 1F).

E. spari is geographically widespread, having been referred to in the Pacific Ocean by YAMAGUTI (1968) in *Sparus macrocephalus*, *Plectorhynchus pictus* and *Epinephelus akara*. In the Atlantic Ocean it was reported by KHON, ABRAMSON & MACEDO (1984) in *Haemulon scirius* (Shaw, 1803) and in the Persian Gulf by KHALIL & ABDUL-SALAM (1988) in *Plectorhynchus cinctus*, *P. pictus* and *P. schotaf*. We found only two parasites affecting the fourth right and left gills, with a low prevalence (2%) (Table 1).

This gill arch study reports on a new host for the species and also extends its distribution. This is the first time that a species of the genus *Encotyllabe* has been found in *Sarpa salpa*, and also the first report of its presence in Mediterranean waters of the Iberian Peninsula.

Diplectanidae Bychowsky, 1933

Lamellodiscus ignoratus Palombi, 1943

Our specimens coincide as far as their morphology with those described by EUZET & OLIVER (1966) (Fig. 2A). We point out mainly the morphology of the opisthohaptor, which consists of two lamellodiscus (dorsal and ventral) (Fig. 2B) made up of ten concentric laminae that work as suckers. Below these suckers there are three transversal bar-shaped pieces, one in the middle and two on the sides, joined at their ends to two pairs of hamuli. The ventral hamulus is larger and more curved than the dorsal. Around these structures there are 14 small marginal hooks. The male genital organs are typical of the species, consisting of two sclerotic parts, the outer being simple, large and curved, and the inner one short and double (Fig. 2C).

The species *Lamellodiscus ignoratus* Palombi, 1943 [= *Diplectanum echeneis* (Wagener, 1857) *sensu* Parona

Species	Specimen number	Prevalence	Intensity	Range
<i>A. salpae</i>	178	41	2	1-7
<i>Encotyllabe</i> sp.	2	1	1	1-1
<i>L. ignoratus</i>	9132	93,5	46	1-238
<i>L. parisi</i>	9059	92,5	49	1-287

Table 1.— Specimen numbers, prevalences, intensities and range of parasite burden of the four monogenean parasite species found in *Sarpa salpa* (Linnaeus, 1758).

et Perugia, 1889] is distributed throughout the Eastern Mediterranean (PAPERNA & KHON, 1964; EUZET, 1984), Western Mediterranean (EUZET, 1957; EUZET & OLIVER, 1966; OLIVER, 1969; LÓPEZ-ROMAN, 1973), Adriatic Sea (RADUJKOVIC, 1986) and the Atlantic Ocean (JUSTINE, 1985 and OLIVER, 1987). It has been found in several hosts, such as *Diplodus vulgaris*, *D. annularis*, *D. sargus*, *D. puntazzo*, *Lithognathus mormyrus*, *Sparus erhenbergi* and *Sarpa salpa*.

We have obtained 9132 specimens of this species, which yield an extremely high prevalence (93,5%) (Table 1), the fourth gill arches being somewhat less affected by parasites (Fig. 3B). The range of infestation was variable from 1 specimen to 238.

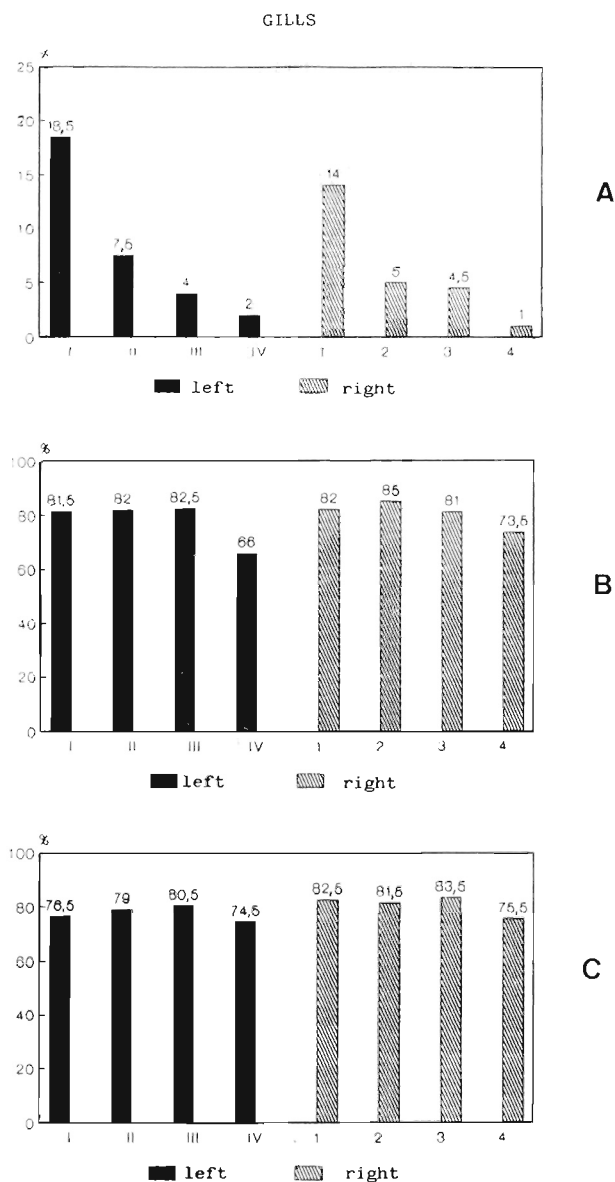


Fig. 3.— Percentage of monogeneans present at each location on the gill arches from *Sarpa salpa*: A) *A. salpae*; B) *L. ignoratus*; C) *L. parisi*.

***Lamellodiscus parisi* Oliver, 1969**

This parasite (Fig. 2D) is exclusive to *S. salpa*. The opisthohaptor has the same structure as that described for *L. ignoratus*, the only difference being the compact triangular structure found in the male genitalia (Fig. 2E) and its smaller body size.

There are few references to this species. OLIVER (1969) described its presence in the Eastern Mediterranean, EUZET (1984) and OLIVER (1987) in the Western Mediterranean and in the Atlantic Ocean. Our study is the first reference to the species in waters of the Iberian Peninsula.

As is the case with *L. ignoratus*, *L. parisi* shows a high prevalence (92,5%) (Table 1), and according to Fig. 3, the distribution is very homogeneous.

ACKNOWLEDGEMENTS

The authors wish to thank Mike Harrison and Dr. Enrique Font for their help in the preparation of this manuscript.

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