GENITOCOTYLE MEDITERRANEA N. SP. (DIGENEA, OPECOELIDAE) FROM *SYMPHODUS OCELLATUS* (TELEOSTEI, LABRIDAE) IN THE WESTERN MEDITERRANEAN

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Summary :

Genitocotyle mediterranea n. sp. is reported from the intestine of *Symphodus ocellatus* off the western coast of Corsica (in the Scandola Nature Reserve). This is the first species of *Genitocotyle* to be described from European waters : other members of this genus are parasites of fishes off the Atlantic and Pacific coasts of North America. *G. mediterranea* can be distinguished from its congeners by the anterior limit of the vitelline fields, which is at the level of the ventral sucker, and, in the case of the Pacific species, by egg-size. This species occurs only in older fish, especially in males, during the third and final year of their life.

KEY WORDS : Digenea. Opecoelidae. Opecoelinae. *Genitocotyle*. *Genitocotyle mediterranea* n. sp. *Symphodus ocellatus*. Mediterranean.

MOTS CLES : Digenea. Opecoelidae. Opecoelinae. *Genitocotyle*. *Genitocotyle mediterranea* n. sp. *Symphodus ocellatus*. Méditerranée.

Résumé : *GENITOCOTYLE MEDITERRANEA* N. SP. (DIGENEA, OPECOELIDAE) PARASITE DE *SYMPHODUS OCELLATUS* (TELEOSTEI, LABRIDAE) DE MÉDITERRANÉE OCCIDENTALE

Genitocotyle mediterranea n. sp. est décrit chez *Symphodus ocellatus* de la Réserve Naturelle de Scandola (côte occidentale de la Corse). Contrairement à toutes les autres espèces de ce genre qui parasitent des poissons des côtes atlantiques et pacifiques de l'Amérique du Nord, *G. mediterranea* est la première espèce décrite des mers européennes. *G. mediterranea* se distingue aisément des autres espèces de ce genre par l'extension de ses champs vitellins qui atteignent la ventouse ventrale et, dans le cas des espèces du Pacifique, par la taille de ses œufs. Les individus de cette nouvelle espèce se rencontrent seulement chez les poissons âgés, spécialement chez les mâles, au cours de la troisième et dernière année de leur vie.

INTRODUCTION

The subfamily Opecoelinae Ozaki, 1925, as defined by Gibson and Bray (1982), comprises opecoelids which lack both a distinct cirrus-sac containing an internal seminal vesicle and a canalicular seminal receptacle (terminology of Gibson and Bray, 1979) but possess a naked seminal vesicle and a uterine seminal receptacle. This is a group which is not common in European waters, where opecoelids usually belong to the large subfamily Plagioporinae Manter, 1947. The latter group has, at least in part, been dealt with in relation to NE Atlantic waters by Gibson and Bray (1982) and, in a series of six papers on those occurring in sparids in the western Mediterranean, by Bartoli *et al.* which culminated in a key (1993).

During the course of his investigations one of us (PB) encountered numerous opecoelines in the intestine of the small labrid fish *Symphodus ocellatus* (Forsskal) off Corsica. The present work describes these worms as *Genitocotyle mediterranea* n. sp.

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MATERIALS AND METHODS

Specimens of *Symphodus ocellatus* were kept alive until just before autopsy. Most digeneans were collected live from their hosts, slightly flattened between slide and coverslip, and heat-fixed in hot Bouin-Hollande fluid; others were dropped into Berland's fluid for one minute and then stored in 80 % alcohol. All were stained in Grenacher's carmine and mounted in Canada balsam.

The drawings were made with the aid of a camera lucida. Measurements are given in micrometres as the range followed by the mean in parentheses.

The type-specimens are deposited in The Natural History Museum, London. Registration numbers : Holotype : BM(NH) Reg. No. 1994.7.12.1; paratypes : BM(NH) Reg. No. 1994.7.12.2-4.

RESULTS

Opecoelinae Ozaki, 1925
Opecoelinae (Ozaki, 1925)
Genitocotyle Park, 1937

GENITOCOTYLE MEDITERRANEA N. SP

Type-host : *Symphodus ocellatus* (Forsskal, 1775) (Labridae).

Fig. 1. – *Genitocotyle mediterranea* n. sp. from intestine of *Symphodus ocellatus*, Scandola, Corsica. A. Ventral view. B. Dorsal view.

Type-locality : Western Mediterranean Sea off the western coast of Corsica, at the Scandola Nature Reserve.

Site : Intestine, never the rectum.

Occurrence : In 27 of 259 *S. ocellatus* examined off Scandola : prevalence 10.4 %; abundance 0.74; mean intensity 7.18. These parasites occur only in older fish, especially in dominant males, at the end of the last (third) year of their life: the figures for these dominant males are : prevalence 62.5 %; abundance 4.4; mean intensity 7.0. Consequently, it would appear that maintenance of the life-cycle of this digenean depends on transmission to one sex (the male) and during a relatively short period of the life span of the host.

MATERIAL STUDIED : 25 adult and 5 immature worms.

DESCRIPTION (figs 1-3)

General morphology. Body elongate with parallel sides, tapering anteriorly, rounded posteriorly. Dorsoventrally flattened.

Tegument. Unarmed.

Suckers. Oral sucker ventro-terminal; lacking post-oral ring. Ventral sucker powerful, round; at junction of first and second thirds of body; somewhat protuberant such that in dorso-ventral mounts its aperture is often pushed to one side; with anterior and posterior lips but lacking papillae; more or less encircled by folds of body wall in flattened preparations. Accessory sucker devoid of limiting membrane, with well-delimited transversely ovoid aperture and conspicuous radiating muscles; just sinistral to posterior limit of oesophagus, about half-way between genital pore and ventral sucker. [It is worth noting that, according to Pearson's (1992) terminology, the accessory sucker is not a sucker *sensu stricto*.]

Digestive system. Prepharynx short; encircled by small group of prepharyngeal cells. Pharynx large. Oesophagus more than twice length of pharynx; thin-walled. Intestinal bifurcation just postero-medial to accessory sucker, at about junction of third and fourth quarters of forebody. Caeca thick-walled in acetabular zone; parallel to lateral body wall in hindbody; end blindly near posterior end of body.

Male reproductive system. Testes 2; tandem, contiguous, in mid-hindbody; regularly rounded, entire. Post-testicular field always shorter than forebody. Cirrus-sac absent. Vasa efferentia unite at base of seminal vesicle. Seminal vesicle free in parenchyma; long, reaching back into hindbody and in mature worms to one third or even half of distance between ventral sucker and ovary; tubular but more dilate proximally; proximal wide region oval to sausage-shaped, in anterior hindbody; proximal and distal regions linked by narrower section (fig. 2); long, distal

tubular region straight, sinuous or convoluted, gradually tapers in forebody. Pars prostatica sausage-shaped, wider than distal region of seminal vesicle; lined with typical anuclear blebs but apparently devoid of external gland-cells. Ejaculatory duct very short; not apparently forming cirrus; opens into genital atrium.

Female reproductive system. Ovary median, immediately anterior to anterior testis; distinctly or indistinctly tri-lobed, transversely elongate; median lobe posteriorly oriented. Laurer's canal opening dorsally posterior to ovary. Oötype and Mehlis' gland large; anterior to ovary. Canalicular seminal receptacle absent. Uterine seminal receptacle present. Uterus pre-ovarian, inter-caecal; uterine field extending between ovary and ventral sucker; uterus narrows as it passes dorsally to ventral sucker; in forebody it may be straight or winding and forms metraterm with thicker walls which opens into genital atrium. Number of eggs usually not large, 7-39 (18). Vitellarium follicular; follicles relatively large; lateral fields extend from region of ventral sucker to posterior extremity, confluent in post-testicular region. Transverse vitelline ducts and vitelline reservoir anterior to ovary.

Genital atrium. Small, spherical; limited by thickened wall; devoid of surrounding gland-cells. Genital pore relatively large; limited by thickened margin; sinistrally submedian; in anterior half of forebody, midway between prepharynx and accessory sucker.

Excretory system. Excretory vesicle I-shaped, tubular; thin-walled; passes dorsal to testis, reaching to level of ovary. Excretory pore terminal.

DIMENSIONS

Measurements are based upon 10 flattened adults.

Length of body :	746-2,201 (1,307)
Breadth of body :	213-421 (284)
Forebody :	266-576 (364)
Hindbody :	522-1,396 (816)
Oral sucker :	74-108 × 80-128 (89 × 101)
Ventral sucker :	130-217 × 130-217 (170 × 169)
Accessory sucker :	43-98 × 48-82 (64 × 66)
Prepharynx :	11-39 (17)
Pharynx :	46-72 × 56-93 (55 × 71)
Oesophagus :	91-228 (129)
Genital atrium (diam.) :	30-80 (51)
Anterior testis :	98-228 × 130-304 (144 × 203)
Posterior testis :	98-250 × 130-271 (160 × 193)
Pars prostatica :	36-77 × 14-29 (54 × 19)
Ovary :	50-108 × 102-228 (74 × 152)
Eggs :	49-59 × 24-32 (53 × 28)
Ventral sucker to ovary :	109-325 (169)
Ventral sucker to end of seminal vesicle :	43-119 (79)
Ventral sucker to anterior testis :	130-434 (239)
Post-testicular region :	174-477 (279)
Sucker-ratio :	1:1.67-2.12 (1.91)
Oral sucker/pharynx ratio :	1:0.53-0.69 (0.62)
Forebody/hindbody ratio :	1:1.71-2.54 (2.20)
Forebody/length of body ratio :	1:3.2-4 (3.7)

Fig. 2. – *Genitocotyle mediterranea* n. sp. from intestine of *Symphodus ocellatus*, Scandola, Corsica. Ventral view of terminal genitalia.

Fig. 3. – *Genitocotyle mediterranea* n. sp. from intestine of *Symphodus ocellatus*, Scandola, Corsica. Ventral view of proximal female reproductive system.

DISCUSSION

An unusual feature of these worms is the presence of a small accessory sucker between the genital pore and the ventral sucker. There are three opcoeline genera which possess this feature : *Anisoporus* Ozaki, 1928; *Opcoeloides* Odhner, 1928; and *Genitocotyle* Park, 1937. The fundamental differences between these genera relate to the termination of the intestinal caeca. In *Anisoporus* the caeca open through a single anus, in *Opcoeloides* they open into the base of the excretory vesicle to form a uroproct, and in *Genitocotyle* the caeca are blind. In possessing blind caeca, the specimens from *S. ocellatus* clearly belong to *Genitocotyle*,

a genus previously reported from the Atlantic and Pacific coast of North America.

There are four nominal species of *Genitocotyle* : *G. acirrus* Park, 1937 [erroneously emended to *G. acirrata* by Manter (1947) and *acirra* by Nahhas and Short (1965)]; *G. atlantica* Manter, 1947; *G. heterostichi* Montgomery, 1957; and *G. cablei* Nahhas and Short, 1965. *G. acirrus*, mainly from embiotocids and occasionally from sciaenids, clinids, etc., and *G. heterostichi*, from a clinid, occur on the Pacific coast of North America, whereas *G. atlantica*, from a wide range of families, and *G. cablei*, recorded from a bothid and a syngnathid, occur on the Atlantic coast of North America. Aspects of the life-history of the type-species, *G. acirrus*, were described by Pratt

(1970). *Genitocotyle* spp. have not previously been reported from labrids. *G. mediterranea* n. sp. is most readily distinguished from its congeners by the anterior limit of the vitelline fields which occurs at the level of the ventral sucker. In *G. atlantica* the vitelline fields extend into the forebody and in the remainder of the species the fields either end in the anterior hindbody or reach only as far as the posterior margin of the ventral sucker (Manter, 1947; Nahhas and Short, 1965). *G. mediterranea* can also be readily distinguished from the Pacific forms by its smaller egg-size (49-59 vs 66-80 μm – Park, 1937; Montgomery, 1957). There are also other features, such as ovarian shape, posterior limit of the seminal vesicle, etc, which have been previously used to distinguish species; but these really require confirmation in a wide range of well-fixed material.

The specimens closest to *G. mediterranea* which we have seen are two worms taken from the intestine of a cardinal fish *Apogon imberbis* (L.) (Apogonidae), which originated from off Madeira but died in the aquarium of London Zoo in 1951. These flattened worms in the collection of The Natural History Museum, London [BM(NH) Reg. No. 1980.7.17.228] differ from the specimens from *S. ocellatus* in that they are larger, contain a much greater number of eggs, have a longer post-testicular zone and the seminal vesicle appears restricted to the forebody. The latter feature would rate as important and resembles the description of *G. heterostichi*, but it is very possible that the posterior regions of the seminal vesicle in the hindbody are obscured by eggs. In other respects the specimens from *A. imberbis* resemble those from *S. ocellatus* and may, therefore, prove to be conspecific, but this will require confirmation in fresh material. It is worth noting that the range of *A. imberbis* does extend into the Mediterranean and that Rudolphi (1819) described *Distomum apertum*, a species of uncertain affinities (Dollfus, 1968) from this host at Naples, in which he mentioned the presence of a genital structure between the suckers.

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