Digenean species diversity in teleost fish from a nature reserve off Corsica, France (Western Mediterranean), and a comparison with other Mediterranean regions

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Abstract
Data on the digenean parasites of 2238 teleosts from the Scandola Nature Reserve off Corsica are presented. These represent the largest general survey of digenean parasites attempted in the Mediterranean region and is the result of major collections and systematic reports published over the past 20 years. The number of different digenean species recorded from 63 fish species was 102. Full parasite–host and host–parasite lists are presented, with information on the geographical distribution of the parasites, their site within the host and the prevalence, abundance and intensity of the infections. The digenean fauna of teleosts off Corsica is compared with that in other regions of the Mediterranean and the Black Sea. A more detailed analysis of the diversity of these parasites in sparid fishes indicates that the digenean diversity off Corsica is far greater than that in other parts of the Mediterranean.

Keywords: Digenean diversity, teleosts, Western Mediterranean Nature Reserve

Introduction
The present study is an attempt at a qualitative and quantitative approach to the study of the digenean fauna of marine teleosts from the Western Mediterranean. The study area is the Scandola Nature Reserve, located on the most western part of the coast of northern Corsica, France (42°23′N, 8°33′E). This nature reserve extends all along a steeply sloped, rocky, high-energy shore, widely exposed to the open sea, and is almost devoid of calm or euryhaline waters. This study is the result of a long research period, which began in 1986. During this period, numerous data have been published concerning the identification of the digeneans collected in teleosts from the Scandola Reserve (Bartoli 1987; Bartoli and Bray 1987, 1990, 1996, 2001; Bartoli et al. 1988, 1989a, 1989b, 1989c, 1989d, 1993, 1994, 2000a, 2000b, 2001, 2003a, 2003b; Bartoli and Gibson 1989, 1991, 1995, 1998, 2000, 2001; Gibson and Bray 1989; Holmes and Bartoli 1993; Bray and Bartoli 1996; Le Pommelet et al. 1997; Jousson and Bartoli 1999, 2000, 2001, 2002; Sasal et al. 1999; Jousson et al. 2000).
In the present study, we report on the quantitative results from 2238 autopsied fish belonging to 63 teleost species in which 102 digenean species have been recovered. In the literature, quantitative data on this group of parasites are usually reported from only a small number of host species. Nevertheless, more extensive data concerning the digenean fauna of teleosts from different areas of the Mediterranean and Black Seas are available in the literature (Vlassenko 1931; Pogorel’tseva 1952; Sey 1968, 1970; Papoutsoglou 1976; Orecchia and Paggi 1978; Fischthal 1980, 1982; Saad-Fares 1985; Radujkovic and Raibaut 1989; Radujkovic et al. 1989). In this study, we compare our data with those of these authors from different areas of the Mediterranean and Black Seas.

Material and methods

Sampling was carried out during summer (July to August) between 1986 and 2002, depending on the opportunities available for the collection of host fishes (by fishermen and diving colleagues). The autopsied fishes were always recently dead or killed using a heavy dose of anaesthetic, identified using Whitehead et al. (1986) and Froese and Pauly (2001), measured and weighed. The digestive tract was divided into various anatomical regions: stomach, pyloric caeca, duodenum, middle intestine, posterior intestine, rectum and gall-bladder. The digenean species were collected from each of these sections under a dissecting microscope. They were studied while still alive and later as permanent preparations. Individuals were fixed in Bouin’s fluid between slide and coverglass without pressure, stained in acetic carmine and mounted in Canada balsam. Type material of new taxa and voucher specimens of poorly known species have been deposited at The Natural History Museum, London.

Parasitological indices were calculated following Margolis et al. (1982). Authorities for the parasite taxa are given in Table I.

Results and discussion

A large number (2238) of fish from the Scandola Nature Reserve was examined, comprising 63 species from 44 genera and 26 families. Among the 102 digenean species collected from these fishes, 99 have been identified to specific level and three to generic level. In one case, due to difficulties with the identification of the *Helicometra* species complex (see Palombi 1931; Reversat et al. 1989, 1991), we prefer to use the terminology *Helicometra* form 1, form 2, etc. These 102 digenean species belong to 62 genera and 17 families (Table I). This is the first time that such a large number of digenean species has been reported from a single region of the Mediterranean.

During this period of research, nine species have been, or are in the process of being, described as new: *Cainocreadium dentecis*, *Deretrema scorpaenicola*, *Folliculovarium mediterraneum*, *Genitocotyle mediterranea*, *Macvicaria maillardi*, *Metadena phoceae*, *Monorchis blennii*, *Stephanostomum gaidropsari* and *Wardula sarguicola*; and *Opecoeloides columbellae* was previously unknown at the adult stage. Some other species, described in previous centuries and never, or very rarely, reported since their original description, have been found commonly in the Scandola Natural Reserve. These include: *Ancylocoelium typicum*, *Anisocladium gracile*, *Holorchis legendrei*, *Lecithochirium grandiporum*, *Macvicaria dubia*, *M. mormyri*, *Pachycreadium carnosum*, *Peracreadium characis*, *Paracryptogenimus aloysiae*, *Tergestia acanthocephala* and *Wardula capitellata*. Other species, such as *Aphallus rubalo*, *Hemiurus communis*, *Homalometron galacicus*, *H. senegalensis* and *Pseudopecoeloides chloroscombi*,
Table I. Digenean species collected from teleost fishes off Scandola Nature Reserve in family order and their distribution (recent references with useful descriptions or illustrations are provided).

| Species Distribution Reference | Reference |
|--------------------------------|-----------|
| **ACANTHOCOLPIDAE Lühe, 1909** |           |
| Lepidauchen stenostoma Nicoll, 1913 | M Bartoli and Bray (2001) |
| Stephanostomum bicoronatum (Stossich 1883) | W Bray and Bartoli (1996) |
| Stephanostomum cesticillum (Molin 1858) | M Bartoli and Bray (2001) |
| Stephanostomum gaidropsari Bartoli and Bray, 2001 | M Bartoli and Bray (2001) |
| Stephanostomum minutum (Looss 1901) | M Bartoli and Bray (2001) |
| Stephanostomum pristis (Deslongchamps 1824) | W Bartoli and Bray (2001) |
| **ACANTHOSTOMIDAE Poche, 1926** |           |
| Anisocladium fallax (Rudolphi 1819) | M Bartoli and Gibson (2000) |
| Anisocladium gracile (Looss 1901) | M Bartoli and Gibson (2000) |
| Anisocoelium capitellatum (Rudolphi 1819) | M Bartoli and Gibson (2000) |
| Timoniella praeteritum (Looss 1901) | M Maillard (1974) |
| **APOCREAIDIIDAE Skrjabin, 1942** |           |
| Homalometron galaicus Sanmartin, Alvarez, Quinteiro and Paniagua, 1995 | NEA+M Sanmartin et al. (1995) |
| Homalometron senegalense Fischthal and Thomas, 1972 | NEA+M Bartoli et al. (2001) |
| **BUCEPHALIDAE Poche, 1907** |           |
| Bucephalus baeri Maillard, 1976 | M Maillard (1976) |
| Bucephalus labracis Paggi and Orecchia, 1965 | M Paggi and Orecchia (1965) |
| Bucephalus marinus Vlassenko, 1931 | M Vlassenko (1931) |
| Bucephalus minimus (Stossich 1887) | NEA+M Maillard (1976) |
| Folliculovarium mediterraneum | M Bartoli et al. (2003c) |
| Prosorhynchoides gracilescens (Rudolphi 1819) | W Overstreet and Curran (2002) |
| Prosorhynchus aculeatus Odhner, 1905 | W Dawes (1968) |
| Prosorhynchus crucibulum (Rudolphi 1819) | W Bray (1973) |
| **CRYPTOGONIMIDAE Ward, 1917** |           |
| Anoiktostoma coronatum (Wagener 1852) | M Bartoli and Gibson (1995) |
| Aphallus rubalo (Bray 1986) | W Bray (1986) |
| Aphallus tubarium (Rudolphi 1819) | NEA+M Bartoli and Bray (1987) |
| Metadena depressa (Stossich 1883) | M Bartoli and Bray (1987) |
| Metadena pauli (Vlassenko 1931) | NEA+M Bartoli and Gibson (1995) |
| Metadena phoceae Bartoli and Gibson, 2001 | M Bartoli and Gibson (2001) |
| Paracryptogonimus aloysiae (Stossich 1885) | M Bartoli and Gibson (1995) |
| **DEROGENIDAE Nicoll, 1910** |           |
| Arnola microcirrus (Vlassenko 1931) | M Kostadinova et al. (2004) |
| Derogenes latus Janiszewska, 1953 | M Bartoli and Gibson (1991) |
| Derogenes varicus (Müller 1780) | W Gibson (1976) |
| Magnibursatus skrjabini (Vlassenko 1931) | M Kostadinova et al. (2003) |
| **FAUSTULIDAE Poche, 1926** |           |
| Bacciger bacciger (Rudolphi 1819) | NEA+M Bray and Gibson (1980) |
| Bacciger israelensis Fischthal, 1980 | M Dimitrov and Bray (1994) |
| **FELLODISTOMIDAE Nicoll, 1913** |           |
| Monascus filiformis (Rudolphi 1819) | W Bray and Gibson (1980) |
| Proctoeces maculatus (Looss 1901) | W Bray and Gibson (1980) |
| Tergestia acanthocephala (Stossich 1887) | M Bartoli et al. (2003a) |
| Tergestia laticollis (Rudolphi 1819) | W Bartoli et al. (2003a) |
| **HEMIURIDAE Lühe, 1901** |           |
| Aphanurus stossichi (Monticelli 1891) | W Looss (1907) |
| Dinosa sp. | W Gibson and Bray (1986) |
| Ectemnus lepidus Looss, 1907 | W Gibson and Bray (1986) |
| Hemiurus communis Odhner, 1905 | NEA+M Gibson and Bray (1986) |
| Hemiurus luehei Odhner, 1905 | NEA+M Gibson and Bray (1986) |
| Lectichochirium fusiforme Lühe, 1901 | NEA+M Gibson and Bray (1986) |
### Table I. (Continued).

| Species | Distribution | Reference |
|---------|--------------|-----------|
| *Lecithochirium grandiporum* (Rudolphi 1819) | M | Looss (1907) |
| *Lecithochirium musculus* (Looss 1907) | NEA+M | Gibson and Bray (1986) |
| *Lecithochirium rufoviride* (Rudolphi 1819) | W | Gibson and Bray (1986) |
| *Synaptobothrium caudiporum* (Rudolphi 1819) | NEA+M | Gibson and Bray (1986) |
| **LECITHASTERIDAE** Odhner, 1905 | | |
| *Aponurus laguncula* Looss, 1907 | W | Bray and MacKenzie (1990) |
| *Lecithaster stellatus* Looss, 1907 | W | Bray et al. (1993) |
| *Lecithaster sp.* | | |
| **LEPOCREADIIDAE** (Odhner 1905) | | |
| *Holorchis legendrei* Dollfus, 1946 | NEA+M | Bartoli and Bray (1996) |
| *Holorchis micracanthum* (Stossich 1888) | M | Bartoli and Bray (1996) |
| *Holorchis pycnoporus* Stossich, 1901 | M | Bartoli and Bray (1996) |
| *Lepocreadium album* (Stossich 1890) | NEA+M | Saad-Fares (1985) |
| *Lepocreadium pegorchis* (Stossich 1901) | M | Bartoli (1983) |
| *Prodistomum poloni* (Molin 1859) | NEA+M | Bray and Gibson (1990) |
| **MESOMETRIDAE** Poche, 1926 | | |
| *Centroderma spinosissima* (Stossich 1883) | NEA+M | Bartoli (1987) |
| *Elistia stossichianum* (Monticelli 1892) | W | Bartoli (1987) |
| *Mesometra brachycoelia* Lühe, 1901 | NEA+M | Bartoli (1987) |
| *Mesometra orbicularis* (Rudolphi 1819) | NEA+M | Bartoli (1987) |
| *Wardula capitellata* (Rudolphi 1819) | NEA+M | Bartoli (1987) |
| *Wardula sarguicola* Bartoli and Gibson, 1989 | NEA+M | Bartoli and Gibson (1989) |
| **MONORCHIIDAE** Odhner, 1911 | | |
| *Lasiotocus typicus* (Nicoll 1912) | NEA+M | Bartoli and Bray (2004) |
| *Lasiotocus multi* (Stossich 1883) | M | Bartoli and Prévot (1966) |
| *Monorchis blemii* Jousson and Bartoli, 2002 | M | Jousson and Bartoli (2002) |
| *Monorchis monorchis* (Stossich 1890) | NEA+M | Bartoli et al. (2000a) |
| *Monorchis parvus* Looss, 1902 | NEA+M | Bartoli et al. (2000a) |
| *Proctotrema bacilliovatum* Odhner, 1911 | M | Bartoli and Prévot (1966) |
| *Timonia mediterranea* Bartoli and Prévot, 1966 | M | Bartoli and Prévot (1966) |
| **OPECOELIDAE** Ozaki, 1925 | | |
| *Allopodocotyle jaffensis* (Fischthal 1980) | M | Bartoli et al. (1989b) |
| *Allopodocotyle pedicellata* (Stossich 1887) | M | Bartoli et al. (1989b) |
| *Bathycreadium elongata* (Maillard 1970) | M | Maillard (1970) |
| *Cainocreadium denteus* Jousson and Bartoli, 2001 | M | Jousson and Bartoli (2001) |
| *Cainocreadium labracis* (Dujardin 1845) | NEA+M | Bartoli et al. (1989c) |
| *Gaeveskajatrema perezi* (Mathias 1926) | NEA+M | Gibson and Bray (1982) |
| *Genitocotyle mediterranea* Bartoli, Gibson, and Riutort, 1994 | NEA+M | Bartoli et al. (1994) |
| *Helicometra* Odhner, 1902, form 1 | | |
| *Helicometra* Odhner, 1902, form 2 | | |
| *Helicometra* Odhner, 1902, form 3 | | |
| *Helicometra* Odhner, 1902, form 4 | | |
| *Macvicaria alacris* (Looss 1901) | NEA+M | Gibson and Bray (1982) |
| *Macvicaria crassigula* (Linton 1910) | W | Bartoli et al. (1989a) |
| *Macvicaria dubia* (Stossich 1905) | M | Bartoli et al. (1989a) |
| *Macvicaria maillardi* Bartoli, Bray, and Gibson, 1989 | M | Bartoli et al. (1989a) |
| *Macvicaria mornymi* (Stossich 1885) | M | Bartoli et al. (1993) |
| *Macvicaria obovata* (Molin 1859) | M | Bartoli et al. (1989a) |
| *Opecoeloides columbellae* (Pagenstecher 1863) | M | Jousson and Bartoli (2000) |
| *Opecoeloides furcatus* (Bremser in Rudolphi 1819) | W | Bartoli and Gibson (1991) |
| *Pachycreadium carnosum* (Rudolphi 1819) | M | Bartoli et al. (1988) |
| *Peracreadium characis* (Stossich 1886) | M | Bartoli et al. (1989c) |
| *Peracreadium genu* Nicoll, 1909 | NEA+M | Gibson and Bray (1982) |
| *Podocotyle novella* (Maillard and Lambert 1978) | M | Bartoli et al. (2003b) |
were new records for the Mediterranean. As can be seen in Table I, a large proportion (45.5%) of the digenean species found in the Scandola Nature Reserve are restricted to the Mediterranean.

In the teleosts from the Scandola Nature Reserve, opecoelids represent the most important digenean family (27 species = 26.5%) (Table I).

Of the 63 teleost species studied, only Gobius geniporus and Trachinus draco were entirely devoid of adult digeneans, and of the 2238 fish autopsied, 1097 (49.02%) were parasitized (Table II). The unparasitized fishes tended to be young individuals. One digenean species was found in 608 (55.4%) of the infected fishes, two digenean species in 298 (27.2%), three in 128 (11.7%), four in 45 (4.1%), five in 14 (1.3%) and six in four (0.4%).

Specimens of a given digenean species in numbers of 1–10 have been found in 695 fishes (63.3%), 11–100 in 342 fishes (31.1%), 101–1000 in 44 fishes (4%) and >1000 in 16 fishes (1.5%).

For each host species and for each of their digenean species, various parasitological indices and information on the site of the parasites are presented in Table II. This table shows that some digeneans were very prevalent and abundant, while others were very rare. With regard to the sites used by the parasites, all available niches were used by digeneans in Gaidropsarus mediterraneus, Mullus surmuletus, Scorpaena porcus and Serranus scriba. For all other hosts, some sites were never used, these usually being the stomach and gall-bladder. Nevertheless, the stomach only was occupied in Gobius cobitis, G. cruentatus, Salaria pavo and Spicara maena.

Some digenean species were very restricted in their distribution and were limited, for example, to: (1) the stomach for Arnola microcirrus, Hemius ruehei, Lecithochirium fusiforme, L. grandiporum, L. rufoviride and L. musculus (nevertheless, single individuals of L. musculus were found in the pyloric caeca of Serranus scriba, the middle intestine of Mullus surmuletus and in the posterior intestine of Symphodus tinca—according to Gibson and Bray (1986), L. musculus can occur in a range of teleosts which feed on gobies that harbour gravid worms in their body cavity; these accidental hosts may have these worms, at least temporarily, in the intestine); (2) the pyloric caeca for Bucephalus marinus, Monorchis monorchis, Podocotyle

Table I. (Continued).

| Species                        | Distribution | Reference                  |
|-------------------------------|--------------|----------------------------|
| Podocotyle scorpaenae (Rudolph 1819) | M            | Bartoli and Gibson (1991)  |
| Podocotyle temensis Fischthal and Thomas, 1970 | NEA+M        | Bartoli et al. (2003b)    |
| Poracanthium furcatum Dollius, 1948 | M            | Bartoli and Gibson (1991)  |
| Pseudopecoeloides chloroscombr (Fischthal and Thomas 1970) | NEA+M        | Bartoli et al. (2003b)    |
| Pseudopycnadenia fischthali Saad-Fares and Maillard, 1986 | M            | Bartoli et al. (1989d)    |
| Pycnadenoides senegalensis Fischthal and Thomas, 1972 | NEA+M        | Bartoli et al. (1989d)    |
| Pleorchidae (Poche 1926) | NEA+M        | Bartoli et al. (2004)      |
| Pleorchis polychi (Stossich 1889) | NEA+M        | Bartoli et al. (2004)      |
| Robphildollfusidae Paggi and Orecchia, 1963 | NEA+M        | Bartoli et al. (2004)      |
| Robphildollfisium fractum (Rudolph 1819) | M            | Bartoli (1987)            |
| Zoogonidae Odhner, 1911       | W            | Bray and Gibson (1986)     |
| Deretrema scorpaenica Bartoli and Bray, 1990 | M            | Bartoli and Bray (1990)    |
| Diphterostomum brusinae (Stossich 1889) | W            | Bray and Gibson (1986)     |
| Lecithostephyllus retroflexus (Molin 1859) | NEA+M        | Bartoli et al. (2003a)    |
| Zoogonus rubellus (Olsson 1868) | NEA+M        | Bray and Gibson (1986)     |

M, Mediterranean; NEA, north-eastern Atlantic; W, wider.
Table II. Parasitological indices for digeneans from teleost fishes off the Scandola Nature Reserve, Corsica (Western Mediterranean).

| Site(s)         | Prevalence (%) | Abundance | Mean | Range |
|-----------------|----------------|-----------|------|-------|
| **APOGONIDAE**  |                |           |      |       |
| Apogon imberbis | B (CD)         | 100       | 18.2 | 18.2  | 2–52 |
| Genitocotyle mediterranea | | | | |
| **ATHERINIDAE** |                |           |      |       |
| Atherina boyeri | C (D)          | 30.7      | 0.4  | 1.3   | 1–2  |
| Bacciger bacciger | | | | |
| Genitocotyle mediterranea | C (DE)       | 73.1      | 2.5  | 3.5   | 1–6  |
| Lecithaster stellatus | F            | 3.8       | 0.04 | 1     | 1    |
| **BELONIDAE**   |                |           |      |       |
| Belone belone gracilis | F            | 3.3       | 0.03 | 1     | 1    |
| Lecithaster stellatus | | | | |
| Lecithostaphylus retroflexus | CDE (F)    | 80        | 8.9  | 11.3  | 1–37 |
| Tergestia acanthocephala | F          | 36.7      | 0.8  | 2.1   | 1–5  |
| **BLENNIIDAE**  |                |           |      |       |
| Parablennius gattorugine | C            | 66.6      | 19.3 | 29    | 14–52|
| Monorchis blennii | F            | 16.6      | 3    | 18    | 18   |
| Diptherostomum brusinae | F        | 16.6      | 4.2  | 25    | 25   |
| Zoogonus rubellus | F            | 16.6      | 4.2  | 25    | 25   |
| Salaria pavoi | A              | 50        | 1.5  | 3     | 3    |
| Magnibursatus skrjabini | D    | 50        | 1.5  | 3     | 3    |
| **BOTHIDAE**    |                |           |      |       |
| Bothus podas | CF             | 33.3      | 0.5  | 1.5   | 1–2  |
| **CARANGIDAE**  |                |           |      |       |
| Trachurus mediterraneus | F (E)   | 7.4       | 1.7  | 23    | 1–45 |
| Aphanurus stossichi | A        | 3.7       | 0.07 | 2     | 2    |
| Hemius communis  | A              | 3.7       | 0.15 | 4     | 4    |
| Prodistomum polonii | B (CDE) | 92.6      | 13.9 | 15    | 3–32 |
| Pseudopeceloides chloroscombri | DE (C) | 29.7      | 0.8  | 2.6   | 1–6  |
| Tergestia laticollis | EF (D)  | 44.4      | 3.5  | 7.9   | 2–20 |
| Trachurus picturatus | F (E) | 47        | 2.4  | 5.1   | 1–14 |
| Ectenurus lepidus | AB            | 8.3       | 0.8  | 1     | 1    |
| Monascus filiformis | D (E) | 41.7      | 0.5  | 1.2   | 1–2  |
| Prodistomum polonii | B (CDE) | 100       | 22.6 | 22.6  | 2–70 |
| Pseudopeceloides chloroscombri | D (E) | 35.3      | 0.7  | 2     | 1–3  |
| Tergestia laticollis | E (DF) | 47        | 2.4  | 5.1   | 1–14 |
| Trachurus trachurus | F            | 8         | 0.1  | 1.5   | 1–2  |
| Lasiotocus typicus | A              | 8         | 0.2  | 2     | 1–3  |
| Monascus filiformis | D        | 4         | 0.04 | 1     | 1    |
| Prodistomum polonii | B (AC) | 72        | 8.1  | 11.2  | 1–38 |
| Pseudopeceloides chloroscombri | DE (BC) | 45.8      | 1    | 2.3   | 1–5  |
| Tergestia laticollis | F (DE) | 56        | 1.9  | 3.4   | 1–12 |
| **CENTRACANTHIDAE** |            |           |      |       |
| Spicara maena | A              | 33.3      | 2.7  | 8     | 8    |
| Hemius communis  | A              | 33.3      | 2.7  | 8     | 8    |
| Spicara smaris | CD (E)         | 90        | 2.3  | 2.6   | 1–6  |
| Lepocreadium album | D | 50        | 1.5  | 3     | 3    |
| Hemius communis  | D              | 50        | 1.5  | 3     | 3    |
Table II. (Continued).

| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| **CONGRIDAE** |
| **Conger conger** n=3 |
| Helicometra form 3 | C | 33.3 | 1.3 | 4 | 4 |
| Lecithochirium fusiforme | A | 100 | 39 | 39 | 4–95 |
| Lecithochirium musculus | A | 33.3 | 1 | 3 | 3 |
| Lecithochirium rufoviride | A | 33.3 | 1.7 | 5 | 5 |
| Podocotyle novella | D (EF) | 33.3 | 6 | 18 | 18 |
| Prosorhynchus aculeatus | F | 66.7 | 20 | 30 | 30 |
| Prosorhynchus crucibulum | CD (E) | 100 | 49.3 | 49.3 | 1–145 |
| **GOBIIDAE** |
| **Gobius cobitis** n=6 |
| Lecithochirium musculus | A | 33.4 | 0.7 | 2 | 1–3 |
| **Gobius cruentatus** n=1 |
| Lecithochirium musculus | A | 100 | 8 | 8 | 8 |
| **Gobius geniporus** n=17 |
| **Gobius paganellus** n=11 |
| Deretrema scorpaenicola | G | 18.2 | 0.4 | 2 | 1–3 |
| Lecithochirium musculus | A | 36.4 | 0.4 | 1 | 1 |
| **Pomatoschistus marmoratus** n=35 |
| Genitocotyle mediterranea | E (CD) | 34.3 | 0.5 | 1.5 | 1–3 |
| **LABRIDAE** |
| **Coris julis** n=58 |
| Diphterostomum brusinae | F (E) | 3.5 | 0.1 | 2 | 1–3 |
| **Labrus merula** n=54 |
| Deretrema scorpaenicola | G | 1.9 | 0.02 | 1 | 1 |
| Diphterostomum brusinae | F | 1.9 | 0.1 | 5 | 5 |
| Helicometra form 2 | E (CF) | 9.3 | 0.3 | 3.4 | 1–6 |
| Helicometra form 3 | EF (CD) | 9.6 | 1.2 | 4.2 | 1–13 |
| Lepidacanthstenostoma | C (D) | 5.6 | 0.1 | 2.3 | 1–3 |
| Peracreadium genu | CDE (BF) | 35.2 | 3.7 | 10.4 | 1–46 |
| Proctoeces maculatus | F | 3.7 | 0.04 | 1 | 1 |
| Zoogonus rubellus | F | 5.6 | 1.2 | 21 | 2–50 |
| **Labrus viridis** n=19 |
| Deretrema scorpaenicola | D | 5.3 | 0.05 | 1 | 1 |
| Helicometra form 3 | E (CF) | 26.3 | 2.6 | 9.8 | 2–40 |
| Peracreadium genu | CDE (F) | 15.8 | 2.7 | 17.3 | 1–46 |
| **Symphodus cinereus** n=82 |
| Gaevskijatrema perezi | D | 1.2 | 0.01 | 1 | 1 |
| Macvicaria alacris | C (D) | 6.1 | 0.1 | 1.4 | 1–3 |
| **Symphodus mediterraneus** n=17 |
| Helicometra form 4 | D | 5.9 | 0.1 | 1 | 1 |
| **Symphodus ocellatus** n=302 |
| Deretrema scorpaenicola | G | 0.7 | 0.01 | 1 | 1 |
| Genitocotyle mediterranea | CD (E) | 10 | 0.7 | 6.6 | 1–31 |
| Helicometra form 3 | C | 2 | 0.04 | 2 | 1–4 |
| Helicometra form 4 | F | 0.3 | 0.01 | 3 | 3 |
| Lecithaster stellatus | F (E) | 8.9 | 0.14 | 1.5 | 1–4 |
| Macvicaria alacris | CDE | 8.6 | 0.14 | 1.7 | 1–6 |
| **Symphodus roissali** n=230 |
| Gaevskijatrema perezi | CDE (F) | 21.7 | 2.8 | 12.7 | 1–97 |
| Helicometra form 3 | DE (F) | 3 | 0.03 | 1 | 1 |
| Holorchis pygnotorus | CDE | 4.3 | 0.07 | 1.5 | 1–4 |
| **Symphodus rostratus** n=41 |
| Deretrema scorpaenicola | G | 2.4 | 0.1 | 5 | 5 |
| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| Helicometra form 4 | CDEF | 31.7 | 1.1 | 3.4 | 1–13 |
| Macvicaria alacris | CDE | 14.6 | 1.1 | 7.7 | 1–41 |
| Symphodus tinca n=114 | | | | |
| Helicometra form 2 | CDEF | 7 | 0.18 | 2.6 | 1–4 |
| Helicometra form 3 | CDEF | 6.1 | 0.24 | 3.9 | 1–13 |
| Lectichirium musculus | E | 0.8 | 0.01 | 1 | 1 |
| Macvicaria alacris | CD (EF) | 8.8 | 0.6 | 6.6 | 1–14 |
| Proctoeces maculatus | F | 3.5 | 0.04 | 1 | 1 |
| Zoogonus rubellus | F | 7.9 | 0.2 | 3 | 1–5 |
| Thalassoma pavo n=2 | | | | |
| Helicometra form 3 | C | 50 | 1 | 2 | 2 |
| Xyrichthyys novacula n=4 | | | | |
| Helicometra form 3 | C | 25 | 10.8 | 43 | 43 |

**LOPHIIDAE**

| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| Aphallus tubarium | CDF | 18.8 | 0.3 | 1.7 | 1–3 |
| Derogenes latus | B | 6.3 | 0.1 | 1 | 1 |
| Dinosoma sp. | A | 6.3 | 0.5 | 8 | 8 |
| Lectichirium fusiforme | A | 6.3 | 0.1 | 1 | 1 |
| Lectichirium musculus | A | 6.3 | 0.1 | 1 | 1 |
| Proorhynchoides gracilescens | CD (BEF) | 25 | 5.2 | 20.8 | 3–52 |
| Proorhynchus acuteatus | C | 6.3 | 0.2 | 3 | 3 |
| Stephanostomum cesticillum | CDE (BF) | 50 | 4.1 | 8.1 | 1–54 |
| Synaptobothrium caudiporum | A | 6.3 | 0.1 | 1 | 1 |

**LOTIDAE**

| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| Bathycreadium elongata | B to F | 23.5 | 2.1 | 9 | 6–13 |
| Bucephalus marinus | B | 5.9 | 0.2 | 3 | 3 |
| Derogenes varicus | A | 11.8 | 0.2 | 2 | 1–3 |
| Deretrema scorpaenicola | G | 5.9 | 0.1 | 1 | 1 |
| Helicometra form 3 | CDE (F) | 35.3 | 2.8 | 7.8 | 1–22 |
| Metadena phoceae | F | 23.5 | 7.9 | 33.8 | 5–110 |
| Opecoeloides columbellae | BC | 58.8 | 46 | 78 | 5–177 |
| Stephanostomum gaidropsari | CDE (F) | 41.2 | 6.8 | 16.4 | 1–77 |

**MORONIDAE**

| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| Bucephalus baeri | F | 9.1 | 1.4 | 15 | 15 |
| Bucephalus labracis | BC | 9.1 | 15.9 | 175 | 175 |
| Bucephalus minimus | DE | 36.4 | 2.2 | 6 | 2–9 |
| Cainocreadium labracis | CD | 100 | 20.2 | 20.2 | 3–115 |
| Timoniella praeteritum | C | 9.1 | 0.2 | 2 | 2 |

**MULLIDAE**

| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|---------|----------------|-----------|------|-------|
| Aponurus laguncula | A | 1.5 | 0.04 | 2.5 | 2–5 |
| Derogenes latus | G | 6.2 | 0.1 | 2 | 1–6 |
| Holorhichis legendreii | F (CDE) | 13.8 | 0.4 | 2.8 | 1–22 |
| Lasiotocus multi | F | 27.7 | 5.4 | 19.6 | 1–118 |
| Lectichirium musculus | D | 0.7 | 0.01 | 1 | 1 |
| Opecoeloideis furcatus | BC (DEF) | 44.6 | 6 | 13.4 | 2–92 |
| Poracanthium furcatum | CDE (BF) | 50 | 14 | 28 | 1–202 |
| Proctotrema bacilliovarum | F (B) | 33.1 | 4.1 | 12.3 | 1–170 |
| Timonia Mediterranea | B | 10.8 | 1 | 9.2 | 1–30 |
| Site(s)      | Prevalence (%) | Abundance | Mean | Range |
|--------------|----------------|-----------|------|-------|
| MURAENIDAE   |                |           |      |       |
| Muraena helena n=10 |             |           |      |       |
| Lecithochirium grandiporum | A 100 | 9 | 9 | 3–23 |
| Lecithochirium musculus | A 10 | 0.1 | 2 | 2 |
| Lecithochirium rufoviride | A 20 | 0.2 | 1 | 1 |
| Follicularium mediterraneum | DE 20 | 0.8 | 4 | 2–6 |
| PHYCIDAE     |                |           |      |       |
| Phycis phycis n=10 |            |           |      |       |
| Bathycracium elongata | D (CE) 50 | 2 | 4 | 1–9 |
| Derogetes varicus | A 10 | 0.2 | 2 | 2 |
| Lecithochirium musculus | A 40 | 2.8 | 7 | 3–14 |
| Stephanostomum pristis | B (C) 80 | 9.3 | 11.6 | 1–25 |
| SCIAENIDAE   |                |           |      |       |
| Sciaena umbra n=41 |            |           |      |       |
| Aonikostoma coronatum | F 85.4 | 476 | 558 | 18–2920 |
| Metadenia pauli | BCDE 68.3 | 1176 | 1722 | 2–6270 |
| Paracryptogonimus aloysiae | BCD 14.6 | 1 | 7.2 | 2–22 |
| Pleorchis polyorchis | C (D) 19.5 | 0.5 | 2.6 | 1–4 |
| Stephanostomum bicornatum | F 24.4 | 4.6 | 19 | 1–111 |
| Umbrina cirrosa n=1 |          |           |      |       |
| Lepocreadium pegorchis | CDE 100 | 284 | 284 | 284 |
| Pycnadenoides umbrinae | CD 100 | 4 | 4 | 4 |
| SCORPAENIDAE |                |           |      |       |
| Scorpaena notata n=5 |           |           |      |       |
| Lecithochirium musculus | A 40 | 1.4 | 3.5 | 1–6 |
| Podocotyle scoraepaeae | D 20 | 0.6 | 3 | 3 |
| Scorpaena porcus n=70 |            |           |      |       |
| Deretremia scorpaenicola | G 21.4 | 0.3 | 1.4 | 1–4 |
| Helicometra form 2 | BCD (AEF) 55.7 | 5.3 | 9.5 | 1–46 |
| Lecithochirium musculus | A 20 | 0.6 | 3.2 | 1–15 |
| Podocotyle scoraepaeae | CD 21.4 | 0.6 | 2.7 | 1–6 |
| Scorpaena scrofa n=11 |            |           |      |       |
| Helicometra form 2 | BC (DE) 36.4 | 1.5 | 4.3 | 1–14 |
| Lecithochirium musculus | A 36.4 | 1.5 | 4 | 1–10 |
| Podocotyle scoraepaeae | BC (AD) 33.3 | 3.1 | 11.3 | 3–26 |
| SERRANIDAE   |                |           |      |       |
| Epinephelus marginatus n=1 |          |           |      |       |
| Podocotyle tenemesis | B 100 | 23 | 23 | 23 |
| Serranuss cabrilla n=15 |            |           |      |       |
| Deretrema scorpaenicola | G 20 | 0.3 | 1.7 | 1–2 |
| Helicometra form 1 | BDF 26.7 | 0.5 | 1.8 | 1–3 |
| Serranuss scriba n=46 |            |           |      |       |
| Deretrema scorpaenicola | G 4.3 | 0.04 | 1 | 1 |
| Helicometra form 1 | BCD (EF) 80.4 | 5.6 | 6.9 | 1–36 |
| Lecithochirium musculus | A (B) 28.3 | 1.5 | 5.3 | 1–16 |
| SOLEIDAE     |                |           |      |       |
| Monochirus hispidus n=3 |            |           |      |       |
| Homalometron galacticus | C 100 | 6.7 | 6.7 | 2–15 |
| Synaptaura kleinii n=8 |            |           |      |       |
| Homalometron senegalense | C (DE) 100 | 24.4 | 24.4 | 2–41 |
| SPARIDAE     |                |           |      |       |
| Boops boops n=13 |            |           |      |       |
| Aphanurus stossichi | A (B) 84.6 | 12.6 | 14.9 | 4–32 |
| Arnola microcirrus | A 30.8 | 0.9 | 3 | 1–7 |
| Site(s) | Prevalence (%) | Abundance | Mean | Range |
|--------|----------------|-----------|------|-------|
| Bacciger israelensis | B (C) | 61.5 | 2.5 | 4.1 | 1–9 |
| Hemiuus communis | A | 76.9 | 7.5 | 9.8 | 4–32 |
| Robphildillus fractum | D (C) | 69.2 | 9 | 13 | 2–38 |
| Dentex dentex n=13 |  |  |  |  |
| Allopodocaule jaffensis | E | 7.7 | 0.15 | 2 | 2 |
| Aphallus rubulco | CF | 15.4 | 0.5 | 3.5 | 2–5 |
| Aphallus tubarium | EF | 84.6 | 18.8 | 22.2 | 1–71 |
| Cainocreadium dentexis | BCD | 76.9 | 8.2 | 10.6 | 1–34 |
| Hemiuus communis | A | 7.7 | 0.4 | 5 | 5 |
| Metadenia depressa | BCD (E) | 30.8 | 2.4 | 7.8 | 2–14 |
| Pachycreadium carnosum | CDE | 23.1 | 0.7 | 3 | 1–3 |
| Diplodus annularis n=54 |  |  |  |  |
| Diphtherostomum brasinae | F | 53.7 | 2 | 3.7 | 1–14 |
| Lecthohirium musculus | A | 1.8 | 0.04 | 2 | 2 |
| Lepocreadium pegorhisis | B | 1.8 | 0.2 | 1 | 1 |
| Macvicaria crassigula | CDE (F) | 29.6 | 1 | 3.7 | 1–6 |
| Monorchis parvus | BC | 72.2 | 11.7 | 16.2 | 1–122 |
| Pseudopycnadenia fischthali | DE | 3.7 | 0.1 | 2.5 | 1–4 |
| Diplodus puntazzo n=31 |  |  |  |  |
| Monorchis monorchisis | B | 12.9 | 0.1 | 1 | 1 |
| Peracreadium characis | BC (D) | 71 | 4.3 | 6 | 1–32 |
| Pseudopycnadenia fischthali | CDE | 9.6 | 0.1 | 1 | 1 |
| Diplodus sargus n=69 |  |  |  |  |
| Diphtherostomum brasinae | F | 31.9 | 7.2 | 22.5 | 1–92 |
| Holorchis pyconos | CDEF | 20.3 | 1.1 | 5.4 | 1–26 |
| Lepidauchen stenomotoma | C | 1.5 | 0.01 | 1 | 1 |
| Lepocreadium album | CD | 2.9 | 0.06 | 2 | 1–2 |
| Macvicaria crassigula | CD (BE) | 24.6 | 0.7 | 2.8 | 1–11 |
| Monorchis parvus | B | 20.2 | 3.7 | 15.2 | 1–17 |
| Proctoeces maculatus | DEF | 7.2 | 0.2 | 2.6 | 1–9 |
| Pseudopycnadenia fischthali | DE | 4.3 | 0.1 | 1.3 | 1–2 |
| Wardula sarguicola | F | 6 | 0.1 | 1.5 | 1–2 |
| Zoogonus rubellus | F | 13 | 2.6 | 20.2 | 1–120 |
| Diplodus vulgaris n=43 |  |  |  |  |
| Diphtherostomum brasinae | F | 34.9 | 9.2 | 26.3 | 1–93 |
| Holorchis pyconos | CDEF (F) | 16.3 | 1.3 | 8 | 1–24 |
| Lepocreadium album | B | 2.3 | 0.07 | 3 | 3 |
| Macvicaria crassigula | CDE (B) | 27.9 | 1.16 | 4.2 | 1–11 |
| Monorchis parvus | B (C) | 11.6 | 1.6 | 13.8 | 1–42 |
| Proctoeces maculatus | F | 2.3 | 0.02 | 1 | 1 |
| Pseudopycnadenia fischthali | DE | 13.9 | 0.1 | 0.8 | 1 |
| Pychnadenoides senegalensis | E | 2.3 | 0.02 | 1 | 1 |
| Wardula sarguicola | F | 2.3 | 0.02 | 1 | 1 |
| Zoogonus rubellus | F | 7 | 0.8 | 11.7 | 4–25 |
| Lithognathus mormyrus n=52 |  |  |  |  |
| Derogenes iatus | G | 1.9 | 0.02 | 1 | 1 |
| Diphtherostomum brasinae | F | 3.8 | 0.06 | 1.5 | 1–2 |
| Holorchis pyconos | CDEF | 50 | 2.1 | 4.2 | 1–17 |
| Lepocreadium pegorhisis | B (C) | 5.8 | 0.7 | 12.7 | 1–21 |
| Macvicaria mormyri | CD | 25 | 0.4 | 1.5 | 1–2 |
| Pychnadenoides senegalensis | CD | 3.8 | 0.15 | 4 | 1–4 |
| Oblada melanura n=22 |  |  |  |  |
| Hemiuus communis | B | 4.5 | 0.05 | 1 | 1 |
| Lepocreadium album | BC | 31.8 | 6 | 19 | 2–42 |
Table II. (Continued).

| Species                        | Site(s) | Prevalence (%) | Abundance | Mean | Range |
|--------------------------------|---------|----------------|-----------|------|-------|
| Macvicaria dubia               | CDE     | 31.8           | 0.7       | 2.1  | 1–4   |
| Pagellus erythrinus n=92       |         |                |           |      |       |
| Allopodocotyle jaffensis       | E       | 2.2            | 0.02      | 1    | 1     |
| Hemiusurus communis            | ACD     | 3.3            | 0.15      | 4.7  | 2–8   |
| Hemiusurus luehei              | A       | 2.2            | 0.1       | 3    | 2–4   |
| Holorchis micracanthum         | CDE     | 10.9           | 0.3       | 2.3  | 1–4   |
| Holorchis pycnoporus           | CD (E)  | 19.6           | 0.8       | 4    | 1–25  |
| Lepidauchen stenostoma         | D       | 1.1            | 0.01      | 1    | 1     |
| Lepocreadium album             | C       | 4.3            | 0.04      | 2.8  | 1–5   |
| Macvicaria crassigula          | CD      | 9.8            | 0.2       | 1.7  | 1–7   |
| Pachycreadium carnosum         | CD (E)  | 28.3           | 0.5       | 1.7  | 1–4   |
| Pagrus pagrus n=59             |         |                |           |      |       |
| Allopodocotyle jaffensis       | DEF     | 16.9           | 0.3       | 1.6  | 1–3   |
| Aphallus rubalo                | E       | 1.7            | 0.05      | 3    | 3     |
| Hemiusurus communis            | AC (D)  | 5.1            | 0.1       | 2.3  | 2–4   |
| Hemiusurus luehei              | A       | 1.7            | 0.07      | 4    | 4     |
| Holorchis micracanthum         | D       | 1.7            | 0.02      | 1    | 1     |
| Holorchis pycnoporus           | DEF     | 15.3           | 0.4       | 2.7  | 1–12  |
| Lecithochirium musculus        | A       | 3.4            | 0.03      | 1    | 1     |
| Macvicaria crassigula          | CD (E)  | 27.1           | 1         | 3.6  | 1–18  |
| Pachycreadium carnosum         | CD (E)  | 25.4           | 0.5       | 2.1  | 1–9   |
| Zoogonus rubellus              | F       | 3.4            | 0.05      | 1.5  | 1–2   |
| Sarpa salpa n=9                |         |                |           |      |       |
| Centroderma spinossima          | CDE     | 44.4           | 13.6      | 30.5 | 1–60  |
| Elstia stossichiana            | DE      | 11.1           | 3.6       | 32   | 32    |
| Lepocreadium pegorchis         | B       | 22.2           | 0.4       | 2    | 1–3   |
| Mesometra brachycoelia         | BCDE    | 55.6           | 17.7      | 31.8 | 1–60  |
| Mesometra orbicularis          | BCDE    | 77.8           | 11.2      | 14.4 | 1–53  |
| Robphildollfustum fractum      | DE (CF) | 77.8           | 34.3      | 44.1 | 2–112 |
| Wardula capitellata            | E       | 44.4           | 1.2       | 2.8  | 2–5   |
| Sparus auratus n=19            |         |                |           |      |       |
| Allopodocotyle pedicellata     | EF      | 57.9           | 3.3       | 5.7  | 2–12  |
| Diphterostomum brusinae        | F (E)   | 26.3           | 6.7       | 25.6 | 6–78  |
| Macvicaria maillardi           | CDE     | 52.7           | 1.5       | 2.9  | 1–12  |
| Macvicaria obovata             | CDE (F) | 52.7           | 3        | 5.8  | 1–10  |
| Pycnadenoides senegalense      | CD (E)  | 26.3           | 2.3       | 8.8  | 1–14  |
| Zoogonus rubellus              | F       | 10.5           | 1         | 9.5  | 1–18  |
| Spondyliosoma cantharus n=108  |         |                |           |      |       |
| Arnola microcirrus             | A       | 0.9            | 0.01      | 1    | 1     |
| Hemiusurus communis            | A       | 2.8            | 0.1       | 3.3  | 1–8   |
| Lepocreadium album             | BC      | 2.8            | 0.1       | 3    | 1–5   |
| Macvicaria crassigula          | DE      | 2.8            | 0.03      | 1    | 1     |
| Monorchis monorchis            | B       | 7.4            | 0.4       | 4.8  | 1–18  |
| SYNODONTIDAE                   |         |                |           |      |       |
| Synodus saurus n=29            |         |                |           |      |       |
| Aphanus stossichi              | A       | 3.5            | 0.03      | 1    | 1     |
| Derogenes varicus              | A       | 3.5            | 0.03      | 1    | 1     |
| Helicometra form 3             | D       | 3.5            | 0.07      | 2    | 2     |
| Hemiusurus communis            | A       | 17.2           | 0.2       | 1    | 1     |
| Lecithaster sp.                | D       | 3.5            | 0.03      | 1    | 1     |
| Lecithochirium musculus        | A       | 31             | 0.8       | 2.5  | 1–8   |

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temensis and Timonia mediterranea; (3) the duodenum for Homalometron galaicus, Monorchis blennii, Prosorhynchus crucibulum and Timoniella praeteritum; (4) the rectum for Diphterostomum brusinae, Lasiotocus mulli, Lecithaster stellatus, Metadena phoceae, Prosorhynchus aculeatus, Stephanostomum minutum, Tergestia acanthocephala, Wardula sarguicola and Zoogonus rubellus; and (5) the gall-bladder for Derogenes latus (but a single individual was recovered from the pyloric caeca of Lophius piscatorius), Deretrema scorpaenicola (but a single individual was found in the middle intestine of Labrus viridis) and Anisocoelium capitellatum.

Some other digenean species were much less restricted in their distribution and were found all along the digestive tract of their host apart from the stomach and gall-bladder: Bathycreadium elongata, Helicometra form 1, Helicometra form 2, Holorchis pycnoporus, Opecoeloides furcatus, Peracreadium genu, Poracanthium furcatum and Stephanostomum cesticillum.

In Table III, we present a parasite–host list. Of the 102 digenean species found in the teleosts from Scandola, 55 were oioxenic (53.9%), 13 stenoxenic (12.7%) and 34 (33.3%) euryxenic (terminology of Euzet and Combes 1980). Of the 34 euryxenic species, nine were restricted to sparids (five digenean species found in two hosts, three in three hosts, one in six hosts), 17 were parasites of two to five unrelated fish host species, six of six to 10 unrelated hosts and two of >11 unrelated hosts. These latter two cases refer to Lecithochirium musculus and forms of Helicometra (which will probably prove to be a species complex).

With the exception of the nine euryxenic species found in sparids, all of the other 25 euryxenic species are found in unrelated fish families. Among these 25 euryxenic digeneans: 14 parasitize fish hosts belonging to two different families, six parasitize fish hosts belonging to three different families, two parasitize fish hosts belonging to four
| Parasite                        | Hosts                                                  |
|--------------------------------|--------------------------------------------------------|
| Allopodocotyle jaffensis       | Dentex dentex, Pagellus erythrinus, Pagrus pagrus     |
| Allopodocotyle pedicellata     | Sparus auratus                                        |
| Anisocladium fallax            | Uranoscopus scaber                                    |
| Anisocladium gracile           | Uranoscopus scaber                                    |
| Anisocoelium capitellatum      | Uranoscopus scaber                                    |
| Anoikstostoma coronatum        | Sciaena umbra                                          |
| Aphallus rubalo                | Dentex dentex, Pagrus pagrus                          |
| Aphallus tubarium              | Dentex dentex, Lophius piscatorius                    |
| Aphanurus stossichi            | Boops boops, Synodus saurus, Trachurus mediterraneus  |
| Aponurus laguncula              | Mullus surmuletus                                     |
| Arnola microcirrus             | Boops boops, Spondyliosoma cantharus                  |
| Bacciger bacciger              | Atherina boyeri                                        |
| Bacciger israelensis           | Boops boops                                            |
| Bathycreadium elongata         | Gaidropsarus mediterraneus, Phyctis phycis            |
| Bucephalus baeri               | Dicentrarchus labrax                                   |
| Bucephalus labracis            | Dicentrarchus labrax                                   |
| Bucephalus marinus             | Gaidropsarus mediterraneus                             |
| Bucephalus minimus             | Dicentrarchus labrax                                   |
| Cainocreadium dentecis         | Dentex dentex                                          |
| Cainocreadium labracis         | Dicentrarchus labrax                                   |
| Centrodera spinossissima       | Sarpa salpa                                            |
| Deretrama scorpaenicola        | Gaidropsarus mediterraneus, Gobius paganellus, Labrus merula, L. viridis, Serranus cabrilla, S. sriba, Scorpaena porcus, Symphodus ocellatus, S. rostratus |
| Derogenes latus                | Lithognathus mormyrus, Lophius piscatorius, Mullus surmuletus |
| Derogenes varicus              | Gaidropsarus mediterraneus, Phyctis phycis, Synodus saurus |
| Dinosoma sp.                   | Lophius piscatorius                                    |
| Diptherostomum brasimae        | Coris julis, Diplodus annularis, D. sargus, D. vulgaris, Labrus merula, Lithognathus mormyrus, Parablenius gattorugine, Sparus auratus |
| Ectenurus lepidus              | Trachurus picturatus, T. trachurus                     |
| Elstia stossichianum           | Sarpa salpa                                            |
| Folliculocystarium mediterraneum | Muraena helena                                         |
| Gaevskajatrema perezi          | Symphodus cinereus, S. roissali                        |
| Genicocotyle mediterranea      | Apogon imberbi, Atherina boyeri, Pomatoschistus marmoratus, Symphodus ocellatus |
| Helicometra form 1             | Serranus cabrilla, S. sriba                            |
| Helicometra form 2             | Labrus merula, Scorpaena porcus, S. scrofa, Symphodus tinca |
| Helicometra form 3             | Bothus podas, Chelidonichthys lucerna, Conger conger, Gaidropsarus mediterraneus, Labrus merula, L. viridis, Symphodus ocellatus, S. roissali, S. tinca, Synodus saurus, Thalassoma pavo, Xyrichtys novacula, Zeus faber |
| Helicometra form 4             | Symphodus mediterraneus, S. ocellatus, S. rostratus    |
| Hemiurus communis              | Boops boops, Dentex dentex, Oblada melanura, Pagellus erythrinus, Pagrus pagrus, Spicara maena, S. maris, Spondyliosoma cantharus, Synodus saurus, Trachurus mediterraneus |
| Hemiurus luehet                | Pagellus erythrinus, Pagrus pagrus, Trachinus araneus  |
| Holorchis legendrei            | Mullus surmuletus                                      |
| Holorchis microcanthus         | Pagellus erythrinus, Pagrus pagrus                     |
| Holorchis pycnoporus           | Diplodus sargus, D. vulgaris, Lithognathus mormyrus, Pagellus erythrinus, Pagrus pagrus, Symphodus roissali |
| Homalometron galaicus          | Monochirus hispidus                                    |
| Homalometron senegalense       | Synaptura kleinii                                      |
| Lasiotocus mulli               | Mullus surmuletus                                      |
| Lasiotocus typicus             | Trachurus mediterraneus, T. trachurus                  |
| Parasite                        | Hosts                                                                 |
|--------------------------------|----------------------------------------------------------------------|
| Lecithaster stellatus          | Atherina boyeri, Belone belone, Symphodus ocellatus                   |
| Lecithaster sp.                | Synodus saurus                                                        |
| Lecithochirium fusiforme       | Conger conger, Lophius piscatorius                                   |
| Lecithochirium grandiporium    | Muraena helena                                                        |
| Lecithochirium musculus        | Chelidonichthys lucerna, Conger conger, Diplodous annularis, Gobius   |
|                                | cobitis, G. cruciatatus, G. pugnax, Lophius piscatorius, Mullus      |
|                                | surmuletus, Muraena helena, Pagrus pagrus, Physicus physicus, Scorpaena |
|                                | notata, S. porcus, S. scrofa, Serranis scribes, Symphodus tinca, Synodus |
|                                | saurus                                                               |
| Lecithochirium rufoviride      | Conger conger, Muraena helena                                        |
| Lecithostaphylus retroflexus   | Belone belone                                                         |
| Lepidacthen stenostoma         | Diplodous sargus, Labrae merula, Pagellus erythrinus                  |
| Lepocreadum album              | Diplodous sargus, D. vulgaris, Oblada melanura, Pagellus erythrinus, |
|                                | Spicaia maris, Spondylosos cantharus                                  |
| Lepocreadum pegorchis          | Diplodous annularis, Lithognathus mormyrus, Umbrina cirrosa, Sarpa    |
|                                | salpa                                                                |
| Macvicaria alacris             | Symphodus cinereus, S. ocellatus, S. rostratus, S. tinca             |
| Macvicaria crassigula          | Diplodous annularis, D. sargus, D. vulgaris, Pagellus erythrinus, Pagrus|
|                                | pagrus, Spondylosos cantharus                                        |
| Macvicaria dubia               | Oblada melanura                                                       |
| Macvicaria maillardi           | Sparus auratus                                                        |
| Macvicaria mormyris            | Lithognathus mormyrus                                                 |
| Macvicaria oboeata             | Sparus auratus                                                        |
| Magnibrutatus shirabini        | Salaria parvo                                                         |
| Mesometra brachycoelia         | Sarpa salpa                                                           |
| Mesometra orbicularis          | Sarpa salpa                                                           |
| Metadena depressa              | Dentex dentex                                                         |
| Metadena pauli                 | Sciaena umbra                                                          |
| Metadena phoceae               | Gaidropsaros mediterraneus                                            |
| Monasus filiformis             | Trachurus picturatus                                                  |
| Monorchis blennii              | Parablenius gattergine                                                |
| Monorchis monorchis            | Diplodous puntazzo, Spondylosos cantharum                             |
| Monorchis parvus               | Diplodous annularis, D. sargus, D. vulgaris                            |
| Opecoeloides columbellae       | Gaidropsaros mediterraneus                                            |
| Opecoeloides furcatus          | Mullus surmuletus                                                     |
| Pachycreadium carnosum         | Dentex dentex, Pagellus erythrinus, Pagrus pagrus                      |
| Paracryptogonimus alosiae      | Sciaena umbra                                                          |
| Peracreadium characis          | Diplodous puntazzo                                                    |
| Peracreadium generi            | Labrae merula, L. viridis                                            |
| Pleorchis polyorchis           | Sciaena umbra                                                          |
| Podocotyle nocirella           | Conger conger                                                         |
| Podocotyle scroaenae           | Scorpaena notata, S. porcus, S. scrofa                                |
| Podocotyle tennensis           | Epinephelus marginatus                                                |
| Poracanthium furcatum          | Mullus surmuletus                                                     |
| Proctoeces maculatus           | Diplodous sargus, D. vulgaris, Labrae melanura, Symphodus tinca       |
| Protectrema baciliformatum     | Mullus surmuletus                                                     |
| Predistomum poloni             | Trachurus mediterraneus, T. picturatus, T. trachurus                  |
| Prosorhynchoides gracilescens  | Lophius piscatorius                                                   |
| Prosorhynchus aculeatus        | Conger conger, Lophius piscatorius                                   |
| Prosorhynchus crucibulum       | Conger conger                                                          |
| Pseudoopoleoides chloroscombri | Trachurus mediterraneus, T. picturatus, T. trachurus                  |
| Pseudopycnadenia fischthali    | Diplodous annularis, D. sargus, D. vulgaris, D. puntazzo              |
| Pycnadenoides senegalensis     | Diplodous vulgaris, Lithognathus mormyrus, Sparus auratus             |
| Pycnadenoides umbrinæ           | Umbrina cirrosa                                                        |
| Rhophodolus fususum fractum    | Boops boops, Sarpa salpa                                              |
| Stephanostomum bicoronatum     | Sciaena umbra                                                          |
different families, one parasitizes fish hosts belonging to five different families, one parasitizes fish hosts belonging to nine different families and one parasitizes fish hosts belonging to 12 different families. Nevertheless, two digenean species are found in the family pair Congridae–Lophiidae, two others are in the pair Triglidae–Lophiidae and two others in the Labridae–Sparidae–Blenniidae. For these euryxenic species, the relationships between the parasites and their hosts probably have an ecological basis (e.g. foodwebs).

In Table IV, we compare the data collected from each teleost species studied in the Scandola Nature Reserve with those reported from the same teleost species in other areas of the Mediterranean and the Black Seas. Such a comparison is not easy because: (1) the sample size varies; and (2) the digenean species reported are sometimes different. In this study, the validity and synonymy of the different digenean species reported by the various authors are not discussed.

In a specific geographical area, the ratio of the total number of the digenean species found in all fish species studied (\( N \)) to the number of fish species examined (\( N' \)), which corresponds to the mean number of digenean species per host species, i.e. \( M = N/N' \), is a reflection of digenean species diversity. Table IV shows that the highest ratio (3.8) is observed off the Scandola Nature Reserve. By contrast, the lowest ratio is reported for the Adriatic (1.9; 2.0; 0.6: the last value could be wrong due to the nature of the data provided by Radujkovic and Raibaut 1989), while an intermediate situation is observed for the Eastern Mediterranean (2.6; 2.9; 2.1).

If we compare the data reported for the Sparidae, a family which has been well studied throughout the Mediterranean (Table V), we obtain similar results: a high mean number of digenean species per host species occurs off the Scandola Nature Reserve, a much lower level in the Adriatic and an intermediate situation for the Eastern Mediterranean. Fredj et al. (1992) have shown that biodiversity in general is high in the Western Mediterranean, lower in the Adriatic and even lower in the Eastern Mediterranean. The high digenean diversity observed for the Scandola region is in accordance with Fredj et al. (1992), but the lower diversity for the Adriatic as compared with the Eastern Mediterranean differs somewhat from the findings of these authors. The higher digenean diversity observed in the Eastern Mediterranean \( \text{vis-à-vis} \) the Adriatic could be related to the encroachment of the Red Sea digenean fauna carried by Red Sea immigrant teleost hosts. In the Western Mediterranean, the high value of the ratio \( N/N' \) found off the Scandola Nature Reserve (3.8) strongly contrasts with a lower one (2.0) indicated by Orecchia and Paggi (1978) for

| Parasite                  | Hosts                                      |
|---------------------------|--------------------------------------------|
| Stephanostomum cesticillum| Lophius piscatorius, Zeus faber             |
| Stephanostomum gaidropsari| Gaidropsarus mediterraneus                  |
| Stephanostomum minutum    | Uranoscopus scaber                         |
| Stephanostomum pristis    | Phycis phycis                              |
| Synaptobothrium caudiporum| Chelidomichthys lucerna, Lophius piscatorius|
| Tergestia acanthocephala  | Belone belone                              |
| Tergestia laticollis      | Trachurus mediterraneus, T. picturatus, T. trachurus |
| Timonidia mediterranea    | Mullus surmuletus                          |
| Timoniella praeteritum    | Dicentrarchus labrax                       |
| Wardula capiellata        | Sarpa salpa                                |
| Wardula sargicula         | Diplodus sargus, D. vulgaris               |
| Zoogonus rubellus         | Diplodus sargus, D. vulgaris, Labrus merula, Pago pagrus, Parablennius gattorugine, Sparus auratus, Symphodus tinca |

Table III. (Continued).
Table IV. Number of digenean species from teleost fishes off the Scandola Nature Reserve (Corsica) compared, where available, with data from the same host species from other areas of the Mediterranean and Black Seas (bold type indicates the highest number of digenean species reported in the host fish; the sample size is given in parentheses).

|                        | Western Mediterranean | Adriatic | Eastern Mediterranean |
|------------------------|-----------------------|----------|-----------------------|
|                        | Scandola              | Split    | Montenegro            | Greece | Lebanon | Israel | Black Sea |
| Present work           | 1^                    | 2        | 3                     | 4      | 5       | 6      | 7         | 8         | 9 |
| **APOGONIDAE**         |                       |          |                       |        |         |        |           |           |   |
| Apogon imberbis        | 1 (9)                 | –        | –                     | –      | –       | –      | –         | –         |   |
| **ATHERINIDAE**        |                       |          |                       |        |         |        |           |           |   |
| Atherina boyeri        | 3 (26)                | –        | –                     | 2 (78) | 2       | 2      | –         | –         | – |
| **BELONIDAE**          |                       |          |                       |        |         |        |           |           |   |
| Belone belone          | 3 (30)                | –        | 1 (2)                 | –      | 0       | 1      | –         | –         | 0 (13) |
| **BLENNIIDAE**         |                       |          |                       |        |         |        |           |           |   |
| Parablennius gattorugine| 3 (6)                | 4 (34)   | 2 (7)                 | –      | 0       | 1      | –         | –         | – |
| Salaria pavo           | 1 (2)                 | 1 (112)  | –                     | –      | 0       | –      | 0 (12)    | –         | – |
| **BOTHIDES**           |                       |          |                       |        |         |        |           |           |   |
| Bothus podas           | 1 (6)                 | 0 (17)   | 1 (2)                 | –      | –       | 2      | –         | –         | – |
| **CARANGIDAE**         |                       |          |                       |        |         |        |           |           |   |
| Trachurus spp.         | 8 (69)                | 2 (66)   | 2 (21)                | 2 (15) | 2       | 6      | 3 (24)    | –         | 6 (18) |
| **CENTRACANTHIDAE**    |                       |          |                       |        |         |        |           |           |   |
| Spicara maena          | 1 (5)                 | –        | 2 (20)                | –      | –       | 2      | –         | 1 (80)    | 1 (38) |
| Spicara smaris         | 2 (10)                | –        | 3 (16)                | –      | 0       | 3      | 1 (50)    | –         | – |
| **CONGRIDAE**          |                       |          |                       |        |         |        |           |           |   |
| Conger conger          | 7 (3)                 | 1 (106)  | –                     | 1 (6)  | 1       | 5      | –         | –         | – |
| **GOBIIDAE**           |                       |          |                       |        |         |        |           |           |   |
| Gobius cobitis         | 1 (6)                 | 3 (107)  | –                     | –      | –       | –      | –         | 1 (23)    | – |
| Gobius crucatus        | 1 (1)                 | –        | 1 (2)                 | –      | 0       | 1      | –         | –         | – |
| Gobius geniporus       | 0 (17)                | –        | 1 (3)                 | –      | –       | –      | –         | –         | – |
| Gobius paganellus      | 2 (11)                | 1 (4)    | –                     | –      | –       | –      | –         | –         | – |
| Pomatoschistus marmoratus | 1 (35)           | –        | –                     | –      | –       | –      | –         | –         | – |
Table IV. (Continued).

|                | Western Mediterranean | Adriatic | Eastern Mediterranean |
|----------------|-----------------------|----------|-----------------------|
|                | Scandola              | Split    | Montenegro            | Greece | Lebanon | Israel | Black Sea |
| Present work   | 1†                    | 2        | 3                     | 4      | 5       | 6      | 7         | 8      | 9      |
| LABRIDAE       |                       |          |                       |        |         |        |           |        |        |
| Coris julis    | 1 (58)                | –        | 1 (6)                 | –      | –       | 0      | –         | –      | –      |
| Labrus merula  | 7 (54)                | –        | 1 (1)                 | –      | –       | 4      | –         | –      | –      |
| Labrus viridis | 3 (19)                | –        | –                     | –      | –       | –      | –         | –      | –      |
| Symphodus cinereus | 2 (82)            | –        | –                     | 5 (74) | –       | 0      | –         | –      | 2 (13) |
| Symphodus mediterraneus | 1 (17)          | –        | –                     | –      | 0       | 5      | –         | –      | –      |
| Symphodus ocellatus | 5 (302)          | –        | –                     | –      | –       | –      | –         | –      | –      |
| Symphodus roissali | 3 (230)          | 0 (105)  | 1 (4)                 | –      | 2       | –      | 2 (9)     | 1 (21) |
| Symphodus rostratus | 3 (41)           | –        | –                     | –      | 3       | –      | –         | –      | –      |
| Symphodus tinca | 5 (114)               | –        | 3 (11)                | 3 (63) | 3       | 2      | –         | 3 (16) | 3 (22) |
| Thalassoma pavo | 1 (2)                 | –        | –                     | –      | 0       | 0      | 1 (3)     | –      | –      |
| Xyrichtys novacula | 1 (4)              | –        | –                     | –      | 0       | –      | –         | –      | –      |
| LOPHIIDAE      |                       |          |                       |        |         |        |           |        |        |
| Lophius piscatorius | 9 (16)         | 1 (10)   | 1 (4)                 | –      | –       | 5      | –         | –      | –      |
| LOTIDAE        |                       |          |                       |        |         |        |           |        |        |
| Gaidropsarus mediterraneus | 8 (17)      | –        | 1 (2)                 | –      | –       | 5      | –         | 4 (12) | –      |
| MORONIDAE      |                       |          |                       |        |         |        |           |        |        |
| Dicentrarchus labrax | 5 (11)       | 4 (200)  | –                     | 0      | 2       | 1 (1) | 0 (2)     | –      | –      |
| MULLIDAE       |                       |          |                       |        |         |        |           |        |        |
| Mullus surmuletus | 9 (129)        | 1 (110)  | 1 (1)                 | 2 (2)  | 2       | 3      | 2 (26)    | 6 (14) | 4 (65) |
| MURAENIDAE     |                       |          |                       |        |         |        |           |        |        |
| Muraena helena | 4 (10)                | –        | 1 (1)                 | –      | 0       | 1      | –         | –      | –      |
| PHYCIDAE       |                       |          |                       |        |         |        |           |        |        |
| Phycis phycis  | 4 (10)                | –        | –                     | –      | 0       | 3      | –         | –      | –      |
Table IV. (Continued).

| Western Mediterranean | Adriatic | Eastern Mediterranean |
|-----------------------|----------|-----------------------|
| Scandola              | Split    | Montenegro            | Greece | Lebanon | Israel | Black Sea |
| Present work          | 1†       | 2                     | 3      | 4       | 5      | 6       | 7       | 8       | 9       |

**SCIAENIDAE**
- *Sciaena umbra* 5 (41) – 1 (1) – 0 – – 0 (3) 3 (26) 1 (7)
- *Umbrina cirrosa* 2 (1) 2 (114) – – – 0 2 – 5 (17) 1 (1) 2 (3)

**SCORPAENIDAE**
- *Scorpaena notata* 2 (5) – – – – 0 – – 0 (1) – –
- *Scorpaena porcus* 4 (70) – – – 0 1 – 0 (14) 2 (75) 3 (35)
- *Scorpaena scrofa* 3 (11) – – – 0 1 – 0 (2) – –

**SERRANIDAE**
- *Epinephelus marginatus* 1 (1) – – – 0 – 1 (17) 1 (15) – –
- *Serranus cabrilla* 2 (15) – 1 (3) 1 (23) 1 3 – – – –
- *Serranus scriba* 3 (46) – 2 (11) – 0 3 – – – 0 (5)

**SOLEIDAE**
- *Monochirus hispidus* 1 (3) – 1 (3) – – 0 – – – –
- *Synaptaura kleinii* 1 (8) – – – – – – – –

**SPARIDAE**
- *Boops boops* 5 (13) 3 (142) 5 (32) – 0 4 3 (266) 5 (32) – –
- *Dentex dentex* 7 (13) 2 (111) – 0 1 – – – –
- *Diplodus annularis* 6 (54) – 6 (46) 4 (85) 4 8 0 (27) – 3 (42) 2 (28)
- *Diplodus puntazzo* 3 (31) – – – 0 5 – 0 (1) – –
- *Diplodus sargus* 10 (69) – 1 (4) – 0 1 4 (252) 5 (44) – –
- *Diplodus vulgaris* 10 (43) 2 (41) 2 (10) 1 (2) 1 5 4 (202) 4 (15) – –
- *Lithognathus mormyrus* 6 (52) – – 3 (15) 3 2 5 (420) 3 (40) – –
- *Oblada melanura* 3 (22) – 1 (11) – 0 3 2 (92) 3 (16) – –
- *Pagellus erythrinus* 9 (92) 3 (260) 1 (18) 2 (40) 2 5 8 (306) – –
- *Pagrus pagrus* 10 (59) – – – – – – 2 (40) 2 (10) – –
- *Sarpa salpa* 7 (9) 6 (250) 4 (12) – – 4 – 5 (24) – –
- *Sparus auratus* 6 (19) 3 (100) – 1 (2) 1 3 – 3 (8) – –
Table IV. (Continued).

| Western Mediterranean | Adriatic | Eastern Mediterranean |
|-----------------------|----------|-----------------------|
| Scandola              | North-western Italian coast | Split | Montenegro | Greece | Lebanon | Israel | Black Sea |
| Present work          | 1†       | 2                    | 3       | 4        | 5          | 6          | 7         | 8          | 9          |

**SYNODIDAE**

*Spondylosoma cantharus*  
(108) – 1 (2) – 0  

**SYNODIDAE**

*Synodus saurus*  
6 (29)  

**TRACHINIDAE**

*Trachinus araneus*  
1 (4)  

*Trachinus draco*  
0 (2) 1 (21) 1 (6) – 0  

**TRIGLIDAE**

*Chelidonichthys lucerna*  
4 (5)  

**URANOSCOPIDAE**

*Uranosco pus scaber*  
4 (49) 2 (100) 3 (43) 2 (7) 2  

**ZEIDAE**

*Zeus faber*  
2 (12) 0 (100) 2 (11) – 0  

| No. of fish examined | 2238 | 2110 | 390 | 338 | ? | ? | 1767 | 304 | 310 | 346 |
| No. of digenean species reported (N) | 234 | 42 | 60 | 24 | 24 | 122 | 40 | 47 | 32 | 28 |
| No. of fish host species studied (N') | 61 | 21 | 32 | 12 | 41 | 47 | 14 | 22 | 12 | 13 |
| N/N' | 3.8 | 2 | 1.9 | 2 | 0.6 | 2.6 | 2.9 | 2.1 | 2.7 | 2.2 |

†References: 1, Orecchia and Paggi 1978; 2, Sey 1968, 1970; 3, Radujkovic et al. 1989; 4, Radujkovic and Raibaut 1989 (sample value not given); 5, Papoutsoglou 1976 (sample value not given); 6, Saad-Fares 1985; 7, Fischthal 1980, 1982; 8, Vlassenko 1931; 9, Pogoreltseva 1952.
the north-western coast of Italy (Table IV). These two places are not widely distant and the striking contrast appears not to be related to sampling effort, since the sample numbers are similar in these two areas (2238 fish for Scandola 2110 for the north-western coast of Italy). As an example, eight digenean species were found in 69 specimens of three *Trachurus* spp. (i.e. 27 *T. mediterraneus* + 17 *T. picturatus* + 25 *T. trachurus* = 69; often these three species are reported as ‘*T. trachurus’*), but only two from 66 along the western coast of Italy. For a particular host fish, the number of digenean species recovered tends to increase in step with the sample size. Nevertheless, we have found seven digenean species in three *Conger conger* from off Scandola, while only one has been reported in 106 *C. conger* from western Italy. Similarly, seven digenean species were found in 13 *Dentex dentex* from off Scandola, while only two were reported from 111 of these fishes from the western Italian coast.

Table VI shows a comparison of the digenean fauna for the same 21 teleost species (i.e. restricted to those hosts recorded by the Italians) studied both off Scandola and the north-western coast of Italy (see list in Table IV). The ratio value (*N/N*') for off the Scandola Nature Reserve (4.8) is much higher than that for the north-western coast of Italy (2.0), even though the sampling numbers in the first area (742) are significantly lower than that of the second (2110).

The very high digenean species diversity observed off the Scandola Nature Reserve is probably related to the high general level of biodiversity reported in the region (Miniconi et al. 1990; Verlaque 1990; Merella 1991; Verlaque et al. 1999). This high level of biodiversity is related to the stability of the equilibrium of the ecosystem in this well-preserved area (protected for 25 years), which is devoid of major pollutants and opens

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**Table V. Digenean species diversity in the well-studied sparid fishes (data from table IV).**

| Region                  | N  | N' | N/N' |
|-------------------------|----|----|------|
| Western Mediterranean   |    |    |      |
| Scandola Nature Reserve | 87 | 13 | 6.7  |
| North-western Italian   | 19 | 6  | 3.2  |
| Adriatic                |    |    |      |
| Split (Sey 1968, 1970)  | 21 | 8  | 2.6  |
| Montenegro (Radujkovic et al. 1989) | 11 | 5  | 2.2  |
| Montenegro (Radujkovic and Raibaut 1989) | 11 | 11 | 1    |
| Eastern Mediterranean   |    |    |      |
| Saronicos, Greece (Papoutsoglou 1976) | 45 | 12 | 3.8  |
| Lebanon (Saad-Fares 1985) | 32 | 9  | 3.6  |
| Israel (Fischthal 1980, 1982) | 30 | 9  | 3.3  |

* N, Total number of all digenean species reported from all sparid species; N', total number of sparid species.

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**Table VI. Comparison of the digenean diversity from the same 21 teleost species (see Table IV) studied off the Scandola Nature Reserve (SNR) and off the north-western Italian coast (data from Orecchia and Paggi 1978).**

| Region                | n   | N  | N' | N/N' |
|-----------------------|-----|----|----|------|
| SNR (Corsica)         | 742 | 101| 21 | 4.8  |
| NW Italian coast      | 2110| 42 | 21 | 2    |

*n*, Total number of fishes examined; *N*, total number of digenean species reported; N', total number of fish species.
directly to the Western Mediterranean basin. A high level of biodiversity and favourable environmental factors will promote the successful completion of the digenean life-cycle.

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