PARASITOFAUNA STUDY OF THE BROWN TROUT, *SALMO TRUTTA* (PISCES, TELEOSTEI) FROM CORSICA (MEDITERRANEAN ISLAND) RIVERS

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Summary:
Corsica is a mediterranean island characterised by a great number of rivers. Salmonides are the main fishes which populate these rivers. Very appreciated by fishermen, Salmonides are represented by three species in the insular hydrographical network, among which an autochthonous species, the brown trout (*Salmo trutta*). In the present work, we have analysed the parasitofauna of this species. According to our knowledge, this research has never been carried out in Corsica. In a first step, we drew up an inventory of the parasites found in this freshwater fish. In a second step, we studied the differences which appeared in the composition of parasite communities of this species.

KEY WORDS : parasitofauna, freshwater fish, *Salmo trutta*, insular hydrographic network.

Résumé : ÉTUDE DE LA PARASITOFAUNE DE LA TRUITE COMMUNE, *SALMO TRUTTA* (POISSON, TÉLÉOSTÉEN) DES RIVIÈRES DE CORSE (ÎLE MÉDITERRANÉENNE)

*La Corse est une île méditerranéenne caractérisée par un nombre important de rivières. Les Salmonidés sont les principaux poissons qui les peuplent. Très prisés des pêcheurs, les Salmonidés sont représentés par trois espèces dans le réseau hydrographique insulaire dont une souche autochtone, la truite commune (*Salmo trutta*). Au cours de notre étude, nous avons analysé la parasitofaune de cette espèce. À notre connaissance, ces recherches n'avaient jamais été effectuées en Corse. Nous avons donc dressé un inventaire des parasites recensés chez ce poisson dulçaquicole. Puis, nous nous sommes attachés à étudier les différences qui apparaissaient dans la composition des communautés parasitaires de cette espèce.*

MOTS CLÉS : *parasitofaune, poisson dulçaquicole,* Salmo trutta, *réseau hydrographique insulaire.*

The maintenance of good health is a major problem in fishes populations. The monitoring of parasites is considered as an essential element in the management of fishes populations. Several papers are devoted to the parasitofauna of freshwater fishes in various continental regions, especially in Europe where fishing represents a significant economic activity (Dezfuli *et al.*, 2001 ; Hanzelova *et al.*, 1999). However, no parasitological study was undertaken on the brown trout of Corsican rivers.

The objective of the present study is to draw up an inventory of the parasitic helminths of brown trout in Corsica, and to determine their prevalence and intensity in order to evaluate their distribution. This study, conducted on the brown trout of Corsican rivers, appears as significant, if we refer to the increase in the current knowledge on freshwater fishes in Europe (Kennedy & Hartvigsen, 2000).

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MATERIALS AND METHODS

SAMPLES

The study was carried out on 96 brown trouts, collected for the period of opening of fishing in four different rivers: Rizzanese (1-2-3) ; Prunelli (4) ; Fium'Orbu (5) ; Tavignano (6-7-8) (Fig. 1). These rivers were selected among the longest and important ones in Corsica and are distributed North to the South of Corsica. Samples (from eight to 20 fishes) were collected in each river between April 2, 2004 and July 31, 2004 (four consecutive months). They concern adult and natural individuals whose size is higher than 14 cm. In some cases, several samples were collected in different locations of the same river.

For each brown trout, intestine and stomach were examined. Collected parasites were kept in 95 % ethanol. Helminths identifications were based on various reference documents (Anderson *et al.*, 1982; Gibson *et al.*, 2001; Moravec, 1968, 2002, 2004; Nicoll, 1909; Slusarski, 1958; Thomas, 1958).

ANALYSIS

Indices of parasite distribution have been calculated: prevalence and abundance (Bush *et al.*, 1997; Margolis *et al.*, 1982).

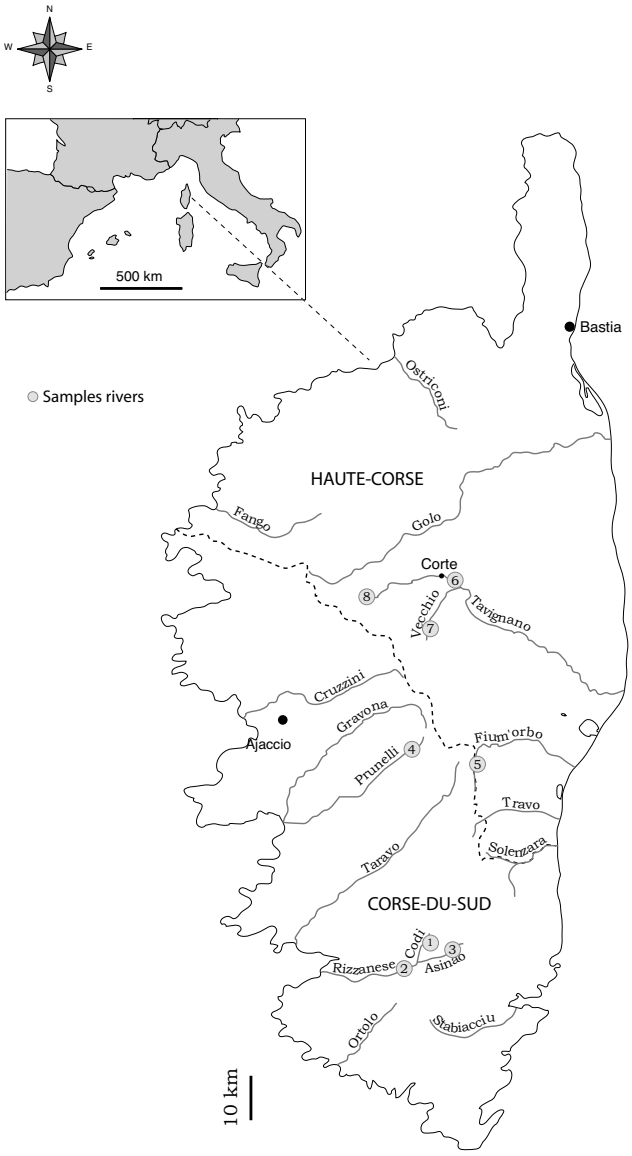

Fig. 1. – Map of Corsica island: sites where the brown trouts were collected.

1: Codi; 2: Rizzanese; 3: Asinau; 4: Ese; 5: Maramano; 6: Tavignanu; 7: Vecchio; 8: Ninu.

RESULTS

The parasitic fauna of the brown trout, in Corsica, is characterised by the presence of five helminths species depending on areas, namely: three Trematoda species (more accurately Digenea), *Crepidostomum metoecus* (Braun, 1900), *Nicolla testiobliquum* (Wisniewski, 1932), *Nicolla wisniewskii* (Slusarski, 1958); two Nematoda species, *Rhabdochona gnedini* (Skrjarbin, 1946); and one undetermined larva. Data on prevalence, abundance and intensity of the parasites of the brown trout in different areas of Corsican rivers are listed in Table I. Results presented show that prevalence for the Digenea, *Crepidosomum metoecus*, is for all the areas higher to prevalence of the two others species *Nicolla testiobliquum* and *Nicolla wisniewskii*. The most important diversity of Digenea was found in the hydrographical network of the Rizzanese with three species. The Nematoda *R. gnedini* has been recorded in six studied sites only, whose altitude is lower than 1 200 m (1, 2, 3, 5, 6 and 7).

	Sampling sites															
	Rizzanese						**Prunelli**		**Fium'Orbu**		**Tavignanu**					
	1		**2**		**3**		**4**		**5**		**6**		**7**		**8**	
	n = 10		**n = 20**		**n = 10**		**n = 10**		**n = 20**		**n = 8**		**n = 10**		**n = 8**	
	P	**A**	**P**	**A**	**P**	**A**	**P**	**A**	**P**	**A**	**P**	**A**	**P**	**A**	**P**	**A**
Digenea																
Crepidostomum meteoecus	40	1.1	90	7	90	5.3	90	9.2	15	0.3	75	16.9	80	5.1	50	5.8
Nicolla testioliquum	10	0.2	70	18.9	90	17.4	0	0	0	0	0	0	0	0	0	0
Nicolla wisniewskii	10	0.3	0	0	0	0	0	0	20	0.2	0	0	0	0	0	0
Nematoda																
Indetermined larvae	50	1.2	20	0.3	0	0	40	0.8	20	0.3	50	0.6	0	0	12.5	0.1
Rhabdochona gredini	60	1.5	20	0.4	10	0.1	0	0	10	0.2	87.1	2.4	10	0.1	0	0
Total number of parasitic species	5		4		3		2		4		3		2		2	

1: Codi; 2: Rizzanese; 3: Asinau; 4: Ese; 5: Maramano; 6: Tavignanu; 7: Vecchio; 8: Ninu.
P: prevalence (%); A: abundance (individuals); n: trout numbers.

Table I. – Prevalence and abundance of *Salmo trutta* parasites in different sites of sampling.

DISCUSSION

The parasitic fauna of brown trout from Corsica rivers is poor since only five parasitic species of helminths have been reported. This result corresponds to our present-day knowledge on the fauna of the Mediterranean islands. In all cases, insular communities are distinguished from their continental counterparts by a reduction in the number of parasitic species and sometimes by a spectacular increase in the percentage of infestation (Byrne *et al.*, 2002). For a same species of host, parasitism differs between the populations from an island and the populations from the mainland. It also differs from one island to the other depending on the surface of the island. The differences are related to the number and the identity of the parasitic species, but also to their prevalence (Combes, 2001).

For example, 34 parasites species of S*almo trutta* were recorded in Ireland (Holland & Kennedy, 1997) whereas we recorded only five parasites species in Corsica. Certain groups of parasites (such as the Cestodes) are missing in Corsica, but are recorded in British and Irish freshwater fishes (Chubb *et al.*, 1987), in France and Switzerland (Hanzelova *et al.*, 1999) and in many European salmonides fishes (Scholz *et al.*, 2003).

In the same way, no acanthocephalan was found whereas their presence was announced in Scotland by Dorucu *et al.* (1995).

Many studies already listed the parasitic trout species, *C. metoecus,* in different European countries and particularly in Ireland (Holland & Kennedy, 1997), England, Sweden (Corbett, 1955), Poland or Czech Republic (Slusarski, 1958) and North Eastern Finland (Rahkonen & Valtonen, 1989). Considering its important geographical distribution (Chubb, 1979), this parasite must have diverse intermediate hosts (Awachie, 1968) according to the biotope which its definitive host colonizes.

The presence of the nematode, *R. gnedini* is well known in *Salmo trutta*. Its distribution in this fish is limited to South of Europe (Spain, ex-Yugoslavia, Bulgaria) and in the Caspian Sea area. It is a thermophilous species (Moravec, 1994). This nematode was mainly found at low altitudes where the temperature of water was higher (Moravec, 1994).

CONCLUSION

During this study, five parasitic species have been collected in the common trout (*Salmo trutta*), three species of Trematodes and two species of Nematodes. This work showed that numerous factors could be implied in the distribution of these parasites. Indeed, we observed variations in the distribution of the parasites in the various studied hosts, depending on the location where the samples have been collected.

This first approach of the parasitism of the salmonides of Corsica created numerous possible research orientations, such as the knowledge of the cycles of these parasites, notably the various intermediate hosts, to be able to explain the observed variations.

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Reçu le 31 juillet 2006
Accepté le 24 avril 2007