Acta Parasitologica, 2005, 50(2), 168–170; ISSN 1230-2821

Helminth fauna of wild boar in Corsica

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Abstract

To determine the helminth fauna of wild boars, 160 stomachs and intestines, 72 lungs and 58 livers of animals from eight areas in Corsica, have been examined. It is the first study made in this Mediterranean island. The evaluation of the helminthic composition revealed six following species: *Dicrocoelium dendriticum* (Rudolphi, 1819), larval stage of *Echinococcus granulosus* (Goeze, 1782), *Ascaris suum* (Goeze, 1782), *Metastrongylus* sp., *Globocephalus urosubulatus* (Alessandrini, 1909), *Macracanthorhynchus hirudinaceus* (Pallas, 1781). Differences among prevalence data indicated an overdispersed helminth distribution in Corsica.

Key words

Helminths, *Sus scrofa*, Corsica

Introduction

There are many papers on the parasitofauna of the wild boar (*Sus scrofa* L., 1758) in various continental regions, namely in Central Europe where hunting represents a significant economic activity (see Gerbaldi 1975, Humbert and Ferté 1986), whereas very few works exist on this subject in Corsica despite of historical and commercial activities related to wild boar on this island.

The objective of our study was to draw up an inventory of the parasitic helminths of wild boar in Corsica, and to determine their prevalence and intensity in order to evaluate distribution of parasites. This survey, conducted on an island, appears as significant, if we refer to the increase of the existent knowledge on the helminth fauna of *S. scrofa* in the Palaearctic region (Tarczyński 1956, Jurašek 1959, Jansen 1967, Kutzer and Hinaidy 1971, Gadomska 1981, De-la-Muela *et al.* 2001).

Materials and methods

Samples

The study was carried out on 160 wild boars, collected during the hunting period in eight different regions of Corsica. These areas were selected according to their altitude (50–1182 m) and their approximate distance from the sea (2–50 km).

Samples were collected in each area during two successive hunting periods between August 15, 2001 and January 15, 2003. Every year from each area, ten wild boars were examined. From all 160 wild boars, each time digestive tract, lungs, heart and liver were examined. Collected helminths were kept in 95% ethanol.

Identifications of helminths were based on keys and descriptions by Petrochenko (1956), Popova (1964), Hartwich (1974), Anderson (1978) and Lichtenfels (1980).

Analysis

Various indices of parasite distribution have been calculated: prevalence, abundance and intensity (Bush *et al.* 1997).

In the same way, variance of samples has been calculated. This one, divided by abundance, informs about the distribution of the parasites in their hosts (Combes 2001). Indeed, when the ratio variance/abundance is close to 1, the distribution of the parasites is known as random; higher than 1, the distribution is aggregated, and most of the parasites are grouped inside some particular hosts; lower than 1, the distribution is regular.

The degree of aggregation of the species distributions was estimated using the parameter of the negative binomial distribution, k (Bliss and Fisher 1953). When $k<1.0$ parasite aggregations indicate an overdispersion (Permin *et al.* 1999).

Results

The parasitic fauna of wild boar, in Corsica, is characterised by the presence of only six species of helminths, namely: one trematode, *Dicrocoelium dendriticum* (Rudolphi, 1819), the only larval stage of the cestode, *Echinococcus granulosus*

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Table I. Prevalence (P), abundance (A), intensity (I), variance (V), distribution (D), standard deviation (SD), and *k* – degree of aggregation of the parasite species found in *Sus scrofa* in Corsica

		Dd (l)	Eg (l)	Gu (i)	Msp (lu)	As (i)	Mh (i)
South Corsica							
Locality 1	P (%)			75		5	5
(n = 20)	A ± SD	–	–	65.9 ± 99.3	–	0.1 ± 0.45	0.05 ± 0.22
	I			87.87		2	1
Locality 2	P (%)			30			60
(n = 20)	A ± SD	–	–	24.8 ± 4.87	–	–	5.7 ± 9.26
	I			82.7			9.5
Locality 3	P (%)			50	10	5	85
(n = 20)	A ± SD	–	–	11.3 ± 14.8	1.65 ± 5.94	0.05 ± 0.22	3.9 ± 3.04
	I			22.6	16.5	1	4.6
Locality 4	P (%)			5		5	50
(n = 20)	A ± SD	–	–	2.75 ± 12.3	–	0.05 ± 0.22	2.35 ± 3.25
	I			55		1	4.7
North Corsica							
Locality 5	P (%)			45		25	45
(n = 20)	A ± SD	–	–	11.3 ± 17.77	–	0.95 ± 2.35	1.4 ± 2.5
	I			25.11		3.8	3.11
Locality 6	P (%)	5		30	35	30	85
(n = 20)	A ± SD	0.55 ± 2.04	–	7.15 ± 14.1	60.9 ± 120.3	0.6 ± 1.23	15.15 ± 55.36
	I	2.00		23.83	174.00	2.00	17.83
Locality 7	P (%)	–	5	30	25	30	80
(n = 20)	A ± SD		0.2 ± 0.9	1.6 ± 3.6	22.65 ± 68.95	2.3 ± 4.18	10 ± 13.53
	I		4.00	5.33	90.6	7.66	12.5
Locality 8	P (%)		5	40	10	25	80
(n = 20)	A ± SD	–	1.0 ± 0.45	18.3 ± 36.66	7.5 ± 24.47	0.55 ± 1.57	3.9 ± 4.22
	I		2.00	45.75	75.00	2.2	4.875
	V/A	7706	3316	118,131	239,629	6596	80,206
	D	aggregated	aggregated	aggregated	aggregated	aggregated	aggregated
	k	0.010	0.016	0.152	0.0485	0.102	0.066

Dd – *Dicrocoelium dendriticum*, Eg – *Echinococcus granulosus*, Gu – *Globocephalus urosubulatus*, Msp – *Metastrongylus* sp., As –*Ascaris suum*, Mh – *Macracanthorhynchus hirudinaceus*; l – liver, i – intestine, lu – lungs.

(Goeze, 1782), three nematode species, *Ascaris suum* (Goeze, 1782), *Globocephalus urosubulatus* (Alessandrini, 1909) and *Metastrongylus* sp., and one species of Acanthocephala, *Macracanthorhynchus hirudinaceus* (Pallas, 1781).

Data on prevalence, abundance and intensity of the parasites of the wild boar in different areas of Corsica are listed in Table I. Additionally, the value for each variance/abundance ratio and the *k* value of the negative binomial are given for the whole sample, in order to evaluate the parasite distribution. Only distribution of parasites with high prevalence has been discussed.

Results presented in the Table I, show that prevalence (for the nematode, *G. urosubulatus*) is for most of the areas lower or equal to prevalence of acanthocephalan, *M. hirudinaceus*, except in the locality 1, where the tendency is clearly reversed.

Discussion

The parasitic fauna of wild boar in Corsica, is generally rather poor since only six species of helminths have been reported. This result is in agreement with our present-day knowledge on the fauna of the Mediterranean islands. In all cases, the insular communities are distinguished from their counterparts by a reduction in the number of parasitic species and in observed sometimes spectacular increase in the percentage of infestation (Fromont *et al.* 2001).

The trematode, *D. dendriticum* and the cestode, *E. granulosus*, have an aggregated distribution, i.e. they are regrouped (Combes 2001). Indeed, only four livers were parasitised, among the 58 analysed ones. These results must come from the weakness of samplings.

The distribution of nematode parasites is usually aggregated, i.e. the majority of worms are harboured by a small proportion of the host population (Boes *et al.* 2000). Our study shows that the distributions of *A. suum*, *Metastrongylus* sp. and *G. urosubulatus* in naturally infected wild boars in Corsica are also overdispersed. This indicates, that the majority of wild boars, harbour few or no worms, whereas a relatively few wild boars harbour the majority of the worms.

The analysis of the faunistic inventory shows that among the nematodes most often cited in the literature, only three were indexed at the time of our study. Indeed, only, *A. suum*, *G. urosubulatus* and *Metastrongylus* sp., seem to be present on the island. *G. urosubulatus* is found everywhere in Corsica.

In this survey, lower prevalence of *Metastrongylus* sp. according to various localities, (Table I) could be explained by the presence of different species of earthworms, which form part of the diet of wild boars and act as intermediate hosts for this nematode. Therefore, this could result in different prevalence of infection among *S. scrofa*. The age of the animal seems to influence the intensity of the infection.

The differences of prevalence of acanthocephalan *M. hirudinaceus* according to the various sectors of the island, could be explained by the presence and the variability in the number of cockchafers (*Melolontha* sp.), larvae of which constitute the intermediate host of this parasite (Bernard and Biesemans 1978). This hypothesis can be related to substrate type but also to the diversity of vegetables covering which characterise each sector. All these results, as well as the distribution of parasites in wild boar populations, reflect the existence in the behaviour of wild boars, of food strategies common to all the populations which will favour the transmission of parasites within any biotope (Humbert and Drouet 1990). Works published on the ethology of wild boars showed that there were traditional "feeding zones" used by these animals (Mauget 1984, Lescourret and Genard 1985). However, the quantitative differences of species, observed in the islands, are probably due to different adaptations of each helminth to the various biotic and abiotic factors specific to each island (Mas-Coma *et al.* 1987); in case of our study it was Corsica. Parasitic faunas of the insular ecosystems always differ significantly from their mainland counterparts.

Acknowledgements. Thanks are due to Dr. Jordi Miquel from Laboratory of Parasitology, Department of Microbiology and Sanitary Parasitology, University of Barcelona, for his contribution in the identification of parasite species.

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(Accepted February 15, 2005)