

## Prevalence and Study of the Bovine *Sarcocystis* Species in the Slaughterhouses of Rouiba (Algiers)

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### Abstract

In this present study, experimental infestations of the definitive hosts of cattle *Sarcocystis* were realized to identify the species existing in our regions. For that purpose, 200 g of a mixture of oesophagi and diaphragms infested by cysts of *Sarcocystis* were administered to 7 dogs, 2 cats and 2 Magot monkeys. Only dogs excreted oocysts and sporocysts of *Sarcocystis cruzii*, although cysts with thick wall were present in broyats.

**Keywords:** *Sarcocystis* sp; Cattle; Infestation; Dogs; Cats; Magot monkeys; Oesophagi; Diaphragm

### Introduction

The sarcosporidiosis is underestimated in Algeria. Although sporadic cases of human sarcosporidiosis were detected in hospitals, it is not a disease with compulsory statement [1]. In our slaughterhouses, our veterinarian colleagues during the inspection of the bovine carcasses, have not noticed cystic or myositis. Seen the absence of data concerning this parasitosis, we had introduced a preliminary study on the prevalency of the bovis sarcocystosis and identification of the *Sarcocystis* species [2]; the histology revealed strong prevalency of cysts with thin wall (*S. cruzii*) (85.8%), the rest corresponding to cysts with thick wall (25%) (*S. hominis* and/or *S. hirsuta*). The aim of our present study is to determine the exact importance of the zoonosis *Sarcocystis* species, by the realization of experimental infestations of the definitive hosts of the *Sarcocystis* cattle.

### Materials and Methods

#### Protocol of infestation of the definitive hosts

The samples of oesophagi and diaphragms used for the infestation were analyzed by the method of enzymatic digestion for searching bradyzoites then histology for the searching both types of cysts. The samples retained for our study (N° 101, 110, 111, 120, 121, 130, 161, and 170).

Samples constituted by a mixture of 200 g of 10 infected oesophagi and 10 infected diaphragms were used for the infestation of animals. All the infested animals were isolated in individual goals and distributed in 3 groups. The 1<sup>st</sup> group of 7 dogs (*Canis familiaris*), localized in different pound of Algiers having received before and during the experiment, a diet with milk bread, and several times, some cheese; the 2<sup>nd</sup> group of 2 domestic cats (*Felis catus*), living in the Veterinary graduate school of Algiers, with a diet with water, milk, cheese and with dry catfood and the 3<sup>rd</sup> group of 2 Magot monkeys (*Macaca sylvana*) property of the Zoological park of Algiers (Ben Aknoun), receiving a diet constituted by water, fruits and by fresh vegetables.

The choice of the monkeys savings is bound to the absence of human volunteers or the other definitive hosts for the *S. hominis* (the monkey rhesus (*Macaca mulatta*), the monkey cynmolgus (*Macaca fascicularis*) [3]. These last ones received 150 g from raw meat mixed with ½ bananas, ½ apples, some sugar and the aroma of banana. The whole is crushed well, homogenized and preserved at the cool. However, the monkeys ate only approximately 50 g of the prepared mixture, whereas dogs and cats

ingested 200 g of a mixture of pieces of oesophagi and diaphragm. We were not able to finalize the experiment with all the dogs because 3 of them had been shot down by the agents of the canine pound.

#### Search for sporocysts of *Sarcocystis* in the saddles of dogs, for cats and for the monkeys after infestation

All the animals underwent 2 controls coprologiques fortnight preceding their infestation to make sure that these last ones are not infested by *Sarcocystis*. After their infestation, 3 takings of saddles, in the 9<sup>e</sup>, 14<sup>e</sup> and 22<sup>e</sup> day post-infestations were realized.

Saddles were analyzed according to the method of qualitative concentration of flotation by using a dense solution of NaCl (d: 1, 12). The positive samples are translated by the presence of ookytes and/or sporocysts of *Sarcocystis*. The size of sporocysts (Length × Width) is measured by means of an eye micrometer.

### Results

On the totality of the infested animals, only dogs excreted oocysts of *Sarcocystis* in their saddles. The optical microscopic examination revealed the presence of sporulated oocysts containing 2 sporocysts surrounded by a slender oocystale wall, of a length of 16,25-20 µm and a Width of 13,75-17,5 µm. Concerning cats as well as savings, although cysts with thick wall were present in samples intended for their infestations, the results obtained by their infestation showed negative (2). In most part of the cases, we observed sporocysts free of *Sarcocystis* cruzi of shape ellipsoïde containing a residual body and sporozoïtes 4. Sporocysts measured on average (15×10 µm, n 20) (Length × Width) (Figure 1).

### Discussion

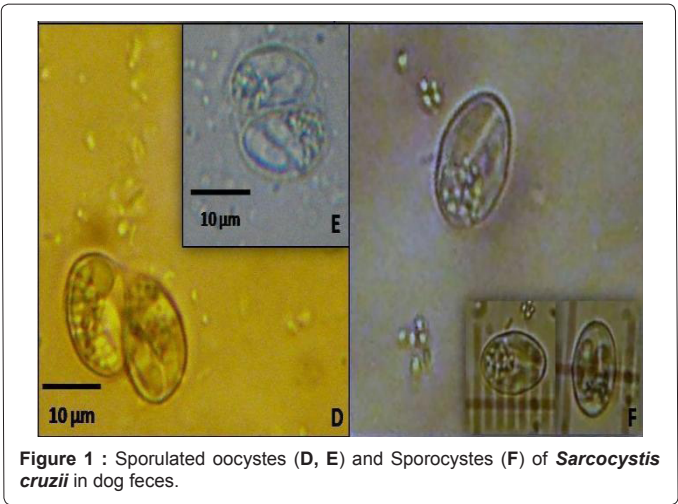
The elimination of sporulated oocysts or sporocysts of *Sarcocystis* by dogs in saddles, confirm the results of the histological analysis for

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Species / N° of animal	Sexe	Âge	Sample	N° of Sample
Dog 1	Femelle	Adult	Œsophagi	101 à 110
Dog 2	Femelle	Adult	Œsophagi	101 à 110
Dog 3	Mâle	Adult	Diaphragms	101 à 110
Dog 4	Mâle	2 months	Œsophagi	111 à 120
Dog 5	Femelle	2 months	Diaphragmes	111 à 120
Dog 6	Femelle	6 years	Œsophagi	161 à 170
Dog 7	Femelle	6 years	Diaphragms	161 à 170
Cat 1	Mâle	1 year	Œsophagi	121 à 130
Cat 2	Femelle	1 year	Diaphragms	121 à 130
monkey Magot 1	Mâle	7 years	Œsophagi	161 à 170
monkey Magot 2	Femelle	5 years	Diaphragms	161 à 170

**Table 1 :** Définitive hosts infested with œsophagi and diaphragms contaminated with *Sarcocystis* cysts.

Species / N° of Animal	N° of Sample	Coprologie	Histologie	
			Kystes with thin wall	Kystes with thick wall
Dog 3	101-110	+	+	+
Dog 5		+	+	+
Dog 6	161 à 170	+	+	+
Dog 7		+	+	+
Monkey Magot 1	161 à 170	-	+	+
Monkey Magot 2		-	+	+
Cat 1	121 à 130	-	+	+
Cat 2		-	+	+

**Table 2:** Coprological and histological results of infested dogs, cats and monkeys.

the presence of *S. cruzi* [2]. Our results are similar to the other authors [4-6]. The negative coprologiques results to cats and savings, while cysts with thick wall were present in samples, suggest several hypotheses. Let be a low concentration of cysts with thick wall in samples confirmed by the results of histological revealing averages of cysts with thick wall of the order of 0,8 cysts for cats, 0,2 cysts for the saving n°1 and 0,5 cysts for the saving n°2 (Table 1). These averages seem very low with regard to the averages of cysts with walls thin in 10 samples (3, 2 cysts for the dog n°6 and 1, 1 for the dog n°7). The same hypothesis is put at savings N 1 and N 2, which had not ingested the totality of the distributed sample (Table 2). Indeed, a study of experimental infestation led on two monkeys [5], revealed one excretion in their saddles of the sporocysts of *S. hominis* after an ingestion of 10 fresh cysts with thick wall, mixed

with the food for animals. Generally, we needs enough raised number of cysts to be able to establishing a rather strong contagious dose, which can produce sporocysts in detectable numbers [7]. The second hypothesis is the age of the cysts which is a factor to be considered [7]. Indeed, the younger cysts or immature containing métrocytes are not infestants for the definitive host. The specificity of the species of *Sarcocystis* to their definitive hosts is confirmed in our study, by the absence of excretion of oocysts of *S. cruzi* in the saddles of cats and in the saddles of savings. The last hypothesis which would explain the negative results to cats and monkeys savings would be of in the low staff used for our infestations (number 2). Indeed, seen the average of cysts with very low thick wall, and to avoid the individual reactions, it would have been necessary to infest a largest number (minimum 10) with cats and with monkeys to increase our chances to make a success of our infestations.

Conclusion

In Algeria, the existence of three species of *Sarcocystis* affecting the cattle, the *S. cruzii*, *S. hirsuta* and *S. hominis* was already reported by Nedjari [7] in a serological study. In our present study, the experimental transmission of *Sarcocystis* only succeeded with dogs, so confirming, and the presence of *S. cruzi* in the infested bovine samples [8]. To determine prevalence of each of the other species, we intend to make a study of cysts with thick wall in electronic microscopy and to infest a more important staff of cats and monkeys [1].

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